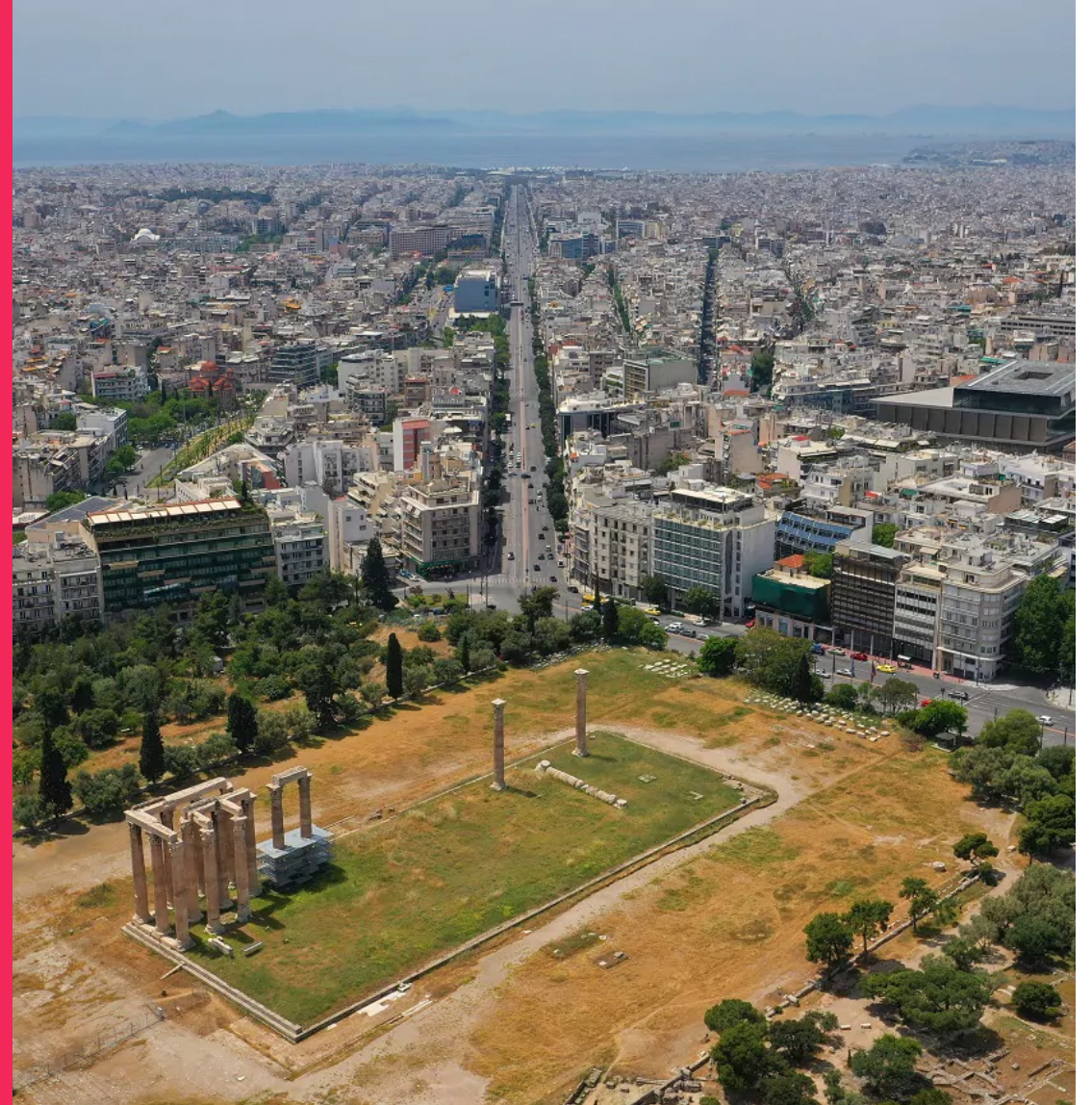


Everllence

Everllence B&W Dual fuel engines

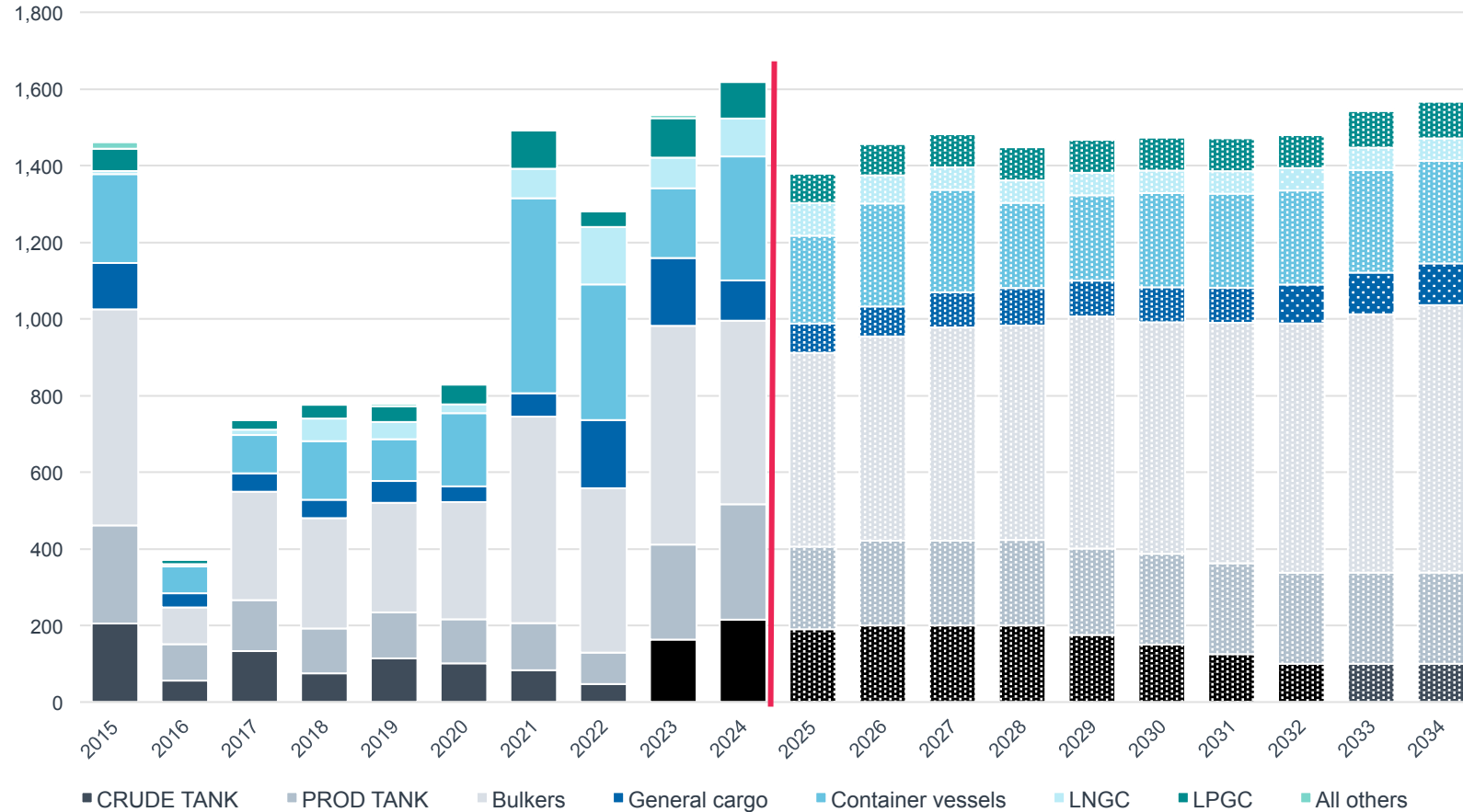
Jakob Gjørtsvang Knudsen | Two-stroke Promotion | 11. November 2025



