

Horizon Europe Co-design 2021-2024

Fields marked with * are mandatory.

With a proposed budget of 100 billion euro from 2021 to 2027, the Horizon Europe framework programme represents the largest collaborative multinational research and innovation investment in Europe and is open to participants worldwide.

The European Parliament and the Council, the co-legislators have provisionally agreed on the Horizon Europe legislative package. Based on the agreement, a Strategic Plan will put forward the targeted impacts for the investment in research and innovation and the priorities for the first four years of implementation of Horizon Europe.

We invite you to contribute to co-designing and help shaping the future research and innovation investment by responding to this questionnaire. It takes approximately 20 minutes to respond. The results will inform the work on the first Strategic Plan of Horizon Europe. You can further engage by participating in the [European Research and Innovation Days](#) on 24-25-26 September 2019 in Brussels.

It is recommended that prior to responding to the questions, you read the attached document: [Orientations](#) towards the first Strategic Plan implementing the research and innovation framework programme Horizon Europe.

[Section A - About you](#)

*1 You or your organisation are mainly active/interested in the following areas of Horizon Europe (Please select all that apply):

- Health (cluster 1)
- Culture, creativity and inclusive society (cluster 2)
- Civil security for society (cluster 3)
- Digital, industry and space (cluster 4)
- Climate, energy and mobility (cluster 5)
- Food, bioeconomy, natural resources, agriculture and environment (cluster 6)
- Widening Participation and Strengthening the European Research Area
- Pillar I Excellent Science
- Pillar III Innovative Europe
- Other

*2 You are responding:

- As an individual
- As a representative of a single organisation
- As a representative of an 'umbrella' organisation (a group of organisations)

*3. You are responding as:

- a researcher
- an entrepreneur

- an expert in research and innovation
- a citizen
- other

*3. You are representing:

- a university
- a research organisation
- a business or an industry
- an international organisation
- a national public authority
- a regional or local public authority
- a non governmental organisation including civil society organisations
- other

*4 Name of the organisation

150 character(s) maximum

Your organization

SUN-ERGY: merger of SUNRISE and ENERGY-X H2020 CSAs preparatory actions-area: Energy, Environment & Climate Change.

4 Your name and last name

150 character(s) maximum

*5 What is your country of residence or establishment?

Azerbaijan

*6 Please select the option that best describes your interest in European Union research and innovation framework programmes:

- I/my organisation is currently participating in at least one project funded by a European Union research and innovation framework programme.
- I/my organisation has proposed and/or participated in project(s) funded by a European Union research and innovation framework programme in the past, but I am/it is not participating in a running projects at this moment.
- I/my organisation has not yet proposed or participated in projects funded by European Union research and innovation framework programmes, but would be interested to do so.
- I/my organisation currently does not intend to propose and/or participate in projects funded by European Union research and innovation framework programmes, but I may be interested in the results of the projects/programme.

***7 Publication privacy setting**

The Commission will publish the responses to this public consultation. You can choose whether you would like your details to be made public or to remain anonymous.

Anonymous

Only your type of respondent, country of origin and contribution will be published. All other personal details (name, organisation name and size, transparency register number) will not be published.

Public

Your personal details (name, organisation name and size, transparency register number, country of origin) will be published with your contribution.

*

I agree with the [personal data protection provisions](#)

Section B - Where should Horizon Europe play its greatest role?

If you want more information to help answer this section, please follow the link towards the [general orientations](#) part of the document. A [reading guide](#) is as well available.

1. In your view, what is the role of Horizon Europe research and innovation investments in addressing the following challenges (as identified in the "Orientations" document)?

	1 (no role)	2	3	4	5 (very strong role)	I don't know
* Future prosperity and sustainable growth					X	
*Climate action and environment preservation					X	
* European security and the well-being of our citizens					X	

2. In your view, what is the role of Horizon Europe research and innovation investments in achieving the United Nations Sustainable Development Goals (as identified in the "Orientations" document)?

