

Clean Steel Partnership Infoday

December 13th 2023 Teams











HIYIELD

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

HORIZON-CL4-2021-TWIN-TRANSITION-01-19: Improvement of the yield of the iron and steel making (IA)















HIYIELD aims to promote circular economy by progressively increasing the scrap uptake in three demo cases that represent the current European steelmaking routes, with the ambition to deliver solutions with relevance to all steelmakers.

Project duration: 01/07/2022 – 30/06/2025



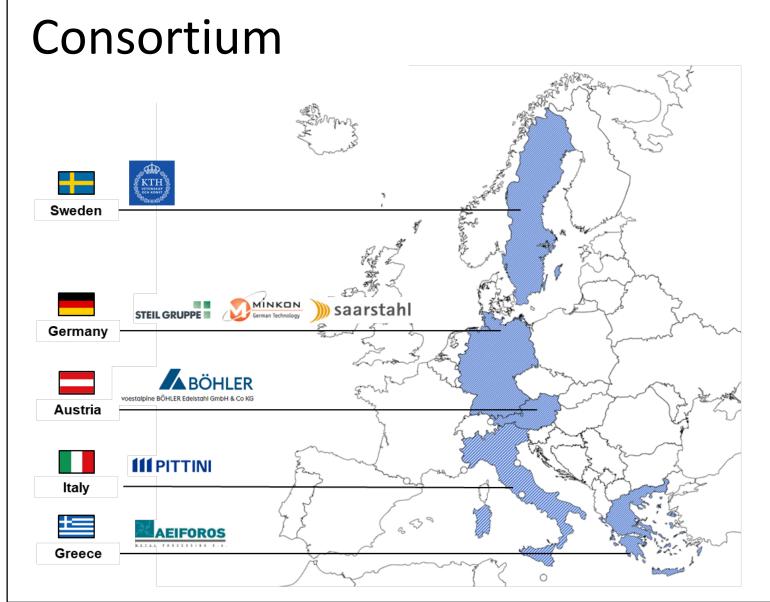






















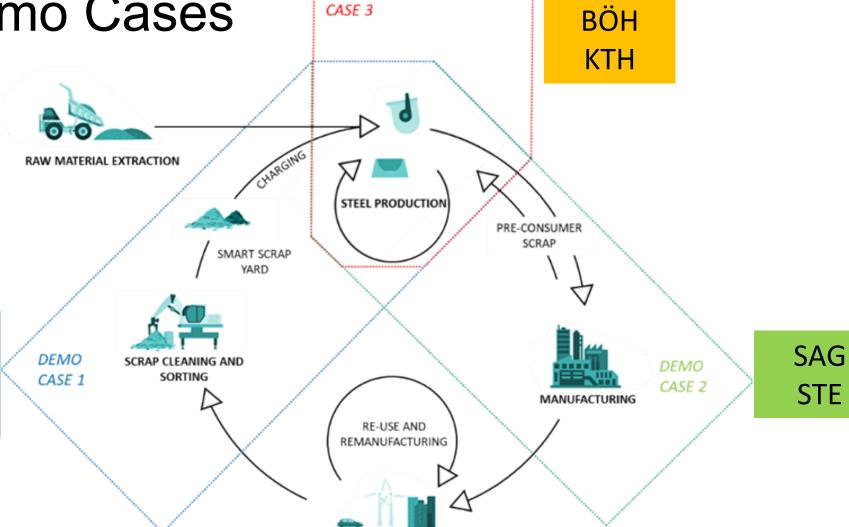






Demo Cases

MIN



DEMO



AEIF

FENO

KTH















Demo Cases

Objectives

To maximize scrap quality by optimal technologies removal of impurities and optimal use of alloying elements

To maximize scrap use by improved scrap identification and classification together with scrap tracking in circular economy

To maximize product quality with further scrap uptake by optimization charge and ensuring the liquid steel analysis and thus the final steel product quality

