Everllence

Scalable energy transition

Everllence B&W two-stroke engines – Moving big things to ZERO



16th Concawe Symposium

Julia Svensson | Senior Research engineer R&D two-stroke | 8 October 2026

Agenda

8 October 2026

1. **Engine Technology**
2. **Fuel quality**
3. **Uptake, Forecast & closing remarks**



1
Engine technology

Vessel types powered by two-stroke engines

The large ocean-going cargo ships







Examples

- Container ships
- Crude oil tankers
- Product and chemical tankers
- Bulk carriers
- LNG, LPG, ethane carriers
- Large vehicle carriers





Everllence B&W engines





Engines ranges

Power: 4350 kW to 82440 kW

Cylinders: 5 to 12

Cylinder bore size: 35 to 95 cm



Everllence Engine programme 2026

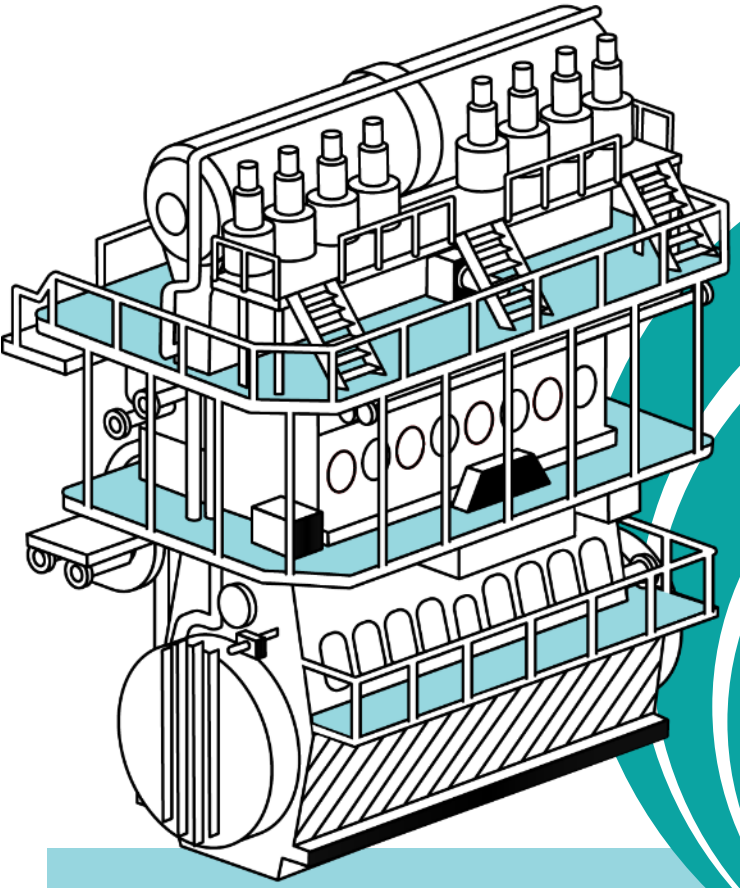
https://www.everllence.com/marine/products/planning-tools-and-downloads/marine-engine-programme

Compare Volkswagen Golf 1.5 TSI 150 hp: Power: 110 kW

The modular development

Built on a trusted platform – ready for the future

Modular design enables extensive retrofit options



ME-C

HSHFO, VLSFO, 0.1% S fuel, Biofuel

Adding dual-fuel system

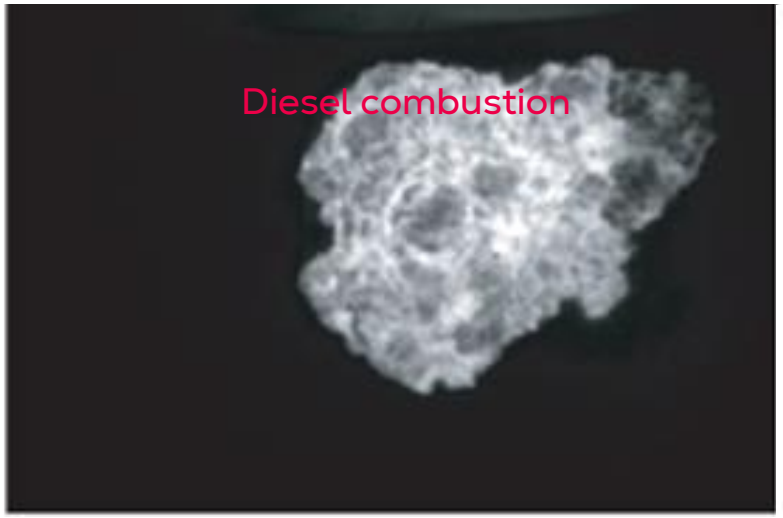
Methane	ME-GI
Ethane	ME-GIE
LPG	ME-LGIP
Methanol / Ethanol	ME-LGIM/e
Ammonia	ME-LGIA

