



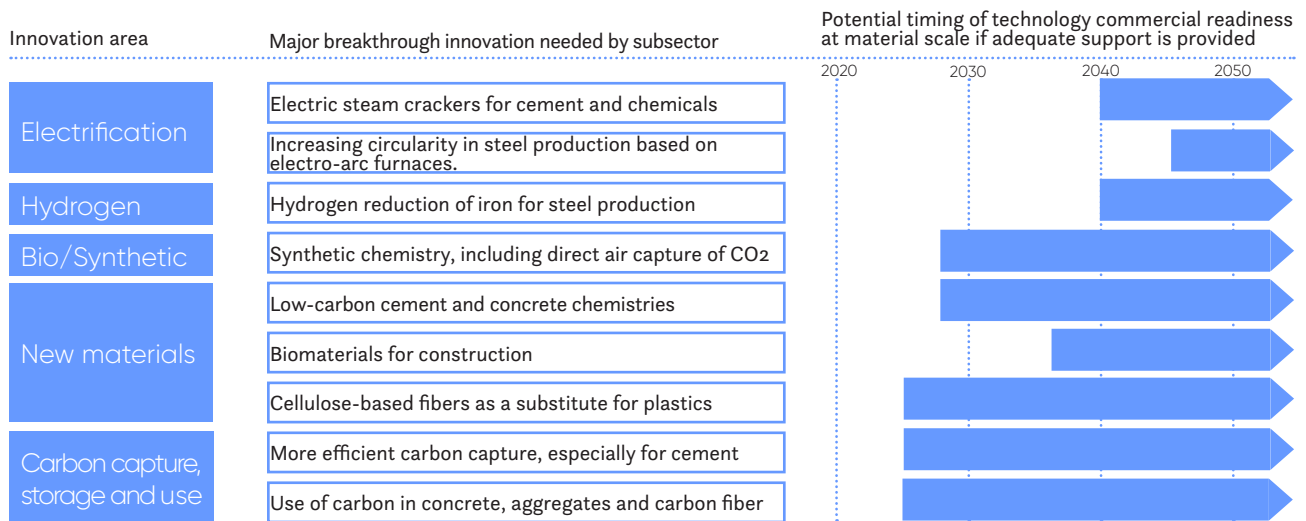
# RESEARCH & INNOVATION FOR EU INDUSTRY:

## INVEST NOW FOR NET-ZERO EMISSIONS BY 2050

### Strategic importance of industry in Europe, and its decarbonisation by 2050:

- ✓ To achieve net-zero emissions by 2050, €5.5 billion annual investment (+88% over International Energy Agency baseline) is required in deep decarbonisation technologies.
- ✓ Industry (heavy industry, manufacturing and industrial SMEs) is the backbone of the European economy, accounting for 80% of exports.
- ✓ It provides 36 million EU jobs, and potentially 1-in-4 of all jobs in 2030.
- ✓ Manufacturing alone generates €32 million (16%) of EU added value.
- ✓ It accounts for 64% of private sector Research and Development (R&D) and 49% of EU innovation investments.
- ✓ Yet, Industry emits 20% of the EU's carbon emissions, and further efficiency gains, lower carbon fuel switching and electrification will only halve industrial emissions by 2050 and will leave process emissions unchanged.

### How the EU can support and accelerate breakthrough innovation



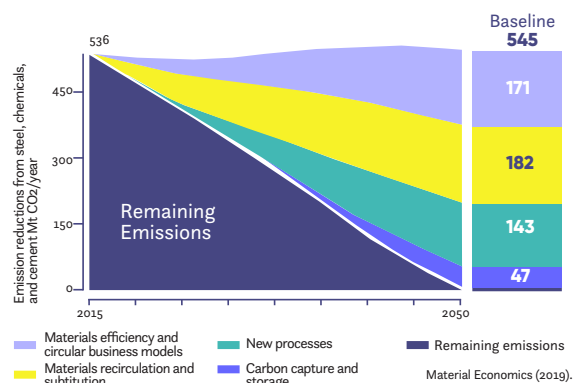
Sources: SYSTEMIQ analysis for the Energy Transitions Commission (2018) & the EU DG RTD (2018)

### Case Study

#### Heated limestone innovation in cement kilns can reduce emissions by 90%

- ✓ Cleanker is researching a breakthrough process that could drastically reduce carbon emissions from one of cement production's most energy-intensive processes – heating limestone.
- ✓ Cleanker hopes to capture about 90 percent of the plant's carbon emissions using calcium looping.
- ✓ Awarded about €9 million from Horizon 2020 to conduct 4 year R&I project.
- ✓ Initiated in 2017, it now includes a dozen partners across five EU countries.
- ✓ Project aims to retrofit a plant in northern Italy operated by Buzzi Unicem, one of the world's largest cement companies.