Methods Deep Learning based Computer Vision for scrap identification and control Digital Scrap Information Card for scrap tracking High Speed Sampling and analysis to avoid waiting times for steel analysis

Demonstration Cases Increase the uptake of post-DC1 consumer scraps in EAF Increase the uptake of pre-DC2 consumer scraps in LD Enable steelmaking for increasing scrap uptake maintaining steel DC3 product quality in EAF+AOD









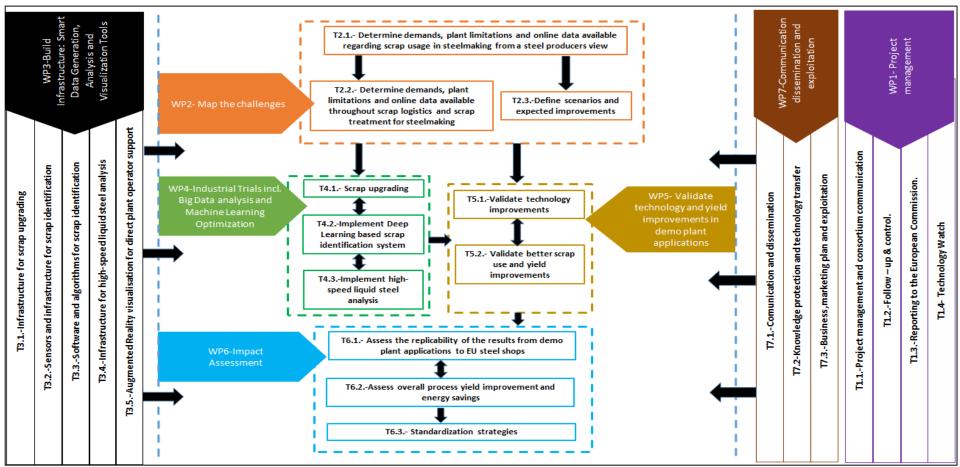








WP management and schedule

















WP management and schedule

	Ect management										Υ	/ear 1							١	ear :	2					Year 3					
				Leader	Participants	Begin	End	1	2 3	4				9 1	0 11	12 1	3 14	15 1				21 2	22 23	24 2	5 26	27 28	3 29	30 31	32	33 34	35 36
WP1	Project management	MS	Deliverables			,	_	_												1											
1.1	Project management and consortium communication		D1.1	KTH	All	M1	M36	6			П	\top	\Box	\neg			\Box	\neg	\Box	Т	П	\neg	\top	П			Т		\Box		\Box
1.2	Follow-up & control		D1.1	KTH	All	M1	M36	6			П	\top	\top	\neg	\top	П	П	\neg	П		П	\neg	\top	П	Т		Т		\Box		
1.3	Reporting to the European Commission			KTH	All	M1	M36	6	\top	\top	\Box	\top	\top	\neg	\top	\Box	\top	\top	\top	1	\Box	\neg	\top	\vdash	\top	\top	\top		\top	\top	Н
1.4	Technology watch		D1.2, 1.3, 1.4	KTH	All	M1	M36	6					\Box				\Box		П		П								\Box		
WP2	Map the challenges			FENO	All	M1	M7	7																					П	\perp	
2.1	Demands, plant limitations and online data available in scrap usage		D2.3	FENO	FENO, SAG, BÖH	M1	M4	1			Ш	\perp	\perp					\perp	Ш		Ш	\perp	\perp						Ш	\perp	
2.2	Demands, plant limitations and online data available in scrap logistics		D2.1	AEIF	A EIF, STE	M1	M4	1																					$\perp \perp$		Ш
2.3	Definition of scenarios and expected improvements	M1	D2.2	KTH	All	M3	M6	5																							
WP3	Build Infrastructure: Smart Data Generation, Analysis and			MIN	All	M4	M18	8				Т	П	П							П	П	Т	П					П		
	Visualization						_		\perp				$\perp \perp$	_			\perp		\perp	_	Ш			\sqcup	\perp	\perp	\perp	\perp	$\perp \perp$	\bot	Ш
3.1	Infrastructure for scrap upgrading		D3.1	AEIF	AEIF, STE	M4	M12	_	\perp		Ш	\perp	$\perp \perp$	\perp	\perp		\perp	\perp	$\perp \perp$	┸	Ш	_	\perp	Ш	\perp	\perp	\perp	\sqcup	$\perp \perp$	\bot	Ш
3.2	Sensors and infrastructure for scrap identification		D3.1	FENO	KTH, SAG, FENO	M4	M13	3	\perp		Ш	\bot	$\perp \perp$	\rightarrow	\perp	\sqcup		\perp	\bot	_	ш	_	\bot	\sqcup	\perp	\perp	\bot	\perp	\bot	\bot	ш
