



#HorizonEU

THE EU RESEARCH & INNOVATION PROGRAMME

2021 – 2027

PIERO DE BONIS

Cluster 5 international Networking Event
19 October 2021

Research and
Innovation

Horizon Europe Programme



HORIZON EUROPE

EURATOM

SPECIFIC PROGRAMME: EUROPEAN DEFENCE FUND

*Exclusive focus on
defence research
& development*

Research
actions

Development
actions

SPECIFIC PROGRAMME IMPLEMENTING HORIZON EUROPE & EIT*

Exclusive focus on civil applications



Pillar I EXCELLENT SCIENCE

European Research Council

Marie Skłodowska-Curie

Research Infrastructures



Pillar II GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS

Clusters

- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- Climate, Energy & Mobility
- Food, Bioeconomy, Natural Resources, Agriculture & Environment

Joint Research Centre



Pillar III INNOVATIVE EUROPE

European Innovation
Council

European Innovation
Ecosystems

European Institute of
Innovation & Technology*

WIDENING PARTICIPATION AND STRENGTHENING THE EUROPEAN RESEARCH AREA

Widening participation & spreading excellence

Reforming & Enhancing the European R&I system

Fusion

Fission

Joint
Research
Center

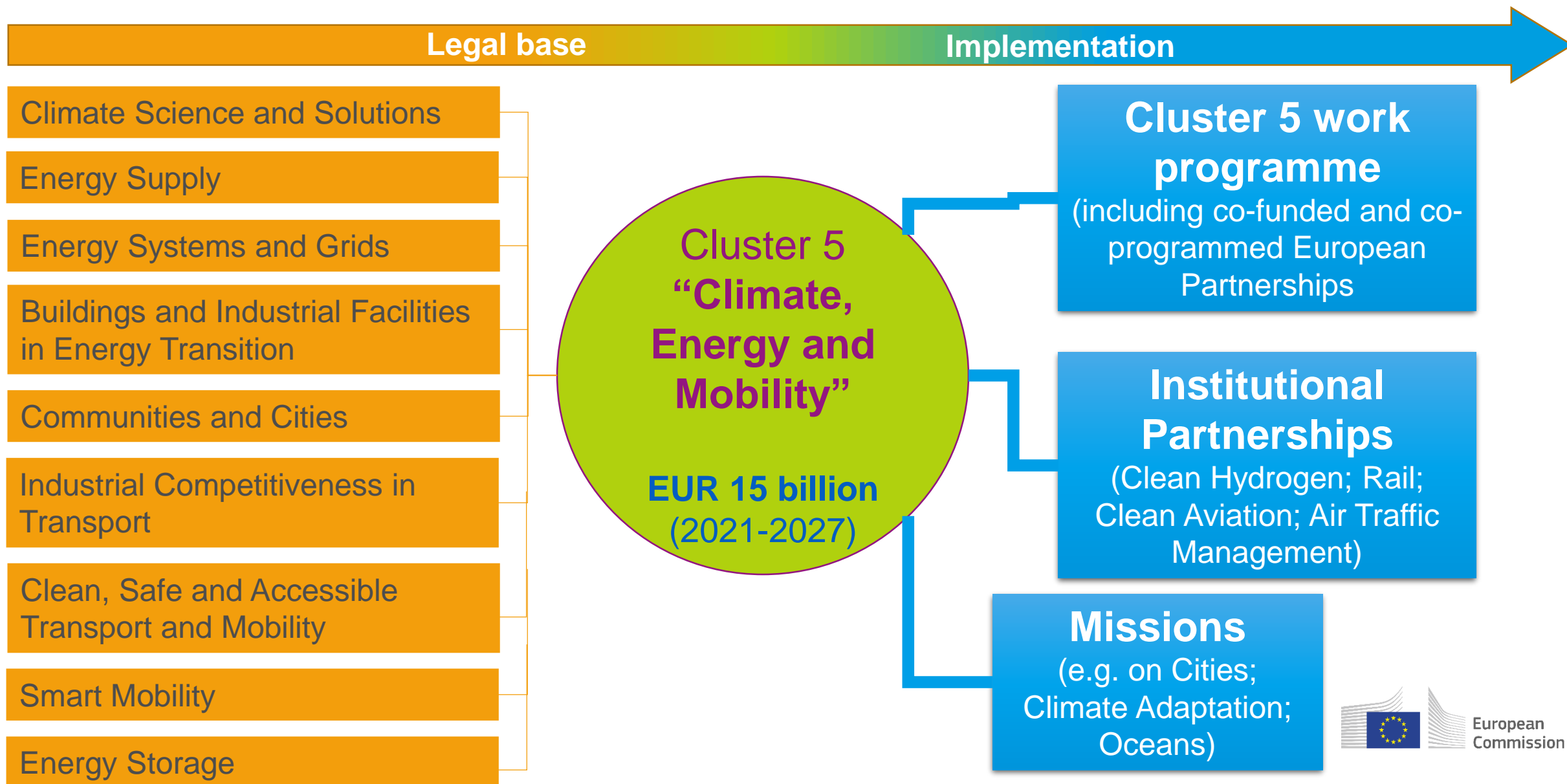
* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

