Consortium

The consortium includes companies from research institutions and metallurgical industry as well as research institutions and consists of:

- Scrap recycling (Stena Recycling AB)
- End user (voestalpine Stahl Donawitz GmbH, SSAB EMEA AB)
- Sensor technology (BT-Wolfgang Binder GmbH, SPECTRAL Industries BV)
- Process control (DANIELI AUTOMATION SPA)
- Research organisation (Swerim AB, K1-MET GmbH, ESTEP)
- University (Scula Superiore Sant'Anna, Luleå tekniska universitet, TU Dortmund)

PURE SCRAP

Start date: 01.01.2023
Duration: 42 months
Type: Innovation Action
Budget: 6.2 M€
Coordinator: Swerim AB
Contact: info@purescrap.eu

HORIZON-CL4-2022-TWIN-TRANSITION-01
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PURITY IMPROVEMENT OF SCRAP METAL

Co-funded by the European Union

CSP The Clean Steel Partnership

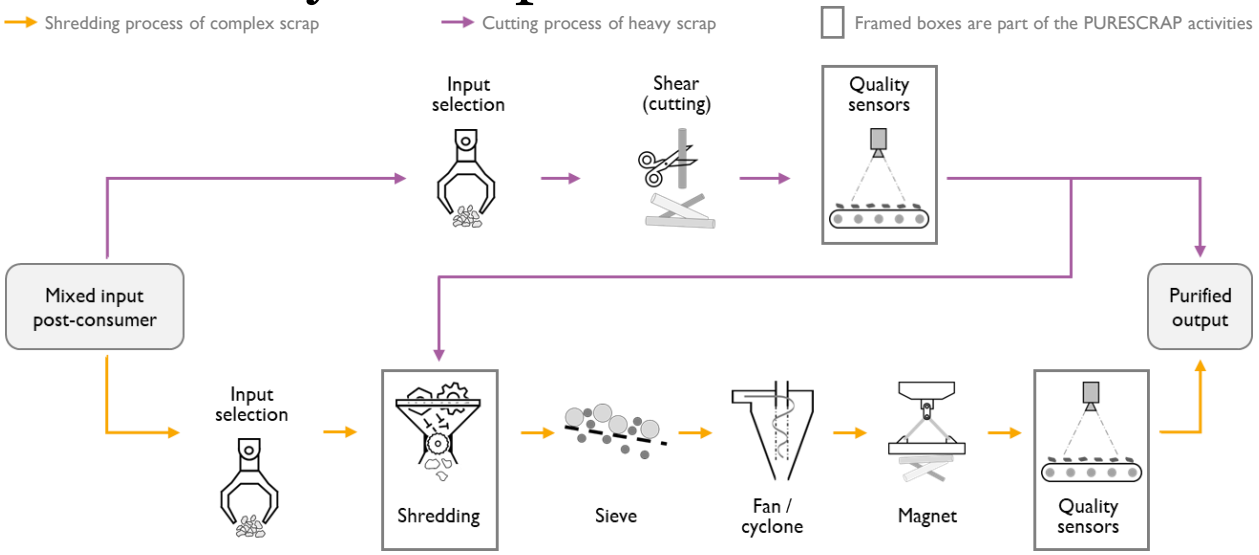
Motivation

In 2020, 80 Mt of post-consumer scrap were generated in Europe and will increase in the future. Tramp elements, such as copper, tin, chromium, nickel or molybdenum prevent the recycling, they may influence material product properties and metallurgical processes. This surplus of low-quality scrap within the EU results in enormous scrap exports. In 2019, these amounted to 21.8 Mt. On the contrary, scrap of higher quality has to be imported to the EU to fulfil the scrap demand for steel production. This situation creates a large potential for improved scrap treatment. The PURESCRAP project is taking an ambitious, major step toward reducing impurities in post-consumer scrap prior to melting by applying highly efficient sensor stations in conjunction with improved scrap processing.

Objectives

The figure below illustrates the preliminary concept of the PURESCRAP project, the framed boxes highlight the project activities. During the project, sensor stations will be integrated in the two separate processing chains for heavy (cut) and shredded scrap to improve the impurity removal and enable a more efficient scrap processing. Optical sensors for visual recognition are combined with chemical sensors and they are applied in a modular fashion so each sensor can work as a stand-alone. The upgraded post-consumer scrap will be used for steel production. Verification of hardenability and physical properties in the final product supports the quantification of scrap quality and the determination of the maximum possible rate of improved post-consumer scrap for high quality steel production.

Preliminary concept



Expected results

- **Reducing impurities in low-quality scrap** through spectroscopy and vision systems
- **Enhancing the uptake of post-consumer scrap** to produce high-quality steel grades
- **Improving the scrap characterization** through image detection and processing models using Deep Learning solutions
- **Reducing CO2 emissions by 10-30 %** for scrap melting due to an increased input of upgraded post-consumer scrap compared to a reference basic oxygen furnace or electric arc furnace operation