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Methanol's integration into maritime transport

Matthías Ólafsson, Chief EU Representative

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Milestones

GHG Intensity

Availability and access in low-carbon formats

Milestone 1: Multiple vessel orders

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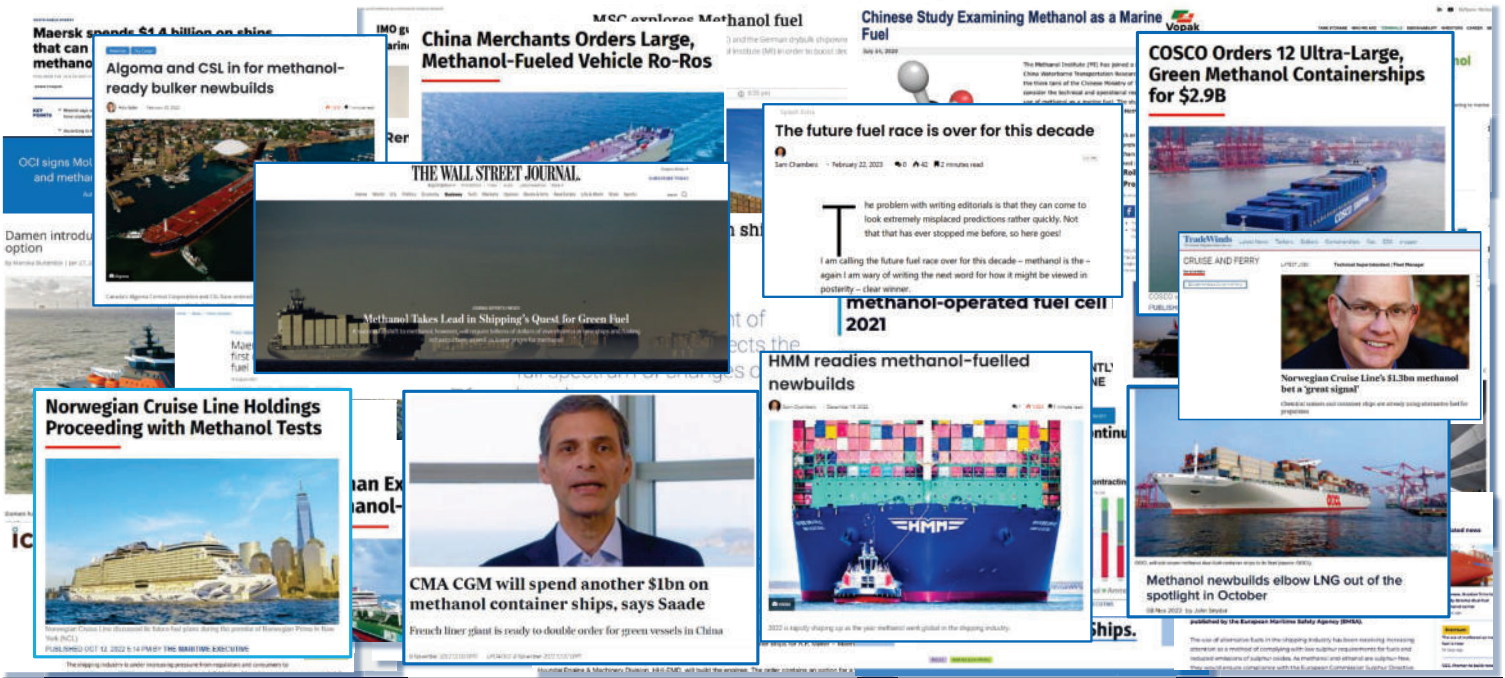


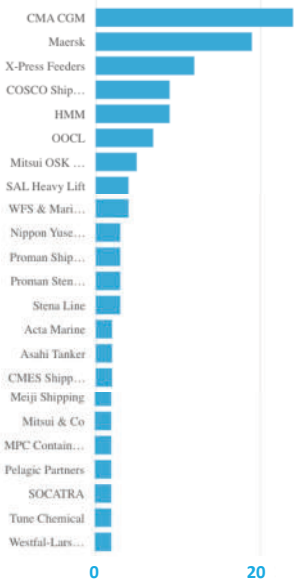
Order book

Alternative Fuels Uptake

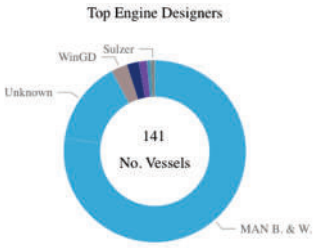
Alt Fuel Uptake by Number of Vessels

Alt. Fuels	Flt	% Flt	OB	% OB
Methanol	24.0	0.0%	117.0	2.4%
Total	**24.0**	**0.0%**	**117.0**	**2.4%**

