



HORIZON EUROPE

THE EU RESEARCH & INNOVATION PROGRAMME

2021 – 2027

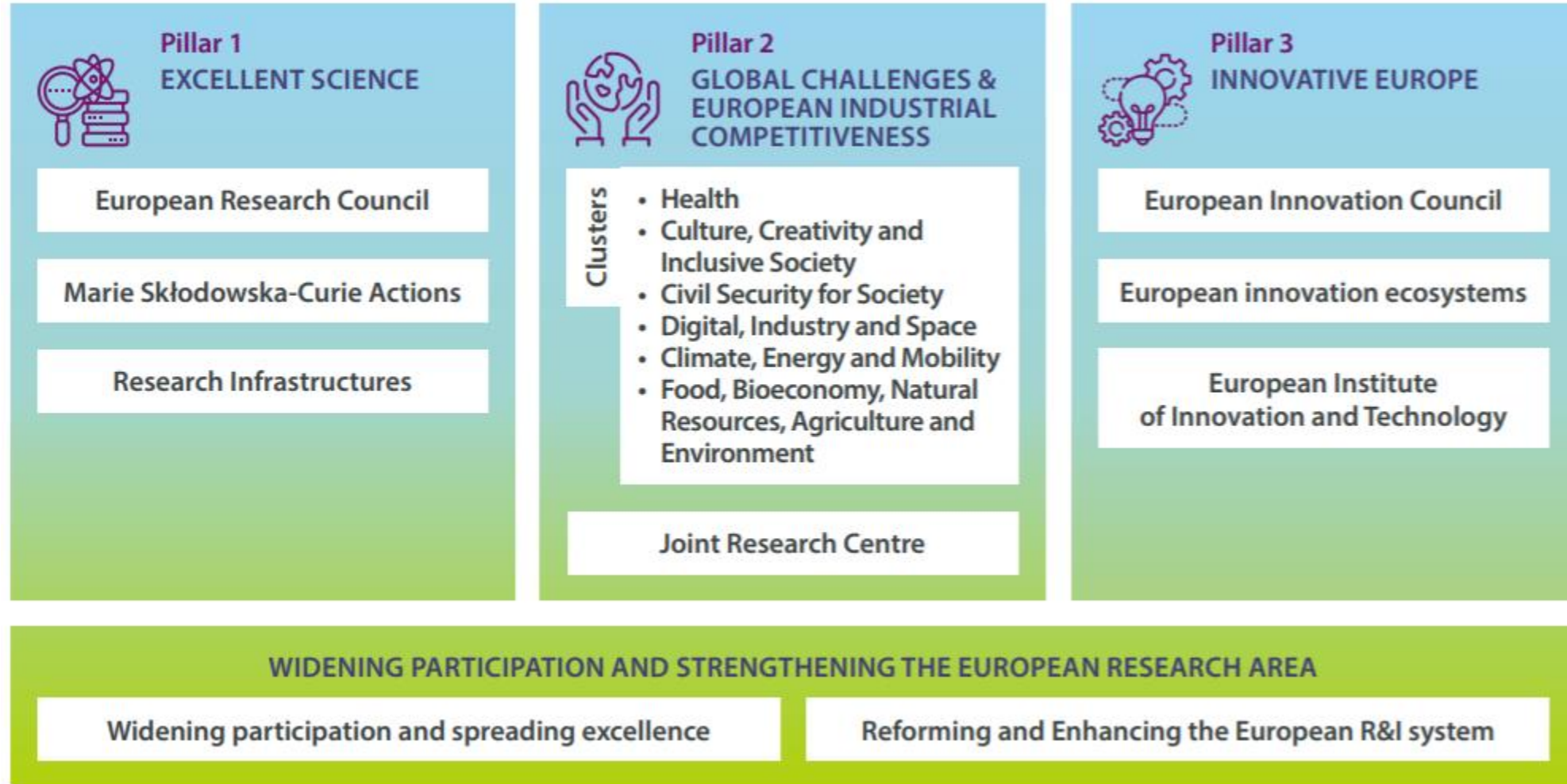
Horizon Europe Information Days – Cluster 4