Dual fuel combustion

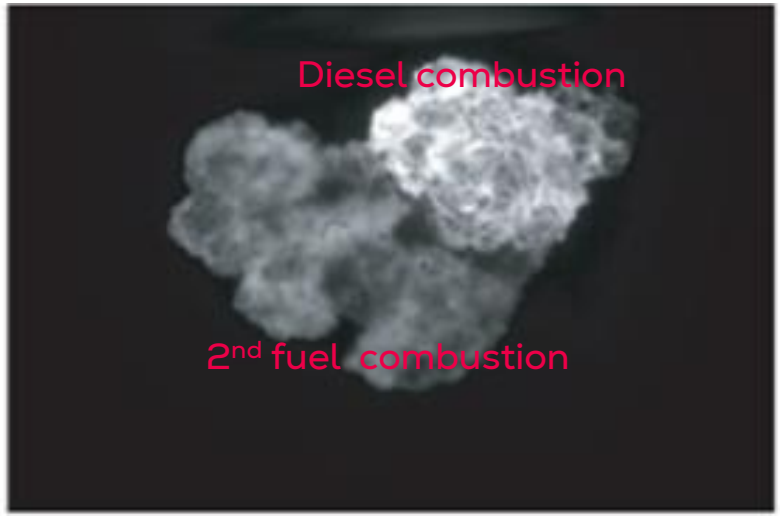
Pilot fuel is used to ignite the fuel

Some fuels require a pilot injection to stabilize the ignition

Single fuel engine combustion



Dual fuel engine combustion



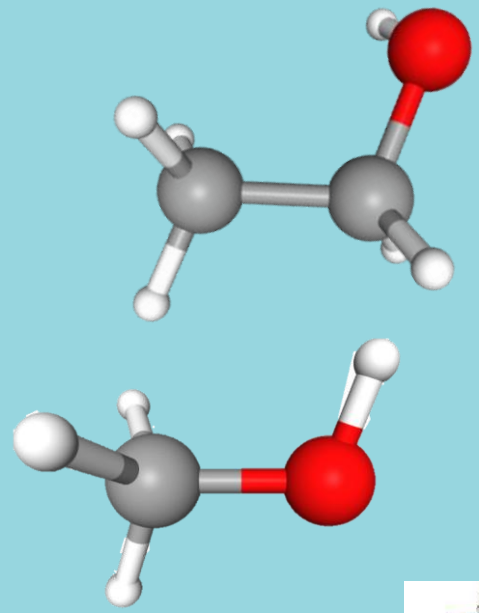
Diesel injector for pilot injection

Second fuel injector (gas or alcohol or NH_3)



ME-LGIMe

The tri-fuel engine!



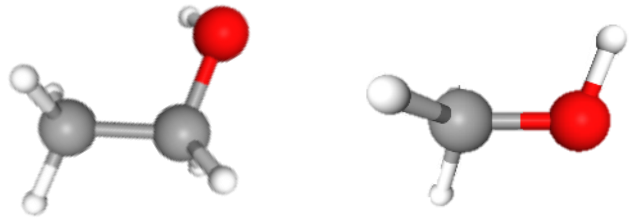
Biofuel



ME-LGIMe – Tri-fuel engine

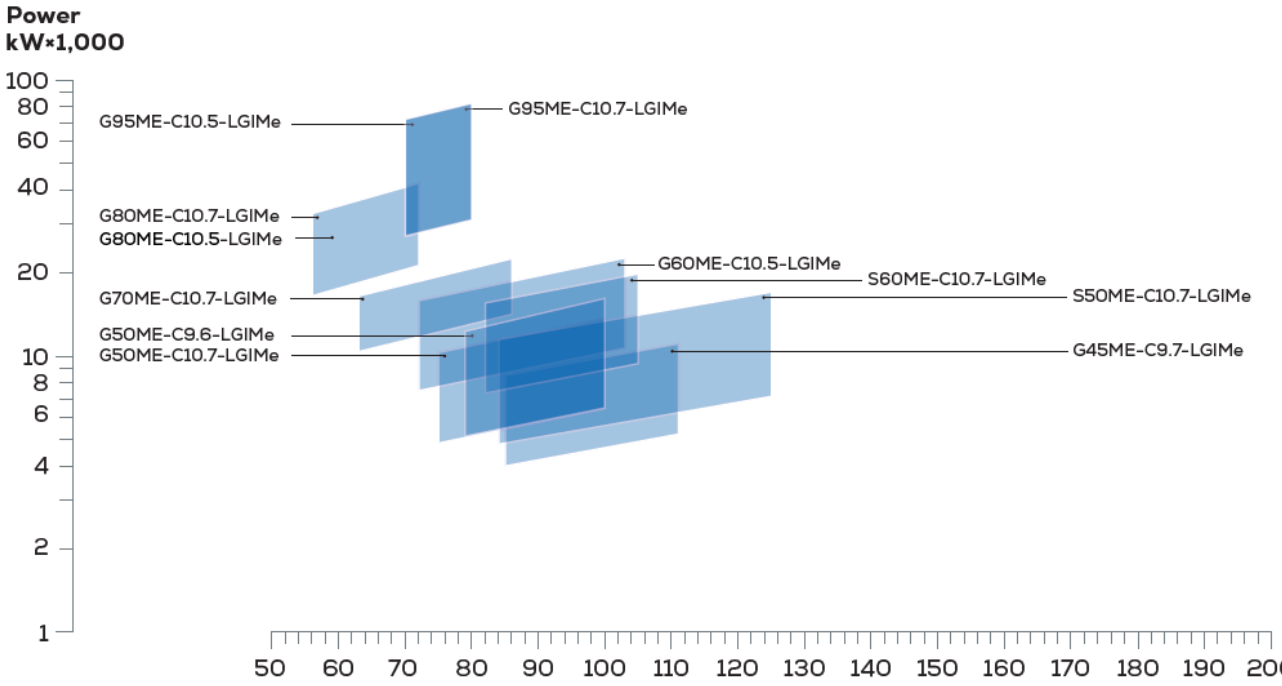
Capable of using both Methanol and Ethanol

Ethanol capability is now available for the entire ME-LGIM engine program



Market Update Note

MUN2026-09-01



1 September 2026

Everllence releases ethanol fuel capability across ME-LGIM engine portfolio

Following successful R&D tests and in-service validation, Everllence now expands its fuel flexibility with tri-fuel operation on Everllence B&W ME-LGIM engines

Already established as the world's best-selling methanol-fuelled marine engine, with more than 250 units sold and over 110 in service, the ME-LGIM portfolio further strengthens its value proposition by now offering ethanol fuel capability across the range.

