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The EU Research and Innovation Programme 2021-2027

UPF, 13 May 2021

Outline

Horizon Europe:
main novelties and opportunities of the new Research AND Innovation Programme

1. Political context
2. Objectives of Horizon Europe
3. General structure and budget
4. Main novelties
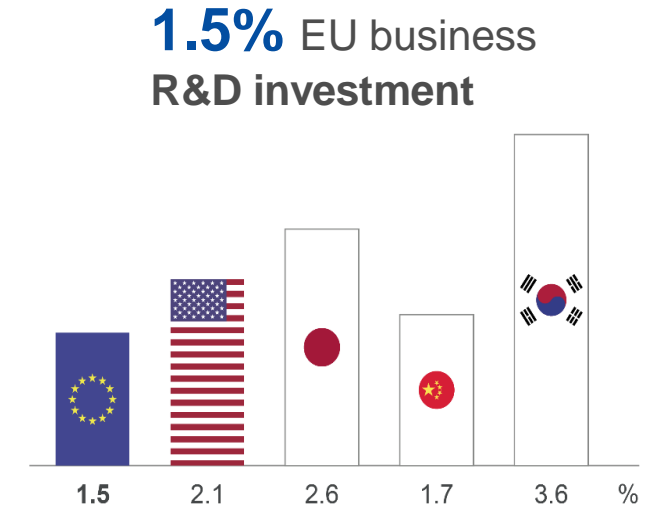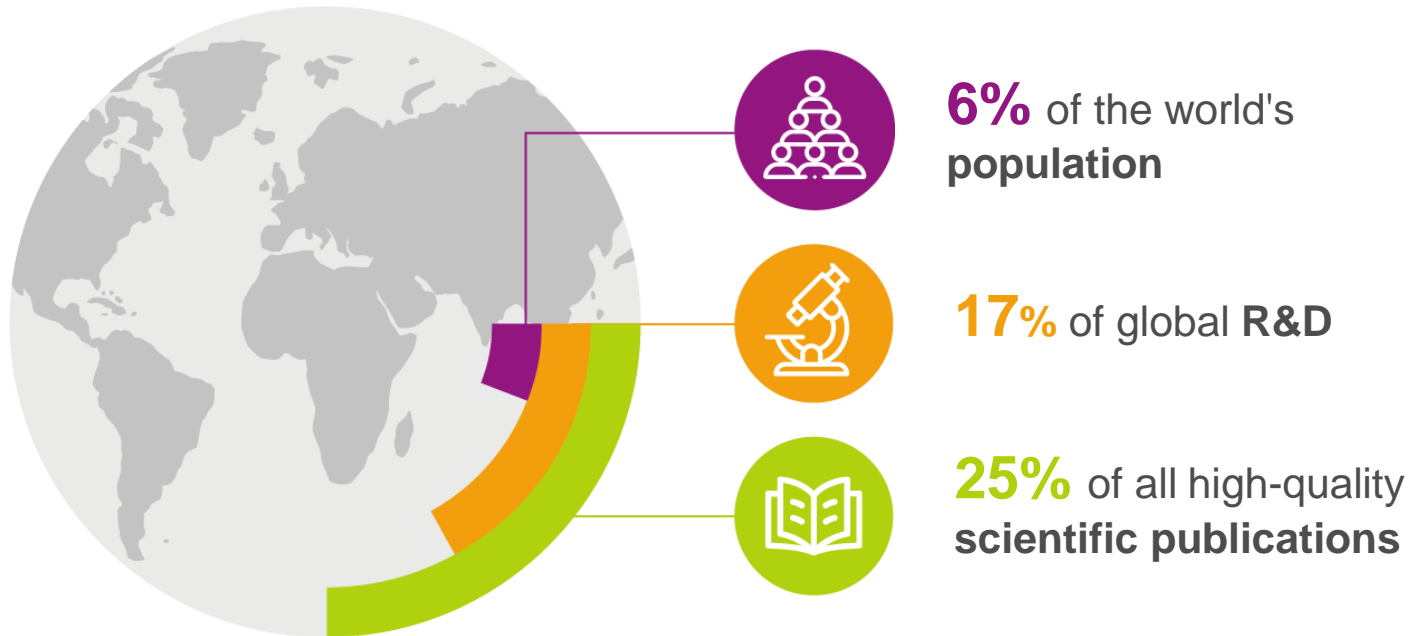5. Practical recommendations
6. Calendar

