

PROJECT

HyMethShip

Hydrogen-Methanol Ship propulsion system using on-board pre-combustion carbon capture

Funding: European (Horizon 2020)

Duration: Jul 2018 - Jun 2021

Status: Complete

Total project cost: €9,288,310

EU contribution: €8,438,110



[CORDIS RCN : 217591](#)

Objectives:

The HyMethShip project reduces drastically emissions and improves the efficiency of waterborne transport at the same time. This system will be developed, validated, and demonstrated on shore with a typical engine for marine applications in the range of 2 MW (TRL 6).

The HyMethShip system will achieve a reduction in CO₂ of more than 97% and will practically eliminate SO_x and PM emissions. NO_x emissions will be reduced by more than 80%, significantly below the IMO Tier III limit. The energy efficiency of the HyMethShip system is more than 45% better than the best available technology approach (renewable methanol as fuel coupled with conventional post-combustion carbon capturing).

The HyMethShip system innovatively combines a membrane reactor, a CO₂ capture system, a storage system for CO₂ and methanol as well as a hydrogen-fueled combustion engine into one system. The proposed solution reforms methanol to hydrogen, which is then burned in a conventional reciprocating engine that has been upgraded to burn multiple fuel types and specially optimized for hydrogen use.

Methodology:

The HyMethShip project will undertake risk and safety assessments to ensure that the system fulfills safety requirements for on-board use. It will also take into account the rules and regulations under development for low flashpoint fuels.

The cost effectiveness of the system will be assessed for different ship types and operational cases. For medium and long-distance waterborne transport, the HyMethShip concept is considered the best approach available that achieves this level of CO₂ reduction and is economically feasible.

The HyMethShip consortium includes a globally operating shipping company, a major shipyard, a ship classification society, research institutes and universities, and equipment manufacturers. Further stakeholders will be represented in the External Expert Advisory Board and will be addressed by dissemination activities respectively.

Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Other programmes: MG-2.1-2017 Innovations for energy efficiency and emission control in waterborne transport

Lead Organisation:

Lec Gmbh

Address:

INFFELDGASSE 19
8010 GRAZ
Austria

EU Contribution: €2,821,250

Partner Organisations:**Muw Screentec Filter- Und Prazision Stechnik Aus Metall Gmbh****Address:**

GRAUE RIETHE 2
29378 HILDESHEIM
Germany

EU Contribution: €446,030

Technische Universitaet Graz**Address:**

Rechbauerstrasse
8010 Graz
Austria

Organisation Website:

<http://www.tugraz.at>

EU Contribution: €2,010,000

Hoerbiger Ventilwerke Gmbh & Co Kg**Address:**

SEESTADTSTRASSE 25
1220 WIEN
Austria

EU Contribution: €367,500

Exmar Marine**Address:**

DE GERLACHEKAAI 20
2000 ANTWERPEN
Belgium

Organisation Website:

<http://www.exmar.be/>

EU Contribution: €133,000

Fraunhofer Gesellschaft Zur Foerderung Der Angewandten Forschung E.v.**Address:**

HANSASTRASSE 27C
80686 MUNCHEN
Germany

Organisation Website:

<http://www.fraunhofer.de>

EU Contribution: €1,017,910

Ge Jenbacher Gmbh & Co Og**Address:**

ACHENSEESTRASSE 1-3
6200 JENBACH
Austria

EU Contribution: €299,440**Colibri Bv****Address:**

TENTSTRAAT 5 A
6291 BC VAALS
Netherlands

EU Contribution: €142,625**Meyer Werft - Jos. L. Meyer Gmbh****Address:**

Postfach 1555
1555 PAPENBURG
Germany

Organisation Website:

<http://www.meyerwerft.com>

EU Contribution: €116,460**Sspa Maritime Consulting Ab****Address:**

Chalmers TvSrgata 10
400 22 GOETEBORG
Sweden

Organisation Website:

<http://www.sspa.se>

EU Contribution: €277,500**Mair Christian****Address:**

TIERGARTENSTRASSE 27
6020 INNSBRUCK
Austria

EU Contribution: €334,335**Lloyd' S Register****Address:**

71 Fenchurch Street
LONDON
EC3M 4BS
United Kingdom

Organisation Website:

<http://www.lr.org>

EU Contribution: €144,375

Chalmers Tekniska Hoegskola Ab**Address:**

-
41296 GOTHENBURG
Sweden

Organisation Website:

<http://www.chalmers.se>

EU Contribution: €327,685

Technologies:

Electric vehicle batteries (and energy management)
Low energy and near-zero emissions ship

STRIA Roadmaps: Low-emission alternative energy for transport
Water transport (sea &

Transport mode: inland)

Transport sectors: Passenger transport, Freight transport

Transport policies: Environmental/Emissions aspects, Decarbonisation

Geo-spatial type: Other