



# HORIZON EUROPE

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## THE EU RESEARCH & INNOVATION PROGRAMME 2021 – 27

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This presentation is based on the political agreement of 11 December 2020 on the Horizon Europe. Information on some parts is pending revision.

19 March 2021

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# Investing to shape our future

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# Our Vision

The EU's key funding programme for research and innovation:

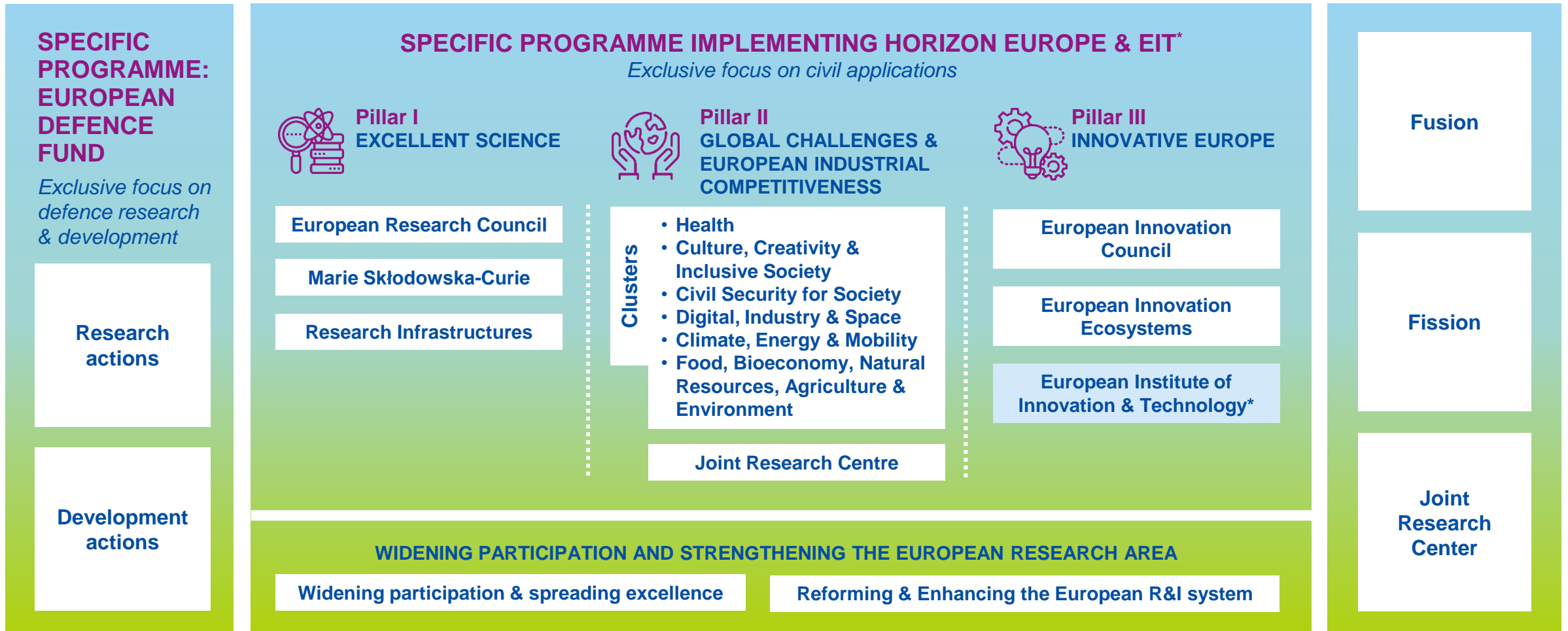
- Tackles climate change
- Helps to achieve the UN's Sustainable Development Goals
- Boosts the EU's competitiveness and growth
- Facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges
- Supports the creation and better diffusion of excellent knowledge and technologies
- Creates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness and optimises investment impact within a strengthened European Research Area.



