



#HorizonEU

HORIZON EUROPE

THE EU
RESEARCH & INNOVATION
PROGRAMME

2021 – 2027

*Horizon Europe
Info Day Greece
19 July 2021*

*Cluster 4 - Digital, Industry
and Space*

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Research
and
Innovation

Cluster 4 – Strategic Priorities

From EU priorities to Work Programme Destinations



Cluster 4 directly supports the following three Key Strategic Orientations outlined in the Strategic Plan 2021-2024 ([ec_rtd_horizon-europe-strategic-plan-2021-24.pdf \(europa.eu\)](#))

- Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains (A)
- Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy (C)
- Creating a more resilient, inclusive and democratic European society (D)

Cluster 4 'Digital, Industry and Space' Destinations in Work Programme 2021-22

Key Strategic Orientation in the Strategic Plan 2021 - 2024	Destination (Industry part)
<p>Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy</p>	<p>Climate neutral, circular and digitised production TWIN-TRANSITION</p>
<p>Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains</p>	<p>A digitised, resource efficient, and resilient industry RESILIENCE</p>
	<p>World-leading data and computing technologies DATA</p>
	<p>Digital and emerging technologies for competitiveness and fit for the green deal DIGITAL-EMERGING</p>
<p>Creating a more resilient, inclusive and democratic European society</p>	<p>Open Strategic Autonomy in developing, deploying and using global space-based infrastructures, services, applications and data SPACE</p> <p>industrial technologies HUMAN</p>

Indicative Budget of Cluster 4

2021-27 budget of 15.348 bn€ (including NGEU)

For the WP 2021-2022, the **programmable budget is ~3.5 bn€**, distributed as follows:

DESTINATION	BUDGET 2021-2022
Destination 'Climate neutral, circular and digitised production'	737.5 M€
Destination 'Increased autonomy in key strategic value chains for resilient industry'	776.4 M€
Destination 'World leading data and computing technologies'	346.0 M€
Destination 'Digital and emerging technologies for competitiveness and fit for the green deal'	750.0 M€
Destination 'Open Strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data' (incl. Other Actions)	517.6 M€
Destination 'A Human-centred and ethical development of digital and industrial technologies'	327.0 M€
Other Actions (other than Space-related)	36.0 M€

Cluster 4 ‘Digital, Industry and Space’ – Political Priorities



[Action Plan on critical raw materials](#)

