A Decisive Year for EU Steel Research

- Flagship projects for EU steel decarbonization -

Dr. Klaus Peters, Secretary General ESTEP

FSF 2026, Bologna, Italy

03 June

EU steel Industry 2026

EU Steel Research developments

- Reform of Research Fund for Coal and Steel
- New type of calls in Clean Steel partnership
- Successor to Clean Steel Partnership
- Success of steel proposals and projects

EU Steel Research areas strongly shaped by the EU's climate, energy, industrial, and competitiveness goals (**policy**)

- **Decarbonized** Steel Production
- Affordable Clean **Energy** Integration
- **Hydrogen** Technologies & **Electrification**
- Advanced **Steel Grades** and Materials Engineering
- Industrial **Competitiveness** and Strategic Autonomy
- Carbon Accounting and **Green Steel** Certification
- **Process Efficiency** and Waste Valorization
- **Digitalization** and Smart Steel Plants
- **Circular Economy** and **Scrap** Utilization
- **Workforce Skills** and Human-Centered Factories

EU steel Industry 2025

AI Overview

The EU steel industry in 2025 faces a severe, historic crisis, with production hitting an all-time low despite a slight rebound in demand, largely due to high energy costs, record imports, and structural overcapacity. Although demand is projected to see a minor recovery of 2.4% after years of recession, imports now hold a record share of over 29% of the market. eurofer.eu +3

European Commission

EN

Research and innovation

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Commission proposes reform of the Research Fund for Coal and Steel to accelerate and simplify investments

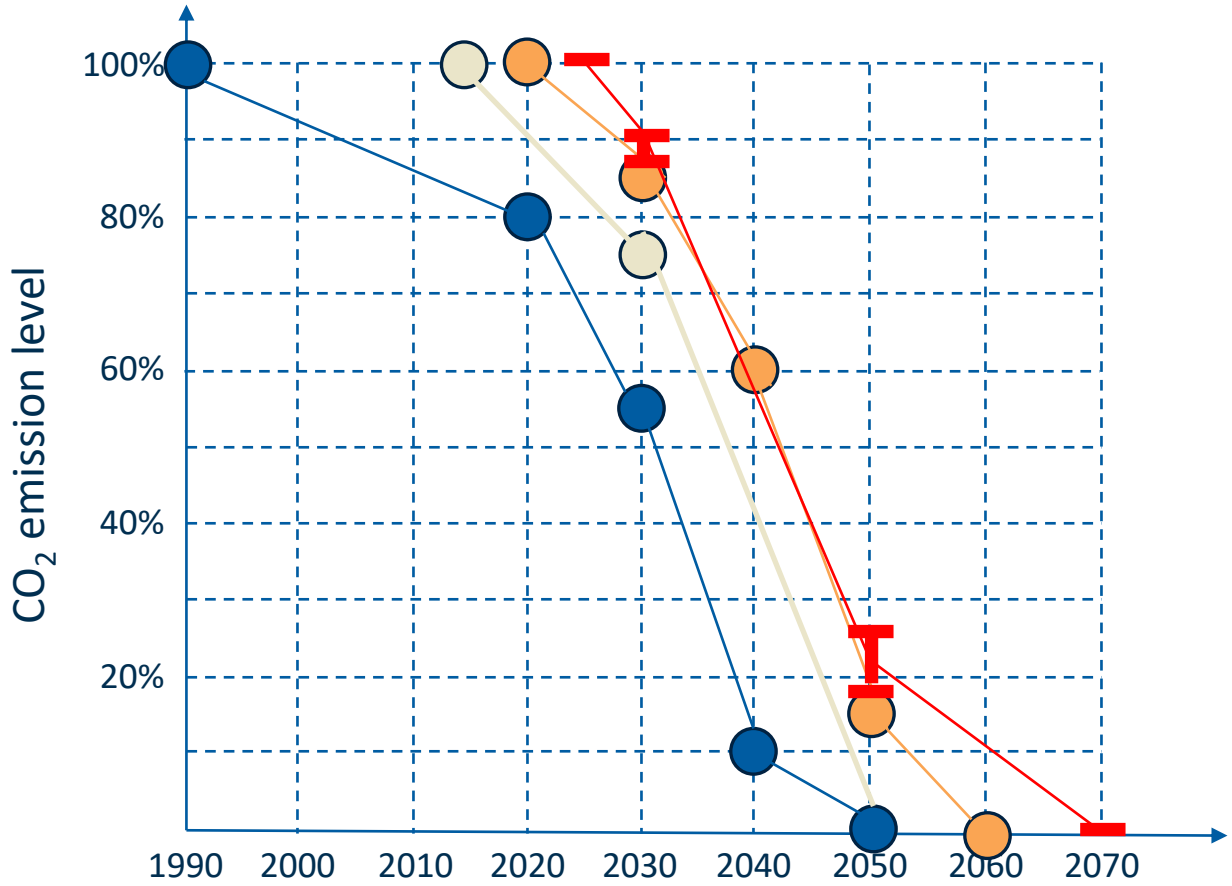
NEWS ARTICLE

10 December 2025 — Directorate-General for Research and Innovation — 4 min read

What is the Research Fund for Coal and Steel (RFCS)?