	1 (no role)	2	3	4	5 (very strong role)	I don't know
*1 No poverty			X			
*2 Zero hunger			X			
*3 Good health and well-being				X		

*4 Quality education				X		
*5 Gender equality				X		
*6 Clean water					X	
*7 Affordable and clean energy					X	
*8 Decent work and economic growth				X		
*9 Industry, innovation and infrastructure					X	
*10 Reduced inequalities				X		
*11 Sustainable cities and communities					X	
*12 Responsible consumption and production					X	
*13 Climate action					X	
*14 Life below water				X		
*15 Life on land				X		
*16 Peace, justice and strong institutions			X			
*17 Partnerships for the goals					X	

3. In your view, what is the role of Horizon Europe research and innovation investments in supporting the following EU policy objectives (as identified in the "Orientations" document)?

	1 (no role)	2	3	4	5 (very strong role)	I don't know
*Protective Europe			X			
*Competitive Europe					X	
*Fair Europe			X			
*Sustainable Europe					X	
*Influential Europe					X	

4. Please provide here your comments on where Horizon Europe should play its greatest role in terms of global challenges, Sustainable Development Goals, and EU policy priorities.

500 character(s) maximum

The main role of Horizon Europe should be in developing solutions and technologies needed to solve the climate problem and thus achieving a climate neutral and sustainable society by 2050 with economically viable solutions. This will benefit the European industry and society by achieving a low carbon, sustainable re-industrialized Europe. A more sustainable and competitive Europe would be de facto more influential at the global scale.

5. In your view, to what extent will the following elements contribute to increase the scientific, economic and societal impacts of Horizon Europe investments (as identified in the "Orientations" document)?

	1 (no contribution)	2	3	4	5 (very strong contribution)	I don't know
*Integration of gender aspects in research and innovation content					X	
*Social Sciences and Humanities role across clusters					X	
*Development and uptake of Open Science practices, such as open access, open data, citizen science, in Europe				X		
*Adequate balance of research and innovation					X	
*Integration of Key Enabling Technologies in strategic value chains					X	
*Fostering excellence by promoting collaboration of actors in higher education, research, innovation and business throughout the European territory					X	
*Cooperation with the rest of the world					X	

Section C - What kind of impacts should Horizon Europe target?

A strategic and targeted approach to European research and innovation investment is needed to maximise the impact of Horizon Europe in line with the sustainable, fair and prosperous future we want.

Protective Europe

Policy objectives: While the establishment of the European Union in itself has brought unprecedented peace and prosperity, there is a continued need to address terrorism and

security issues, which are among the top concerns for European citizens, and to enhance internal security within and across the European Union, and along its external borders. The overarching ambition of secure societies is also reflected in Sustainable Development Goal 16 - Peace, Justice and Strong Institutions.

There are a number of EU policy responses to current security challenges. As regards disasters, these include the Union Civil Protection Mechanism, the EU Adaptation Strategy and the [Sendai Framework for Disaster Risk Reduction \(2015-2030\)](#). In the framework of the [European Agenda on Security](#) and as part of the development of a Security Union, the EU has adopted policies and instruments on integrated border management, on protection of public spaces, on security (including cybersecurity) of infrastructure, and on fighting crime, including cybercrime and terrorism. An EU Maritime Security Action Plan addresses relevant challenges. Policies have also been put in place to ensure cybersecurity, such as the Directive on security of network and information systems (NIS Directive) and the EU Cybersecurity Act, and online privacy.

If you want more information, in particular on [cluster 3](#) (civil security for society), please follow the link to the specific annex.

5. In your view, how relevant is it for Horizon Europe to deliver on the following impacts for a "Protective Europe"?

	1 (not relevant)	2	3	4	5 (very relevant)	I don't know
Increased cybersecurity					X	
Improved security and resilience of infrastructure and vital societal functions				X		
Improved management of EU external borders (air, land and sea)		X				
Improved management of EU external borders		X				
Improved disaster risk management and societal resilience				X		
Improved maritime security		X				
More effective fight against crime and terrorism			X			
Better protection of public spaces		X				

6. Please provide here your comments or suggestions on the above (if any)

Protective Europe is an important goal, reached mainly through other programmes of the EU. HE should focus only on aspects related to research and innovation - in particular energy technologies to reach a low carbon, sustainable and competitive Europe - to avoid diluting effort and resources.

