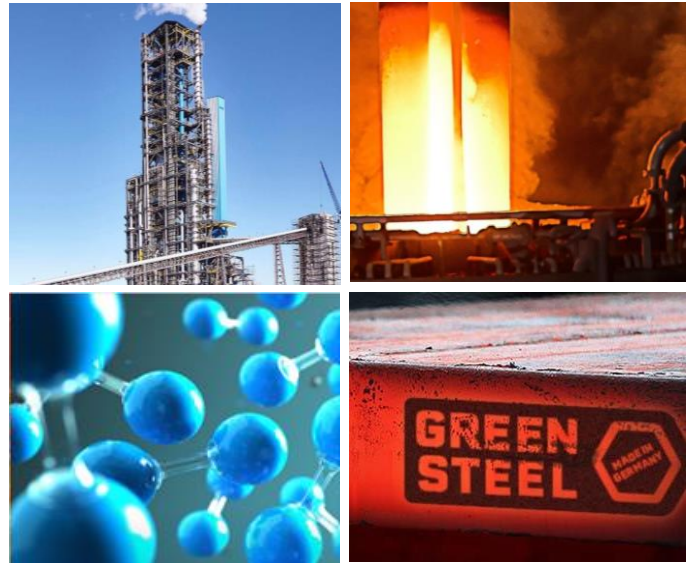


Seminar

Hydrogen-based transformation of the steel industry

Technology and challenges of CO₂ neutral steelmaking

5 - 7 November 2024
Düsseldorf, Germany



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SEMINAR'S TARGET

Europe wants to become climate-neutral by 2050 and already save 55% of greenhouse gases by 2030 compared to 1990. The EU Climate Act sets these targets in law for the first time. For large parts of the European steel industry, these targets mean a far-reaching technological change. The technical solution has been found and is: Replace coal with hydrogen! But how does the new process route work in detail? What are the challenges? In three days, the seminar will provide a technical overview of the biggest technology change in the steel industry for decades.

ORGANISATION / REGISTRATION

Steel Academy / Steel Institute VDEh

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REGISTRATION FEE

EUR 1.090,00* seminar registration fee VAT-free plus
EUR 318,00 conference package (total amount 1.408,00 EUR)

EUR 1.290,00 registration fee VAT-free plus
EUR 318,00 conference package (total amount 1.608,00 EUR)

* for employees of member companies and individual members of the Steel Institute VDEh. Scientific staff of universities gets a 50 % off.

+++ as part of the VDEh young talents promotion also young engineers (up to 35 years) of member companies receive a 50% discount +++

The conference package includes food and beverages during the seminar (incl. 19 % VAT). This fee does not include the hotel room. A free with-drawal from the seminar is possible until two weeks prior to the start. Then, 25% of the seminar fee must be paid. The total registration amount will be charged for no show or cancellation from the first day of the event. The participant has to bear the cancellation costs of the seminar hotel.

CONTENT

- Ways to CO₂ neutral steel production
- Iron ores for (hydrogen-based) direct reduction
- Technologies of current direct reduction concepts
- Reduction technologies of iron ore fines with hydrogen
- Green ironmaking with hydrogen and ammonia
- Hydrogen as a challenging atmosphere for refractories
- Electric arc furnace technology - AC and DC
- Technology of the OBF (Smelter)
- Melting of DRI and HBI in the EAF
- Future importance of steel scrap
- Project SALCOS: Steelmaking route DR - EAF
- Project tkH2Steel: Steelmaking route DR - OBF - Converter
- Slags of CO₂ neutral steel production
- Hydrogen production, transport and storage – case study Germany
- Green power production and availability
- Decarbonisation of downstream processes – H₂ burner

TECHNICAL CHAIRMAN

Jochen Schlüter

VENUE

NH Düsseldorf City North

Münsterstr. 230-238

40470 Düsseldorf, Germany

<https://www.nh-hotels.com/en/hotel/nh-duesseldorf-city-nord>

The Steel Academy will automatically make a room booking for the participants at the NH Düsseldorf City North from 4-7 November 2024 for a special rate of EUR 119,00 per night incl. breakfast. The hotel room bill will be settled by you upon departure. Please advise at your seminar registration, if you do not need a reservation or whether you would like to stay longer in the hotel.

Recommendation: The seminar ends on Thursday afternoon – take the chance to spend the weekend in Düsseldorf! There is a beautiful old town with several famous brewery pubs!