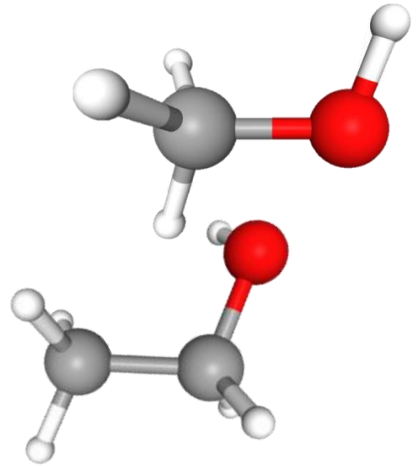
The addition of ethanol capability to the existing LGIM platform is not just a new fuel option; it is a strategic fuel-flexibility solution that protects customer investments and accelerates decarbonisation adoption while maintaining the proven reliability and performance of the ME-LGIM platform. The engine designation of these tri-fuel engines will be ME-LGIMe.

The ethanol capability will be introduced for both currently available engines and legacy engines (selected single-fuel engines), adhering to both newbuild (Fig. 1) and retrofit demands:

- G95ME-C10.7-LGIMe – HPSCR, EGRTC and EcoEGR (LPSCR available upon request)
- G95ME-C10.5-LGIMe – HPSCR, EGRTC and EcoEGR
- G80ME-C10.7-LGIMe – HPSCR, EGRTC and EcoEGR (LPSCR available upon request)
- G80ME-C10.5-LGIMe – HPSCR, EGRTC and EcoEGR
- G70ME-C10.7-LGIMe – HPSCR, EGRBP and EcoEGR
- S60ME-C10.7-LGIMe – HPSCR, EGRBP and EcoEGR
- G60ME-C10.5-LGIMe – HPSCR, EGRBP and EcoEGR
- G50ME-C10.7-LGIMe – HPSCR, EGRBP and EcoEGR
- G50ME-C9.6-LGIMe – HPSCR, EGRBP and EcoEGR

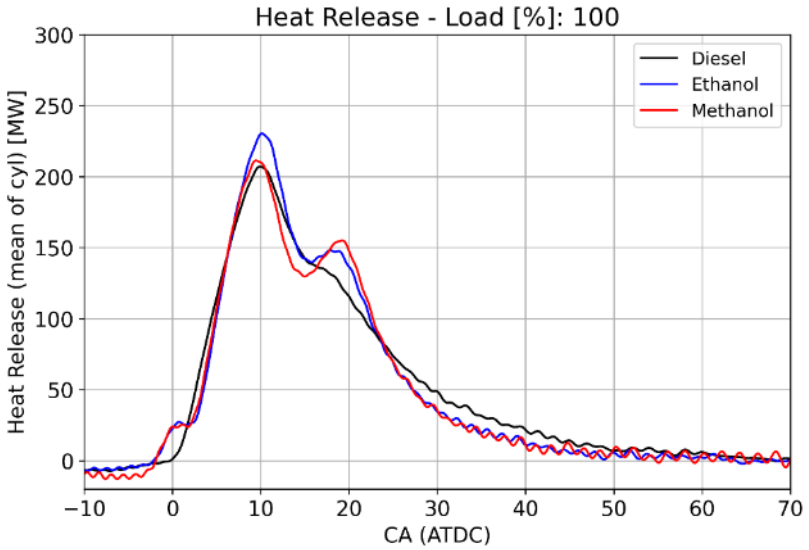
Ethanol, Methanol and Diesel operation

Engine combustion characteristics - Heat release

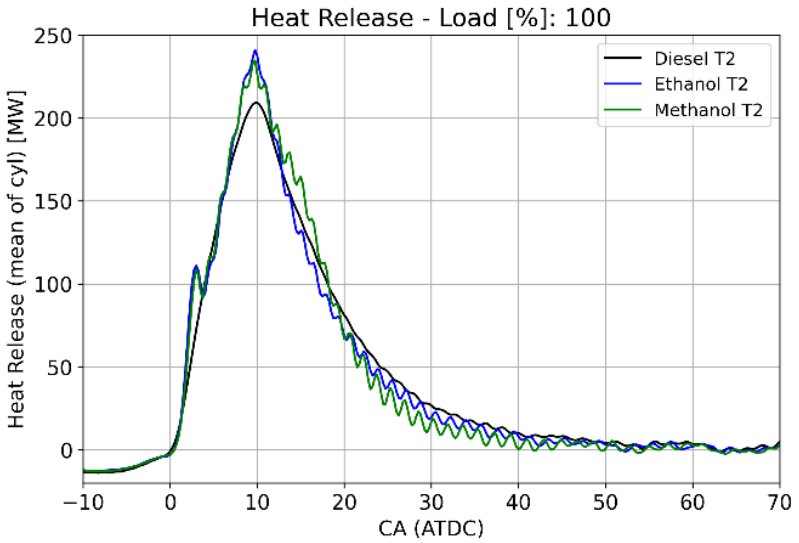


- Ethanol burns just as nicely as methanol.
- A diesel pilot is needed for sustaining ignition.
- Same LGIM injection system is used for ethanol as for methanol.