CLIMATE, ENERGY AND MOBILITY

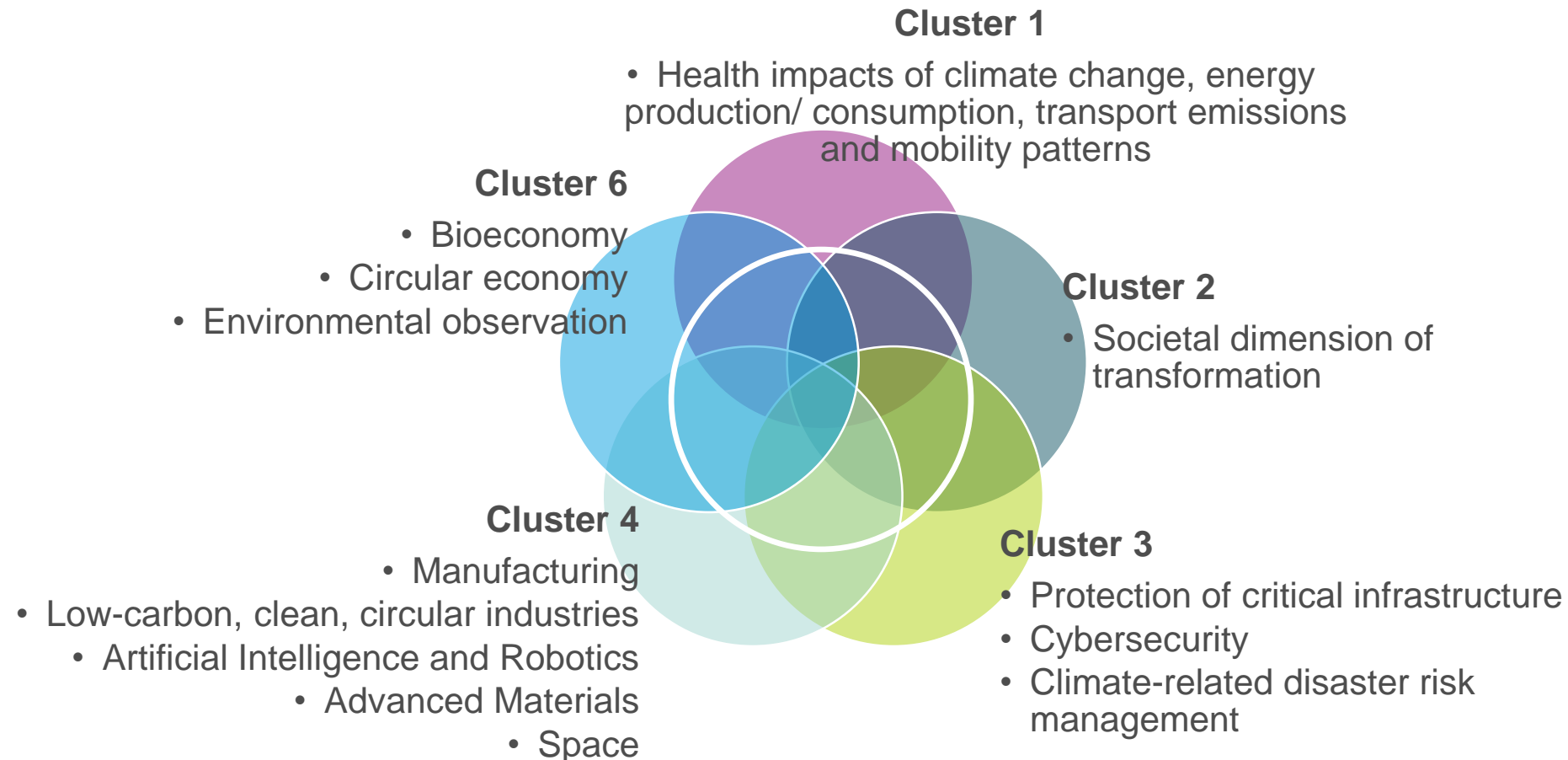
Cluster 5



Cluster 5 - overview



Cluster 5 – Links to other clusters



Cluster 5 Partnerships

Institutional Partnerships

- Transforming Europe's rail system
- Integrated Air Traffic Management
- Clean Aviation
- Clean Hydrogen

Co-funded Partnerships

- Driving urban transitions to a sustainable future (DUT)
- Clean Energy Transition