Credits: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

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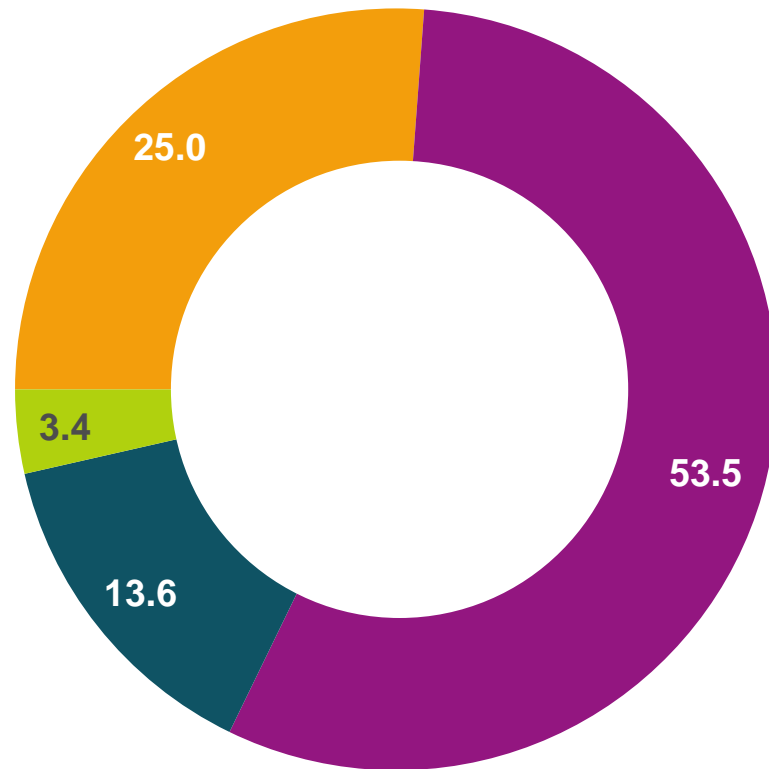
# EURATOM



\* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

# Horizon Europe Budget: €95.5 billion (2021-2027)

(including €5.4 billion from NGEU – Next Generation Europe – programme of EU for Recovery from COVID-19 crisis)



## Political agreement December 2020

*€ billion in current prices*

- Excellent Science
- Global challenges and European ind. comp.
- Innovative Europe
- Widening Part and ERA

# Lessons Learned

from Horizon 2020 Interim Evaluation



Support breakthrough innovation



Create more impact through mission-orientation and citizens' involvement



Rationalise partnerships' landscape



Reinforce openness



Strengthen international cooperation



Encourage participation



# Key Novelties

in Horizon Europe

European Innovation Council

EU Missions

New approach to partnerships

Open science policy

Extended association possibilities

Spreading Excellence

# Next: Horizon Europe

The ambitious EU research and innovation framework programme (2021-2027)



fuel EU's **scientific and technological excellence** and the strengthen the European Research Area (ERA)

**Science  
& technology**



tackle policy priorities, including **green and digital transitions** and Sustainable Development Goals

**Society**



boost Europe's **innovation uptake, competitiveness** and **jobs**

**Economy**

# Mission Board proposals Sept 2020

- **Conquering Cancer: Mission Possible**

Targets by 2030: more than 3 million more lives saved, living longer and better, achieve a thorough understanding of cancer, prevent what is preventable, optimise diagnosis and treatment, support the quality of life of all people exposed to cancer, and ensure equitable access to the above across Europe.

- **A Climate Resilient Europe - Prepare Europe for climate disruptions and accelerate the transformation to a climate resilient and just Europe by 2030**

Targets by 2030: prepare Europe to deal with climate disruptions, accelerate the transition to a healthy and prosperous future within safe planetary boundaries and scale up solutions for resilience that will trigger transformations in society.

- **Mission Starfish 2030: Restore our Ocean and Waters**

Targets by 2030: cleaning marine and fresh waters, restoring degraded ecosystems and habitats, decarbonising the blue economy in order to sustainably harness the essential goods and services they provide.