Global Steel Decarbonisation Roadmaps

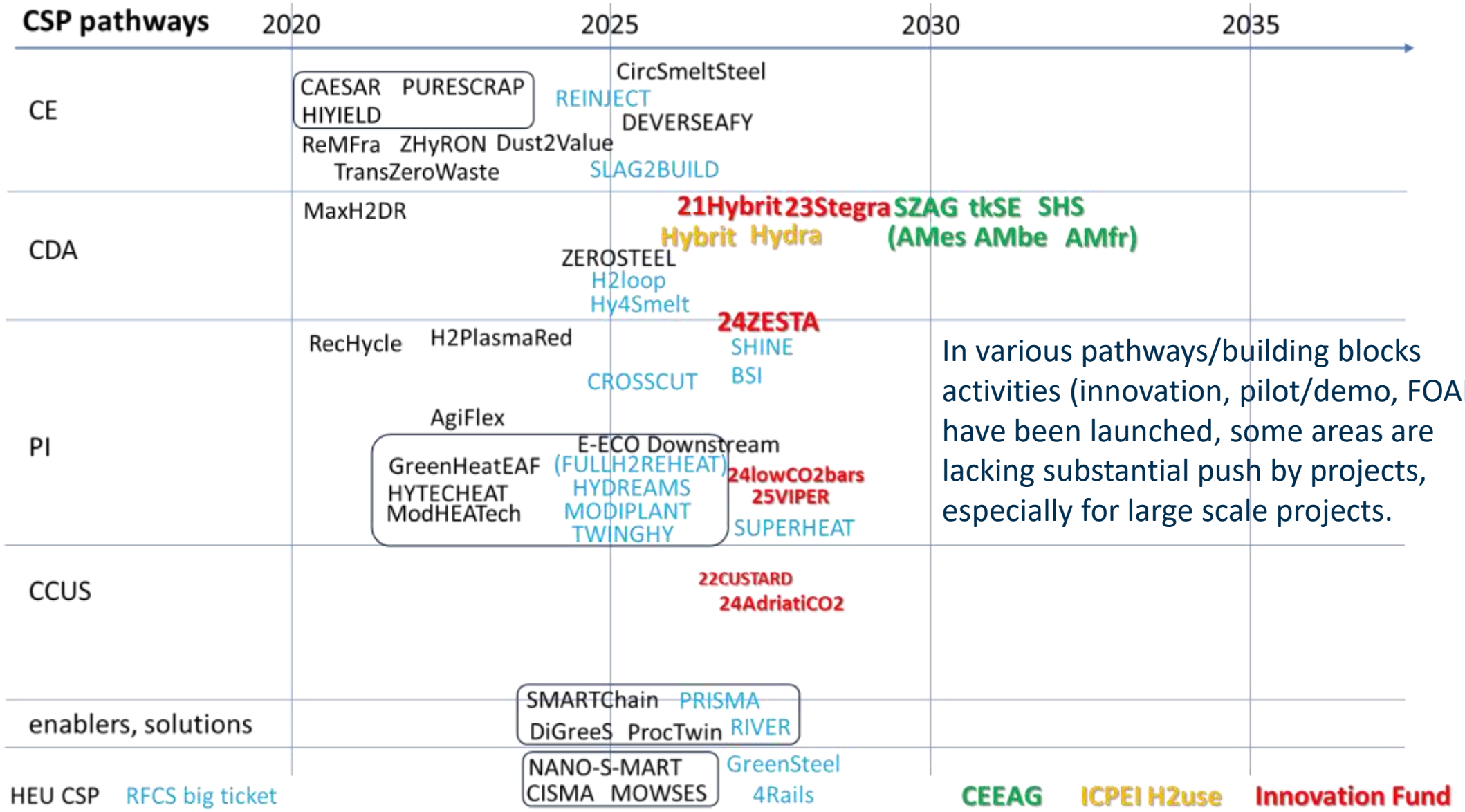
Steel decarbonisation ambition in Europe is 7 – 15 years ahead of Asian roadmaps



- Europe (source EC)
  (ca. 130 Mt/yr in 2025)
- Japan (source TransitionZero)
  (ca. 75 Mt/yr in 2025)
- China (source CISA)
  (ca. 960 Mt/yr in 2025)
- India (source Kearney study)
  (ca. 150 Mt/yr in 2025, strongly growing)
- AESEAN (towards 2050 target)
  (ca. 50 Mt/yr in 2025, strongly growing)

Source: ESTEP analysis based on the Breakthrough Technology Conference 2025 - worldsteel.org
Regional Decarbonisation Workshop, 01 Dec. 2025