Dual fuel Market

Two-Stroke Contracting Forecast

Number of ships



Source: FRD/Everllence, January 2025

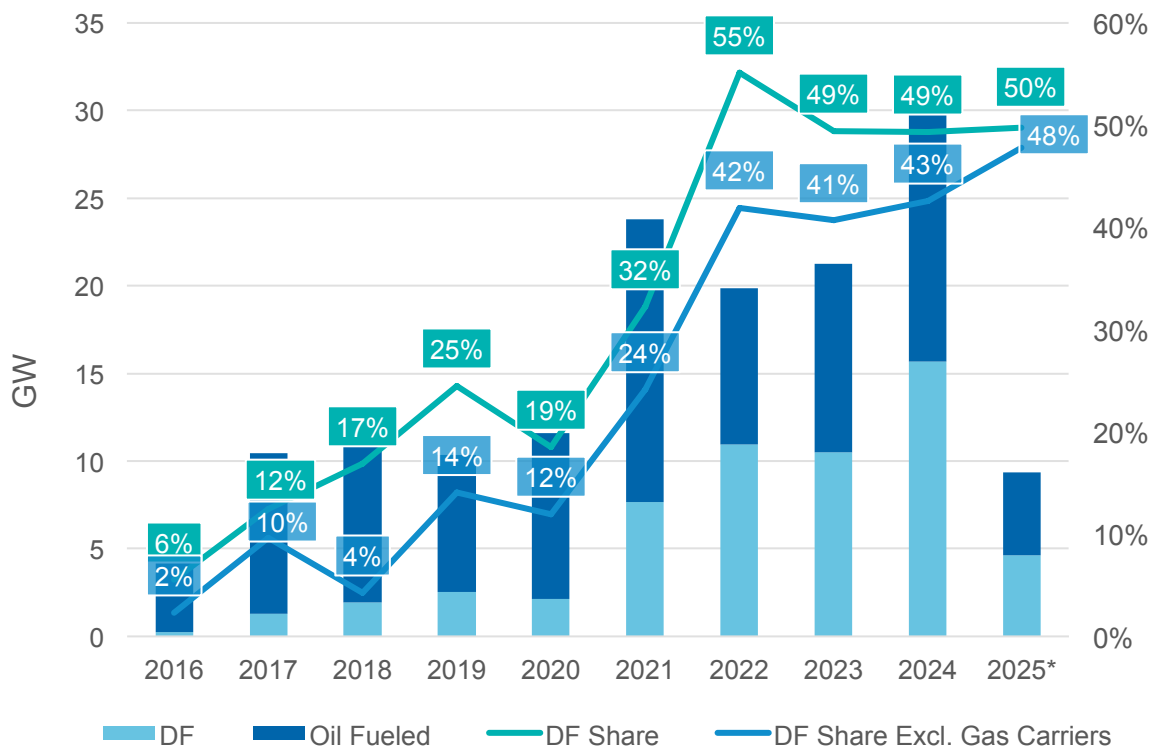
An increase in vessel contracting and deliveries is necessary over the next decade