- **100 Climate-Neutral Cities by 2030 - by and for the citizens**

Targets by 2030: support, promote and showcase 100 European cities in their systemic transformation towards climate neutrality by 2030 and turn these cities into innovation hubs for all cities, benefiting quality of life and sustainability in Europe.

- **Caring for Soil is Caring for Life**

Targets by 2030: at least 75% of all soils in the EU are healthy for food, people, nature and climate. The proposed mission combines research and innovation, education and training, investments and the demonstration of good practices using “Living labs” (experiments and innovation in a laboratory on the ground) and “Lighthouses” (places to showcase good practices).





# New approach to European Partnerships

New generation of objective-driven and more ambitious partnerships in support of agreed EU policy objectives

## Key Features

- **Strategic orientation**
- **Systemic approach**
- **Simple architecture and toolbox**
- **Common set of criteria for the life-cycle**

### CO-PROGRAMMED

Based on Memoranda of Understanding/contractual arrangements; implemented independently by the partners and by Horizon Europe

### CO-FUNDED

Based on a joint programme agreed and implemented by partners; commitment of partners for financial and in-kind contributions

### INSTITUTIONALISED

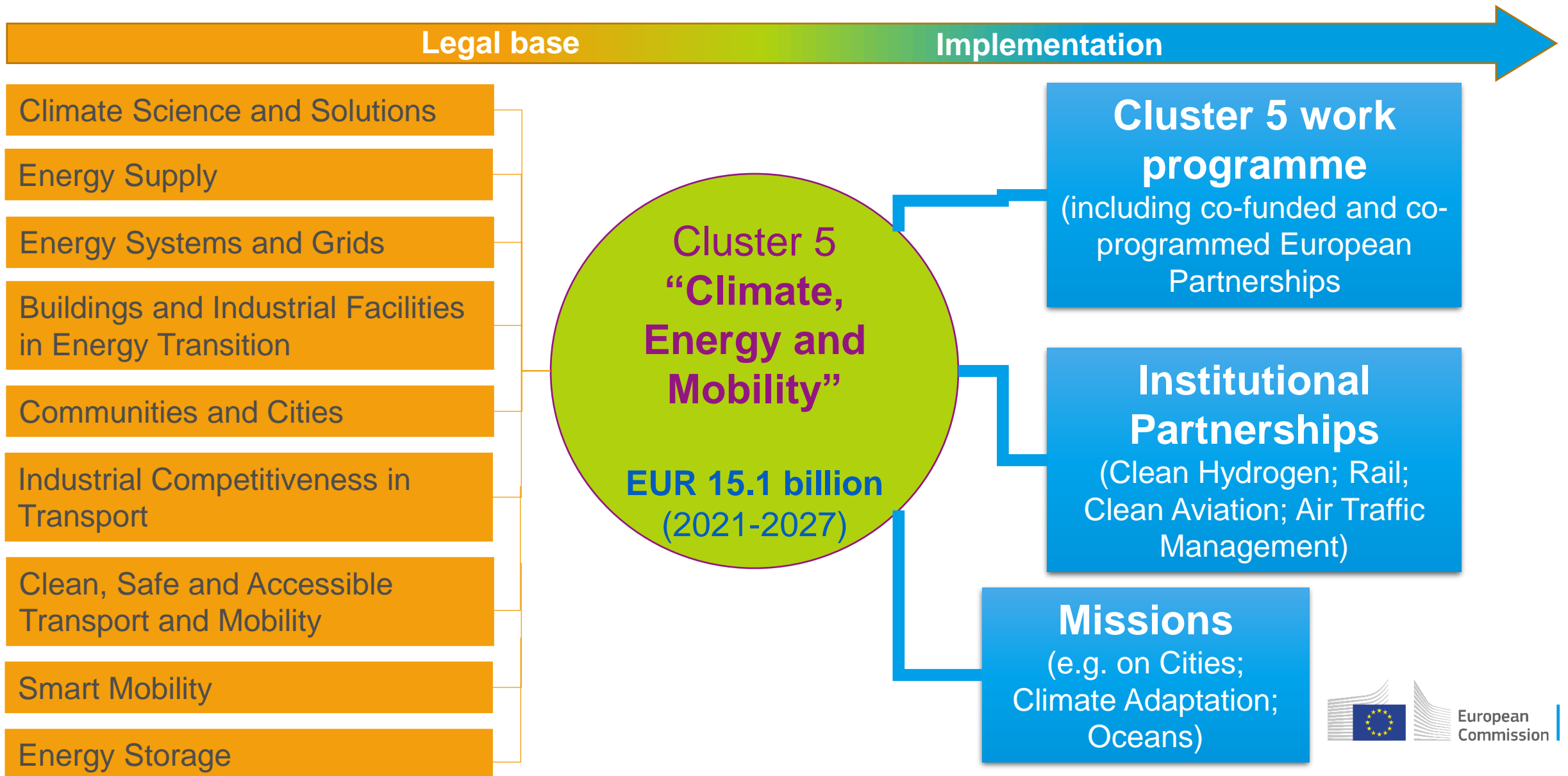
Based on long-term dimension and need for high integration; partnerships based on Art 185/187 of TFEU and the EIT legal acts for 2021-2027