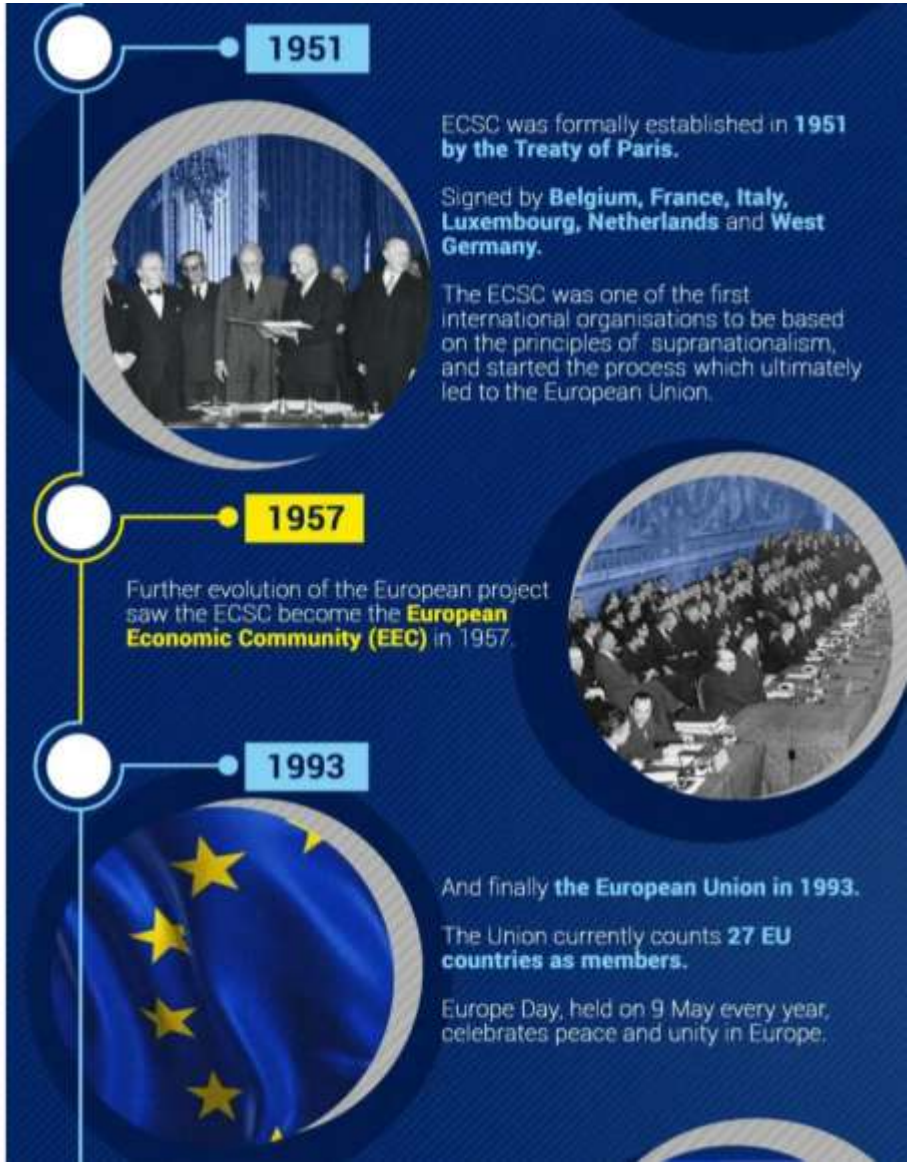
Moving ahead in the various pathways



In various pathways/building blocks activities (innovation, pilot/demo, FOAK) have been launched, some areas are lacking substantial push by projects, especially for large scale projects.

Research Collaboration in the Steel Sector

Steel and Coal Community showcased the way to the EU



ECSC=European Coal and Steel Community: 1952 - 2001

RFCS=Research Fund for Coal and Steel (link): 2002 - (2034)

Source: EUAM-Ukraine.eu, link

Origin of the Research Fund for Coal and Steel (RFCS) = ECSC

- In the year **1952** the first “European Union” in the form of the “European Coal and Steel Community (**ECSC**)” had been founded, starting with 6 member states (treaty of Paris)
- The ECSC had been financed by money from the steel producers in Europe. The money was collected as special **levy on steel production**.

Funding aspects

- The ECSC's **budget** was funded by **levies on coal and steel production** and by contracting **loans**. The levies were intended to cover administrative expenditure, non-repayable aid towards retraining workers, and technical and economic research (which needed to be encouraged). Money received from borrowing could only be used to grant loans.
- In the field of **investment**, in addition to granting loans, the ECSC could guarantee loans contracted by companies with third parties. The ECSC also had the power to provide guidance on investments which it did not fund.

Source: https://eur-lex.europa.eu/EN/legal-content/summary/treaty-establishing-the-european-coal-and-steel-community-ecsc-treaty.htm

- Beneath financing many economical and social topics, the **common research** was an important aspect of the ECSC.
- The ECSC treaty expired on 23rd July 2002 and needed a successor.

The 15 ECSC (EU) members in 2002

Date	Members	Members added
23 July 1952	6	The *Inner Six*: Belgium, France, West Germany, Italy, Luxembourg and the Netherlands
1 January 1973	9	Denmark, Ireland and the United Kingdom
1 January 1981	10	Greece
1 January 1986	12	Portugal and Spain
1 January 1995	15	Austria, Finland and Sweden

Source: https://en.wikipedia.org/wiki/European_Coal_and_Steel_Community

Backbone of EU Steel Research: RFCS

- After expiring of the ECSC treaty in 2002 it had been decided, to use the still existing assets (around 2 billion €) as basis for a new research programme
- **RFCS** = Research Fund for Coal and Steel started in **2002**
  - Check and balance by inclusive approach
  - Technical groups composed of steel producers and academia steered the projects
- Use the interest rates of these assets of the ECSC (now ECSC in Liquidation =ECSC i.L.) to finance the new fund. Worked well for the first years until the financial crisis 2008/2009 and low interest rates.
- Budget distribution steel / coal: 72,8% / 27,2%
- 2021 Modernisation of RFCS
  - Using interest rates and part of the assets
  - Period of Horizon Europe (2021-2027)
  - 40 million € annual budget for coal and steel
  - 52 million € annual contribution to the EU Clean Steel partnership
  - 2025 Steel and Metal action Plan announces the reform of RFCS
- Necessity to act for period starting 2028: **reform of RFCS**

