Europäischer Forschungsraum: Ein neuer Technologiefahrplan für industrielle Kreislauftechnologien

ERA roadmap for circular industrial technologies and business models for textile, construction and energy-intensive industries

Stakeholderdialog Kreislaufwirtschaft:
Von der Forschung in die Umsetzung
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THE ROADMAP – WHAT IT OFFERS

KEY FINDINGS

FRAMEWORK CONDITIONS

INVESTMENTS IN
R&D AND INNOVATION

KEY TECHNOLOGIES AND BUSINESS
MODELS FOR INDUSTRIAL CIRCULARITY

THREE INDUSTRIAL ECOSYSTEMS
LANDSCAPING & CIRCULARITY

Drafted in consultation with Member States, industry, research & technology organisations, academia, civil society

Selecting 3 industrial ecosystems

textile, construction and energy-intensive industries

- EU Circular Economy Action Plan 2020
- Major sources of waste
- Need and potential for circularity
- Viable technologies, existing R&I base
- Zero Pollution Action Plan 2021
- Important for the EU

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EU textile ecosystem at a glance

€163 bn. — **Textile ecosystem turnover**

267k — **Number of companies in the EU**

4 mio. — **Employed staff**

Shares of total EU textile production per EU Member State

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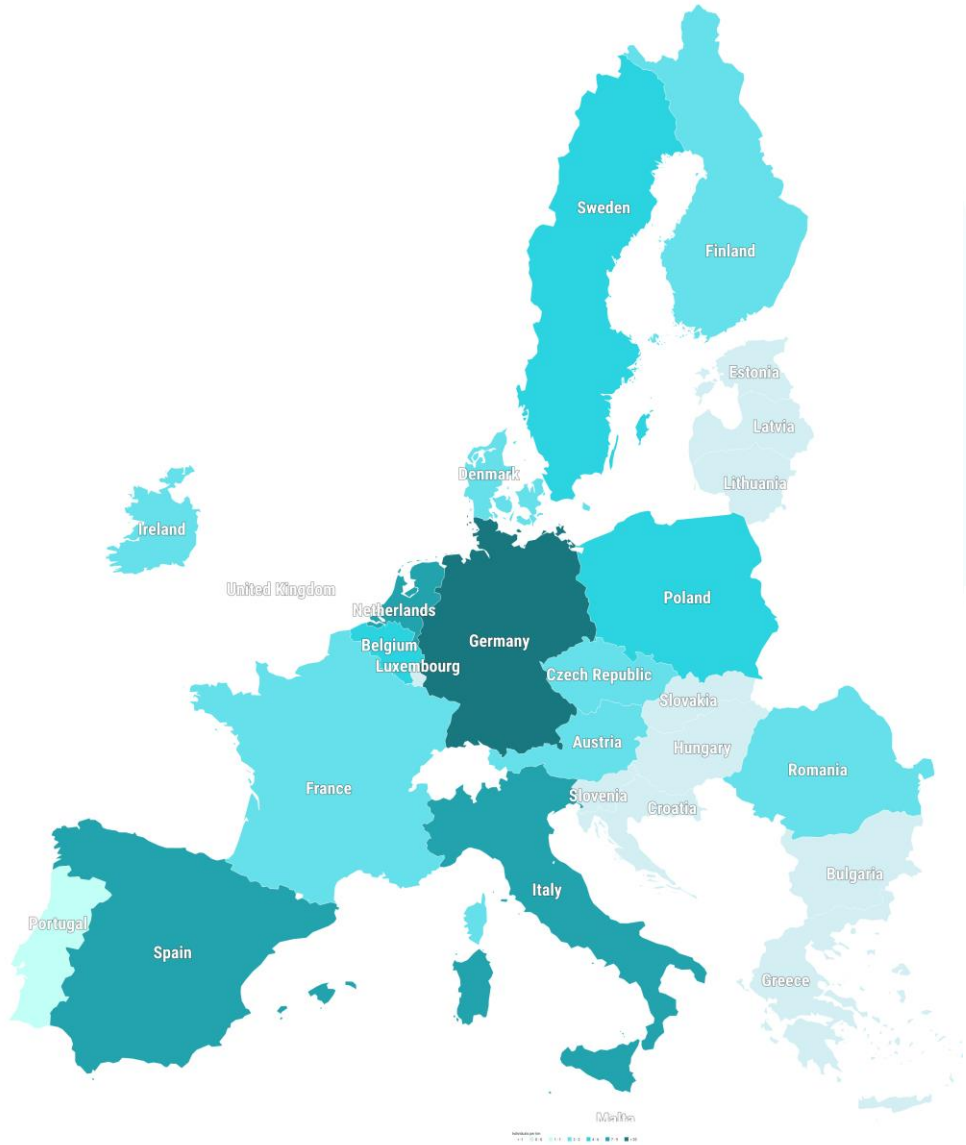
EU construction ecosystem at a glance

