



#HorizonEU

THE EU
RESEARCH & INNOVATION
PROGRAMME

2021 – 2027

**CLUSTER 5 Climate,
Energy & Mobility**



EUROPEAN UNION

CLUSTER 5 Climate, Energy & Mobility

INFO DAY 2022 - 3 February 2022

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THE EU RESEARCH & INNOVATION PROGRAMME 2021 - 2027

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CLUSTER 5 Climate, Energy, Mobility



Virtual INFO DAY 2022
3 February 2022

Parallel sessions – 15:30 – 16:45

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

Follow the streaming link: <https://europa.eu/!UmC7FF>

Destination 3 Global leadership in renewable energy

Follow the streaming link : <https://europa.eu/!UmC7FF>

Destination 6

Multimodal and sustainable transport systems for passengers and goods

Follow the streaming link: <https://europa.eu/!UmC7FF>



CLUSTER 5 Climate, Energy, Mobility

Virtual INFO DAY 2022 – 3 February 2022



Destination 3

Global leadership in renewable energy



MARIA GETSIOU



HORIZON-CL5-2022-D3-03



HORIZON-CL5-2022-D3-03-01

Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations



Scope

- Support will be given to the demonstration of innovative, cost effective and more reliable components and/or sub-systems for **CSP plants and/or concentrating solar thermal installations**
- Components and/or sub-systems will allow **better efficiency in terms of solar energy conversion**
- The demonstration should span a continuous interval of **at least six months covering all possible incidence angles of the direct solar radiation**
- Projects are expected to assess the **sustainability** of the proposed components and/or sub-systems in environmental, social and economic terms.
- All **demonstrators should be fully and transparently documented**, to ensure replicability, up-scaling and to assist future planning decisions
- **TRL**: Activities are expected to achieve **TRL 6-7** by the end of the project

HORIZON-CL5-2022-D3-03-01

Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations



Expected outcome

Project results are expected to contribute to **some** of the following expected outcomes:

- **Higher shares of variable output renewables** in the energy system
- **Higher efficiency** of CSP plants and/or concentrating solar thermal installations
- **Reduced operation and maintenance costs** of CSP plants and/or concentrating solar thermal installations
- Achievement of the targets of the **SET Plan Initiative for Global Leadership in CSP**

HORIZON-CL5-2022-D3-03-01

Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations



Type of action: Innovation Actions



Specific Topic conditions: Activities are expected to achieve **TRL 6-7** by the end of the project



EU contribution: The Commission estimates that an EU contribution of around EUR 5.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.



Deadline: Opening: 6 September 2022
Deadline: 10 January 2023



Scope

The proposal is expected to address all of the following aspects:

- Address and validate how digital innovation on wind farm control are able to provide more stable, resilient, secure, reliable and affordable energy, while retaining high levels of cybersecurity. Focus on farm output maximization is expected. Additionally, focus on reduced component load is strongly encouraged.
- Address how these data-driven innovations reduce operational and maintenance costs, increase energy output, and their impact on (component, turbine, farm) lifetime;
- Address the role of such innovations as a prognostic tool, regarding failures and damages:
- Develop and release an open source digital/AI solution for sector uptake. This tool is expected to be built from concrete experiments and data measurements. Further, it should account for the advent of large wind turbines (up to 20 MW) and include those in the development of this tool.

HORIZON-CL5-2022-D3-03-04

Integrated wind farm control



Scope

- In order to optimise impact and enhance synergies, cooperation with projects from the HORIZON-CL5-2021-D3-02-04 call is particularly encouraged.
- The selected projects are expected to contribute and participate to the activities of the project BRIDGE^[2] when relevant. - www.h2020-bridge.eu

HORIZON-CL5-2022-D3-03-04

Integrated Wind Farm Control



Expected outcome

In this context, project results are expected to contribute to all of the following expected outcomes:

- Development of open source data-driven tools to decrease energy costs on operation, while increasing total wind farm output, and a parallel evaluation of operational risks arising from the chosen solution, including e.g. limitations from machine learning (AI) and resilience against third-party fraud, i.e. operational security.
- Development of digital and physical tools, as well as interoperable frameworks and controls, for enhanced data collection, analysis, and operation aimed at an improved performance at farm level.
- Allow operators to make better informed decisions on farm-wide system optimisation, lifetime extension, decommissioning and/or recycling of components.
- Contribute to LCOE reduction in line with the SET Plan targets (actions should clearly justify the estimated LCOE at project start and end)

HORIZON-CL5-2022-D3-03-04

Integrated Wind Farm Control



Type of action: Research and Innovation Action



Specific Topic conditions: Activities are expected to achieve TRL 5 by the end of the project



Cross cutting priorities: Ocean sustainability and blue economy



EU contribution: The Commission estimates that an EU contribution of around **EUR 6.00 million** would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

The total indicative budget for the topic is **EUR 18.00 million**.