Enrico Gibellieri

Presidente del Comitato consultivo CECA

27.6.2002

Research Fund for Coal & Steel

2026 Reform of RFCS

- Intense discussion between
  - EU Commission
  - private side (steel producers, plant builders, universities etc.)
  - Member States

Compromise Proposal expected to be implemented 01.01.2027:

- Period 2027 to 2034 – aligned with next EU Framework program
- 120 million EURO Annual budget
  - Big Ticket (4-20 million EURO funding for a steel project)
  - Annual Call (1-5 million EURO funding for a single project)
- Continuation of
  - Industry driven research program
  - Bottom-up topics
  - Earmarking for coal and steel
- Funding Rate
  - Up to 70% for industry
  - Up to 100% for non-profit organisations and SMEs
- Work Program valid for two years
  - May deadline for Big Ticket proposals (high TRL)
  - September deadline for Annual Call proposals (low & medium TRL)
  - Role of Dual-use call to be seen

Research Fund for Coal & Steel

European Steel Technology Platform (ESTEP) - Timeline

2004

Establishment of ESTEP in context of ULCOS

Vision

ESTEP is the dissemination and communication platform for EU Steel Research Activities

2015

Appointment of Secretary General: Dr. Klaus Peters

2017

Strategic Research Agenda (SRA)

2018

Legal entity (AiSBL): Incorporation by 13 founders

ESTEP

2021

Clean Steel Partnership

CSP
The Clean Steel Partnership

2023

ESTEP Support towards standardization

2025+

Cooperation + International Presence

Climate Action
worldsteel
2025

Supported by:

SEAISI

ESTEP

More info: https://www.estep.eu/

European Steel Technology Platform (ESTEP)

- **Focus Groups**

Circular Economy	Energy Market & Engineering	Transport and Mobility
Smart Factory	Low Carbon & Energy Efficiency	People

- Collaborative work in 6 Focus Groups
  - Thematic mini-conferences
  - Initiate proposal writing
  - Road mapping and publication
  - Work towards standardization

- **Facilitates the private side of EU Clean Steel Partnership (CSP)**

CSP The Clean Steel Partnership

EU Clean Steel Partnership

Accelerate towards net zero CO_2 steelmaking

- Partnership in the frame of Horizon Europe (HEU) in 2021 to 2027/2030
  - Unique setting due to synergies of public financial pillars (HEU + **R**esearch **F**und **C**oal+**S**teel)
  - Memorandum of Understanding signed by ESTEP + European Commission (RTD+Grow)
- CSP-Budget: € 1.7 billion
  - €350 million from Horizon Europe
  - €350 million from assets of the ECSC* in Liquidation (source of RFCS funding)
  - At least matched by steel sector (expected €1.000 million)
- Projects
  - size: € 10-100 million
  - Developments starting at TRL 6 to end up with TRL 8 (Technology Readiness Level)
    exceptional start at 5 to end up with at least TRL 7
  - 2 + 2 demonstrators showing CO_2 emission reduction potential of at least 50% (80%)
- Strategic Approach by 12 Building Blocks
  - Building Blocks define collaborative research areas
  - Impact by linking the Building Blocks with company pathways
    - Carbon Direct Avoidance
    - Smart Carbon Usage (Process Integration and CCUS)
    - Circular Economy
  - Enablers: People + Digitization (2% of the total budget)

*ECSC=European Coal and Steel Community (grandfather of the EU)

37 Clean Steel Partnership Projects (2021 onwards)

Total Funding = 204.3 million € [Horizon Europe: 107.3 and RFCS BT: 97.0]

Horizon Europe: 107.3 million € funding (funding rate 60% to 100%)

No.	Project Acronym	Funding call	Area of Intervention	EU Funding (mln Euro €)
1	MaxH2DR	HEU 2021 #18	CDA	4.2
2	HIYIELD	HEU 2021 #19	CE	3.6
3	RemFRa	HEU 2021 #19	CE	4.8
4	CAESAR	HEU 2021 #19	CE	5.6
5	RecHycle	HEU 2021 #22	COMB	6.2
6	PURESCRAP	HEU 2022 #13	CE	5.0
7	TransZeroWaste	HEU 2022 #13	CE	5.0
8	GreenHeatEAF	HEU 2022 #16	PI	3.6
9	ModHEATech	HEU 2022 #16	PI	3.4
10	HyTecHeat	HEU 2022 #16	PI	3.4

No.	Project Acronym	Funding call	Area of Intervention	EU Funding (mln Euro €)
11	Agiflex	HEU 2023 #43	SCU	4.7
12	H2PlasmaRed	HEU 2023 #43	PI	6.0
13	Dust2Value	HEU 2023 #45	CE	4.6
14	ZHyRON	HEU 2023 #45	CE	4.5
15	MEDALS	HEU 2023 #45	CE	5.7
16	SMARTChain	HEU 2024 #44	ENA	5.0
17	DiGreeS	HEU 2024 #44	ENA	5,0
18	ProcTwin	HEU 2024 #44	ENA	4.8
19	NANO-S-MART	HEU 2024 #46	CE	3.1
20	E-ECO Downstream	HEU 2024 #46	CE	5.0
21	ZEROSTEEL	HEU 2024 #46	CE	5.0
22	MOWSES	HEU 2024 #46	CE	4.6
23	CISMA	HEU 2024 #46	CE	4.5

