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# **AENEAS**

## **innovActive ENERgy storage systems onboArd vessels**

### **Deliverable D 6.2**

LCIA, LCC, TCO, safety assessment



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## Public Summary

AENEAS Deliverable D6.2 aims to assess three use-case vessels implementing the Energy Storage System (ESS) solutions proposed by AENEAS, from an environmental, economic, and safety point of view. In order to achieve that, a complete environmental, cost and safety assessment is conducted for each use case (A, B and C), comparing a baseline vessel with an optimised one equipped with AENEAS ESS solutions.

Firstly, a Life Cycle Assessment (LCA) is completed to determine the potential environmental benefit of the optimised vessel compared to the baseline one for each use-case. Several greenhouse gas and pollutant emissions are calculated for the proposed ESS from a Cradle-to-Gate (CtG) and End-of-Life (EoL) perspective, while the impacts of the vessel's in-use operation are examined at a vessel level. The environmental analysis is concluded with the Life Cycle Impact Assessment (LCIA), which assesses six different impact categories (including climate change and human toxicity) and shows the environmental impacts or benefits of each use-case. An additional investigation of different use-stage scenarios is done to further determine the impact of vessels' hybridisation on their environmental performance.

The second part of this deliverable comprises a cost assessment, including a Life Cycle Cost (LCC) analysis of the proposed ESS solutions and a Total Cost of Ownership (TCO) analysis of the use-case vessels employing them. The LCC covers all main cost elements from manufacturing, or purchasing, to EoL, and aims to identify and compare the cost performance of AENEAS ESS technologies against current state-of-the-art battery technologies. The TCO of the three use-case vessels is estimated over their operational lifetime, focusing on the cost aspects of owning and operating the vessels throughout their useful life, while also considering the costs associated with the integration of the examined ESS solutions. These two analyses will evaluate the economic viability of the ESS solutions within the maritime applications considered.

Finally, a safety assessment is conducted in order to confirm that the proposed AENEAS ESS solutions can safely be implemented in maritime applications.

In total, this deliverable provides environmental, economic and safety analyses to assess the ESS solutions proposed by AENEAS. The three use-cases examined are evaluated and compared to determine the most environmentally beneficial, cost-effective and safe solution for future electrified vessels.