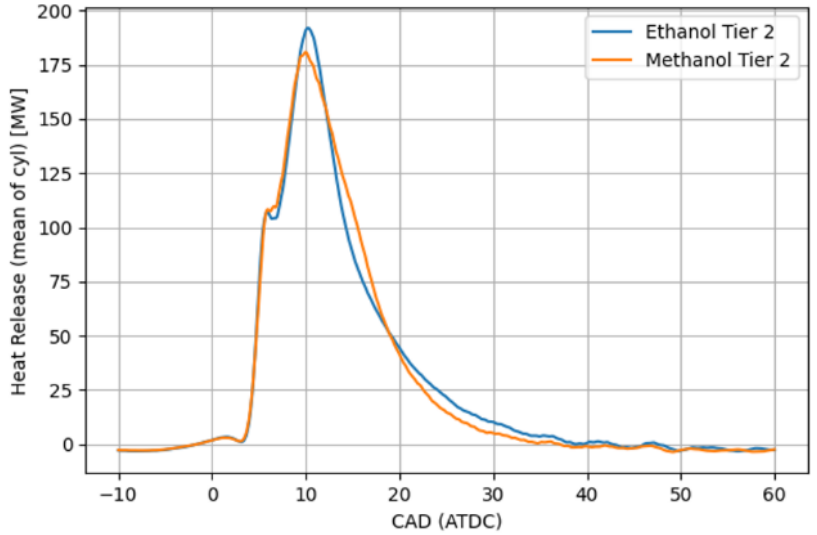
4S90ME-C10.5-LGIM



7G95ME-C10.5-LGIM



7G80ME-C10.5-EGRTC-LGIM



ME-LGIA

Ammonia

Ammonia

Biofuel



The ammonia engine builds on a decade of dual-fuel experience supported by 2100+ orders

	Methane		Methanol	Ethane	LPG	Ammonia	Diesel
	ME-GI	ME-GA	ME-LGIM	ME-GIE	ME-LGIP	ME-LGIA	ME-C & MC
No. of engines	*1202*	*280*	*246*	*94*	*302*	*7*	*30236*

2015
World's 1st **LNG** driven container vessel



2016
World's 1st **MeOH** driven vessel



2017
World's 1st **Ethane** driven vessel



2020
World's 1st **LPG** driven vessel



2023
World's 1st **MeOH** driven container vessel



2026
NH3 driven Vessel (not in service yet)

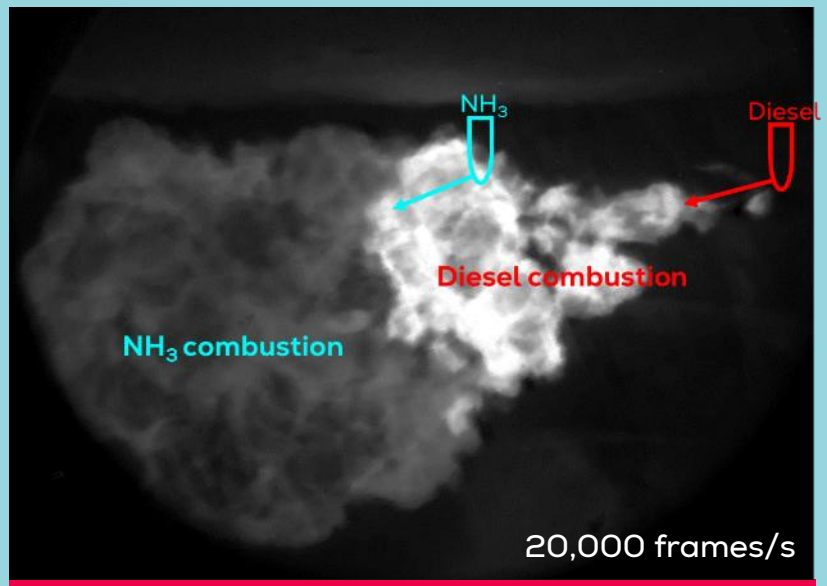


Ammonia Combustion process

Test results from full engine testing (Research Centre Copenhagen)

