



#HorizonEU

# HORIZON EUROPE

THE EU  
RESEARCH &  
INNOVATION  
PROGRAMME 2021 – 27

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

Research and  
Innovation

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HORIZON EUROPE

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# Investing to shape our future



# Our Vision

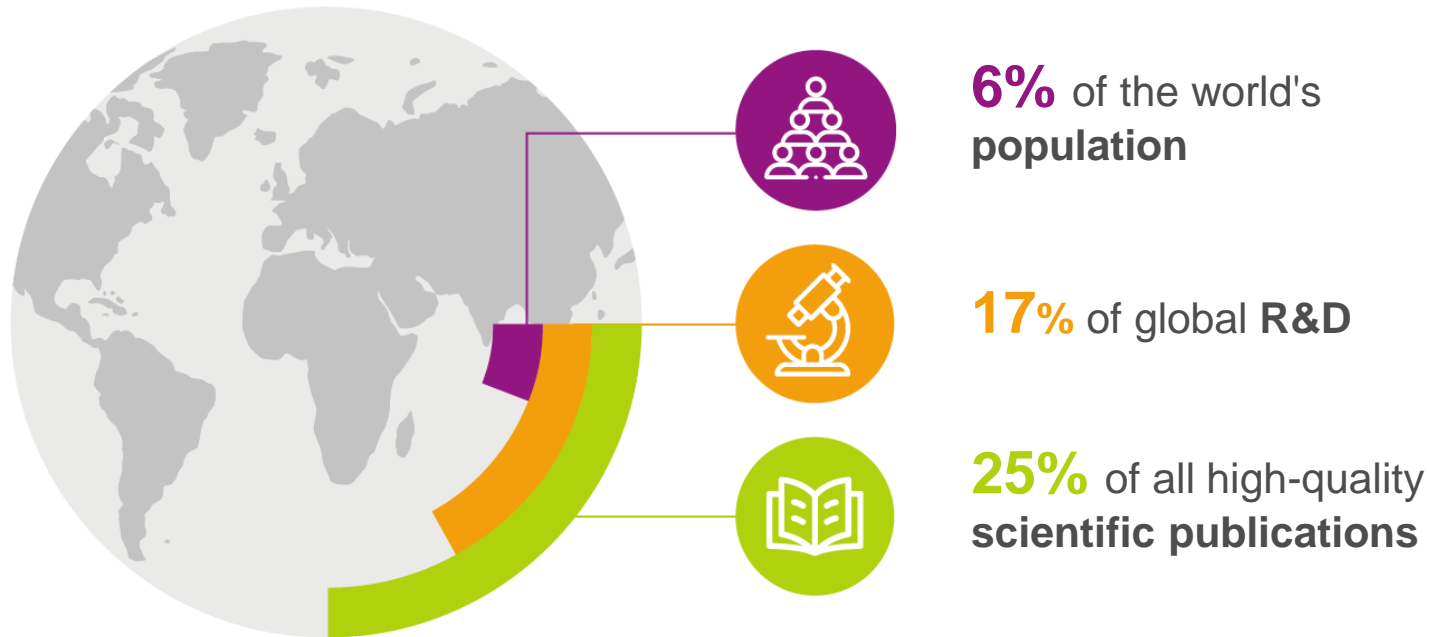
The EU's key funding programme for research and innovation:

- 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.



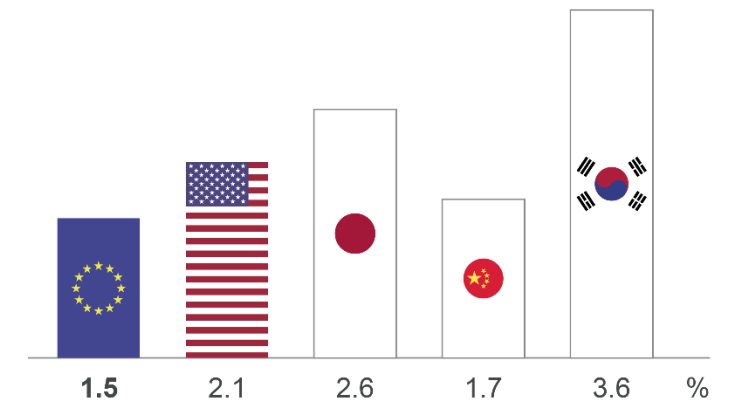
Credits: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