Deadline: **Opening: 6 September 2022**
Deadline: 10 January 2023

HORIZON-CL5-2022-D3-03-05

Novel Thin Film (TF) technologies targeting high efficiencies



Scope

An alternative to c-Silicon PV thin-film solar cells, can be fabricated on various and flexible substrates (including glass, metal foils and polymers) with lower direct semiconductor materials use and cost.

- Develop novel environmentally benign thin-film technology concepts that optimise PV cell and module architecture, increase durability, decrease losses (minimising also the cell-to-module efficiency gap) and target very high efficiencies (>25%) with flexibility for specific applications.
- Employ simple, scalable and low cost/low energy consumption and higher rate deposition processes.
- Ensure compliance with all relevant standards, including those related to the specific applications targeted.
- Perform device/module real-life (under actual outdoor operating conditions) characterisation for reliability and energy yield assessment.
- Perform a life cycle analysis to bring evidence of the lower environmental impact, better resource efficiency than current commercial PV technologies, and circularity potential.

HORIZON-CL5-2022-D3-03-05

Novel Thin Film (TF) technologies targeting high efficiencies



Expected outcome

Project results are expected to contribute to all of the following

- Increase the potential of thin-film technologies for mass production, low cost and/or specialised applications.
- Reinforce the European PV value chain, support local companies to develop and sell differentiated PV products.
- Allow for an efficient use of available areas for renewable energy generation/ reducing competition between different kinds of land use by further increasing PV energy yield/m².
- Enable and facilitate large-scale deployment of PV and generation of renewable electricity

HORIZON-CL5-2022-D3-03-05

Novel Thin Film (TF) technologies targeting high efficiencies



Type of action: Research Innovation Action (IA)



Specific Topic conditions:

Activities are expected to achieve TRL5 by the end of the project



EU contribution:

The total indicative budget for the topic is **EUR 20.00 million**. The Commission estimates that an EU contribution of around **EUR 5.00 million** would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts



Deadline:

Opening: 06 September 2022

Deadline: 10 January 2023



Scope

Long-term sustainability of photovoltaics will be largely dependent on the effectiveness of the process solutions that will be adopted to recycle the unprecedented volume of end-of-life panels/products expected to be generated in the near future.

- Forecast the PV waste streams and estimate the market potentials.
- Develop and demonstrate flexible, high efficiency and throughput recycling technologies adapted to the large volumes of PV modules/products that will be disposed in the future, depending on the typologies of cells/modules/products and reverse logistics.
- Demonstrate re-use potential of high-value recycled material (maintaining its purity and/or integrity) in the PV sector.
- Demonstrate a business case for the concept and a market introduction strategy.
- Address the following related aspects: low environmental impact, resource efficiency and circularity potential.

The proposal should involve multidisciplinary consortia including industrial partners.



Expected outcome

Project results are expected to contribute to all of the following outcomes:

- Demonstrate efficient, low-cost, emerging recycling technologies for PV modules/products.
- Increase recyclability and minimise the environmental impact of PV technology.
- Introduce new business models and open new markets in PV recycling.
- Reduce dependency on primary raw materials through the circular use of resources, sustainable products and innovation.
- Strengthen domestic sourcing of raw materials in the EU.

HORIZON-CL5-2022-D3-03-09

Recycling end of life PV modules



Type of action: Innovation Action (IA)

Activities are expected to achieve TRL 7 by the end of the project



EU contribution:

The total indicative budget for the topic is **EUR 20.00 million**. The Commission estimates that an EU contribution of **between EUR 6.00 and 7.00 million** would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.



Deadline:

Opening: 06 September 2022
Deadline: 10 January 2023

MARIA GEORGIADOU



HORIZON-CL5-2022-D3-03



HORIZON-CL5-2022-D3-03-02

Best international practice for scaling up sustainable biofuels



Scope

Aim at **fostering international cooperation** to develop **best practices** and **concepts** along the **entire value chain** for accelerating the scale-up of **sustainable biofuels** worldwide. Scaling up sustainable biofuels is a global challenge in terms of environmental, social, and economic sustainability, which can benefit from international collaboration and knowledge exchange. Proposals should address **systemic constraints** and **opportunities for scaling up** complete value chains of sustainable biofuels and **propose solutions**. Any sustainable non-food/feed biomass feedstock and any innovative technology or combinations of them should be considered. Proposals should enhance overall **cost-effectiveness** and **sustainability** of **large scale production** of sustainable biofuels based on Life Cycle Analysis addressing social, economic and environmental aspects. International cooperation with **Mission Innovation countries** is expected.