- Predicted trade growth
- Increase in scrapping volume because of fleet age

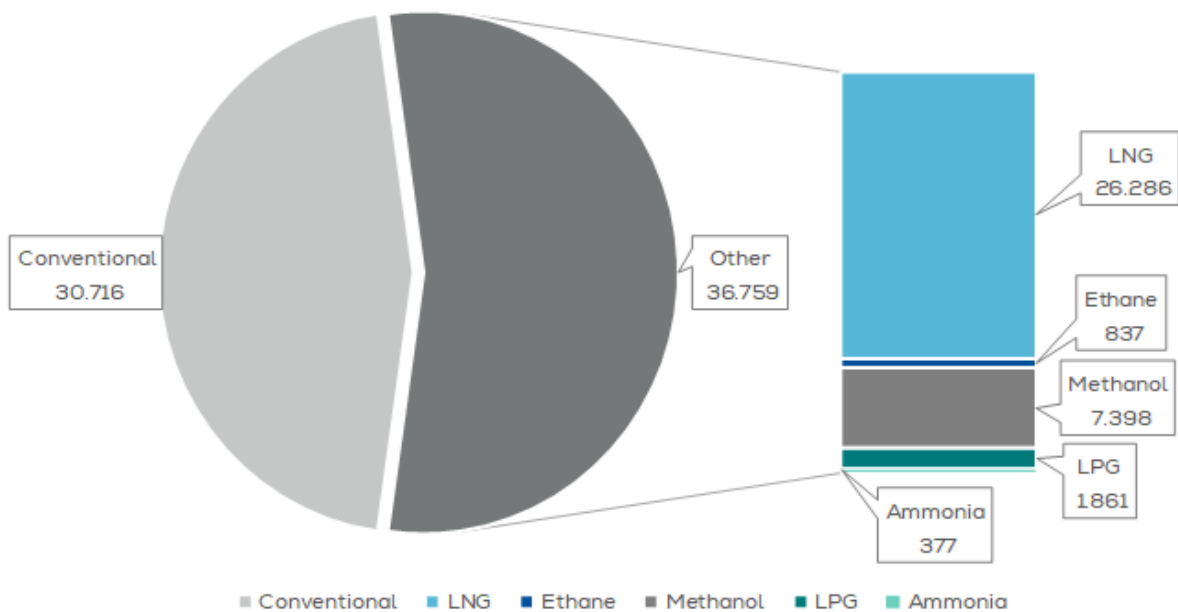
Two-stroke vessel contracting

Conventional and dual-fuel

Two-stroke contracting



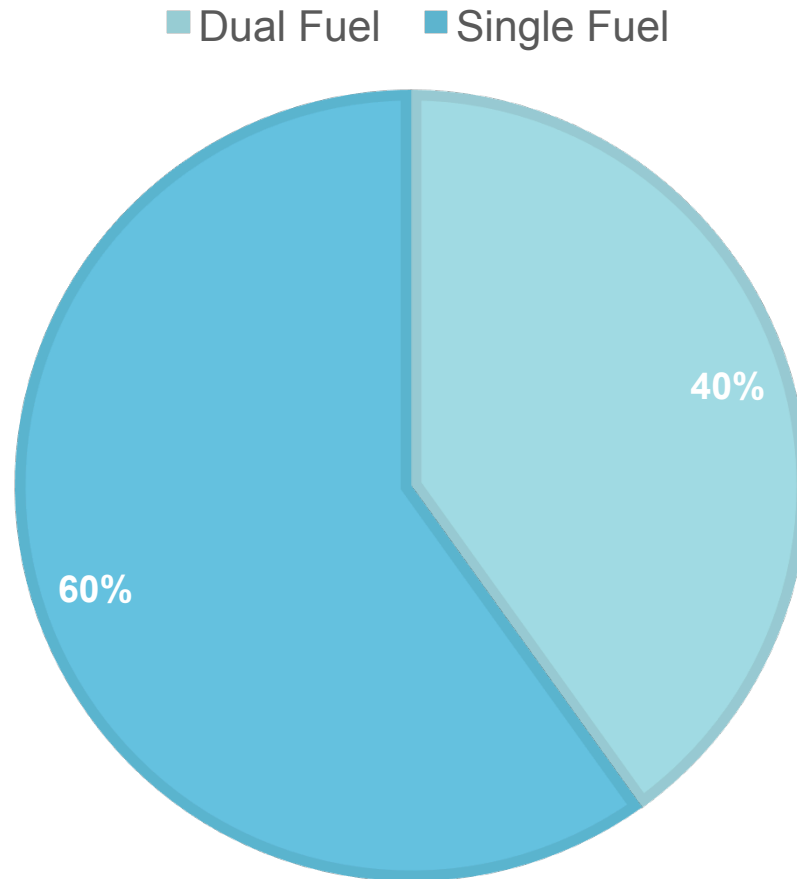
Two-stroke (MW) on order



Source (both graphs): IHS Markit. *Preliminary Year to Date (July 2025)

Dual Fuel Vs Single Fuel

Fuel type distribution (measured in power)- Order intake YTD - 2025



Data Source: Everllence Internal Database and leading indicators.(as on 23/Sep/2025)

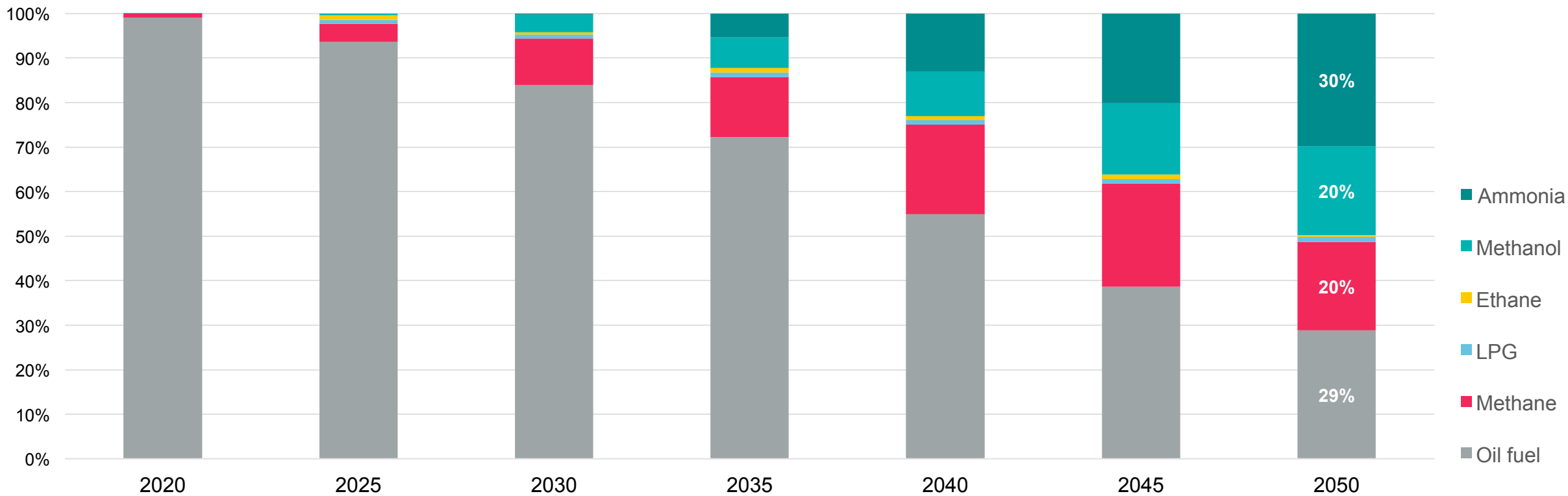
Year on year order backlog average are above 50% dual fuel engines.

The projections are to see an increasing share of Dual fuel as global regulations are getting defined and more viable alternative fuels enter the market

Fuel mix for two-stroke powered vessels in operation

Two-stroke fleet development: A diversified fuel mix is expected for the coming decades

Percentage of installed power (MW)