€2201 bn. — **Construction ecosystem turnover**

5.4 mln. — **Number of companies in the EU**

24.9 mio. — **Employed staff**

Shares of total EU construction production per EU Member State



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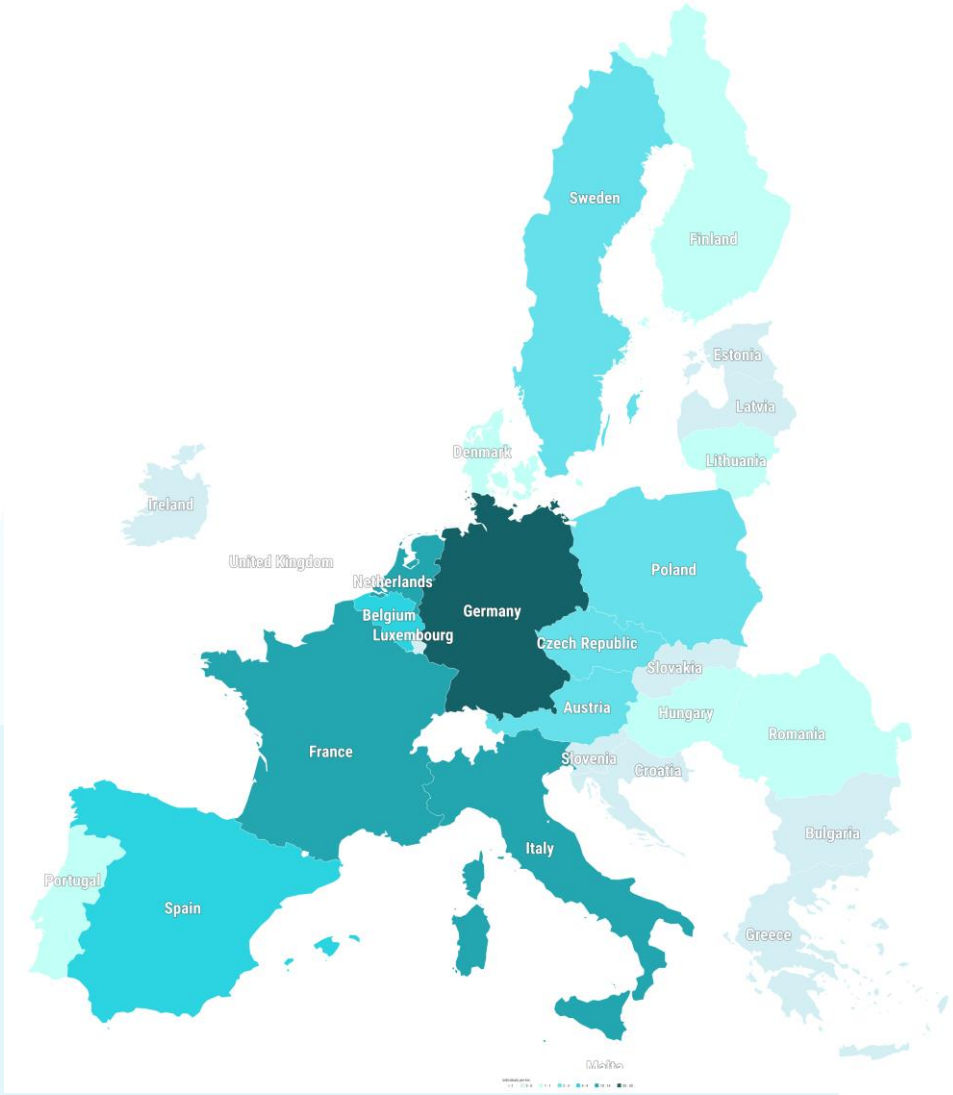
EU EIIs ecosystem at a glance