# Cluster 5 'Climate, Energy and Mobility'



# Cluster 5 - overview



# Cluster 5 – Expected impacts

Transition to a climate-neutral and resilient society and economy enabled through **advanced climate science**, pathways and responses to climate change (mitigation and adaptation)

Clean and sustainable transition of the energy and transport sectors towards climate neutrality facilitated by innovative **cross-cutting solutions**

Efficient and sustainable **use of energy**, accessible for all is ensured through a clean energy system and a just transition



More efficient, clean, sustainable, secure and competitive **energy supply** through new solutions for smart grids and energy systems based on more performant renewable energy solutions

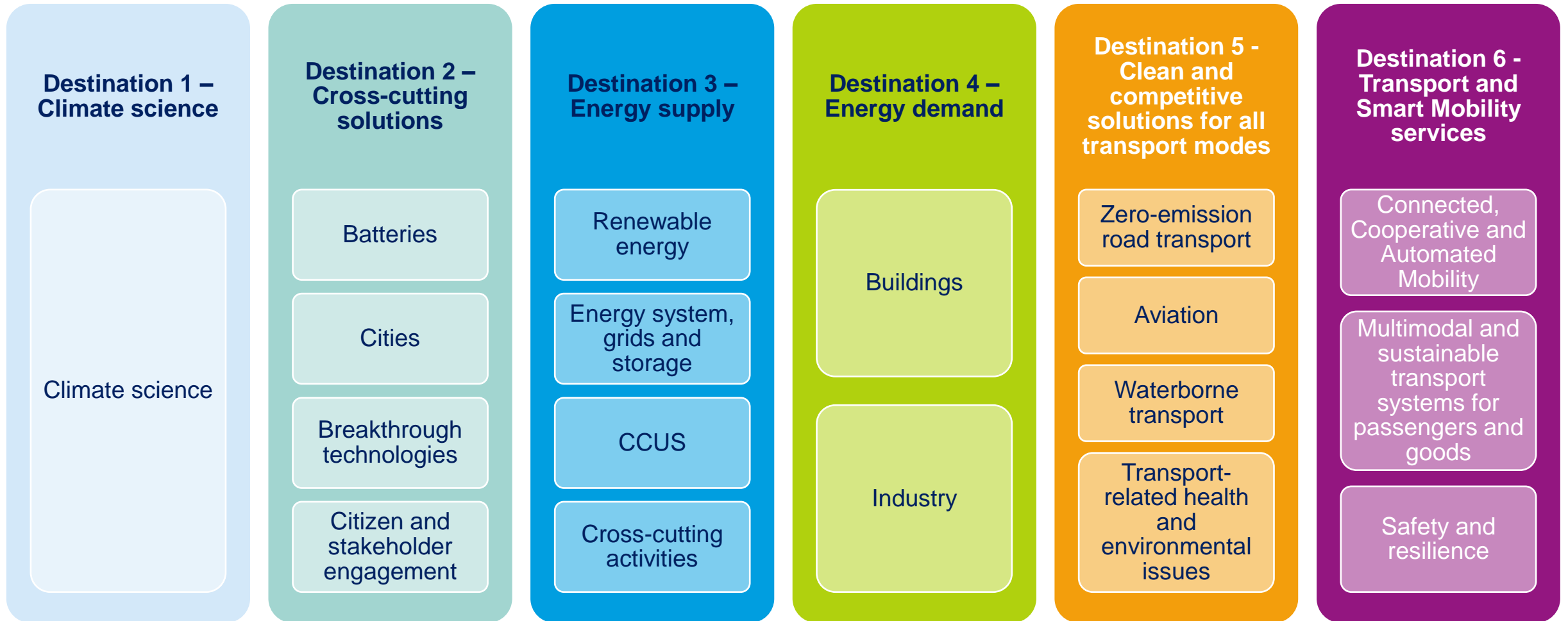
Safe, seamless, smart, inclusive, resilient, climate neutral and sustainable **mobility systems** for people and goods