# While benefiting from world-class research and strong industries... Our knowledge and skills are our main resources



...Europe can do better at transforming this into **leadership in innovation** and **entrepreneurship**

**1.5%** EU business R&D investment



*EU figure is for 2019  
Figures for USA, Japan, China and South Korea are for 2018. Figures represent R&D as % of GDP*

# 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

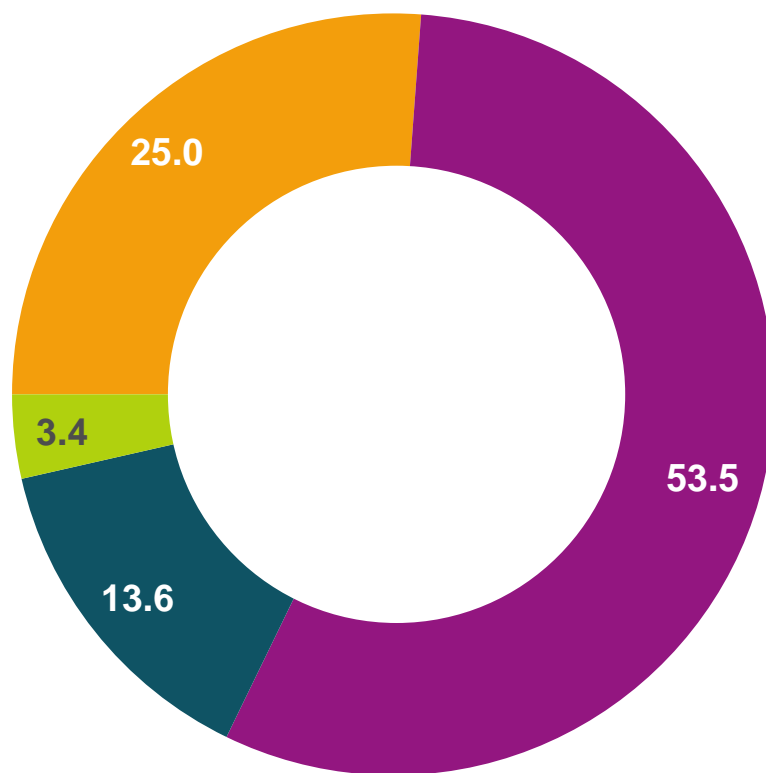
Fission

Joint  
Research  
Center

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

# 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

# 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**

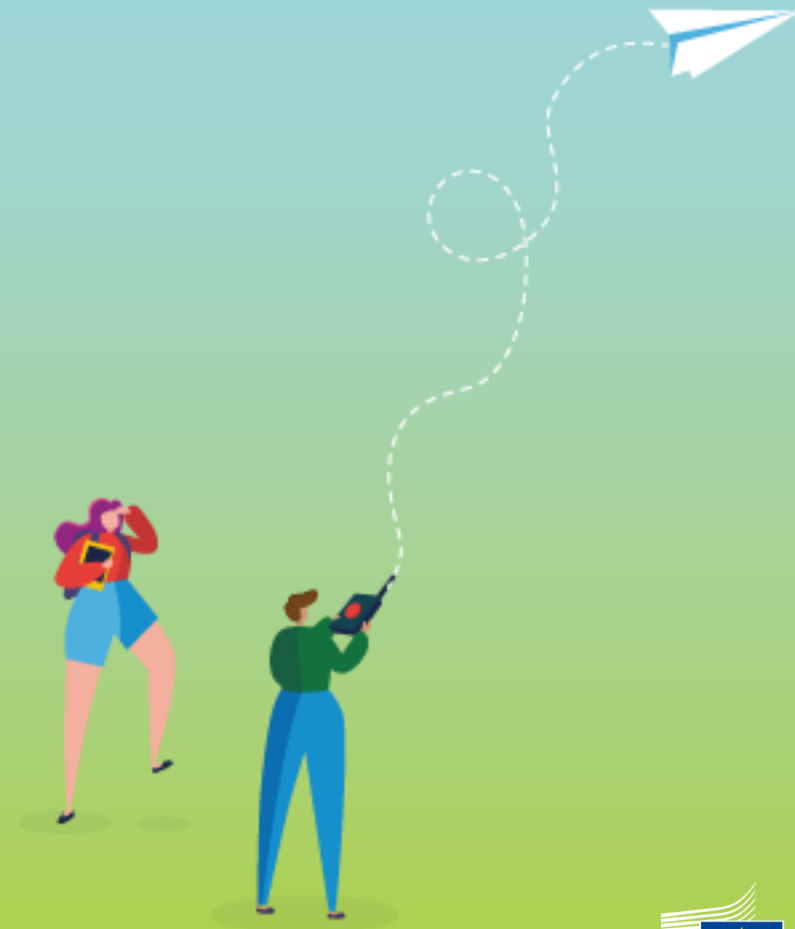
**Economy**

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# In detail





## Pillar I

# EXCELLENT SCIENCE:

reinforcing and extending the **excellence of the Union's science base**

### European Research Council

Frontier research by the best researchers and their teams

**€16 billion**

### Marie Skłodowska-Curie Actions

Equipping researchers with new knowledge and skills through mobility and training

**€6.6 billion**

### Research Infrastructures

Integrated and inter-connected world-class research infrastructures

**€2.4 billion**



# European Research Council

Competitive funding to support investigator-driven frontier research across all fields, on the basis of scientific excellence.

## Funding



10,000+  