3.3	Software and algorithms for scrap identification		D3.3	SAG	KTH, SAG, FENO	M6	M14	_	\perp	\perp	Ш	\perp	\perp	\perp	\perp	Ш	\perp	\perp	\perp	┸	Ш	\perp	\bot	Ш	\perp		\bot	Ш	$\bot \bot$	\bot	Ш
3.4	Infrastructure for high speed liquid steel analysis	M2	D3.1	MIN	MIN, KTH	M8	M16		\perp	\perp	Ш	\perp	\perp	\perp	\perp	\sqcup	$\perp \perp$	\perp	\perp	_	Ш	_		\sqcup	\perp		\perp	\perp	$\perp \perp$	\bot	Ш
3.5	Augmented Reality visualisation for direct plant operator support		D3.2	KTH	KTH	M9	M18	_	\perp		Щ	_	$\perp \!\!\! \perp$	_	\perp		\perp	\perp	\perp	_	Ш	_		ш	\perp	\perp	\bot	\perp	\bot	\bot	Ш
WP4	Industrial Trials incl. Big Data analysis and Machine Learning			SAG	All	M6	M24	_	\perp	\perp	Ш	\perp	$\perp \perp$	_			Ш		Ш	_	Ш				Ш	\perp	\perp	Ш	$\perp \perp$	\bot	Ш
4.1	Scrap upgrading		D4.1	AEIF	AEIF, FENO	M6	M18	_	\perp	\perp	Ш	\perp	$\perp \perp$	\perp		Ш	Ш	\perp	$\perp \perp$		Ш	\perp	\perp	Ш	\perp		\perp		$\perp \perp$	\bot	Ш
4.2	Implementation of a Deep Learning based scrap identification system		D4.2	SAG	SAG, STE. FENO, KTH	M9	M21		\perp	\perp	Ш	\perp	$\perp \perp$	\perp			Ш	\perp	$\perp \perp$		Ш		\perp	Ш	\perp		\perp		$\perp \perp$	\bot	Ш
4.3	Implementation of a high speed liquid steel analysis	МЗ	D4.3	MIN	MIN, KTH, BÖH	M13	M24	4					$\perp \perp$																Ш		Ш
WP5	Technology and yield improvement validation in demo plant			AEIF	AEIF, SAG, STE, BÖH, FENO	M18	M26	6			Ш	\perp	\perp				Ш	\perp	Ш		Ш								Ш	\perp	
5.1	Validation of technology improvements		D5.1	AEIF	AEIF, SAG, STE, BÖH, FENO	M18	M26	6																							
5.2	Validation of better scrap use and yield improvements		D5.2	FENO	FENO, SAG, BÖH	M18	M26	6																					П		
WP6	Impact assessment and industrial deployment			KTH		M22	M36	6					П						П		П								\prod		
6.1	As sess the replicability of the results from demo plant applications		D6.1	FENO	KTH,SAG,STE,MIN,BÖH,FEN	M22	M35	5																							
6.2	As sess overall process yield improvement and energy savings	M4	D6.2, 6.4, 6.5	KTH	AEIF, KTH	M22	M33	3																							
6.3	6.3 Standardization strategies			MIN	MIN, AEIF, STE	M27	M36	6					\perp					\perp	\perp		Ш										
WP7	Communication, dissemination and exploitation			KTH	All	M1	M36	6				\perp	Ш						Ш	┸	Ш								Ш		
7.1	Communication and dissemination		D7.1 -7.3	KTH	All	M1	M36	_																							
7.2	Knowledge protection and technology transfer		D7.7	KTH	All		M36	_					$oxed{oxed}$																		
7.3	Business, marketing plan and exploitation		D7.4 - D7.6	KTH	All	M18	M36	6																							

