37 Clean Steel Partnership Projects (2021 onwards)

Total Funding = 204.3 million € [Horizon Europe: 107.3 and RFCS BT: 97.0]

Research Fund for Coal and Steel (RFCS): 97.0 million € (funding rate 50% in Big Ticket)

No.	Project Acronym	Funding call	Area of Intervention	EU Funding (million Euro €)
24	MODIPLANT	RFCS BT 2022	PI	8.0
25	FULL2REHEAT	RFCS BT 2022	PI	8.6
26	HYDREAMS	RFCS BT 2022	PI	4.3
27	TWINGHY	RFCS BT 2022	PI	4.5
28	SLAG2BUILD	RFCS BT 2024	CE	4.6
29	Hy4Smelt	RFCS BT 2024	CDA	18.0
30	H2Loop	RFCS BT 2024	CDA	6.2
31	CROSSCUT	RFCS BT 2024	SCU	5.0
32	PRISMA	RFCS BT 2024	ENA	5.1
33	SUPERHEAT	RFCS BT 2025	CDA	3.1
34	RIVER	RFCS BT 2025	SCU	6.9
35	SHINE	RFCS BT 2025	CDA	14.7
36	BSI	RFCS BT 2025	CE	2.4
37	GreenHeat4Rails	RFCS BT 2025	ENA	5.6

Area of Interventions

CDA = Carbon Direct Avoidance
CE = Circular Economy
PI = Process Intensification
SCU = Smart Carbon Usage
ENA = Enablers (people, digitisation)

Examples of EU steel research projects

Scrap

Decarbonisation

Standardisation

ISO Standards

Slags etc.

Digitisation

Collaboration

Scrap Cluster Workshop @ ESTEP, April 2025

- 4 projects joined and discussed how to optimise scrap quality and usage
- Purescrap (workshop leader), CISMA, DiGreeS, CEASAR
- Hybrid workshop

4 projects on Scrap

CAESAR

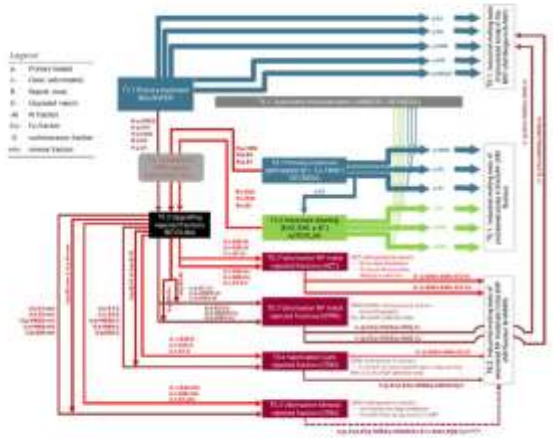
CAESAR ambition: upgrade ferrous scrap & valorise cleaning residues

Project aims

- ✓ to improve sorting of purely FE scrap
- ✓ to valorize all the treatment by-products:
  - Non-ferrous metals
  - Carbon bearer materials (plastics, wood…)
  - Mineral fraction

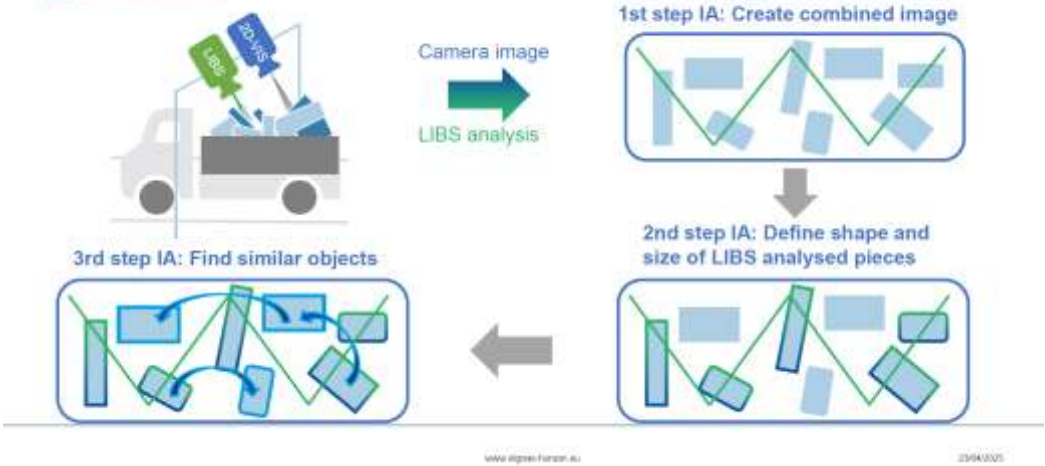
Work on the optimization of separation and purification steps

