



HORIZON EUROPE

THE EU RESEARCH & INNOVATION PROGRAMME

2021 – 2027

Horizon Europe Cluster 5 Info Day
3 February 2022



EUROPEAN UNION

CLUSTER 5 Climate, Energy & Mobility

INFO DAY 2022 - 3 February 2022

WELCOME

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THE EU RESEARCH & INNOVATION PROGRAMME 2021 - 2027

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2. Go to *Slido.com* and enter

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CLUSTER 5 Climate, Energy, Mobility



Virtual INFO DAY 2022 – 3 February 2022

Destination 5

Impact of transport on environment and human health

Waterborne Transport



14:00 – 15:15

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IMPROVED UNDERSTANDING OF GREENHOUSE GAS
FLUXES AND RADIATIVE FORCERS, INCLUDING
CARBON DIOXIDE REMOVAL TECHNOLOGIES

HORIZON-CL5-2022-D5-01-07

Georgios Tzamalís

Policy Officer /DG MOVE

2021 – 2027

HORIZON-CL5-2022-D5-01-07

Prevent smog episodes in Europe: Air quality impact of engine-emitted volatile, semi volatile and secondary particles



Scope

Emissions from engines and combustion processes could lead to the formation via atmospheric aerosol chemistry of health impact compounds, the specific impact thereof is less understood. Proposals are expected to:

- Assess in detail engines emissions in Real Driving Emissions (RDE)-compliant testing conditions (based on currently used fuels) leading to volatile and semi-volatile and secondary particulate
- Assess the health impact of volatile and semi-volatile and secondary particulate with relevant modelling and in vitro and in vivo testing
- Define a robust and transparent measurement and modelling system in order to determine an equivalent total particles emissions index for each engine encompassing all these emissions in order to complement the direct solid particles emissions count currently in use and to better quantify the total externalities of combustion engines in all transport fields and related fuels

HORIZON-CL5-2022-D5-01-07

Improved understanding of greenhouse gas fluxes and radiative forcers, including carbon dioxide removal technologies



Expected outcomes

- Achieve better understanding of (semi)volatile particles and secondary aerosol formation as well as their effects on health, air quality (in particular during winter season) and climate
- Assess the contribution to PM2.5 of precursors present in exhaust from transport (i.e. volatile organic compounds, NO_x, unburned hydrocarbons, nano-particles below 23nm, ammonia, etc.) through the formation of secondary aerosol (organic –SOA- and inorganic)
- Find ways in which scientific evidences of the role of emissions in atmospheric processes could be an input to develop policies and mitigate SOA formation in urban areas of EU
- Improved quantification of transport externalities.
- Support of future emissions legislation and of “polluter pays” legislation

HORIZON-CL5-2022-D5-01-07

Improved understanding of greenhouse gas fluxes and radiative forcers, including carbon dioxide removal technologies



Type of action: Research and Innovation Action



EU contribution 7m Euro (2.5-3m per project)



Deadline: 26 April 2022

Waterborne Transport 2022 Call

- Indicative total EU Contribution : 96 M EUR for 6 topics
- Call opening: 2 December 2021
- Deadline: 26 April 2022 17:00
- Reference Document: Horizon Europe Work Programme 2021-2022, Climate, Energy and Mobility
- Warning: presentation is for guidance only, without commitment.

Questions ? Horizon Europe Research Enquiry Service

[Research Enquiry Service | European Commission \(europa.eu\)](https://ec.europa.eu/research-enquiry-service/)



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EXPLOITING ELECTRICAL ENERGY STORAGE SYSTEMS AND BETTER OPTIMISING LARGE BATTERY ELECTRIC POWER WITHIN FULLY BATTERY ELECTRIC AND HYBRID SHIPS (ZEWTP PARTNERSHIP)

HORIZON-CL5-2022-D5-01-01

Agnieszka Zaplatka

Policy Officer, RTD.C3



2021 – 2027

HORIZON-CL5-2022-D5-01-01

Exploiting electrical energy storage systems and better optimising large battery electric power within fully battery electric and hybrid ships (ZEWT)



Scope

- **solutions for on-board integration and control of batteries: optimal operation, long lifetime and low weight.** Electrical systems - not the batteries themselves
- address one of the two cases:
 - **hybrid arrangement for zero local pollution,**
or
 - **full electric arrangement** with plug-in charging.
- **strategies for safe energy management systems**
- **different optimisation strategies** for the large batteries on board
- prove the applicability to **several ship types and operational profiles- ie not niche**
- consider **technology transfer** and long term **skills'** development needs

HORIZON-CL5-2022-D5-01-01

Exploiting electrical energy storage systems and better optimising large battery electric power within fully battery electric and hybrid ships (ZEWT)



