

The Clean Steel Partnership as accelerator towards climate neutrality

EU Sustainable Energy Week

18 October 2021

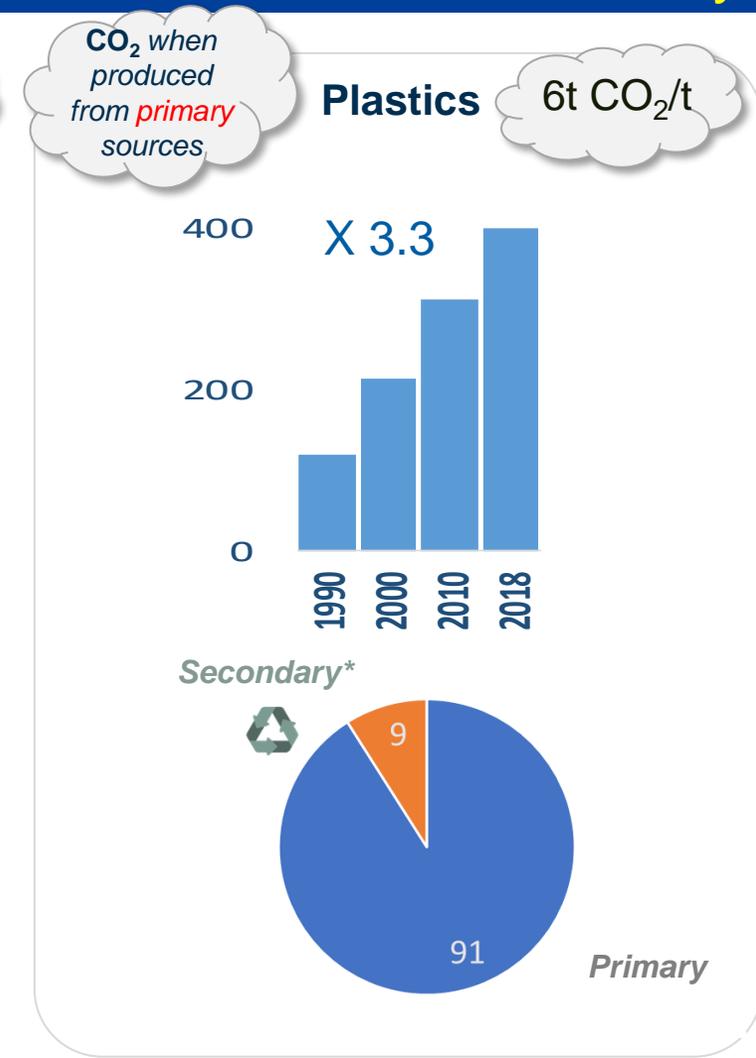