- ➢ Sensor-based sorting



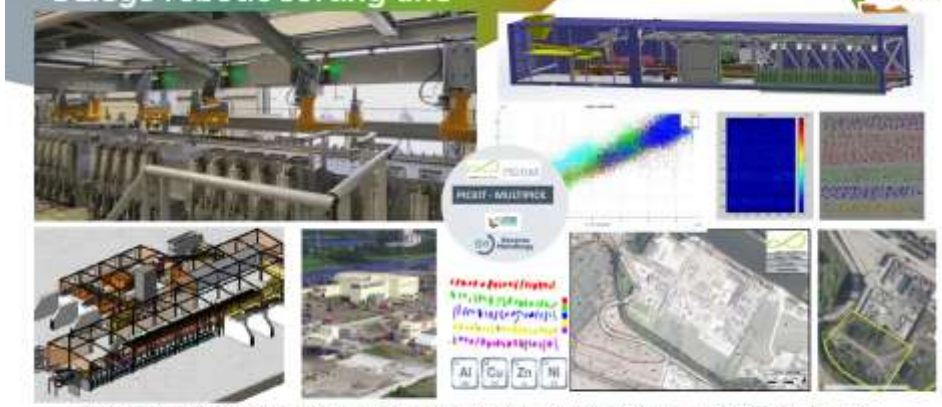
DiGreeS

Heavy melting scrap verification – Image analysis (IA)



ULiège robotic sorting line

CiSMA

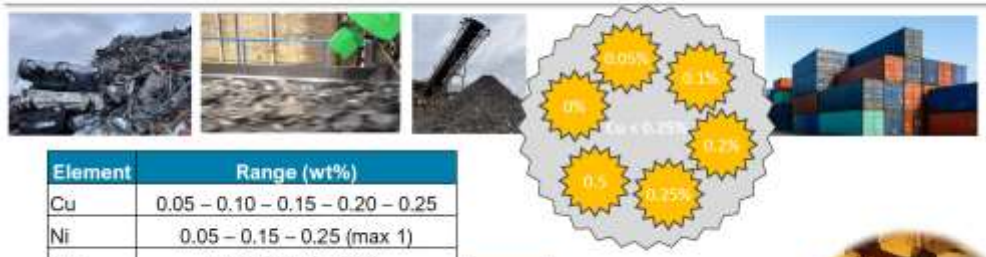


PICKIT – MULTIPICK: first industrial line sorting 10 000 t/year of Zorba @ Comet Traitements in Obourg (Belgium)

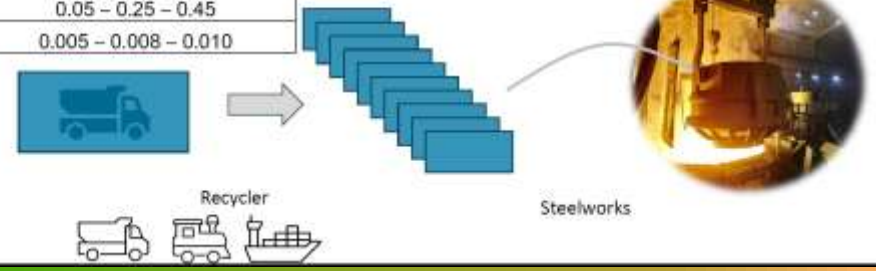
THE PURESCRAP CONCEPT

Batch analysis with chemistry and size information

PURE SCRAP



Element	Range (wt%)
Cu	0.05 – 0.10 – 0.15 – 0.20 – 0.25
Ni	0.05 – 0.15 – 0.25 (max 1)
Mo	0.05 – 0.25 – 0.45
Sn	0.005 – 0.008 – 0.010



Hy4Smelt: 50.5 mln € total budget – 18 mln € funding

Hy4Smelt = Hydrogen-based fluidised bed direct reduction of ultra-fine iron ores and smelting to green hot metal

Co-Funding Strategy with National and European Sources

Hy4Smelt

CAPEX HYFOR-Part funded by aws „Twin Transition“

PRIMETALS TECHNOLOGIES
Mitsubishi Corporation

CAPEX Smelter-Part funded by KPC „Transformation of Industry“

voestalpine
ONE STEP AHEAD.

R&D OPEX funded by RFCS/CSP „Big Tickets for Steel“

PRIMETALS TECHNOLOGIES
Mitsubishi Corporation
voestalpine
ONE STEP AHEAD.
K1 MET
metallurgical competence center
ESTEP
European Steel Technology Platform

R&D Deployment funded by EU Clean Hydrogen Partnership „HI2“

K1 MET

Funding in EUR million

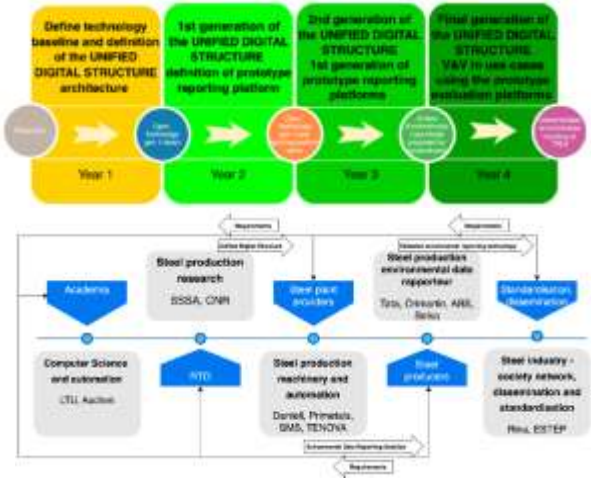
22	austria wirtschafts service aws
30	KOMMUNAL KREDIT PUBLIC CONSULTING
18	CSP The Clean Steel Partnership; Research Fund for Coal & Steel
1,4	HI2 Hydrogen Industrial Inland Valley; Clean Hydrogen Partnership; Co-funded by the European Union