Co-programmed Partnerships

- Built4People | People-centric sustainable built environment
- Towards zero-emission road transport (2ZERO)
- Batteries: Towards a competitive European industrial battery value chain for stationary applications and e-mobility
- Zero-emission waterborne transport
- Connected, Cooperative and Automated Mobility (CCAM)

CLIMATE, ENERGY AND MOBILITY

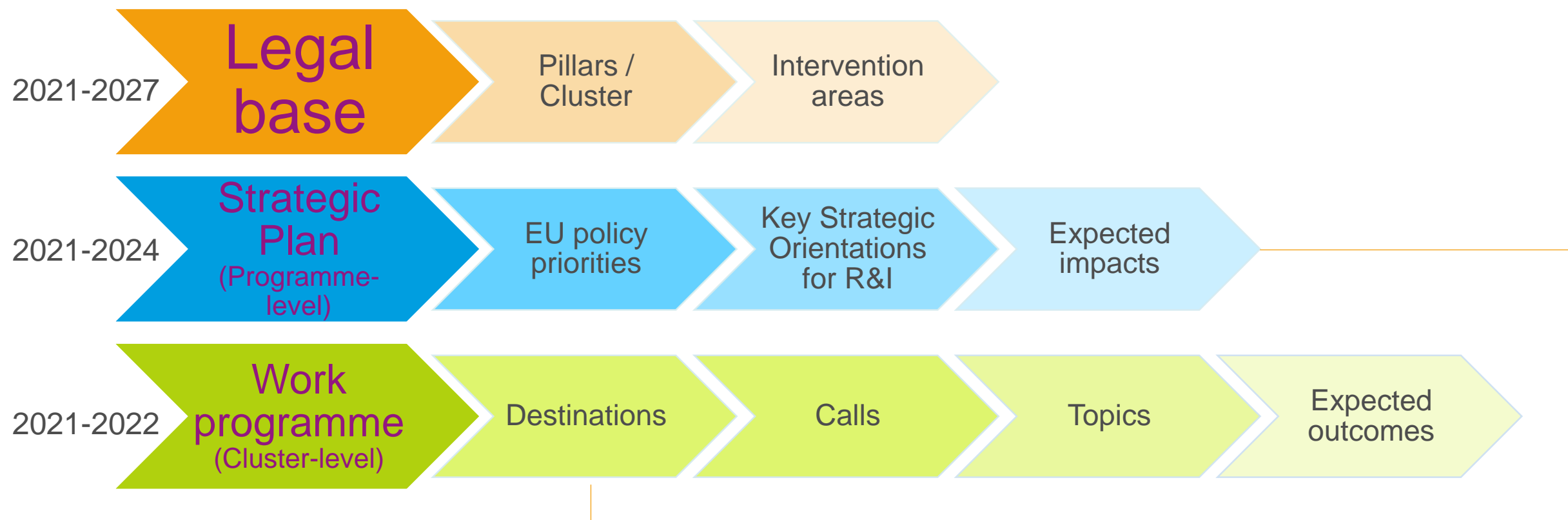


Cluster 5

Work programme 2021-2022



Programme intervention logic



EU Policy priorities

European Green Deal

- Climate Action; Clean Energy; Sustainable Mobility; Eliminating pollution; Building and renovating; Biodiversity; Sustainable Industry

A Europe fit for the digital age

- Artificial Intelligence; European data strategy; European Industrial Strategy; Cybersecurity

An economy that works for the people

- Internal market; Jobs, Growth and investment

Promoting our European way of life

- European Security Union; European Health Union

A stronger Europe in the world

- International partnerships; Trade policy; EU Foreign policy

A new push for European Democracy

- Strategic foresight; Future of Europe

Recent Commission initiatives:

Climate Action

- EU Climate Law (EU climate neutral by 2050)
- 2030 Climate Target Plan (55% GHG reduction by 2030)
- Make sectoral legislation 'fit for 55'
- EU Climate Adaptation Strategy
- Zero Pollution Action Plan

Energy

- EU Strategy for Energy System Integration
- Hydrogen strategy
- Renovation wave for Europe
- Offshore renewable energy

Mobility

- Sustainable and Smart Mobility Strategy

Research and Innovation

- A new European Research Area

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)