Competitive Europe

Policy objectives: Research and innovation plays a central role in enhancing competitiveness throughout Europe and Europe has the potential to become a world leader in the ongoing and foreseeable sustainable and digital transitions. However, there is a need to prepare our technological and industrial future in a more strategic way, including incentivising and steering innovation and facilitating the uptake of new technologies and innovative solutions. New developments within mobility and transport, including automated and connected mobility, will also require new solutions, still to be developed and implemented. Furthermore, the need to promote inclusive and sustainable economic growth and industrialization and to foster innovation is reflected in Sustainable Development Goals 8 - Decent Work and Economic Growth, and 9 - Industry, Innovation and Infrastructure.

The [renewed EU Industrial Policy Strategy](#) shows how the EU must tackle missing segments in key strategic value chains if its industry is to stay competitive and become sustainable at the same time. This requires a stepping up of the level and quality of the EU research and innovation effort with focus on the key parts of strategic technology supply chains: from secure and sustainable supply of raw materials, maximising the value of its resources and materials, to batteries, low-carbon industry, space critical components smart connectivity platforms. At the same time, breakthrough technologies and solutions are necessary to bring about a deep decarbonisation of EU industries by 2050, and foster a circular economy. Future factories will be carbon-neutral, resource efficient and fully integrated in the circular economy. The zero-carbon and circularity ambitions should reinforce one another.

If you want more information, in particular on [cluster 4](#) (digital, industry and space), please follow the link to the specific annex.

Please, remember that Investment in research and innovation regarding [health](#) (Cluster 1) will support an innovative, sustainable and globally competitive health-related industry, while investments in research and innovation for [mobility and transport](#) (Cluster 5) will contribute to developing low-carbon and competitive transport solutions across all modes

7. In your view, how relevant is it for Horizon Europe to deliver on the following impacts for a "Competitive Europe"?

	1 (not relevant)	2	3	4	5 (very relevant)	I don't know
Increased industrial leadership in key enabling technologies and uptake of new technologies					X	
Help achieve climate-neutral, circular and clean EU industries					X	
Climate-neutral, circular and clean EU industries					X	
Increased industrial leadership in key enabling and digital technologies and uptake of new technologies					X	
More appealing and creative jobs in Europe					X	

Increased inclusiveness					X	
Low-carbon and competitive transport solutions across all modes					X	
Increased autonomy in critical raw materials					X	

8. Please provide here your comments or suggestions on the above (if any)
300 character(s) maximum

HE must play a key role to support R&I along the value chain: from disruptive science to breakthrough and emerging tech. and the accelerated transfer of research into industrial innovation with emphasis on sustainable (low carbon, circular economy) and disruptive approaches (digital technologies).

Fair Europe

Policy objectives: The promotion of social cohesion and inclusiveness and the health and well-being of its people are central aims of the European Union's policies and programmes. With the [European Pillar of Social Rights](#), the EU set the direction towards a fairer, inclusive and more social Europe for all citizens based on a European social model that is fit for the challenges of the 21st century. To continue delivering on this agenda and to safeguard shared values and mutual trust, it is important to support Member States in addressing social challenges and inequalities, e.g. related to health or education, within and across their territories and regions. Further efforts should equally be devoted to make high-quality health care both available and affordable for citizens as well as to render health care systems more accessible and sustainable, including through the digital transformation of health and care.

These aims are also reflected in Sustainable Development Goals: 1 - No Poverty; 3 - Good Health and Well-being; 4 - Quality Education; 5 - Gender Equality; 6 - Clean Water and Sanitation, 8 - Decent Work and Economic Growth; 10 - Reduced Inequalities; 11 - Sustainable Cities and Communities, and 16 - Peace, Justice and Strong Institutions.

If you want more information, in particular on [cluster 1](#) (health) and [cluster 2](#) (culture, creativity and inclusive society), please follow the links to the specific annexes.