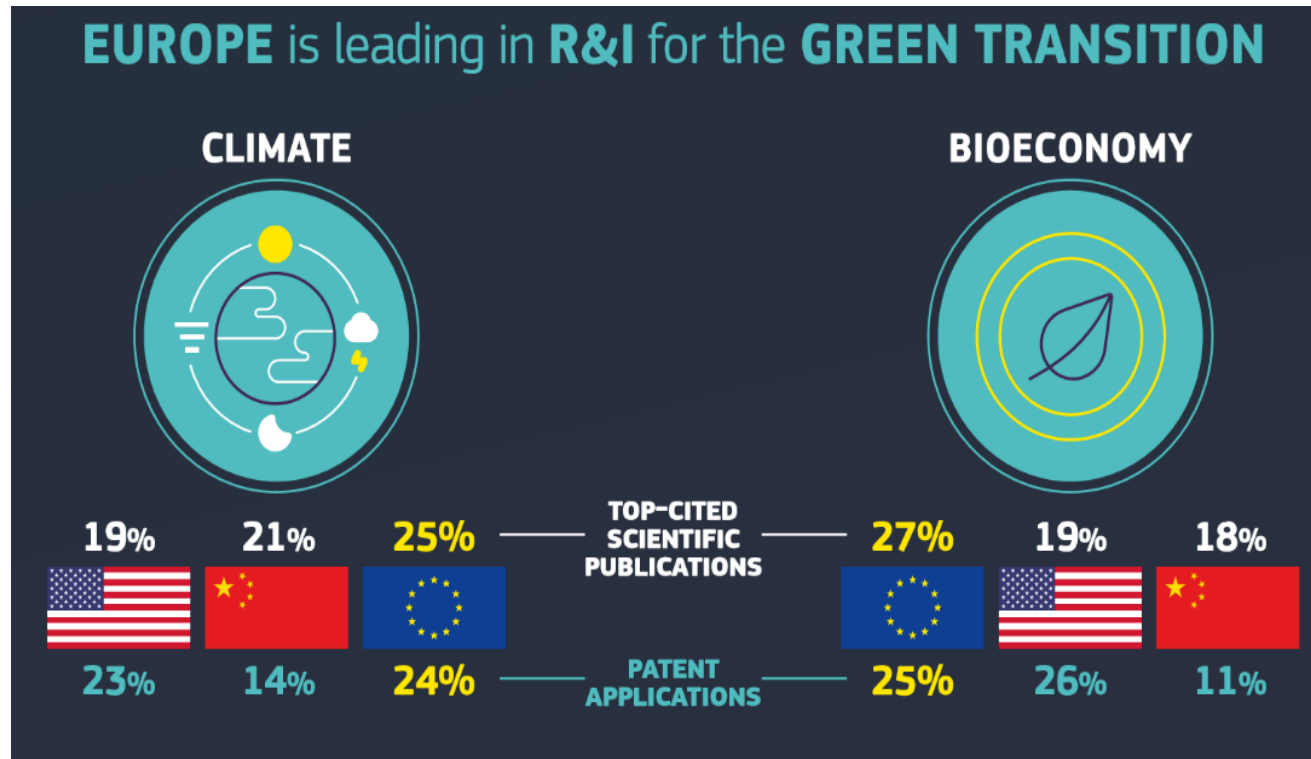
[Chemical Strategy for Sustainability](#)

[Circular Economy Action Plan 2.0](#)

[European Space Strategy](#)

[Europe’s Digital Decade: digital targets for 2030 | European Commission](#)

Who is still leading on green technologies – in the next three to four years?



Source: Science, Research and Innovation Performance of the EU, 2020

Example 1 - Hubs for Circularity (H4C)

As Part of Processes for Planet (P4P) Partnership roadmap, the Hubs for Circularity (H4C)

- Are first-of-a-kind, lighthouse demonstrator plants of (near) commercial size implementing industrial symbiosis and/or urban industrial symbiosis.
- Aim at collectively demonstrating leap towards circularity and carbon neutrality in the use of resources (feedstock, energy and water) in a profitable way.
- Should be implement well beyond research and innovation. Specific implementation (including funding) strategies will have to be co -designed, ensuring the participation of all stakeholders; industry, Small and medium-sized enterprises (SMEs), research and technology organizations (RTOs), local authorities, educational institutions and civil society.
- Workshop on 21 April 2021 [Workshop: A new flagship initiative – Hubs for Circularity \(H4C\) - Morning sessions - YouTube](#)



Example 2 – Safe and Sustainable by Design for chemicals and materials

Safety (Health & Environment), Circular, Economical, and Societal

**Reduce time
required for R&D**



**More cost effective
innovation**



Faster to market



**Prepare for future
regulatory challenges**



Safer products



**Better consumer
acceptance**



- **Learning from nature: adopt a better use of our natural resources and preserve the natural environment**
- **Use chemicals and advance materials to produce our products in a safe and sustainable way by design**
- **Developing and solutions for citizens**
- **See [Mapping study for the development of sustainable-by-design criteria - Publications Office of the EU \(europa.eu\)](#)**





Watch the Topics presentations/discussions at the Info Days:

[Destination 1 - Climate neutral, circular and digitised production | Horizon Europe Info Days 2021 \(horizon-europe-infodays2021.eu\)](https://horizon-europe-infodays2021.eu)

[Horizon Europe Info Days 2021 | Cluster 4 | Destination 1 - YouTube](#)



Call - TWIN GREEN AND DIGITAL TRANSITION 2021

FUNDING RATES FOR PARTNERSHIP TOPICS

- Innovation Actions in co-funded partnerships Made in Europe, Processes for Planet and Clean Steel
- 60% funding for with-profit entities
- 6 topics in 2021 as a pilot