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

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

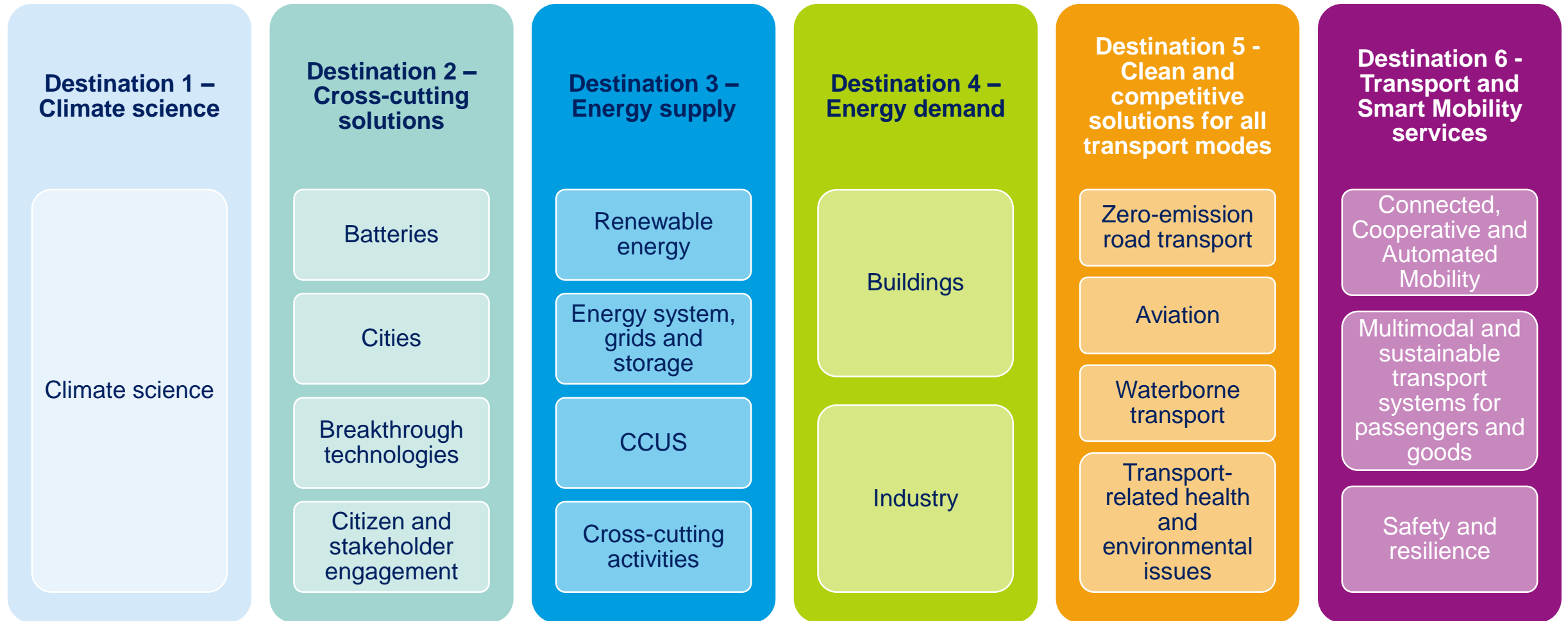
Efficient and sustainable **use of energy**, accessible for all is ensured through a clean energy system and a just transition



