



H2FUTURE

Green Hydrogen

D10.5: Yearly summary of meetings with the steel industry community in EU28 and beyond

Funded by



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1 Introduction

1.1 Purpose of Work Package 10.5:

The purpose of Task 10.5 is to provide yearly summary from voestalpine and K1-MET of the meetings with steel sector in the EU28 and beyond.

The major communication goals and messages were:

- Hydrogen is the key enabler for deep decarbonization of the sector.
- Raise stakeholder awareness regarding the need for renewable energies and the future demand for green hydrogen.
- In steel production, the basic prerequisite is the continuous availability of electricity or hydrogen 24 hours a day, 7 days a week.
- Only mature electrolysis technologies can be scaled up to the GW range.
- Transformation of the energy system is a prerequisite for decarbonisation.
- Integration of PEM electrolysis in industrial network as primary and secondary frequency reserve

The communication measures were planned based on existing events and communication activities of the segment.

Due to the COVID-19 Pandemic in 2020/ 2021 most of the meetings in 2020 and 2021 were held online due to travel restrictions.

2 Overview activities

voestalpine has communicated H2FUTURE at various events with the steel industry and also other industry sectors over the last years.

In addition to official appointments and events, a multitude of communication opportunities arose from visits by a wide variety of companies, suppliers, customers, universities and interest groups to the H2FUTURE plant at the Linz site.

In the course of the press conferences for the ground-breaking ceremony for the construction of the plant in April 2018 as well as for the commissioning in November 2019, special video material was produced which was subsequently also used for presentations and communication activities by voestalpine.

2018

- <https://www.youtube.com/watch?v=t-ZnNOrAuT8>
- <https://www.youtube.com/watch?v=gdrKcp02eEM>
- <https://www.youtube.com/watch?v=7MWUO0-YFa8>

2019

- <https://www.youtube.com/watch?v=MrLw8TpKBt8>
- https://www.youtube.com/watch?v=0hzZXH_YdEY

and material from the H2FUTURE Homepage.

2.1 Communication activities 2017

2.1.1 Worldsteel meeting Global Technology Innovation Expert Group 2017 in Memphis Tennessee USA (24.04.)

worldsteel is one of the largest and most dynamic industry associations in the world, with members in every major steel-producing country. worldsteel represents steel producers, national and regional steel industry associations, and steel research institutes. Members represent around 85% of global steel production. worldsteel is active in key areas of interest to the steel industry, the CO₂ Breakthrough programme is one of the key pillars. In the course of the regular Global Technology Innovation Expert Group Meeting H2FUTURE was presented as a novel project to the international iron&steel community. Representatives of ArcelorMittal, POSCO, SSAB, BaoSteel, China Steel Corporation, Tata Steel, HBIS, and NUCOR were present.

2.1.2 European Steel Technology and Application Days 2017 in Vienna (26. and 27.6.)

The European Steel Technology and Application Days, organized by the ASMET took place from 26th June to 29th June 2017 at the Austria Center Vienna in Vienna, Austria. The conference covered areas like ironmaking, steelmaking, rolling, steel materials and their application, surface technologies and environmental and energy. The latest developments and trends in steel production were reported in 11 plenary lectures and over 400 technical presentations, voestalpine contributed with two presentations in the field of decarbonisation including H2FUTURE, one given by CEO Dr. Wolfgang Eder.

2.1.3 CSR Tag Linz (11.10.)

Around 250 representatives from business and civil society recently discussed the importance of strategic partnerships for achieving the global Sustainable Development Goals (SDGs) in Linz. The annual congress organised by respACT is one of the most important Austrian events on corporate social responsibility and sustainable development. voestalpine, together with Verbund, contributed to workshops presenting the H2FUTURE project.

2.1.4 worldsteel 50th anniversary General Assembly Brussels (16.10.)

In the course of the 50th anniversary meeting of worldsteel H2FUTURE and the potential of hydrogen for voestalpine was presented prior to the board meeting.

2.1.5 10th FCH JU Stakeholder Forum in Brussels, (22. 11.)