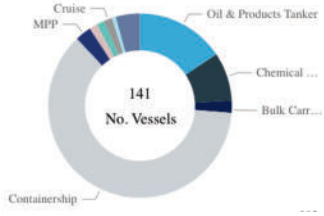
Top Owners



Engine Designers

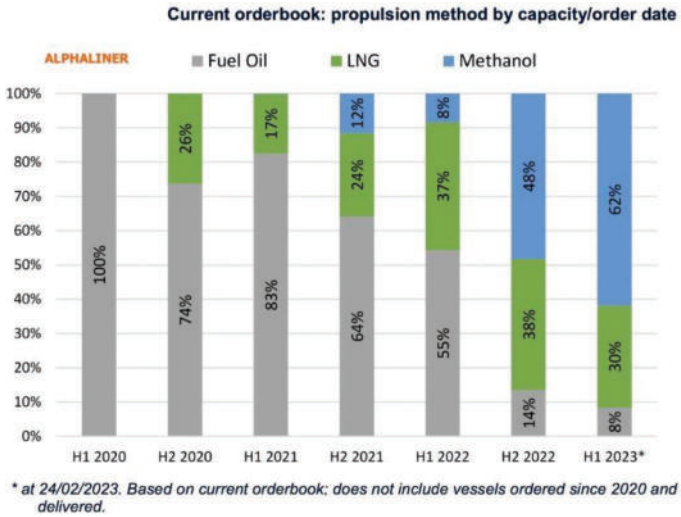


Uptake by Vessel Type

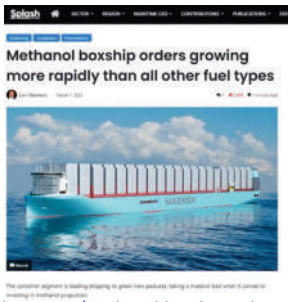


Source: Clarksons

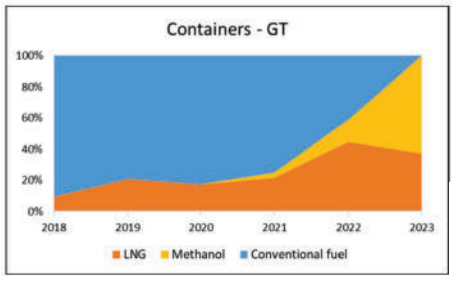
Dominating Container Orderbook



** at 24/02/2023. Based on current orderbook: does not include vessels ordered since 2020 and delivered.*

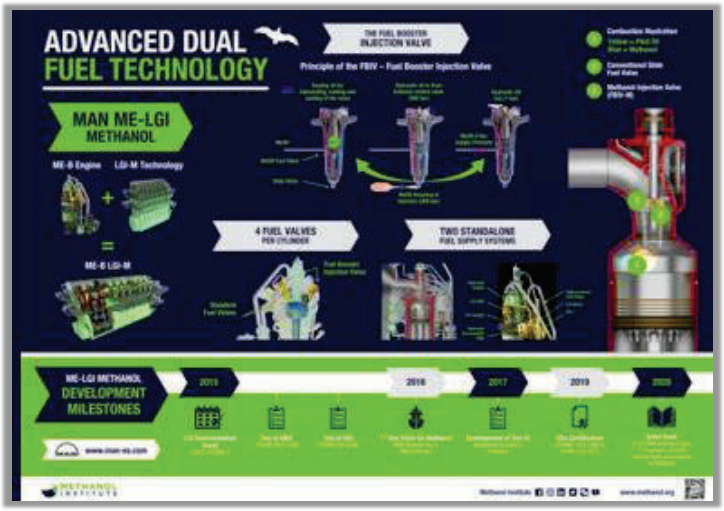


https://splash247.com/methanol-boxship-orders-growing-more-rapidly-than-all-other-fuel-types/