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

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

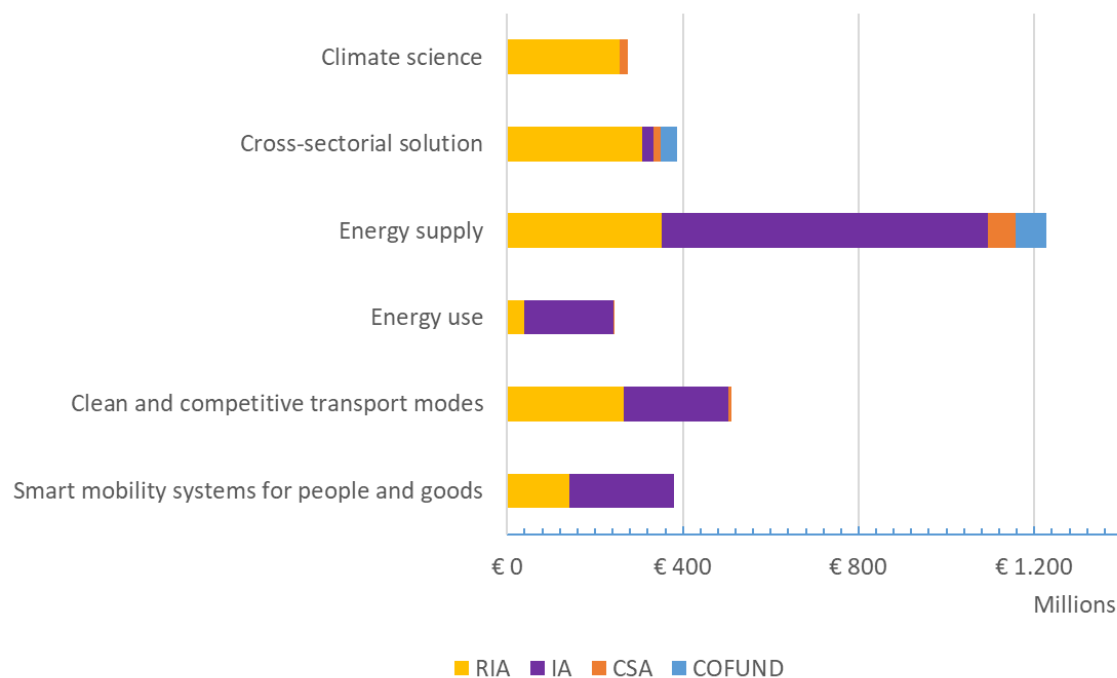
Cluster 5 Work programme - overview



Cluster 5 Work programme - overview

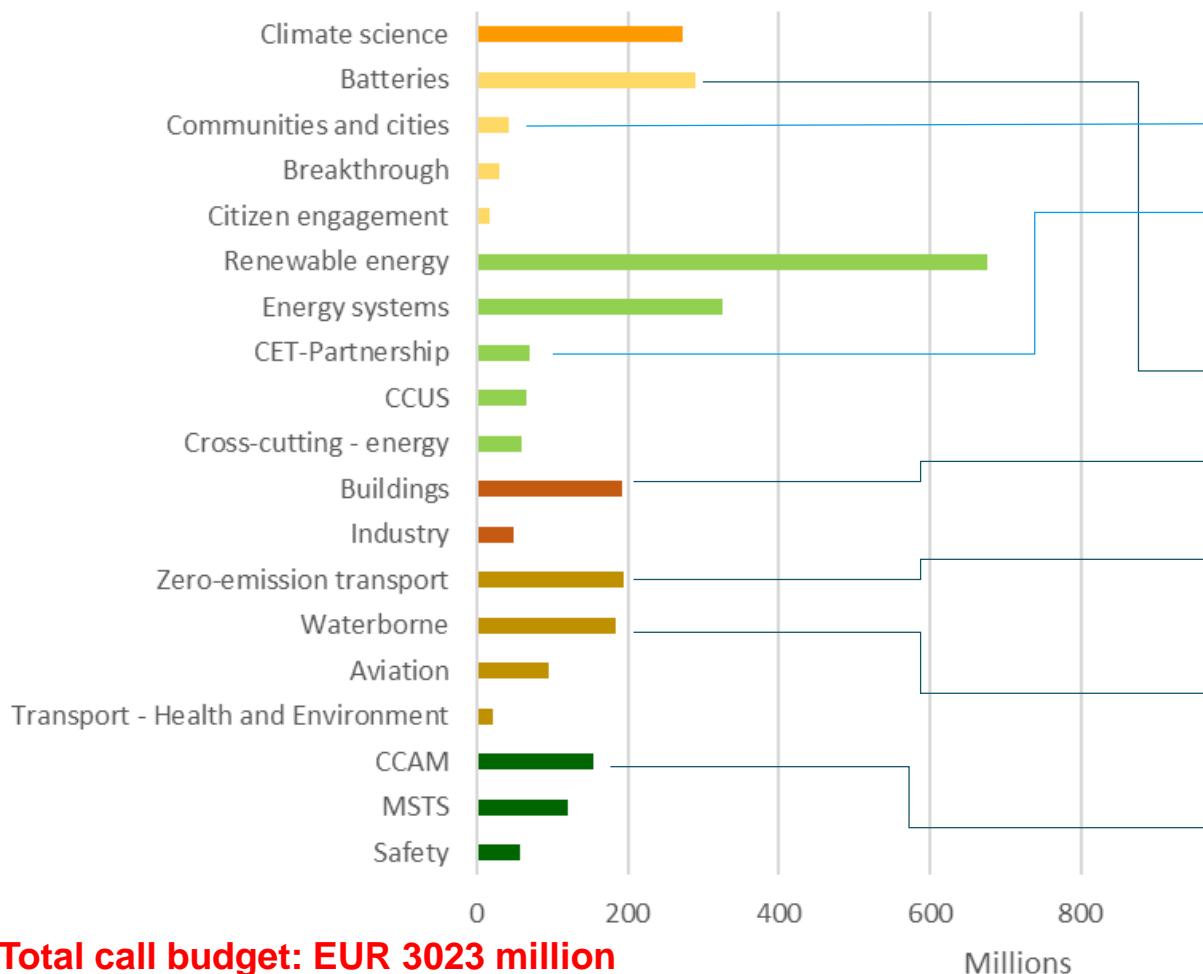
	Budget (Mio €)	Share of total	Number of topics	Share of total
Climate science	274.0	9%	17	9%
Cross-sectorial solution	387.5	13%	25	13%
Energy supply	1226.3	40%	67	36%
Energy use	244.0	8%	18	10%
Clean and competitive transport modes	511.0	17%	31	17%
Smart mobility systems for people and goods	380.0	13%	28	15%
TOTAL	3022.8		186	