Disclaimer: this is not a legal document. Always check Horizon Europe's latest work programmes and legal documents

1. Political context and vision

- 6 [political priorities](#) of EU Commission (2019-2024)
- Achieve a sustainable, fair and prosperous future for people and planet based on European values.
- Horizon Europe should:
  - tackle climate change (35% budgetary target)
  - Help achieve Sustainable Development Goals (UN SDG)
  - Boost EU's competitiveness and growth
  - Facilitate collaboration and strengthen the impact of R & I
  - Support the creation and better diffusion of excellent knowledge and technologies

While benefiting from world-class research and strong industries…

6% of the world's **population**

17% of global **R&D**

25% of all high-quality **scientific publications**

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

| 1.5 | 2.1 | 2.6 | 1.7 | 3.6 | % |

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

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

2. Horizon Europe's political objectives

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

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

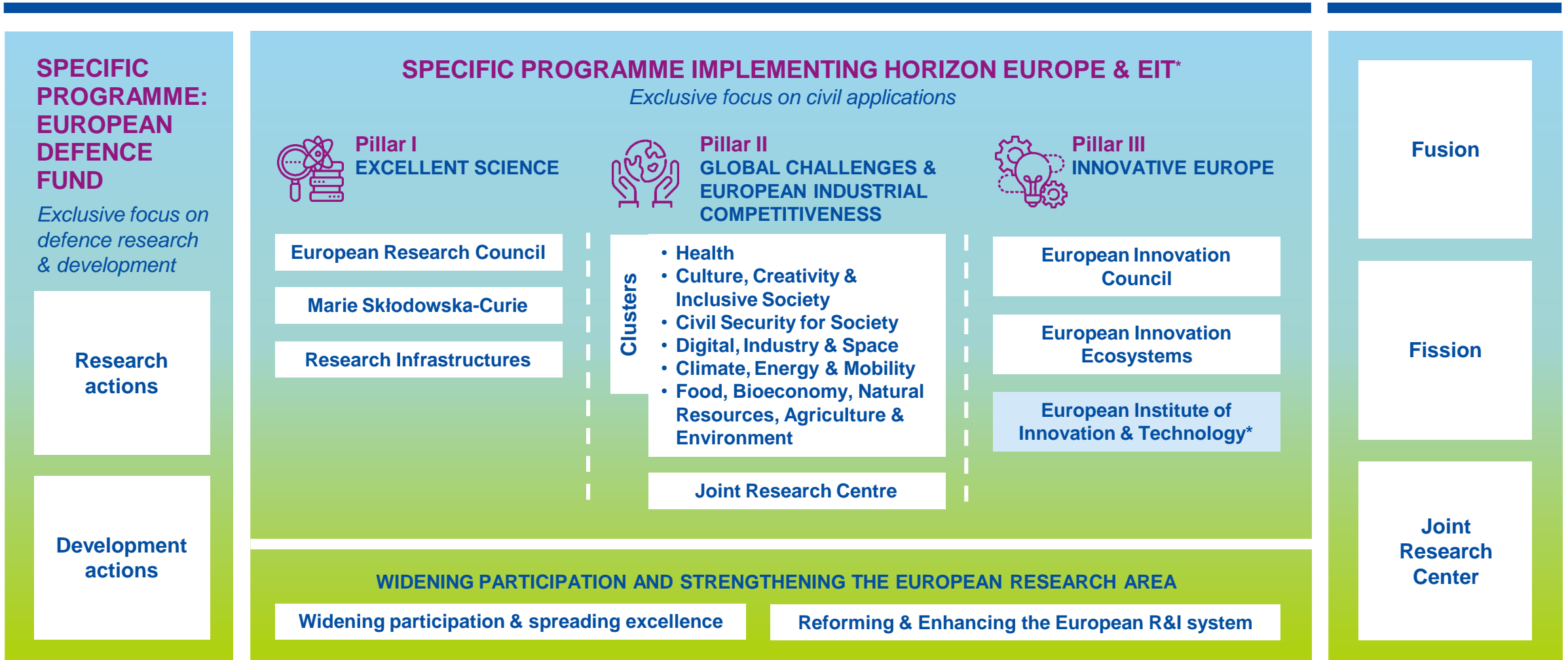boost Europe's **innovation uptake**, **competitiveness** and **jobs**

Science & technology

Society

Economy

It is a research & innovation programme!