Projects funded  
since 2007



Over 70% of completed  
ERC projects led to  
breakthroughs or major  
advances (according to  
independent studies)



7 Nobel Prizes, 4 Fields  
Medals, hundreds of  
important prizes awarded  
to ERC grantees



80+  
Nationalities  
(ERC grantees)



**Starting Grant:** up to €1.5 million. Duration: up to 5 years. 2-7 years of experience since completion of PhD.



**Consolidator Grant:** up to €2 million. Duration: up to 5 years. 7-12 years of experience since completion of PhD.



**Advanced Grant:** up to €2.5 million. Duration: up to 5 years. An excellent scientific track record of recognized achievements in the last 10 years.



**Synergy Grant:** 2-4 researchers (one can be based outside Europe). Up to a maximum of €10 million for a period of 6 years.

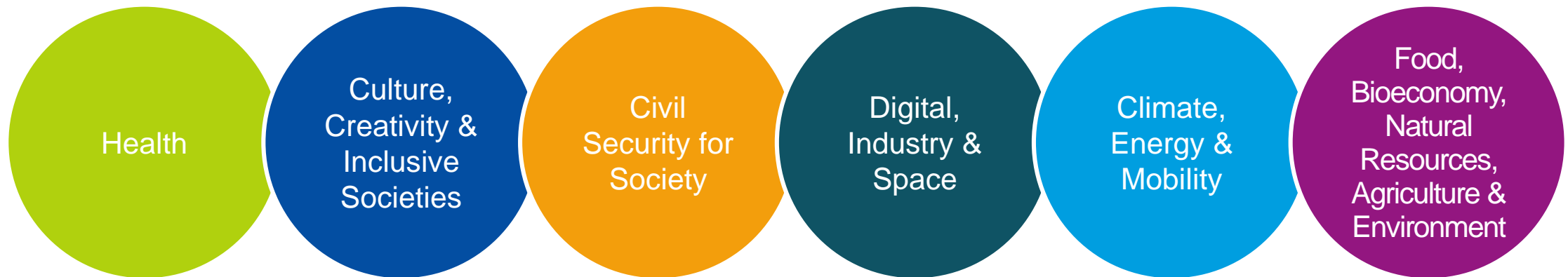
*“The expertise that we gathered in cancer trials encouraged us to extend the use of mRNA vaccines towards the prevention of infectious diseases. Groundbreaking innovation requires decades of research and contributions from multiple research frontiers until it reaches maturity to provide benefit for humanity.”*

**ERC Grantee Uğur Şahin, Mainz University**

## Pillar II - Clusters

# GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS:

boosting **key technologies** and solutions underpinning **EU policies & Sustainable Development Goals** (6 clusters and JRC – non-nuclear direct actions)