EU contribution per Destination and type of action (2021-2022, in Mio EUR)



Cluster 5 Work programme - budgets

EU contribution per thematic area
(2021-2022, in Mio EUR)



58 out 186 topics (31% of all) implement European Partnerships (2021-2022)

Co-funded Partnerships:

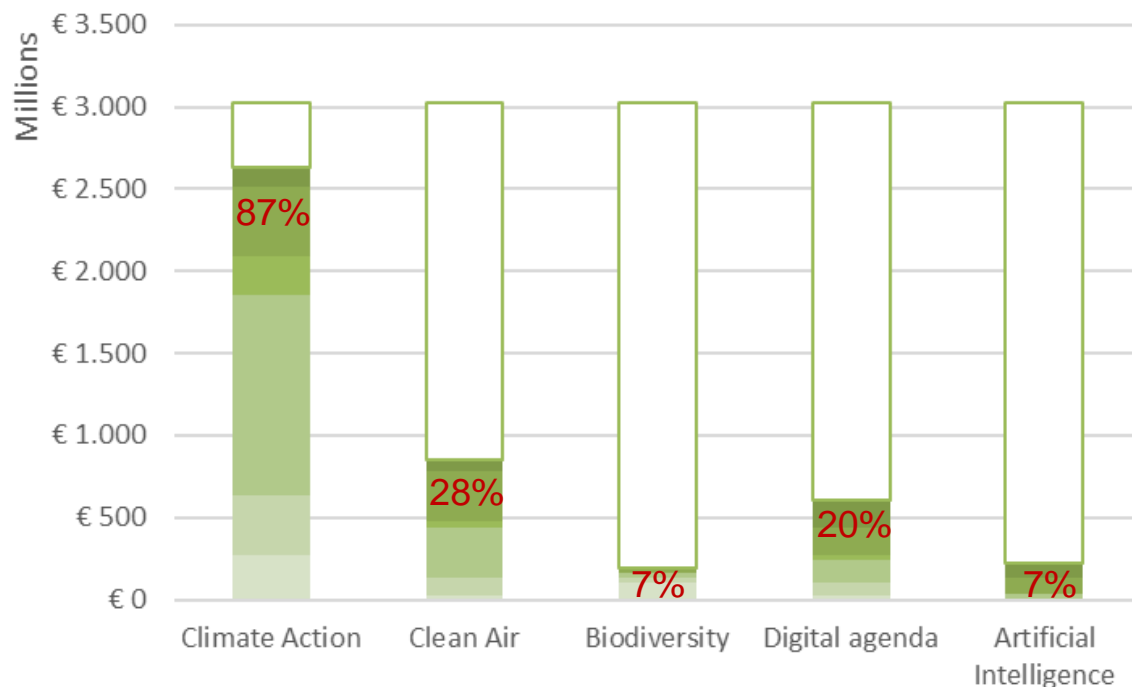
- **Driving Urban Transition:** 1 topic (37 M€ for 2021-2022)
- **Clean Energy Transition:** 1 topic (70 M€ for 2021-2022)

Co-programmed Partnerships:

- **Batteries:** 17 topics (EUR 293 million)
- **Built4People:** 8 topics (EUR 124 million)
- **Towards Zero-Emission Road Transport:** 8 topics (EUR 199 million)
- **Zero-Emission Waterborne Transport:** 12 topics (EUR 167.5 million)
- **Connected, Cooperative and Automated Mobility:** 11 topics (EUR 162 million)

Cross-cutting priorities

Contribution of **cluster 5** topics to cross-cutting policy priorities
(percentage of total call budget; WP 2021-2022)