3. General structure

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

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

(including € 5 . 4 billion from Next Generation Europe – programme of EU for Recovery from COVID-19 crisis)

Political agreement December 2020
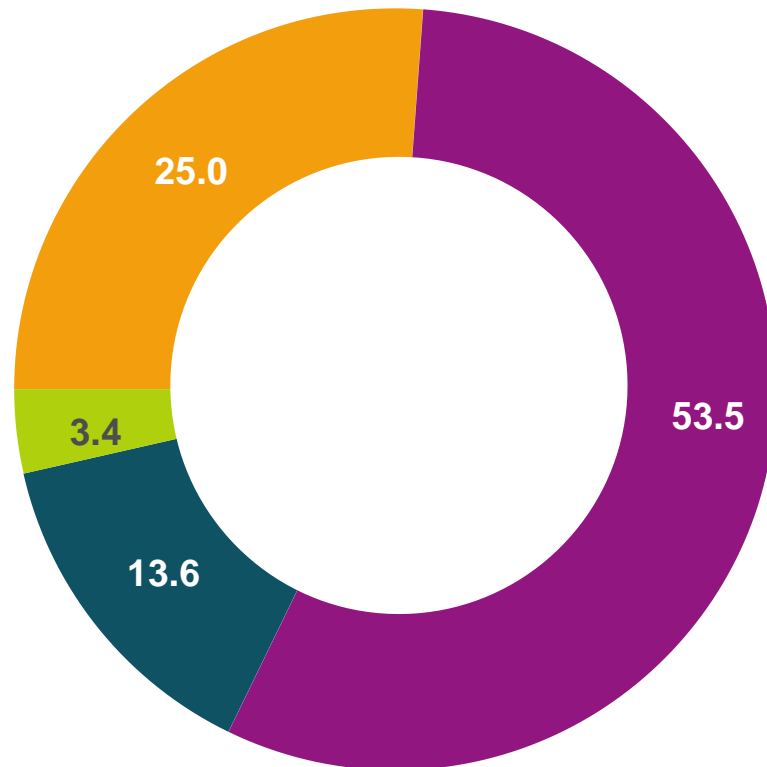
- Excellent Science
- Global challenges and European ind. comp.
- Innovative Europe
- Widening Part and ERA

€ billion in current prices

Total budget: 95.517 M EUR

Pillar I Excellent Science	25.011 MEUR	26,18%
European Research Council (ERC)	16.004	16,75%
Marie Skłodowska-Curie actions	6.602	6,91%
Research Infrastructures	2.406	2,52%

Widening Participation and Strengthening the European Research Area	3.393 MEUR	3,55%
Spreading Excellence and Widening	2.955	3,09%
Reforming and Enhancing the European R&I System	0.438	0,46%

Pillar II - Global Challenges and European Industrial Competitiveness	53.516 MEUR	56,03%
1. Health	8.246	8,63%
2. Culture, creativity and inclusive society	2.280	2,39%
3. Civil Security for Society	1.596	1,67%
4. Digital, Industry and Space	15.349	16,07%
5. Climate, Energy and Mobility	15.123	15,83%
6. Food, Bioeconomy, Natural Resources, Agriculture and Environment	8.952	9,37%
7. non-nuclear direct actions of the Joint Research Centre (JRC)	1.970	2,06%

Pillar III - Innovative Europe	13.597 MEUR	14,24%
European Innovation Council (EIC)	10.105	10,58%
European innovation ecosystems	0.527	0,55%
European Institute of Innovation and Technology (EIT)	2.965	3,10%

Incl. **5.000 MEUR** Next Generation EU
Incl. **4.000 MEUR** (political agreement MFF)

