



HORIZON EUROPE



THE EU RESEARCH & INNOVATION PROGRAMME

2021 – 2027

Cluster 4 - Digital, Industry and Space

Overview & Calls

2022-TWIN-TRANSITION

2022-RESILIENCE

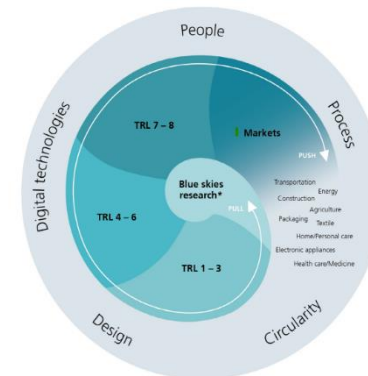
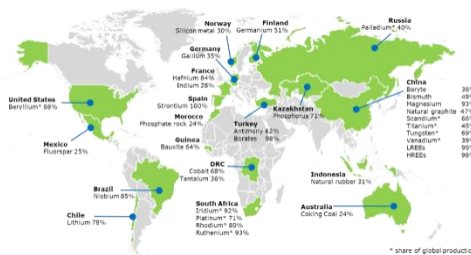
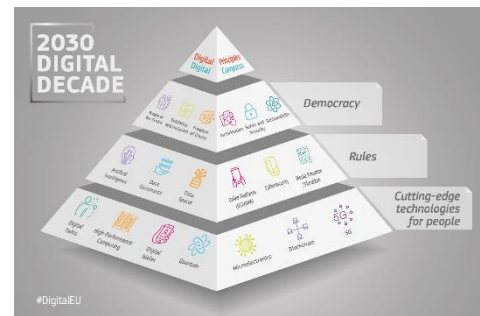
Nicholas Deliyankis

DG Research & Innovation

European Commission



Cluster 4 'Digital, Industry and Space' – Policies, Strategies, Action Plans



* Research where 'real-world' applications are not immediately apparent

Cluster 4 – Vision

Competitive technologies respecting the boundaries of our planet, and reflecting human needs

Twin Green and Digital Transitions

Industrial and Digital transformation

- mastering technologies
- deploying technologies – technology infrastructures
- securing autonomy in strategic value chains and critical raw materials



Climate-neutral, circular and clean industry

- Innovative production and manufacturing processes
- Sustainable-by-design advanced materials and technologies
- Deep decarbonisation of energy-intensive industries

Major contribution to Inclusiveness and Resilience

- engagement with users, workers, citizens
- development of skills
- development of regions

