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ELECTRIFICATION OF SHIPPING: EUROPEAN ON-BOARD ENERGY STORAGE PROJECTS CONVENE IN BRUSSELS

Brussels hosted the Horizon Europe clustering event on advanced energy storage systems for zero-emission waterborne transport. The four projects together represent an EU investment of over €20 million in innovative technology development, bringing together more than 50 research and industrial partners across 10 European countries, alongside CERN and the United Kingdom. Thirty industrial stakeholders — shipyards, shipowners and technology suppliers, including SMEs — are driving the projects forward from the inside, turning research into real-world solutions. The next step is clear: continued effort to bring these innovations to industrial-ready TRL levels.

Brussels, 29 May 2026 – Representatives of the companies involved in four flagship EU-funded projects under the HORIZON Europe programme on innovative on-board energy storage systems met today to help drive the electrification of shipping.

The projects — V-ACCESS, AENEAS, NEMOSHIP and POSEIDON — span a range of technological fields, including MgB_2 superconducting SMES, supercapacitors, solid-state batteries, hybrid systems, large modular battery systems and flywheels, and have delivered major innovations that are now approaching industrialisation.

According to **Giorgio Sulligoi**, Professor of Electrical Power Systems and Director of the Department of Engineering and Architecture at the University of Trieste, organiser and spokesperson for the Cluster event, and coordinator of V-ACCESS: "*This event marks an important milestone, allowing us to look back on a significant journey of innovation and technological development involving leading European companies in the shipping and technology sectors. At the same time, it also marks a new beginning: these innovations must now continue to mature until they reach a technology readiness level close to industrial deployment;* Concrete institutional support is therefore essential — both in terms of resources and a favourable regulatory framework. We will act immediately to bring this need to the attention of the relevant authorities. *In this context, the role of universities and cooperation with industry and local ecosystems across different countries remain essential, both to strengthen the expertise developed in different territories and industrial clusters and to achieve the ultimate goal of making maritime transport greener, through marine systems electrification*"

A cornerstone of the global economy and of international market connectivity, the maritime sector now sits at the heart of the energy transition. Shipping routes remain the backbone of world trade: according to the latest UNCTAD data (2024–2025), more than 80% of globally

traded goods are transported by sea. At the same time, UNCTAD reports that trade linked to the ocean economy reached USD 2.2 trillion in 2023, underlining the sector's growing contribution to global growth. [statista.com] [oecd.org]

Against this backdrop, the climate challenge is becoming ever more pressing: according to the International Maritime Organization, maritime transport accounts for approximately 1,056 million tonnes of CO_2, or around 2.9% of global emissions. This places shipping among the priority sectors for action if global decarbonisation targets are to be met. [maritime-hub.com]

In this context, the European Union is accelerating innovation by supporting advanced research projects under the Horizon Europe programme, with the backing of the ZEWT (Zero Emission Waterborne Transport) partnership.

Jaap Gebraad, Secretary General of the Waterborne Technology Platform, said: "*Cooperation across the European waterborne sector creates significant value in developing and deploying zero-emissions solutions. This initiative provides an important forum for strategic discussion among projects which, while pursuing different technological approaches, share a common objective: enabling the electrification of shipping through advanced, efficient and safe energy storage systems. For this reason, a continued joint and coordinated approach is critical to ensure the transition to a competitive, resilient and sustainable waterborne sector pooling public and private resources.*"

FURTHER INFORMATION ON THE PROJECTS

At the core of these activities is the development of new energy storage solutions capable of overcoming the limitations of conventional technologies and meeting the specific requirements of the maritime sector:

- high variability in load demand
- power peaks
- stringent safety requirements
- the need for reliability and economic competitiveness

The technologies being developed range from advanced hybrid systems — integrating batteries, supercapacitors and innovative solutions such as superconducting magnetic energy storage — to new on-board electrical architectures based on DC microgrids.

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Taken together, the projects contribute to:

- enabling new on-board energy architectures
- improving dynamic energy management
- reducing fossil fuel consumption
- accelerating the transition to hybrid and fully electric vessels

The four projects span a broad spectrum of technological innovation.

V-ACCESS is developing hybrid storage systems that combine **supercapacitors and MgB_2 superconducting SMES**, integrated into DC microgrids to support batteries and manage transients and power peaks.

AENEAS is advancing three key technologies — **solid-state batteries, supercapacitors and hybrid systems** — designed to adapt to different operating profiles in maritime and inland waterway transport.

NEMOSHIP focuses on **large modular battery systems** and an advanced digital platform to optimise energy use while improving safety and efficiency.

POSEIDON is developing, integrating and testing fast-response solutions — **supercapacitors, flywheels and SMES** — that address performance, safety, economic sustainability and environmental impact in an integrated way.

The results point to significant progress towards industrial application.

In the case of **V-ACCESS**:

- **7 vessel types** identified and **3 complete use cases** developed
- systems validated with efficiencies **above 90–95%**
- operational emissions reduced by up to **36%** in the most energy-intensive profiles
- **TRL 5** achieved for supercapacitor-based solutions

In the case of **POSEIDON:**

- The project has moved from technology development to the **integration phase**, bringing together the fast-response storage systems designed, built and validated in laboratory conditions into a single containerised demonstrator.

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- Container integration includes the required safety and auxiliary systems to enable compliant onboard operation.
- The integrated solution will be demonstrated onboard the Cap de Barbaria ferry (Baleària), with sea trials planned for November 2026.
- Design and performance have also been validated against an inland waterway Waterbus reference use case (Damen), supporting transferability beyond the ferry segment and different mechatronic models.

In parallel:

- **AENEAS** has developed models and prototypes for different use cases at TRL 5
- **NEMOSHIP** is progressing towards large-scale validation with modular architectures
- **POSEIDON** is moreover consolidating innovative systems and assessment tools such as LCOS and LCA.

For more information about the projects

www.v-access.eu

www.project-aeneas.eu

www.nemoship.eu

www.poseidon-europeanproject.eu

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