BUSINESS CASE

- Expected impact in terms of market opportunities
- ... and manufacturing capacities in EU in short to medium term

EXPLOITATION STRATEGY

- Identify needs, obstacles and necessary actions – e.g. matching value chains
- For TRL 7-8, credible strategy for full-scale manufacturing in EU
- Where relevant, skills addressed through training material that can be up-scaled, e.g. through ESF+

European Partnerships in Cluster “Digital Industry, Space” – three Green Deal Partnerships

Name	Type	Scope/Aim
Made in Europe	Co-programmed	Zero-waste, circular, digital manufacturing
Processes4Planet	Co-programmed	Climate-neutral, circular process industry
Clean Steel	Co-programmed	Carbon-neutral steel production
Photonics	Co-programmed	Maintain leadership in photonic technologies
AI, data and robotics	Co-programmed	Innovation and uptake of AI, data and robotics
Global Competitive Space Systems	Co-programmed	Reinforce EU capacity to access and use space
Metrology	Art.185	A world-class metrology system for EU
Key Digital Technologies	Art.187	Digital hardware and software development
Smart networks and Services	Art.187	Support European 5G and develop 6G
High Performance Computing	Art.187	Quantum/super-computing technologies

Co-programmed European Partnerships

“Division of labour”

- Legal form: Contractual Arrangement / MoU (signed between representatives of the partners and the Commission during the Research and Innovation Days in June [#RiDaysEU](#) | [Memorandum of Understanding signature ceremony for EU Partnerships - YouTube](#))

Implementation:

- Union budget is implemented in the Horizon Europe Work Programme.
- Piloting 60% funding rate for IA (TRL 5 to 7)
- Partners implement their commitments and contributions under their responsibility.

Activities and contributions have to be agreed in the Annual Work Plan (to ensure they are in the scope of the partnership)

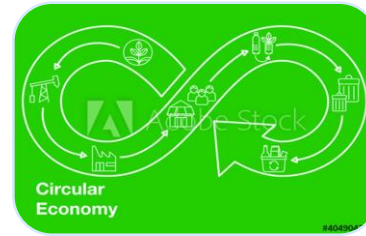
- European Commission: call topics for the necessary range of actions)
- Partners: their own activities and investments (at least equivalent to public funding)

Private association provides back-office with important functionalities

Green, digital and flexible manufacturing



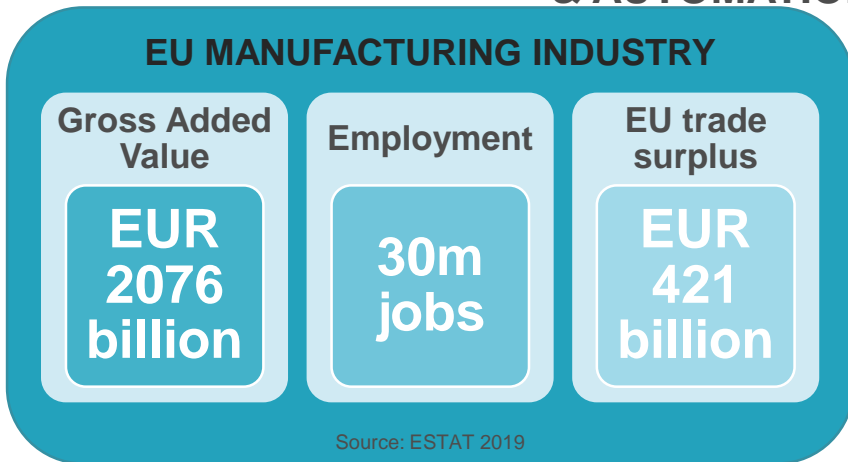
**DIGITALISATION
& AUTOMATION**



**GREEN &
CIRCULAR
MANUFACTURING**



**BIO-BASED
PRODUCTION**



**RESILIENT
SUPPLY CHAIN
& NEW
BUSINESS
MODELS**



**HUMAN-
CENTER
APPROACH**

Call - TWIN GREEN AND DIGITAL TRANSITION 2021

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Green, flexible and advanced manufacturing