Hy4Smelt – Groundbreaking Ceremony 23 Sep. 2024

Unique financing of the overall project:
RFCS Big Ticket Funding supports OPEX, while national funding supports CAPEX

Work Towards Standardization (2 examples)

- CSP Project: PRISMA
  - April 2025- March 2029
  - Product environmental footprint information system for steel manufacturing (PRISMA)
  - To develop a Unified Environmental Data Model (UEDM), streamlining environmental reporting and analysis across the steel value chain.
  - *https://prisma-project.eu*



Kickoff Meeting April 2025

- CSP Project : CISMA
  - November 2024 – April 2028
  - High-quality sheet steel production from 100% scrap-based EAF routes, reducing CO_2 emissions compared to traditional methods. It focuses on managing residual elements like Copper, improving scrap quality and developing digital tools, with validation through pilot trials in automotive and white goods sectors.
  - *https://cisma-project.eu*

Funded by the European Union

Perfomance of the EU Clean Steel Partnership on KPIs

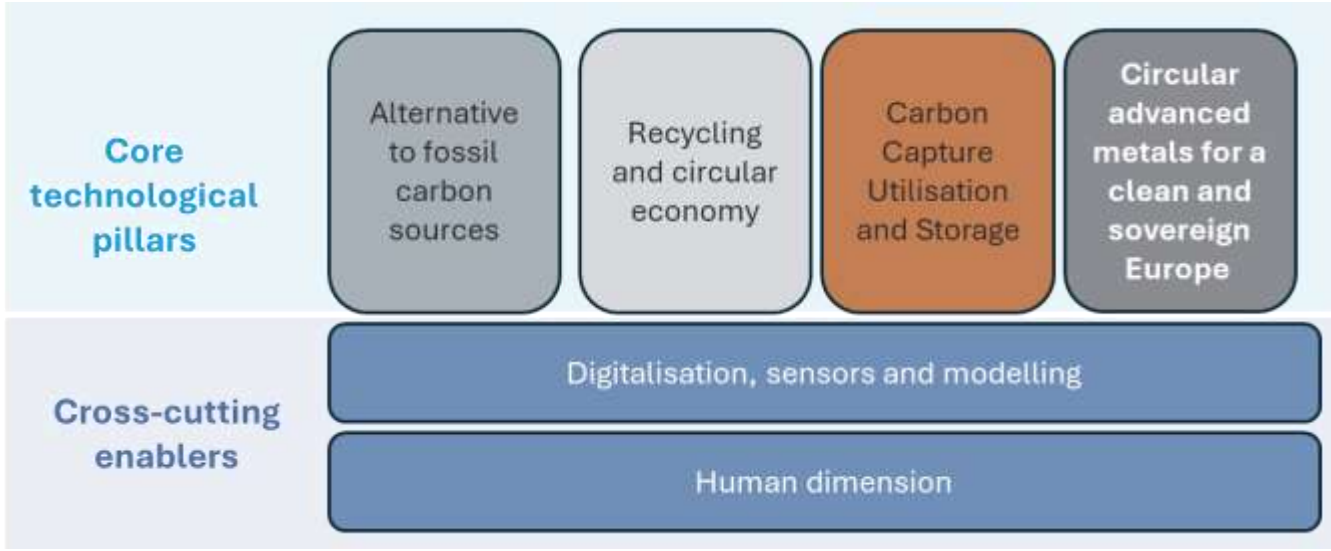
KPI NAME	UNIT OF MEASUREMENT	BASELINE	TARGET 2023	ACHIEVED 2023	TARGET 2025	ACHIEVED 2025	TARGET 2027	AMBITION >2027	CLARIFICATIONS 2025
RESOURCES (INPUT), PROCESSES AND ACTIVITIES									
Steel industry involvement - financial	% of project budget to steel producers	new	>50	65,0	**>50**	**65,3%**	>50	N/A	Exceeded - Slight increase: higher number of benefidiaries among steel producers but with lower % of project budget
Steel industry involvement - inclusivenes	% of CO2 represented by CSP project partners	new	>50	58,0	**>60**	**68,0%**	>85	>95	Exceeded - Significant increase thanks to the larger number of beneficiaries among steel producers
R&D Collaboration science - EU Steel companies	# external reasearch stays funded by the Partnership	new	N/A		**>5 in 4 technology fields**	**48 FTE**	N/A	>10 in 3 technology fields	Based on the share of project funding to academics, 48 FTE from academia were working on CSP projects
Joint calls with other partnerships	# of joint calls	new	N/A		**Min. 2**	**1**	N/A	Min. 5	Joint call topics in Horizon Europe with P4P
OUTCOMES									
Energy use per tonne	%	1990	N/A		**-5% at TRL7**	**Achieved**	N/A	-10 at TRL8	24 projects at TRL7 or 8 allowing >5% energy use reduction per tonne
CO2 capture for CCU/CCS	% capture rate	1990	N/A		**90% at TRL 6**	**Achieved**	N/A	95 at TRL 8	Achieved with amine technology (3D-project) at TRL7
Scrap recycling	% low quality scrap input share	1990	N/A		**>25% at TRL 6**	**Achieved**	N/A	+50 at TRL 8	5 projects allowing >25% ow quality scrap input, at TRL 6 to 8
Breakthrough in technology building blocks	% projects TRL 7	1990	N/A		**Min. 50%**	**69,0%**	N/A	Min. 85 (Min. 75 TRL 8)	Achieved with 69% of CSP projects at TRL 7 or 8
Upskilled labour force	# dedicated programmes	0	N/A		**Min. 1**	**Achieved**	N/A	Min. 3	The European Steel Skills Agenda (ESSA) continues as an active, sustainable initiative
IMPACTS									
EU market share clean steel products	% of clean steel out of total EU steel demand	N/A	N/A		**Acceptance of definition of clean steel and its products**	**In progress**	TBD	Start of roll-out of clean steel and its products	Progress made in 2024-2025 in annual workshops "Green Steel Dialogue" with all stakeholders
Global market share EU technology providers	% growth	2020	N/A		>5%	**Achieved**	N/A	+10	Key EU players: +5% in EAF, +25% in H2DRI, +20% in CCUS (based on public announcements)
Gross Added Value clean steel production	% growth	2020	N/A		>1%	**Achieved**	N/A	+2 in 2030	Estimated at >1% based on H2DRI pilot projects (which did not yet exist in 2020) and scrap/EAF using green electricity (based on the growth of renewable electricity in the EU).
CO2 emission reduction	t C02e/tCO2e_1990	1990	N/A		N/A	**In progress**	N/A	-55% in 2030	Estimated -35% in 2025

