



European
Commission

Circular Industrial Technologies Roadmap

Closing the circle in energy-intensive industries, textiles & construction



We need to accelerate the switch from linear to fully circular production and consumption to reduce the billions of tonnes of waste that go to landfill every year. The upcoming Circular Industrial Technologies Roadmap will provide a comprehensive outlook of relevant key technologies and new business models for circularity, while exploring ways to bring them faster to the market and creating new opportunities for European businesses.

MARIYA GABRIEL

Commissioner for Innovation, Research, Culture, Education and Youth

Industrial ecosystems targeted by the Circular Industrial Technologies Roadmap

The roadmap on circular industrial technologies will address the circularity of three industrial ecosystems: construction, textiles and energy-intensive industries. These industries stand out for their resource intensity and waste generation, but also their potential for circularity thereby contributing overall to the circular economy.



ENERGY-INTENSIVE INDUSTRIES

STEEL, CHEMICALS, CERAMICS

- High level of energy consumption & emissions
- Large waste streams, which can contain dangerous substances
- Waste is often landfilled instead of being recycled



CONSTRUCTION

- One of the industrial ecosystems with highest waste levels (35%) in Europe, with one to two thirds of waste being recycled
- Highly fragmented across the EU
- Recycled materials are repurposed at a considerably lower value than their economic potential



TEXTILES

- High volumes of waste generated by the sector, with up to 15.3kg of used textiles per person collected every year in the EU
- High water intensity, coupled with high water pollution (53 000 million m³ of water)
- High water intensity, coupled with high water pollution (53 000 million m³ of water)
- Recycling at equal or higher value complicated and costly, with less than 1% of worldwide textiles being recycled

Linking Horizon Europe to industrial ecosystems

Building on [Horizon Europe Partnerships](#) with industry such as [Made in Europe](#), [Processes for Planet \(P4P\)](#), [Circular Bio-Based Europe](#) and [Built4People](#), the ERA Circular Industrial Technologies Roadmap will present the state of EU research & innovation on circular industrial technologies.

It will identify synergies between funding instruments at EU and national levels for research on new circular technologies, fostering R&I investment and ensuring a faster market roll-out for technologies that will ensure the circularity of the targeted industrial ecosystems.

MADE IN EUROPE

is the leading European driver of the twin green and digital transitions of EU's manufacturing industries, seeking to boost the sectors towards global leadership in technology, towards circularity and flexibility. It aims to achieve sustainable, circular and climate-neutral manufacturing by creating, for example, 30 cases demonstrating new innovative circular value chains.



PROJECT ZOOM | ForZDM aimed at developing and demonstrating a next generation Zero-Defect Manufacturing strategy, which is the way to go to minimise waste and to achieve production and quality targets in the European manufacturing industries, limiting the use and waste of resources.



PROJECT ZOOM | NEOCEL developed regenerated cellulose textile fibres with a lower environmental impact than any other type of existing textile fibre, for example 15-50% lower than commercially produced viscose. In addition, with at least a 15% lower production cost than standard viscose it is highly competitive. The concept can achieve a 15-50 % lower environmental impact than commercial viscose production.

PROCESSES 4 PLANET (P4P)

aims at circularity and an extensive decarbonisation of European process industries. Within a cross-sectorial approach, P4P aims to develop innovations to reuse energy, materials and waste gases or water in the production process, which enables a profound transformation of process industries to achieve the EU Green Deal targets by 2050. It will develop and deploy industrial solutions aiming at closing the energy and feedstock loops, including through the launch of 25 [Hubs for Circularity](#) (H4C).



PROJECT ZOOM | SUSPIRE developed novel highly efficient heat exchangers and thermal energy storage technology for reuse or commercialisation of waste heat. The results of the project can be broadly applied, allowing spillovers to other industries.

CIRCULAR BIO-BASED EUROPE

objective is to shift from non-renewable fossil raw materials and minerals to circular bio-based production processes. Strong, resource-efficient and competitive bio-based industries will produce from waste and biomass in an innovative, sustainable and circular manner, contributing to the 2050 climate neutrality target.

BUILT 4 PEOPLE

will bring together the whole value chain to radically accelerate progress on the more holistic R&I agenda for a people-centric sustainable built environment, on topics such as resource and energy efficiency, bio-based solutions, waste protocol or material recovery targets. It will work across disciplines and life cycle stages, and across various scales, from building, block of buildings, and district, and bringing components and modules to city and wider regional and national levels. It aspires to demonstrate a number of innovative solutions in the construction sector for new sustainable and circular business models and value chains.



PROJECT ZOOM | REHOUSE aims to develop 8 Building Renovation Packages for simple renovations to large-scale deep renovations, following principles of circularity, multi-functionality, prefabrication and off-site construction, while respecting aesthetics, as well as the architectural and historic value of buildings.

What & when to expect?

- A comprehensive **synthetic view for industry, research & technology organisations, and policymakers** on relevant (upcoming) key circular technologies and business models for different stages of the lifetime of products (design, manufacturing, end-of-life & repurposing)
- A detailed overview of **available EU funding instruments** for the development and adoption of circular industrial technologies in the areas of energy-intensive industries, construction, and textiles
- **Potential synergies with national programmes** in EU Member States
- **Final report** in Q4/2022



More information at

[ERA Common Industrial Technologies Roadmaps](#)
[Horizon Europe](#)
[EU's updated Industrial Strategy](#)

@EUScienceInnov
#EUResearchArea
#EUCircularEconomy
#CircularIndustry



Publications Office
of the European Union

© European Union, 2023
Reuse of this document is allowed, provided appropriate credit is given and any changes are indicated (Creative Commons Attribution 4.0 International license). For any use or reproduction of elements that are not owned by the EU, permission may need to be sought directly from the respective right holders. All images © European Union unless otherwise stated. Images sources: © creativeteam #323412491, skypicsstudio #286372753, Viktoriia #345410470, yaksun #468303837, naulicreative #217241567, alexdndz #482420955, 2022. Source: Stock.Adobe.com. Icons © Flaticon – all rights reserved.

PDF: ISBN 978-92-76-57722-5, doi:10.2777/348605, KI-04-22-122-EN-N