**€53.5 billion**

## Pillar II

# Budget for clusters & for JRC

*in current prices*

<b>Cluster 1</b>	<b>Health</b>	<b>€8.246 billion</b> (including €1.35 billion from NGEU)
<b>Cluster 2</b>	<b>Culture, Creativity &amp; Inclusive Societies</b>	<b>€2.280 billion</b>
<b>Cluster 3</b>	<b>Civil Security for Society</b>	<b>€1.596 billion</b>
<b>Cluster 4</b>	<b>Digital, Industry &amp; Space</b>	<b>€15.349 billion</b> (including €1.35 billion from NGEU)
<b>Cluster 5</b>	<b>Climate, Energy &amp; Mobility</b>	<b>€15.123 billion</b> (including €1.35 billion from NGEU)
<b>Cluster 6</b>	<b>Food, Bioeconomy, Natural Resources, Agriculture &amp; Environment</b>	<b>€8.952 billion</b>
	<b>JRC (non-nuclear direct actions)</b>	<b>€1.970 billion</b>

Clusters are including a budget for Partnerships and Missions  
NGEU is Next Generation EU programme – Recovery Fund



# EU Missions

## R&I Missions

Relating EU's research and innovation better to society and citizens' needs; with strong visibility and impact

A mission is a portfolio of actions across disciplines intended to achieve a **bold and inspirational and measurable goal** within a set timeframe, with **impact** for society and policy making as well as relevance for a significant part of the European population and wide range of European citizens.

Horizon Europe defines mission characteristics and elements of governance, and **5 missions areas**. Specific missions will be programmed within the Global Challenges and European Industrial Competitiveness pillar, but may also benefit from actions carried out within other parts of the Programme as well as complementary actions carried out under other Union programmes.

# Five Missions Areas



**Adaptation to  
climate change,  
including societal  
transformation**



**Cancer**



**Healthy oceans,  
seas, coastal &  
inland waters**



**Climate-neutral  
& smart cities**



**Soil health &  
food**

# 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



# Overview of 49 candidate European Partnerships

## HORIZON EUROPE PILLAR II - Global challenges & European industrial competitiveness

CLUSTER 1: Health	CLUSTER 4: Digital, Industry & Space	CLUSTER 5: Climate, Energy & Mobility	CLUSTER 6: Food, Bioeconomy, Agriculture, ...
Innovative Health Initiative	Key Digital Technologies	Clean Hydrogen	Circular Bio-based Europe
Global Health Partnership	Smart Networks & Services	Clean Aviation	Rescuing Biodiversity to Safeguard Life on Earth
Transformation of health systems	High Performance Computing	Single European Sky ATM Research 3	Climate Neutral, Sustainable & Productive Blue Economy
Chemicals risk assessment	European Metrology (Art. 185)	Europe's Rail	Water4All
ERA for Health	AI-Data-Robotics	Connected and Automated Mobility (CCAM)	Animal Health & Welfare*
Rare diseases*	Photonics	Batteries	Accelerating Farming Systems Transitions*
One-Health Anti Microbial Resistance*	Made in Europe	Zero-emission waterborne transport	Agriculture of Data*
Personalised Medicine*	Clean steel – low-carbon steelmaking	Zero-emission road transport	Safe & Sustainable Food System*
Pandemic Preparedness* <i>Co-funded or co-programmed</i>	Processes4Planet	Built4People	
	Global competitive space systems**	Clean Energy Transition	
		Driving Urban Transitions	

	Institutionalised Partnerships (Art 185/7)
	Institutionalised Partnerships / EIT KICs
	Co-Programmed
	Co-Funded

\* Calls with opening dates in 2023-24

\*\* Calls with opening dates not before 2022

## PILLAR III - Innovative Europe

EIT (KNOWLEDGE & INNOVATION COMMUNITIES)	SUPPORT TO INNOVATION ECOSYSTEMS
InnoEnergy	Innovative SMEs
Climate	
Digital	
Food	
Health	
Raw Materials	
Manufacturing	
Urban Mobility	
Cultural and Creative Industries	

## CROSS-PILLARS II & III

European Open Science Cloud
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# European Partnerships: more information

**[European partnerships webpage](#)** on europa.eu:

- Draft partnership proposals
- Report on coherence and synergies
- Infographics

**Horizon Europe Strategic Plan** – identification of co-programmed and co-funded European partnerships

**Commission proposals for Art 185/7 initiatives**

## Pillar III

# INNOVATIVE EUROPE:

stimulating **market-creating breakthroughs** and **ecosystems** conducive to innovation

### European Innovation Council

Support to innovations with breakthrough and market creating potential

The budget: **€10.6 billion**, incl. up to **€527 million** for ecosystems (including NGEU – Recovery Fund parts dedicated to EIC).