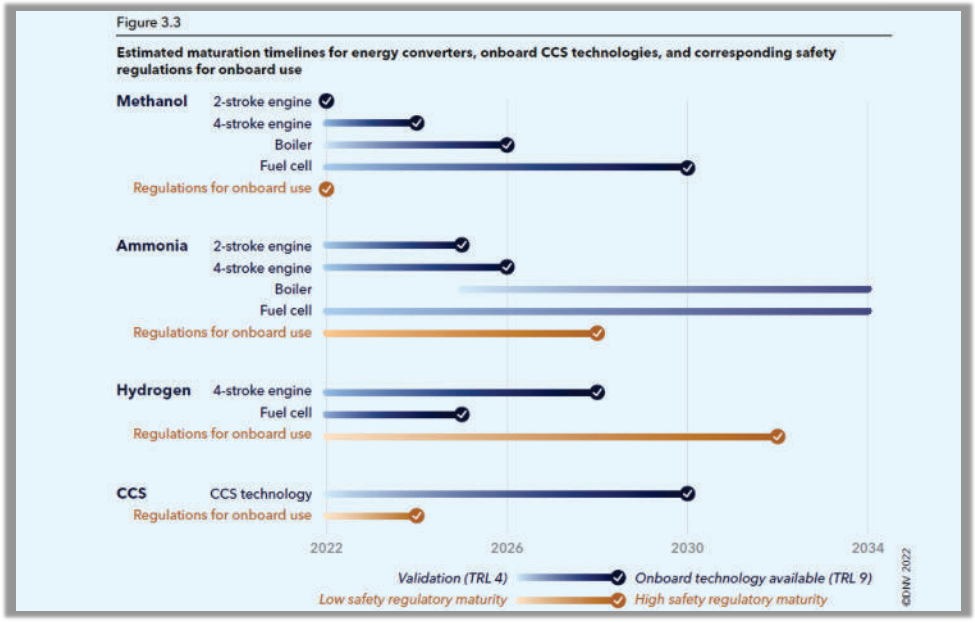
DNV

Engines Available and More Coming



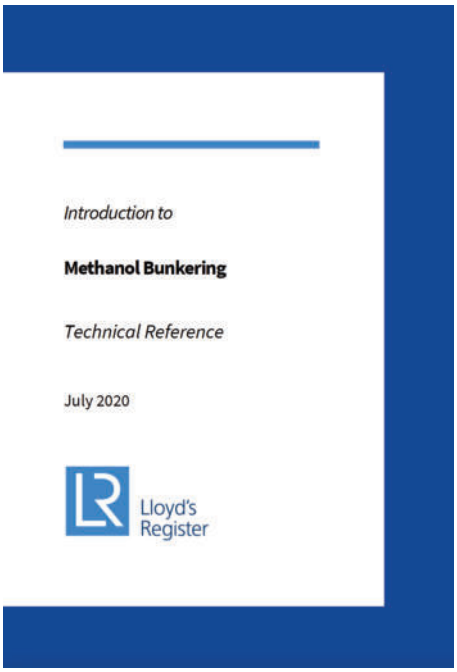
Since 2016, MAN has received orders for 110 large, two-stroke methanol engines, with 24 already in operation in chemical tankers operated by MI members. Another 100+ engine orders on the way!!!

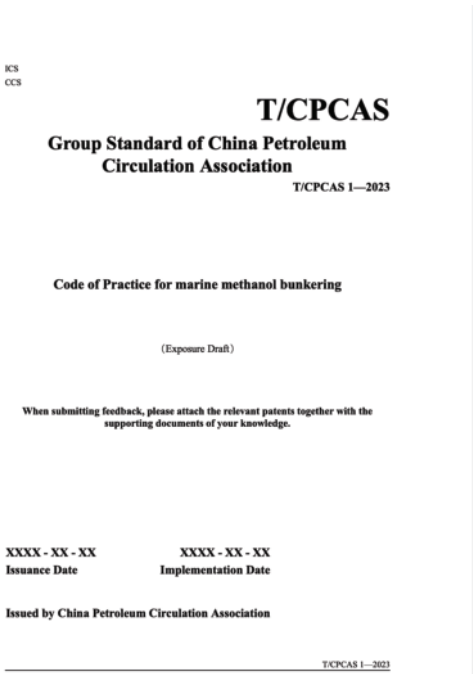
Technology Readiness



https://www.dnv.com/maritime/publications/maritime-forecast-2022/index.html

Milestone 2 : Bunkering development





ICS
CCS

T/CPCAS

Group Standard of China Petroleum Circulation Association

T/CPCAS 1—2023

Code of Practice for marine methanol bunkering

(Exposure Draft)

When submitting feedback, please attach the relevant patents together with the supporting documents of your knowledge.