29 Nov – 01 Dec 2021

Destination “Climate neutral, circular and digitised production”



Structure of Horizon Europe



Cluster 4 - Vision

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

Green and digital 'twin' transition

Industrial and digital transformation

- mastering technologies
- deploying technologies and technology infrastructures
- securing autonomy in strategic value chains



Climate-neutral, circular and clean industry

Major contribution to inclusiveness and resilience

- human-centred and ethical developments
- engagement with users, workers, citizens
- social innovation

**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

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+*

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)

HORIZON-CL4-2022-TWIN-TRANSITION-01-01: Rapid reconfigurable production process chains (Made in Europe Partnership) (IA)

Projects are expected to contribute to the following outcomes:

- Achieve a significant reduction in reconfiguration time, which includes all steps between stopping a production, reconfiguration of the individual production steps, requalification, adjustment of the intra-logistics processes, and ramping up to a full production speed;
- Develop validated standardised interfaces and protocols to enable digitalised and thus flexible manufacturing processes;
- Develop protocols for best practices in rapid reconfiguration applicable not only for the products and sectors present in the project, but also transferable to other sectors and application areas.

Indicative budget: EUR 27.50 million

EU contribution per project: EUR 8.00 – 10.00 million

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7

HORIZON-CL4-2022-TWIN-TRANSITION-01-02: Products with complex functional surfaces (Made in Europe Partnership) (RIA)

Projects are expected to contribute to the following outcomes:

- Develop more efficient manufacturing processes to increase market share increase for products with functional surfaces that contribute to competitiveness and a transition to green and sustainable production flows;
- Significant reduction of the environmental footprint for surface treatments;
- Uptake of treatment technologies in applications for a sustainable society, targeting reductions in energy use and environmental footprint.

Indicative budget: EUR 21.50 million

EU contribution per project: EUR 4.00 – 6.00 million

Type of Action: Research and Innovation Actions

TRL: Start at 4 and achieve 6

HORIZON-CL4-2022-TWIN-TRANSITION-01-03: Excellence in distributed control and modular manufacturing (Made in Europe Partnership) (RIA)

Projects are expected to contribute to the following outcomes:

- Significant advance in modular technologies for flexible manufacturing operations, which respond to disrupted supply chains, or rapid changes in customer and societal demands;
- Transition of modular technology to sustainable production for varying batch sizes, including single lots, with a clear integration of control and decision-making strategies at different levels and throughout the supply chain;
- Improved understanding among industrial users, including SMEs, of how to organise and control reconfigurable manufacturing systems built from modules with defined interfaces, including quality assessments, environmental impact, energy use, end-user involvement and business models.

Indicative budget: EUR 21.50 million

EU contribution per project: EUR 4.00 – 6.00 million

Type of Action: Research and Innovation Actions

TRL: Start at 4 and achieve 6

HORIZON-CL4-2022-TWIN-TRANSITION-01-04: Intelligent work piece handling in a full production line (Made in Europe Partnership) (RIA)

Projects are expected to contribute to the following outcomes:

- Develop highly flexible, resilient, reconfigurable and agile production lines able to handle a variety of different products and materials with high precision;
- Deploy easy to program advanced control systems capable of intelligent handling of complex products in terms of shape, size, material and stiffness;
- Increase productivity by enabling fast and accurate movement of work pieces through the production line, ensuring just-in-time delivery and reducing downtime.

Indicative budget: EUR 21.50 million

EU contribution per project: EUR 4.00 – 6.00 million

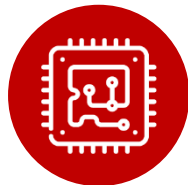
Type of Action: Research and Innovation Actions

TRL: Start at 4 and achieve 6

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

HORIZON-CL4-2022-TWIN-TRANSITION-01-06: ICT Innovation for Manufacturing Sustainability in SMEs (I4MS2) (Made in Europe Partnership) (IA)

Projects are expected to contribute to the following outcomes:

- Making European manufacturing companies, especially SMEs and small mid-caps, more sustainable and resilient through the best use of digital technologies and upskilling of personnel;
- Making jobs of humans working in the manufacturing sector safer and more attractive for a diverse population of workers;
- Increasing innovation capacity, agility and productivity of the manufacturing sector, in particular for SMEs and mid-caps;
- Increasing the competitiveness of SMEs and mid-caps by reducing the entry barriers to the use of advanced digital technologies, and transferring innovative solutions into the wider manufacturing community.