### European innovation ecosystems

Connecting with regional and national innovation actors

### European Institute of Innovation and Technology (EIT)

Bringing key actors (research, education and business) together around a common goal for nurturing innovation

circa **€3 billion**



# European Innovation Council

Support to innovations with breakthrough and disruptive nature and scale up potential that are too risky for private investors **(70% of the budget earmarked for SMEs)**

**European  
Innovation Council –  
a one-stop-shop**

- Helping researchers and innovators create markets of the future, leverage private finance, scale up their companies
- Innovation centric, risk taking & agile, pro-active management and follow up
- Mostly 'bottom up', but also targeting strategic challenges
- EIC Programme Managers to develop visions for breakthroughs and steer portfolios

Complementary instruments bridging the gap from idea to market

## **PATHFINDER**

**R&I grants**  
(from early technology  
to proof of concept)

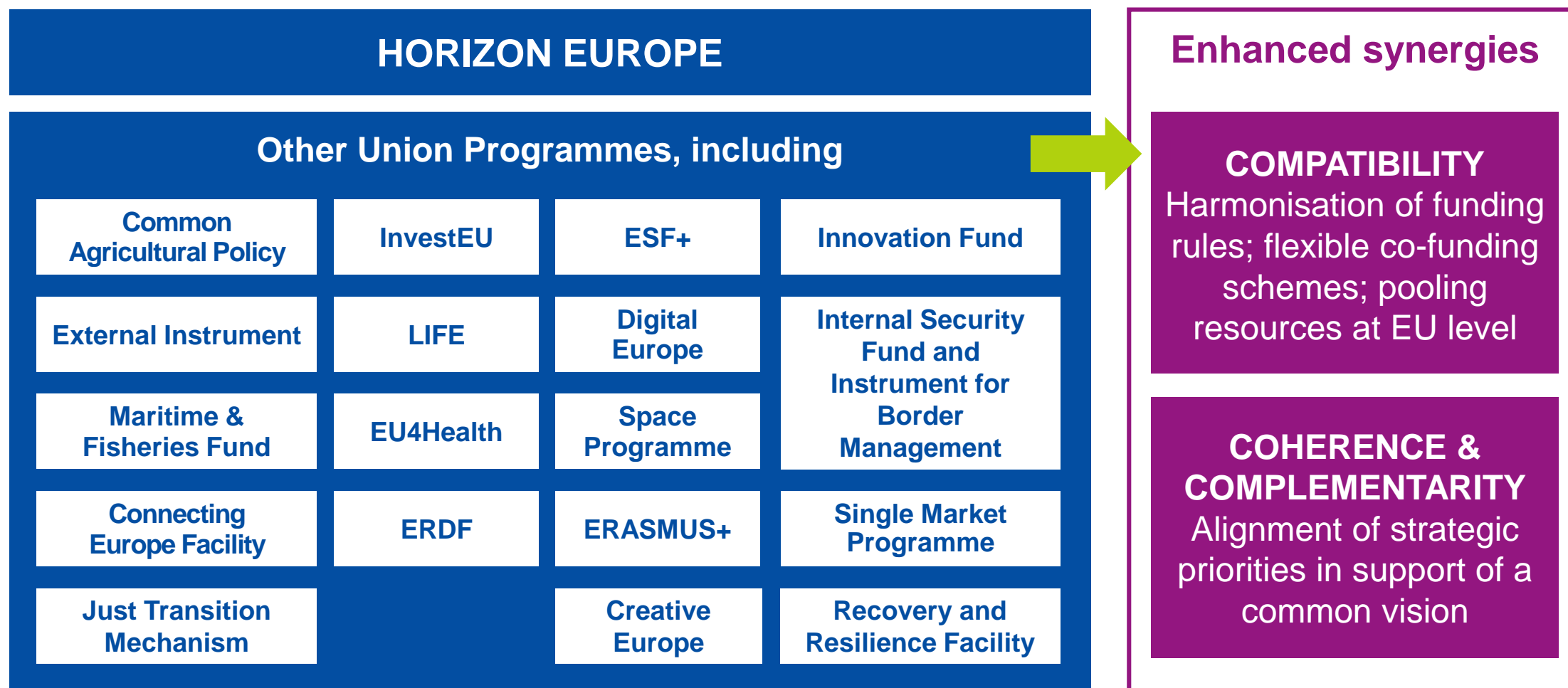
## **TRANSITION**

**R&I grants**  
(proof of concept to  
pre-commercial)

## **ACCELERATOR**

**Grants & investment (via EIC Fund) for  
single SMEs & start-ups**  
(from pre-commercial to market & scale-up)

# Synergies with other Union programmes



Part

# Widening Participation & Strengthening the European Research Area (ERA):

## Widening Participation and Spreading Excellence

- Teaming, Twinning, ERA Chairs,
- European Cooperation in Science and Technology (COST)
- Boosting National Contact Points' (NCPs) activities, pre-proposal checks and advice
- Brain circulation
- Excellence initiatives:
- Possibility for entities from widening countries to join already selected collaborative R&I actions
- Recognition of participation
- Matchmaking services

**€2.96 billion**

## Reforming and enhancing the EU R&I system

- Strengthening the evidence base for R&I policy
- Foresight
- Support for policy makers to the ERA development
- Support to national R&I policy reform, including Policy Support Facility
- Attractive researcher careers and links with higher education
- Open science, citizen science and science communication
- Gender equality
- Ethics and integrity
- Support to international cooperation
- Scientific input to other policies
- Support to the Programme implementation
- Support for National Contact Points
- Support to dissemination & exploitation

**€0.44 billion**



# Open Science across the programme

## Open Science

Mainstreaming of open science practices for improved quality and efficiency of R&I, and active engagement of society

**Mandatory immediate Open Access to publications:** beneficiaries must retain sufficient IPRs to comply with open access requirements;

**Data sharing as ‘open as possible, as closed as necessary’:** mandatory Data Management Plan for FAIR (Findable, Accessible, Interoperable, Reusable) research data

- Work Programmes may incentivize or oblige to adhere to **open science practices** such as involvement of citizens, or to use the **European Open Science Cloud**