Source: Everllence, February 2025

Everllence B&W two-stroke dual-fuel engine orders

1900+

Methane

ME-GI
1043

ME-GA
270

Methanol

ME-LGIM
225

LGIP

ME-LGIP
275

Ethane

ME-GIE
90

Ammonia

ME-LGIA
→

Everllence B&W ME-GI

Refinements based on millions of running hours

ME-GI Mk. 2 engine design has been standard since January 2020

Simplified piping system

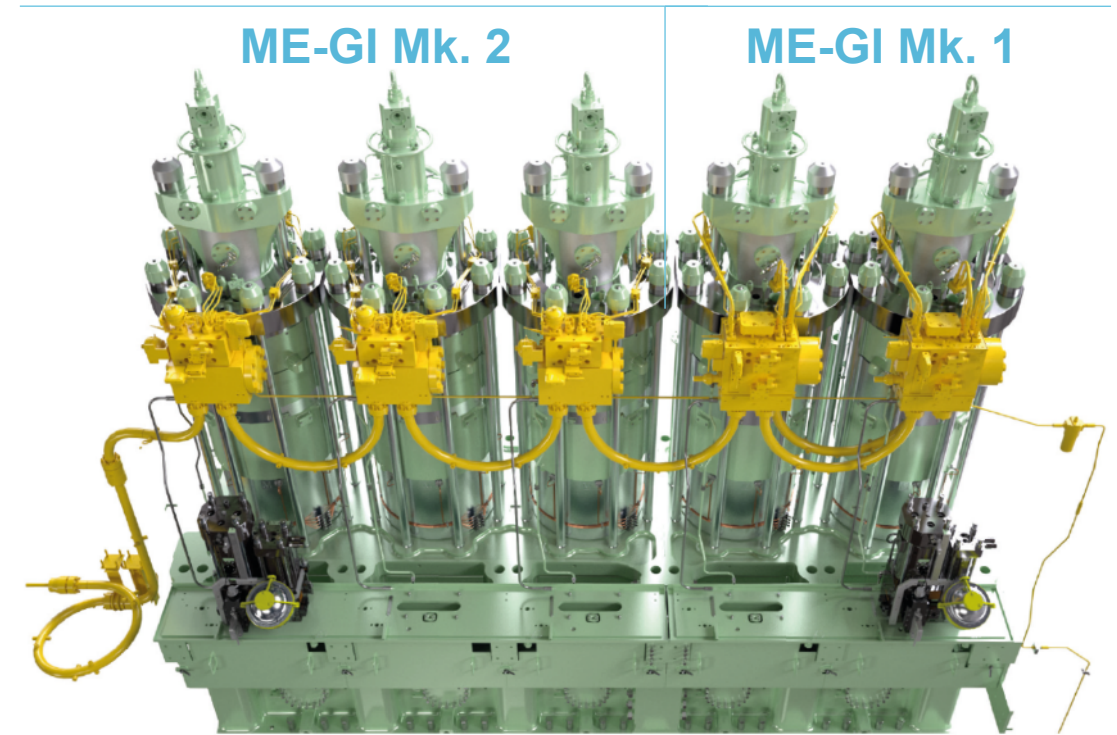
Gas supply and purge pipes replaced with only one bi-directional pipe resulting in lower installation costs

Improved pilot oil consumption

Pilot oil consumption is lowered to 1.5% for some engines based on L1 rating at 100% load*

Gas cylinder cut-out

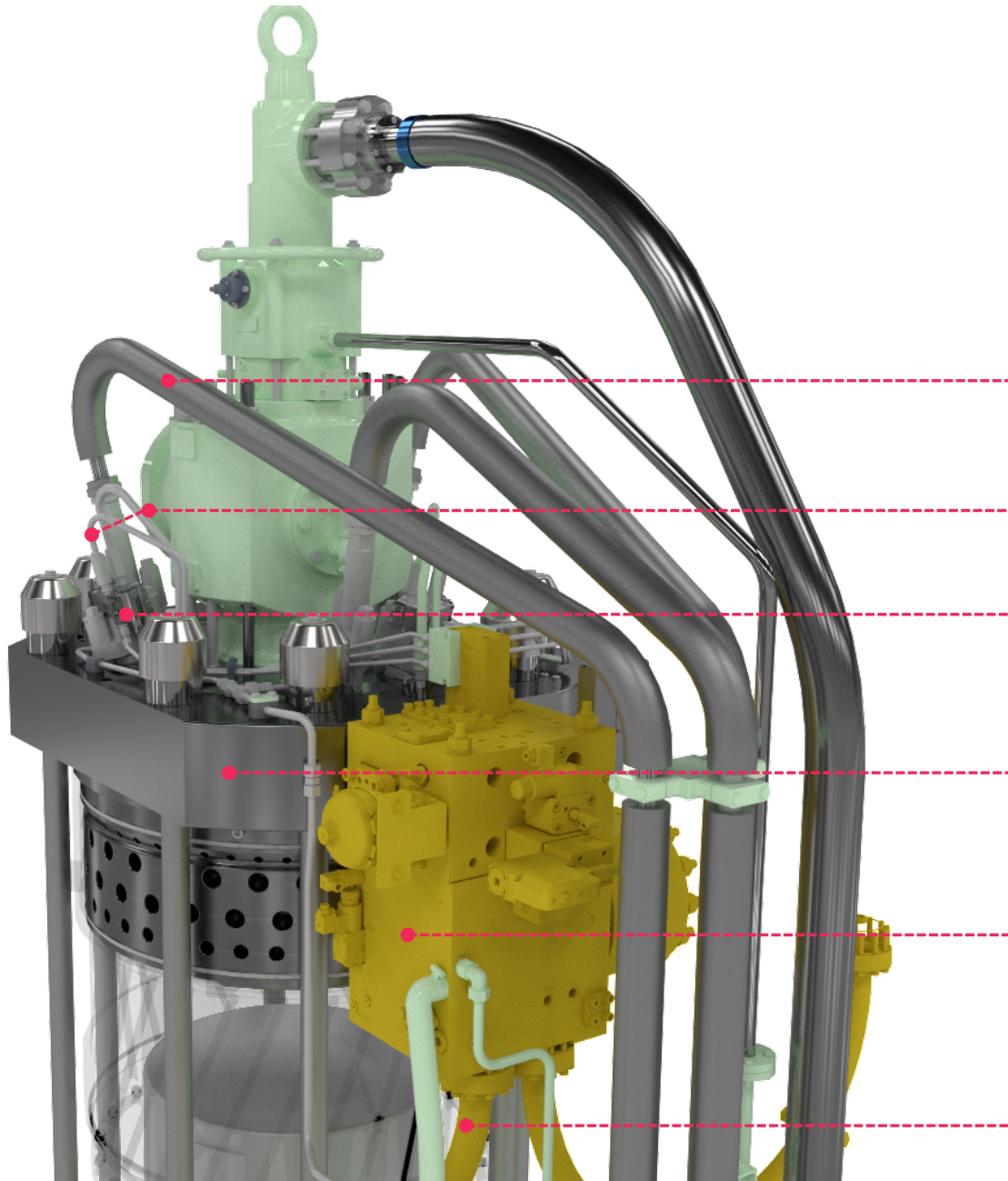
Enabling one-cylinder to run on fuel oil while the remaining cylinders continuously operate on gas



*Performance values indicated refer to energy fraction for L1 rated engines operating at 100% load point in Tier II mode. Actual values may vary depending on engine rating and load conditions.

ME-GI concept

Basic principles



High pressure pipe to pilot injection valve

Control and sealing oil pipes

Gas injection valve

Gas channel in cylinder head

Gas block

Double-walled bi-directional pipe

Everllence B&W LGI-M

Everllence B&W ME-LGIM

Based on

- Proven high efficiency Diesel cycle.
- Merits of ME-C, ME-GI and LGIP engines.

