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The European Steel Association

Developing The EU Long-term Climate Strategy: Overall Impact of sectoral Roadmaps

Towards An EU Masterplan For A Low-carbon, Competitive European Steel Value Chain

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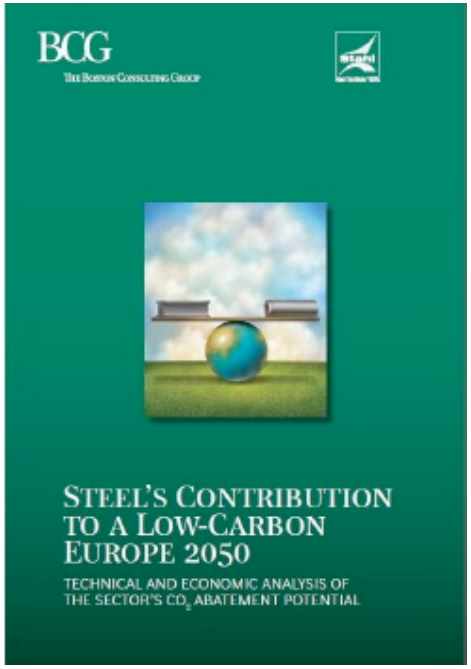
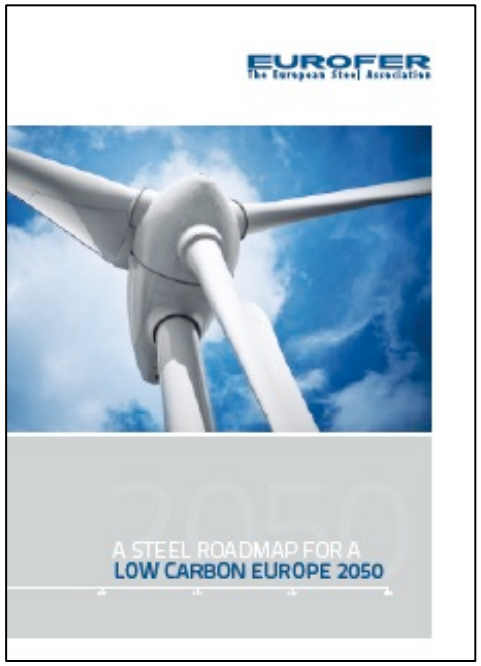
Jean Theo Ghenda – Adolfo Aiello
EUROFER

EU steel sector has assessed and reported its CO_2 reduction potential up to 2050 and highlighted the pre-requisites