- HORIZON-CL4-2021-TWIN-TRANSITION-01-01: AI enhanced robotics systems for smart manufacturing (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-02: Zero-defect manufacturing towards zero-waste (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-03: Laser-based technologies for green manufacturing (RIA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-05: Manufacturing technologies for bio-based materials (RIA)

Call - TWIN GREEN AND DIGITAL TRANSITION 2021

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Advanced digital technologies for manufacturing

- HORIZON-CL4-2021-TWIN-TRANSITION-01-07: Artificial Intelligence for sustainable, agile manufacturing (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-08: Data-driven Distributed Industrial Environments (IA)



Digital technologies for sustainability in industry



Focusing on manufacturing and process industry

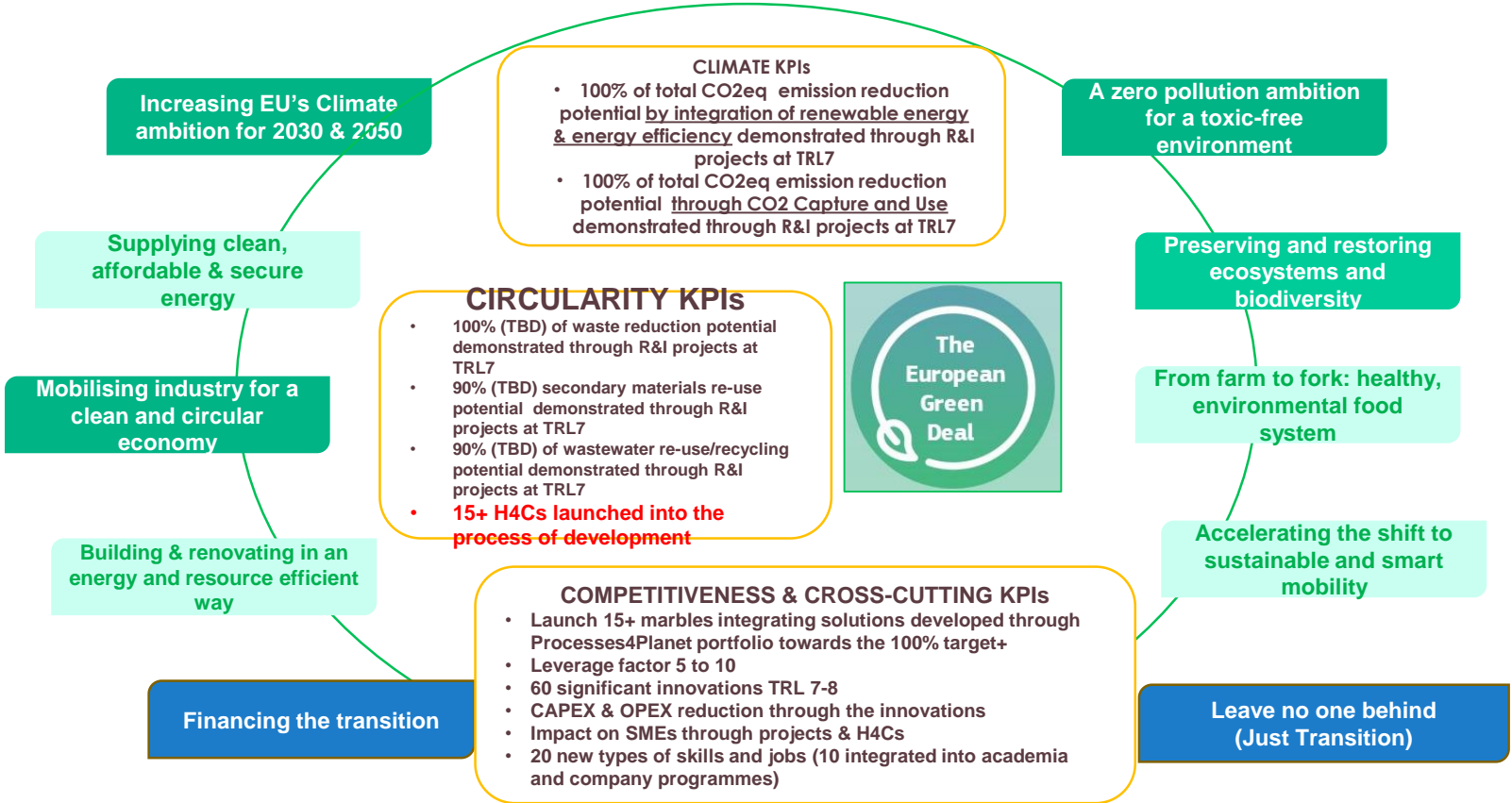
Call - TWIN GREEN AND DIGITAL TRANSITION 2021

