

Infoday Horizon Europe 2024

# CLIMATE



Cluster 5 – Climate sciences and responses for the transformation towards climate neutrality

Cluster 6 – Land, ocean and water for climate action

21/04/2023



# Agenda



- ▶ Horizon Europe : qu'est-ce que c'est ?
- ▶ Présentation du programme de travail 2024 :
  - 👉 Cluster 5 – Climate sciences and responses for the transformation towards climate neutrality
  - 👉 Cluster 6 – Land, ocean and water for climate action

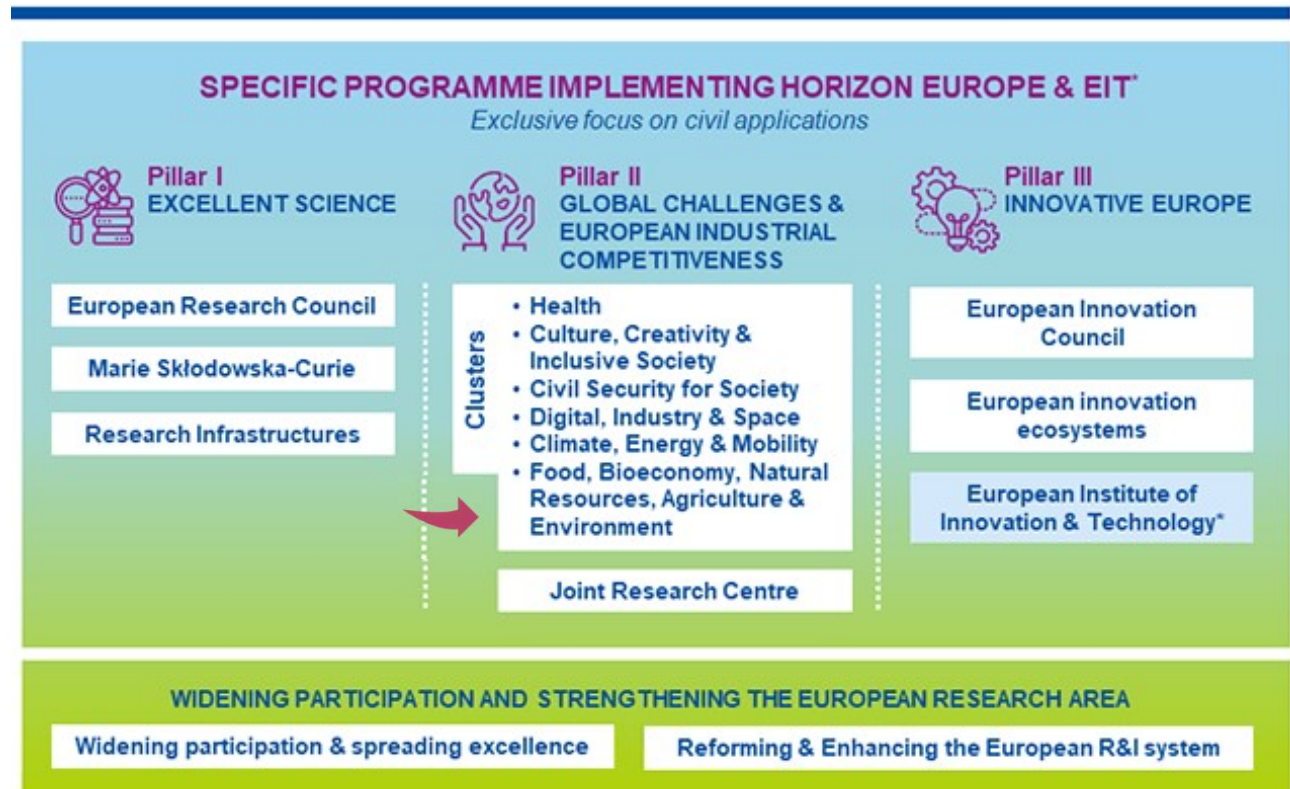
# Horizon Europe: le programme UE de R&I

- ▶ €95.5 milliards d'€ (2021-2027)
- ▶ Pour les entreprises, universités et acteurs publics dans leurs activités de recherche et d'innovation

## HORIZON EUROPE



- 👉 no net emissions of greenhouse gases by 2050
- 👉 economic growth decoupled from resource use
- 👉 no person and no place left behind



