



#HorizonEU

HORIZON
EUROPE

THE EU
RESEARCH & INNOVATION
PROGRAMME

2021 – 2027

*European Research Day -
Croatia, 25 November 2021*

*Cluster 4 - Digital, Industry
and Space – relevant 2022
calls*

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Cluster 4 – Strategic Priorities

From EU priorities to Work Programme Destinations



Cluster 4 directly supports three of the four Key Strategic Orientations of the Strategic Plan 2021-2024

- 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>A human-centred and ethical development of digital and industrial technologies HUMAN</p>

Indicative Budget of Cluster 4

2021-27 budget: **15.348 bn€** (including NGEU)
WP 2021-2022, **programmable budget ~3.5 bn€:**

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 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
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
Metrology	Art.185	A world-class metrology system for EU

Co-programmed European Partnerships

Legal form: Contractual Arrangement / MoU (signed between representatives of the partners and the Commission)

[#RiDaysEU | Memorandum of Understanding signature ceremony for EU Partnerships - YouTube](#)

Implementation:

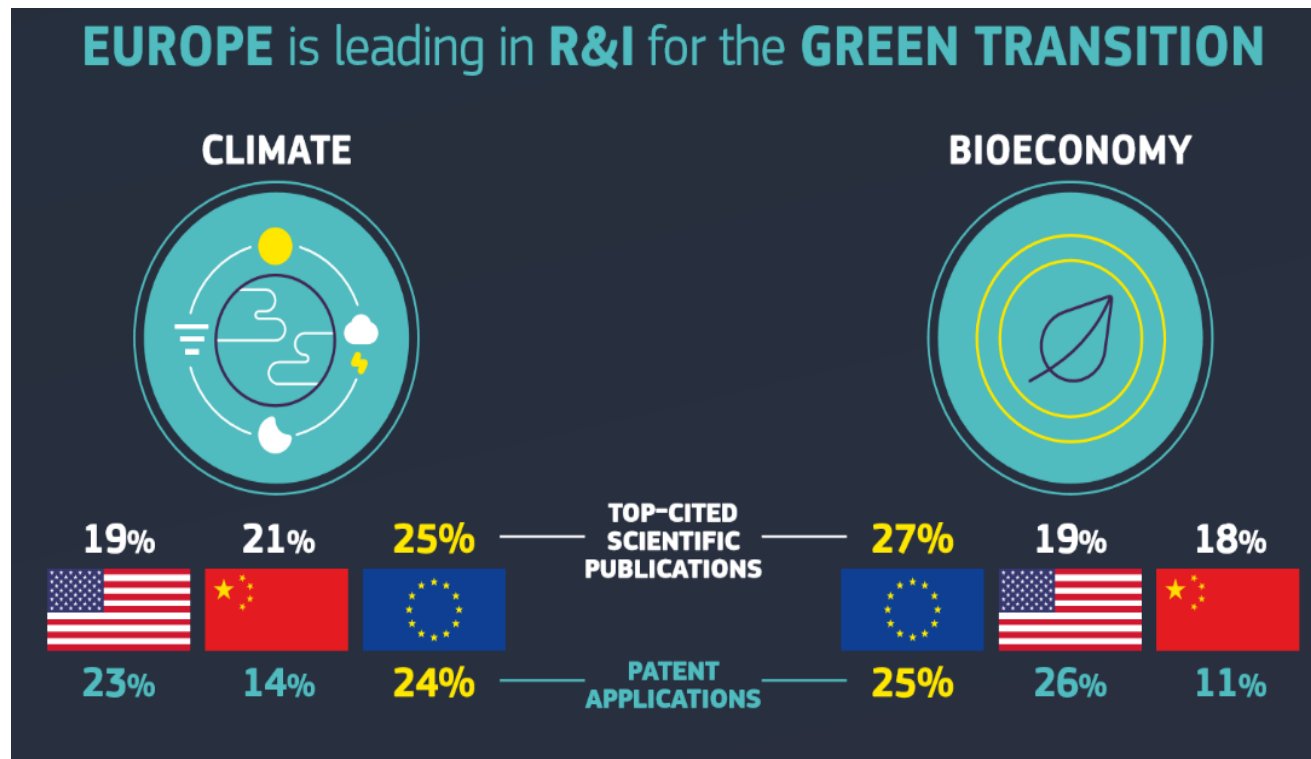
- Union budget is implemented in the Horizon Europe Work Programme.
- Piloting 60% funding rate for IA (TRL 5 to 7)
- Partners implement their commitments and contributions under their responsibility.

