EU Clean Steel Partnership (CSP)
Webinar on the roadmap
supporting its public consultation

Klaus Peters, Secretary General, ESTEP

08 Sep 2020, 14.00
Remote Meeting
Agenda

14:00 • Introduction
• Overall Process
• Clean Steel Roadmap
  • Vision
  • Research and Innovation Strategy
  • Expected Impacts
  • Governance
• Summary and Conclusion
14:30 • Questions and Answers
15:00 • End

Additional remarks:
• Webinar will be recorded
• Documents available
  • Presentation today
  • Recorded webinar tomorrow
  • …
EU Clean Steel Partnership
Keeping the EU Leadership in Low Carbon Steelmaking

- Scalability, Affordability andCircularity will define the winning technologies in 2050

- Primary and Secondary Steelmaking requires novel approaches and breakthroughs

- More collaboration will be required with all partners in the value chain
  - Working together among competitors to overcome challenges is not an easy exercise
  - ESTEP is ready to work on providing added value events and support innovation actions for the steel community, which are screened by the experts on competition compliance

Nature friendly, “rusts” back
Preferred material, universally used in very diverse sectors
Key material for our future sustainable economy
Circular, easy to recover and 100% recyclable

sustainable steel
Clean Steel Partnership (CSP)

The overall process

- Information, communication involvement
  - Systematic exchange with DG RTD unit D3 and DG Grow unit C2
  - Presentation in related EU events – open communication with other sectors
  - Broad consultation with full value chain of the steel sector (producer, supplier, RTO, customer)
  - Consultation of other stakeholders, in particular Member States and NGOs

- Start “Big Ticket” in autumn 2016
- Preparation as EU partnership in 2018 ("Big Scale"): contractual / institutional
- Creation of proposal and roadmap document for Clean Steel partnership 2019+2020
  - Proposal published on Europa website June 2020
  - Roadmap published on ESTEP website July 2020
- Public consultation of the CSP roadmap on ESTEP website: Jul-Sep 2020
- Final CSP roadmap: Autumn 2020
- Memorandum of Understanding: end 2020
- 2021: start of EU Clean Steel – Low Carbon Steelmaking Partnership (CSP)

Alignment on complementarity with
- A.SPIRE / P4Planet: e.g. coordinated calls on CCU
- Fuel Cell Hydrogen Clean Hydrogen: H for reduction (100.000 t in 2027)
Clean Steel Partnership
Vision: context of CSP

• Two major challenges
  • climate change and
  • sustainable growth for the EU.

• In line with EU policy
  • European Green Deal
  • Clean Planet for All strategy
  • Paris Agreement
  • Recovery Plan (COVID19)

• Integrated approach
  • fighting climate change
  • moving towards climate neutrality by 2050
  • contributing to zero pollution ambition
  • increasing circular economy
  • supporting the EU commitment to the United Nations Sustainable Development Goals
  • Contributing to sustainable growth based on knowledge and innovation (Horizon Europe)
Clean Steel Partnership - Roadmap
Vision, expected impact nad general objectives

Vision

• The EU steel industry stays at the forefront of low carbon technologies and is climate neutral by 2050 in a sustainable way.

Expected impact and general objective

• Accelerate the transformation of the steel industry by
  • tackling important R&D&I challenges and
  • bringing a range of breakthrough technologies for clean steel production up to large scale demonstration by 2030

• Develop technologies at TRL8 to reduce CO₂ emissions stemming from EU steel production by 80-95% compared to 1990 levels by 2050, ultimately leading to carbon neutrality.

• CSP general objective
  • aligns with commitments set by the European Green Deal and
  • contributes to UN Sustainable Development Goals.
Clean Steel Partnership
Vision: Specific objectives and expected impacts

Specific objectives and impact of the Clean Steel partnership

• Specific and operational objectives to be achieved in 7-10 years (full intervention logic in development)

• Promote a transformational change in how R&D&I activities are conducted in the steel sector.
  • identifying, bringing together, coordinating and enabling multiple breakthrough technologies with high decarbonisation potential.
  • relying on strong collaboration and joint commitment from both the private and public sectors, thus reducing overlaps in R&D&I efforts and funding and ensuring better synergies and larger impacts.