Expected outcome

- Development and validation of **electrical architectures** for on board large battery systems
- Proof of the **safe integration** of battery systems into the ship's electrical grid for a relevant number of ship types and operational scenarios
- Verification of the architecture and the **power management system** for two cases: **hybrid and fully electric**. *Note, outcome is at topic call level, depending on the case addressed, each project would usually address one these case*
- Documentation of **skill** requirements for crew

HORIZON-CL5-2022-D5-01-01

Exploiting electrical energy storage systems and better optimising large battery electric power within fully battery electric and hybrid ships (ZEWT)



Type of action: Innovation Action (TRL 7)



EU contribution: EUR 16 M (2 projects)



Deadline: 26 April 2022 17:00 Brussels time



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INNOVATIVE ENERGY STORAGE SYSTEMS ON-BOARD VESSELS (ZEWTPARTNERSHIP)

HORIZON-CL5-2022-D5-01-02

Agnieszka Zaplatka

Policy Officer, RTD. C3

2021 – 2027

HORIZON-CL5-2022-D5-01-02

Innovative energy storage systems on-board vessels (ZEWT)



Scope

- **Innovative energy storage systems other than batteries** (e.g. super-/ultra-capacitors, superconductivity magnetic energy storage, flywheels, flow batteries, etc.) for waterborne applications
- **NOT the internal design** of the energy storage technology itself, e.g. the internal design of a super capacitors would be excluded
- **low TRL solutions** for waterborne transport- preliminary **integration, potential combination** with other disruptive technologies
- **integration on-board** of innovative energy storage systems (excluding storage of fuels and conventional batteries)
- **cost competitiveness** of the innovative solutions when compared with batteries
- **risk levels? safety measures? regulatory aspects? skills** needed?

HORIZON-CL5-2022-D5-01-02

Innovative energy storage systems on-board vessels (ZEWT)



Expected outcomes

- comprehensive understanding of **potential of innovative non battery energy storage** and their applicability to waterborne transport
- **improve energy efficiency** and make waterborne transport **climate neutral** founded upon innovative energy storage
- **assessment of the technical feasibility** of innovative energy storage for a range of waterborne operations including efficiency, safety, cost competitiveness compared to batteries, skills requirements, and regulatory aspects

HORIZON-CL5-2022-D5-01-02

Innovative energy storage systems on-board vessels (ZEWT)



Type of action: Research and Innovation Action, TRL 5



EU contribution: EUR 15 mln (3 projects)



Deadline: 26 April 2022 17:00:00 Brussels time



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**EXPLOITING RENEWABLE ENERGY FOR SHIPPING,
IN PARTICULAR FOCUSING ON THE POTENTIAL OF
WIND ENERGY (ZEWTP PARTNERSHIP)**

HORIZON-CL5-2022-D5-01-03

Agnieszka Zaplatka

Policy Officer, RTD.C3



2021 – 2027

HORIZON-CL5-2022-D5-01-03

Exploiting renewable energy for shipping, in particular focusing on the potential of wind energy (ZEWT)



Scope

- Explore **wind energy** potential, significantly enlarging the current scale for a **wider range of applications**, demonstrating **cost-effective, safe, reliable and easy-to-handle** technologies in a variety of conditions
- **energy efficiency** strategies and architectures for the power management in **large ships**
- both **retrofitting** existing ships and **new purpose built** designs, incl. regulatory issues
- **Large scale testing** and preferably demonstration
- **Main focus on wind**, but other renewables such as solar electric systems should be considered for different ship types, to the extent they can significantly contribute to the ship's overall power systems

HORIZON-CL5-2022-D5-01-03

Exploiting renewable energy for shipping, in particular focusing on the potential of wind energy (ZEWT)



Expected outcomes

- Through full scale demonstration **prove the viability at large scale of power generation** and propulsion assistance systems on-board harvesting renewable energies such as wind and solar
- System designs to **reduce the costs** of and **increase confidence** in refitting of the most appropriate existing vessels addressing several types of ships and different forms of renewable energy
- System designs including power management architectures and energy efficiency solutions for purpose built new ships including designs that are “**wind-ready**”. Demonstration of efficiency gains of >15% power generation or >25% propulsion
- address pertinent **regulatory** issues
- Documentation of **skills** requirements and incentives for the crew for different types of ships

HORIZON-CL5-2022-D5-01-03

Exploiting renewable energy for shipping, in particular focusing on the potential of wind energy (ZEWT)



Type of action: Research and Innovation Action, TRL5



EU contribution: EUR 18 mln (2 projects)



Deadline: 26 April 2022 17:00:00 Brussels time



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TRANSFORMATION OF THE EXISTING FLEET TOWARDS GREENER OPERATIONS THROUGH RETROFITTING (ZEWTP PARTNERSHIP)

HORIZON-CL5-2022-D5-01-04

Agnieszka Zaplatka

Policy Officer, RTD.C3

2021 – 2027

HORIZON-CL5-2022-D5-01-04

Transformation of the existing fleet towards greener operations through retrofitting (ZEWT)



Scope

For **inland or marine shipping** address **one or more** of the following **innovative retrofit solutions**:

- **significantly reduce air or water pollution** without increasing fuel consumption and hence GHG emissions,
- **significantly reduce GHG emissions** through partial or full electrification, clearly progressing beyond the state of the art,
- **hydrodynamic improvements** to significantly improve energy efficiency and reduce GHG emissions by reducing fuel consumption.