€2200 bn. — **Energy-intensive industries ecosystem turnover**

548k — **Number of companies in the EU**

7.8 mio. — **Employed staff**

Shares of total EU industrial production in EII per EU Member State



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KEY TECHNOLOGIES & BUSINESS MODELS

3

Industrial ecosystems:
textile,
construction,
energy-intensive industries

100+

Technologies and business models

5

Technology assessment criteria:
TRL, circularity potential, economic performance, contribution to zero-pollution, potential negative effects

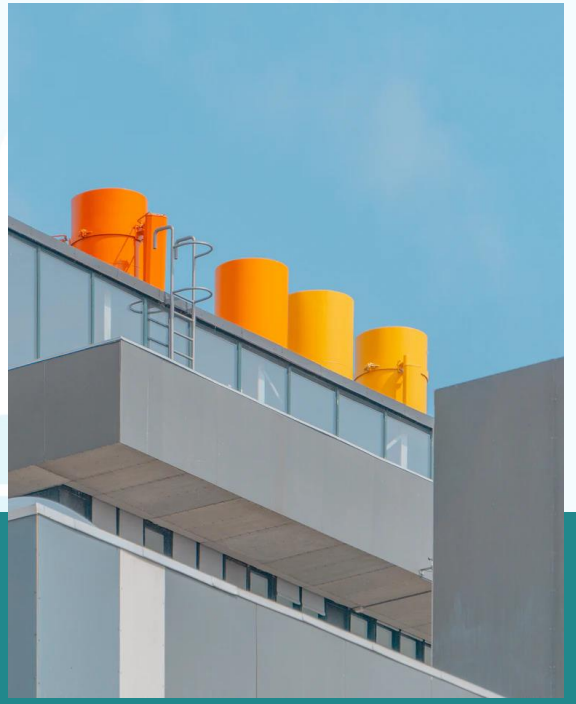
INVESTMENTS IN R&D AND INNOVATION

INVESTMENT NEEDS

Investments in R&D and innovation, as well as perceived needs

RESEARCH & INNOVATION NEEDS

Identified priorities in order to develop new circular technologies



MARKET DEPLOYMENT NEEDS

Where action is needed to bring technologies to market

TEXTILE ECOSYSTEM

Investments
in R&D and innovation

- Improve technologies that use less energy and reduce waste
- Invest in technologies that focus on material and product innovation, design for better recyclability of disposed textile products
- Further development of textile recycling technologies that reached a higher TRL than a demonstrated proof of concept
- Foster recycling capabilities and attract the necessary investments

Estimated investment needs

EUR 6-7 billion
Capital expenditure investments to scale up the textile recycling industry by 2030
McKinsey

EUR 5-6 billion
Investments in recycling technologies by 2026, and capital for collecting and storing infrastructure
2021 Global Fashion Agenda

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CONSTRUCTION ECOSYSTEM

Investments
in R&D and innovation

- Develop smart grid-ready and smart network-ready buildings, as active utility nodes in smart communities
- Invest in technologies that focus on reuse and recycling, such as the use of sustainable and durable construction products and low-carbon and durable solutions for new construction
- Facilitate a lifecycle-based approach and better integrate holistic building assessments into green public procurements
- Invest in reliable and robust new approaches to building the circular economy (for technology and nature-based solutions)
- Integrate construction and demolition waste into new constructions and industrial symbiosis

Estimated investment needs

EUR 300 million*

R&I investments needed for the Partnership projects pipeline *Built 4 People Partnership*

* Investment needs on construction are estimated to far exceed the project pipeline of the Built 4 People Partnership.

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ENERGY-INTENSIVE INDUSTRIES ECOSYSTEM

Investments
in R&D and innovation

- Develop recycling friendly materials and smart connections between materials
- Increase valorisation of solids from wastewater treatments into new materials or reuse for energy production
- Invest in fully recyclable homogenous catalysis and highly efficient heterogenous catalysis
- Invest in the demonstration of industrial-urban symbiosis, as well as in its digitalisation
- Develop technologies to process chemical waste, metal waste, textile, mineral waste from construction & demolition, etc.