Ammonia





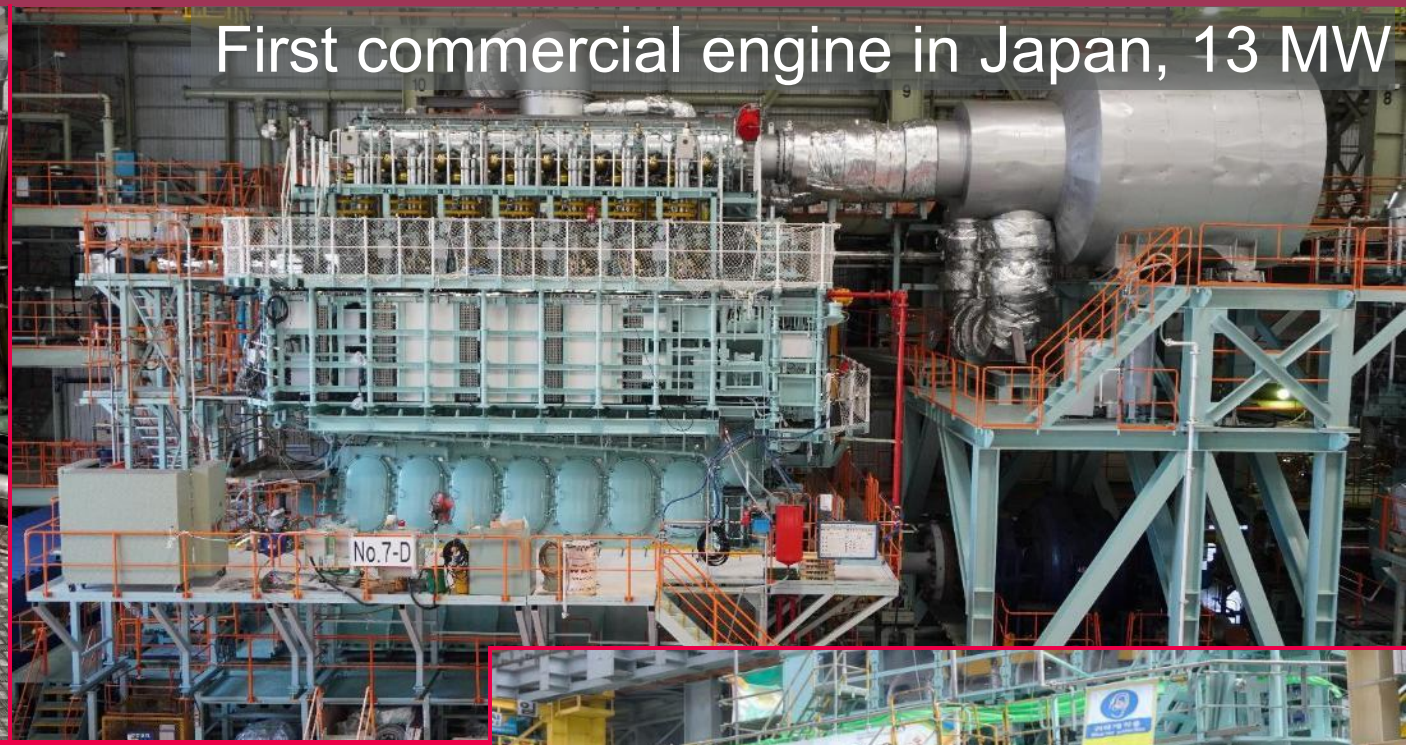
Ammonia combustion process behaves the same way as dual-fuel combustion of other fuels

