



Delivering an adaptable, renewable and environmentally-friendly solution for marine transportation



Renewable methanol production for the shipping industry

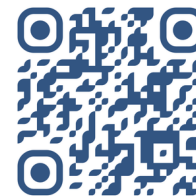
What we do

M²ARE is an ambitious project that aims to decrease the use of fossil fuels in the maritime sector using renewable sources to produce "Maritime Methanol".

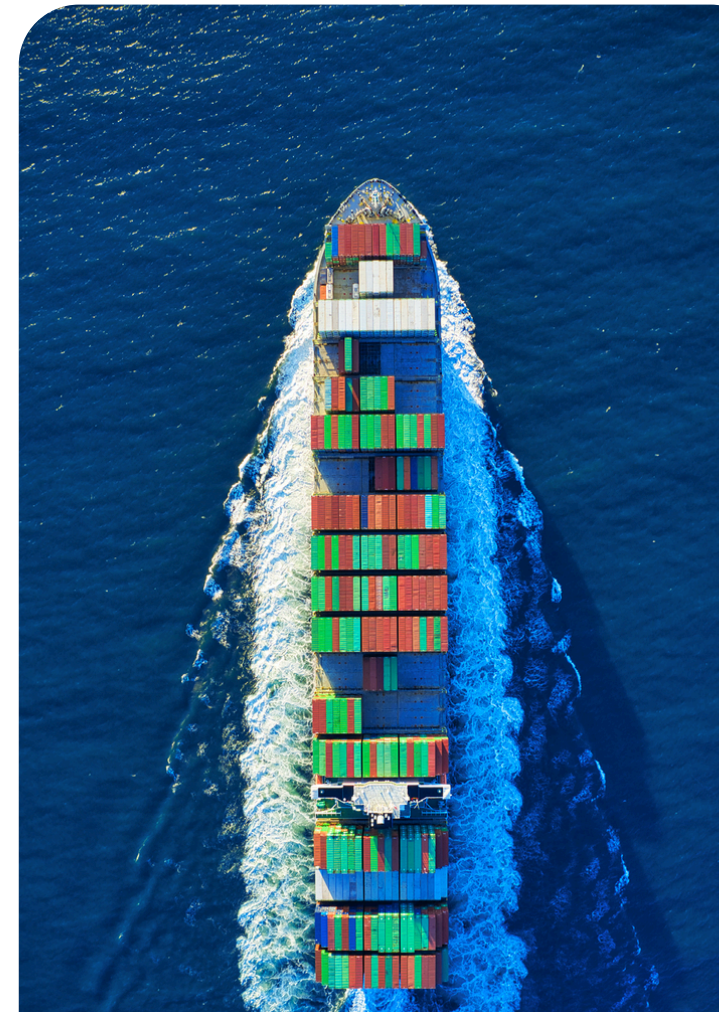
Maritime Methanol is a low-cost, renewable fuel coming from biogenic CO₂ and renewable H₂, representing a sustainable alternative to advance the decarbonization of the maritime sector. We can refer to different sources of bio-CO₂, for example biogas, bioethanol, biomass combustion, and others.

Contacts

-  M²ARE Project
-  M²ARE Project
-  M²ARE.eu
-  info@M²ARE.eu



Partners



Concept overview



Mapping bio-CO₂ feedstocks for its conversion into maritime methanol



Demonstrating a 1st generation of maritime methanol synthesis from CO₂ feedstocks



Development of a new reactor (GEN2) for methanol synthesis



Methanol purification: developing a fuel with improved product properties



Engine test: validation of the new maritime methanol in marine engines



Deployment roadmap and scale-up for the production of maritime methanol

Reaching the goal

The project aims at developing an improved, next generation methanol synthesis process ("GEN2") to produce a sustainable fuel with a CO₂ emission reduction by more than 80% compared to conventional maritime fuels on a well-to-wake basis.



The M²ARE project is successfully scaling renewable maritime methanol by mapping and characterizing European biogenic CO₂ streams.

Key challenges



Selecting the right bio-CO₂ sources is vital, as impurities affect capture costs and catalyst life. While biogas and bioethanol offer high purity, their dispersion and low volumes pose logistical hurdles. M²ARE aims at integrating these sources with renewable H₂ to create a technical roadmap for maritime decarbonization.

Key findings identify pulp and paper and biomass combustion as the most promising sectors due to their high total emissions, despite varying CO₂ concentrations and seasonality.



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