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

A new way to build, accelerating disruptive change in construction

- HORIZON-CL4-2021-TWIN-TRANSITION-01-10: Digital permits and compliance checks for buildings and infrastructure (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-11: Automated tools for the valorisation of construction waste (RIA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-12: Breakthrough technologies supporting technological sovereignty in construction (RIA)

Processes4Planet



Call - TWIN GREEN AND DIGITAL TRANSITION 2021

3/4

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Hubs for circularity, a stepping stone towards climate neutrality and circularity in industry

- HORIZON-CL4-2021-TWIN-TRANSITION-01-14: Deploying industrial-urban symbiosis solutions for the utilization of energy, water, industrial waste and by-products at regional scale (RIA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-16: Hubs for Circularity European Community of Practice (ECoP) platform (CSA)

Call - TWIN GREEN AND DIGITAL TRANSITION 2021

4/4

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Enabling circularity of resources in the process industries, including waste and CO₂/CO

- HORIZON-CL4-2021-TWIN-TRANSITION-01-17: Plastic waste as a circular carbon feedstock for industry (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-18: Carbon Direct Avoidance in steel: Electricity and hydrogen-based metallurgy (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-19: Improvement of the yield of the iron and steel making (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-20: Reducing environmental footprint, improving circularity in extractive and processing value chains (IA)

Call - TWIN GREEN AND DIGITAL TRANSITION 2021

4/4

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Integration of Renewables and Electrification in process industry

- HORIZON-CL4-2021-TWIN-TRANSITION-01-21: Design and optimisation of energy flexible industrial processes (IA)
- HORIZON-CL4-2021-TWIN-TRANSITION-01-22: Adjustment of Steel process production to prepare for the transition towards climate neutrality (IA)



Watch the Topics presentations:

Raw materials/SMEs

[Destination 2: Increased autonomy in key strategic value chains for resilient industry | Horizon Europe Info Days 2021 \(horizon-europe-infodays2021.eu\)](https://horizon-europe-infodays2021.eu)

Advanced materials

[Destination 2 - Increased autonomy in key strategic value chains for resilient industry | Horizon Europe Info Days 2021 \(horizon-europe-infodays2021.eu\)](https://horizon-europe-infodays2021.eu)



Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Novel paradigms to establish resilient and circular value chains

- HORIZON-CL4-2021-RESILIENCE-01-01: Ensuring circularity of composite materials (RIA)

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Raw materials for EU open strategic autonomy and successful transition to a climate-neutral and circular economy

- HORIZON-CL4-2021-RESILIENCE-01-03: **Identifying future availability of secondary raw materials (RIA)**
- HORIZON-CL4-2021-RESILIENCE-01-04: **Developing climate-neutral and circular raw materials (IA)**
- HORIZON-CL4-2021-RESILIENCE-01-05: **Building EU-Africa partnerships on sustainable raw materials value chains (CSA)**
- HORIZON-CL4-2021-RESILIENCE-01-06: **Innovation for responsible EU sourcing of primary raw materials, the foundation of the Green Deal (RIA)**
- HORIZON-CL4-2021-RESILIENCE-01-07: **Building innovative value chains from raw materials to sustainable products (IA)**

