

12. Action 12: Accelerate the green/digital transition of Europe's key industrial ecosystems

1.1. Purpose of the Action and expected outcomes

The green and digital transitions call for increased R&I investments as well as timely scale-up and deployment of results, notably by industry, including SMEs and start-ups. The European Green Deal is a long-term vision for a greener, fairer, more resilient society with the ambition for significant greenhouse gas emissions reduction by 2030 and achieving climate neutrality by 2050. Implementing this ambition requires the mobilisation of all available R&I investment programmes, but also strategic and joint engagement by policy-makers, industry and R&I stakeholders at EU and national levels.

The outcomes of Action 12 are to create stronger links between research & innovation and industrial policies, encourage systematic transfer of R&I results into EU industrial ecosystems and mobilise private and public R&I investments for a faster development and deployment of key green and digital technologies through the following activities:¹

- Facilitate a consultation process on R&I-related needs of industries, including skilling needs, digitalisation, R&I driven standardisation, technology roadmaps, and research infrastructures;
- Develop a policy framework to support industrial R&I from fundamental research to breakthrough knowledge and innovation;
- Develop a policy approach to link industrial and R&I policies, on how to speed up the industrial absorption of R&I results for decarbonisation of energy-intensive industries;
- Develop industrial technology roadmaps for low-carbon technologies in energy-intensive industries and for circular technologies and business models at EU and national levels;
- Develop a coordination mechanism to provide industry with the Technology Infrastructures needed to test, validate and scale up innovations;
- Address the social adaptation driven by the green (and digital) transitions.

Action 12 is part of the priority area 'Taking up together the challenges posed by the twin green and digital transition and increasing society's participation in the ERA' and linked with actions 10 and 14, focussing on the green and digital transitions and the challenges for society and R&I linked to them. The action is also particularly closely linked to action 11, the ERA For Green Energy Transformation.

1.2. Implementation of the Action

The two **ERA Industrial Technology Roadmaps** low-carbon technologies in energy-intensive industries (published in April 2022)² and circular technologies in textiles, construction and energy-intensive industries (published in January 2023).³ collected evidence about the current status and the future outlook for R&I development of new green technologies. They mapped the way forward for research and innovation in industry with a focus on bridging the innovation gap between EU countries and better exploiting research and innovation results.⁴ The Roadmaps assess the participation of the industry in R&I to increase market introduction of relevant technologies. The insights from the roadmaps facilitate the identification of common action areas to enable faster

¹ European Commission (2021), European Research Area Policy Agenda – Overview of actions for the period 2022-2024.

² https://research-and-innovation.ec.europa.eu/document/download/addb797d-f670-4ac6-9591-17283f0c3ff9_en

³ https://research-and-innovation.ec.europa.eu/document/download/77e27852-4431-491b-8e9a-1eb73ae90d30_en

⁴ https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/era-industrial-technologies-roadmaps_en

progress along the research stages. They provide a solid basis for a consultation process on the broader R&I needs of industry.⁵

The roadmaps were prepared by the Commission in consultation with Member States, Associated Countries, as well as with representatives of industry and research and innovation stakeholders across the EU. This co-creative action aimed at ensuring the alignment of research and innovation investment plans at EU and national levels.⁶

As a follow-up to the roadmap for low-carbon technologies in energy-intensive industries, the Commission published the report '**Scaling up innovative technologies for climate neutrality**' mapping close to 200 EU-funded demonstration projects in these industries⁷ and developed an interactive tool publicly available displaying these demonstrators on a map.⁸ A **Mutual Learning Exercise on Industrial Decarbonisation** was also launched in April 2023, with involvement of 10 Member States and 2 Associated Countries. The MLE will run until March 2024 facilitating exchange of experience and knowledge in the following fields: (i) overview of industrial technology roadmaps and national strategies; (ii) policies, design and financing for R&I investments in development, uptake and deployment of low-carbon technologies; (iii) actors' engagement; and (iv) framework conditions (regulatory framework, permits for demonstrators and 'first-of-a-kind' pilots, IPR, technology infrastructures, knowledge and data'.⁹ In addition, the **MLE on a Whole-of-government approach (WGA) in research and innovation**, which started in November 2022 and will run until March 2024, includes topic 4 on 'Green Transition: Implementation of Industrial Technology Roadmaps through WGA', which complements the work on industrial decarbonisation and circular strategies by facilitating knowledge and experience on the institutional set-up across five Member States.¹⁰

Technology Infrastructures are understood as facilities, equipment, capabilities and support services required to develop, test and upscale technology to advance from validation in a laboratory up to higher TRLs prior to competitive market entry. They include, for example, pilot lines, test facilities, digital innovation centres, open innovation testbeds, demonstration sites or living labs. Technology infrastructures are critical for the development of new technology-based innovative products and services.¹¹

With a view to develop a European coordination mechanism for Technology Infrastructures, the Commission has launched **a study that will provide mapping of strategies, programmes and initiatives, targeting Technology Infrastructures, at European, national and regional level**. The final report will be published in spring 2024. The Commission is also setting up an informal expert group to provide advice on the industrial needs, improving accessibility of Technology Infrastructures, investment programmes and strategic pilot areas.