Please remember that Investments in research and innovation concerning [digital, industry and space](#) (Cluster 4) will also aim to contribute to create more appealing and creative jobs in Europe and increased inclusiveness in the development of technologies and the acquisition of skills to put the new technologies, for instance the digital area or the area of advanced manufacturing, to use.

9. In your view, how relevant is it for Horizon Europe to deliver on the following impacts for a "Fair Europe"?

	1 (not relevant)	2	3	4	5 (very relevant)	I don't know
Healthy citizens in a rapidly changing society			X			
Healthy and health-promoting living and working environments		X				

Effective health services to tackle diseases and reduce the burden of diseases			X			
Improved access to innovative, sustainable and high-quality health care				X		
Unlocking the full potential of new tools, technologies and digital solutions for a healthy society					X	
A sustainable and globally competitive health-related industry in the EU					X	
Enhanced democracy and governance		X				
Better approaches to tackle political extremism and polarisation		X				
Reversing socio-economic and gender inequalities				X		
Improved understanding of societal - including political, ethical and economic - effects of technological advancements and the impact of drivers of change					X	
Novel growth model					X	
Increased use of evidence-based strategies in the management of mobility and migration and the integration of migrants in European society			X			
Better valorisation of European cultural heritage			X			

10. Please provide here your comments or suggestions on the above (if any)
300 character(s)

Energy justice is a central challenge for the clean energy transition. A fair distribution of benefits and costs and fair and participatory decision-making processes are essential to get public support for the required changes towards a climate neutral society.

Sustainable Europe

Policy objectives: In order to achieve the objectives of the Sustainable Development Goals, significant changes are needed to modernise our economy towards sustainable consumption and production patterns, reinforce efforts to fight climate change and

reverse environmental degradation, promote biodiversity and the transition to a circular economy respecting planetary boundaries. This includes maximising the potential of the Energy Union, including promoting a cleaner and more reliable energy supply to households and businesses.

These objectives also are reflected in especially Sustainable Development Goals 2 - Zero Hunger, 6 - Clean Water, 7 - Affordable and Clean Energy, 11 - Sustainable Cities and Communities, 12 - Responsible Consumption and Production, 13 - Climate Action, 14 - Life below Water and 15 - Life on Land.

In the areas of climate change and planetary boundaries, the EU is at the forefront of implementing the Paris Agreement. This EU has already put in place the legislation required to reach the Nationally Determined Contribution for 2030, and the Commission adopted a vision for achieving a [climate neutral economy by 2050](#). The long-term strategy outlines a vision of the technological, economic and societal transformations required to achieve climate neutrality and to ensure a socially fair transition that does not leave any EU citizens or regions behind. It recognises that a forward-looking research and innovation strategy should be guided by zero-carbon solutions that have the potential to be deployed by 2050, and that climate action is at the heart of Horizon Europe, with the intention of devoting 35% of the budget to climate objectives. In January 2019, the Commission adopted the reflection paper '[Towards a Sustainable Europe by 2030](#)', with the intention of launching a forward-looking debate among citizens, Member States and other stakeholders on how to best progress with the Sustainable Development Goals.

If you want more information on [cluster 5](#) (climate, energy and mobility) and [cluster 6](#) (food, bio-economy, natural resources, agriculture and environment), please follow the links to the specific annexes.

11. In your view, how relevant is it for Horizon Europe to deliver on the following impacts for a "Sustainable Europe"?

	1 (not relevant)	2	3	4	5 (very relevant)	I don't know
Advanced climate science and solutions					X	
Novel competitive cross-sectoral solutions for decarbonisation					X	
Novel energy system					X	
New demand side solutions to decarbonise the energy and transport systems					X	
Increased adaptation of production systems				X		
Reinforced supply of sustainable biomaterials and bio-economy					X	
Reduction of greenhouse gas emissions					X	

More sustainable management of natural resources, prevention and removal of pollution					X	
Halt of decline, and restoration, of biodiversity and ecosystems services					X	
Establishment of new primary production and food systems						X
Establishment of new governance models enabling sustainability					X	
A built Environment better fit for EU citizens					X	

12. Please provide here your comments or suggestions on the above (if any)
300 character(s)

Recent IPCC reports urgently call for strong, focused and concerted actions towards economically viable technological solutions and environmental protection in order to fulfil the COP 21 Paris Agreement. This should be a top priority of Horizon Europe.