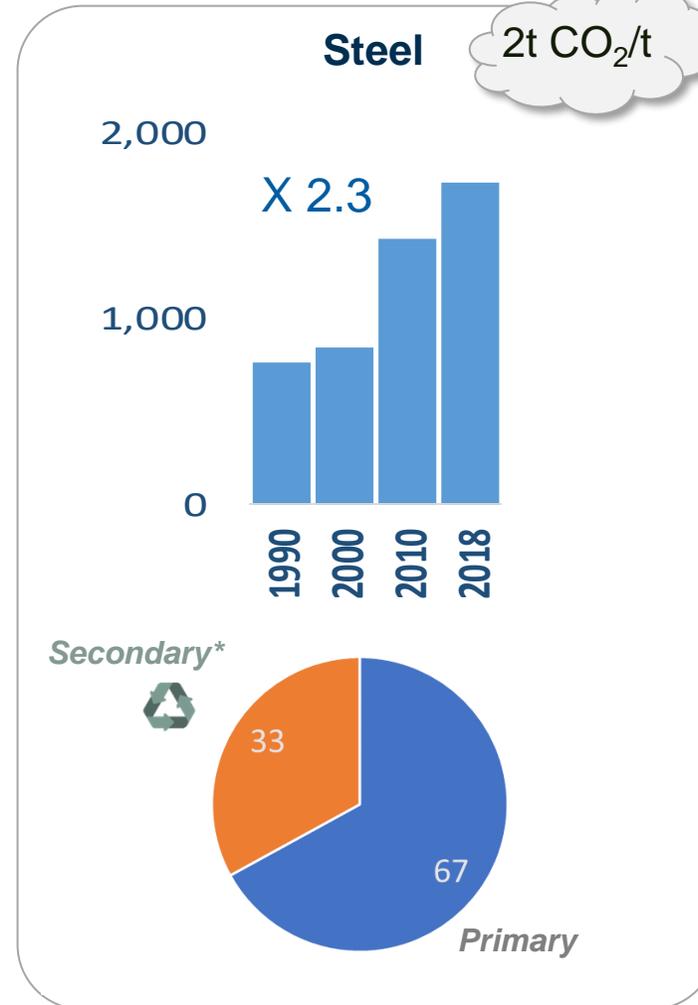
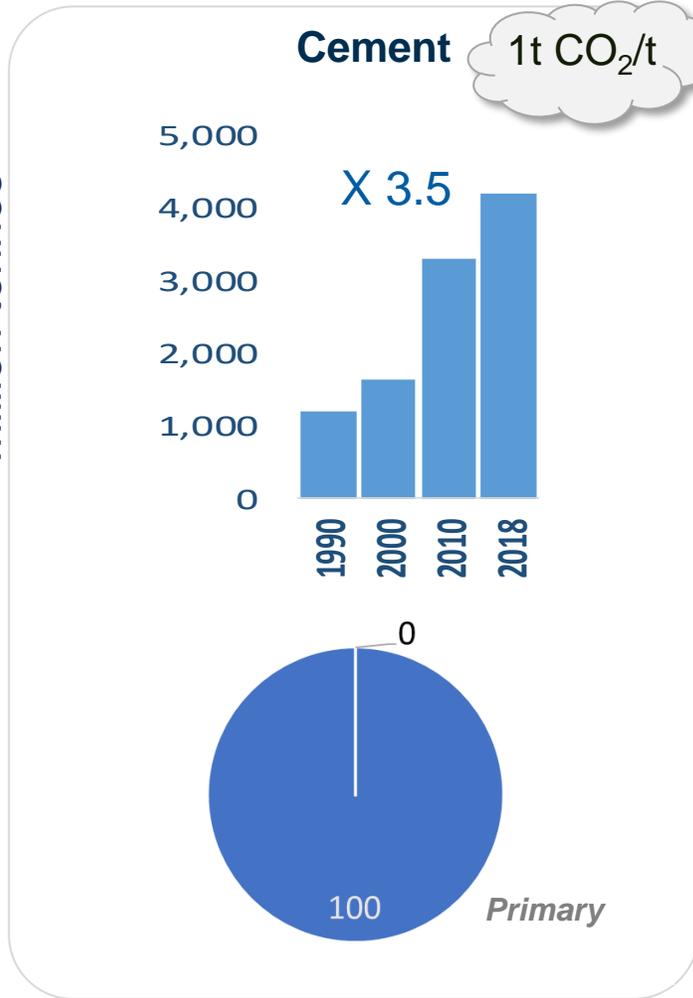
Klaus Peters
Secretary General, ESTEP