Estimated investment needs

EUR 3.6 billion

Investments in circular technologies in the Partnership's project pipeline by 2030

Processes 4 Planet Partnership

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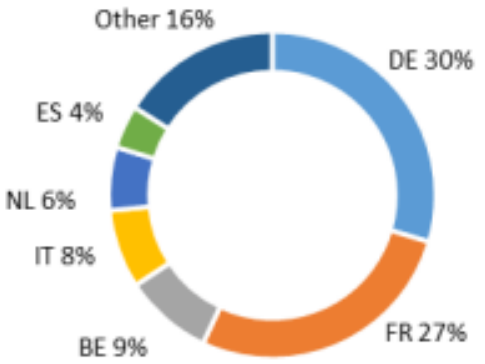
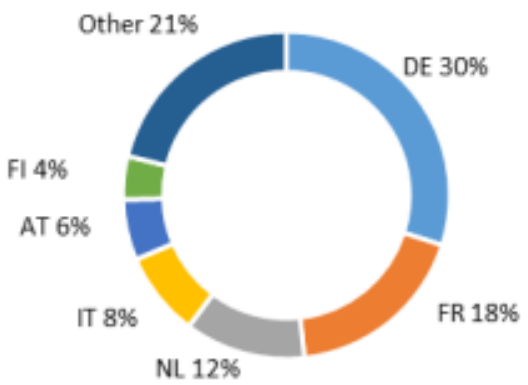
INVESTMENTS IN CIRCULAR ECONOMY – INDUSTRY - PATENTS

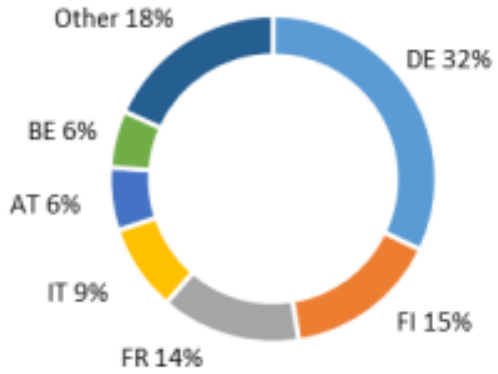
Construction (495)



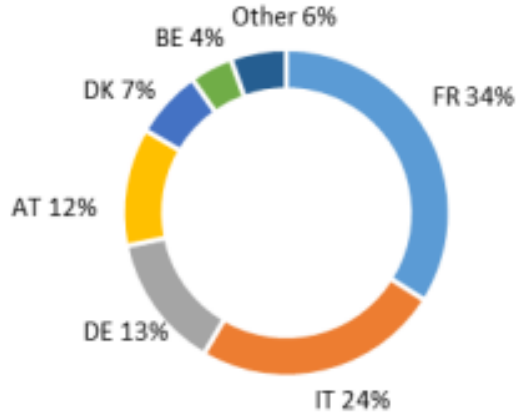
Chemicals & Plastics (915)



Metals (640)



Textiles (12)