The Fuel Cells and Hydrogen Joint Undertaking (FCH JU) held the 10th edition of its Stakeholder Forum. voestalpine contributed a presentation "H2FUTURE Green hydrogen for steelmaking" to the second session entitled "HYDROGEN ECONOMY. Fuel cells and hydrogen: development and competitiveness"

2.2 Communication activities 2018

2.2.1 EU Seminar “European Steel: The Wind of Change” Brussels (31.01.)

The seminar was organized by DG RTD. In session I: Energy in Future Steelmaking a joint contribution of voestalpine and K1-MET “The hydrogen and electrical technological paths” was presented.

<https://www.youtube.com/watch?v=rRDclzmXWLO>

<https://www.youtube.com/watch?v=9Rd47O4hw7s>

The minutes of the event were published by the commission:

<https://op.europa.eu/en/publication-detail/-/publication/fb63033e-2671-11e8-ac73-01aa75ed71a1/language-en/format-PDF/source-71566609>

2.2.2 DBI Fachforum Wasserstoff und Brennstoffzellen Mainz (8.03.)

Session 2, Hydrogen use and Power-to-X: A presentation of H2FUTURE and hydrogen use in the steel industry was given by K1-MET.

2.2.3 Fachtagung „Sektorkopplung: Neue Optionen für die Energiewirtschaft“ (24.04.)

An important lever for the success of the energy transition is the increased coupling of the electricity, heat and transport sectors. Through this sector coupling, in interaction with smart grids, flexibilities and synergy effects in the integration of renewable energies can be used to design holistic energy systems. In the course of the conference the three sectors of electricity, heat and transport were highlighted and a look at the industry was taken. New technologies, regulatory challenges, and the importance of grids and storage completed the overview. A presentation of H2FUTURE and hydrogen use in the steel industry was given by K1-MET.

2.2.4 workshop "Green hydrogen opportunities in selected industrial processes" Brussels (26.06)

The Joint Research Centre (JRC) of the European Commission, with the support of the Fuel Cell Hydrogen 2 Joint Undertaking (FCH JU) organised a one-day workshop at the Centre Albert Borschette in Brussels. The main aim of this workshop was to assess the technical limitations and the potential benefits for the direct use of green hydrogen in three specific energy-intensive industrial processes: Ammonia production, Steelmaking, and Oil Refining. This focus was complemented by contributions regarding system modelling work relevant to the three technologies, guarantees of origin for green hydrogen and the European legislative context. In the course of voestalpine's contribution “Green Hydrogen Opportunities in Steelmaking” H2FUTURE was presented.

The full JRC technical report of the workshop may be found here:

<https://publications.jrc.ec.europa.eu/repository/handle/JRC114766>

2.2.5 Metallurgie im Wandel 4.0. 32. Aachener Stahlkolloquium, Aachen (13.09.)

The two-day event, consisting of lectures, poster and trade exhibition, took place in the Business & Event area of the Aachen Tivoli hosted by the University of Aachen. The approximately 200 visitors, among whom were students and university staff as well as participants from industry, used the two days for lively discussions about current research topics and visions for the future. In the course of voestalpine's contribution "Technology Development in Hydrogen Steelmaking" H2FUTURE was presented.

2.2.6 H2FUTURE at the High Level Energy Conference in Linz (17.09.)

Around 200 participants from all over Europe gathered for the High-Level Energy Conference: "Charge for Change: Innovative Technologies for Energy-Intensive Industries". This event was organised as part of the Austrian Presidency of the Council of the European Union, one day before the Informal Meeting of the Energy Ministers. As part of the High-Level Energy Conference, H2FUTURE was presented to the audience, including a site visit. The event was prepared by voestalpine and Verbund.



Miguel Arias Cañete, European Commissioner, Climate Action and Energy and other high-level guests visiting the H2FUTURE site at voestalpine Linz. (c) BMNT / Robert Strasser

The H2FUTURE project factsheet published for the event can be downloaded:

<https://www.h2future-project.eu/images/news/H2FUTUREshort-description.pdf>

More information on the High-Level Energy Event:

<https://www.eu2018.at/calendar-events/political-events/BMNT-2018-09-17-HL-Conference-Energy.html>



More information on the Hydrogen Initiative launched during 17.-18. September:

