Online Registration is open

The Focus Group "**Low Carbon and Energy Efficiency**" of **ESTEP** is pleased to announce the

H2GreenSteel Web-Workshop

Hydrogen route for a green steel making process

Overview, state of the art, recent developments and future trends

7th, 21st, 28th MAY – 11th JUNE 2021

7th May 2021 - Opening and Session I: Low carbon Hydrogen production and supply chain

21st May 2021 - Session II - Part I: Hydrogen metallurgy and related up/down streams processes issues

28th May 2021 - Session II - Part II: Hydrogen metallurgy and related up/down streams processes issues

11th June 2021 - Session III: Norm and Standards relevant for Hydrogen application in steelworks & Session IV: Hydrogen safety, availability and market and related legislation and social impact

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31st July 2021 - Deadline for submitting articles, which will be peer reviewed to be published in a special issue of the Journal Matériaux et Techniques (EDP Sciences, indexed in SCOPUS, CrossRef, ESCI WoS and others), which will be dedicated to the Workshop

H2GREENSTEEL
WEB-WORKSHOP

Background

Carbon neutrality of steel sector is the main topic of the Clean Steel Partnership fully in line with the European Green Deal. Carbon Direct Avoidance is one fundamental CO_2 mitigation pathway. Steel production based on Hydrogen is one of the key factors to improve the green footprint of steel industry; it is strictly linked to low carbon H_2 production, norm and standardisation. The synergic use of low carbon H_2 instead other fossil fuels in both routes, Blast Furnace (BF) - Basic Oxygen Furnace (BOF), and Direct Reduction (DR) - EAF, and the complementary role of these routes can significantly contribute to the decrease of the GHG overall emissions.

The Aims

The four-sessions workshop is dedicated to key players of the transition towards a green steel production based on the use of Hydrogen, such as steel manufacturers, Hydrogen producers, solutions providers, academic, research institutes, policy makers.
The aims of the workshop are included in the following three points

- Providing an overview of the state of the art, best available technologies, economic, social and legislation aspects related to Hydrogen exploitation in the steel industry.
- Highlighting existing issues to be addressed for the acceleration of Hydrogen application in the steel sector.
- Providing elements based on shared experiences to solve the existing issues and to identify main key aspects to be addressed in future R&D&I projects.

Scientific Committee

- Ismael Matino (Scuola Superiore Sant'Anna)
- Valentina Colla (Scuola Superiore Sant'Anna)
- Fabrice Del Corso (Air Liquide)
- Filippo Cirilli (RINA-CSM)
- Marta Guzzon (Tenova)
- Johannes Schenk (Montanuniversität Leoben and K1-MET)
- Hanspeter Ofner (Primetals)
- Jan van der Stel (Tata Steel)

Organizing Committee

- Ismael Matino (Scuola Superiore Sant'Anna)
- Filippo Cirilli (RINA-CSM)
- Delphine Snaet (ESTEP)

Participation fee

- Free for speaker in the related session
- 50 € per person for 1 session
- 150 € per person for all 4 sessions

Student fee (all 4 sessions)

- 60 € per student (only for first 30 registered students – further students can participate to the workshop paying the standard fee - the student status, i.e. bachelor, master and PhD, must be certified); a certificate of attendance will be released to all the students.

Company fees (all 4 sessions)

- 250 € for 2 persons
- 300 € for 3 persons
- 350 € for >3 persons (max 25)

Fee is used by ESTEP for workshop organization as well as generation and provision of the proceedings and related publications.

Topics

1. *Low carbon Hydrogen production and supply chain*

The topic is focused on the "low carbon" Hydrogen production and supply chain technologies. It includes state of the art comprising both high TRLs (8 – 9) and low TRLs (3 – 7) technologies. Contributions will focus on all stages of the supply chain including but not limited to:

- production including and not limited to Partial oxidation and Steam Methane reforming with CCS and/or biomass, water electrolysis with "low-carbon" electricity, extraction from off-gases;
- storage under gaseous, liquid forms but also by intermediate molecules synthesis like ammonia or methanol;
- underground storages in caverns;
- transportation by road, railways, boat, pipelines, including mix use of natural gas pipelines;
- associated economic and environmental assessments for each technology can also be included when TRL are high enough.