• Positive spill overs on suppliers will foster green energy generation, efficient production systems, and hydrogen technologies. As regards customers, R&D&I investment in the steel sector will lead to the production of a cleaner, high-quality steel, which in turn will stimulate the production of goods with lower lifecycle impacts.

• Create synergies with other sectors

• Foster collaboration across Member States and Associated Countries to develop breakthrough technologies.

• A vibrant EU steel industry
  • sustain economic growth, preserve high-quality jobs, and ensure leadership in renewable energy technologies.
Clean Steel Partnership
Research and Innovation Strategy

3 Technology Pathways
• Carbon direct avoidance (CDA)
• Smart carbon Usage (SCU)
• Circular Economy (CE)

Focus on impact in steel plants

6 Areas of Intervention
• Following technology pathways

CSP budget allocation

12 Building Blocks
• Bring to TRL8 at large scale

Collaborative research and innovation
### R&I Strategy of the Clean Steel Partnership

**Impact along 3 Technology Pathways: CDA, SCU, and CE**

<table>
<thead>
<tr>
<th>Pathways/Groups</th>
<th>Description</th>
<th>Smart Carbon Usage (SCU)</th>
<th>Circular Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pathways/Groups</strong></td>
<td>Process Integration with reduced use of carbon (+CCS)</td>
<td>Process Integration with reduced use of carbon (+CCS)</td>
<td>Enhancing the recycling of steel (e.g. scrap in BOF/EAF*) and its by-products, Resource efficiency</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Integration of process steps and internal use of process gases</td>
<td>Carbon Valorisation/Carbon Capture and Usage (CCU) (+CCS)</td>
<td>Carbon Direct Avoidance (CDA)</td>
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<td>Hydrogen</td>
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<td>Use of renewable electricity in basic steelmaking, e.g. production of H2 to replace carbon</td>
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<td>Using CO/CO2 from steel mill as raw material (Chemical conversion of CO/CO2)</td>
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Clean Steel Partnership
Investments and Resources

- Major private investment would match
  - public funding from Horizon Europe and
  - the Research Fund for Coal and Steel
  - (EUR 700 million / 700 million)

- Additional private investment
  - Projects with funding from other public sources (e.g. other EU programmes, national or regional programmes)
  - Staffing of Program Office
  - Bridging the gaps between funded projects and towards full industrial scale installation

Financial Figures of R&I activities for Clean Steel
Development of key breakthrough technologies up to TRL8 in 2020-2050

- Total R&I need
- Consolidated R&I need
- in 2021-2027
- CSP budget in 2021-2030

EUR million:
- 3000
- 2550
- 2000
- 1400

Timeline:
- in 2021-2027
- in 2021-2030

- in 2021-2027
- in 2021-2030
R&I Strategy of the Clean Steel Partnership
Envisaged budget split along 6 areas of intervention

<table>
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<tr>
<th>6 Areas of Intervention</th>
<th>Budget split according areas of intervention</th>
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<tbody>
<tr>
<td></td>
<td>CDA</td>
</tr>
<tr>
<td>CDA</td>
<td>25%</td>
</tr>
<tr>
<td>SCU-PI</td>
<td>25%</td>
</tr>
<tr>
<td>SCU-CCUS</td>
<td>25%</td>
</tr>
<tr>
<td>CE</td>
<td>5%</td>
</tr>
</tbody>
</table>

Column: average value; line: min- and max-value

- **CDA** = Carbon Direct Avoidance
- **SCU** = Smart Carbon Usage
- **PI** = Process Integration
- **CCUS** = Carbon Capture and use/storage
- **CE** = Circular Economy
R&I strategy of the Clean Steel Partnership
Collaborative R&I defined by 12 Building Blocks