## Horizon Europe: Cluster 5



Horizon Europe: Cluster 5 - Climate, Energy and Mobility,


- ▶ 6 Destinations ~ expected impacts (Strategic Plan 2021 – 2024\*)
  - ▶ **Climate sciences and responses for the transformation towards climate neutrality**
  - ▶ Cross-sectoral solutions for the climate transition
  - ▶ Sustainable, secure and competitive energy supply
  - ▶ Efficient, sustainable and inclusive energy use
  - ▶ Clean and competitive solutions for all transport modes
  - ▶ Safe, Resilient Transport and Smart Mobility services for passengers and goods

## Horizon Europe: Cluster 6



Horizon Europe: Cluster 6 - Food, Bioeconomy, Natural Resources, Agriculture and Environment

### ▶ 7 Destinations ~ expected impacts (Strategic Plan 2021 – 2024\*)

- 
- ▶ Biodiversity and ecosystem services (*BIODIV*)
  - ▶ Fair, healthy and environment-friendly food systems from primary production to consumption (*FRAM2FORK*)
  - ▶ Circular economy and bioeconomy sectors (*CIRCBIO*)
  - ▶ Clean environment and zero pollution (*ZEROPOL*)
  - ▶ **Land, ocean and water for climate action (*CLMATE*)**
  - ▶ Resilient, inclusive, healthy and green rural, coastal and urban communities (*COMMUNITIES*)
  - ▶ Destination - Innovative governance, environmental observations and digital solutions in support of the Green Deal (*GOVERNANCE*)



## Calls CLIMATE

### ► Climate sciences and responses for the transformation towards climate neutrality (Cluster 5)

#### ► 7 topics 2024

- Earth system science [3]
- Climate change mitigation, pathways to climate neutrality [3]
- Climate-ecosystem interactions [1]

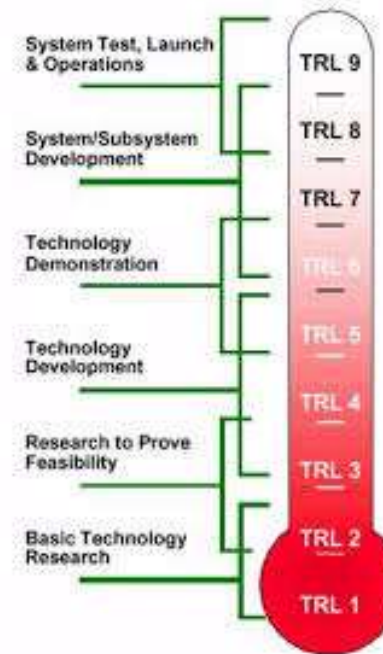
### ► Land, oceans and water for climate action (Cluster 6)

#### ► 7 topics 2024

# Légende

|     |                                |   |
|-----|--------------------------------|---|
| RIA | RESEARCH & INNOVATION ACTIONS  | 100% funding                            |
| IA  | INNOVATION ACTIONS             | 70% funding, Entreprises                |
|     |                                | 100% funding - non profit organisations |
| CSA | COORDINATION & SUPPORT ACTIONS | 100% funding                            |

- RIA → **TYPE D’ACTION**
- € → **BUDGET / PROJET**
- 6 M€
- 🕒 → **DEADLINE**
- 12.04.23
- 📄 4 → **NB PROJETS FINANCÉS**
- 🌡️ 3-5 → **TRL TECHNOLOGY READINESS LEVEL**



## HORIZON-CL5-2024-D1-01-01: Enhanced quantification and understanding of natural and anthropogenic methane emissions and sinks

### Scope

- ✎ further quantify and understand natural and anthropogenic methane emissions based on selected European land sites and European sea sites with unprecedented resolution in space and time
  - Deploying large coordinated in situ, ground-based and airborne observation monitoring campaigns over different Earth's ecosystems (terrestrial, terrestrial-aquatic continuum, and marine sub-seafloor) and key anthropogenic sources (e.g. agriculture, waste, mining, oil and gas industry)
  - Evaluating temporal change in methane release over centuries at selected

### Expected outcomes

- ⇒ to foster collaboration between the **modelling and observing** (satellite, ground-based, airborne) communities and advance towards an enhanced global and regional assessment of the methane sources and sinks
  - to develop an **enhanced methane assessment capacity** - in situ data, novel satellite observations, modelling efforts to quantify and understand hotspots and background for natural and anthropogenic methane emissions - resolution in space and time.
  - **coordination** of in-situ observations of methane emissions - communication and networking
  - science base **high-resolution assessment** of the methane sources and sinks in relevant environments, their short and long-term changes, the related natural and anthropogenic sources, and impacts on atmospheric chemistry and dynamics.
  - Clear policy advice on current and future climate contributions of methane
  - contribution to IPCC + COP26 Glasgow agreement on methane emission reductions