### Key components of industrial decarbonisation



\*The circular economy pathway hinges on the potential of a more circular economy for materials recirculation and increased materials efficiency.



"...it is technically possible to achieve zero carbon emissions from heavy industry by 2050, at a very low cost to consumers and no cost to jobs."

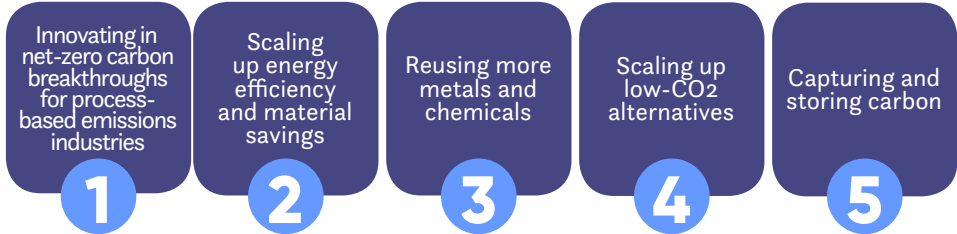
Adair Turner,  
Chair, the Energy Transitions Commission



# RESEARCH & INNOVATION FOR EU INDUSTRY:

## ALIGNED POLICY ENVIRONMENT REQUIRED TO SCALE-UP INVESTMENTS

**Decarbonise European industries by focusing EU research and innovation (R&I) policy on five pillars:**



### Demand side R&I priorities

- » Industrial symbiosis promoting resource flows between sites and valorisation of by-products and waste streams.
- » Promoting alternative low-carbon feedstocks, resource control, material tracking and sorting using life-cycle analysis.
- » Eco-designed products, services and business models to extend life-cycle performance, durability, upgradeability and ease of repair, reuse and recycling.
- » Improved recycling industry, optimising secondary materials and minimising GHG pollution.
- » Elimination of end-of-life processes and related emissions.
- » Sustainable supply and substitution of raw materials, including critical raw materials, covering the whole value chain.

### Supply side R&I priorities

- » Process technologies, including heating and cooling, digital tools, automation and large-scale demonstrations for process performance and resource and energy efficiency.
- » CO2 valorisation (eg. Carbon capture and utilisation - CCU).
- » Conversion technologies to increase resource efficiency and reduce emissions, including hybrid energy systems.
- » Electrification and use of unconventional energy sources within industrial plants.
- » Low or zero carbon emissions production processes through product life cycles.
- » Development of the infrastructure required for the increase in electricity demand and for the transport of CO2.

## R&I investments need an aligned policy environment to grow markets for low carbon products



### Case Study

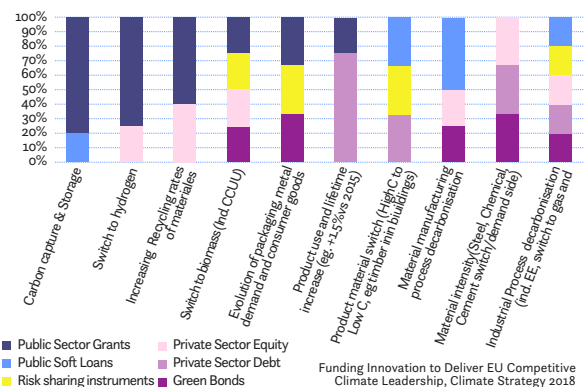


**Carbon4PUR**

**Industrial symbiosis and circularity - using CO2 from steel as a resource for chemicals**

- ✓ Carbon4PUR is researching whether waste gases from a steel mill like carbon and carbon monoxide can be turned into chemicals needed for producing polyurethane-based foams.
- ✓ Awarded €3.2 million from Horizon 2020 in 2017 to conduct a 3 year R&I project.
- ✓ The project includes 14 different partners from 5 different countries.
- ✓ Located near Marseille (France), a steel plant owned by ArcelorMittal and a chemical plant owned by Covestor practically sit side-by-side.
- ✓ Researchers and engineers from both companies are trying to identify potential synergies between operations at their neighboring plants.
- ✓ If successful, it could be replicated at dozens of other industrial sites across the EU.

### Financial instruments necessary for the different components of net-zero industry



### Participant Institutions:

**CLIMATE & STRATEGY PARTNERS**