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)

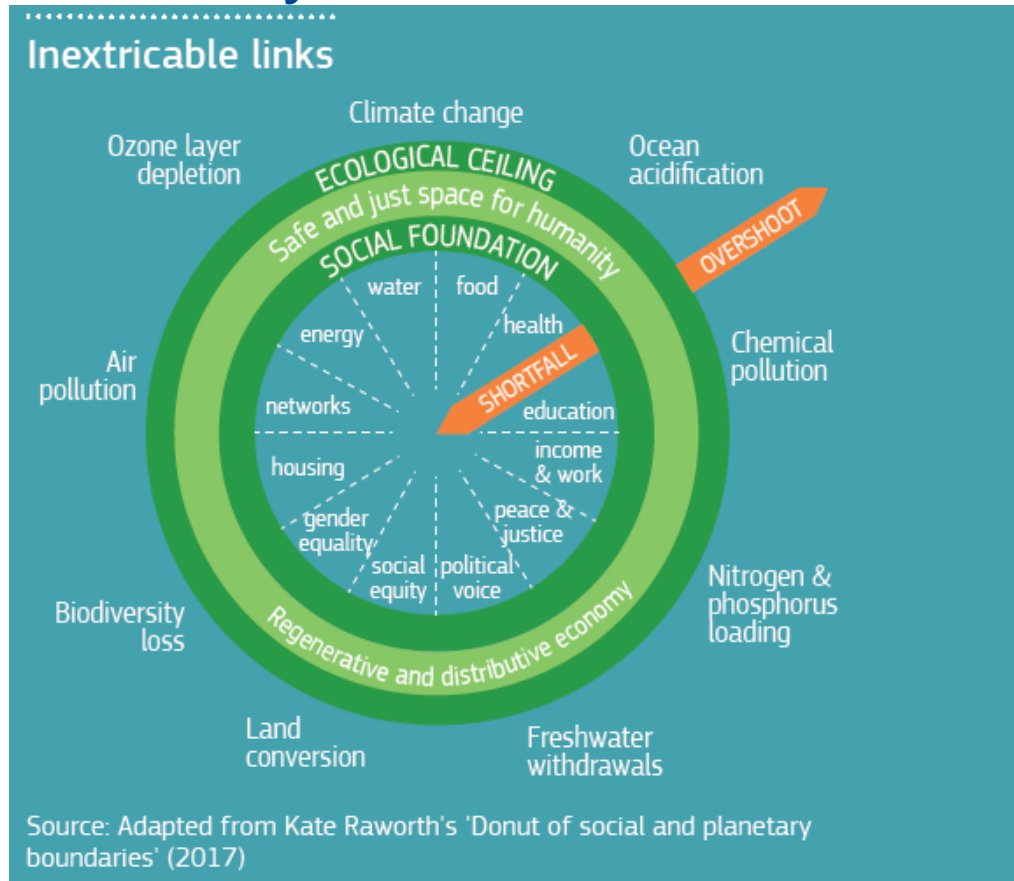
Private association provides back-office with important functionalities

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



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

Sustainability Puzzle



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](#)



Call - TWIN GREEN AND DIGITAL TRANSITION 2022

Green, flexible and advanced manufacturing

- HORIZON-CL4-2022-TWIN-TRANSITION-01-01: Rapid reconfigurable production process chains (Made in Europe Partnership) (IA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-02: Products with complex functional surfaces (Made in Europe Partnership) (RIA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-03: Excellence in distributed control and modular manufacturing (Made in Europe Partnership) (RIA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-04: Intelligent work piece handling in a full production line (Made in Europe Partnership) (RIA)