HORIZON-CL5-2022-D3-03-02

Best international practice for scaling up sustainable biofuels



Expected outcome

Project results are expected to contribute **to some** of the of the following expected outcomes:

- Build **global knowledge** for the **scaling-up** and the **sustainability assessment** of sustainable biofuels value chains.
- Contribute to cost-effective and more sustainable **large-scale production** of sustainable biofuels.
- Contribute to **Mission Innovation Challenge n°4 Sustainable Biofuels** .
- Contribute to the **SET Plan Action 8** Bioenergy and Renewable Fuels for Sustainable Transport.
- Accelerate **capacity building** for sustainable biofuels **in the world**.
- Develop **networks** for **skill development** and **knowledge sharing** in sustainable biofuels value chains worldwide

HORIZON-CL5-2022-D3-03-02

Best international practice for scaling up sustainable biofuels



Specific Conditions

- Type of action: **Research and Innovation Actions**
- Technology Readiness Level: **Expected TRL 4-5 by end of project**



EU contribution:

- Total indicative budget for the topic: **€ 9.00 million**
- Expected EU contribution per project: **€ 3.00 million**
- Expected number of funded projects: **3**



Deadline:

- Opening: **06 Sep 2022**
- Deadline(s): **10 Jan 2023**

HORIZON-CL5-2022-D3-03-03

Efficient and circular artificial photosynthesis



Scope

Development of novel artificial photosynthesis technologies, which allow for **improved efficiency of light harvesting, conversion to electrochemical potential and energy fixation to carriers** with strictly implementing circularity by design and efficient use of carrier and (photo)catalyst materials through **novel photoelectrochemical or bio-based (bio-hybrid) or biological pathways for solar fuel production** with increased efficiency in comparison to light and dark reactions of natural photosynthesis. Production of hydrogen as a final product is not envisaged.

Synergies are possible with topic **HORIZON-CL4-2021-RESILIENCE-01-16** Creation of an innovation community for solar fuels and chemicals (CSA) and respective cooperation activities are encouraged.

HORIZON-CL5-2022-D3-03-03

Efficient and circular artificial photosynthesis



Expected outcome

Project results are expected to contribute to some of the following expected outcomes:

- Advance the **European scientific basis**, leadership and global role in the area of renewable and solar fuels, while creating evidence for policy making;
- Provide **solar fuel breakthrough solutions** towards a fossil-free economy and ecosystem by bridging solar energy and fuel needs with the potential of high penetration in the energy system, ensuring stability and security of energy supply;
- Increase **European technology competitiveness** in solar fuel technologies, thus supporting the EU goals for climate protection, energy independence and economic growth.
- **Develop artificial photosynthesis solutions**, which will minimize further downstream processing and increase their scalability and integration within the industrial value chain in respect of **circularity**.

HORIZON-CL5-2022-D3-03-03

Efficient and circular artificial photosynthesis



Type of action: Research and Innovation Actions

Activities are expected to achieve TRL 5 by the end of the project



EU contribution: between EUR 3.00 and 5.00 million (total: EUR 10.00 million)



Deadline:

Opening: 06 September 2022

Deadline: 10 January 2023

HORIZON-CL5-2022-D3-03-06

Efficient and low-emission technologies for industrial use of combustion and gasification systems from low-value biogenic residues and wastes



Scope

Development of technologies for optimization of advanced biofuel flexible systems regarding upstream multi-feedstock, logistics, feeding, ash management, combustion or gasification processes and effluent emissions and their effective integration into industrial process energy environment through efficient and low-emission technologies for industrial use of combustion and gasification systems from low-economic value, but fully sustainable biogenic residues and wastes.

HORIZON-CL5-2022-D3-03-06

Efficient and low-emission technologies for industrial use of combustion and gasification systems from low-value biogenic residues and wastes



Expected outcome

Project results are expected to contribute to some of the following expected outcomes:

- Advance the **European scientific basis**, technology base, leadership and global role in the area of bioenergy integration into industrial settings while creating evidence for policy making
- Increased **feedstock diversification and better technological performance** leading to cost-reduction of bioenergy with positive effects on renewables' penetration, circularity and security of supply;
- **Reduced emissions** and increased environmental and socio-economic **sustainability** of biomass combustion and gasification and bioenergy value chains.