- Assessment of open science practices through the **award criteria** for proposal evaluation
- Dedicated support to **open science policy actions**
- **Open Research Europe** publishing platform



# International Cooperation

## International Cooperation

Tackling together global societal challenges; access to the world's best talents, expertise and resources; enhanced supply and demand of innovative solutions

### Association to Horizon Europe

- Third countries with good capacity in science, technology and innovation
- Taking into account objective of driving economic growth in Europe through innovation
- Intensified targeted actions
- Strengthened support to multilateral cooperation
- Openness to international participation balanced with the promotion of EU strategic autonomy



# InvestEU for Research and Innovation (R&I)

**Stimulates more investment in research and innovation**, notably by the private sector; leverages and complements national/regional initiatives

**No market distortion:** intervention only to address financing gaps in the R&I delivery chain (notably due to high risk)

## **Support through:**

- InvestEU Fund
- InvestEU Assistance
- InvestEU Portal

With an EU budgetary guarantee of **€6.6 billion**, the Research, Innovation and Digitisation is expected to leverage an estimated **€90 billion** of investments into R&I; **market-based finance** for the exploitation and scale-up of European R&I.

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HORIZON EUROPE

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# Impact, flexibility, co-design



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

1. Creating high-quality new knowledge
2. Strengthening human capital in R&I
3. Fostering diffusion of knowledge and Open Science

**Scientific  
Impact**



4. Addressing EU policy priorities & global challenges through R&I
5. Delivering benefits & impact via R&I missions
6. Strengthening the uptake of R&I in society

**Societal  
Impact**



7. Generating innovation-based growth
8. Creating more and better jobs
9. Leveraging investments in R&I

**Economic  
Impact**



# Follow us and keep up to date via:

## HorizonEU

*Commissioner Mariya Gabriel:* @GabrielMariya

*Director-General Jean-Eric Paquet:* @JEPaquetEU

**DG Research and Innovation:** @EUScienceInnov @EU\_H2020

<https://www.facebook.com/EUScienceInnov/>

**Horizon Magazine:** @HorizonMagEU

**Horizon Europe website:** <http://ec.europa.eu/horizon-europe>

**European Innovation Council:** <http://ec.europa.eu/research/eic>

**European Research Council:** <https://erc.europa.eu/>



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With Horizon Europe, we step up our ambition for a sustainable future. The programme will maximise its impact by strengthening our scientific and technological bases, boosting our innovation capacity, driving the green and digital transitions and supporting an inclusive recovery.

**Mariya Gabriel**

*Commissioner for Innovation, Research, Culture, Education & Youth*

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European  
Commission |



# Thank you!

## #HorizonEU

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