[https://www.eu2018.at/dam/jcr:9b0c0051-2894-4bc6-86ba-ea959dc82c0d/The%20Hydrogen%20Initiative%20\(not%20available%20in%20an%20accessible%20format\)%20\(EN\).pdf](https://www.eu2018.at/dam/jcr:9b0c0051-2894-4bc6-86ba-ea959dc82c0d/The%20Hydrogen%20Initiative%20(not%20available%20in%20an%20accessible%20format)%20(EN).pdf)

2.2.7 EUMICON 2018, European Mineral Resources Conference, Vienna (26.09.)

EUMICON is a networking platform for strategic discussion processes and technology transfer on the topic of mineral resources. The platform links public entities and institutions, domestic and international interest groups, the mineral resources industry as well as science and research. EUMICON addresses the topic along the entire value creation chain of mineral resources from extraction to treatment and refinement to their use in processing and production all the way to recycling.

One highlight of the conference was the presentation “H2FUTURE, Wasserstoff als Energieträger der Zukunft” given by the Head of Strategic Environmental Management of voestalpine AG.

https://www.eumicon.com/fileadmin/Pdf/programm_deutsch.pdf

2.2.8 22. Handelsblatt Tagung Energiewirtschaft Österreich (05.11.)

Topics of this event were Energy and Strategy & Management

<http://www.inform-you.de/Veranstaltung.aspx?code=P1200770>

During the Session „Dekarbonisierung des Wärmemarktes als vordringliches Ziel: Strategien, Projekte und Visionen“ voestalpine contributed a lecture „Power-to-X – Game Changer in der Energieversorgung? - Wie die Energiebewirtschaftung- der Zukunft gelingen kann.“ H2FUTURE was a major part of the presentation.

2.2.9 57th ExCo Meeting of IEA on Advanced Fuel Cells (6.11.)

The 57th Executive Committee Meeting of the International Energy Agency's (IEA) Technology Collaboration Programme on Advanced Fuel Cells (AFC TCP) was held at the Energie AG, Linz, Austria during November 06-08 2018. 20 participants were present, including members from Austria, China, Denmark, Finland, Germany, Italy, Japan, Korea, Spain and the US. voestalpine presented H2FUTURE project in detail to the hydrogen affine members of the IEA Committee.

2.2.10 Austrian Pavilion @COP24, Katowice (4.12.)

Austria was present at this COP with its own pavilion. Companies and initiatives presented and discussed their technologies, services and best practice models for climate protection, energy and the environment.

<https://www.klimafonds.gv.at/wp-content/uploads/sites/16/181129-full-programme-Austrian-pavilion-fin.pdf>

The official opening of the pavilion was followed by project presentations. voestalpine presented "H2FUTURE – Long Term Decarbonisation of the Steel Industry"

2.3 Communication activities 2019

2.3.1 IPHE Forum: Increasing the Role of Hydrogen and Fuel Cells in the Economy, Vienna (10.04.)

The International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), formed in 2003, is an international governmental partnership currently consisting of 21 member countries and the European Commission. In Session 2 Fuel Cells and Hydrogen in the Economy: Industry Perspectives leading companies from component and system suppliers, to infrastructure developers, and leading industrialists presented their vision and the actions necessary by industry and government to make a sound business case for FCH in the economy. voestalpine's Head of Strategic Environmental Management presented H2FUTURE in the course of this session.

2.3.2 EU Workshop - Electrolysis: features, capabilities and projections, Spain (23.05.)

The Aragon Hydrogen Foundation (FHa) organized the European conference "Electrolysis: characteristics, capacities and projections". The conference was able to promote and facilitate a first exchange of views on the integration of renewable electricity through the applications of water electrolysis technology. The joint event brought together the most relevant industry stakeholders, potential end users and technology developers to share knowledge. The event provided a forum to discuss the latest technological innovations. The debate allowed to share challenges and opportunities related to the production of hydrogen from the electrolysis of water.

2.3.3 Upper Austrian Hydrogen Forum - "OÖ Wasserstoffforum" (13.06.)

The Upper Austrian Hydrogen Forum explores the question of what role hydrogen will play in the future and in which areas renewable hydrogen can be used sensibly. The event provided information about hydrogen initiatives in Austria and current research projects. Possible areas of application for renewable hydrogen, from storage to mobility were discussed. In the course of this event H2FUTURE was presented.