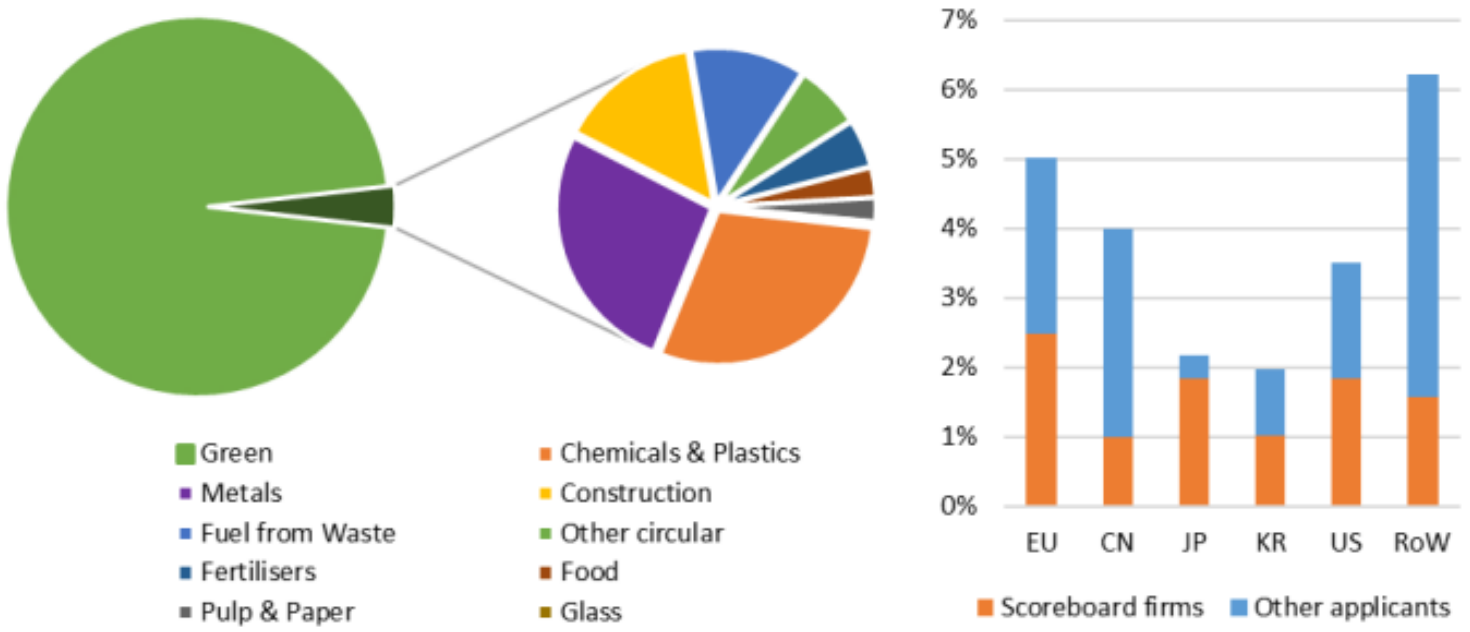


Share of CET inventions per industry and EU Member State (2010-2019)
(total numbers in parenthesis)

Source: The 2022 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD

INVESTMENTS IN CIRCULAR ECONOMY – INDUSTRY - PATENTS

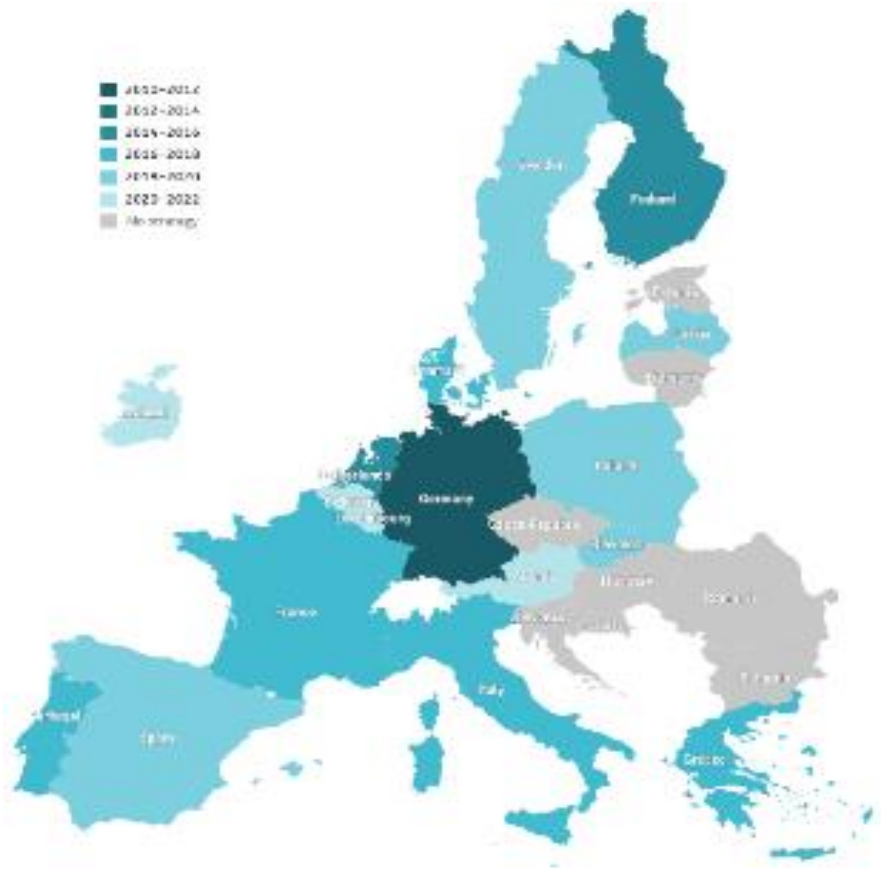
Share of Circular Economy Technologies over green inventions in major economies (2010-2019)