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## HORIZON-CL5-2024-D1-01-02: Inland ice, including snow cover, glaciers, ice sheets and permafrost, and their interaction with climate change

### Scope

- Observing, modelling, and projecting the **characteristics, volume, and dynamic of inland ice and permafrost** in relevant regions, impacting regional and global climate, taking inter-seasonal, annual, decadal, as well as long-term (centuries) changes into account
  - understanding of the **ice sheet or glacier dynamics** and evaluate reversibility or irreversibility of changes on multi-decadal to centennial timescales
  - Impacts and consequences

### Expected outcomes

- ⇒ **Advanced knowledge** on the impacts of climate change and different natural and socio-economic drivers on inland ice and permafrost, and its global repercussions, including climate-ecosystem interactions
- ⇒ Further developed and improved climate and **Earth System Models (ESMs)** that inform the international climate assessments and support the development of “digital twins”
- ⇒ Advanced **provision and use of observations**, including in-situ, of complex processes with focus on dynamic and vulnerable regions that may lead to high impact changes.
- ⇒ Supported **climate change adaptation strategies** - development of solutions to enhance the resilience of local communities



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## HORIZON-CL5-2024-D1-01-03: Paleoclimate science for a better understanding of the short- to long-term evolution of the Earth system

### Scope

- ☞ The geological and ice-core records provide long-term information on the conditions and processes that can drive physical, ecological, and social systems during interglacial periods, deglaciations and abrupt climatic events

### Expected outcomes

- ⇒ assess **climate variability** from **past** climate and environmental datasets
  - Better **understanding of past climate changes**, their variability and interactions with ecosystems
  - Assessment of driving and feedback mechanisms (e.g., the carbon cycle evolution and water cycle process), and **precise timing and dynamics of deglaciation and glaciation**.
  - Future **climate change scenarios** produced in light of documented past changes in climate and ice sheets, in particular warm climates/high sea-level situations, and abrupt transitions.
  - Strengthened Earth system **models** integrating paleoclimate data
  - Identification of **thresholds** in Earth system components → for non-linear behaviour of the climate system
  - Early warning signals, and tipping points
  - Synthesis of climate variations → bases for IPCC future assessment and benchmarks for model inter-comparisons.



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## HORIZON-CL5-2024-D1-01-04: Improved toolbox for evaluating the climate and environmental impacts of trade policies

### Scope

- 👉 Study and quantification of the **effects of trade** on the climate and the environment
- 👉 Study and quantification of the **effects of trade policy** on the climate and the environment
- 👉 Methodology and toolbox related aspects

### Expected outcomes

- ⇒ Enhance our **knowledge and inform policy makers** on the positive and negative impacts of trade and trade policy on the climate. Additionally, where relevant, broader effects on the environment, in particular biodiversity, pollution and natural resources depletion may also be considered.
- ⇒ Improve and enlarge the toolbox of models and other research techniques as well as available data and its processing to analyse the impact of trade and trade policy on the climate.



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## HORIZON-CL5-2024-D1-01-05: Next generation low-emission, climate-resilient pathways and NDCs for a future aligned with the Paris Agreement

### Scope

- ☞ strengthening of national climate policies, Nationally Determined Contributions (NDCs) and long-term strategies, by developing next generation low-emission transformation pathways, with increased sectoral detail, and fostering more holistic and more integrative approaches that promote synergies and minimise trade-offs between mitigation, adaptation, biodiversity and other policy objectives.
  - to support the creation of **tools** that **evaluate the existing NDCs** and facilitate **monitoring processes**.

### Expected outcomes

- **Methodologies and approaches** → improved transparency, consistency, and clarity of GHG emission reduction **commitments**.
- Production of more diversified, granular, and customised **state-of-the-art pathways** consistent with the objectives of the Paris Agreement at global, national and sectoral levels in a diverse selection of countries, better reflecting different national circumstances and constraints and promoting synergies between climate action and other policy objectives.
- Science-based evaluation of selected existing pathways, policies, and measures to implement NDCs
- Extended use of modelling, mitigation pathways based on provision of tailor-made tools, trainings
- Enhanced **international cooperation** on identification and implementation of effective **mitigation strategies**



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## HORIZON-CL5-2024-D1-01-06: The role of climate change foresight for primary and secondary raw materials supply

### Scope

- ☞ Achieving digitalisation and a low carbon society will involve a change in the type and quantity of the raw materials required by the economy.
  - ⇒ This can result in **geopolitical shifts** in extraction and processing, as well as an increase in the extraction, processing, and recycling of many minerals and metals.
  - ⇒ Materials are likely to be extracted from increasingly lower grade ores and hostile environments, from mining wastes, as well as through recycling.