Key specifications

- 13 bar supply pressure.
- 600 bar injection pressure.
- 5% pilot energy fraction at L1 and 100% load (any compliant fuel oil)*.
- Operation on methanol from 10-100% load.

*Performance values indicated refer to energy fraction for L1 rated engines operating at 100% load point in Tier II mode. Actual values may vary depending on engine rating and load conditions.

LGIM components on engine

The latest generation LGIM engine components

Hydraulic oil

Sealing oil

FBIV-M

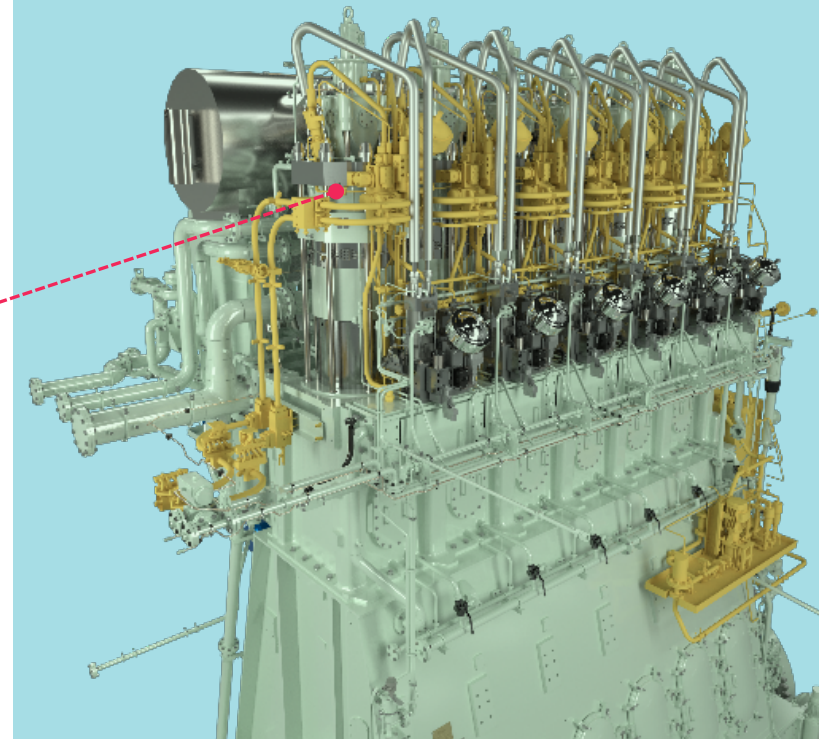
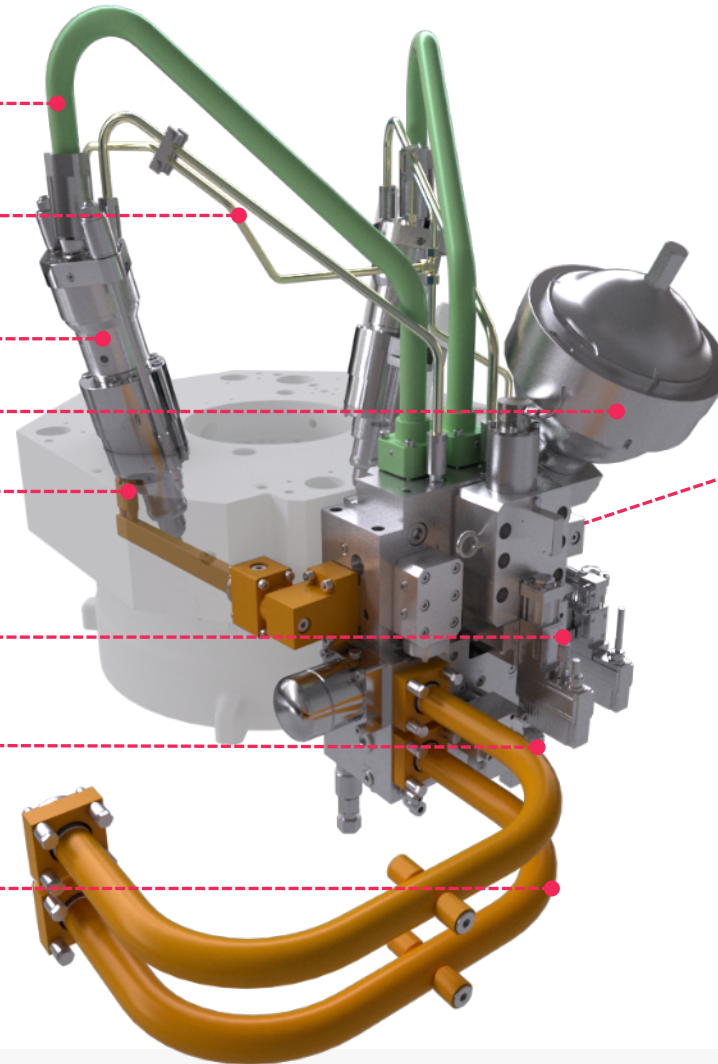
Hydraulic accumulator