BCG/VDEh report



EUROFER Steel low-carbon Roadmap 2050

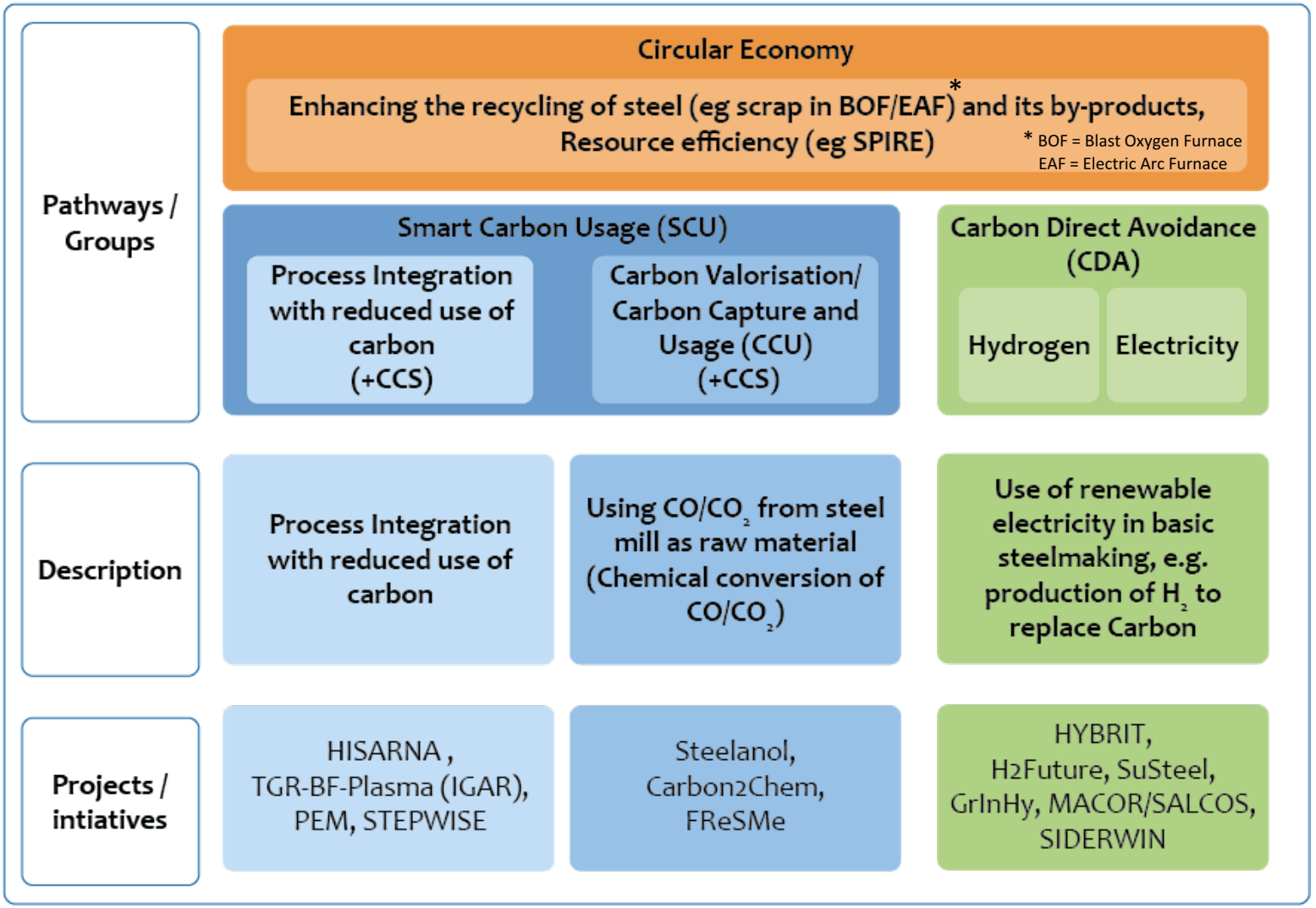


- **Published in 2013 – with long term horizon (2050)**
- **Large diffusion through publications and discussions with stakeholders**

"Breakthrough" technologies are necessary to deliver the emission reductions set out by the EU of 80-95% by 2050 vs 1990 level

- Key findings of the roadmap published in 2013:
  - Economically viable CO2 reduction potential by 2050 is very limited due to high level of efficiency already achieved – in particular in primary production route.
  - Absolute CO2 emissions in 2050 could be almost 60% lower than in the 1990s with the full implementation of CCUS
  - "Breakthrough" technologies are needed to deliver the emission reductions set out by the EU
- Hence, the EU steel industry is working on a range of new technologies as a set of technologies might be needed to bring about the most sustainable outcome by 2050.

Technological pathways to CO_2 reduction in steel



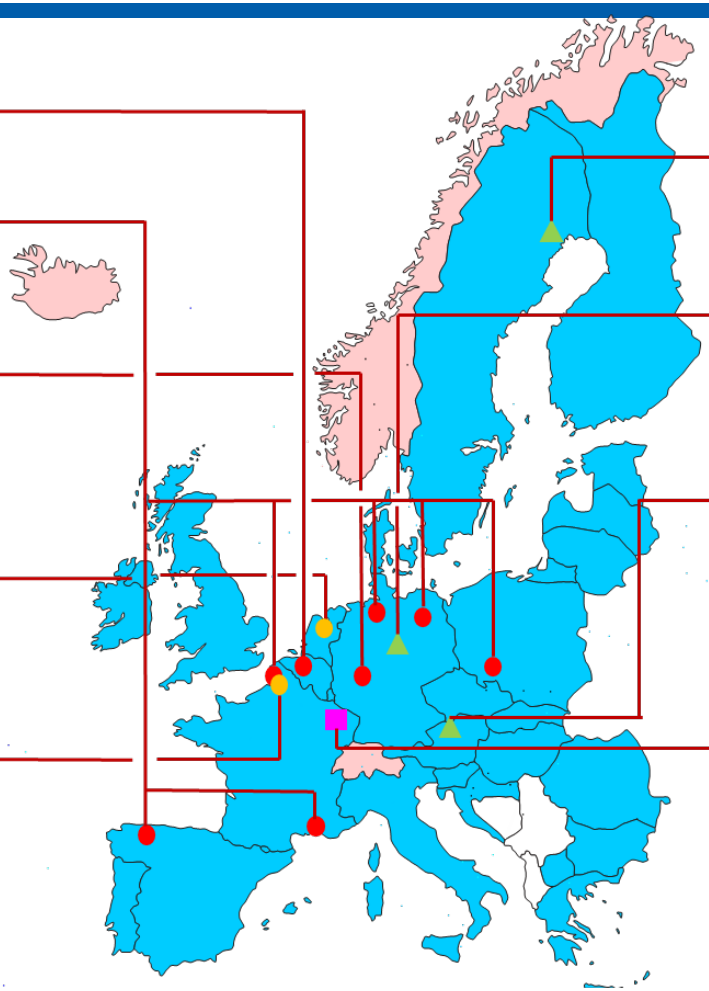
Mapping key innovative low-carbon projects of the EU steel industry

Steelanol - *Ghent*
2015-2017: R&D+Engineering+Pilot test
2018-2020: Full demonstration plant
2021-2030s: Scale-up and Roll-out in AM plants

Carbon2Chem - *Duisburg*
2015-2020: Proof of concept
2020: Start scale-up on industrial scale
2030s: Start large scale implementation

