

SPIRETH

Alcohol (Spirit) and Ether as Marine fuel

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Project Partners:



Funding Agencies:

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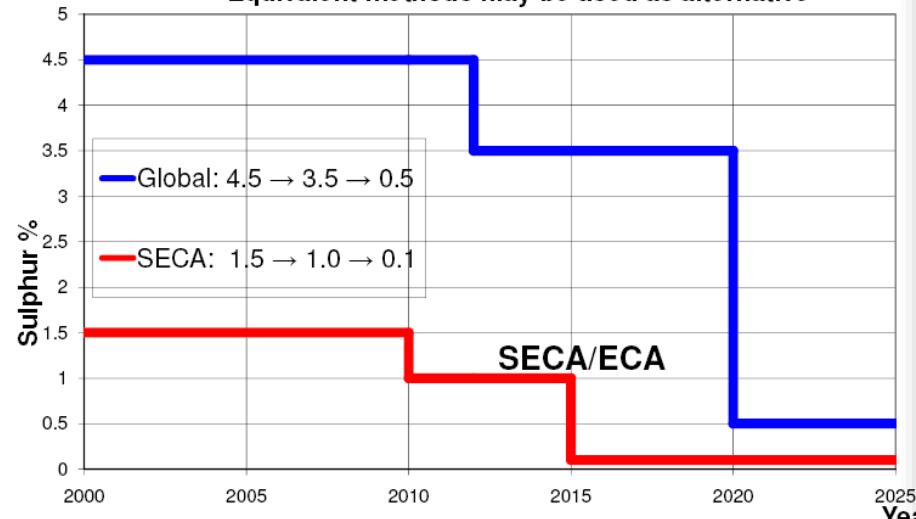


Background

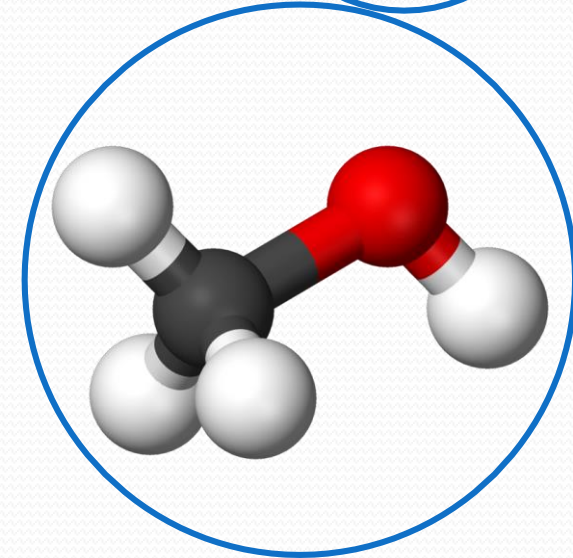
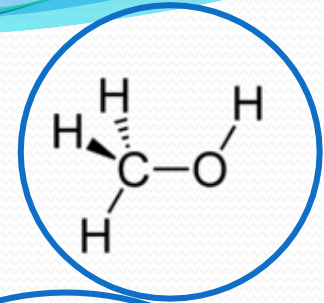
- Shipping is faced with the requirement to reduce emissions:
 - regulations for SO_x in 2015
 - IMO MARPOL NO_x emissions limits
- Future challenges for particulate matter and CO_2 reductions
- Need to find an economic and environmental solution – methanol was identified as a promising alternative fuel but had not been tested in marine engines