2.3.4 METEC & 4th ESTAD Düsseldorf (24.- 28.06)

The fourth "European Steel Technology and Application Days" (ESTAD) conference took place in Düsseldorf from 24 to 28 June 2019, parallel to the world's largest metallurgy trade fair METEC. 1200 participants from 55 countries took part in ESTAD and exchanged views on current topics in steel production, application and development in a total of 129 sessions. The overarching themes were the digital transformation and climate-neutral steel production. voestalpine and K1-MET were well represented with a number of presentations including H2FUTURE as a milestone on the way to decarbonise steel production.

https://www.metec-estad2019.com/files/190611_metec-estad_programmflyer_a5g_web.pdf

2.3.5 AIST European Steel Forum 2019, Leoben (20.-25.10.)

The Association for Iron & Steel Technology (AIST) is a non-profit organization with 15,500 members from more than 70 countries. The European Steel Forum featured a two-day program to highlight important economic and technical issues for today's steel industry. voestalpine contributed a presentation entitled "Technology Development Hydrogen Steelmaking", including H2FUTURE as substantial part of the presentation.

A summary of the conference contributions can be found here:

https://www.aist.org/AIST/aist/AIST/Conferences_Exhibitions/Italy/ESF19-Recap.pdf

2.3.6 Press conference H2FUTURE: World's largest "green" hydrogen pilot facility successfully commences operation, Linz (11.11.)

After successful start of operation of H2FUTURE a press conference including a site visit with journalists was organized by voestalpine, Verbund and Siemens. Amongst the guests, Bart Biebuyck, Executive Director Fuel Cell Hydrogen Joint Undertaking was able to get a picture on site.

Press release:

<https://www.voestalpine.com/group/static/sites/group/.downloads/de/presse/2019-11-11-h2future-worlds-largest-green-hydrogen-pilot-facility-successfully-commences-operation.pdf>

Event video of the press conference

<https://www.youtube.com/watch?v=MrLw8TpKBt8>

2.4 Communication activities 2020

The year 2020 was marked by the COVID-19 pandemic. A large number of events were cancelled or postponed.

2.4.1 Participation in the symposium: CO₂-freie, nachhaltige Stahlherstellung und Wasserstofftechnologie, Leoben (05.02)

The symposium was organized as part of the SuSteel project. voestalpine conducted a presentation regarding the production of hydrogen with renewable energy

2.4.2 Article in Berg- und Huettemännische Monatshefte (BHM) (13.02.)

The article comprises results from the activities performed within WP9.

Sasiain, A., Rechberger, K., Spanlang, A., Kofler, I., Wolfmeir, H., Harris, C., Buegler, T., Green hydrogen as decarbonization element for the steel industry, Berg- und Huettemännische Monatshefte (BHM) 165 (5), pp. 232-236

2.4.3 Webinar RFCS project Low Carbon Future (24.03.)

K1-MET was project partner in the RFCS (Research Fund for Coal and Steel) project and contributed with results from the H2FUTURE project (WP 9). LowCarbonFuture (04/2018 – 03/2020) focused on the collection, valorisation and dissemination of information and results of European research projects concerning the pathways Carbon Direct Avoidance (CDA), process integration (PI) and Carbon Capture&Utilisation (CCU). As a result, a roadmap stating research needs, requirements and boundary conditions regarding a successful implementation was generated to guide the EU iron and steel industry towards a carbon-lean steel production. The webinar was a dissemination event to the entire EU Steel Community.

2.4.1 Article in steel research international (published 14.05.)

K1-MET and voestalpine published a scientific article in steel times international reflecting a part of the work done in WP9 of H2FUTURE: “Green Hydrogen-Based Direct Reduction for Low-Carbon Steelmaking“

<https://onlinelibrary.wiley.com/doi/full/10.1002/srin.202000110>

2.4.2 Article in Steel times international (September 2020 issue)

Special article in Steel times international (Vol. 44 No. 6) jointly with project partner Siemens Energy page 35/36

https://issuu.com/quartzbusinessmedia/docs/steel_times_international_september_2020?fr=sYzJlNzE1NTc0ODQ

2.4.3 AIST European Steel Forum (13-15.10.)

The European Steel Forum of Association for Iron & Steel Technology (AIST) was carried out as virtual event.

