NEWSLETTER ISSUE 4 June 2025





INVESTIGATIONS OF SLAGS FROM NEXT GENERATION STEEL MAKING PROCESSES

InSGeP

SNEAKPEEK

Unlocking opportunities

Promising potential | European status on steel production

Team spotlight

Leading the way | Introducing the supporter and steelworks

CURRENT STEEL PRODUCTION

Steel manufacturing is an important aspect of Europe's industrial environment, contributing significantly to the economic development. The European steel sector has a turnover of around €130 billion, with more than 500 manufacturing facilities throughout 22 European Union (EU) member states. This production capacity supports a wide range of industries, from automotive manufacturing to construction and infrastructure development. Germany is Europe's largest steel producer, accounting for 27% of total production. Further major European

steel producers are Italy (15.8%), France



(9%), Spain (8.4%), Austria (5.5%),

Poland (5.4%) and Belgium (5.2%).

With <u>136 million tons</u> of steel, the EU

ranked as the world's second-largest

producer of steel (7.2%), behind

Asia with 1.1 billion tons (73.9%) in 2024.



The project receives funding from the European Union's Research Fund for Coal and Steel research program under grant agreement number 101112665.

Updates & Events

Breaking news | Latest findings and project activities



TEAM SPOTLIGHT

MEET OUR SUPPORTER AND STEELWORKS

 The InSGeP project is one of the initiatives supported by ESTEP, an organization that promotes research and innovation in the European steel industry, focusing on sustainability, digitalization, and competitiveness. One unique aspect of ESTEP is its <u>Clean Steel Partnership (CSP)</u>. This initiative collaborates to develop breakthrough technologies for reducing CO_2 emissions in steel production, aiming for climate-neutral steelmaking by 2050 with solutions like hydrogen-based production and carbon capture.

• voestalpine Stahl GmbH is a key player in the European steel industry and the main company within the Steel Division of the voestalpine Group. Based in Linz, Austria, it operates a fully integrated steel mill with an annual capacity of 5.9 million tons of steel for flat products. The core aggregates include one coke oven, a sinter plant, three BFs and three BOFs (Figure below). voestalpine manufactures and processes high-quality hot-rolled and cold-rolled, electrogalvanized, hot-dip galvanized and organic-coated steel strip. voestalpine Stahl GmbH is also known for its commitment to sustainability and innovation. It is actively involved in projects like InSGeP, which aims to shift from traditional blast furnace methods to electric arc furnace technology, reducing environmental impact. Until 2027, voestalpine plans to substitute one BF with an EAF. Due to this transformation step more than 1.5 million tons of CO_2 emissions can be reduced. In 2035, a second EAF is planned to be commissioned, and another BF is scheduled for shutdown. The remaining BF (3 million tons per year) will continue to operate with alongside two BOFs and two EAFs, each with a production capacity of 1.5 million tons. As part of a subsequent transformation step -potentially involving smelter operation— it is planned to construct a DR production plant. The EAFs are expected to process high-quality raw materials, while the smelter would handle low-quality materials.

• ORI Martin (ORI) is a modern electric furnace steel mill based in Brescia, Italy producing continuous casting billets, hot rolled wire rod, bars in coils and alloy steel bars for special applications. It currently operates a Consteel[®] electric furnace, which includes a scrap preheating system. ORI Martin employs a heat recovery system for primary fumes from the melting furnace as well as from the cooling circuit water with heat pump, both are at TRL 9.

As part of the transformation of steelmaking,



focus is put on circular economy of material and energy. This includes the recovery



of not only all forms of thermal energy currently wasted and not yet recovered to produce electricity for self-consumption, but also metals from waste from the steel production process and from mechanical processing. Their commitment to environmental

protection includes reducing emissions, improving energy efficiency, and investing in staff development. Ori Martin aims to reduce its ecological footprint and expand the circular economy.



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CONTINUING THE CONVERSATION 4th IN-PERSON PROJECT MEETING IN DÜSSELDORF

The 4th in-person project meeting was hosted at BFI's headquarters in Düsseldorf, Germany on January 20th and 21st, 2025. Each partner shared their recent activities and accomplishments, leading to productive discussions focused on next steps and future collaborations. An in-depth discussion about the workshop scheduled for March 2025 outlined its objectives and planned key activities. Additionally, attendees enjoyed a comprehensive tour of BFI's facility, gaining valuable insights into its operations and capabilities. This event fostered stronger connections and set the stage for continued success and innovation. The whole consortium is enthusiastic about translating these discussions into tangible actions and advancing together!



DEC ACTIVITIES 1st InSGeP PROJECT WORKSHOP IN DUISBURG

InSGeP first workshop, was organized by FEhS and ESTEP on March 5th, 2025, in Duisburg, Germany. This event gathered steel industry experts to discuss the crucial role of slags in circular economy. The workshop included100 registered participants.





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Cont. 1st InSGeP PROJECT WORKSHOP IN DUISBURG

The focus of the workshop was on slags from next generation steelmaking (DRI/HBI/smelter/HPSR), to understand how the transition will affect slag characteristics and as a result the potential valorisation routs. David Algermissen (FEhS) started with a presentation of the transition taking place in Europe and different approaches. Valentina Colla (SSSA) discussed the modelling of the slag characteristics, followed by Mattia de Colle (ArcelorMittal Maizieres Research), who presented the collection and laboratory development of slag samples using DRI and HBI in industrial and pilot scales. Marta Guzzon (Tenova) explained the work on the valorisation of EAF slags from DRI melting using a dry granulation process. Parinaz Seifollahzadeh (K1-MET) shared the results of market analysis and stakeholder consultations, which helped guide the direction of the InSGeP project.

These presentations highlighted innovative research aimed at improving resource efficiency and sustainability in steel production and can be found on InSGeP website.

- 1) FEhS: Introduction to the InSGeP project
- 2) SSSA: Simulation of effects on slag and process of DRI or HBI charge in electric arc furnace
- 3) AMMR: Collection and laboratory development of slag samples using DRI and HBI in industrial and pilot scales
- 4) TENOVA: Valorization of EAF slags from DRI melting with dry granulation process
- 5) K1-MET: Market analysis and stakeholder consultation



InSGeP Investigations of Slags from Next Generation Steel Making Processes

START DATE | 01-07-2023

PROJECT DURATION | 48 months TOPIC | RFCS-02-2022-RPJ COORDINATED BY | FEhS CONTACT | info@insgep.eu WEBSITE | insgep.eu

PUBLICATION DATE |June 2025





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