MEPC 57 IMO Fuel-sulphur Content

Equivalent methods may be used as alternative

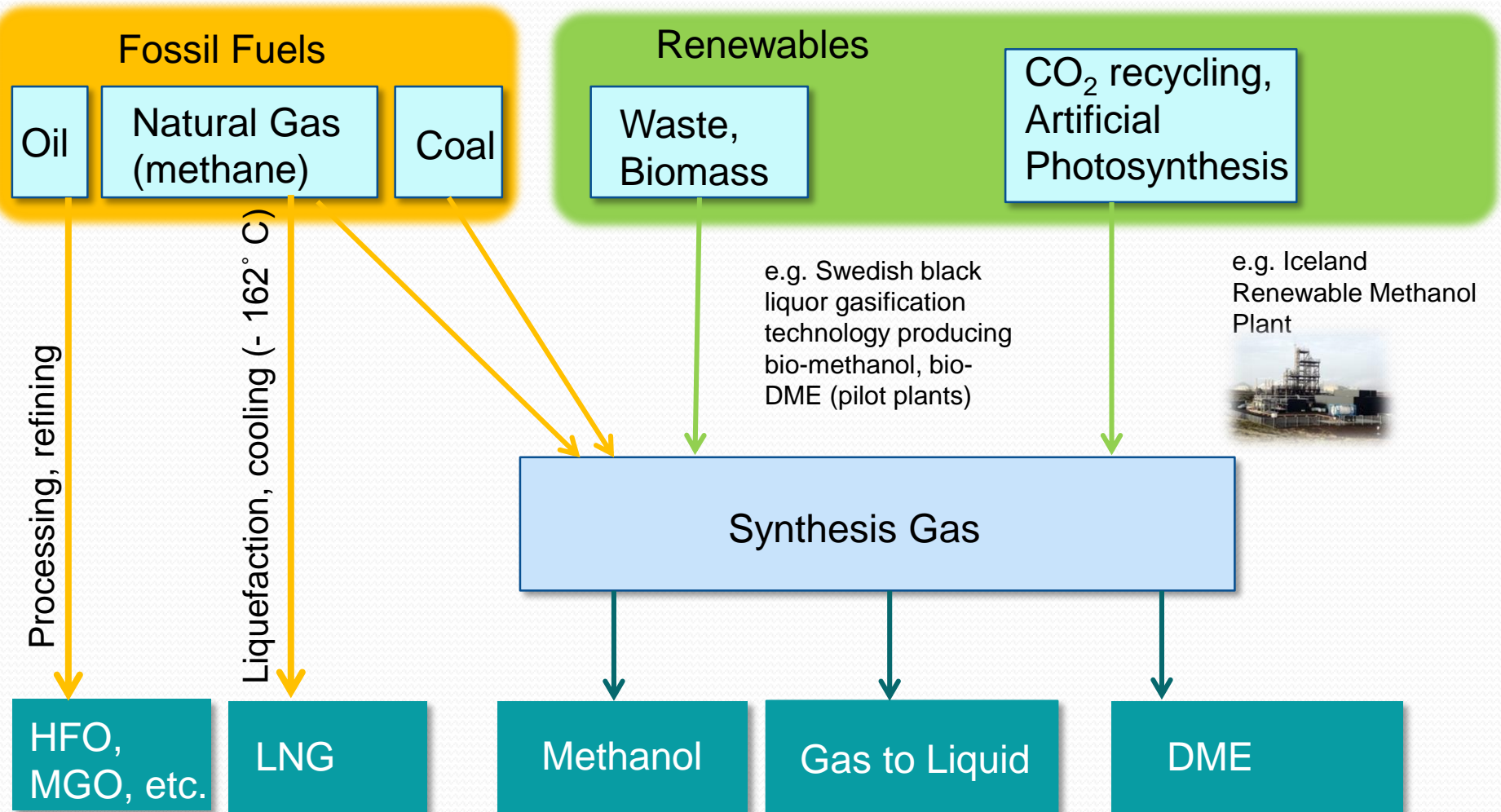


About methanol



- Also referred to as methyl alcohol, wood alcohol, methyl hydrate, methyl hydroxide
- CH₃OH (or MeOH)
- is a colourless, odourless liquid with a boiling point of 64.6° C, flash point of 12° C, auto ignition temperature of 470 °C
- easy to transport and store because it is liquid at ambient temperature and pressure
- “clean burning” – no sulphur, less NO_x
- Has been used as a land transport fuel with good results (used as a fuel in otto engines); also tested in diesel engines using a “glow plug” concept

Fuel feedstock and production – simplified examples



SPIRETH Two Test Streams

- DME: Development of a methanol to DME (di-methyl ether) conversion process plant for shipboard operation, and testing the plant and the DME fuel mix on board an existing ship, using an adapted diesel auxiliary engine.
- Methanol: Conversion of a full scale marine diesel engine to run efficiently on methanol, and performance testing in a laboratory.