During the second day a session dedicated to CO₂-Free Steelmaking: Status and Further Developments took place: Steel producers have begun to lay the foundations on which a carbon-neutral industry will be built. As a number of efforts are based on a hydrogen direct reduction-electric arc furnace (EAF) model, the European Union's recent adoption of a hydrogen policy could quicken the pace of development. Attendees heard from several steel producers and shared updates on their own investments.

voestalpine contributed a presentation entitled "CO₂-free Steelmaking, Status and Further Development", including H2FUTURE as substantial part of the presentation.

Conference recap: https://www.aist.org/AIST/aist/AIST/Conferences_Exhibitions/Italy/ESF-20-Recap.pdf

2.4.1 SET Plan Virtual Conference 2020, Making the SET Plan fit for the EU Green Recovery (23-24.11.)

The European Strategic Energy Technology Plan (SET Plan) was established to accelerate the transformation of the European energy system and to bring new low-carbon energy technologies to market. It identifies research and innovation activities throughout the entire innovation chain. SET Plan conferences offer an opportunity for decision makers, researchers and stakeholders to get together and evaluate the progress being made towards achieving the SET Plan's goals. The 14th SET Plan Conference highlighted the possibilities that innovative energy technologies offer for promoting carbon neutrality. The focus of this conference was on the interplay between the different parts of the energy system, both on a technological level and other levels.

The 14th Strategic Energy Technology Plan conference was organized by the German Federal Ministry for Economic Affairs and Energy.

During Session 6: "Hydrogen: creating a clean fuel and feedstock supply chain" H2FUURE was presented by K1-MET.

The detailed program of the conference may be found here:

https://www.bmwi-registrierung.de/SETPlan2020/pdf/Detailprogramm_SET_Plan.pdf

press release:

<https://www.eu2020.de/blob/2419606/65a68e82a50eb62406d44f507e62a96c/set-plan-conference-2020-1588772599085---pressemitteilung-data.pdf>

2.5 Communication activities 2021

2.5.1 21. Österreichischer Klimatag "Clash of Cultures? Klimaforschung trifft Industrie!" (12.-13. 4)

The 21st Climate Day took place under the motto "Clash of Cultures? Climate Research Meets Industry!" took place online. The cooperation with the University of Leoben provided the ideal framework for this: As one of the Austrian technical universities, it combines, among other things, technology with science and the fields of raw materials science. Due to the special challenges posed by the COVID-19 pandemic, the Climate Day could not take place in 2020. Therefore, on the 21st Climate Day, the submissions from the call in autumn 2019, together with the submissions from the call in autumn 2020, formed the scientific program.

<https://ccca.ac.at/dialogformate/oesterreichischer-klimatag/klimatag-2020-2021/programm#c8347>

A keynote speech was given by Thomas Bürgler "Wasserstoff in der Stahlproduktion" where H2FUTURE was a substantial part of the presentation.

A summary of the event can be found here:

<https://ccca.ac.at/dialogformate/oesterreichischer-klimatag/nachlese-impressionen>

2.5.2 H2 Greensteel web-workshop: „Hydrogen route for a green steel making process” (7.5, 21.5, 28.5 & 11.6.)

The "H2GreenSteel Web-Workshop - Hydrogen route for a green steel making process - Overview, state of the art, recent developments and future trends" was organized by the Focus Group "Low Carbon and Energy Efficiency" of the "European Steel Technology Platform (ESTEP)".

The H2 Greensteel web-workshop is one of the key dissemination activities of voestalpine to reach the steel industry community in EU28 and beyond. Due to the Covid 19 pandemic situation, it was not possible to carry out an onsite conference, as initially foreseen.

Both voestalpine and K1-MET are ESTEP members and contributing to the Focus Group "Low Carbon and Energy Efficiency" and played a major role in making the event possible. Professor Schenk from University of Leoben and CTO of K1-MET became a member of the scientific committee and was involved in the content preparation.

<https://www.estep.eu/event-materials/h2-greensteel-web-workshop-hydrogen-route-for-a-green-steel-making-route>

The four-sessions workshop was 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 included the following 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.



voestalpine and K1-MET together contributed three presentations strongly related to the H2FUTURE project.

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, Head of Unit (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 - UL	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 Abdelrahim	Oulu University	Influence of H ₂ -H ₂ O 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

2.5.1 coming together (10.06.)

