

Project information

Start date: 01.01.2023

Call: HORIZON-CL4-2022-TWIN-TRANSITION-01

Duration: 42 months

Coordinator: SWERIM AB

Type: Innovation Action

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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. The project thereby provides a contribution to the Strategic Research and Innovation Agenda (SRIA) of the Clean Steel Partnership (CSP) and to the achievement of the European Green Steel goals regarding circular economy as well as to the reduction of CO₂ emissions.



Key performance indicators

During the project, defined key performance indicators (KPIs) will be monitored to demonstrate the feasibility of the PURESCRAP concept. The KPIs are split into technical and social KPIs. Technical KPIs cover indicators related to scrap quality, scrap circularity and resource efficiency, as well as indicators related to the system and CO₂ reduction for scrap melting. Social KPIs include training and user involvement as well as the acceptance of the PURESCRAP solutions. The effect model diagram on the right (Fig.1) displays the dependencies of the social KPIs.

In April, two workshops on the social KPIs were held at STENA's pilot plant in Sweden. Additionally, questionnaires on training, involvement and acceptance were distributed to the managers and operators. The aim of the survey was to obtain expectations and assessments of training needs and a current assessment of involvement and acceptance.

In general, acceptance of the PURESCRAP solution appears to be very high - both among managers and operators, as the latter also expect the technology to make their work easier.

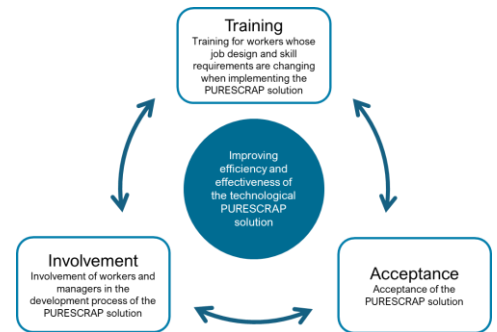


Fig.1: Effect model diagram of social KPIs



Fig.2: Trials with material at Swerim lab-conveyer

Sensor station development

Both sensor stations for shredded scrap and heavy scrap are in their final stages of completion now. They are now being built and will be taken in use after the summer (Fig.2). The station for shredded scrap will first be set up as a separate test line where both the sensors and material can be analysed in controlled manner which is not possible in the full production line. This enables controlled tests also of specific material batches which are not normally used in the shredder operation.

The station for heavy scrap is also first being set up as a free-standing test station. This allows for test of material both from the recycling facility as well as other material handled at the steel works.

Market analysis



Fig.3: Adrian and Jonas at the ESTEP event

In order to analyse in more detail what the existing market for technological results for the replication of PURESCRAP scrap processing solutions looks like, a market analysis of the existing market for scrap processing was conducted. The PURESCRAP team invited stakeholders from the steel industry, steel producers, scrap recyclers, research organisations as well as system integrators, technology providers and equipment manufacturers, to take part in an online survey and representatives from steel producing companies and scrap recyclers participated in deep dive interviews. With the results we aimed for a better understanding of the expected market size, hot spots for the incubation of optimized scrap upgrading initiatives and user and customer needs as well as existing competition and competitive advantages of the technologies to be developed. The results show, among other things, that there is a clear demand for the planned PURESCRAP solutions and that these can make an important contribution to closing crucial gaps, particularly regarding sensor technologies.

Jonas and Adrian (pictured in Fig.3) presented the barriers and drivers for the increased use of post-consumer scrap at the ESTEP Spring Dissemination Event in Brussels. Furthermore, we are currently planning a webinar to distribute the outcomes of the market analysis. If you'd like to participate, [sign up for our newsletter](#) to be the first to receive updates.

Requirements of the sorted scrap

For the recycling process, the separation and removal of unwanted material is important because scrap is sold with a specified maximum content of certain elements. Proper charge planning within the steel plant relies on the exact average chemical composition, not just maximum values. The elements Cu, Ni, Mo, and Sn are present as alloying elements in the steel and are identified as the most important elements for improved control of the scrap to enable a more efficient charge planning. Additionally, also Sb and As are of particular interest for the PURESCRAP consortium. Table I provides the useful ranges and desired accuracies (precision in analysis). While elements like P, Cr, Mn, Si, C, Al are also important for steel quality, they are not primary targets for the scrap analysis.

Table I: desired elemental levels and precision

Element	Range (wt.%)	Accuracy (wt.%)
Cu	0.05 – 0.4	+/- 0.05
Sn	0.004 – 0.01	+/- 0.002
Mo	0.02 – 0.40	+/- 0.02
Ni	0.10 – 1.0	+/- 0.10
Sb	0.002 – 0.010	+/- 0.002
As	0.002 – 0.010	+/- 0.002

Upcoming events

Use the opportunity to connect with team members of the PURESCRAP project and gather additional information at one of those upcoming events.



ESTEP annual event
Linz | 29 - 31 October



LMPC 2024
Leoben | 22 – 25 September

Check out our [project website](#) and follow us on [LinkedIn](#)

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