

MaxH2DR newsletter

May 2023

ISSUE n°1

Maximise H2 Enrichment in Direct Reduction Shaft furnaces

The project falls under the funding programme of Horizon Europe – Clean Steel Partnership.

The call topic is related to Carbon Direct Avoidance in steel: electricity and hydrogen-based metallurgy.

This project has received funding from the European Union under grant agreement n° 101058429

PROJECT KEY FACTS

Max [H2] DR

Maximise H2 Enrichment in Direct Reduction Shaft Furnaces



GRANT AGREEMENT ID : 101058429



Hydrogen-based direct reduction as groundbreaking technology for climate neutral steelmaking



DURATION 4 YEARS

Start: 01 June 2022
End: 31 May 2026



BUDGET

Total cost : 4 476 585 €



FUNDED UNDER

Horizon Europe Clean Steel Partnership

COORDINATOR

SSSA - Suola Superiore di Studi Universitari e di Perfezionamento Sant' Anna (IT)

CONSORTIUM

10 Partners from 7 EU countries



TARGET MAXH2DR

Raise the maturity of the relevant toolkits from TRL 5 to TRL 8

MaxH2DR in a nutshell

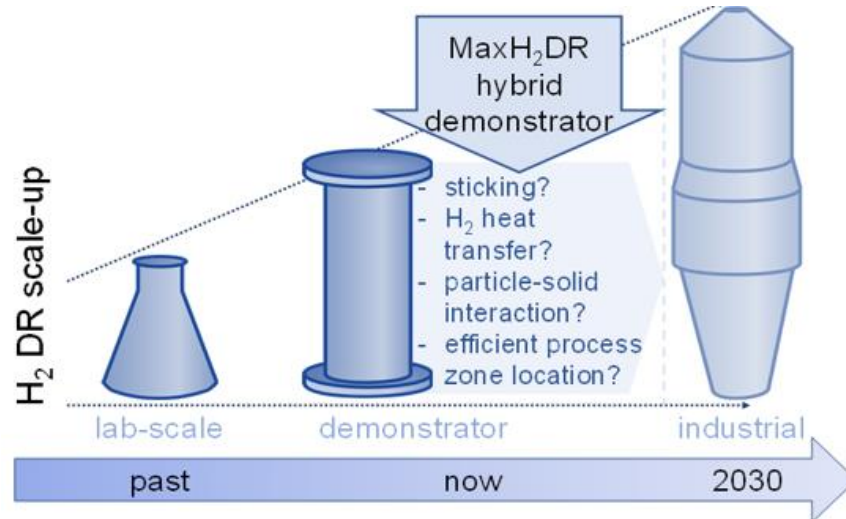
Several national demonstration projects on H₂ enriched direct reduction (DR) have recently been or will shortly be started. However, results of these projects have not been published (yet). One of the issues is that demonstration scale trials cannot simply be scaled-up to industrial level. Crucial aspects need to be taken into account such as flow distribution, uniformity of gas and burden, process stability and efficiency issues, etc. Trials in demonstration scale are also expensive and time consuming.

The project MaxH2DR is focussing on optimising hydrogen-based direct reduction as key decarbonisation technology for integrated steelworks. The project aims to provide missing knowledge and data of reduction processes. It will by this close the current knowledge gaps, which are hindering efficient scale-up. It will also deliver the tools needed for industrial implementation, process optimization, process integration and investment planning. Hence, these digital toolkits will support and strengthen digitisation and competitiveness of the European steel industry.

MaxH2DR is carried out over 48 months from June 2022 to May 2026. As the project is still in an early project phase, raw materials as iron ore (in the form of lump ore or pellets) and sinter are currently being investigated.

The main impact of MaxH₂DR is to significantly mitigate CO₂ emissions in the steel industry.