Methanol supply

Hydraulic control valves

Double-walled pipe inlet

Double-walled pipe outlet

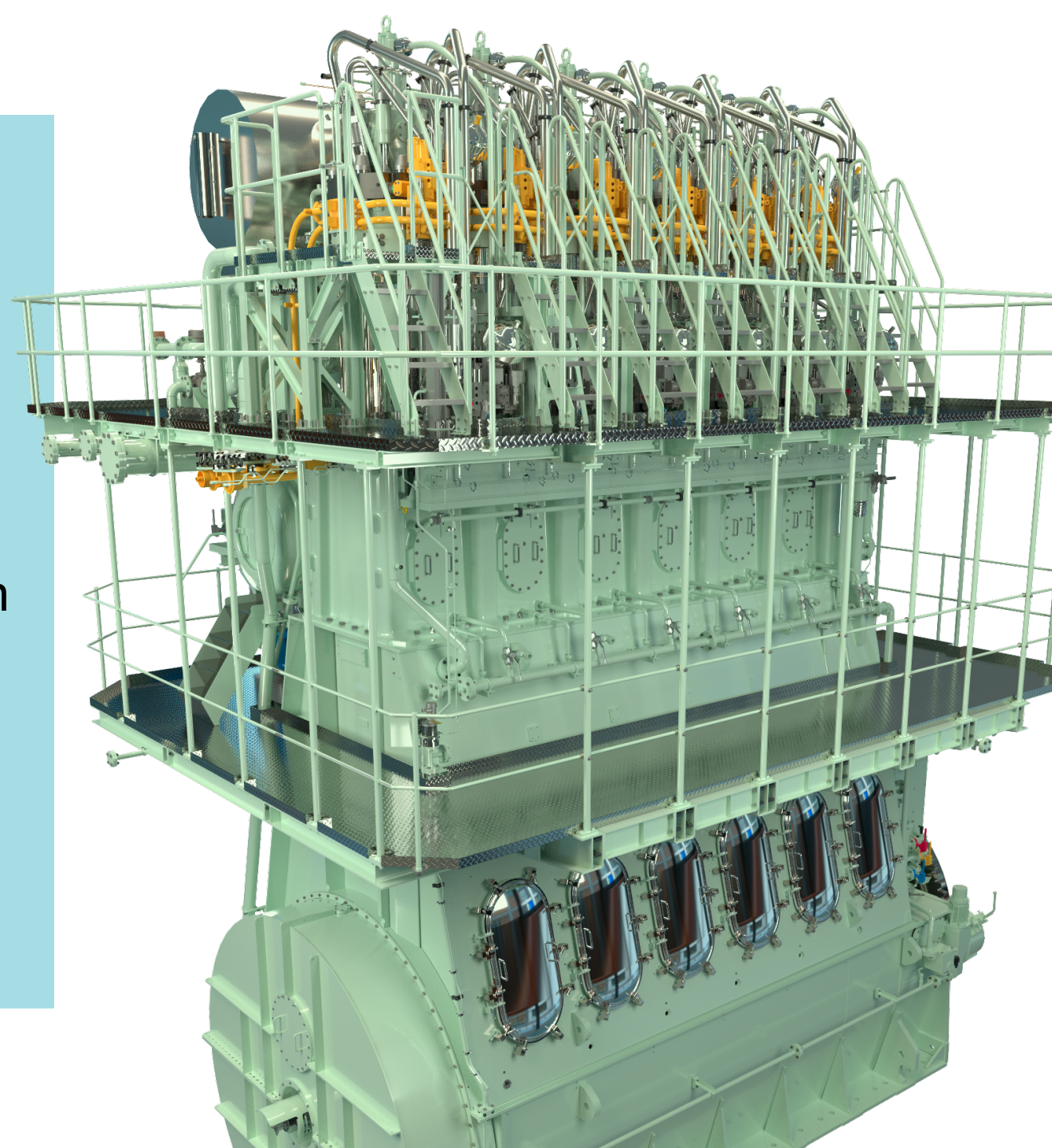


Everllence B&W LGI-P

Using LPG for propulsion of gas carriers

- ME-LGIP is applied as standard for VLGCs and most medium size gas carriers.
- LPG result in $\approx 13\%$ CO₂ reduction compared to fuel oil on TTW.
- 90-100% reduction in SO_x emissions

The ME-LGIP engine was introduced in September 2018



Everllence B&W ME-LGIP

Designed to be dual-fuelled with LPG as the low-flashpoint fuel

Working principle

- LPG is supplied at 53 bar
- **Fuel Booster Injection Valve Propane (FBIV-P)** raises LPG injection pressure to 600-700 bar
- **5% pilot oil for L1 rated engines at 100% load***

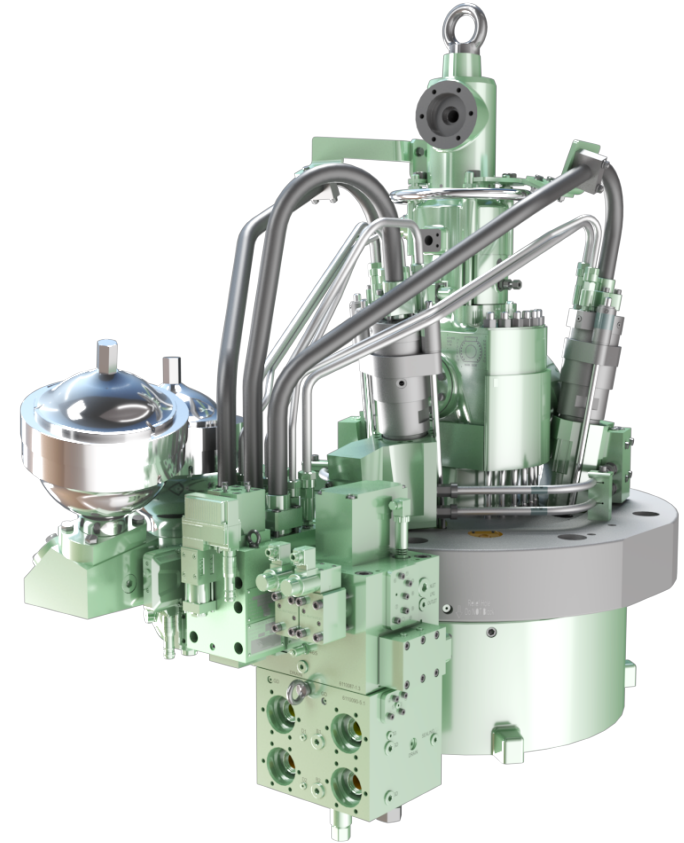
Gas control block

- ELWI-valve (fuel pressurization)
- ELGI-valve (injection timing)
- Hydraulic accumulator

Double wall gas piping

- LPG inlet
- LPG return

*Performance values indicated refer to energy fraction for L1 rated engines operating at 100% load point in Tier II mode. Actual values may vary depending on engine rating and load conditions.