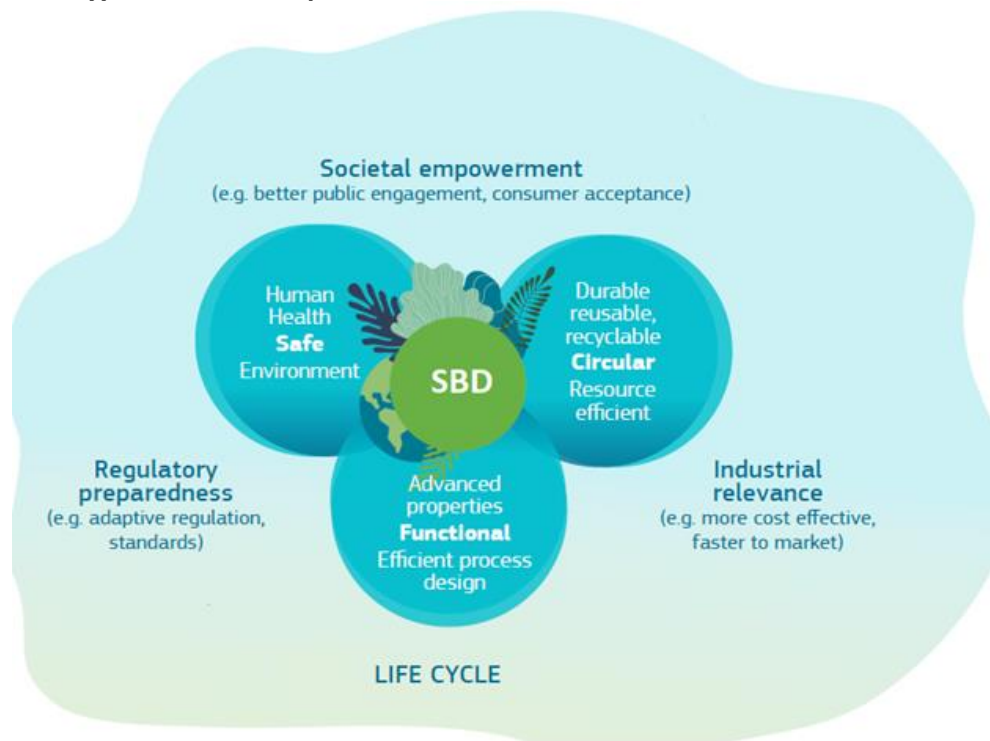
Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Green and Sustainable Materials

- HORIZON-CL4-2021-RESILIENCE-01-08: Establishing EU led international community on safe- and sustainable-by-design materials to support embedding sustainability criteria over the life cycle of products and processes (CSA)
- HORIZON-CL4-2021-RESILIENCE-01-09: Promote Europe's availability, affordability, sustainability and security of supply of essential chemicals and materials (IA)
- HORIZON-CL4-2021-RESILIENCE-01-10: Paving the way to an increased share of recycled plastics in added value products (RIA)
- HORIZON-CL4-2021-RESILIENCE-01-11: Safe- and sustainable-by-design polymeric materials (RIA)
- HORIZON-CL4-2021-RESILIENCE-01-12: Safe- and sustainable-by-design metallic coatings and engineered surfaces (RIA)

The concept

An approach to the design, development and use of substances, materials and/or products that focuses on providing a function (or service), while reducing harmful impacts to human health and the environment