Indicative budget: EUR 30.00 million

EU contribution per project: EUR 4.00 – 8.00 million

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7

HORIZON-CL4-2022-TWIN-TRANSITION-01-07: Digital tools to support the engineering of a Circular Economy (Made in Europe Partnership) (RIA)

Projects are expected to contribute to the following outcomes:

- Provide a range of support solutions and innovative digital tools for engineers, technicians and operators on the factory floor, in order to build agile, sustainable and responsive production environment and supply chains, with specific focus on areas such as material saving, repair, refurbishing, re-manufacturing, recycling, and reuse of products and components;
- Reduction of the dependency from imported raw materials or harmful materials for the European manufacturing sector (e.g. by material consumption reduction, material substitution and use of secondary raw materials);
- Define specifications and standards for data, products, and/or business processes, that can be agreed and commonly used by many industrial actors and across different industry sectors; and facilitate industry agreements on circularity and sustainability through increased data exchange among value chain actors and enable the development of new types of businesses;
- Reduce the skills and knowledge gap for the actors involved.

Indicative budget: EUR 22.00 million

EU contribution per project: EUR 3.00 – 6.00 million

Type of Action: Research and Innovation Actions

TRL: Start at 3-4 and achieve 6

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)

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

Projects are expected to contribute to the following outcomes:

- Measurable improvements in resource efficiency and decarbonisation of buildings and their construction/renovation, as a result of using digital building logbooks;
- Improved linkages of existing databases, tools and sources for digital building logbooks;
- Improved usability of digital building logbooks through user eXperience, taking into account issues of accessibility as well as inclusivity;
- New or improved tools for collection and update of relevant data;
- Demonstrate other benefits of using digital building logbooks e.g. safety and health in buildings and construction for instance by structural health monitoring; cost effectiveness, efficiency gains in terms of time; enhanced climate resilience.

Indicative budget: EUR 9.00 million

EU contribution per project: EUR 4.50 million

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7

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)

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

Projects are expected to contribute to the following outcomes:

- Deploy the concept of Industrial-Urban Symbiosis (I-US) on a real scale demonstrator, making the flow of solid waste circular in process, manufacturing and/or construction industries;
- Reduce 80 % (in weight or volume) solid waste generated in comparison to current state-of-the art, by re-using, valorising and transforming waste, by-products and side-streams into new/secondary resources of raw materials;
- Plan actions to overcome non-technological barriers for exploitation (i.e. waste regulations, standardisation, confidentiality and compliance, ownership, fair sharing of benefits, acceptance of the concept);
- Develop knowledge sharing: know-how, advantages, challenges and recommendations on technological and non-technological with the European Community of Practice (ECoP) and other relevant bodies, disseminating the major innovation outcomes to support the implementation of I-US;
- Explore and illustrate replication potential in other regions (e.g. by setting up a network amongst waste associations to optimise flow of secondary raw materials);
- Implement actions to facilitate relations and to involve the local community actors by exchanging knowledge, training, human capital and sharing with the local educational establishments and with the ECoP;
- Implement a social innovation spin-off action involving one of the local community actors.

Indicative budget: EUR 42.50 million

EU contribution per project: EUR 12.00 – 18.00 million

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7

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)

HORIZON-CL4-2022-TWIN-TRANSITION-01-11: Valorisation of CO/CO2 streams into added-value products of market interest (Processes4Planet Partnership) (IA)

Projects are expected to contribute to the following outcomes:

- Utilise CO/CO2 streams to produce added value products and/or intermediates of wide industrial interest (e.g. polymers, resins, chemicals, food/feed ingredients, minerals, etc.). Excluding fuels and/or energy carriers;
- Enhance the market for CO/CO2 based products providing economically viable and sustainable alternatives to existing products with strong market interest in one or more applications (e.g. consumer products, feed/food ingredients, automotive, construction, etc.);
- Develop concepts enabling 100% utilisation of RES (e.g. electrified processes, concentrated solar, etc.), coping with potential fluctuations in the energy supply;
- Achieve at least 60% GHG emissions mitigation in the overall lifecycle compared to existing processes for the same products (or relevant benchmark);
- Develop mature technologies for separation/purification of CO/CO2 containing waste streams to allow the integration in the targeted industry sector/sectors..