4T50ME-X

Ammonia test platforms



4-cylinder Ammonia test engine at Research Centre Copenhagen, 7 MW



First commercial engine in Japan, 13 MW



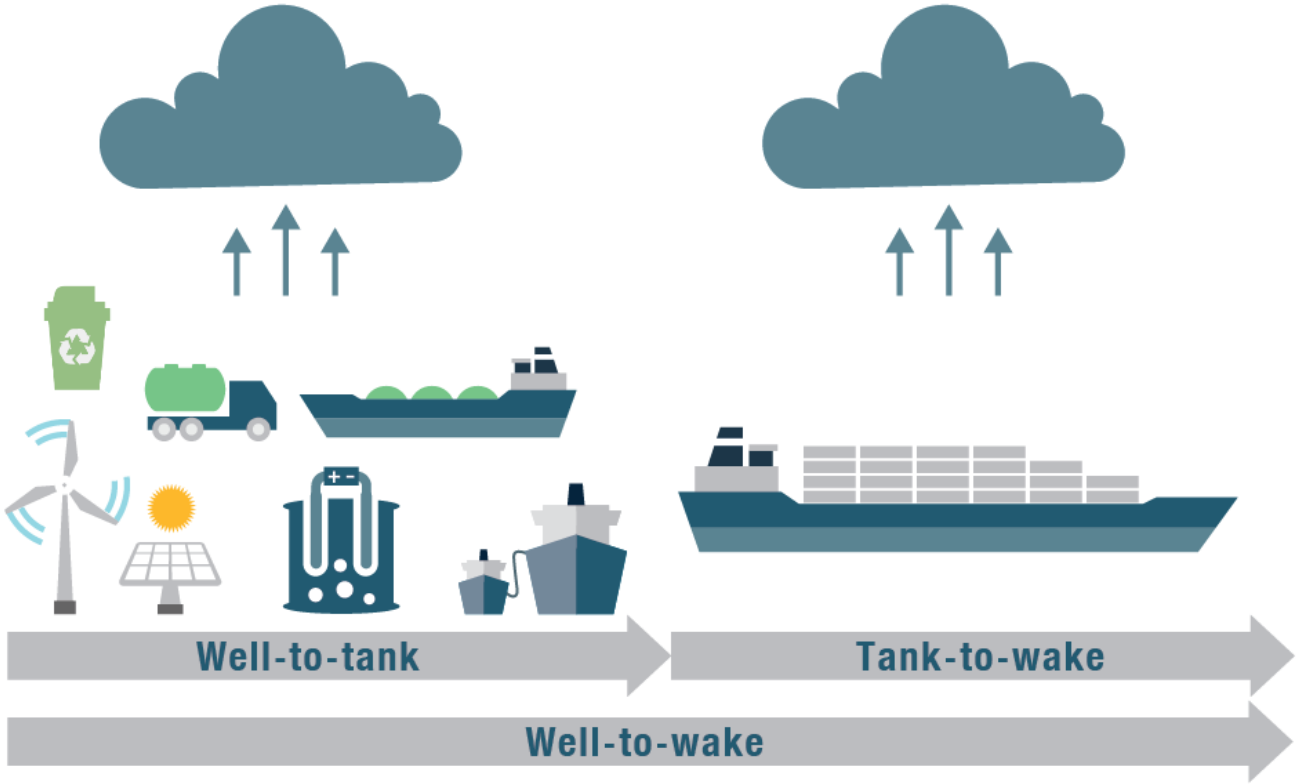
First commercial engine in Korea, 12 MW

- Copenhagen 4T50 tests 2023-2026
- Mitsui (Japan) 7S60 tests 2025-2026
- HHI (Korea) 6G60 tests 2026

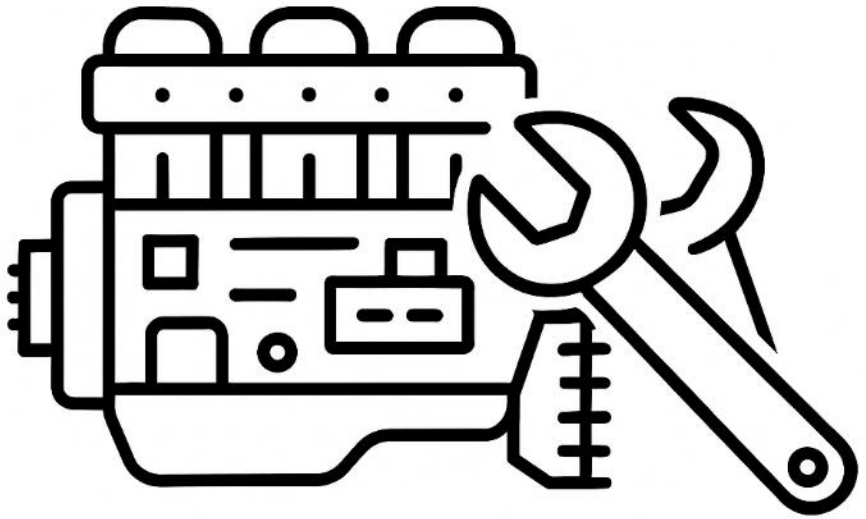
2
Fuel quality

Fuel Sustainability and Fuel Quality

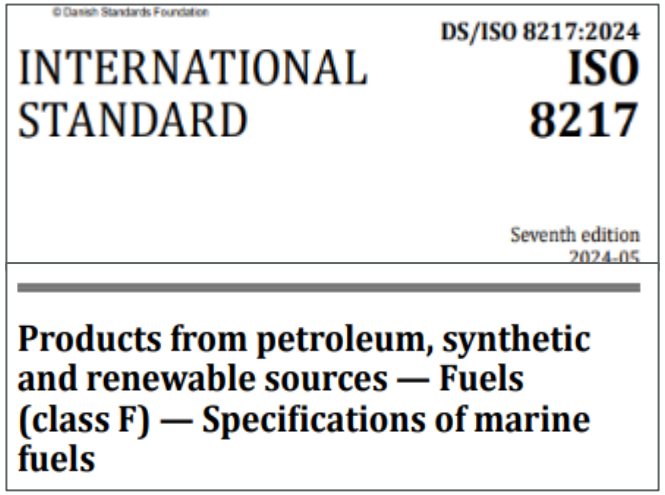
Fuel sustainability is important for the environment



Fuel quality is important for the equipment on board – and possibly the environment



Fuel standards and Specifications are available



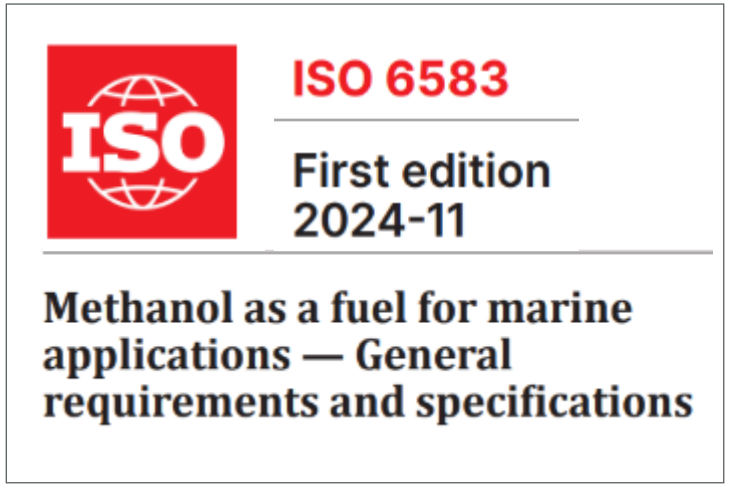
ISO 8217 – Marine fuels

Distillate fuels

Residual fuels

Biofuels (FAME, HVO)

Everllence biofuel guide: SL2026-784

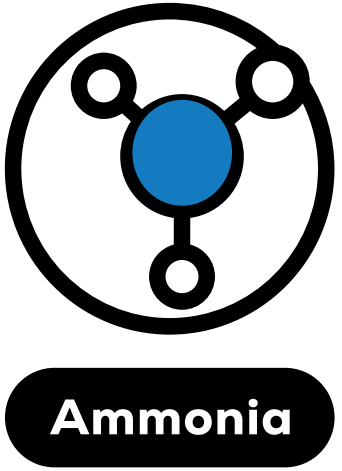


Methanol – published

Everllence Methanol spec. available

Ethanol: ISO work is ongoing

Everllence Ethanol spec. available!