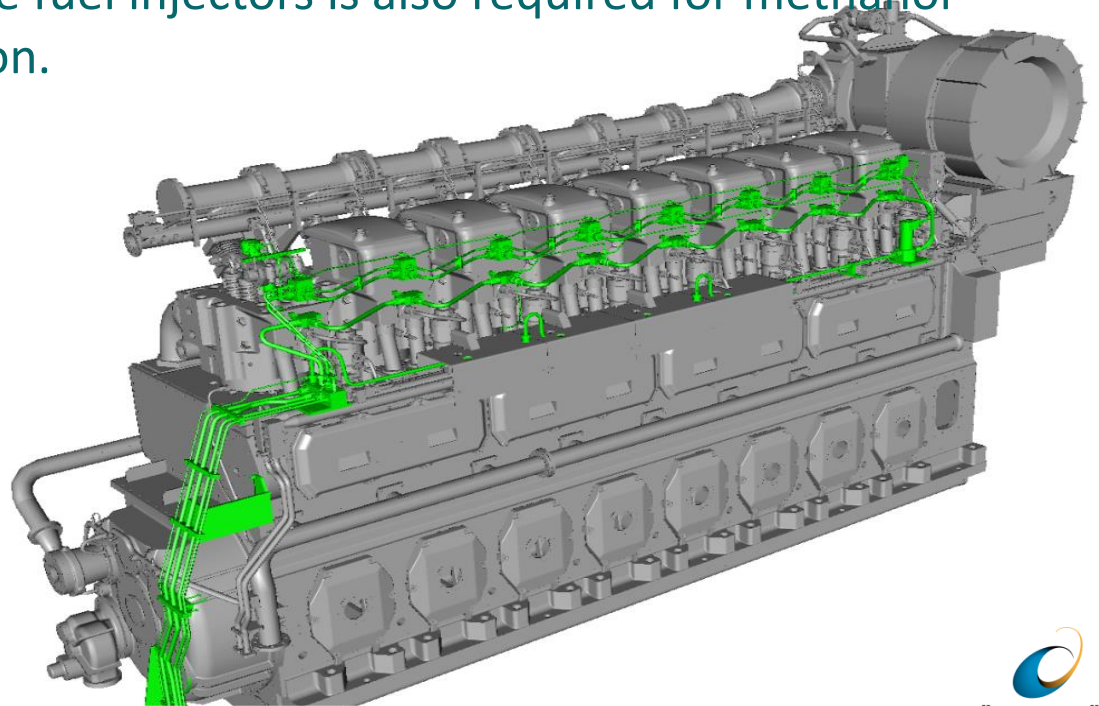
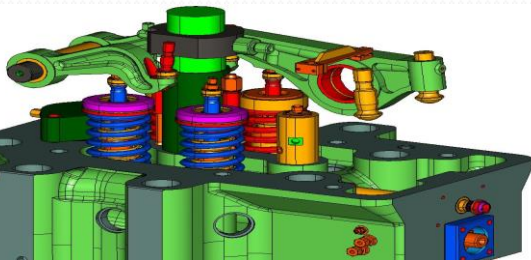
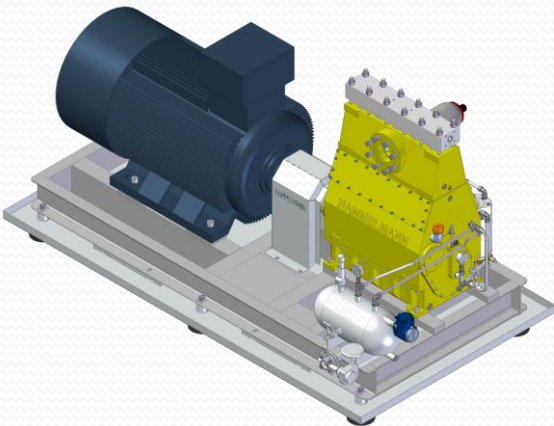
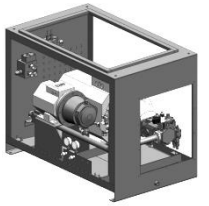
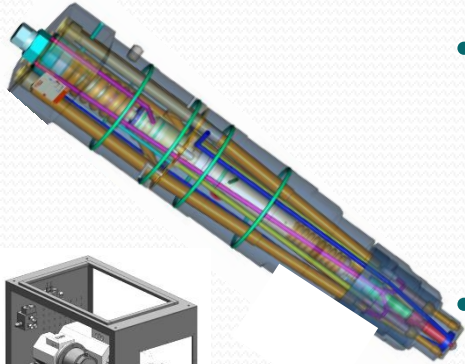


Methanol diesel engine test stream

- Different combustion concepts and design solutions for retrofit were evaluated
- Low emissions, high efficiency, robust solution and cost effective conversion were key factors when judging the different combustions concepts and design solutions.
- Diesel combustion of methanol with pilot fuel ignition was determined to be the preferred combustion retrofit concept

Methanol Conversion Scope

- On-engine scope is limited to exchange of cylinder heads, fuel injectors and fuel plungers in existing fuel pumps. A common rail system for methanol injection will be added on the engine.
- A stand-alone high pressure methanol pump with accompanying oil unit for supply of sealing oil and control oil to the fuel injectors is also required for methanol operation.