Influential Europe

Policy objectives: In an increasingly fractured and multipolar world, the EU will need to strengthen its position in order to guarantee its prosperity and competitive position. Through EU international cooperation in research and innovation, the EU can shape new technologies and solutions to global challenges, set world standards and disseminate its values.

Innovation value chains and knowledge production are increasingly global and previously emerging economies have become major players in the research and innovation area. The EU is well placed to tap into this new wealth of research excellence and resources across the world. It has a long history of international cooperation within research and innovation, lies at the centre of most international collaborative networks and offers a general openness to international participation. The EU needs to build upon and further intensify this to fully benefit from the new global opportunities. Activities should promote and integrate international cooperation based on mutual benefits, EU interests, international commitments and, where appropriate, reciprocity, with each area developing its strategy for engaging internationally, in coherence with the overall EU strategy for international cooperation in research and innovation.

The Sustainable Development Goals are increasingly providing a reference point to prioritise and reshape research and innovation policy agendas, and international programmatic coordination through multilateral initiatives are more and more used as a means for global cooperation in areas such as climate change, biodiversity, clean energy, sustainable cities, infectious diseases, seas and oceans, sustainable agriculture and food and nutrition security. The expanding scope and interconnectivity of these challenges require that the EU strengthens its role in multilateral and bilateral setups while also asserting more pro-actively EU values and interests, including in strategic alliances and networks such as global environmental conventions on climate, desertification and biodiversity, the Belmont Forum, the Group on Earth Observations, the Mission Innovation initiative, the International Bio-economy Forum, and a range of Global Health initiatives.

Increased attention is being paid to achieve sovereignty in strategic technology areas and critical infrastructures. Though no jurisdiction is fully autonomous in terms of design, development and production of enabling technology, in a world of globe-spanning value chains the EU should now do more to strengthen alliances with key actors in a strategic and principled way so as to ensure its competitive position.

International cooperation in research and innovation is indispensable for effectively tackling global challenges and for implementing global commitments. Collaborating with the world's top researchers, innovators and knowledge-intensive companies should strengthen the EU's research and innovation excellence and attractiveness, increase the quality of research and innovation results, and reinforce the economic and industrial competitiveness of the Union. Increasing international engagement should also lead to an enhanced EU role in setting the research and innovation policy agendas and shaping global research and innovation systems and innovative solutions for the global challenges.

Engaging internationally should allow for a better assessment of challenges in their global, regional or local context, produce more targeted results, expand and diversify the global flow of knowledge and increase innovation capacity, contributing also to more efficient EU responses in key areas of political dialogue. The growing role of science diplomacy as a key element of EU external action should also foster mutual understanding, stability and progress.

13. Please provide here your suggestions for relevant Horizon Europe impacts to contribute to an "Influential Europe".

300 character(s)

A sustainable and competitive Europe will be more influential on the global scale. HE should promote cooperation with other international large scale initiatives, for instance Mission Innovation, where most of the Innovation Challenges are in line with the EU energy policy objectives.

For more informations on [missions and partnerships](#), please follow the link.

Section D - More in detail on the "Orientations" document

Please click on the part of Horizon Europe for which you would like to provide further general input regarding the targeted impacts from Horizon Europe.

- Health (cluster 1)
- Culture, creativity and inclusive society (cluster 2)
- Civil security for society (cluster 3)
- Digital, industry and space (cluster 4)
- Climate, energy and mobility (cluster 5)
- Food, bio-economy, natural resources, agriculture and environment (cluster 6)
- Widening Participation and Strengthening the European Research Area
- Pillar 1 Excellent Science
- Pillar 3 Innovative Europe

Please provide here further general input regarding the targeted impacts from Horizon Europe.