2. *Hydrogen metallurgy and related up/down streams processes issues*

The topic mainly concerns cutting and leading edge developments of hydrogen metallurgy and related technologies (both existing or innovative and alternative ones) as well as of further possible uses of Hydrogen in the steelworks. In addition, contributions will also discuss the issues derived from Hydrogen introduction in up and down streams processes and to propose solutions that can improve Hydrogen utilization with respect to other fossil fuels.

3. *Norm and Standards relevant for Hydrogen application in steelworks*

The spread use of Hydrogen in steel shops dictates the definition of new norms and standards to regulate and provide a guidance/compliance for a functional Hydrogen exploitation. Therefore, proposal of norms and standards to be introduced as well as sharing of experience considering other industries are included in the contributions.

4. *Hydrogen safety, availability and market, and related legislation and social impact*

The increasing exploitation of Hydrogen in steelmaking industry poses it in a competitive position with respect to other Hydrogen users (e.g. industries or the transport sector). Furthermore, safety issues and lack of Hydrogen related legislation can hamper its use, despite of the possible benefits in terms of environmental and social effects. Contributions will focus on the availability of natural resources to produce Hydrogen as well as on the creation of a dedicated market for Hydrogen-intensive industries, on the requirements in terms of safety and policy and on the impact that an extensive use of Hydrogen in steel sector can create in the society.

Paper Submission

It is possible to submit articles, which will be peer reviewed to be published in a special issue of the Journal Matériaux et Techniques (EDP Sciences, indexed in SCOPUS, CrossRef, ESCI WoS and others), which will be dedicated to the Workshop. The deadline for paper submission is the 31st of July, 2021.

Information and Contacts

For information and subscriptions, contact the ESTEP Secretariat, Mrs. Delphine Snaet - D.Snaet@estep.eu

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H2GREENSTEEL WEB-WORKSHOP

Programme

Day 1 – 07.05.2021 – Web-Workshop opening and Session I: Low carbon Hydrogen production and supply chain			
Time	**Speaker**	**Speaker Organization**	**Presentation**
09:00	Ismael Matino (*Session Chairman*)	Scuola Sup. Sant'Anna	Welcome and introduction
09:10	Klaus Peters	ESTEP SG	Opening Lecture
09:40	Jane Amilhat	European Commission, DG RTD C3	Opening Lecture
10:10	Hermann Wolfmeir	voestalpine	H2FUTURE Green Hydrogen
10:30	Susanne Nævermo-Sand Geir Magnor Brekke	CELSA Nordic Statkraft	Development of a complete value chain for green hydrogen for industrial use in a high-temperature steel process in the northern part of Norway
10:50	*Break*		
11:00	Mike Grant	Air Liquide	**Keynote Lecture:** Tying it all Together - Hydrogen Supply and Use for a Carbon Neutral Steel Industry
11:30	Nils Jäger	ThyssenKrupp	Comprehensive view of sustainable hydrogen production routes for green steelmaking
11:50	Andrea Lanari Stefano Magnani	SMS Group Paul Wurth Italia S.p.A.	Outlook into the Hydrogen cycle in EAF Steelmaking
12:10	All		Plenary discussion with speakers
12:40	Ismael Matino (*Session Chairman*)	Scuola Sup. Sant'Anna	Closure of the session