Figures in current prices

Pillar I

EXCELLENT SCIENCE

BOTTOM UP

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

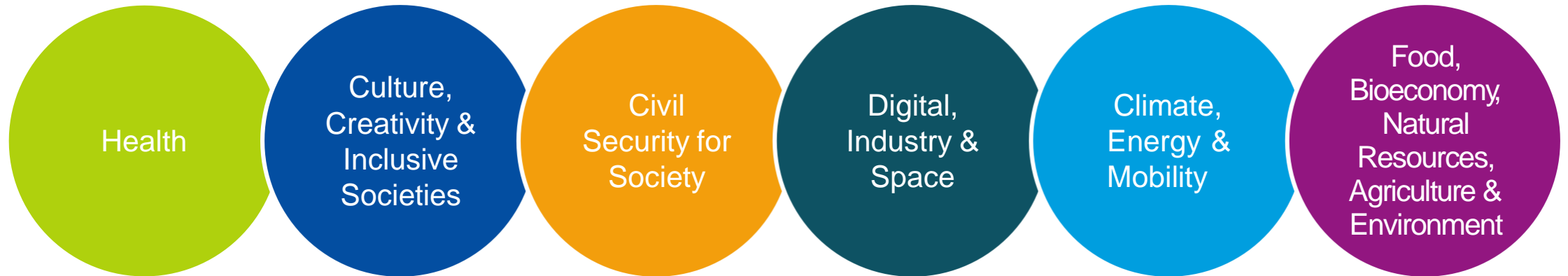| **European Research Council**	**Marie Skłodowska-Curie Actions**	**Research Infrastructures**
Frontier research by the best researchers and their teams	Equipping researchers with new knowledge and skills through mobility and training	Integrated and inter-connected world-class research infrastructures
€16 billion	**€6.6 billion**	**€2.4 billion**

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

ERA Communication (2020)

Part

Widening Participation & Spreading Excellence (WP)

AIM: reduce the R&I divide in the EU

Definition of "Widening country" (eligible as host institution/ coordinator): Portugal, Greece, Malta, Czechia, Poland, Slovakia, Slovenia, Lithuania, Latvia, Estonia, Hungary Romania, Bulgaria, Croatia, Cyprus + EU outermost regions (Canary Islands (ES), Réunion (FR), etc.).

- Teaming: institution building; creation of excellent teams
- Twinning: institutional networking
- ERA Chairs: an institution in a "Widening" country attracts talent
- Brain circulation
- Hop on: possibility for entities from widening countries to join already selected collaborative R&I actions

EURATOM research and training programme (2021-2025)

Objective

Research and training activities to reduce risks in nuclear safety and security, development of safe nuclear technologies and optimal radiation protection.

Key novelties

- Increased focus on non-power applications of radiation (medical, industrial, space)
- Opening mobility opportunities for nuclear researchers through inclusion in Marie Skłodowska-Curie Actions

Budget for years 2021-27

€1.981 billion

4. Lessons Learned
from Horizon 2020 Interim Evaluation

Key Novelties
in Horizon Europe

Lessons Learned	Key Novelties
Support breakthrough innovation	**European Innovation Council**
Create more impact through mission-orientation and citizens' involvement	**EU Missions**
Rationalise partnerships' landscape	**New approach to partnerships**
Reinforce openness	**Open science policy**
Strengthen international cooperation	**Extended association possibilities**
Encourage participation	**Spreading Excellence**

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)

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.

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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 for concrete missions

- **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

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

CROSS-PILLARS II & III

European Open Science Cloud

Legend:
- 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

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
- **UK, Switzerland, Israel:** in principle eligible to participate in first calls. Should sign association agreements with the EU before the signature of grant agreements. Check Q+A

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

Integration of the gender dimension in R&I content

Gender dimension

Addressing the gender dimension in research and innovation content entails taking into account sex and gender in the whole research & innovation process

The integration of the gender dimension into R&I content is mandatory, unless it is explicitly mentioned in the topic description

Why is the gender dimension important?

- Why do we observe differences between women and men in infection levels and mortality rates in the COVID-19 pandemic?
- Does it make sense to study cardiovascular diseases only on male animals and on men, or osteoporosis only on women?
- Does it make sense to design car safety equipment only on the basis of male body standards?
- Is it ethical to develop AI products that spread gender and racial biases due to a lack of diversity in the data used in training AI applications?
- Is it normal that household travel surveys, and thus mobility analysis and transport planning, underrate trips performed as part of caring work, which are predominantly undertaken by women?
- Did you know that pheromones given off by men experimenters, but not women, induce a stress response in laboratory mice sufficient to trigger pain relief?
- And did you know that climate change is affecting sex determination in a number of marine species and that certain populations are now at risk of extinction?