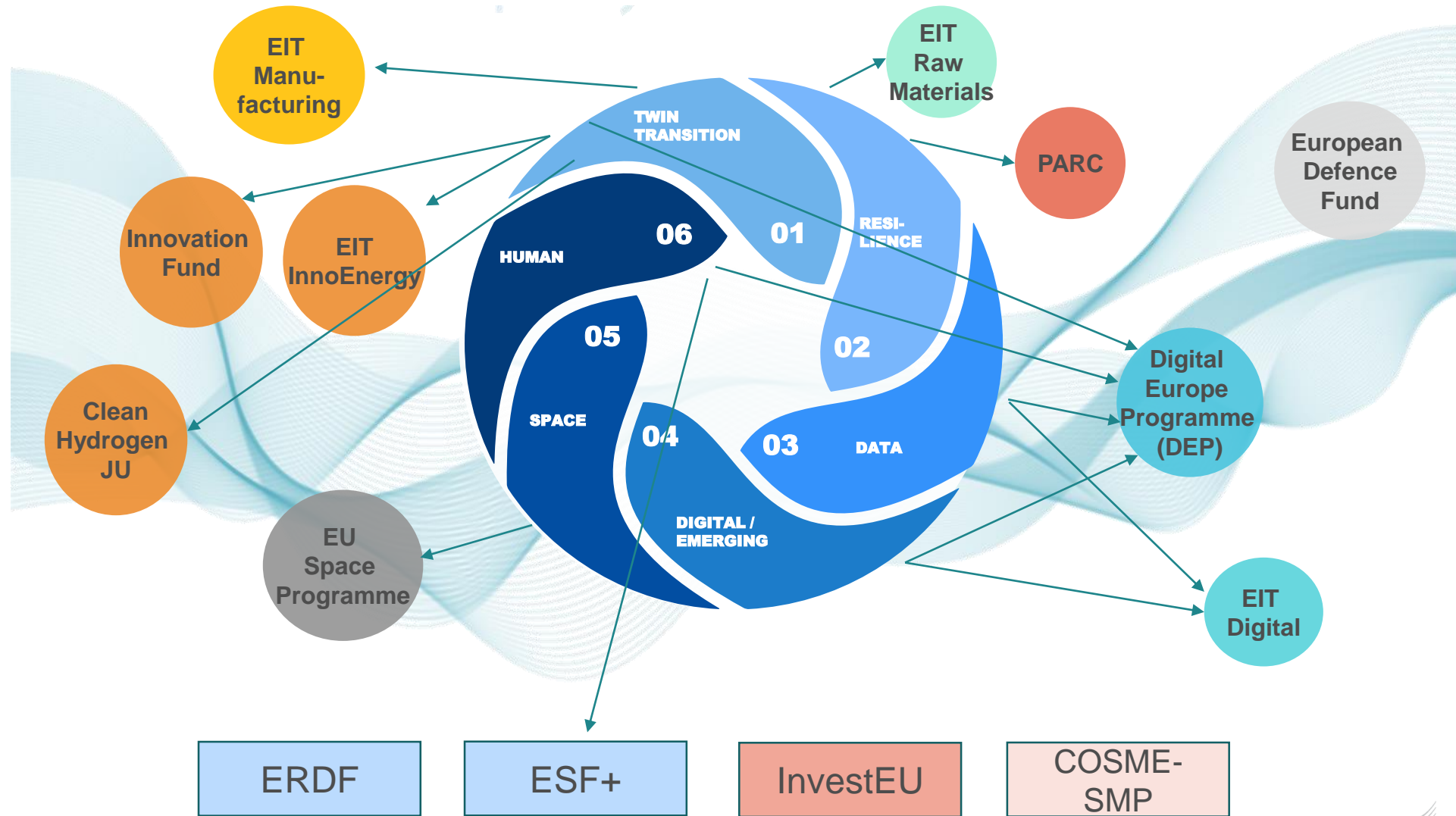
Cluster 4 - Digital, Industry and Space

“Destinations” 2021-22 & 2023-24

Key Strategic Orientation in the Strategic Plan 2021 - 2024	Destination	Strategies
Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy	Climate neutral, circular and digitised production TWIN-TRANSITION	Fit for 55 Digital Decade Industrial Strategy
Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains	A digitised, resource efficient, and resilient industry RESILIENCE	Fit for 55 EU Chemical Strategy Industrial Strategy
	World-leading data and computing technologies DATA	Digital Decade Industrial Strategy
	Digital and emerging technologies for competitiveness and fit for the green deal DIGITAL-EMERGING	
	Open Strategic Autonomy in developing, deploying and using global space-based infrastructures, services, applications and data SPACE	EU Space Strategy
Creating a more resilient, inclusive and democratic European society	A human-centred and ethical development of digital and industrial technologies HUMAN	Digital Decade Industrial Strategy

The Key Strategic Orientation “restoring Europe’s eco-systems and biodiversity” becomes increasingly important for cluster 4

Cluster 4 Synergies - Overview



Partnerships in Cluster 4

- Processes4Planet – Transforming the European Process Industry for a sustainable society (1,300M€)
- Clean Steel – Low-carbon Steelmaking (700M€)
- Made in Europe (900M€)
- EuroHPC, High-Performance Computing (JU, 900M€)
- KDT, Key Digital Technologies (JU, 1,800M€ + Chips)
- SNS, Smart Networks and Services (JU, 900M€)
- Artificial Intelligence, Data and Robotics (1,300M€)
- Photonics (340M€)
- Globally competitive Space Systems (proposed)
- Metrology (Art. 185, 300M€)