Focus on **design for technically and economically efficient retrofitting**.

New business models and implementation strategies based on a catalogue of solutions including smart maintenance.

No secondary emissions to air or water and no significant increase fuel consumption.

HORIZON-CL5-2022-D5-01-04

Transformation of the existing fleet towards greener operations through retrofitting (ZEWT)



Expected outcome

- **Demonstrated retrofitting solutions for sea-going and inland navigation vessels in operation.**
- Retrofit solutions to **reduce GHG emissions** that are **developed and ready to deploy**. Target cut GHG emissions by at least 35% compared to original design.
- Retrofit solutions involving **climate neutral fuels** making vessels GHG emission free. These solutions are expected to have a **significant R&I content** going beyond a simple exchange of fuels through minor technical adaptations.
- Establishment of an **up-to-date catalogue of suitable solutions** for a wide variety of ship types and operation scenarios

HORIZON-CL5-2022-D5-01-04

Transformation of the existing fleet towards greener operations through retrofitting (ZEWT)



Type of action: Innovation Action (TRL 7-8)



EU contribution: EUR 25 mln (5 projects)



Deadline: 26 April 2022 17:00:00 Brussels time



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SEAMLESS SAFE LOGISTICS THROUGH AN AUTONOMOUS WATERBORNE FREIGHT FEEDER LOOP SERVICE

HORIZON-CL5-2022-D5-01-05

Agnieszka Zaplatka

Policy Officer, RTD.C3

2021 – 2027

HORIZON-CL5-2022-D5-01-05

Seamless safe logistics through an autonomous waterborne freight feeder loop service



Scope

- **Develop an autonomous waterborne freight feeder loop service for inland or maritime transport**
- **Preference for zero GHG and zero polluting emissions-** supporting safer navigation
- Address **safety, regulatory and legal rules** needed for such a service
- Key aspects are real time data acquisition, management, storage and exchange, and the supporting digital infrastructure(s), standards and connectivity, also **addressing the potential use of Galileo GNSS services.**
- Address **requirements for telemetry, its architecture, infrastructure monitoring and security** needed for controlling the system's water-side and shore-side assets

HORIZON-CL5-2022-D5-01-05

Seamless safe logistics through an autonomous waterborne freight feeder loop service



Expected outcome

Preferably demonstrate the solution at **full scale** with all technology building blocks **in a real world scenario**.

If full scale demonstration is unfeasible, solutions and key technology building blocks may be validated by means of testing within relevant environments, noting the lower project budget foreseen in this case.

HORIZON-CL5-2022-D5-01-05

Seamless safe logistics through an autonomous waterborne freight feeder loop service



Type of action: Research and Innovation Action, TRL 5



EU contribution: EUR 15 mln (1 project)



Deadline: 26 April 2022 17:00:00 Brussels time



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COMPUTATIONAL TOOLS FOR SHIPBUILDING

HORIZON-CL5-2022-D5-01-06

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2021 – 2027

HORIZON-CL5-2022-D5-01-06

Computational tools for shipbuilding



Scope

- **Develop advanced innovative computational tools for shipbuilding**
- **New concepts** for a reliable and cost efficient roll-out of advanced platforms and tools are expected to be **developed and demonstrated**
- **Benefit the wider European shipbuilding sector** and **address the necessary skills development** to enable full exploitation of the advanced computation tools

HORIZON-CL5-2022-D5-01-06

Computational tools for shipbuilding



Expected outcome

- Achieve a **competitive advantage for European shipbuilders** within global markets, particularly for complex high added value vessels.
- **Rapid early ship design**, underpinning functional design concept and production cost estimates.
- **Virtual prototyping to increase the reliability** of early stage capital **cost estimations**.
- Provide **benefits towards** the competitiveness of the **wider European shipbuilding sector, beyond single shipyards**.
- Computational shipbuilding tools **resilient to cyber** threats.
- A **European workforce that is highly skilled in use of computational tools**.

HORIZON-CL5-2022-D5-01-06

Computational tools for shipbuilding



Type of action: Innovation Action, TRL 7-8



EU contribution EUR 7mln (1 project)



Deadline: 26 April 2022 17:00:00 Brussels time



Thank you!

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<http://ec.europa.eu/horizon-europe>



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