Horizon Europe Strategic Plan (2021- 2024)

Promoting an open strategic autonomy by leading the development of key digital, enabling and emerging technologies, sectors and value chains to accelerate and steer the digital and green transitions through human-centred technologies and innovations

Restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources to ensure food security and a clean and healthy environment

Making Europe the first digitally enabled circular, climate-neutral and sustainable economy through the transformation of its mobility, energy, construction and production systems

Creating a more resilient, inclusive and democratic European society, prepared and responsive to threats and disasters, addressing inequalities and providing high-quality health care, and empowering all citizens to act in the green and digital transitions

- Key strategic orientations for R&I support, including a description of expected impacts, cross-cluster issues and intervention areas covered;
- Identification of co-programmed and co-funded European Partnerships;
- Identification of missions;
- Areas for international cooperation;
- Specific horizontal issues.

Key Impact Pathways to track progress

Scientific Impact

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

Societal Impact

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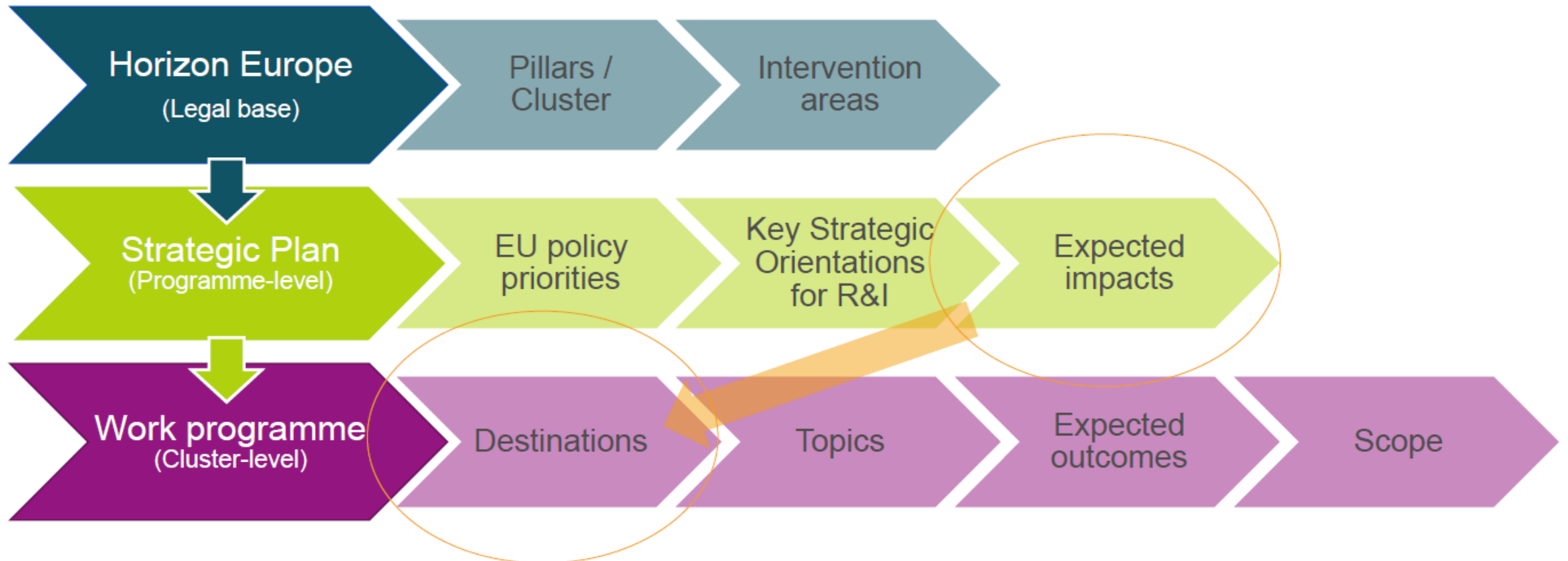6. Strengthening the uptake of R&I in society

Economic Impact

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

Horizon Europe: intervention logic

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Horizon Europe Impact Implementation

KEY elements to read before writing a proposal!