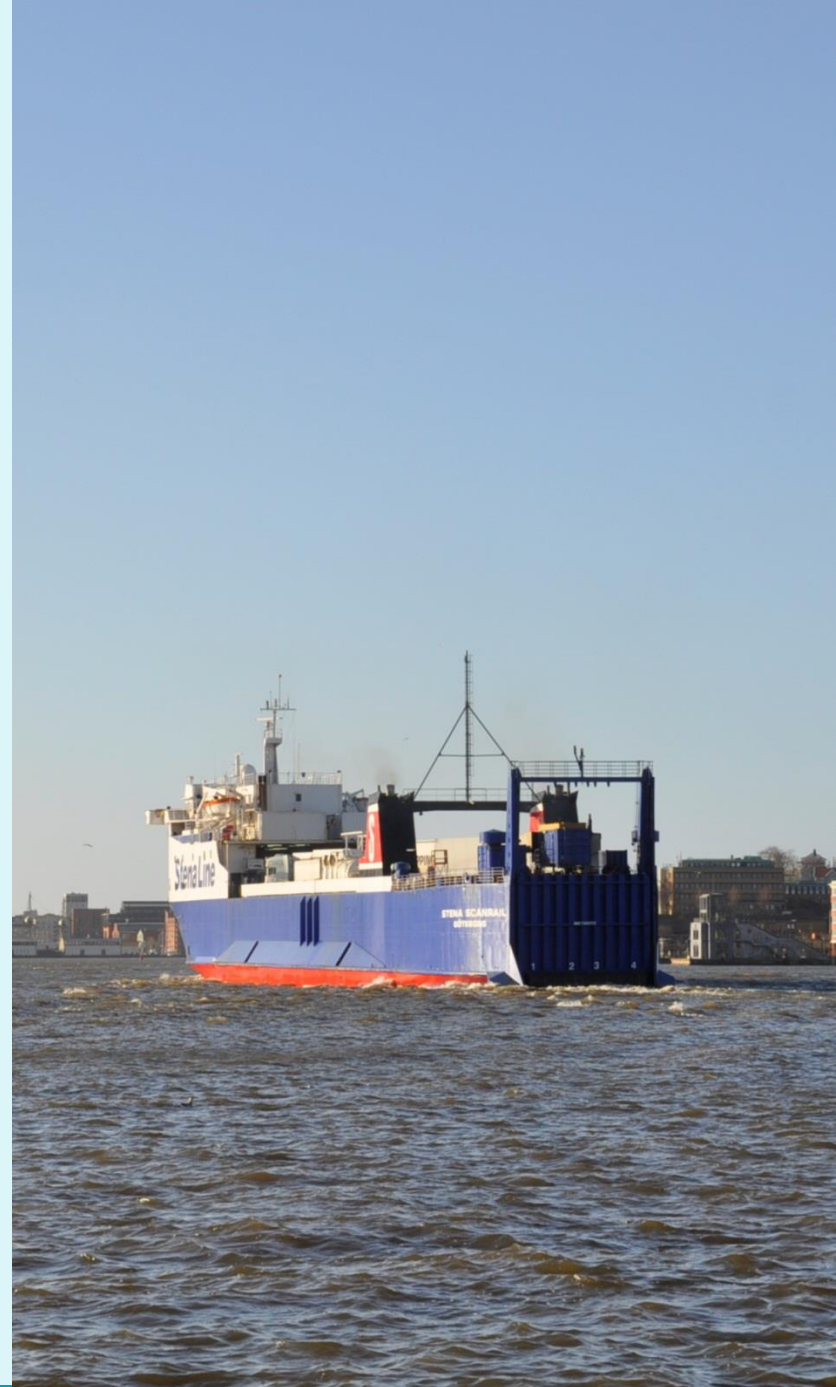


Project accomplishments:

- Risk and safety work carried out for the on board installation within SPIRETH has contributed to the development of draft regulations at the International Maritime Organization, and to the development of Classification Society Rules.
- The project has lead to acceptance of methanol as a marine fuel on the international level

What has SPIRETH lead to?

- New TEN-T project to convert the Stena Germanica main engines to methanol operation
- Order for new ships with methanol dual fuel engines (Waterfront)
- Increased interest from marine engine manufacturers for further development of methanol fuelled engines (covering more engine sizes along with new and retrofit solutions)



Thanks for your attention!

www.spireth.com

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