HIsarna - *IJmuiden*
2018-2020: Pilot plant
2021-2025: Industrial Demo. plant (1.2 Mt/y) first hot metal 2024
2025: Production & further roll-out

IGAR - *Dunkerque*
2018-2020: Pilot plant
2023-2027: Demonstration plant
2030s: Roll-out



Hybrit - *Lulea*
2018-2024: Pilot plant
2025-2035: Demonstration plant
2036: Roll-out

SALCOS - *Salzgitter*
2018-2020: Pilot phase
2021-2050s: Full implementation phase

H2Steel – *Linz & Leoben*
2017-2030: Demo H_2 PEM electrolyser
2019-2030: Pilot HPSR*
2030-2035: Demonstration Plant
2036: Start Roll-out
*Hydrogen Plasma Smelting Reduction

SIDERWIN- *Maizières*
2018-2022: Pilot cell
2022-2030: Large scale pilot
2035s: Roll-out

- Process Integration
- CO_2 Valorization /CCU
- H_2 based steel making
- Iron ore electrolysis

Start of **market roll-outs** if CAPEX & OPEX are competitive at demonstration phase, & regulatory framework conditions and infrastructures beyond site borders are in place

Source: Publicly available literature, presentations

Industrial demonstration of 7 projects & roll-out

Period	Smart Carbon Use (SCU) Carbon Direct Avoidance (CDA)		CO_2 reduction potential* (up to…)
2018-2021	SCU	CCU (ethanol)	80% with CCS and H_2
2021-2025	SCU	CCU (methanol)	80% with CCS and H_2
2022-2027	SCU	Process Integration	80% with CCUS
2025-2030	CDA	Hydrogen based steelmaking	95%
2025-2030	CDA	Hydrogen based steelmaking	95%
2025-2035	CDA	Hydrogen based steelmaking	95%
2025-2035	CDA	Iron ore electrolysis	95%
2022, 2026, 2031, 2036	Start of **market roll-outs** if CAPEX & OPEX are competitive at demonstration phase, & regulatory framework conditions and infrastructures beyond site borders are in place		

*Potential CO_2 reduction compared to Blast Furnace route in case of full scale implementation. CO_2 reduction of the entire steel industry depends on the combination of production technologies.

Key Messages For Policymakers (1)

- **The aim** of this long term climate strategy should be to **identify the necessary conditions to mobilise investments for a successful transition to a low carbon economy and define concrete actions and tasks in order to deliver such conditions in time.**
  - Prioritising research into low-carbon and fossil-free breakthrough technologies **in sectors with a high share of global greenhouse gas emissions** will allow the EU to pave the way for significant CO2 emission reductions in Europe and globally.
  - Therefore, we call for a **Mission for Low Carbon Industry** in the framework programme "Horizon Europe". This Mission should include a **European Partnership for Low Carbon Steel in form of a Joint Undertaking**.

Key Messages For Policymakers (2)

- The first priority should be to **mobilise the necessary public and private investments for the demonstration, scale up and commercialisation of breakthrough technologies:**
  - Bringing ongoing projects of the EU Steel industry up to industrial scale will require an additional financing of **up to 11 billion euros in the years 2021-2034**.
  - **Several sources of financing at EU and national level should be used in a complementary way**, including Horizon Europe, the EU ETS Innovation Fund, the European Fund for Strategic Investments (EFSI), Important Projects of Common European Interest (IPCEIs), etc.
  - Public financial support should **better cover the risk sharing** and address also the challenge of the high OPEX of the projects

Key Messages For Policymakers (3)

- The second priority is to **secure sufficient, reliable and competitively priced low carbon energy:**
  - ✓ The new low carbon technologies (also for the entire EU industry) will require **significant amounts of electricity** to operate.
  - ✓ With the full deployment of its new technologies, **the steel sector alone could need more than 400 TWh of (carbon-lean) electricity per year**.
  - ✓ The first step to address this challenge is to **map the necessary investments in infrastructures** (hydrogen, high voltage electricity, CO2 pipelines, etc.) and develop a plan for the implementation on the ground.

Key Messages For Policymakers (4)

- The third priority **is to start shaping the mix of measures for the right regulatory framework to preserve a level playing field of energy intensive sectors exposed to international competition such as the steel industry.**
  - **Shield the sector** from the direct and indirect costs deriving from ambitious climate and energy targets.
  - **State aid rules** need to ensure the full offsetting of indirect ETS carbon costs, renewables levies and charges as well as the financial support for financing CAPEX and mitigating OPEX of the new low carbon technologies.
  - **Both EU and multilateral trade policies** should contribute to levelling the playing field against international competition without equivalent environmental targets and regulatory costs.
  - **Environmental policy** needs to adopt concrete measures to **support the circular economy and promote recyclable materials such as steel.**

Key Messages For Policymakers (5)

- The long-term strategy needs to include the **task** to develop above priorities in a **“masterplan”** or an **industry strategy**.
- The work on all these priorities has to **start simultaneously** in order to **not loose time** and should **be finalised by 2020 at the latest.**

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