# Decarbonisation efforts of the EU steel industry

Industry experiences with decarbonisation: current efforts and lessons being learned

**GFSEC Stakeholder Event, 22 April 2021** 



## EU Climate Objectives & Measures

### **EU** Objective

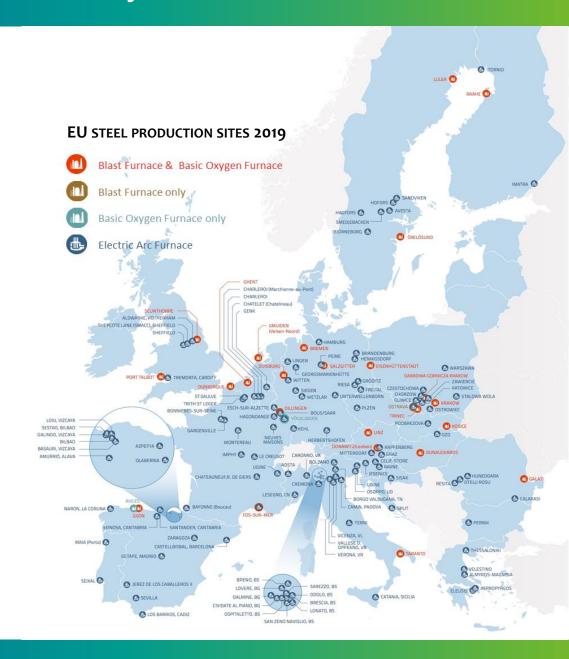
- 40% by 2030 (new target: 55% by 2030)
- Carbon neutrality by 2050

### EU regulatory measures, inter alia

- Emissions Trading System (industry, power, aviation)
- Effort Sharing (all other emitters, national measures)
- Climate Law
- Carbon Border Adjustment Measure

## EU funding programmes for R&D&I

- Horizon Europe; Innovation Fund; Recovery Fund / Next Generation Europe
- Just Transition Fund



## Steel in the Context of Global CO<sub>2</sub> Emissions

Global CO<sub>2</sub> emissions from fossil fuels combustion and processes (2019): 3

38 Gt CO2 <sup>8</sup>

Global steel industry's direct & indirect CO<sub>2</sub> emissions:

3.7 Gt CO2 <sup>9</sup>

**9.7%** 

EU steel's direct & indirect CO<sub>2</sub> emissions:

213 Mt CO2 10

**0.56%** 

EU steel share in global steel emissions: \$\ightharpoonup 5.5\%\$

EU steel share in global steel production:  $\implies$  8.5%

EU steel share in EU total  $CO_2$  emissions of 3.9 Gt (2018):  $\implies$  5.7%.

EU steel share in direct & indirect emissions of EU industrial manufacturing of 858 Mt (2018):  $\implies$  25.7%. 11

Sources: <sup>8</sup> Joint Research Centre, Fossil CO<sub>2</sub> emissions of all world countries, 2020 report; <sup>9</sup> IEA, IEA Iron and Steel Technology Roadmap, 2020; <sup>10</sup> Estimation of 2019 direct and indirect CO<sub>2</sub> emissions based on a recalculation of 2018 data on 2019 production; <sup>11</sup> European Environment Agency (EEA). Total EU of 3.9 Gt CO<sub>2</sub> including LULUCF (Land Use, Land Use Change, and Forestry)

Absence of a global system to decarbonise the industry

Risk of carbon leakage through unilateral regional or national regulatory CO<sub>2</sub> abatement cost for globally competing industries



#### Creating lead markets

Breakthrough technologies would increase the steel price significantly

### Access to (affordable) CO<sub>2</sub>-low energy

Breakthrough technologies need ± 400 TWh of electricity (equivalent to France)

#### Level playing field

The EU imports ±30 M tons and exports ±20 M tons of steel per year

#### Funding support

Breakthrough technologies need 50 to 60 €bn investment





Our ambition is to reduce  $CO_2$  emissions from EU steel production by **30% by 2030** compared to 2018 (1.7% of total EU  $CO_2$  emissions), or 55% compared to 1990, and up to **95% by 2050**, ultimately becoming  $CO_2$ -neutral.



## Pathways for the green transition in steel

#### **Circular Economy** Enhancing the recycling of steel (e.g. scrap in BOF/EAF\*) and its by-products, Resource efficiency \*BOF= Basic Oxygen Furnace EAF= Electric Arc Furnace **Smart Carbon Usage (SCU) Carbon Direct Avoidance** Pathways/ (CDA) Groups Carbon Valorisation/ **Process Integration Carbon Capture and** with reduced use of Usage (CCU) carbon Hydrogen Electricity (+CCS) (+CCS) Use of renewable Using CO/CO<sub>2</sub> from steel **Integration of process** electricity in basic mill as raw material steps and internal use of steelmaking, e.g. Description (Chemical conversion of process gases production of H<sub>2</sub> to CO/CO<sub>2</sub>) replace carbon HYBRIT, H2Steel (H2Future, SuSteel, Steelanol, HISARNA, Projects/ Hybrid Steel Making), Carbon2Chem, TGR-BF-Plasma (IGAR), **Initiatives** tkH<sub>2</sub>Steel, FReSMe, PEM, STEPWISE, Torero GrInHy, SALCOS, Everest, Hydrogen Hamburg, Carbon2Value **SIDERWIN**

#### A large number of promising projects:

#### **Clean Steel Partnership (CSP):**

- > 32 collaborative projects (16 x TRL7, 12 x TRL8, 4 demonstrators)
- Objectives include to demonstrate -50% CO<sub>2</sub> by 2027, -80% by 2034
- Financing requirements: €3 billion, minimum: €1.4 billion
- Minimum needed from Horizon Europe: €350 million

#### Innovation Fund

- 16 large scale projects responded to the first call
- Objectives of projects: -25% to -45% CO<sub>2</sub> by 2025 to 2030

#### **IPCEI** proposal

- 33 steel projects
- Objective: 33 Mt  $CO_2$ /year by 2030 ( = 0.85 % of total EU  $CO_2$  emissions of 3893 Mt in 2018).
- Requirements: 0.6 to 1.2 Mt hydrogen/y and 10 to 12 TWh/y
- Investment needs: €26 billion (CAPEX €13.6 billion, OPEX €12.8 billion)

**Requirements**: access to finance, affordable CO<sub>2</sub>-low energy, a market for green steel, full carbon leakage prevention, level playing field also on global markets.