Global production

Million tonnes

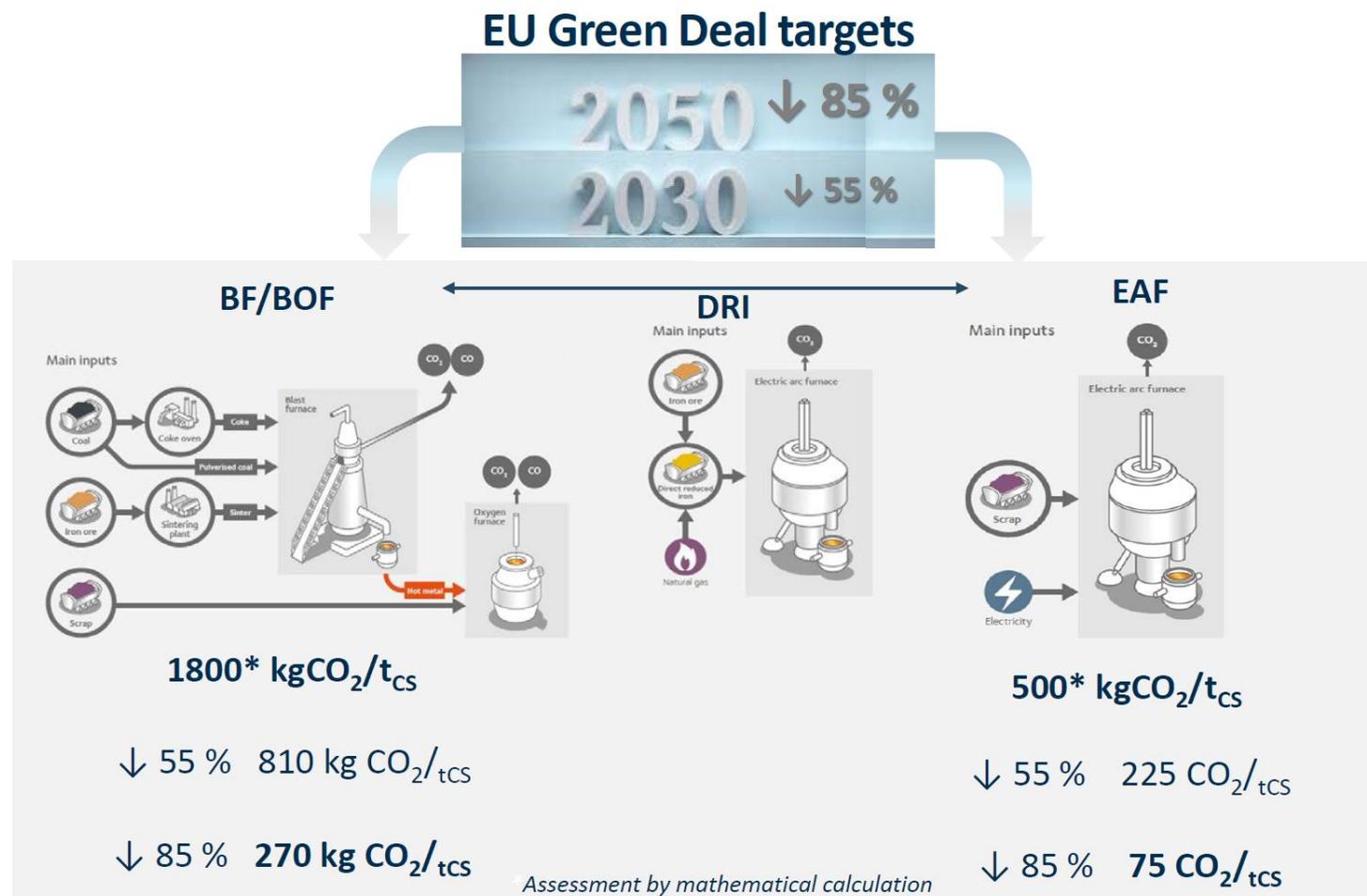
Sources



Materials are responsible for 25% of GHG and demand has tripled over the last 30 years.

* Defined as end of life material recycled to make same material again
Sources: WSA, Plastics Europe, ArcelorMittal Corporate Strategy analysis

- Scalability, Affordability and Circularity will define the winning technologies in 2050
- Primary and Secondary Steelmaking requires novel approaches and breakthroughs
- Unique opportunity to partner with players in Renewable Power and in Chemical recycling
- Collaboration in Europe is Key



- Partnership in the frame of Horizon Europe (HEU) in 2021 to 2027/2030
 - Public side: **DG RTD & DG Grow**
 - Private side: **ESTEP & EUROFER**
- 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 CO₂ emission reduction potential of at least 50% (80%)
- CSP-Budget: € 1.4 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)
- Total need for large R&D&I projects on low-carbon steelmaking technologies
 - € 2.55 billion (estimate)
 - Funding gap outside the partnership financed also with other EU and national instruments.



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

3 Technology Pathways

- Carbon direct avoidance (CDA)
- Smart carbon Usage (SCU)
- Circular Economy (CE)

Each pathway needs hydrogen!