HORIZON-CL5-2022-D3-03-06

Efficient and low-emission technologies for industrial use of combustion and gasification systems from low-value biogenic residues and wastes



Type of action: Research and Innovation Actions

Activities are expected to achieve TRL 5 by the end of the project



EU contribution: between EUR 3.00 and 5.00 million (total: EUR 10.00 million)



Deadline:

Opening: 06 September 2022

Deadline: 10 January 2023

HORIZON-CL5-2022-D3-03-07

Development of algal and renewable fuels of non-biological origin



Scope

Develop and improve **algal and/or non-biological renewable fuel technologies** (other than for hydrogen as a final product), through developing **synthetic pathways** including **biological, biochemical, thermochemical, electrochemical processes or combinations** of them. Improving the performance of the conversion process by increasing the **efficiency**, reducing the **cost** and decreasing the **GHG emissions from the production** should be addressed beyond the current state of the art. Implementing and improving **circularity for energy and material use** should be considered, also as means to enhance **sustainability** and **economic feasibility** of the proposed concepts. Proposals should also address **systemic constraints** and **opportunities** for **scaling-up** algal and non-biological renewable fuel technologies.

HORIZON-CL5-2022-D3-03-07

Development of algal and renewable fuels of non-biological origin



Expected outcome

Project results are expected to contribute **to some** of the of the following expected outcomes:

- Increase **feedstock** and **technology basis** for renewable fuels.
- Facilitate development of **advanced** and **high-quality** biofuels from algae vegetable lipids.
- Foster development of **technological pathways** for algal and non-biological renewable fuel **production**.
- Increase **robustness of conversion** and **process sustainability** for algal and non-biological renewable fuels.
- Contribute to the priorities of the **SET Plan Action 8**.
- Deliver technology for **longer-term needs** for renewable fuels in **energy and transport**.

HORIZON-CL5-2022-D3-03-07

Development of algal and renewable fuels of non-biological origin



Specific Conditions

- Type of action: **Research and Innovation Actions**
- Technology Readiness Level: **Expected TRL 4-5 by end of project**
- Eligibility conditions (Annex B exception): **must use of Copernicus and/or Galileo/EGNOS** (other data and services may additionally be used)
- Procedure (Annex B exception): **At least one algal fuel project**, the highest scored from the above threshold proposals will be funded, provided that it passes all thresholds



EU contribution:

- Total indicative budget for the topic: **€ 15.00 million**
- Expected EU contribution per project: **€ 5.00 million**
- Expected number of funded projects: **3**



Deadline:

Opening: 06 September 2022

Deadline: 10 January 2023

HORIZON-CL5-2022-D3-03-08

Development of digital solutions for existing hydropower operation and maintenance



Scope

Development of novel sensor technologies and digital solutions for digitization of existing hydropower plants and improving their **sustainable operation** by addressing one or more of the following: **weather and flow forecast, biodiversity monitoring, predictive modelling and artificial intelligence for the analysis of sensor data for decision-making in operation and maintenance**. Acknowledging eventual confidentiality of operational data, to ensure wide uptake and reliability, actions should promote the highest standards of **transparency and openness** of the digital solutions, extending to aspects such as assumptions, architecture, code and data.

HORIZON-CL5-2022-D3-03-08

Development of digital solutions for existing hydropower operation and maintenance



Expected outcome

Project results are expected to contribute to some of the following expected outcomes:

- Advance the **European scientific basis**, technology base, technology leadership in the area of hydropower in the context of digital transition and energy markets while creating evidence for policy making;
- Increase the **technology competitiveness** of the existing hydropower fleet in changing European power markets by increasing hydropower flexibility and decision-making in modern power markets;
- **Facilitate market penetration** of renewables and getting closer to the European Green Deal and climate and energy targets for 2030 by increasing the flexibility, sustainability and predictability of existing hydropower;
- Improve environmental and socio-economic **sustainability** of the existing hydropower fleet.

HORIZON-CL5-2022-D3-03-08

Development of digital solutions for existing hydropower operation and maintenance



Type of action: Research and Innovation Actions

Activities are expected to achieve TRL 5 by the end of the project



EU contribution: between EUR 3.00 and 4.50 million (total: EUR 9.00 million)



Deadline:

Opening: 06 September 2022

Deadline: 10 January 2023



Thank you!

HorizonEU

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