Seminar

Hydrogen-based transformation of the steel industry

Technology and challenges of CO_2 neutral steelmaking

1 - 3 April 2025
Düsseldorf, Germany

©VDEh, Primetals, WV Stahl

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
Mr Peter Schmieding
Sohnstraße 65
40237 Düsseldorf
Fon +49 (0)211 6707-458
training@vdeh.de / www.steel-academy.com

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 30 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 CO_2 neutral steel production
- Iron ores for (hydrogen-based) direct reduction
- Technologies of current direct reduction concepts
- Reduction technologies of iron ore fines with hydrogen
- Hydrogen as a challenging atmosphere for refractories
- Electric arc furnace technology - AC and DC
- Technology of the OBF (so called 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 CO_2 neutral steel production
- Hydrogen production, transport and storage – case study Germany
- 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

If The Steel Academy will automatically make a room booking for the participants at the NH Düsseldorf City North from 31 March to 3 April 2025 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, 1 April 2025

09.00 **Introduction:** Peter Schmieding / Jochen Schlüter

09.45 **Ways to a CO_2 neutral steel production**
Hans Bodo Lüngen / 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
Construktion 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 H_2**
Johannes Schenk
Fluidized bed based direct reduction / Plasma smelting reduction

17.00 **H_2 as a challenging atmosphere for refractories**
Jens Sperber
Lining concepts of DR systems: reduction gas, lining, size comparison / Gas permeability and pore size distribution of refractory materials / HIRON materials

18.00 **End of 1st day** => 19.00 common dinner

Wednesday, 2 April 2025

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**
Rolf Degel
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, 3 April 2025

09.00 **Slags of CO_2 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 **Decarbonisation of downstream processes – H2 burner**
Nico Schmitz
Requirements / Safety engineering / Control of burner systems / Influences on furnace operation / NOx emissions

14.30 **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. ■ Dr. Rolf Degel, SMS group ■ Johannes Höffgen, Salzgitter Flachstahl GmbH ■ Dr. Nils Jäger, thyssenkrupp Steel Europe ■ Prof. Dr.-Ing. Klaus Krüger, Engineering office Passion Steel ■ Dr.-Ing. Hans Bodo Lüngen, Neuss / Prof. Dr.-Ing. Peter Schmöle, Dortmund ■ 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