Towards **climate-neutral and environmental friendly mobility** through clean solutions across all transport modes while increasing global **competitiveness** of the EU transport sector

# Horizon Europe legislation defines three types of impact tracked through **Key Impact Pathways**



# Cluster 5 Work programme - overview



# Destination 3 - Sustainable, secure and competitive energy supply

## Renewable energy

- Fostering **European global leadership** in affordable, secure and sustainable renewable energy technologies and services by improving their **competitiveness** in global **value chains** and their position in growth markets, notably through the **diversification** of the renewable services and technology portfolio
- **20 topics in 2021** (335 M€)
- **24 topics in 2022** (368 M€)
- **Issues:** disruptive technologies, cost reduction, improved efficiency, de-risking, integration, export potential, sustainability, market uptake

## Energy system, grids and storage

- Ensuring cost-effective **uninterrupted** and **affordable** supply of energy to households and industries in a scenario of **high penetration of variable renewables** and other new low carbon energy supply.
- Managing smart and cyber-secure **energy grids** and optimisation the interaction between producers, consumers, networks, infrastructures and vectors
- **10 topics in 2021** (152 M€)
- **7 topics in 2022** (181 M€)
- **Issues:** energy sector integration, energy system planning and operation, active consumer, markets and energy communities, digitization

## Carbon Capture, Utilization and Storage

- **Accelerating** the development of Carbon Capture, Use and Storage (CCUS) as a CO<sub>2</sub> emission mitigation option in **electricity generation** and **industry applications** (including also conversion of CO<sub>2</sub> to products)
- **2 topics in 2021** (32 M€)
- **1 topic in 2022** (58 M€)
- **Issues:** CCUS hubs, application in industry, CO<sub>2</sub> capture

## Cross-cutting

- Geological services (2021; CSA; 20 M€)
- Stakeholder support (2021; CSA; 9.8 M€)
- Clean Energy Transition co-funded Partnership (2021-2027; 210 M€ in total)



# HORIZON-CL5-2021-D3-01-01: Demonstration of wave energy devices to increase experience in real sea condition

Budget available 15 million Euro

Expected Outcomes: Project results are expected to contribute to all of the following expected outcomes:

- Demonstrated performance and reliability of wave energy devices producing comparable and public results using international metrics
- Improved knowledge on how to operate wave energy devices, their availability maintainability and to increase the impact it is expected that projects are sharing project data.
- Reduction of the LCOE in line with the SET Plan targets (actions should clearly justify estimated LCOE at project start and end, using a recognised calculation methodology).
- Reinforced industrial supply chain in Europe.
- Attraction of private investors to the sector and reduction of the cost of their investment by presented evidences and credible key performance indicators.