### Expected outcomes

- ⇒ support the **transition to a digital and low carbon society** with a particular emphasis on climate change and raw material value chains
  - Short-, medium-, and long-term scenarios of changes in the type, origin and quantity of raw materials (metals/minerals) required for the twin transition.
  - Geo-referenced projections for the changes to the greenhouse gas and energy footprint associated with the supply of these primary and secondary raw materials with a view to facilitating their use in integrated assessment models.
  - Models and data → European Commission's Raw Materials Information System



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## HORIZON-CL5-2024-D1-01-07: Quantification of the role of key terrestrial ecosystems in the carbon cycle and related climate effects

### Scope

- ☞ to develop an enhanced capacity to better characterise and reduce uncertainties of the carbon cycle related to key terrestrial European ecosystems as a function of anthropogenic emissions, environmental forcing conditions, and management practices.
  - Coordinated European effort to expand dedicated campaigns to collect in situ-data to support the modelling of these changes based on current and historical trends, and to develop empirically based scenarios connecting land use and land cover change to carbon emissions, and sequestration potential.

### Expected outcomes

- ⇒ A comprehensive **assessment and quantification** of the role of **terrestrial biogeochemical dynamics** and the role of **vegetation in the carbon cycle**, compared to the pre-industrialisation situation, building on dedicated in situ data collection, novel satellite data development, and advanced carbon cycle modelling.
  - Enhanced understanding and characterisation of the **terrestrial carbon pools and fluxes**, including through taking account of hydrological exchanges, with unprecedented accuracies and spatial scales
  - Improved methods for the monitoring of **key ecosystems state** in Europe, regarding terrestrial carbon, including e.g. forestry, croplands, peatlands, inland water, extensive grasslands, tundra, tidal marshes, seagrass, and mangroves
  - Improved handling of **anthropogenic management practices** (land use including forestry) in terrestrial carbon modelling, including lateral transfers of carbon (notably in the form of harvested biomass including exports, imports, and use as well of land-water exchange).



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## Calls CLIMATE

### ► Climate sciences and responses for the transformation towards climate neutrality (Cluster 5)

#### ► 7 topics 2024

- Earth system science [3]
- Climate change mitigation, pathways to climate neutrality [3]
- Climate-ecosystem interactions [1]

### ► Land, oceans and water for climate action1 topic 2024 (Cluster 6)

#### ► 5 topics 2024 (+2 CSA)

## HORIZON-CL6-2024-CLIMATE-01-1: Improving irrigation practices and technologies in agriculture

### Scope

- Improve the understanding of the **potential for irrigation** in terms of efficiency, reliability and cost-effectiveness **of sewage sludge and other biowaste streams** without a negative impact on the environment, ensuring high agronomic efficiency of the nutrients they contain.
- New or improved **tools for an efficient combined use of water and fertilizers via irrigation** for different agricultural systems, including agroecology, organic production
- Improve practices and solutions to deal with the effects of water **abundance** (rapid showers, floods) / **scarcity**.
- Identification of **societal and regulatory barriers** hampering upscaling of recycled water-use

### Expected outcomes

- ⇒ to increasing the resilience of agriculture to drought with innovative irrigation systems that increase efficiency in water management
  - Solutions and prevention tools for **improving water management** in particular in areas experiencing recurrent or permanent water scarcity to anticipate solutions for current and future challenges in water management.
  - Unlocking the potential of **recycled sewage sludge and other biowaste streams as alternative**, safe water and nutrient supply resources for agriculture.
  - Increased socio-economic and environmental potential of alternative irrigation practices
  - Reduced agricultural water demand, as a result of optimized irrigation systems



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## HORIZON-CL6-2024-CLIMATE-01-4: Land use change and local / regional climate