EC POLICY PRIORITIES	Political Guidelines for the European Commission 2019-2024 (and other key strategic documents - e.g. Green Deal)	
KEY STRATEGIC ORIENTATIONS FOR R&I	Set of strategic objectives within the EC policy priorities where R&I investments are expected to make a difference	
IMPACT AREAS	Group of expected impacts highlighting the most important transformation to be fostered through R&I	
EXPECTED IMPACTS ⇒ *DESTINATIONS* = *General objectives*	Wider effects on society (incl. the environment), the economy and science enabled by the outcomes of R&I investments (long term). EXAMPLE *Strategic Plan & Work Programme: R&I contribution to seamless, smart, inclusive and sustainable mobility services*	*Project : Increase maximum passenger capacity by 15% and passenger average throughput by 10%, leading to a 28% reduction in infrastructure expansion costs*
EXPECTED OUTCOMES =>*TOPICS* = *Specific objectives*	Effects of Horizon Europe projects such as uptake, diffusion, use and deployment of the projects' results by direct target groups (medium term) EXAMPLE *Work Programme : Innovative accessibility and logistics solutions applied by the European Transport sector*	*Project : At least 9 European airports adopt the advanced forecasting system that was demonstrated during the project*
PROJECT RESULTS = *Operational objectives*	What is produced during the project implementation, such as innovative solutions, algorithms, new business models, guidelines, policy recommendations, methodologies, publications, database, prototypes, trained researchers, new infrastructures, proof of feasibility, networks, etc. (short term) EXAMPLE *Project (by the end of its implementation): Successful large-scale demonstration trial with 3 airports of an advanced forecasting system for proactive airport passenger flow management*	

STRATEGIC PLAN

WORK PROGRAMME

PROJECT

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Other key novelties I

- **Less prescriptive** topics

- **Reduced number** of pages

- Evaluation of the **quality of applicants** (implementation criterion)

- **Open Science practices** assessed as part of scientific methodology (excellence criterion)

- **Eligibility criterion:** gender equality plan for public institutions (not for companies)

- **General rule:** at least one partner should be from a **EU Member State**

- **Security scrutiny**: self-assessment in proposals & systematic checks

- **Portfolio approach:** missions and EIC projects

Other key novelties II

- Importance of **impact and project results (p. II)**

- Global strategy for the **dissemination, exploitation and communication** (D&E&C) of the project

- D&E&C in evaluation criteria:
    - Only short description of activities in project proposal
    - Detailed plan within first 6 months of the project

- Need to **exploit R&I results** of the project: Horizon Results Platform & Horizon Exploitation Booster

- **Data Management Plans** (DMP): compulsory based on FAIR principles. But exceptions: "as open as possible, as closed as necessary".

- **IPR** management

5. Practical recommendations

- HEU offers **bottom-up** and **top-down** opportunities, for a **variety of actions and actors**.
- In top down calls, remember the **link between policy objectives and impact:** read the Strategic Plan, general introduction to the WP, destination and topic text.
- **Key Impact Pathways** should be addressed (scientific, economic & societal): how will your project contribute to the expected outcomes and impacts set out in the WP?
- **Exploitation, IPR, data management plans** (*as open as possible, as closed as necessary*).
- **Remember the ranking criteria for *ex aequo* proposals**:
  - Aspects of the call not covered by others
  - Scores on Excellence, then Impact (RIA) or Impact, then Excellence (IA)
  - Gender balance in main R&I team
  - Geographical diversity

Policy and horizontal considerations

Don't forget these aspects!

🔓 Open Science across the programme

🧪 Gender dimension in R&I content

🎯 Pathway to impact

📢 Measures to maximise impact

💡 Do no significant harm principle (DNSH)

⚙️ Artificial intelligence

These aspects must normally be considered in all Horizon Europe calls (unless explicitly mentioned in the topic description).

Specific calls may include other aspects to take into account.

Future webinars focused on these specific aspects will come soon.

6. Calendar

Official publication of the programme and the work programmes with calls will be soon

- **End of May** (tbc): adoption of Horizon Europe's main work programme (WP).
- **27 May:** webinar '*Funding & Tenders Portal for Beginners*'.
- **End May-June:** EC thematic info days & brokerage events per cluster 1-6, ERA & Widening part, and EURATOM.
- **May-June:** implementation plans for missions and debate during summer.
- **23 & 24 June**: Research & Innovation Days.
- **End of 2021**: update of WP 2022 and concrete missions calls.
- **End of 2021**: signature of first association agreements of 3rd countries to Horizon Europe (*tbc*).

More information & resources

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/

Webinars on how to present a successful proposal in Horizon Europe:

- **Part I (general) https://ec.europa.eu/research/participants/docs/h2020-funding-guide/other/event210324.htm**

- **Part II (key aspects beyond scientific excellence) https://ec.europa.eu/research/participants/docs/h2020-funding-guide/other/event210421.htm**

F&T Portal https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home

Register as an expert https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/work-as-an-expert

Thank you for your attention