# **HORIZON-CL5-2021-D3-01-01: Demonstration of wave energy devices to increase experience in real sea condition**

Scope: The action is expected to:

- Demonstrate wave energy devices in real sea conditions for long periods of time (12-24 months) providing invaluable learnings regarding performance, reliability, availability, maintainability, survivability and environmental impact.
- Utilise verified key subsystems by comprehensive dry testing to reduce risks in the implementation of the project. Alternatively, the project action is expected to finalise the dry testing in the first year of the project. The onshore testing of key subsystems need to have been carried out prior to any at-sea deployment of complete devices.

The project has to include a clear go/no go moment ahead of entering the deployment phase. Before this go/no-go moment, the project has to deliver the detailed engineering plans, a techno-economic assessment, including key performance indicators based on international recognized metrics, a complete implementation plan, a plan to achieve certification by an independent certification body before the end of the action, and all needed permits for the deployment of the project. The project proposal is expected to clearly demonstrate a proposed pathway to obtaining necessary permits for the demonstration actions and allow for appropriate timelines to achieve these. The project is expected also to demonstrate how it will get a financial close for the whole action. Independent experts will assess all deliverables and will advise for the go/no-go decision.

# HORIZON-CL5-2022-D3-01-07: Demonstration of innovative rotor, blades and control systems for tidal energy devices

Budget available 10 million Euro –Innovation Action

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Demonstrated increased performance (>20%) and reliability of tidal energy devices.
- Improved knowledge on how to operate tidal energy devices, their availability, maintainability and survivability.
- Reduction of LCOE approaching SET Plan targets (actions should clearly justify the estimated LCOE at project start and end using a recognised calculation methodology).
- Reinforced industrial supply chain in Europe.
- Attraction of private investors to the sector and reduce the cost of their investment to projects with evidences and credible key performance indicators.

## **HORIZON-CL5-2022-D3-01-07: Demonstration of innovative rotor, blades and control systems for tidal energy devices**

- Scope: There is a need for further technology investigation and demonstration for improved reliability and efficiency of tidal turbine rotor and blades, including control and condition monitoring systems. Failure in a blade can create long downtimes, for instance blade edges can erode rapidly, facilitating water ingress, accelerating fatigue and the risk of failure. There are different blade solutions under development in terms of shape and material. Improving the seaworthiness of rotor and blades will reduce the likelihood of failure, reduced annual energy production and increases in operating costs.

The proposal is expected to:

- Demonstrate innovative rotor and blade solutions including condition monitoring systems for tidal energy devices in real sea conditions for long periods of time (12-24 months) providing invaluable learnings regarding performance, reliability, availability, maintainability, survivability and environmental impact.
- Apply high performance computing and digitalisation (e.g. data processing, machine learning and data analytics methods for implementation in data driven design, digital twins and control and monitoring for O&M).
- The selected projects are expected to contribute and participate to the activities of the project BRIDGE when relevant. <https://www.h2020-bridge.eu/>

# **HORIZON-CL5-2021-D3-02-10: Innovative foundations, floating substructures and connection systems for floating PV and ocean energy devices**

Budget available 10 million Euro –Research and Innovation Actions

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Improved overall life time, reliability, installability, operability and maintainability of marine substructures, mechanical joints and energy connection systems for ocean energy devices and/or offshore floating PV to reduce degradation and failure rates and thus investment risk.
- Better understanding of the device's real life performance allowing a safe reduction in the over-engineering of devices' specifications.
- Reduction of LCOE in line with the SET Plan targets (actions should clearly justify estimated LCOE at project start and end, using a recognised calculation methodology).
- Contribution to the objectives of the Mission Healthy oceans, seas, coastal and inland waters.