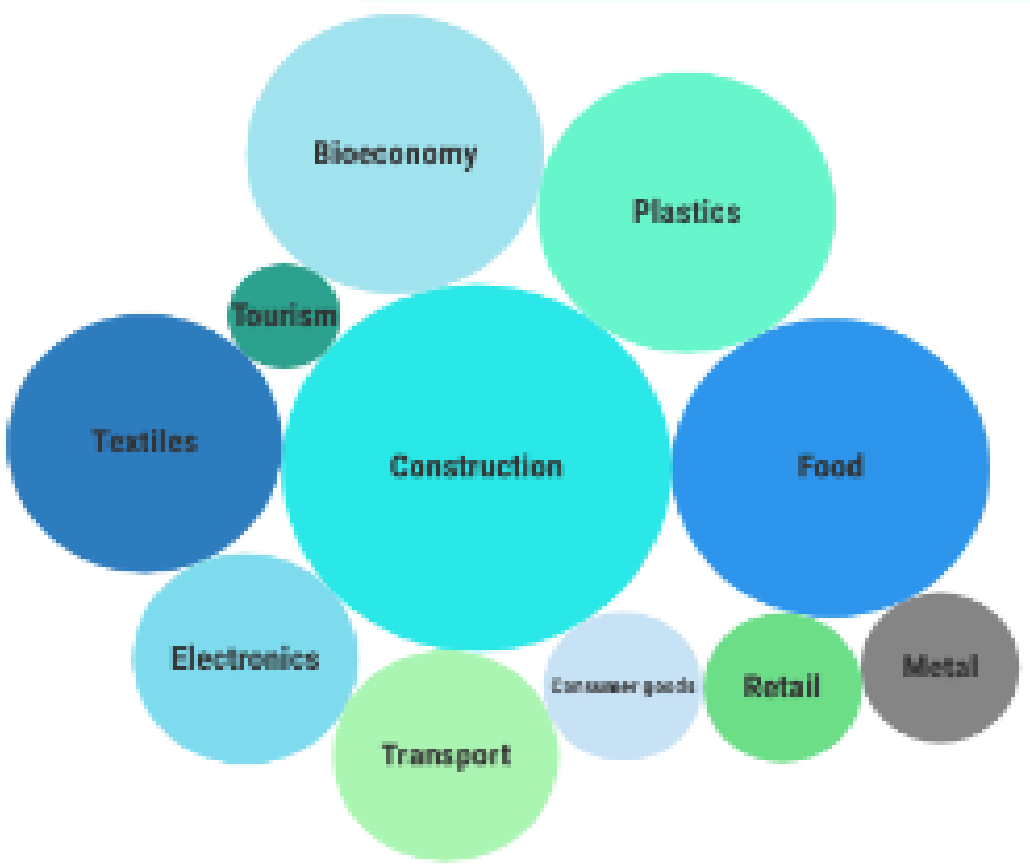
Note: On the left: Share of CETs in green inventions and the split of share by industrial categories for circular economy technologies. On the right: Share of CETs in green inventions for major economies and the split of share between the Scoreboard firms and other applicants.
Source: The 2022 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD.