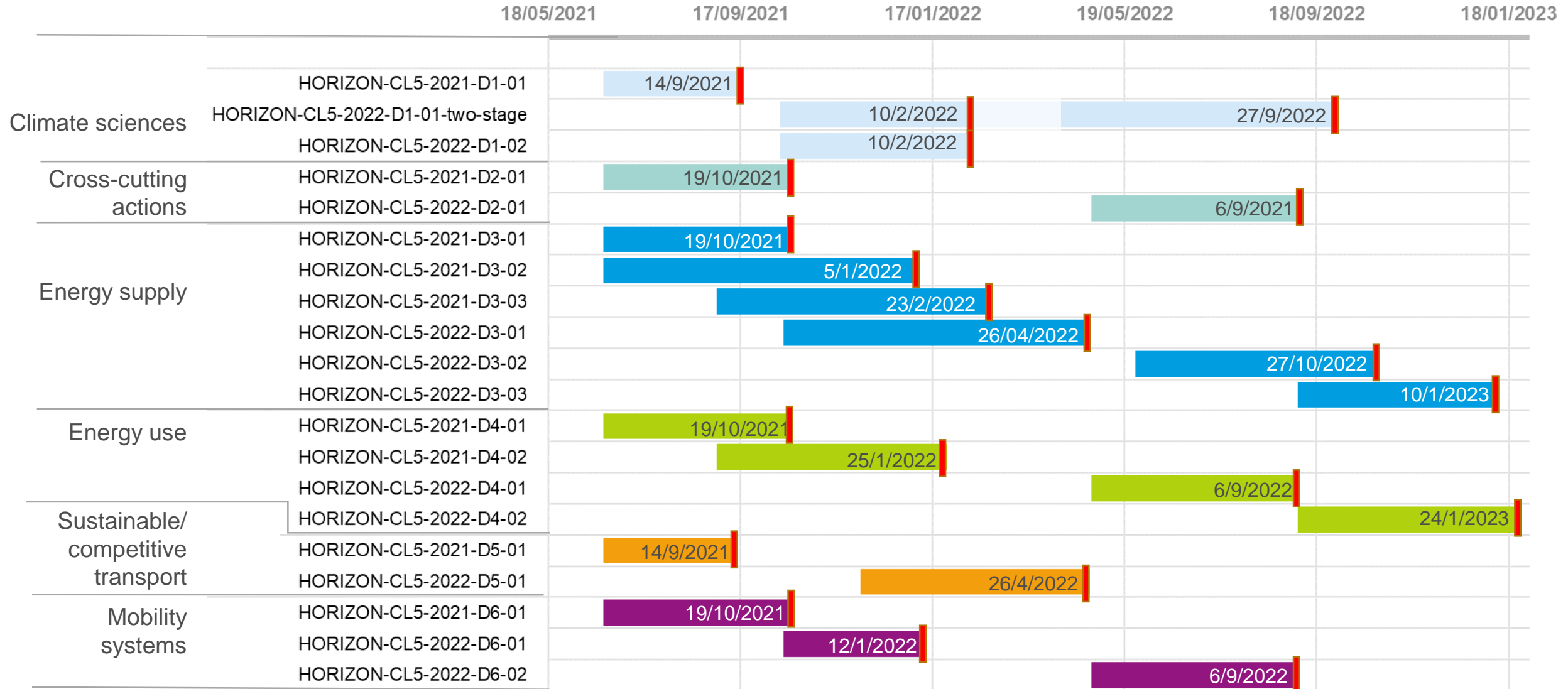
Budget share dedicated to **climate action** in other HE parts:

- Cluster 1: 300 M€ (17%)
- Cluster 2: 30 M€ (7%)
- Cluster 3: 40 M€ (10%)
- Cluster 4: 1235 M€ (41%)
- **Cluster 5: 2630 M€ (87%)**
- Cluster 6: 1345 M€ (72%)

Budget share dedicated to **digital agenda** in other HE parts:

- Cluster 1: 600 M€ (34%)
- Cluster 2: 95 M€ (22%)
- Cluster 3: 220 M€ (54%)
- Cluster 4: 1840 M€ (61%)
- **Cluster 5: 605 M€ (20%)**
- Cluster 6: 375 M€ (20%)

Cluster 5 call structure



Destination - 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 CO₂ emission mitigation option in **electricity generation** and **industry applications** (including also conversion of CO₂ to products)
- **2 topics in 2021** (32 M€)
- **1 topic in 2022** (58 M€)
- **Issues:** CCUS hubs, application in industry, CO₂ 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)



Destination - Efficient, sustainable and inclusive energy use

Buildings

- **Technological and socio-economic breakthroughs** for achieving climate neutrality and the transition to zero pollution of the building stock by 2050, based on **inclusive and people-centric R&I**
- **6 topics in 2021** (74 M€)
- **10 topics in 2022** (140 M€)
- **Issues:** Energy performance assessment and monitoring, industrialization of deep renovation, integrated technology solutions, prefabricated renovation packages, demand response, renewable intensive homes, smart buildings, design, materials, sustainability of life-cycle
- Implementing co-programmed Partnership “People-centric, Sustainable Built Environment” (Built4People)

Industry

- Increased energy efficiency in industry and **reducing industry’s Greenhouse Gas (GHG) and air pollutant emissions** through recovery, upgrade and/or conversion of industrial excess (waste) heat and through electrification of heat generation
- **2 topics in 2021** (30 M€) and in **2022** (18 M€)
- **Issues:** heat upgrade technologies, industrial excess (waste) Heat-to-Power conversion



Destination 3 – Renewable energy

Objectives

- 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**

Issues covered in topics 2021-2022

- Solar energy, wind energy, biofuels, geothermal energy, hydro energy, CHP, energy carriers
- Disruptive technologies, cost reduction, improved efficiency, de-risking, integration, export potential, sustainability, market uptake

Implementation

- **2021: 20 topics** (total budget: 335 M€)
- **2022: 24 topics** (total budget: 368 M€)



Destination 3 – Energy systems, grids and storage

Objectives

- 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.