Call - TWIN GREEN AND DIGITAL TRANSITION 2022

Advanced digital technologies for manufacturing

- HORIZON-CL4-2022-TWIN-TRANSITION-01-06: ICT Innovation for Manufacturing Sustainability in SMEs (I4MS2) (Made in Europe Partnership) (IA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-07: Digital tools to support the engineering of a Circular Economy (Made in Europe Partnership) (RIA)



Digital technologies for sustainability in industry



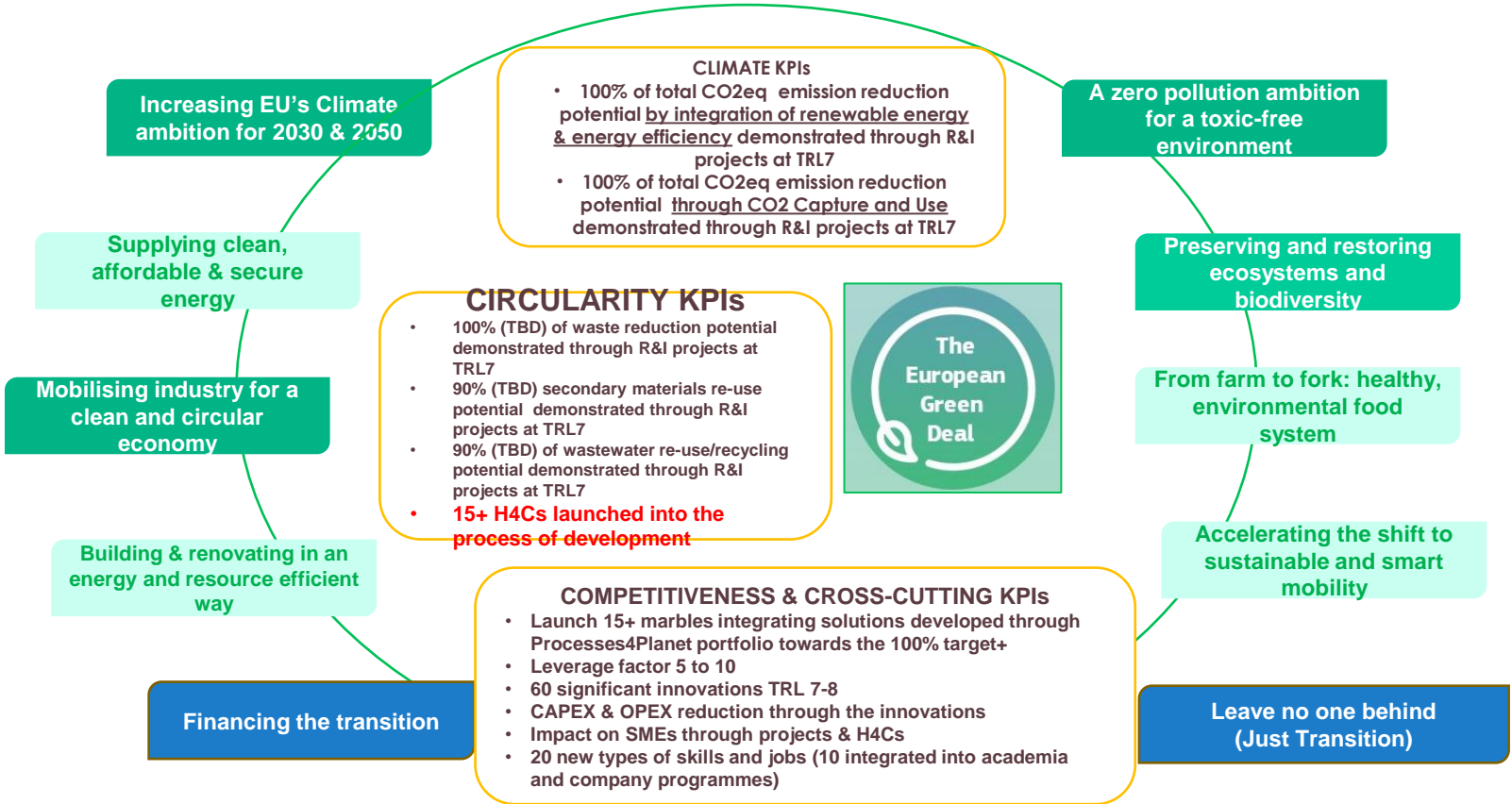
Focusing on manufacturing and process industry