# HORIZON-CL5-2021-D3-02-10: Innovative foundations, floating substructures and connection systems for floating PV and ocean energy devices

Scope: The action is expected to:

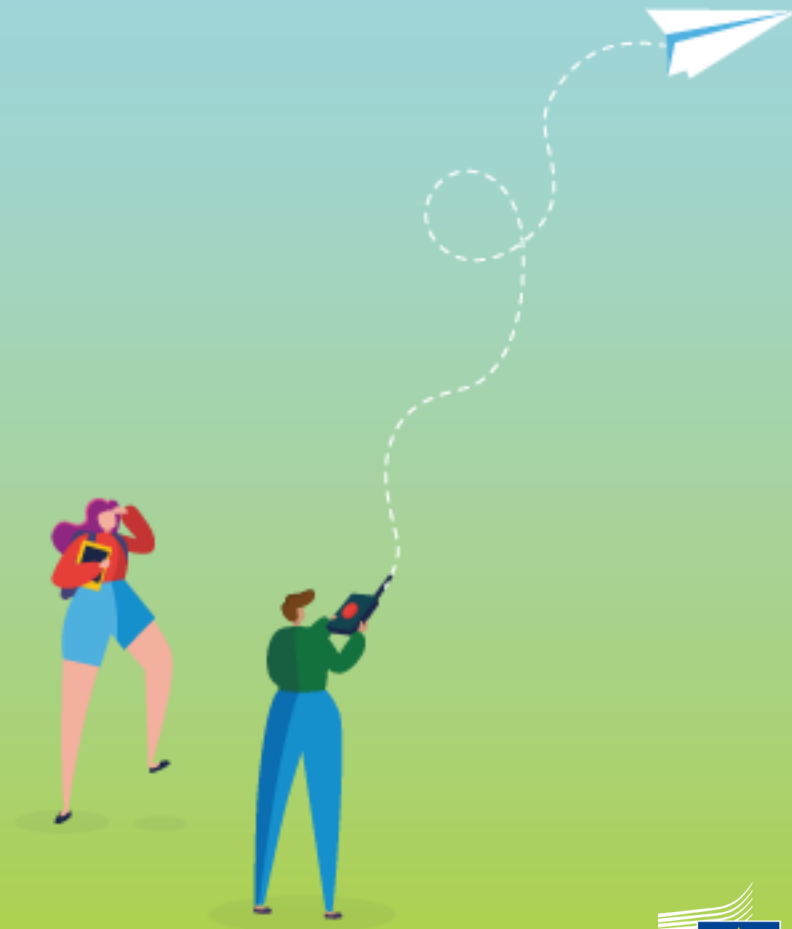
- Test and validate the potential benefits of new circular materials in offshore floating PV and/or ocean energy substructures, foundations and if relevant mooring and anchoring systems whilst ensuring structural integrity and durability considering very high wind (speed >25 m/s), current (>1.2 m/s) and wave (height >14 m) loads and corrosion and biofouling on all elements of the ocean energy systems.
- Test and validate new prototype components and materials used in offshore floating PV and/or ocean energy devices and verify that they are compatible with and resistant to the marine environment.
- Research material properties and behaviour in combination with the use of improved predictive computational modelling tools.
- Research, develop and validate improved predictive computational modelling tools for material properties.
- The use of existing test facilities and related research infrastructures for the purposes of the project should be considered.
- This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities.
- The selected projects are expected to contribute and participate to the activities of the project BRIDGE when relevant. <https://www.h2020-bridge.eu/>

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# In detail





# New submission process

- One of the biggest differences in the Horizon Europe template is the **reduction in the amount of pages** → from 70 pages to 45 pages.
- A **table of researchers** involved in the project will have to be filled in. It does not aim at identifying researchers but rather studying the link between funding and its influence on researchers' careers.
- The **role of each participating organisation** will have to be specified.
- Participants that are public bodies, research organisations or higher education establishments from Members States and Associated countries **must have a gender equality plan**, covering minimum process-related requirements (applicable only from 2022).