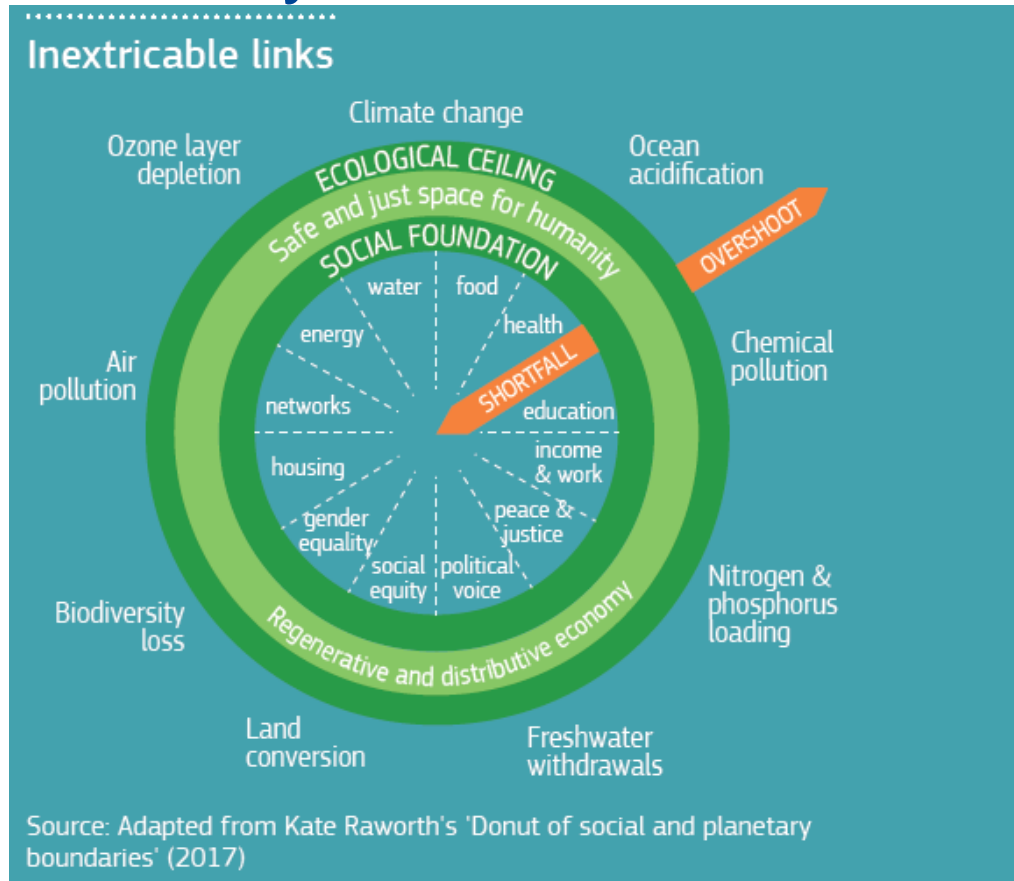


Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Materials for the benefit of society and the environment and materials for climate-neutral Industry

- HORIZON-CL4-2021-RESILIENCE-01-14: Development of more energy efficient electrically heated catalytic reactors (IA)
- HORIZON-CL4-2021-RESILIENCE-01-16: Creation of an innovation community for solar fuels and chemicals (CSA)
- HORIZON-CL4-2021-RESILIENCE-01-17: Advanced materials for hydrogen storage (RIA)
- HORIZON-CL4-2021-RESILIENCE-01-20: Antimicrobial, Antiviral, and Antifungal Nanocoatings (RIA)

Sustainability Puzzle



Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Materials and data cross-cutting actions

- HORIZON-CL4-2021-RESILIENCE-01-25: Biomaterials database for Health Applications (CSA)
- HORIZON-CL4-2021-RESILIENCE-01-26: Sustainable Industry Commons (RIA)



HORIZON-CL4-2021-RESILIENCE-01-27: Innovation Radar, Tech Due Diligence and Venture Building for strategic digital technologies (CSA)

Expected outcome:

Projects are expected to contribute to at least one of the following outcomes:

- A scaling up of capabilities in matching EU-funded technology solutions developed by highly innovative sustainable and digital startups with access to finance and growth opportunities including, but not limited to, other European funding instruments (such as the Digital Europe Programme and EIC), innovation procurement, investors and corporate innovation ventures.
- Deliver, through tech due diligence and venture-building approaches, a step change in the number of new ventures created and ventures' ability to attract funding for sustainable and digital innovations developed in EU-funded R&I.