5000 character(s)

The replacement of fossil fuels and the modernisation of the production processes are crucial to meet the COP 21 Paris Agreement's mission of tackling climate change. SUNRISE and ENERGY-X communities and projects (see *Background* below) aim at developing innovative technologies and sustainable approaches for the capture and subsequent storage of renewable energy (solar and wind) through its conversion to fuels and commodity chemicals using abundant molecules (CO₂, H₂O, N₂) and with an overarching circular economy approach. It is urgent to work towards an ambitious European Large-Scale Initiative (ELSCI), building on these 2 projects to drive forward major global transformations led by new disruptive technologies and address the following grand challenges:

- Storage of renewable energies as liquid fuels;
- Production of basic chemicals for the industry and agriculture without fossil resources;
- Negative CO₂ emission technologies,

The overall goal would be to provide - in a clean and climate-friendly way - all the value and services presently obtained from fossil resources, which are essentially imported from outside Europe, and to foster a transition from an unsustainable linear economic model to a sustainable circular economy. Thus, the ELSCI would aim at using solar energy for recycling atmospheric gases, especially CO₂, the most voluminous waste of over 200 years of global economic development. Wind or PV electricity in temperate climates combined with electrochemistry and advanced homogeneous and heterogeneous catalysis is an open route, whereas direct sunlight conversion can operate in regions with abundant sunshine employing photo-electrochemistry, bio-inspired photocatalysis or biological (biohybrid) systems. Technologies to concentrate waste or atmospheric gases, mainly CO₂, would be also part of most strategies to be developed.

10 years will be sufficient to kick-start key technologies, and turn into attractive commercial activities the most advanced existing industrial processes. A 10-year objective would be to enable the progressive displacement of fossil resources, using renewable energy to convert ubiquitous molecules from the environment into valuable products (fuels, commodity chemicals, base chemicals and monomers for the synthesis of fertilizers, plastics, and building materials). On the longer term, 10-30 years, the ELSCI would aim at the massive deployment of economically viable and energy efficient negative emission technologies. It would have a huge impact on the society, environment and economy, with, on the economical and industrial sides:

- Enhanced investment in CO₂-neutral energy technologies
- Decrease of the carbon footprint of heavy industrial emitters
- Opportunity of making economically attractive CO₂ storing materials.

The ELSCI is directly relevant to the cluster 5 but has also strong connections with clusters 4 and 6. It should also be implemented in relation with international initiatives, especially Mission Innovation.

Elements of the proposed ELSCI are coherent with the HE "Orientations" document, including with some candidate partnerships or Missions. However, a large, dedicated European initiative would be needed to avoid fragmentation and provide a framework that combines disruptive science, innovation, with scale-up to industry to operate across the entire TRL spectrum, through a multi-stage, interdisciplinary approach, and across industries. It would contribute to Europe's and global energy and climate agenda and to its competitiveness: Europe's chemical industry is already leading globally, and dedicated support would enhance Europe's key role for leading the world towards a more sustainable society, creating job opportunities and welfare. It would be complementary to other EU initiatives, and coordination will be sought to avoid duplication and maximise the added value for Europe. To prepare the ELSCI is necessary to build on the momentum and sustain the community, beyond the duration of the current projects and preparing the ground for a large, dedicated initiative.

Background: ENERGY-X (www.energy-x.eu) and SUNRISE (<https://sunriseaction.com/>) are 2 out of the 6 CSA projects selected for the 2018 call FETFLAG-01-2018 within the area of Energy, Environment and Climate Change. Both initiatives received €1 million from the EC to develop a detailed feasibility proposal for a large-scale research initiative during 1 year (03/2019 to 02/2020). They bring together 30 top universities/research organisations, backed by a supporting community of currently approx. 300 stakeholders from academia, industry, and society from across Europe. They have strong connections with various networks: national (e.g. energy research alliances), European (e.g. EERA is member of both consortia) and international networks such as Mission Innovation. At the end of the 2 CSAs, SUNRISE and ENERGY-X will join effort and merge into a single larger initiative, SUN-ERGY.

Thank you very much for your input.

An analysis of the results of this co-design consultation will be available after September 2019. The replies will also feed into the organisation of the debate in the co-design sessions at the European Research and Innovation Days where you are welcome to register for engaging in further discussion: [European Research and Innovation Days](#) on 24-25-26 September 2019 in Brussels.