INVESTMENTS IN CIRCULAR ECONOMY - NATIONAL DIMENSION

National circular economy strategies



Sectors most often targeted by national strategies



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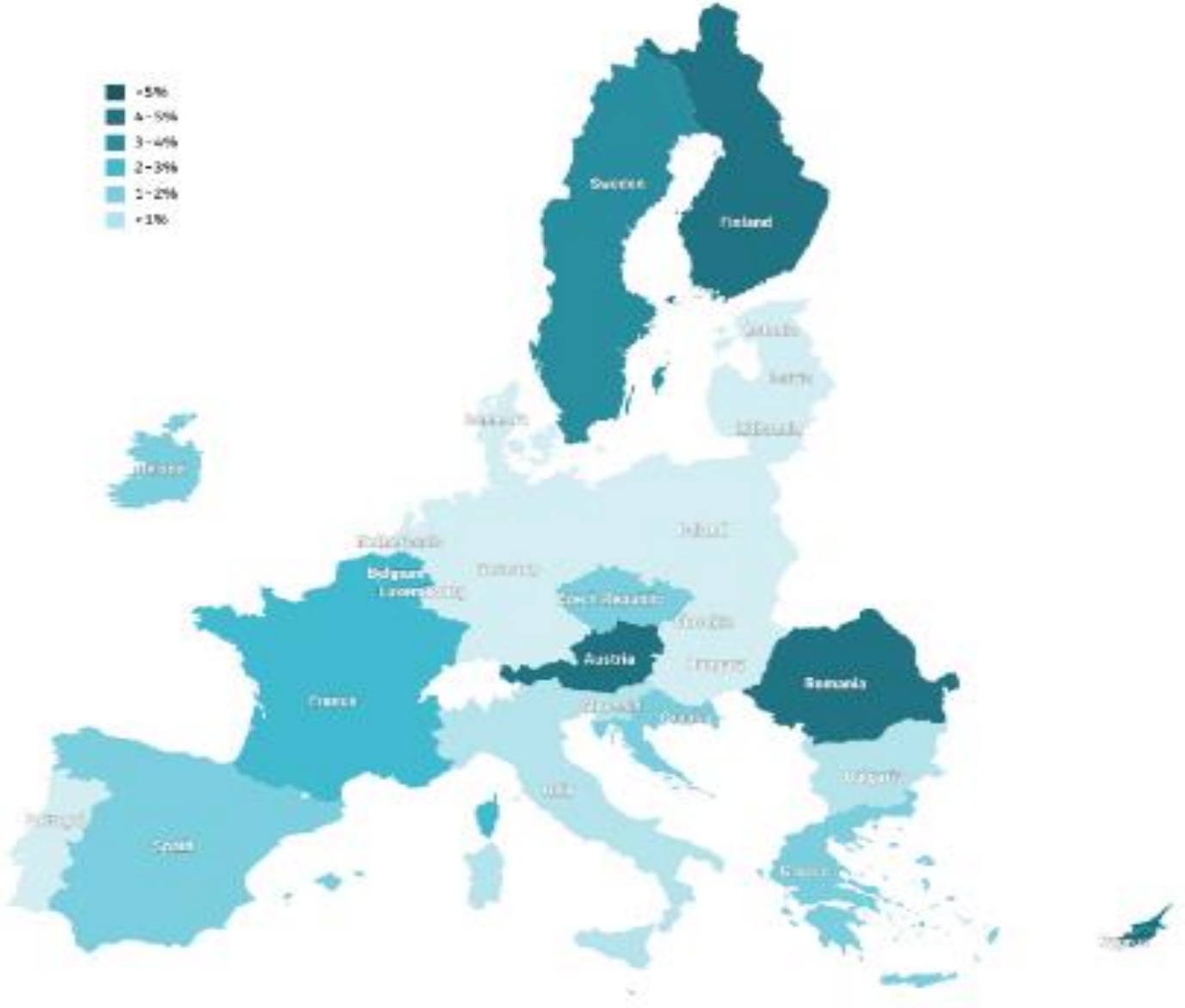
INVESTMENTS IN CIRCULAR ECONOMY - NATIONAL DIMENSION

Percentage of national RRPs for circular economy



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FRAMEWORK CONDITIONS

REGULATIONS

KNOWLEDGE VALORISATION

STANDARDS

TECHNOLOGY INFRASTRUCTURES

KEY FINDINGS

TEXTILE

Advanced end-of-life technologies
Need to invest in technologies across products lifecycle
Consumer behaviour is key

CONSTRUCTION

Design, material-sourcing, recycling and repurposing stages have high potential
Ecosystem circularity relies on an integrated approach, and not on individual technologies

ENERGY-INTENSIVE INDUSTRIES

Chemicals: crucial R&I areas refer safe and sustainable by design materials.
Steel: recycling technologies are already advanced,
with scrap steel market expected to meet market demand by 2050.
Ceramics: circularity of materials & products is addressed through waste take back programmes ready to be piloted.

