

AGENDA

Nordic Maritime Transport and Energy Research Programme

Ammonia and Hydrogen for Ships

WORKSHOP

20-21 April 2022

World Maritime University
Fiskehamnsgatan 1, 211 18 Malmö, Sweden

○ THE WORKSHOP

As part of the Nordic Maritime Transport and Energy Research Programme, the three research projects AEGIR, CAHEMA and HOPE will be conducting a two-day workshop at the World Maritime university in Malmö, to discuss their ongoing work on ammonia and hydrogen as maritime fuels.

○ Getting there

World Maritime University is located in Malmö, Sweden. You can take a train from the railway station at Copenhagen Airport (CPH) to Malmö Central. Travel time is 25 minutes (<https://www.oresundstag.se/en/>).

○ Accommodation

See attached document for special rates at nearby hotels.

○ Registration

To register for the event please contact Svend Søyland, Senior Adviser, Nordic Energy Research: Email: svend.soyland@nordicenergy.org Phone: +47 474 87 930.

DAY 1 | 20 April 2022, 11:00 – 17:00

11:00 – 12:00	Registration
12:00 – 13:30	Welcome and overview of workshop objectives and structure Welcome by WMU President Dr. CLEOPATRA DOUMBIA-HENRY Group photo <ul style="list-style-type: none">• Introduction to NER and the Nordic Research Programme on Sustainable Maritime Fuels and Efficiency: Svend Søyland, NER• Keynote: Mr. Sveinung Oftedal, Specialist Director, Norwegian Ministry of Climate and Environment
13:30 – 14:00	Coffee break
14:00 – 15:30	Session A – Ammonia and hydrogen as fuels
	<ul style="list-style-type: none">• Ammonia and hydrogen in four-stroke engines: Jari Hyvönen, Wärtsilä (CAHEMA)• Prof. Xue-Song Bai, Lund University: Concepts of ammonia/hydrogen engines for marine application – CFD modelling (CAHEMA)• Dag Stenersen, SINTEF: Hydrogen as fuel on ROPAX vessels with high power demand - technology options, (HOPE)
15:30 – 17:00	<ul style="list-style-type: none">• Anke Hagen: Use of ammonia as fuel in fuel cells in maritime frameworks (AEGIR)<ul style="list-style-type: none">• Speaker 5: Topic 5 (AEGIR)• Dr. Kevin Koosup Yum, SINTEF: The system model for testing and validating maritime fuel cell application (HOPE)
17.00	Closing remarks

Dinner

DAY 2 | 21 April 2022, 09:00 – 12:30

8:30 – 09:00	Registration
9:00 – 10:30	Session B – Ammonia and hydrogen as fuels
	<ul style="list-style-type: none">• Riccardo Caldogno & Anke Hagen: Electrochemical behavior of single solid oxide fuel cells with ammonia as fuel (AEGIR)• Dr. Ossi Kaario: Experimental study of ammonia spray injection and combustion (CAHEMA)• Dr. Julia Hansson, IVL Svenska Miljöinstitutet: On the overall possibility for using hydrogen in Nordic shipping (HOPE)
10:30 – 10:45	Coffee break
10:45 – 12:15	Session C – Ammonia and hydrogen as fuels
	<ul style="list-style-type: none">• Speaker 10: Topic 7 (AEGIR)• Dr. Tuan Dong, WMU: Life-Cycle impacts of ammonia and hydrogen as maritime fuels (CAHEMA)• Dr. Mauricio Andres Latapi Agudelo, University of Iceland: Drivers and barriers for the adoption of hydrogen/fuel cells for the Nordic shipping industry (HOPE)
12:15 – 13:15	Lunch

NMTEP – Steering Board meeting (by invitation)

13:15 – 15:15	Discussion on possible second Call
	Agenda tbd.

About the projects:

● AEGIR

“AEGIR proposes a unique fuel cell and membrane-based system for efficient conversion of green ammonia to electrical energy. In this concept, ammonia is (i) cracked to H₂ and N₂ using a solid oxide fuel cell; (ii) H₂ is extracted and purified using a proton conducting electrochemical membrane; and (iii) converted to electricity using a polymer exchange membrane fuel cell. By combining these three technologies, AEGIR aims at developing an ammonia-fueled ship propulsion system that offers high efficiency in combination with a low total system volume and weight, which is the key innovation of the project. Furthermore, the concept avoids emissions of NO_x and allows for a drastic reduction of CO₂ emissions; the product of the fuel cell electricity process is water.”

Project description.

● CAHEMA

This project investigates innovative injection and combustion strategies using ammonia and hydrogen in combination, to achieve Reactivity Controlled Compression Ignition (RCCI) and Direct-injection dual fuel stratification (DDFS) with these fuels. The project combines advanced computational models and experimental techniques to develop these engine concepts, and assess the potential environmental, economic and regulatory impacts.

● HOPE

The project HOPE (Hydrogen fuel cells solutions in shipping in relation to other low carbon options – a Nordic perspective) includes developing and evaluating a concept design for a vessel for short sea shipping that uses hydrogen as fuel and fuel cells for propulsion. Technical aspects are included, as well as barriers and drivers for the realization of such vessels in the Nordic region and the impact on greenhouse gas emissions and air pollution.

Accommodation list with discounts:

Hotels (click on name to access website)	Address	How to book
Elite Hotel Esplanade	Master Johansgatan 15, 211 21 Malmö Tel: +46 40 424 85 00 reservation.malmo@elite.se	Login to website and book directly using the following booking codes 4410543 to get 13% discounted rate Credit card guarantee required
Elite Hotel Savoy	Norra Vallgatan 62, 201 80 Malmö Tel: +46 40 664 48 00 reservation.malmo@elite.se	
Elite Hotel Residens	Adelgatan 7, 201 80 Malmö Tel: +46 40 664 48 90 reservation.malmo@elite.se	
Elite Plaza Hotel	Gustav Adolfs torg 49, 201 80 Malmö Tel: +46 40 664 48 70 reservation.malmo@elite.se	
Clarion Hotel Malmö Live	Dag Hammarskjölds torg 2, 211 18 Malmö Tel: +46 40 207 500 book@clarionlive.se	Booking code CH03310374 to get 12% discounted rate Credit card guarantee required Can also book online https://www.nordicchoicehotels.se/
Comfort Hotel	Carlsgatan 10, 211 10 Malmö	

<p>Clarion Collection Temperance</p> <p>Quality Hotel The Mill</p>	<p>Tel: +46 40 33 04 40</p> <p>co.malmo@choice.se</p> <p>Engelbrektsgatan 16, 211 33 Malmö</p> <p>Tel: +46 040-710 20</p> <p>cc.temperance@choice.se</p> <p>Amiralsgatan 19, 211 55 Malmö</p> <p>Tel: +46 406 646 000</p> <p>q.themill@choice.se</p>	
<p>MJ's</p>	<p>Mäster Johansgatan 13 21121 Malmö</p> <p>Tel: +46 406 646 400</p> <p>reception@mjs.life</p>	<p>Click on this link and select MJ's to make booking.</p> <p>To get 20% discount on room, click on 'I have a code' and key in ESSAVTAL20 and click on "Verify code"</p> <p>or call hotel directly.</p> <p>Credit card guarantee required</p>