Call - TWIN GREEN AND DIGITAL TRANSITION 2022

A new way to build, accelerating disruptive change in construction

- HORIZON-CL4-2022-TWIN-TRANSITION-01-09: Demonstrate the use of Digital Logbook for buildings (IA)

Processes4Planet



Call - TWIN GREEN AND DIGITAL TRANSITION 2022

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

- HORIZON-CL4-2022-TWIN-TRANSITION-01-10: Circular flows for solid waste in urban environment (Processes4Planet Partnership) (IA)

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

- HORIZON-CL4-2022-TWIN-TRANSITION-01-11: Valorisation of CO/CO₂ streams into added-value products of market interest (Processes4Planet Partnership) (IA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-13: Raw material preparation for clean steel production (Clean Steel Partnership) (IA)

Integration of Renewables and Electrification in process industry

- HORIZON-CL4-2022-TWIN-TRANSITION-01-15: New electrochemical conversion routes for the production of chemicals and materials in process industries (Processes4Planet Partnership) (RIA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-16: Modular and hybrid heating technologies in steel production (Clean Steel Partnership) (IA)
- HORIZON-CL4-2022-TWIN-TRANSITION-01-17: Integration of hydrogen for replacing fossil fuels in industrial applications (Processes4Planet Partnership) (IA)

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2022

Novel paradigms to establish resilient and circular value chains

- HORIZON-CL4-2022-RESILIENCE-01-01: Circular and low emission value chains through digitalisation (Processes4Planet Partnership) (RIA)

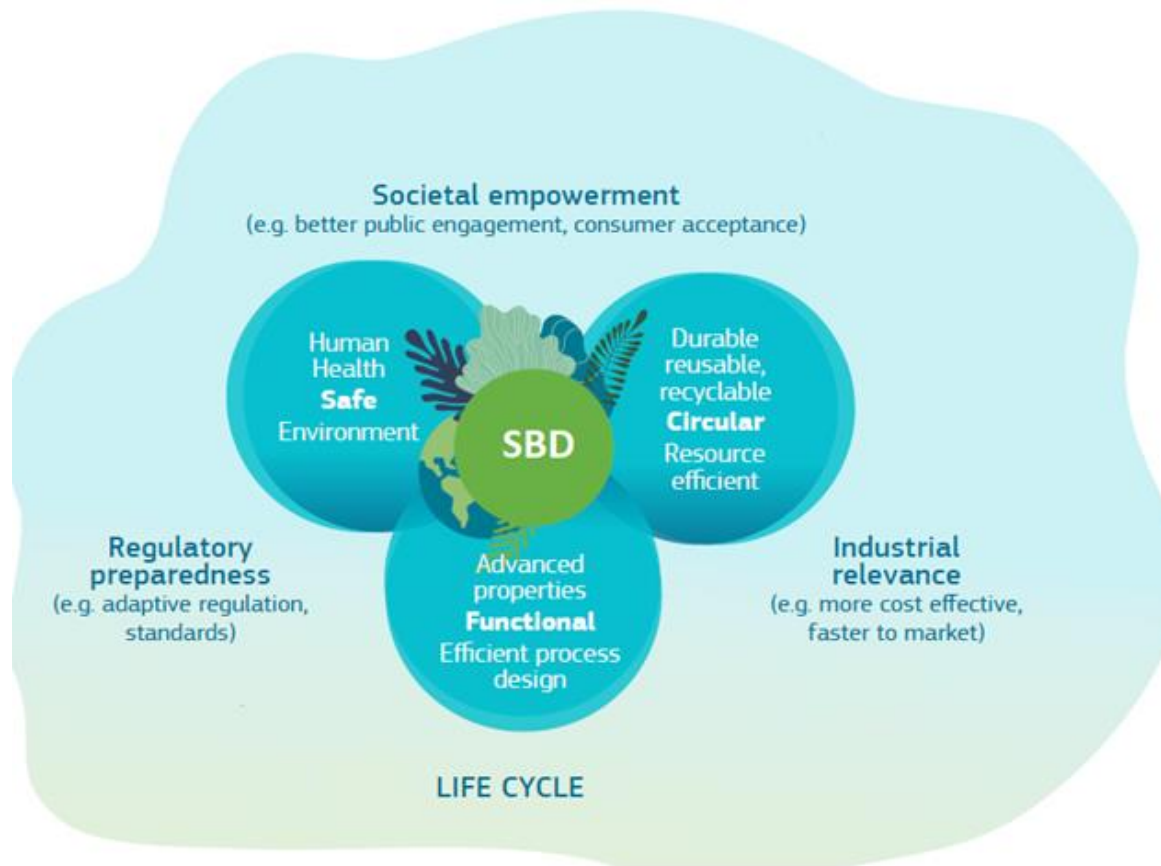
Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2022