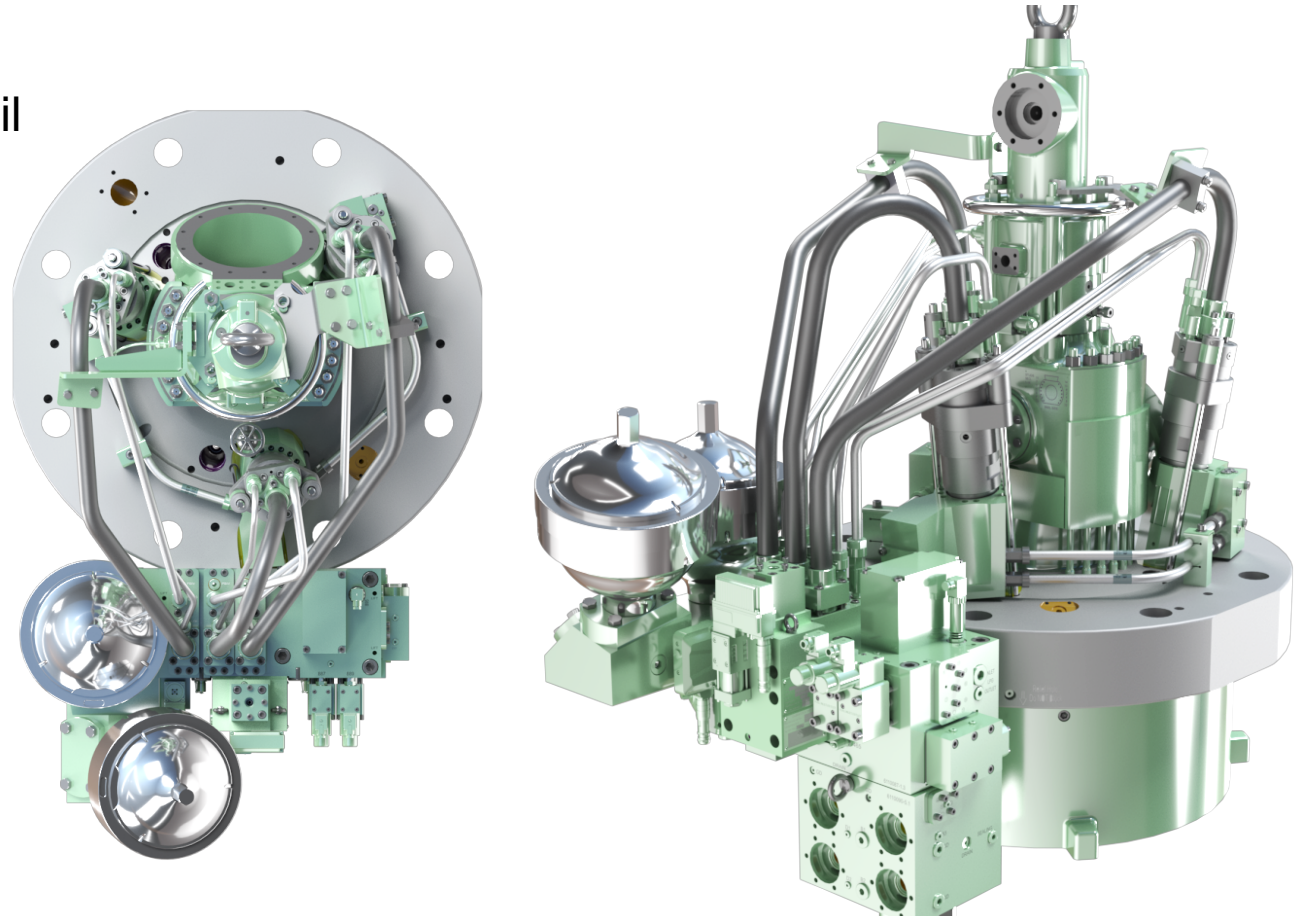


Everllence ME-LGIP Engine

Designed to be dual-fuelled with LPG as the low-flashpoint fuel

Arrangement of FBIV-P and fuel injection valves

- Simple system with combined pilot and main fuel oil injector in one valve and one supply system
- Pilot oil can be any compliant fuel
- FBIV-P

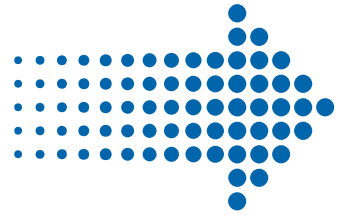


Fuel oil injection valves are not mounted on the illustrations

Everllence B&W LGI-A

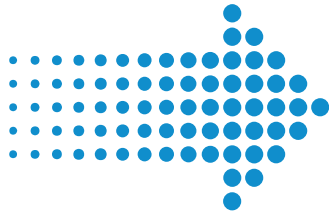
Two-stroke ammonia engine development

High-level development milestones



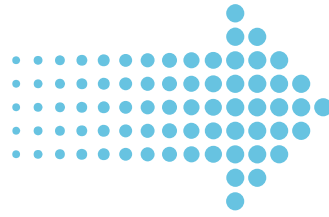
2019

- ✓ Combustibility investigation.



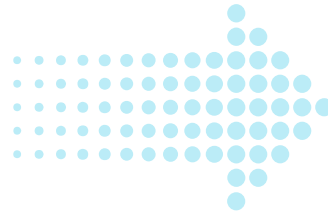
2020

- ✓ 4T50ME-X test engine received.



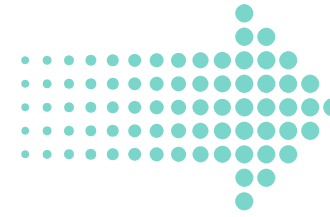
2021

- ✓ Engine concept defined based on R&D and simulations.
- ✓ Ammonia fuel supply and auxiliary systems specified.



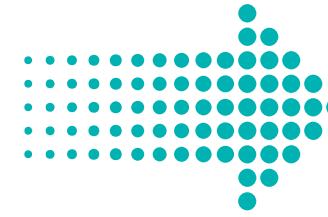
2022

- ✓ Ammonia fuel supply and auxiliary systems installed at RCC.



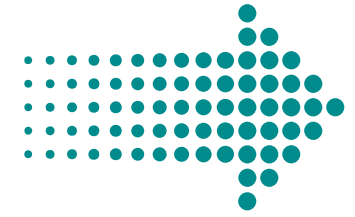
2023

- ✓ 1st bunkering of ammonia at RCC.
- ✓ Single-cylinder two-stroke ammonia combustion at RCC.



2024

- ✓ Full-scale engine test started at RCC.



2025

- ✓ 100% engine load on ammonia achieved on full scale test engine at RCC.
- First commercial ME-LGIA engines on testbed.