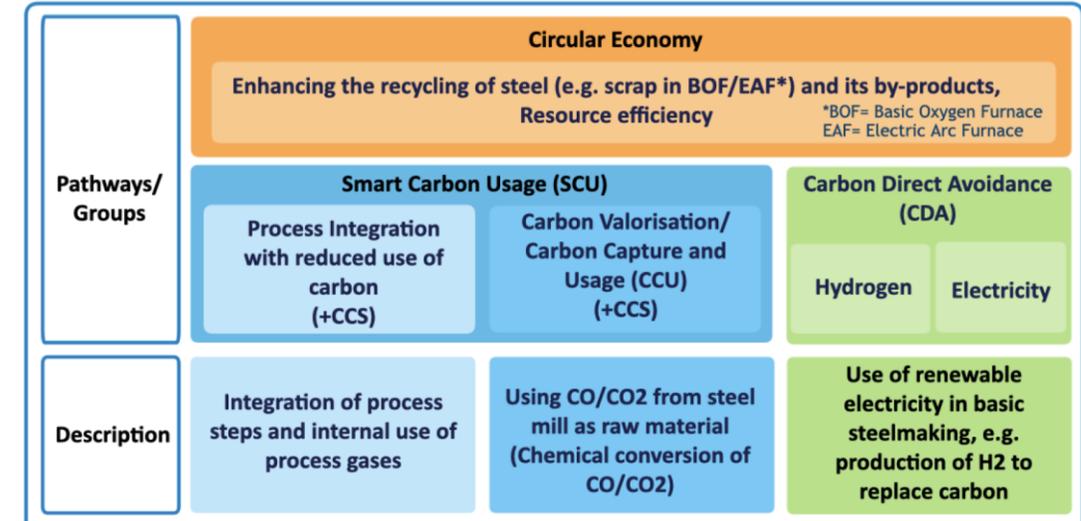
6 Areas of Intervention

- Integrating BB into the 3 Pathways
- CDA, SCU-PI, SCU-CCUS, CE, combination
- Include enablers (Digitisation+Social Innovation)

12 Building Blocks

- Bring to TRL8 at large scale
- Foster collaborative projects

TRL=Technology Readiness Level
CSP roadmap (SRIA): www.estep.eu/clean-steel-roadmap



