

Fairway forward - Seminar

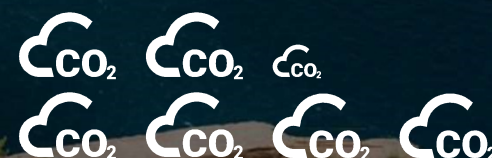
13.10.2020,

Kaj Portin, General Manager, R&D and Engineering

Vessel emissions

-40%

-70%



Fleet emissions

-50%

2008

2030

2050

Different types of emissions



Category 1: Local emissions: health & environment related

- Contribute to deterioration of human health, loss of wellbeing
- Mainly NO_x, SO_x and particulates
- Also impact the natural environment (flora & fauna) on short term
- Impact depends very much on location of emission. Focus on densely populated areas and sensitive ecosystems

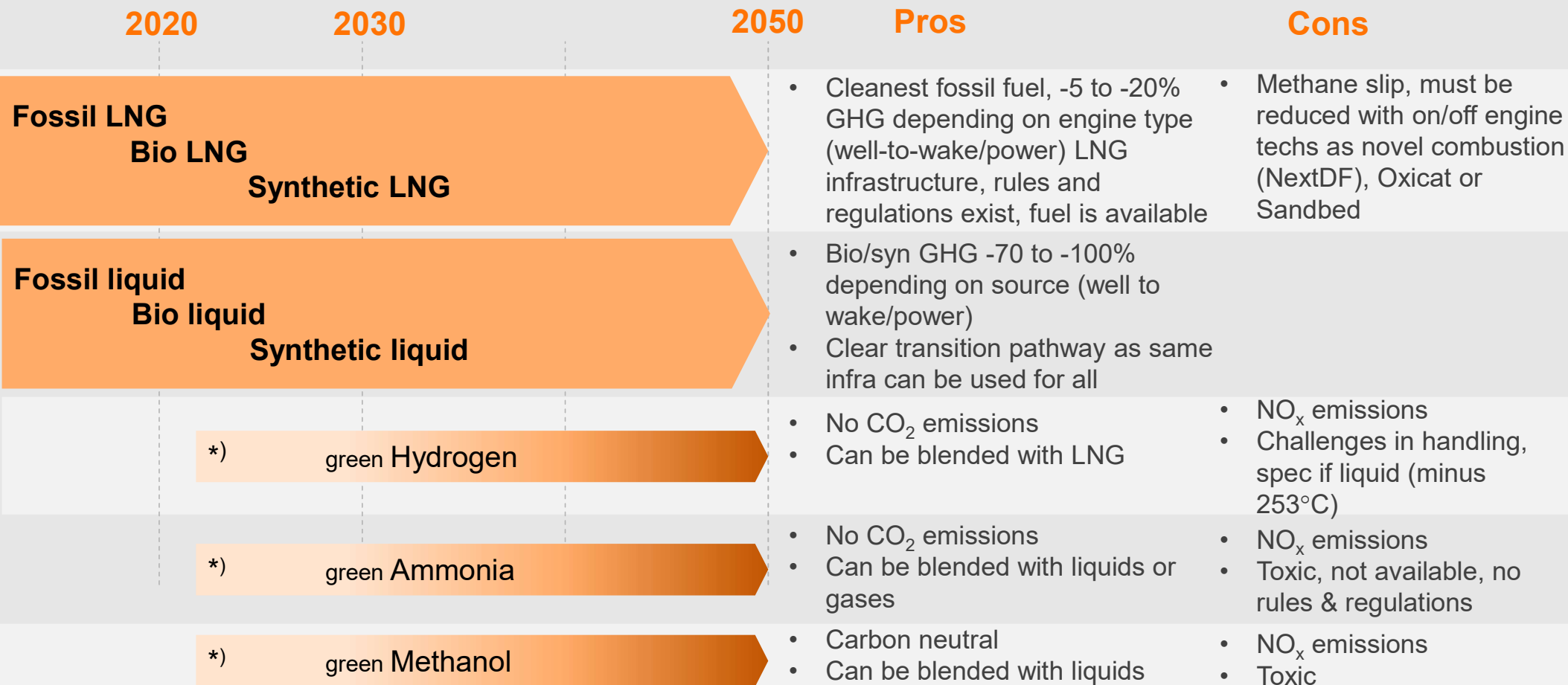


Category 2: GHG emissions: climate related

- Contribute to global warming / climate change
- Mainly CO₂, CH₄ (methane) and N₂O (laughing gas)
- Low to no impact on human health or the natural environment on short term
- Impact is not dependent on location of emission, as climate change is a global problem

Sometimes conflicting interests exist between the two. Optimize for one or the other?

FUEL ROADMAP – FOCUS ON RENEWABLE FUELS



*) timing depends on the market demand

World's first full scale ammonia engine test - an important step towards carbon free shipping

Wärtsilä Corporation, Trade press release, 30 June 2020 at 10:01 AM E. Europe Standard Time



The technology group Wärtsilä, in close customer cooperation with Knutsen OAS Shipping AS and Repsol, as well as with the Sustainable Energy Catapult Centre, will commence the world's first long term, full-scale, testing of ammonia as a fuel in a marine four-stroke combustion engine. The testing is made possible by a 20 MNOK grant from the Norwegian Research Council through the DEMO 2000 programme.

ARTICLE

Wärtsilä, Repsol, and Knutsen to test ammonia four-stroke engine

By [Trevor Brown](#) on July 01, 2020

This week, engine manufacturer Wärtsilä announced “the world’s first long term, full-scale, testing of ammonia as a fuel in a marine four-stroke combustion engine.” The project will begin in the first quarter of 2021, at the Sustainable Energy Catapult Centre’s testing facilities at Stord, Norway. It is supported by a NOK 20 million (USD 2 million) grant from the Norwegian Research Council.

LPG, Methanol and Ammonia testing facility in Vasa, Finland



Summary

- GHG is an important topic, but local emissions should not be forgotten
- Natural gas operation result significantly lower emissions already today, and provides gaseous fuel infrastructure for future fuels
- GHG reduction enablers
 - Fuel flexible engine technologies
 - Low carbon fuels
 - Renewables - both on liquid and gaseous fuels
 - Hybrid solutions