Issues covered in topics 2021-2022

- Energy sector integration; energy system planning and operation; grid resilience and reliability; power electronics; active consumer; markets and energy communities; digitization; thermal energy storage

Implementation

- **2021: 10 topics** (total budget: 152 M€)
- **2022: 7 topics** (total budget: 181 M€)



Destination 3 – Carbon Capture, Utilization and Storage (CCUS)

Objectives

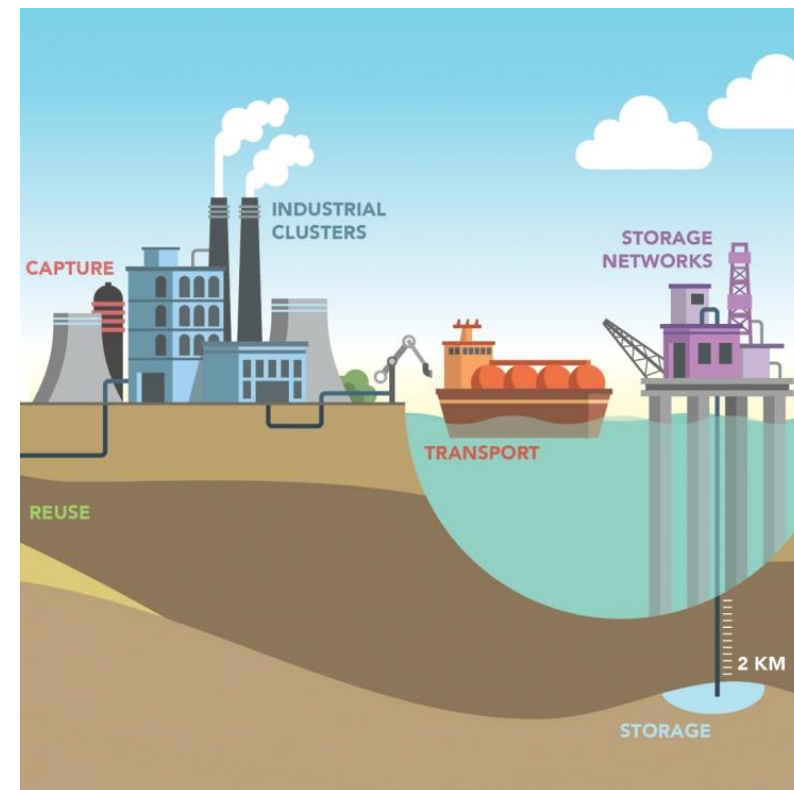
- Accelerating the development of Carbon Capture, Use and Storage (CCUS) as a CO₂ emission mitigation option in **electricity generation and industry applications** (including also conversion of CO₂ to products)

Issues covered in topics 2021-2022

- CCUS hubs, application in industry, CO₂ capture

Implementation

- **2021: 2 topics** (total budget: 32 M€)
- **2022: 1 topics** (total budget: 58 M€)



Destination 3 – Cross-cutting actions

Issues covered in topics 2021-2022

- **Clean Energy Transition co-funded Partnership:** 70 M€ (2021-2022)
- **Support for stakeholder associations:** 9.8 M€ (2021)
- **Geological services:** 20 M€ (2021)



Destination 4 – Highly energy-efficient and climate neutral EU building stock

Objectives

- Technological and socio-economic breakthroughs for achieving **climate neutrality** and the transition to **zero pollution** of the **building stock by 2050**, based on **inclusive and people-centric R&I**

Issues covered in topics 2021-2022

- Energy performance assessment and monitoring, industrialization of deep renovation, integrated technology solutions, prefabricated renovation packages, demand response, renewable intensive homes, smart buildings, design, materials, sustainability of life-cycle

Implementation

- **2021: 6 topics** (total budget: 74 M€)
- **2022: 10 topics** (total budget: 140 M€)

Many topics contribute to the **European Partnership “People-centric, Sustainable Built Environment” (Built4People)**

(https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe/candidates-climate-energy-and-mobility_en)



Destination 4 – Industrial facilities in the energy transition

Objectives

- Increased energy efficiency in industry and reducing industry's Greenhouse Gas (GHG) and air pollutant emissions through **recovery, upgrade and/or conversion of industrial excess (waste) heat** and through **electrification of heat generation**.

Issues covered in topics 2021-2022

- Heat upgrade technologies; heat-to-power conversion; high temperature thermal storage

Implementation

- **2021: 2 topics** (total budget: 30 M€)
- **2022: 2 topics** (total budget: 18 M€)



Important websites

Information event on cluster 5 calls

<https://www.horizon-europe-infodays2021.eu/event/cluster-5-climate-energy-mobility>

Funding & Tender Portal

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/horizon>

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Thank you!

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