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

- HORIZON-CL4-2022-RESILIENCE-01-02: Monitoring and supervising system for exploration and future exploitation activities in the deep sea (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-03: Streamlining cross-sectoral policy framework throughout the extractive life-cycle in environmentally protected areas (CSA)
- HORIZON-CL4-2022-RESILIENCE-01-04: Developing digital platforms for the small scale extractive industry (IA)
- HORIZON-CL4-2022-RESILIENCE-01-05: Technological solutions for tracking raw material flows in complex supply chains (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-06: Sustainable and innovative mine of the future (IA)
- HORIZON-CL4-2022-RESILIENCE-01-07: Innovative solutions for efficient use and enhanced recovery of mineral and metal by-products from processing of raw materials (IA)
- HORIZON-CL4-2022-RESILIENCE-01-08: Earth observation technologies for the mining life cycle in support of EU autonomy and transition to a climate-neutral economy (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 2022

Green and Sustainable Materials

- HORIZON-CL4-2022-RESILIENCE-01-10: Innovative materials for advanced (nano)electronic components and systems (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-11: Advanced lightweight materials for energy efficient structures (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-12: Functional multi-material components and structures (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-23: Safe- and sustainable-by-design organic and hybrid coatings (RIA)

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2022

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

- HORIZON-CL4-2022-RESILIENCE-01-13: Smart and multifunctional biomaterials for health innovations (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-14: Membranes for gas separations - membrane distillation (IA)
- HORIZON-CL4-2022-RESILIENCE-01-16: Building and renovating by exploiting advanced materials for energy and resources efficient management (IA)
- HORIZON-CL4-2022-RESILIENCE-01-24: Novel materials for supercapacitor energy storage (RIA)

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2022

Materials and data cross-cutting actions

- HORIZON-CL4-2022-RESILIENCE-01-19: Advanced materials modelling and characterisation (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-20: Climate Neutral and Circular Innovative Materials Technologies Open Innovation Test Beds (IA)
- HORIZON-CL4-2022-RESILIENCE-01-25: Optimised Industrial Systems and Lines through digitalisation (IA)

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2022

Improving the resilience and preparedness of EU businesses, especially SMEs and Startups

- HORIZON-CL4-2022-RESILIENCE-01-21: Leveraging standardisation in Digital Technologies (CSA)
- HORIZON-CL4-2022-RESILIENCE-01-26: 'Innovate to transform' support for SME's sustainability transition (CSA)
 - Support European Green Deal and SME Strategy for a sustainable and digital Europe;
 - Increased resilience of SMEs, through technological and social innovation, 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.

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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