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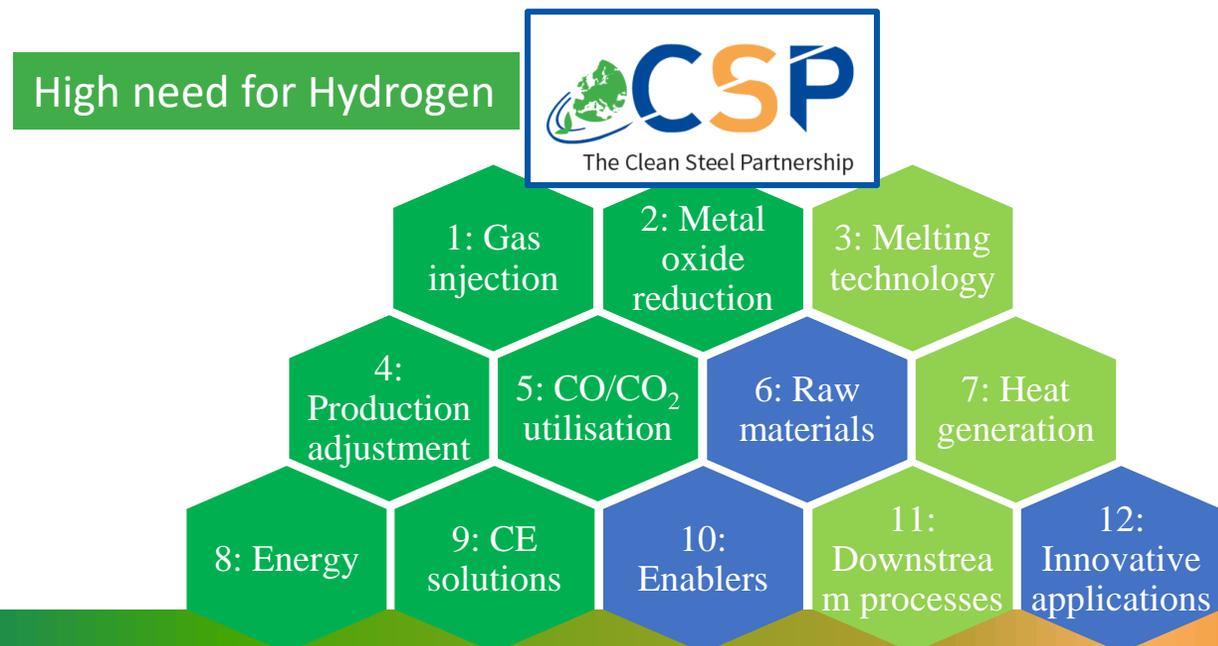
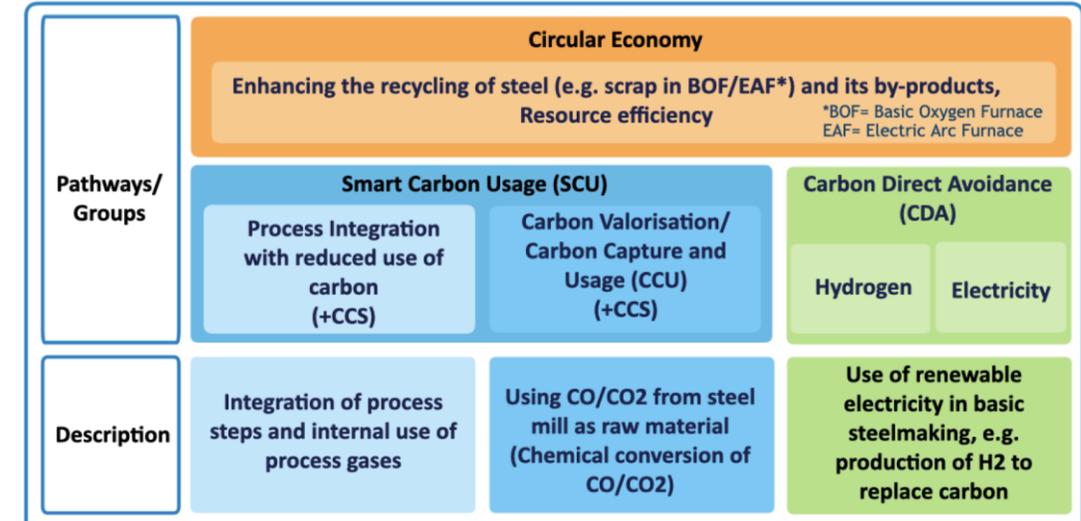
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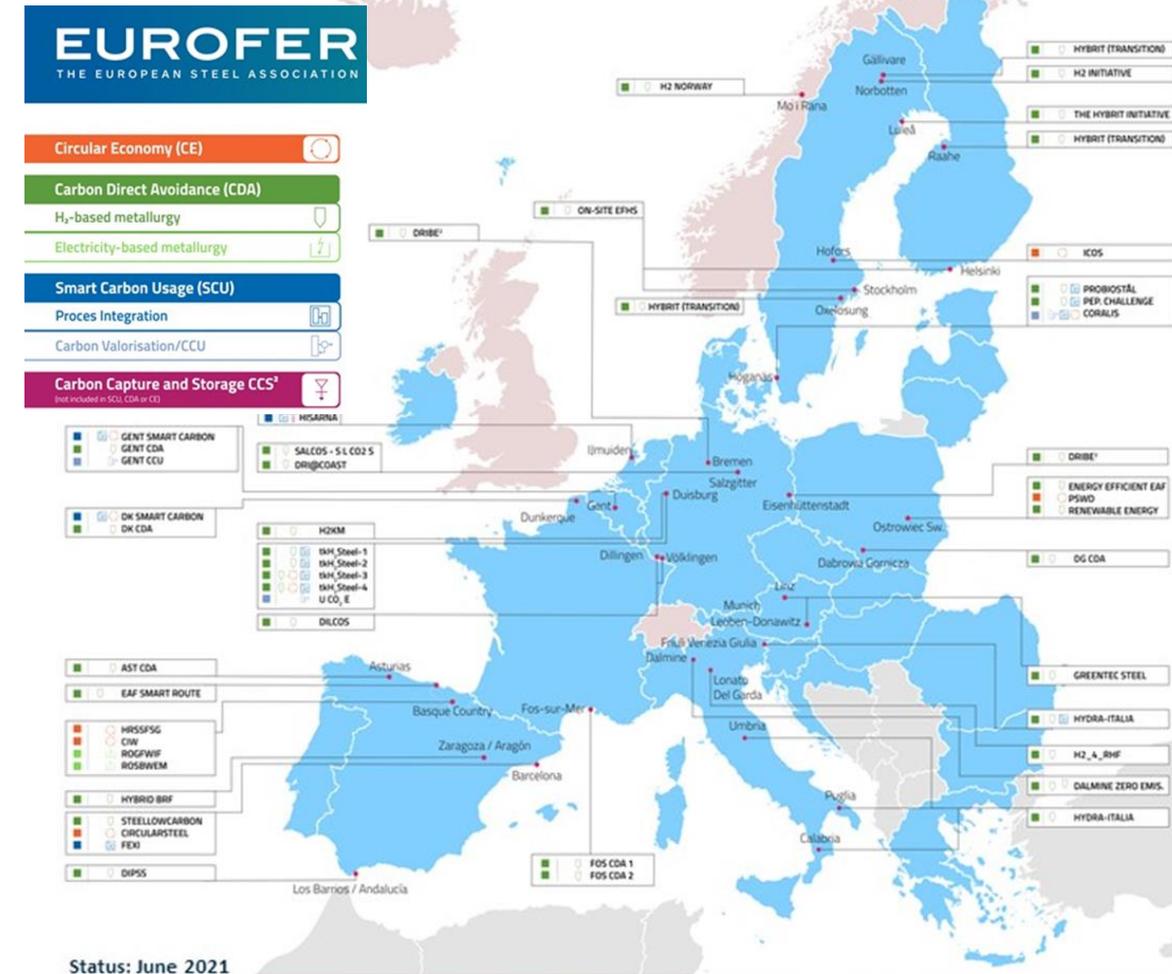
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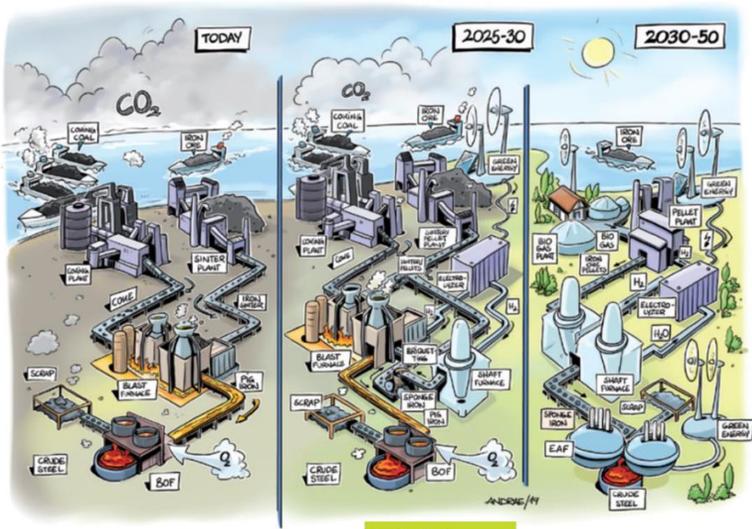
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- Innovation Fund (ETS)
 - estimation -
 - 16 large scale projects responded to the first call
 - Objectives of projects: -25% to -45% CO₂ by 2025 to 2030
- IPCEI proposal (funding by member states) estimation as of June 2021
 - 54 steel projects
 - Start before 2030
 - Technology Readiness Level (TRL) at least 7
 - Capex needs: 25 billion EUR
 - Opex needs: 45 billion EUR
 - Potential annual CO₂ abatement in 2030
 - 76 Mio tons CO₂/year
 - Equal to 1/3 of total direct and indirect CO₂ emissions of EU steel
 - **Hydrogen** needs: 0.6 to 1.2 Mt hydrogen/y and 10 to 12 TWh/y (tbc)
(For complete shift of 90 mio. t BF steel to hydrogen: ~400 TWh/y)
- The success of these projects and their envisaged emission reductions require a **legislative framework** that effectively addresses **carbon leakage** both during and after the projects implementation
=> Green Deal + Fit for 55% Package