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 *approximately* as:

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€

Climate neutral, circular, and digitised production

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (M€)
Green, flexible and advanced manufacturing	8	193
Advanced digital technologies for manufacturing	4	94
A new way to build, accelerating disruptive change in construction	4	69
Hubs for circularity, a stepping stone towards climate neutrality and circularity in industry	3 (including 1 CSA)	72.5
Enabling circularity of resources in the process industries, including waste, water and CO ₂ /CO	6	173.5
Integration of Renewables and Electrification in process industry	5	135.5
TOTAL estimated budget WP 2021-2022	30	737.5



Autonomy in Key Strategic Value Chains for Resilient Industry

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (M€)
Novel paradigms to establish resilient and circular value chains	2	50
Raw materials for EU strategic autonomy and successful transition to a climate-neutral and circular economy	12 (incl. 2 CSA)	253.9
Green and Sustainable Materials	9 (incl. 1 CSA)	173
Materials for the benefit of society and the environment and materials for decarbonising Industry	8 (incl. 2 CSA)	175
Materials and data cross-cutting actions	5 (incl. 1 CSA)	59.5
Improving the resilience and preparedness of EU businesses, especially SMEs and Startups	8 (incl. 4 CSA)	65
TOTAL estimated budget WP 2021-2022	44	776.4



Social Sciences and Humanities (SSH)

- Involving Social Sciences and Humanities can significantly enhance the outcomes of many projects in Digital, Industry and Space. Examples include
 - Human-robot collaboration, Human empowerment
 - Improving working environments
 - Engaging with society to develop and adopt green and digital solutions
 - Removing biases in Artificial Intelligence
 - Trustworthiness in Next-generation Internet and Artificial Intelligence
- Role of Social Sciences and Humanities explicit in 52 topics of Cluster 4
- Opportunities for **Social Innovation** in 20 topics of Cluster 4

International Cooperation

- General opening of Horizon Europe to international cooperation
 - Low- and middle-income countries can participate with EU funding
 - Other countries can participate, normally without EU funding, except in justified cases
- International cooperation explicitly encouraged in 42 topics of the cluster
 - flagged on portal as ‘A Stronger Europe in the World’
- Associated Countries
 - Transitional arrangement for countries formerly associated in Horizon 2020, UK, Kosovo* and Morocco – until association agreements enter into force
 - Switzerland depends on progress with the general cooperation agreement
 - Art. 22.5

** This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.*

Call - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 2022

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*

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+*

**WORK PROGRAMME 2021-2022 – DESTINATION
“CLIMATE NEUTRAL, CIRCULAR AND DIGITISED
PRODUCTION”**

Call

**CLIMATE NEUTRAL, CIRCULAR AND DIGITISED
PRODUCTION 2022**

HORIZON-CL4-2022-TWIN-TRANSITION-01

Opening: 12 Oct 2021

Deadline: 30 Mar 2022 (17.00.00 Brussels local time)

Call - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 2022

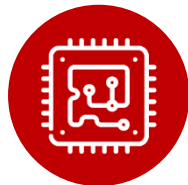
Green, flexible and advanced manufacturing

- 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 - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 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 - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 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)

Call - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 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)

Call - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 2022

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)

Call - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 2022

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)

**WORK PROGRAMME 2021-2022 – DESTINATION
“CLIMATE NEUTRAL, CIRCULAR AND DIGITISED
PRODUCTION”**

Call

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

HORIZON-CL4-2022-RESILIENCE-01

Opening: 12 Oct 2021

Deadline: 30 Mar 2022 (17.00.00 Brussels local time)

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 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)**