Regarding the steps taken on to develop a policy framework to support industrial support fundamental research at national and EU levels to generate pioneering knowledge and innovation (Activity 12.3), a hybrid workshop with the participation of about 450 representatives of government, business, research and academia, was organised on 27 March 2023 by the European Commission, Technical University in Munich, and DEEP Ecosystems in Munich (Germany) on '**Leveraging the deep tech green transition and digital solutions to transform EU industrial ecosystems**'. The workshop report highlights the importance of stimulating finance/investment for deep-tech, improving the availability of relevant infrastructures, creating robust exit opportunities, and strengthening the role of the ecosystem in bringing together the stakeholders.¹²

Activities aimed at addressing social adaptation of the green and digital transitions (Activity 12.4) have been limited so far. However, a workshop is planned at the end of 2023 under Action 12 to discuss the role of Industry 5.0 as an emerging paradigm of a future-proof industry that aims beyond efficiency and productivity and reinforces the role and the contribution of industry to society focusing on three pillars: sustainability, human-centricity and resilience.

⁵ https://research-and-innovation.ec.europa.eu/system/files/2021-11/ec_rtd_era-policy-agenda-2021.pdf

⁶ Ibid.

⁷ [Scaling up innovative technologies for climate neutrality | Research and innovation \(europa.eu\)](https://research-and-innovation.ec.europa.eu/system/files/2023-03/scaling-up-innovative-technologies-for-climate-neutrality.pdf)

⁸ [Demonstrators scaling up innovative technologies for climate-neutral industries around Europe | Research and Innovation \(europa.eu\)](https://research-and-innovation.ec.europa.eu/system/files/2023-03/demonstrators-scaling-up-innovative-technologies-for-climate-neutral-industries-around-europe.pdf)

⁹ [Mutual Learning Exercise on Industrial decarbonisation | Research and Innovation \(europa.eu\)](https://research-and-innovation.ec.europa.eu/system/files/2023-03/mutual-learning-exercise-on-industrial-decarbonisation.pdf)

¹⁰ [Mutual Learning Exercise on The Whole of Government Approach in Research and Innovation | Research and Innovation \(europa.eu\)](https://research-and-innovation.ec.europa.eu/system/files/2023-03/mutual-learning-exercise-on-the-whole-of-government-approach-in-research-and-innovation.pdf)

¹¹ <https://data.consilium.europa.eu/doc/document/ST-8411-2019-INIT/en/pdf>

¹² [https://research-and-innovation.ec.europa.eu/system/files/2023-03/leveraging-deep-tech-green-transition-and-digital-solutions-transform-eu-industrial-ecosystems-2023-03-27_en](https://research-and-innovation.ec.europa.eu/system/files/2023-03/leveraging-deep-tech-green-transition-and-digital-solutions-transform-eu-industrial-ecosystems-2023-03-27_en.pdf)

The 2023 OECD STIP Survey **identifies four types of policy instruments** in EU Member States related to Action 12: governance, direct financial support, collaborative infrastructures as well as guidance, regulation and incentives. The distribution of such policies according to their budget demonstrates a significant diversity of the levels of funding (Figure 31). Smaller budgets are typically made available for collaborative infrastructures and guidance, while larger budgets are more common in the area of direct financial support. Policies targeting governance have typically smaller budgets (up to 5M EUR), but there are also individual policy initiatives in this area with budgets over 500M EUR. Examples of initiatives with budgets exceeding EUR 500 million include the Polish National Centre for Research and Development (NCBR) Strategy focusing on supporting the development of innovations in Poland¹³ and the Research for Sustainability (FONA) Strategy in Germany¹⁴.

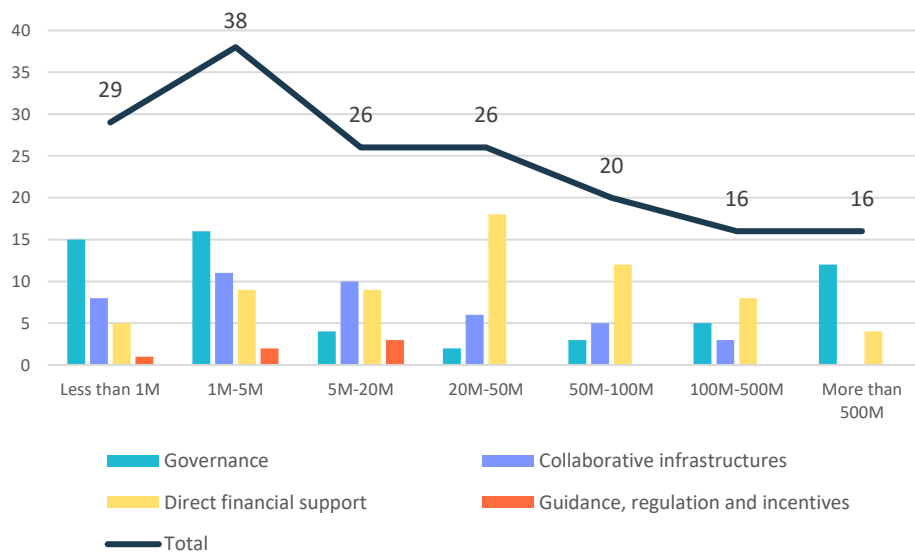


Figure 1: Action 12: Distribution of budget per policy instrument

¹³ <https://www.gov.pl/web/ncbr/ncbr>

¹⁴ <https://www.fona.de/en/about-fona/research-for-sustainable-development.php>