European Commission

Low-carbon technologies for industries in Europe

"Deploying breakthrough technologies across European industrial ecosystems is vital for a resilient, green and digital industry. The updated Industrial strategy brings Europe's energy-intensive industries closer to an ambitious decarbonisation route, in partnership with industry, researchers, innovators, SMEs and civil society."

Mariya Gabriel, Commissioner for Innovation, Research, Culture, Education and Youth

R&I supported industrial transitions...

Europe's recovery efforts to accelerate the green and digital transitions will also rely on research and innovation (R&I) as a key enabler for a green, digital and circular industry. R&I drives new breakthrough technologies, helping Europe to become a climate-neutral and competitive economy by 2050. A future zero-emission aircraft alliance would help to accelerate the deployment and market uptake of the results from the European research and innovation investments in aviation from the Horizon 2020 Clean Sky 2 and Horizon Europe Clean aviation partnerships. Horizon Europe Partnerships on clean steel, process industries and advanced manufacturing will bring low-carbon technologies and processes to maturity, preparing the ground for investments to scale-up and deploy in industrial ecosystems.

... in a new European Research Area

The European Research Area's (ERA) ambition to create a single, borderless market for research, innovation and technology across the EU will help create, valorise and disseminate innovative technologies, which help bringing EU's industrial ecosystems to solid pathways to transition and resilience. The new ERA[1] will strengthen the translation of R&I results into the economy and enhance the competitiveness of European industry, including through Common Industrial Technology Roadmaps, by linking EU and national R&I investment agendas.

[1] A New ERA for Research and Innovation, COM(2020)628.

Industrial Technology Roadmap #1 | Low-carbon technologies for energy intensive industries

Energy-intensive industries, such as steel, cement and chemicals account for more than two thirds of all industrial CO2 in the EU. Between 1990 and 2018, these industries decreased their emissions by almost 30%[2]. However, existing technologies will not be able to deliver the full emissions reduction required to achieve the green transition, and new technologies need to be commercialised by 2030. Energy-intensive industries require significant investments into R&I, demonstration, and rollout of new technologies[3].

The Low-Carbon Industrial Technologies Roadmap will link EU Strategic Research and Innovation Agendas, developed together with industry through the dedicated Horizon Europe partnerships, with the main EU and national support programmes to support low-carbon technologies.

It will provide R&I evidence and guidance to strengthen the EU energy-intensive industries ecosystem and facilitate scoping and development of potential industrial alliances and Important Projects for Common European Interest[5].

Horizon Europe Partnerships

Clean Steel – Low Carbon Steelmaking

- The **Clean Steel** Partnership will focus on accelerating and deploying the most promising solutions, with an investment of €1,700 million (€700 million from the EU & €1,000 million from industry).
- Synergies with the Research Fund for Coal and Steel will provide an additional budget of €700 million through Horizon Europe and the assets of the European Steel and Coal Community. The investments, under a common governance structure, will translate results into the economy to ensure market uptake of research outputs and make EU steel industry a first mover in industrial-scale decarbonisation.

Project | Use of recycling, waste and biomass materials in electric arc furnaces. GREENEAF2 demonstrated a reduction in CO2 emissions without drastic modification of the production cycle and realised collaboration among local institutions and other industrial sectors.

Processes for Planet (P4P)

- P4P aims to develop and foster the deployment of climate neutral solutions for the European process industries, designed to close the energy and feedstock loops.
- With a budget of €2,600 million, P4P will bring together process industry, focused on sustainable processes through resource & energy efficiency (cement, ceramics, chemicals, engineering, minerals and ores, non-ferrous metals, steel & water sectors), SMEs, the public sector, research & academia. The partnership will develop Hubs4Circularity, first-of-a-kind, lighthouse demonstrator plants of (near) commercial size across the EU.

Project | Transforming industrial emissions into building insulation and coatings. The Carbon4PUR project sought to turn CO2 in a raw material for increased sustainability & a more circular economy.

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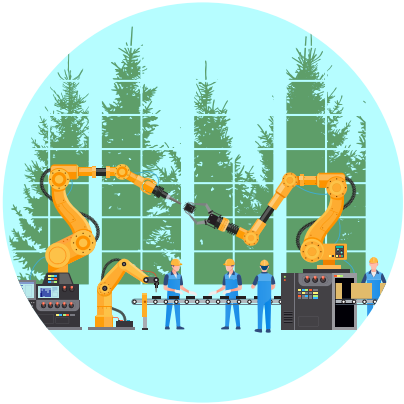
[2] de Bruyn et al., S, Energy-intensive industries – Challenges and opportunities in energy transition, study for the committee on Industry, Research and Energy (ITRE), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2020.

[3] SWD(2021)351, Annual Single Market Report 2021.

[4] Joint Research Centre, estimated figures based on data from International Energy Agency, Material Economics, Agora Energiewende and Wuppertal Institut.

[5] COM(2021)350, Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery.

Made in Europe



- Europe's industry is strong in advanced manufacturing technologies, with the highest share of world patent applications and the highest number of venture capitalist backed firms[6]. It generates 22% of the world's manufacturing output for EU27, with a trade surplus in manufactured goods of €421 billion annually[7].
- The partnership's budget of €1,800 million will seek to increase the number and attractiveness of jobs, while securing the environmental, economic and social sustainability for future generations in Europe. Key areas of action refer to establishing efficient, responsive and smart factories and supply chains.

SPIRE

Project | A circular-economy-approach to the cement industry. The RECODE project aims to recycle carbon dioxide in the cement industry to produce value-added chemicals and materials, thus enabling a CO2 circularity in advanced manufacturing.

EIT Climate KIC & EIT Raw Materials

- EIT Climate-KIC runs holistic, transformative, citizen-driven and systemic innovation initiatives to support the EU climate goals, circular economy, digitization and the use of satellite data. It attracted more than €550+ million investment to start-ups.
- Raw materials are essential to the transition to a carbon-neutral circular economy. With a budget up to €800 million, including contribution from industry, EIT Raw Materials connects more than 120 core and associate partners and over 190 project partners of leading businesses, universities and research & technology organisations from over 20 EU countries.

Project | Recycling of carbon fibres. The RELICARIO project develops a new technology to recycle Carbon Fibre Reinforced Plastics using thermosolvolysis allowing the substitution of metals used in the automotive or sport industry by recycled carbon fibres while offering easier use by industry, lower process cost and lower carbon footprint

[6] European Commission, Report on technology trends, technology uptake, investment and skills in advanced technologies, 2020, https://ati.ec.europa.eu/reports/eu-reports/report-technology-trends-technology-uptake-investment-and-skills-advanced

[7] Eurostat, https://ec.europa.eu/eurostat/statistics-explained/index.php/Manufacturing_statistics_-_NACE_Rev._2#Structural_profile

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