Webinar: How to prepare a successful proposal in Horizon Europe (24 March 2021)

<https://ec.europa.eu/research/participants/docs/h2020-funding-guide/other/event210324.htm#general-info>

[www.youtube.com/watch?v=Sgk6poR3glc](http://www.youtube.com/watch?v=Sgk6poR3glc) - (2 hrs 20 min!)



# New submission process continued

- The information on **ethics** and **security** will have to be fully completed in Part A, and not in a separated annex as in Horizon 2020.
- Information on **participants previous activities** related to the call in Part moved from Part B to Part A
- The proposal template has been completed with a **glossary of definitions**. This encourages a more **consistent use of the terminology for key terms** (from WP to proposal and reporting).
- **Detailed explanations of what is expected and should be included** by the Commission have been added in each section.



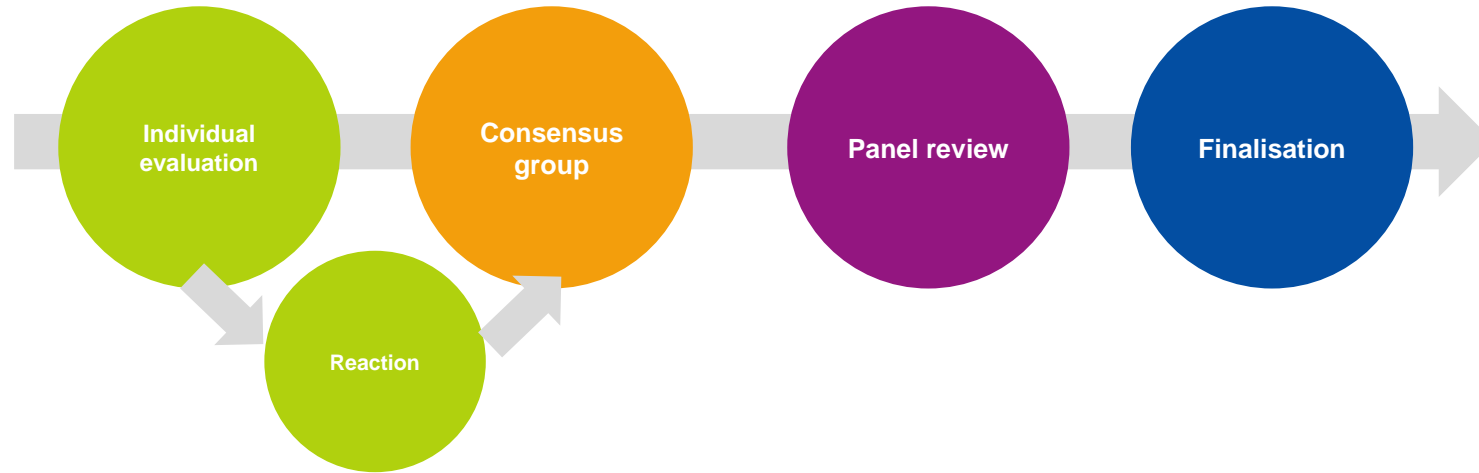


# Evaluation Criteria

- Same three award criteria: **‘Excellence’**, **‘Impact’** and **‘Quality and efficiency of the implementation’**. Excellence only for ERC.
- The number of ‘aspects to be taken into account’ **have been reduced**, ensuring that the same aspect is not assessed twice.
- **Open Science** practices assessed as part of the scientific methodology in the excellence criterion.
- **New approach to impact**: Key Impacts Pathways (KIPs).
- The assessment of the **quality of applicants** is assessed under ‘implementation’, rather than as a separate binary assessment of operational capacity
- Assessment of **management structures** has been removed.



# New evaluation process



- New evaluation process includes the **right-to-react**.
- Objective is to increase transparency, to correct any factual or major misunderstandings by experts at an early stage, and provide more detailed feedback to applicants.
- Applicants will send their reactions to draft experts comments
- Experts will take applicants' reaction into account before finalising their final assessment.
- Blind evaluation during the 1<sup>st</sup> stage.



# Thank you!

## #HorizonEU

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



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