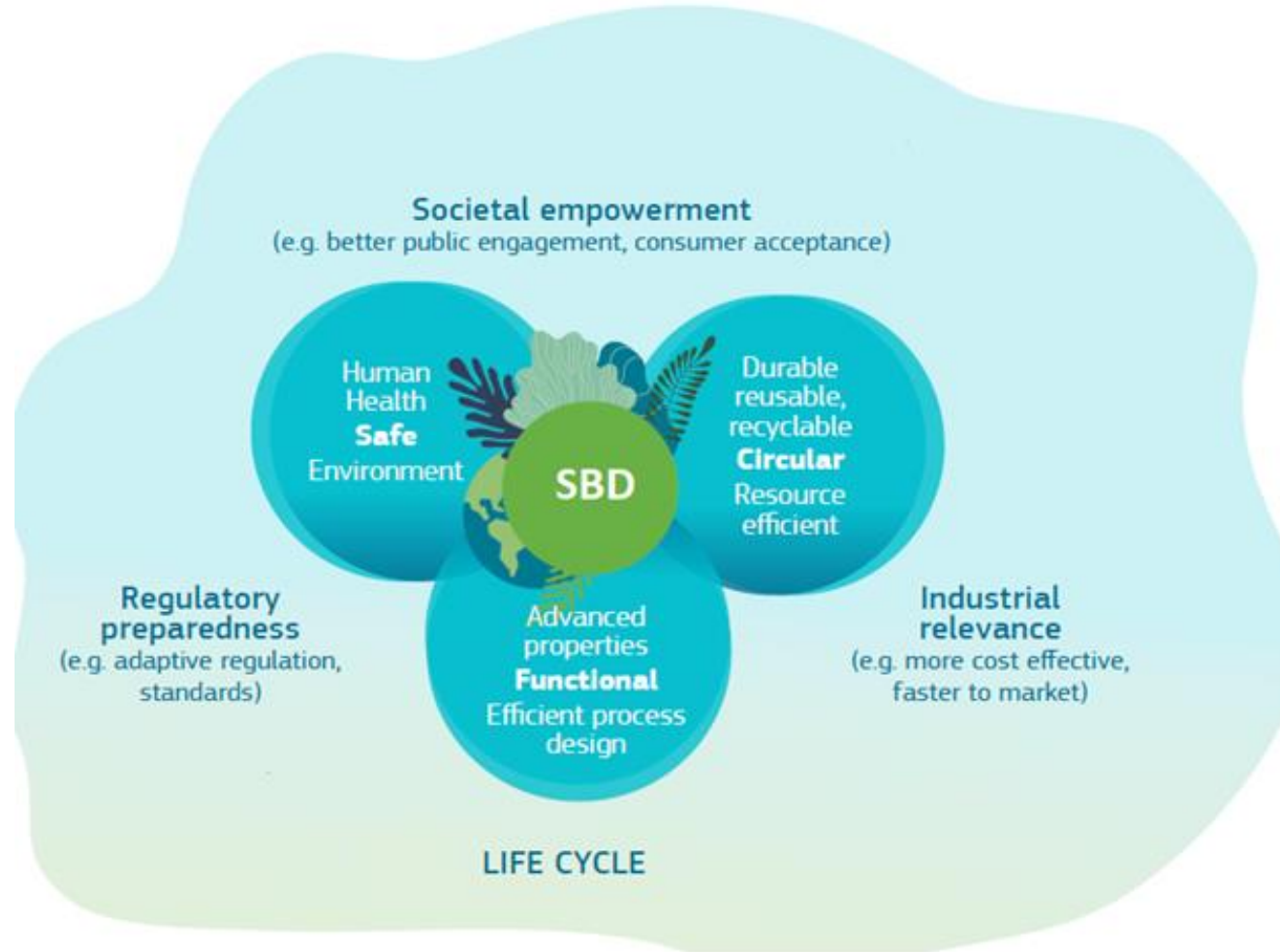
Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

Green and Sustainable Materials

- HORIZON-CL4-2022-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)

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-CL4-2022-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 2021

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)
- 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)

Expected Outcome:

- 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 million

EU contribution per project: EUR 5 million

Type of Action: Coordination and Support Action (with financial support to third parties)



Thank you!

HorizonEU

<http://ec.europa.eu/horizon-europe>



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