PROGRAMME

Tuesday, 5 November 2024

- 09.00 **Introduction:** Peter Schmieding / Jochen Schlüter
- 09.45 **Ways to a CO₂ neutral steel production**
Hans Bodo Längen / Peter Schmöle
EU requirements / CO₂ emissions / Smart Carbon Usage / Carbon Direct Avoidance / Development of direct reduction
- 11.00 coffee break
- 11.30 **Technology of current direct reduction concepts**
Jochen Schlüter
Konstruktion und design / Reduction with hydrogen / Concept Midrex / Concept HyL/Energiron
- 13.00 lunch break
- 14.15 **Iron ores for (hydrogen based) direct reduction**
Rénard Chaigneau
Iron ore pellets are the current raw material for direct reduction. Also for efficient hydrogen-based reduction??
- 15.30 coffee break
- 16.00 **Reduction technologies of iron ore fines with H₂**
Johannes Schenk
Fluidized bed based direct reduction / Plasma smelting reduction
- 17.00 **H₂ as a challenging atmosphere for refractories**
Jens Sperber
Role of OBF in decarbonization / OBF versus EAF / OBF types: circular and rectangular
- 18.00 **End of 1st day => 19.00 common dinner**

Wednesday, 6 November 2024

- 09.00 **Electric arc furnace technology – AC / DC**
Klaus Krüger
Historical development / construction / Process engineering of the direct current and three-phase arc furnace
=> **Excursus: EAF and OBF power supply**
- 10.45 coffee break
- 11.15 **Technology of the OBF / Smelter**
Ralf Nörthemann
Role of the smelter/OBF in decarbonisation / Smelter/OBF versus EAF / Smelter types: circular and rectangular

- 12.00 **Melting of DRI and HBI in the EAF**
Markus Abel
DRI- and HBI-production and transport / Operation with the input of DRI / Equipment design for use of DRI
- 13:15 lunch break
- 14.30 **The future importance of steel scrap**
Klaus Krüger
Recycling / Scrap quantities and qualities / Scrap availability / Tramp elements / Significance in the future
- 15.30 coffee break
- 16.00 **SALCOS: Process route DR – EAF**
Johannes Höffgen
- 16.45 **tkH2Steel: Process route DR – Smelter – Converter**
Nils Jäger
- 17.30 **Open discussion on transformation challenges**
- 18.00 **End of 2nd day => 19.00 common dinner**

Thursday, 7 November 2024

- 09.00 **Slags of CO₂ neutral steel production**
David Algermissen
Problem of slag quantity in EAF / Slags in the oxidizing EAF and the reducing OBF / Quality & use of slags
- 10.00 coffee break
- 10.30 **Hydrogen production, storage and transport – case study Germany**
Karsten Pinkwart
Infrastructure concepts for H₂ and electricity / Differences between the processes / Hydrogen vs. oxygen / H₂ distribution
- 12.30 lunch break
- 13.30 **Green power production and availability**
Minias Höfinghoff
Energy market and economy / Energy production and green energy within the framework of the sustainability goals
- 14.15 **Decarbonisation of downstream processes – H₂ burner**
Nico Schmitz
Requirements / Safety engineering / Control of burner systems / Influences on furnace operation / NO_x emissions
- 15.00 **End of seminar**

SPEAKERS Markus Abel, tripleS ■ Dr.-Ing. David Algermissen, FEhS Institut für Baustoff-Forschung ■ Dr. ir. Rénard Chaigneau, Baffinland Iron Mines Europe B.V. ■ Johannes Höffgen, Salzgitter Flachstahl GmbH ■ Minias Höfinghoff, ECG Energy Consulting ■ Dr. Nils Jäger, thyssenkrupp Steel Europe ■ Prof. Dr.-Ing. Klaus Krüger, Engineering office Klaus Krüger ■ Dr.-Ing. Hans Bodo Längen, Neuss / Prof. Dr.-Ing. Peter Schmöle, Dortmund ■ Ralf Nörthemann, SMS group ■ Prof. Dr. rer. nat. Karsten Pinkwart, University of Karlsruhe ■ Prof. Dr.-Ing. Johannes Schenk, Montanuniversität Leoben ■ Jochen Schlüter, Dortmund ■ Jens Sperber, Steuler KCH-GmbH ■ Dr.-Ing. Nico Schmitz, RWTH Aachen

Organisation: Peter Schmieding, Steel Academy, Steel Institute VDEh