First virtual "coming together" of the professional association of engineering offices in Austria on climate change and decarbonisation.

The association is the professional representation of consulting engineers in Austria who offer their services in all technical and scientific fields of activity and is embedded in the Austrian chamber of commerce. In the course of this online event for the members of the association voestalpine gave a lecture on "Green hydrogen from Austria" with a content focus on H2FUTURE.

Program (German):

https://www.ingenieurbueros.at/media/Kwc_Basic_DownloadTag_Component/70-1457_942-content-6545-11871-downloadTag/default/4e61a5df/1618303168/coming-together-2021-einladung-pdf.pdf

2.5.2 VGB Kongress 2021, Essen (22.-23.09.)

In addition to Verbund, voestalpine also contributed to this congress. In the session: “The part of hydrogen in energy System of the Future”, voestalpine presented “The role of hydrogen in the steelmaking” including the H2FUTURE project.

Program:

https://www.de.endress.com/_storage/asset/9472071/storage/master/file/35758920/download/VGB-Kongress%20Einladung-2021%20FINAL%20web.pdf

2.5.3 Main excursion Metallurgy, University of Leoben (28.09.)

The graduating class of metallurgists from the University of Leoben travel to Linz every year for an excursion. Numerous lectures and current challenges are presented and discussed with the young academics. In the course of the excursion 2021, the H2FUTURE plant was visited and an in-depth lecture was held.

2.5.4 Hydrogen Iron&Steel making Forum 2021, Seoul (6-8.10.)

This Forum was hosted by POSCO, supported by worldsteel (voestalpine is a worldsteel member company) and held as combined hybrid event in Seoul, Korea, and online.

During the worldsteel’s 52nd Technology Committee meeting (TECO-52) in May 2021, POSCO initially proposed a coordinated approach among member companies to discuss carbon neutrality with hydrogen ironmaking technologies. Finally, the “Hydrogen Iron & Steel Making Forum 2021” was agreed in Seoul. At the Forum, global steelmakers and stakeholders hold in-depth discussions on three main agendas: 1) Policies to reduce greenhouse gases, 2) Hydrogen iron and steelmaking technology, and 3) Collaboration in hydrogen ironmaking technology development.

voestalpine contributed a presentation during the technology session entitled “CO₂ neutral steelmaking at voestalpine – Status and future developments” including H2FUTURE.

Program: <https://h2ironsteelforum.com/program/program.php>

2.5.5 AIST European Steel Forum (27-29.10.)

The European Steel Forum of Association for Iron & Steel Technology (AIST) was carried out as virtual event as in 2020.

Sessions included: CO₂-Free Steelmaking; CO₂-Free Energy; The Role of Iron Units in the Green Steel Transition; Successful Applications of AI and Innovation in Plant Design.

During the session “CO₂-Free Steelmaking: The Road Map” voestalpine presented H2FUTURE in the course of the overall presentation entitled “CO₂ neutral steelmaking”.

2.5.6 Industrielle Brennertechnik und nachhaltige Wärmeerzeugung, Linz, (03-04.11.)

Expert lectures, discussion platform and trade exhibition: Vulkan Verlag organised the expert forum "Industrial burner technology and sustainable heat generation" together with DBI Gas- und Umwelttechnik GmbH.

<https://prozesswaerme.net/wp-content/uploads/2021/09/Programm.pdf>

voestalpine contributed a lecture "Wasserstoff in der Stahlproduktion" including H2FUTURE. A tour of the voestalpine plant, including a visit to the hydrogen pilot plant, rounded off the symposium.

3 Summary

Generally speaking, the interest in the project has been overwhelming. In addition to the presentations at the relevant congresses and events, the site visits contribute to a strong dissemination of the project results. Since 2018, voestalpine has received countless requests for visits. Visitors from a wide range of sectors have been taken on tours of the plant, sometimes several times a week, and the rush continues to this day.

The circle of stakeholders is enormous and includes customers, suppliers, authorities, politicians, chambers, associations and academic interested parties. In addition, voestalpine supported the project partners Verbund and Siemens Energy with their requests for visits.

voestalpine made every effort to meet the enormous interest, presented the plant, held lectures on site and team members were available for discussions.