### Scope

- ☞ The conservation and enhancement of Earth's natural **terrestrial carbon sinks** such as soils and plants in forests, on farmed lands as well as peatlands and wetlands is crucial
  - Analyse, model and project impact of past, present and future land use and land use change on the local and regional evolution of the climate, including as appropriate the use of remote sensing technologies (Copernicus) combined with innovative processing and AI;
  - Develop **strategies for policy-making** to mitigate adverse evolutions of climate at the regional/landscape level, including with regard to trade-offs between different objectives (climate change mitigation and adaptation, food and biomass production, biodiversity protection);
  - Solutions for **improved land management**, making use of afforestation, integrated land use change and management practices (e.g. hedges, agro-forestry), extensification and rewetting of organic soils, improved forest management and better use of biomass, more efficient use of fertilisers, dietary changes, etc.;

### Expected outcomes

- ⇒ Solutions for understanding, modelling and optimising the relationships between net removals from Land Use, Land Use Change and Forestry and biogenic emissions from the agriculture sector at local / regional level
- ⇒ Strategies → at local and regional level to deal with impacts of climate change and to maximise co-benefits for other objectives, including biodiversity protection.



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## HORIZON-CL6-2024-CLIMATE-01-5: Climate-smart use of wood in the construction sector to support the New European Bauhaus

### Scope

- ☞ Wood materials remain considerably under-utilised in the construction sector despite their durability and appreciation by end users
- ☞ This requires new raw material sources and secondary material, technologies, and designs for wood components, specified products and for wooden buildings. Buildings need also to be adapted to climate change, including as regards summer and winter thermic performance

### Expected outcomes

- ⇒ making the construction sector more renewable and circular especially for existing buildings, which includes the use of currently underused timber such as hardwoods, salvage wood and post-consumer wood for traditional and newly emerging innovative woody biomass-based applications, while including circularity as part of a broader system and design loop.



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## HORIZON-CL6-2024-CLIMATE-01-6: Ocean models for seasonal to decadal regional climate impacts and feedbacks

### Scope

- ✍ A current limitation to climate change projections for EU-basin scale to coastal use comes from an insufficient representation and resolution of **basin and coastal ocean dynamics** and from an unsatisfactory understanding of the **oceanic biogeochemical cycle**.

### Expected outcomes

- ⇒ Demonstration of **the ocean models**, for climate change impact assessment in European sea basins and coastal areas, in particular on marine ecosystems;
- ⇒ Demonstration of EU basin scale to **coastal ocean climate services** that support policy implementation and the development of climate adaptation strategies and of a carbon-neutral blue economy
- ⇒ Development and publication of indicators on **ocean status and health**
- ⇒ Fostered collaboration between the climate science community and operational oceanography communities



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## HORIZON-CL6-2024-CLIMATE-01-7: EU-China international cooperation on improving monitoring for better integrated climate and biodiversity approaches, using environmental and Earth observation

### Scope

- ✎ The EU and China face **similar challenges** as a result of climate change where it comes to biodiversity related aspects, while reaching climate neutrality will require critical contributions from terrestrial land, including through enhancing net carbon dioxide removals.

### Expected outcomes

- ⇒ A comprehensive assessment and quantification of the **role of terrestrial biogeochemical dynamics** and the role of vegetation in the carbon cycle, compared to the pre-industrialisation situation - dedicated in situ data collection, novel satellite data development, and advanced carbon cycle modelling.
  - Enhanced understanding and characterisation of the **terrestrial carbon pools and fluxes**,
    - new generation of satellite missions (e.g., ESA's BIOMASS, FLEX, Sentinel missions, NASA's NISAR, GEDI, ICESat-2 etc...).
  - Improved methods for the **monitoring of key ecosystems** state in Europe, regarding terrestrial carbon, e.g. forestry, croplands, peatlands, inland water, extensive grasslands, tundra, tidal marshes, seagrass, and mangroves, and **tackling key gaps in observations**, e.g. age-structure, species richness, canopy structure (including use of Terrestrial Laser Scanning)
  - **handling of anthropogenic management practices** (land use, forestry) in terrestrial carbon modelling .
  - understanding of impacts on the carbon cycle of **extreme events** (wind throw, drought, pest outbreaks, fire)
  - Novel monitoring frameworks **combining remote and proximate sensing** techniques with machine learning and edge computing.



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# Calls - Climate sciences and responses for the transformation towards climate neutrality



## Call – Land, oceans and water for climate action CLIMATE

### ► Textes complets des appels disponibles

► Site web NCP-Wallonie: <https://www.ncpwallonie.be/secteurs/climate-environment/>

► Portail EU: [HE Cluster 5 - Climate](#)

[HE Cluster 6 – Climate](#)





# Merci pour votre attention

Retrouvez-nous sur [ncpwallonie.be](http://ncpwallonie.be)

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