ISO task force WG started

Everllence NH_3 spec. available

Service letters & Project guides

https://www.everllence.com/marine/products/planning-tools-and-downloads

Biofuel

Fuel quality – Fuel management – Engine

New

Biofuels covered by ISO 8217:2024

1. FAME (EN 14214, ASTM D6751)
2. Hydrotreated vegetable oil (HVO)
3. (0 to 100%) Blends of the above with ISO 8217 compliant distillate and residual fuel grades

Biofuels covered by Everllence SL2026-784

1. Biofuels covered by ISO 8217:2024
2. Similar FAME-type fuels – up to 100%*
   a) Marine grades of FAME*
   b) FAME distillation residue (FDR)*
3. Blends of the above with ISO 8217 compliant distillate or residual fuel grades, e.g. B30.

*Certain conditions apply. Refer to SL2026-784

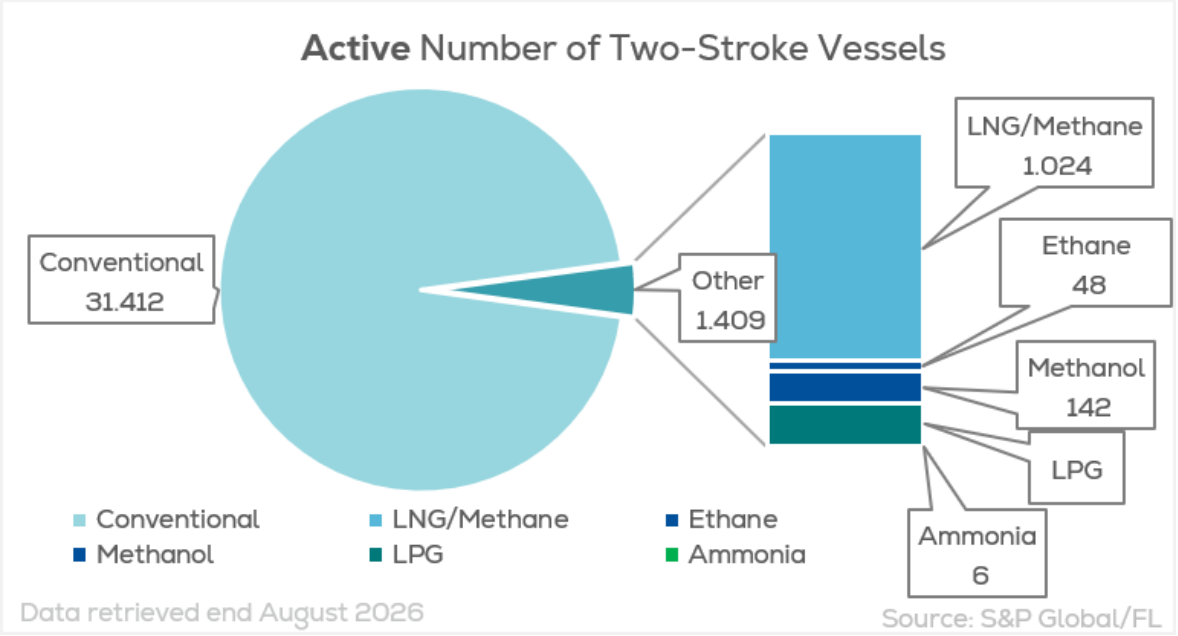
Other bio-components

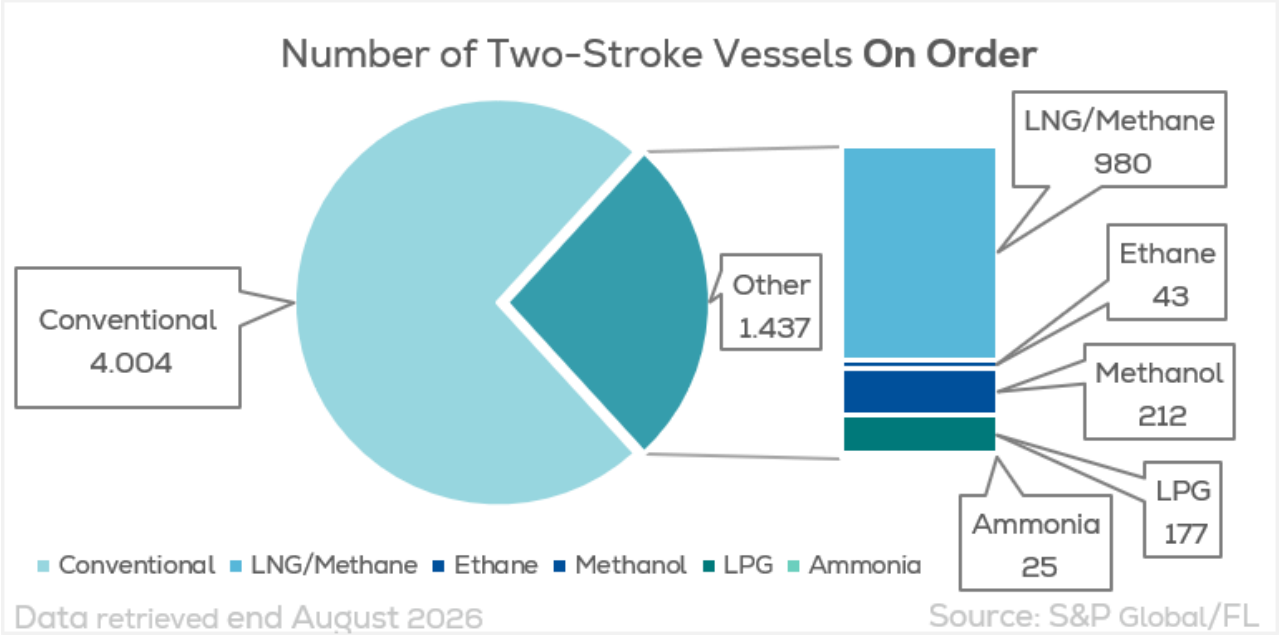
- Distillation bottoms, other streams from FAME production
- Cashew nutshell liquid (CNSL) – different qualities
- Pyrolysis oil and HTL - different qualities
- Straight / unprocessed waste and residue fats and oil