Day 2 – 21.05.2021 – Session II - Part I: Hydrogen metallurgy and related up/down streams processes issues			
Time	**Speaker**	**Speaker Organization**	**Presentation**
09:00	Valentina Colla (Session Chairman)	Scuola Sup. Sant'Anna	Welcome and introduction
09:10	Thomas Bürgler	voestalpine	**Keynote Lecture:** Developments and trends in green steelmaking at voestalpine
09:40	Fabrice Patisson	Université de Lorraine - IJL	Hydrogen steelmaking, part 1: physical chemistry and process metallurgy
10:00	Jean Pierre Birat	IF Steelman	Hydrogen Steelmaking, part 2: competition with other zero-carbon steelmaking solutions and geopolitical issues
10:20	Ismael Matino	Scuola Sup. Sant'Anna	Hydrogen role in the valorisation of integrated steelworks process off-gases through methane and methanol synthesis
10:40	*Break*		
10:50	Axel Sormann	K1-MET GmbH	Hydrogen Plasma Smelting Reduction – Carbon-free steelmaking
11:10	Ahmed Abdeirahim	Oulu University	Influence of H_2-H_2O content on the reduction of acid iron ore pellets in a CO-CO_2-N_2 reducing atmosphere
11:30	Umberto Zanusso Irene Luzzo	SMS Group Rina	Development and testing of Flameless burner fed by NG/H_2 mix
11:50	Alessandro Della Rocca	Tenova	Rolling Mill decarbonisation: Tenova SmartBurners with 100% Hydrogen
12:10	All		Plenary discussion with speakers
12:40	Valentina Colla (Session Chairman)	Scuola Sup. Sant'Anna	Closure of the session

Day 3 – 28.05.2021 – Session II - Part II: Hydrogen metallurgy and related up/down streams processes issues			
Time	**Speaker**	**Speaker Organization**	**Presentation**
09:00	Filippo Cirilli (Session Chairman)	Rina	Welcome and introduction
09:10	Alexander Redenius	Salzgitter	**Keynote Lecture:** Green Steelmaking 2.0 - SALCOS + ENERGIRON
09:40	Henrik Saxen	Abo Akademi University	Numerical Analysis of a Shaft Furnace for Hydrogen Reduction of Iron Oxide Pellets
10:00	Guido Jochler	Rina	Effects of H_2 combustion on scale growth and steel surface quality in reheating furnaces
10:20	Paolo Stagnoli	Tenova	The DR-OSBF route for production of Virgin Iron Units
10:40	*Break*		
10:50	Robert Millner	Primetals	Hydrogen Use in a Midrex Direct Reduction Plant
11:10	Joachim von Scheele	Linde Technology	Technologies for Use of Hydrogen in Melting, Heating and Reheating
11:30	Valentina Colla	Scuola Sup. Sant'Anna	Green Hydrogen for decreasing the fossil fuels exploitation in electric steelmaking route: one of the identified priority intervention areas of the ESTEP roadmap for an improved EAF scrap route
11:50	Amaia Sasiain Conde	K1-MET GmbH	Greening the steel industry with hydrogen
12:10	All		Plenary discussion with speakers
12:40	Filippo Cirilli (Session Chairman)	Rina	Closure of the session

Day 4 – 11.06.2021 – Session III: Norm and Standards relevant for Hydrogen application in steelworks & Session IV: Hydrogen safety, availability and market and related legislation and social impact			
Time	**Speaker**	**Speaker Organization**	**Presentation**
09:00	Ismael Matino (Session Chairman)	Scuola Sup. Sant'Anna	Welcome and introduction
09:10	Renzo Valentini	University of Pisa	**Keynote Lecture:** Materials safety with respect to hydrogen-induced problems
09:40	Irene Luzzo Alessio Gambato	Rina Snam Rete Gas	Feasibility study for the utilization of natural gas and hydrogen blends on industrial furnaces
10:00	Jean-Claude Bidaut	John Cockerill	Green Hydrogen for Steel Processing
10:20	*Break*		
10:30	Aidin Heidari	University of Oulu	A Review on Kinetics of Iron Ore Reduction by Hydrogen
10:50	Abninav Bhaskar	University of Stavanger	Hydrogen Direct Reduced Iron and Steel Production in Norway with Grid-connected Electrolysers for Hydrogen production
11:10	Antonello Di Donato	Rina	Hydrogen demand and feasibility for the Italian electrical steel industry
11:30	All		Plenary discussion with speakers
12:00	Ismael Matino (Session Chairman)	Scuola Sup. Sant'Anna	Closure of the workshop