Achievements up to now

Completed Deliverables Report

- D1.2: Technology Watch report M12 (WP1)
- D2.1: Database of suitable scrap types as process feedstock (WP2)
- D2.2: Report on defined Scenarios and Improvements (WP2)
- D3.1: Report on the implementation of the infrastructure at demo plant (WP3)
- D3.3: Software and algorithms for scrap identification developed (WP3)
- D7.1: Plan for Communication, Dissemination and Exploration activities M6 (WP7)
- D7.5 : Data Management Plan M6 (WP7)

Achieved Milestones

- M1 : Scenarios defined (WP2)
- M2: Infrastructure prepared (WP3)



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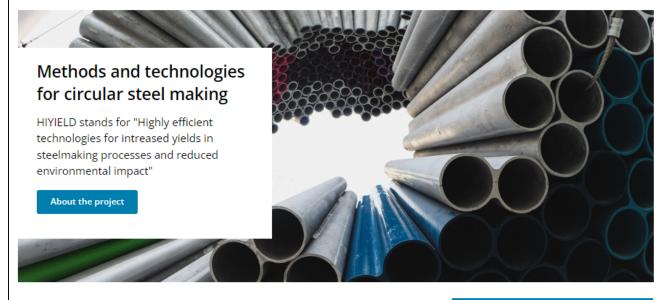
Webpage

https://www.hiyield.proj. kth.se/

HIYIELD project



About the project Research updates News and events Home



What is HIYIELD?

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, the project consortium will work to achieve three main objectives:

- 1. To maximize scrap quality by optimal technologies for removal of impurities and optimal use of alloying elements.
- 2. To maximize scrap use by improved scrap identification and classification together with scrap tracking in the circular economy.
- 3. To maximize product quality with further scrap uptake by charge optimization and ensuring the liquid steel analysis and thus the final steel product quality.

Our method

We will apply highly innovative methods and technologies to the steel sector such

- 1. Deep Learning based Computer Vision for scrap identification and control
- 2. Digital Scrap Information Card for scrap tracking
- 3. Direct Sample analysis

More project deliveries



















KTH Materialvetenskap

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Proposal preparation – Steps/ Hints NCP4



1) Proposal Call

- a) Looking for an suitable call for an existing project idea
- b) Developing a good project idea for an upcoming call

2) Identification of consortium partners

- a) Well distributed within Europe (at least 3 European countries involved) countries outside from Europe can be involved
- b) Good balance between industry and R&D partners
- c) Funding rate e.g. RIA = 100% for all partners, IA = approx. 60% for industrial partners
- d) How many partners shall be in the consortium?'
- e) Contribution of each partner in the project?
- f) Make partners stay in the proposal!!!
- g) Good distribution max 1/3 new partners with no experience in EU projects and proposals

3) Proposal/Project coordination

- a) Who is coordinating?
- b) Who has the resources/ capabilities large consortium, small consortium?

Proposal preparation – Steps/ Hints INCP4



- Proposal writing supporting company
 - Identification of a good/recommended company a)
 - How much shall this company be involved only supporting with writing or full coordination of the proposal
 - Proposal partner or only preparation support?
 - Costs!!!
- Proposal preparation
 - All depends on the coordinator main work load/contribution
 - Industrial partners have very limited capabilities to contribute so limit down your contribution expectations
 - Try to distribute the work load between the R&D partners
 - d) TRL levels?
 - Define Use cases (RIA) or Demo cases (IA)
- Other issues to be aware of
 - Project start approx. one year after proposal submission
 - Project duration time