3
Uptake, Forecast and closing remarks

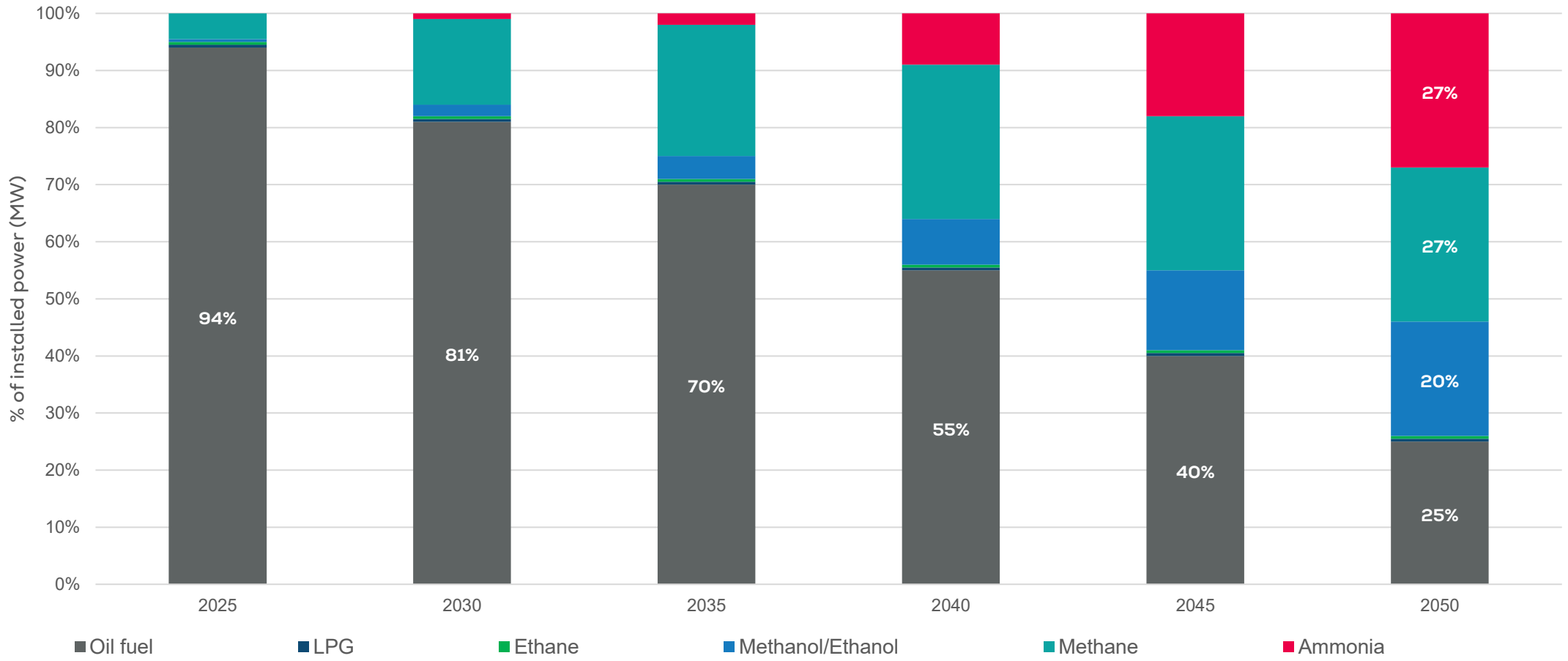
Two-stroke dual fuel uptake and forecast in number of ships





Aug 26 *Source: Everllence*

Fuel-mix forecast for two-stroke powered vessels



Source: Everllence August 2026

Summary

The future will be a mix of fuels

- ✓ **Fuel flexible engine technologies are available**
  - ✓ Retrofitting possible.
  - ✓ Methanol – ethanol
  - ✓ LNG – bio-LNG
  - ✓ Ammonia
- ✓ **Everllence fuel specifications for the alternative fuels are in place.**
- ✓ **International standards Methanol, LNG are in place. Both feed stock agnostic**
  - ✓ Ethanol standard is under development, and an ISO NH3 task force has started.
- ✓ **Biofuels. The system tolerates a lot but not everything. Let's find a good path forward together.**

Disclaimer

All data provided in this document is non-binding.
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.



Thank you!

Julia Svensson
Everllence

Everllence