Future of EU Steel Research

- Continuation of active research ecosystem
- Attractiveness of funding opportunities
- 2 Examples of high priority ESTEP actions
  - Steel and Metals Partnership (SAMP)
  - Flagship Initiative

Future of EU steel Research: (1) SAMP

- Steel and Metals Partnership (SAMP)
  - 2028 – 2024 aligned with next EU Framework program
  - Fully supporting the EU policy document: Steel and Metals Action Plan (2025)
  - High synergies between metals:
    - ESTEP
    - European Aluminium
    - European Metals
  - Strengthen Resilience and competitiveness of EU metals' industry
    - Optimise the low-CO2-production processes
    - Higher Flexibility of processes



Future of EU steel Research: (2) Flagship Initiative

- Starting Point
  - EU steel industry facing tremendous challenges mainly due to special EU policy
  - Global situation (overcapacity, tariffs, war, etc.) enhances challenges
  - Subsidies of Billions of EUROS do not do the trick – investments delayed

- ESTEP-EUROFER approach:
  - EUROFER
    - Europe should accelerate steel decarbonization with dedicated policies that simultaneously maintain competitiveness, protect against unfair imports, lower energy costs, create demand for green steel, and support investment in European production
  - ESTEP (including its member EUROFER) focusses on
    - technology development, research, innovation and its deployment
    - Collaborative research, its implementation and roll-out is key for future competitiveness
    - EU steel industry has to be ready, once the policy framework allows a sound business case

- The Flagship Initiative combines existing and new actions towards a sustainable, low-CO2 iron&steelmaking in Europe
  - Consists of research, pilot&demonstration, up-scaling, First of its kind (FOAK), n of its kind (NOAK)

Context of Flagship Initiative

- General objective: fasten demonstration of near-zero decarbonization of the iron&steel upstream processes (90% CO2 emission reduction) within EU constraints and EU Climate law
- Pathways:
  - Electric Arc Furnace & Smelter: **E-Axis**
  - Hydrogen-rich Direct Reduction
  - Innovative Shaft Furnace: **CARVI – Carbon Reduced Virgin Iron**
  - Circular Economy
- Special actions for projects with high TRL (and promising medium-TRL)
  - Joint exercise of the full ESTEP community in collaboration with all stakeholders
  - Creative and realistic solutions in not-so-easy times
  - Way forward based on scalable and flexible solutions – no “one silver bullet”
- Timeline : 2026-2035
- Raise awareness and deepen understanding of existing and future EU and national instruments
  - Successful journey depends on collaboration of all actors
- Power of Flagship Initiative multiplied by inter-pathway-synergies
  - Technologies are not pathway-specific
  - Actions and projects complement each other and do not compete

Thank you very much for your attention

CSP
The Clean Steel Partnership

ESTEP
European Steel Technology Platform

FUTURE STEEL FORUM
2026 3-4 JUNE • BOLOGNA • ITALY

www.estep.eu

7. 2026 ESTEP Events including raising awareness actions

- Spring Dissemination Event, Brussels

- AI4Steel Workshop (Leoben)

- Clean Steel Roundtable, online

- Future Steel Forum (Bologna, Italy)

- 13th European Slag Conference, Luleå

- Annual Event, Gent

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

- Green Steel Dialogue, Brussels

- Compliance Training

- AISTech,4-6 May Pittsburgh, US

- EEC, 11-13 May, Milan, Italy

- ESTEP & CSP Info-Day, tbd