12 Building Blocks

1: Gas injection
2: Metal oxide reduction
3: Melting technology
4: Production adjustment
5: CO/CO₂ utilisation
6: Raw materials
7: Heat generation
8: Energy
9: CE solutions
10: Enablers
11: Downstream processes
12: Innovative applications

Foreseen innovations cover
- High TRL research and
- Pilot & demonstration

Impact timeline
- Project results provide short time impact
- Company follow-up generates long term impact
Clean Steel Partnership
Results via Multi Stage Approach

Stage 1
4 BBs at TRL7

Stage 2a
4 BBs at TRL7
6 BBs at TRL8
2 demo’s at TRL8

Stage 2b
4 building blocks at TRL7

Stage 3
4 BBs at TRL7
6 BBs at TRL8
2 demo’s at TRL8

Legend:
towards -50% target (2030)
towards -80% & carbon neutrality target (2050)
Governance, composition, openness and transparency

Overview

• Clean Steel Partnership will be established between
  • European Commission and
  • European Steel Technology Platform (ESTEP)

• Clean Steel Partnership will include the entire EU steel value chain community
  • Steel producers
  • Suppliers
  • Customers
  • Plant builders
  • RTOs, and
  • Steel processors
  • will involve any other relevant stakeholders beyond the steel industry, and
  • will be constantly open to new partners.

• Clean Steel Partnership will continuously cooperate with public entities at all levels to ensure the alignment of research, innovation and deployment strategies with EU, national and regional programmes and policies, in order to maximise efforts.
Governance, composition, openness and transparency

Governance details

- **Legal entity of ESTEP**
- **More details to be defined**
- **Open for new members**
- **Members**
  - Steel value chain
  - Industry driven
  - Large Industry as well as SMEs
- **Broad stakeholder involvement**
  - Non-members
  - Member States
  - NGOs
  - Etc.

**Stakeholder Forum**
- Governance Board
- Implementation Group
- Task Forces
- Programme Office
- Experts Advisory Group
Summary and Conclusion

• Steel needs EU – and EU needs steel
  • Carbon neutrality
  • Sustainable growth

• EU steel industry
  • At forefront of carbon neutral steelmaking technologies
  • Ice-breaker for other sectors to transform to carbon neutrality – without doing harm to other EU objectives

• EUR 1.4 billion partnership => EUR 2.55 billion R&D&I need for decarbonisation
  • 50% private / 50% public (Horizon Europe + European Community for Coal and Steel assets)

• Full steel value chain involved + broad stakeholder engagement

• High TRL + large scale demonstrators
  • Accelerate transformation of EU steel industry towards carbon neutrality

• Open, inclusive governance using legal entity of ESTEP
Thank you for your attention

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Public Consultation of the CSP Roadmap:
A number of external conditions must be met for these investments to be realised:

- **Policy**: EU continues considering low-carbon manufacturing industries – including the steel sector – a pillar of its industrial policy. EU and Member States continue their support towards the circular economy, and establish a supportive regulatory framework.

- **Economy**: State aid framework (IPCEIs), a stable financing flow from both public sources (e.g. ETS Innovation Fund, loans and guarantees from InvestEU) and private sources, availability of competitively-priced low CO$_2$ energy supply, common European hydrogen strategy, and consistent policies against carbon leakage.

- **Societal**: Availability of a highly skilled workforce and awareness of EU citizens for clean steel products.

The Partnership will establish **systematic exchanges** with relevant bodies managing other Horizon Europe initiatives and other EU actions and programmes, to avoid duplication, clarify overlap, **foster collaboration** and **maximise synergies**.

The Partnership has already identified several **national** policies, **programmes** and activities that may create high synergies when it comes to R&D&I activities contributing to the decarbonisation of the steel industry.