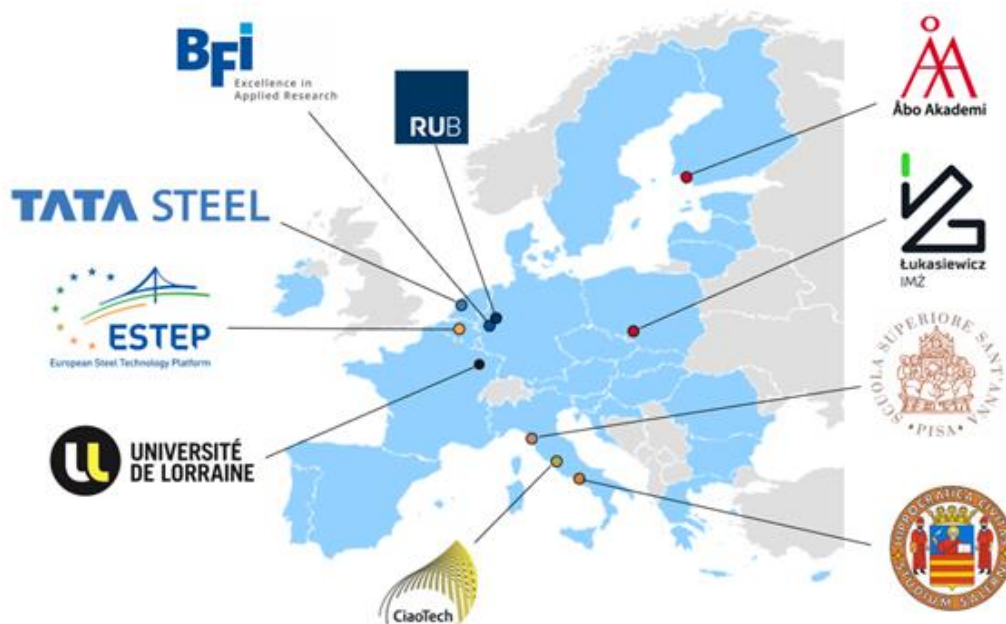
With a consortium of 10 partners, the project aims in the end to raise the technological maturity of relevant toolkits for hydrogen-based direct reduction from TRL 5 to TRL 8. Pilot plants will be located at BFI in Düsseldorf (Germany), at UniSa in Salerno (Italy), at Åbo Akademi in Turku (Finland) and at Tata Steel Europe in IJmuiden (Netherlands).



Consortium

The MaxH₂DR consortium consists of 10 specialised partners (1 steel producer, 3 research institutes, 5 universities and 1 technology platform) from 7 different EU countries.

The MaxH₂DR project is coordinated by SSSA (overall project coordination) and BFI (technical coordination).



Partners

- [Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna \(SSSA\)](#)
- [VDEh-Betriebsforschungsinstitut GmbH \(BFI\)](#)
- [Ruhr-University Bochum \(RUB\)](#)
- [Université de Lorraine \(UL\)](#)
- [Åbo Akademi University \(AAU\)](#)
- [Tata Steel](#)
- [University of Salerno \(UNISA\)](#)
- [Lukasiewicz Research Network – Institute for Ferrous Metallurgy \(GIT\)](#)
- [European Steel Technology Platform \(ESTEP\)](#)
- [CiaoTech \(PNO\)](#)

Expected outcomes

The main idea of the MaxH2DR project is the combination of physical demonstrators at different sites together with relevant digital toolkits into a so-called “hybrid demonstrator”.

The MaxH2DR project will result in two digital toolkits which are essential enablers for the planned demonstration of a Carbon Direct Avoidance (CDA) process chain demonstrator with more than 80% of CO₂ mitigation. This central result, new knowledge, new test rigs and recommendations will strongly support the implementation of the key technology H₂-enriched DR in European steelworks. They will also support the fast increase of the hydrogen content in the new industrial DR plants including the process optimisation. This head start of digital and technical levels will be essentially for the survival of the European steel industry during the inevitable decarbonisation process. Thus, the impact of MaxH2DR will be a significant mitigation of CO₂ emissions in the European steel industry.

These outcomes of MaxH2DR are perfectly aligned with the expectations within Horizon Europe, which are namely:

- Demonstrate CDA technologies with more than 80% CO₂ mitigation
- Efficiently and flexibly integrate RES in metallurgical processes,
- Accelerate the green and digital transition with respect to efficient and globally leading,
- Competitive and climate-neutral industrial value chains.

Events & meetings

In order to raise awareness of the project and to engage relevant stakeholders, also beyond the steel industry, the MaxH2DR project took already part to various events.

The project was presented at the EU Green Week Partner Event, the second H₂ for Green Steel conference in Versailles (November 2022) and at the two ESTEP Dissemination Events in June 2022 in Brussels and March 2023 in Pisa.

The project consortium had its second General Assembly meeting on 27 & 29 March 2023 in Pisa at SSSA and also had its first internal exploitation workshop online on 23 May 2023.



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