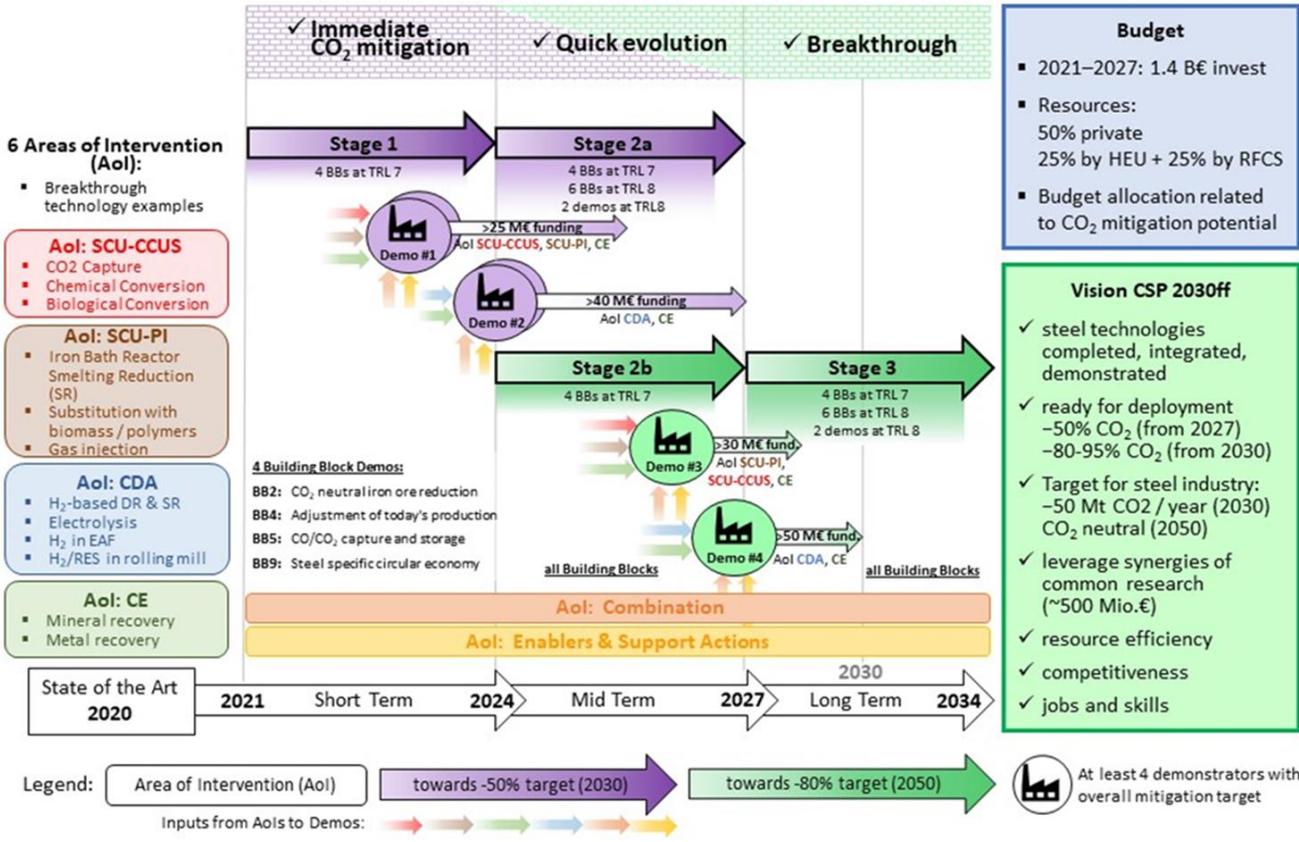
Roland Berger, May 2020



The future of steelmaking | 13



Pilot & Demonstration plants Completion and Integration First-of-a-kind deployments



Budget

- 2021–2027: 1.4 B€ invest
- Resources: 50% private, 25% by HEU + 25% by RFCS
- Budget allocation related to CO₂ mitigation potential

Vision CSP 2030ff

- steel technologies completed, integrated, demonstrated
- ready for deployment: -50% CO₂ (from 2027), -80-95% CO₂ (from 2030)
- Target for steel industry: -50 Mt CO₂ / year (2030), CO₂ neutral (2050)
- leverage synergies of common research (~500 Mio.€)
- resource efficiency
- competitiveness
- jobs and skills

Thank you for your attention!



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15 October 2021