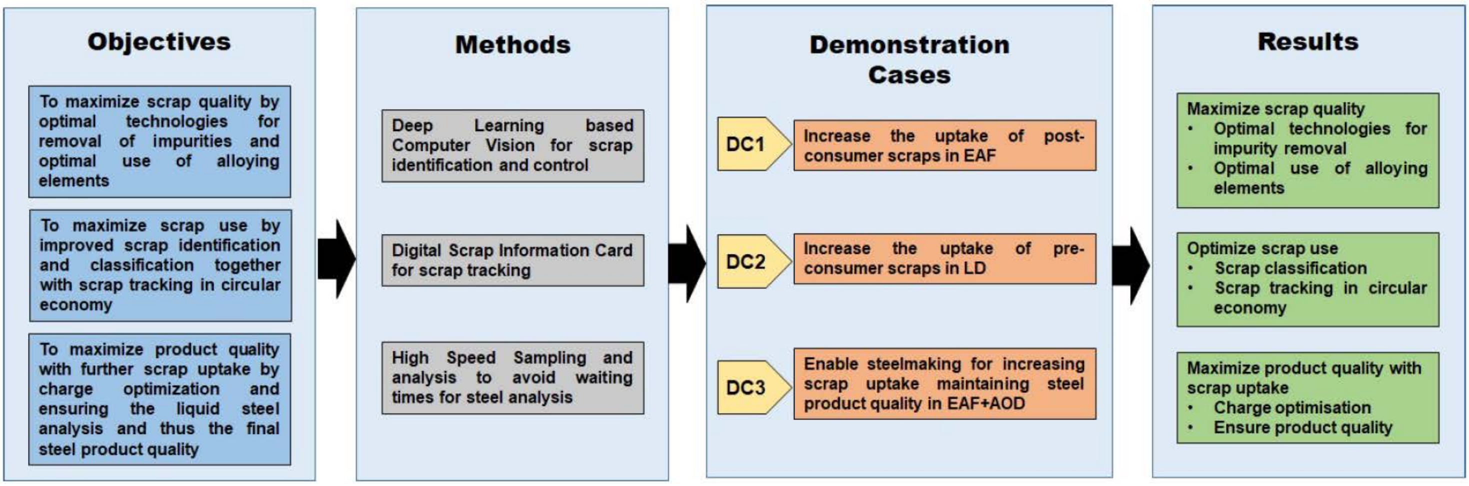
Highly efficient technologies for increased yields in steelmaking processes and reduced environmental impact

Newsletter #2

Project details

Project Call	**EU Horizon Europe – Cluster 4** **Climate neutral, Circular and Digitised Production – Twin Green and Digital Transition** **Improvement of the yield of the iron and steel making (Clean Steel Partnership) (Innovation Action)**		
Project Acronym	**HIYIELD**		
Grant Agreement No.	101058694	**Duration**	36 months
Project Start Date	01-07-2022	**Project End Date**	30-06-2025
Coordinator	KTH	**Webpage:**	www.hiyield.proj.kth.se

The project HIYIELD aims to promote a circular economy by progressively increasing the scrap uptake in three scenarios representing the current European steelmaking routes, with the ambition to deliver relevant solutions to all steelmakers.



News

The project was recently presented at the Clean Steel Partnership Infoday by our project co-ordinator Björn Glaser from KTH.

The setting up phase is almost completed and the required infrastructure with smart data generation, analysis and visualization tools is built. In the implementation phase the new technologies will be experimentally examined in industrial trials including big data analysis and machine learning optimization. Some of the achievements are detailed below per demonstration case and we look forward to give a more substantial update on the results from implementation phase when ready to publish.

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HIYIELD

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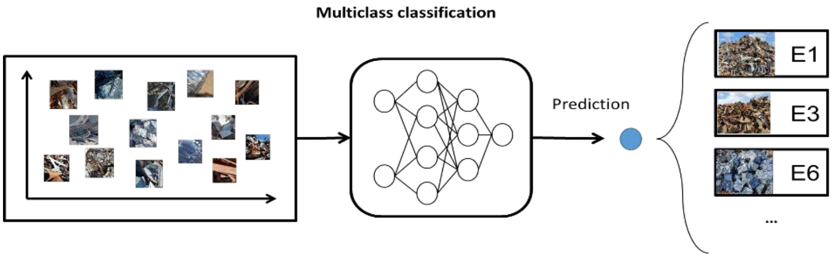
Demo case 1: Upgrading and intelligent use of post-consumer scraps

Different scenarios for processing are tested, aiming to highlight an optimized process for the upgrading of post-consumer scrap.
An important aspect of proper scrap charge mix characterization is to derive the average density from crossmatching the weight with the volume assessed by Laser scanning technology during scrap bucket charging. Furthermore, the system helps to monitor the dynamic evolution of the scrapyard.

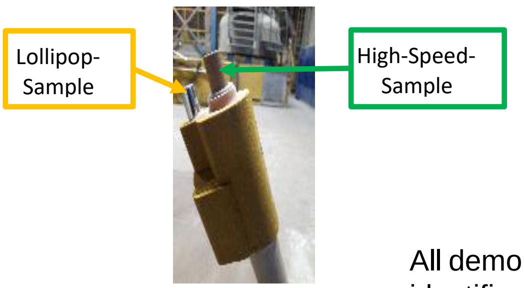
Demo case 2: Identifying and tracking of pre-consumer scraps

A demo unit for combined sorting and analysis was installed and commissioned. Tests with different material streams were performed and a set up was implemented for further tests.
A first Digital Scrap Information Card for identifying and tracking scrap from the scrap supplier to the steel mill was created and sent to partner with the material delivered.

Based on a novel approach for dataset generation a dataset of European scrap classes was published. DL-based algorithms for scrap identification were trained.
A more automated scrap process will provide optimized scrap charging based on a better knowledge of the analytical properties.



Demo case 3: Enabling steelmaking to further increase scrap uptake and improved utilization of alloys by providing high-speed sampling and analysis



Measuring equipment was set up in laboratory successfully. Combination sampler of high-speed sampling and conventional Lollipop sampling was developed and tested successfully.
High speed sampling and direct OES at steelmaking will help to avoid liquid steel temperature loss, reduce waiting time, and provide energy savings of 2% per batch.

All demo cases are provided with academic background, DL CV model for scrap identification, optimizer tool for bucket charge based on scrap availability, CFD modelling to optimize high-speed samplers for steelmaking, and AR visualization system for operators.

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