Indicative budget of the call: EUR 4.00 million

EU contribution per project: EUR 2.50–4.00 million

Type of Action: Coordination and Support Action

TRL: -



HORIZON-CL4-2021-RESILIENCE-01-28: Re-opening industrial sites preparatory action – Promoting a sustainable strategy for Europe’s industrial future (CSA)

Expected outcome:

Projects are expected to contribute to at least one of the following outcomes:

- Providing strategic business development plans for the re-opening of more than 20 industrial sites in Europe, which have recently been closed or are about to be closed in the next months;
- Proposing networks of key players, stakeholders and projects to support regions exploring new approaches to address the challenges of green and digital transition of industries, an innovation-led and place-based approach inherent in Smart Specialisation;
- Analysing the regional cross-fertilization potential between traditional, high-tech and digital sectors, education and research, federal and local authorities, early stage venture capital and innovators;
- Promote the establishment of a new sustainable and inclusive regional industry eco-system;
- Identification of innovation barriers and recommendations for policy support;
- Analysis should be based on key figures like: Economic growth rates and Per Capita GDP, salaries; labour and unemployment rate of different population groups; innovation power in terms of patent applications; number of business registrations per year; tax revenues, taking also into gender and demographic data.

Indicative budget of the call: EUR 1.00 million

EU contribution per project: EUR 1.00 million

Type of Action: Coordination and Support Action

TRL: -



HORIZON-CL4-2021-RESILIENCE-01-29: 'Innovate to transform' support for SME's sustainability transition (CSA)

Expected outcome

Projects are expected to contribute to the following outcomes:

- Support objectives of the European Green Deal and of the EU SME Strategy for a sustainable and digital Europe;
- Increased resilience of SMEs, by fostering technological and social innovation in SMEs to support their transition to more sustainable business models and more resource-efficient and circular processes and infrastructures;
- Increased competitive sustainability of SMEs through the uptake of advanced technologies;
- Stronger innovation support ecosystems supporting the green, social and economic transition of SMEs, by leveraging synergies between existing EU networks and SME support initiatives.

Indicative budget of the call: EUR 10.00 million

EU contribution per project: EUR 5 million

Type of Action: Coordination and Support Action

TRL: -



HORIZON-CL4-2021-RESILIENCE-01-31: European Technological and Social Innovation Factory (RIA)

Expected Outcome

- Strengthened resilience and sustainability – in its economic, social ecological aspects – of the European industries;
- Innovations that combine technological and social innovation and support industry in their transition and the achievement of EU's priorities;
- Inclusive entrepreneurship with a positive social impact;
- A new generation of technologically savvy social entrepreneurs;
- New business models capitalizing on a new partnerships between industry and society;
- New markets.

Indicative budget of the call: EUR 5.00 million

EU contribution per project: EUR 3–5 million

Type of Action: Research and Innovation Action

TRL: -



HORIZON-CL4-2021-RESILIENCE-02-32: Social and affordable housing district demonstrator (RIA)

Expected outcomes

- **Public authorities**, industry, housing **associations and cooperatives** have access to blueprints for replication of innovative ways to renovate social and affordable housing addressing residents' needs;
- Development and deployment of cost-effective, environment-friendly and scalable **processes, technologies and methods** to renovate social and affordable housing in an **integrated way** (energy efficiency, circular, modular building, smart living, eco-design, social inclusion) **at community scale** ;
- Apply and pilot innovative technologies and methods that **go the extra mile (environmental - social – cultural ambition)** putting inclusion and social progress at the forefront in link with the **New European Bauhaus**;
- Mobilise cross-sectoral **partnerships** at local level to develop, adapt, design new processes, methods and technologies applied to renovation of social and affordable housing;
- Obtain lighthouse districts focussing on different innovative solutions addressing local reality and needs and **demonstrating replication potential towards other districts**;
- Provide relevant **indicators and metrics with baseline values**, for monitoring large scale renovation projects targeting social and affordable housing districts.

Indicative budget : EUR 10.00 million

EU contribution per project : EUR 2,5 million

Type of Action: Research and Innovation Action

TRL: start at 5 and achieve 7

Thank you

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https://ec.europa.eu/info/research-and-innovation/research-area/industrial-research-and-innovation_en



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