

IRONER



Potential for innovative and sustainable recycling of steel (IRONER)

OVERALL APPROACH

The European iron and steel industry is committed to the global climate targets and aims to reduce its production-related CO₂ emissions by at least 55% by 2030 (compared to 1990 levels) with climate neutrality by 2050 as ultimate goal (zero CO₂ emission from the steel production processes). Steel scrap is an important secondary raw material for steel production and a key pillar within the transition towards a climate-neutral steel industry. The melting of steel scrap requires fewer resources than primary steel production, and thus, enables environmental and economic benefits in terms of CO₂ emission and resource demand. Increased and optimized recycling of steel scrap to produce high-performance steels requires precise knowledge of available scrap grades. Particularly old scrap classes often cannot meet the required quality criteria with regard to their composition (e.g., proportions of non-metallic impurities or non-ferrous metals). This induces a currently high export rate, and thus, an exclusion from the material cycle. Environmental protection and circular economy are central topics of the steel sector and require measures and improved technologies for scrap processing to minimize the export of the valuable resource scrap. In this context, IRONER aims at identifying optimization potentials for a sustainable recycling of steel and at elaborating a catalog of open questions and necessary innovations for an increased steel recycling.

The IRONER consortium comprises leading research institutions for metallurgical process technology, materials development, circular economy, and climate research. The project pursues a comprehensive and application-oriented approach which includes a model-based material flow analysis and stakeholder interview as well as metallurgical and materials engineering considerations. By considering the environmental footprint of steel recycling, emission impacts from increased steel recycling will be quantified and economic issues will be discussed.



OBJECTIVES IRONER

will develop a catalogue of open questions and necessary innovations for increased steel recycling. This will be achieved by means of a material flow analysis on the availability of scrap, stakeholder interviews with the steel and scrap industry, and the plant engineering sector, as well as accompanied ecological and economic analyses. Additionally, the influences of increased steel recycling on metallurgical processes and the material properties

of steel products will be considered and evaluated. Ultimately, a position paper will be developed to identify necessary research questions. The report can serve as preparation for future national funding initiatives.

PROJEKTLAUFZEIT

01.01.2022 bis 31.08.2022

PROJECT RUNTIME

01.08.2022 - 31.08.2022

FRAMEWORK

The project (project number FO999889868) has a duration of 8 months and is funded 100% within the framework of the RTI initiative circular economy. This program is coordinated by the Austrian Research Promotion Agency (FFG) and financially supported by the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology.

PROJECT PARTNERS

The consortium consists of the following partners, starting with the project coordinator:

- [ASMET - The Austrian Society for Metallurgy and Materials](#)
- [Joanneum Research, Institut LIFE](#)
- [Montanuniversität Leoben, Lehrstuhl für Eisen- und Stahlmetallurgie](#)
- [Montanuniversität Leoben, Lehrstuhl für Stahldesign](#)
- [Technische Universität Wien, Institut für Wassergüte und Ressourcenmanagement](#)
- [Universität Graz, Wegener Center für Klima und Globalen Wandel](#)
- [K1-MET GmbH](#)

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