KEY FINDINGS ACROSS THE INDUSTRIAL ECOSYSTEMS

LIFECYCLE APPROACH

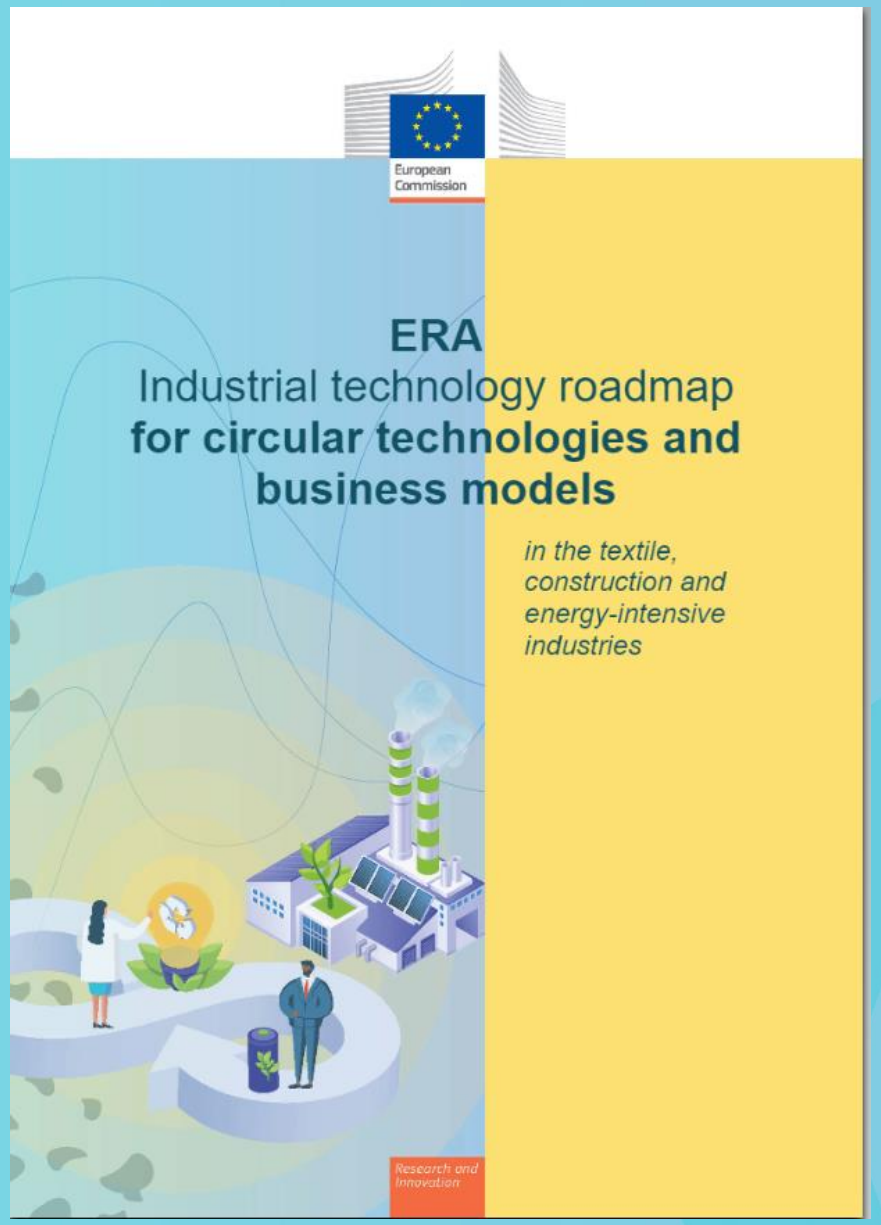
Regulation is key for industrial circularity.

ADVANCED MATERIALS

Industrial standards for circularity are developing at EU and Member States' level.

DIGITAL TECHNOLOGIES

Research and technology infrastructures are important cooperation partners and service providers to industry, including SMEs, for technology and product/service development.



Further reading:

- EU programmes
- Patent positioning of EU industries
- EU Member States and strategies
- …

ERA industrial technology roadmap for circular technologies and business models in the textile, construction and energy-intensive industries - Publications Office of the EU (europa.eu)

Annexes:

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