Two-stroke ammonia engine combustion

The Everllence ME-LGIA design philosophy

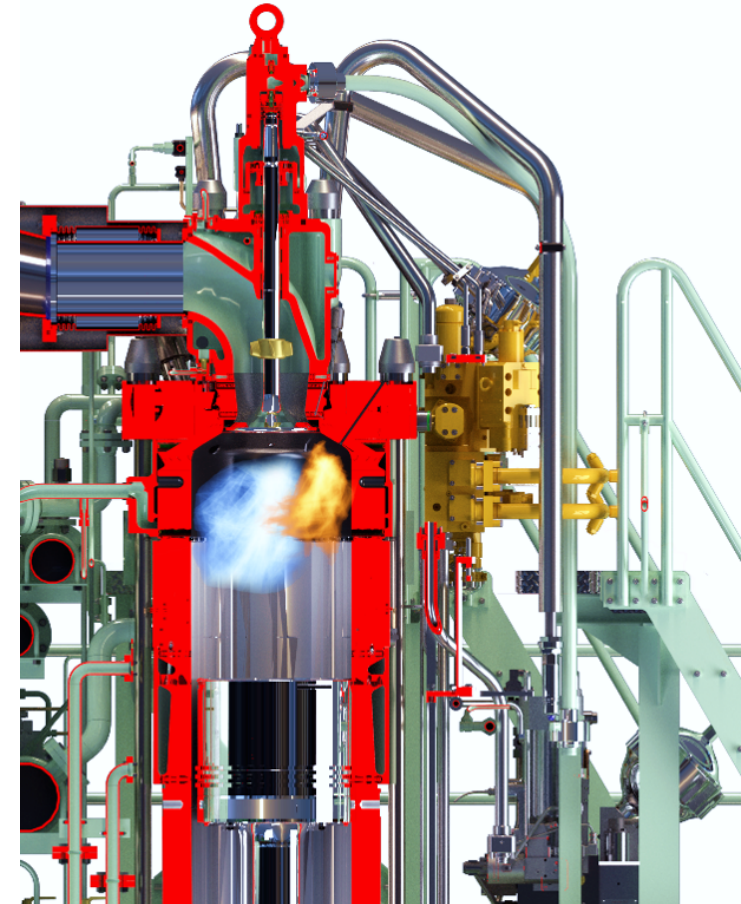
“Ammonia mode”

- Small pilot flame needed.
- Target of 5% Specific Pilot Oil Consumption at 100% load for L1-rated engines has been reached*.
- Potential for further reductions, but 4-cylinder testing will showcase the full potential. The initial ME-LGIA engines will have 5% SPOC*.
- We target to obtain same heat rate as “fuel oil mode”.

“Fuel oil mode”

- We target identical performance as a conventionally fueled Diesel engine.

*Performance values indicated refer to energy fraction for L1 rated engines operating at 100% load point in Tier II mode. Actual values may vary depending on engine rating and load conditions.



Ammonia engine design

The LGI injection system on S60 for ammonia fuel

Hydraulic oil

High pressure hydraulic oil pipes

Hydraulic control valves

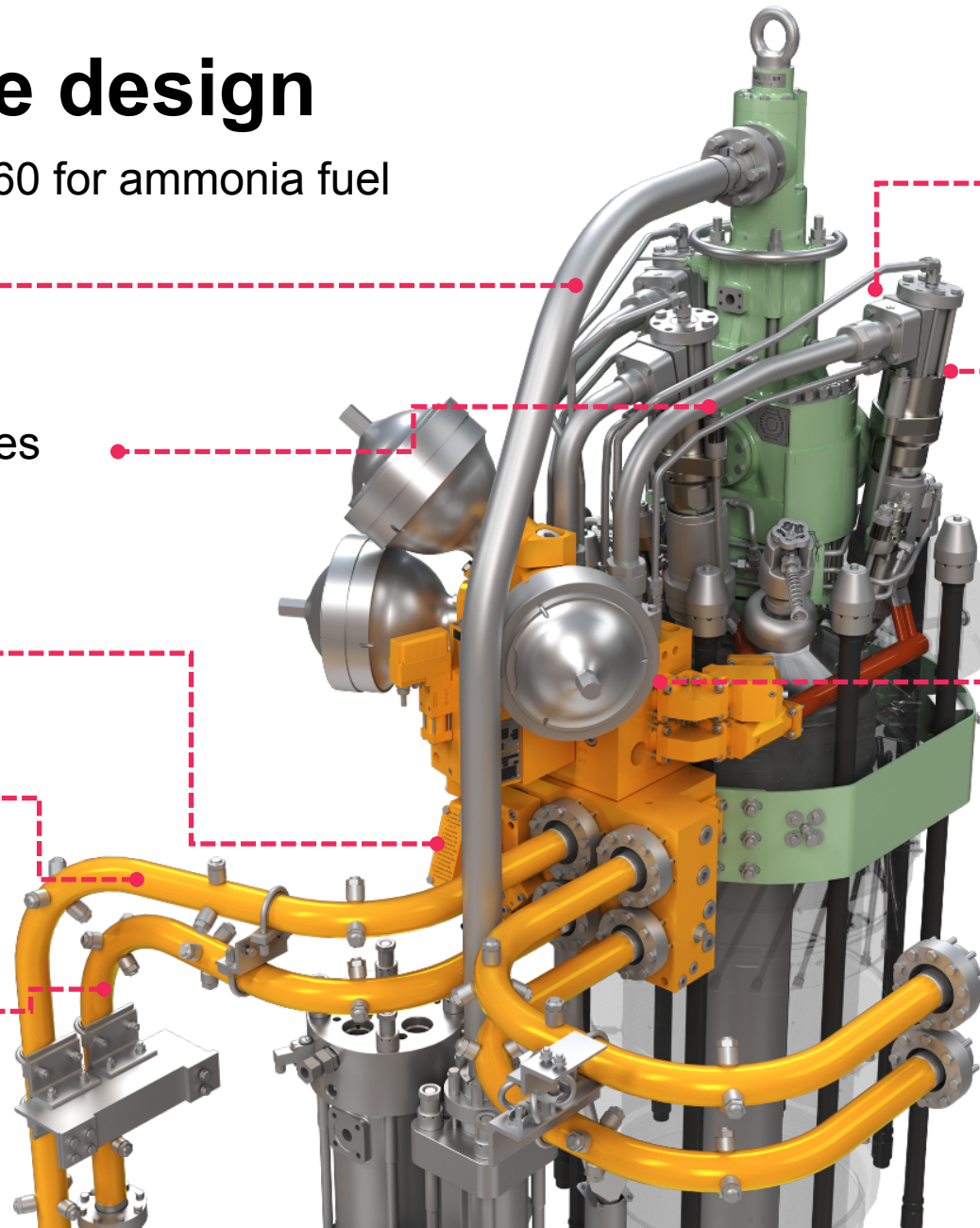
Ammonia double-walled
pipe inlet

Ammonia double-walled pipe
outlet

De-aeration point

Fuel Booster Injection Valve

Hydraulic accumulator



7S60ME-C10.5-LGIA at Mitsui E&S Co., Ltd.

7S60ME-C10.5-LGIA at MES has been operated on ammonia.
Delivery time schedule will be pending shipyard delivery schedule.



Ammonia injection valve

Fuel Booster Injection Valve – Ammonia (FBIV-A) – ongoing development

- Basic design concept known from our methanol and LPG fuelled engines.
- High pressure hydraulic oil acting on top of a piston to increase ammonia pressure from 83 bars to around 650 bar injection pressure.
- Ammonia supplied via lance in cylinder cover and sleeve to FBIV-A.





**Thank you
very much!**

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This data serves informational purposes only and is especially not guaranteed in any way. Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project.

This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.