Indicative budget: EUR 42.50 million

EU contribution per project: EUR 12.00 – 18.00 million / The funding rate is up to 60% of the eligible costs

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7

HORIZON-CL4-2022-TWIN-TRANSITION-01-13: Raw material preparation for clean steel production (Clean Steel Partnership) (IA)

Projects are expected to contribute to the following outcomes:

- Testing and validation of technologies for the upgrade and the use of low-quality iron ores. This includes low carbon technologies for sintering/pelletisation and/or cold bonded iron ore agglomeration;
- Identification of best available and applicable technologies for the reduction of impurities in post-consumer scrap;
- Technologies for the valorisation of low-quality scrap streams.

Indicative budget: EUR 14.00 million

EU contribution per project: EUR 4.00 – 5.00 million / The funding rate is up to 60% of the eligible costs

Type of Action: Innovation Actions

TRL: Start at 6 and achieve 8

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)

HORIZON-CL4-2022-TWIN-TRANSITION-01-15: New electrochemical conversion routes for the production of chemicals and materials in process industries (Processes4Planet Partnership) (RIA)

Projects are expected to contribute to the following outcomes:

- Electrification of the industrial production process by shifting from the chemical conversion process to an electrochemical conversion process;
- Efficient integration of renewable electricity to drive the conversion process;
- Significant reduction of CO₂ emissions of the overall industrial process, including the emissions related to the generation of the electricity;
- Energy savings compared to the classical production routes;
- Overall material savings (waste reduction) compared to the classical production routes;
- Competitive costs of the new process technology and its integration in the processing line, including upstream and downstream.

Indicative budget: EUR 30.00 million

EU contribution per project: EUR 8.00 – 12.00 million

Type of Action: Research and Innovation Actions

TRL: Start at 3-4 and achieve 5-6

HORIZON-CL4-2022-TWIN-TRANSITION-01-16: Modular and hybrid heating technologies in steel production (Clean Steel Partnership) (IA)

Projects are expected to contribute to the following outcomes:

- Use a wide control range of heating capacity by modular heating technologies such local regenerators, and of hybrid heating, based on both fuel gases from the steel-making process and the incorporation of electricity from renewable sources;
- Integration of fuel cells, electrolyzers or alternative carbon-based products for non-fossil coke, as well as increased use of non-fossil energy and reactants (e.g. green electricity for heat generation, biomass, green hydrogen) in downstream processes. .
- Integrate fuel cells of alternative coal-based products for non-fossil coke, as well as increased use of non-fossil energy and reactants (e.g. green electricity for heat generation, biomass, green hydrogen) in downstream processes.

Indicative budget: EUR 10.00 million

EU contribution per project: EUR 3.00 million / The funding rate is up to 60% of the eligible costs

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7

HORIZON-CL4-2022-TWIN-TRANSITION-01-17: Integration of hydrogen for replacing fossil fuels in industrial applications (Processes4Planet Partnership) (IA)

Projects are expected to contribute to the following outcomes:

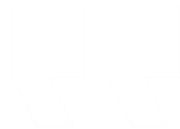
- Significant reduction of CO₂ emissions of the industrial process, whilst keeping NO_x levels at least not higher than the equivalent gas-based solutions
- Improved energy efficiency of the industrial process
- Significant reduction of hydrogen fuel needs of the developed process with regards to the current fossil fuel needs
- Competitive costs of the developed technologies

Indicative budget: EUR 42.50 million

EU contribution per project: EUR 12.00 – 18.00 million / The funding rate is up to 60% of the eligible costs

Type of Action: Innovation Actions

TRL: Start at 5 and achieve 7



Thank you for your questions

HorizonEU

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