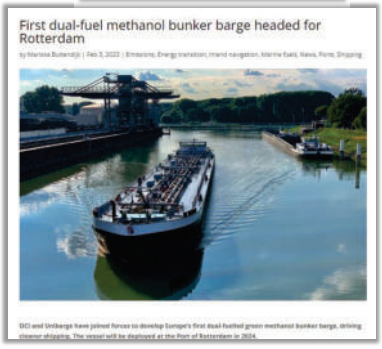
XXXX - XX - XX
Issuance Date

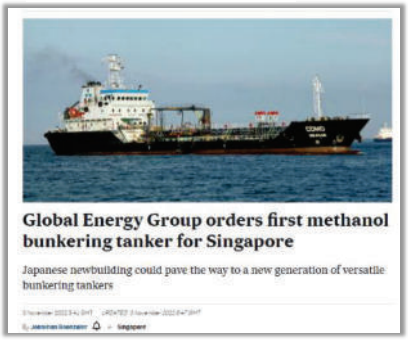
XXXX - XX - XX
Implementation Date

Issued by China Petroleum Circulation Association

T/CPCAS 1—2023

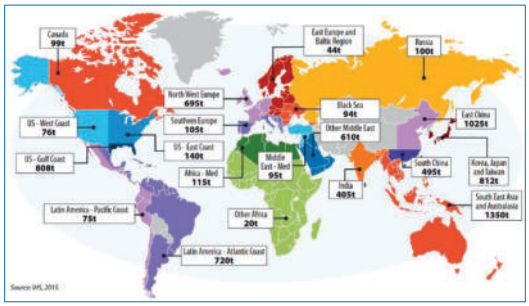
Bunkering demonstrations

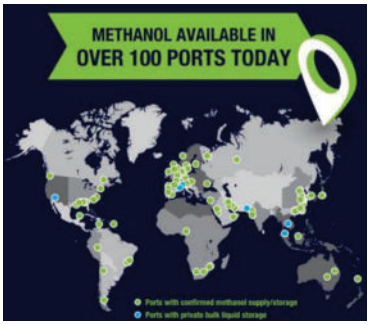


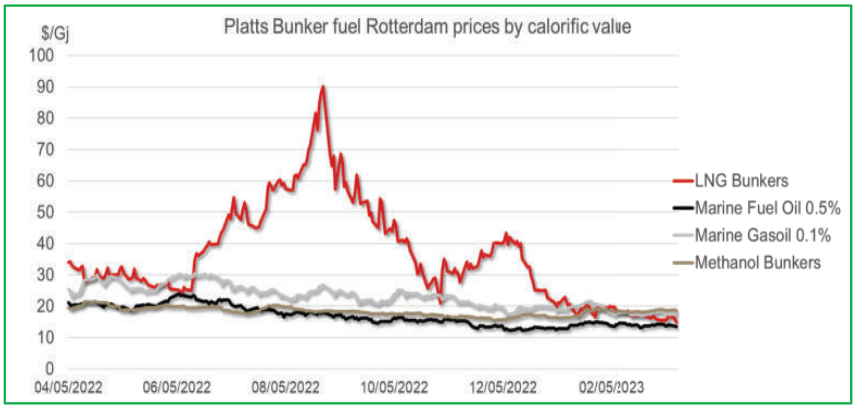


Availability in ports and bunker pricing

Methanol Trading Hubs – Storage Capacity



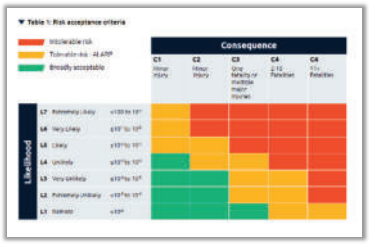




Friday 17 March – S&P Methanol
Rotterdam Spot = €335/tonne

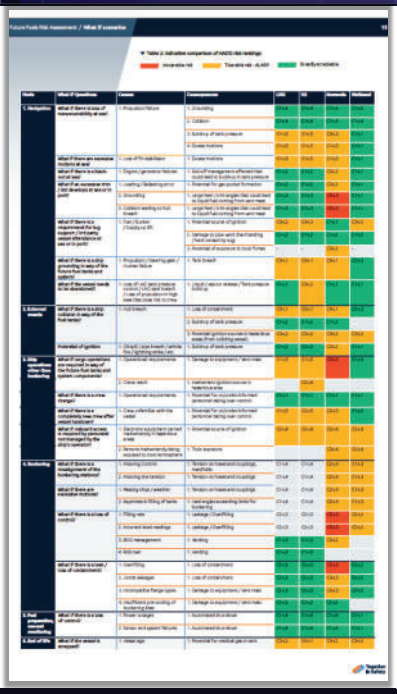
Safety Assessments conducted

- June 2022: *Together in Safety*, a non-regulatory shipping industry consortium initiated the *"Future Fuels Risk Assessment,"* a cross-industry study to evaluate the potential operational risks of LNG, methanol, hydrogen and ammonia.
- The study, which involved a series of hazard identifications (HAZID) workshops across a set of operational scenarios, found of the four fuels reviewed, methanol poses the least overall risk, followed by LNG, hydrogen and ammonia.
- Methanol scored the lowest risk ratings within navigation-related scenarios, as well as in scenarios related to ship operations.
- Methanol also scored the lowest risk ranking in the external event scenario of hull breach from ship collision.
- The study identified some 'intolerable' risks associated with ammonia that need to be resolved before it can be used at scale as a bunker fuel.

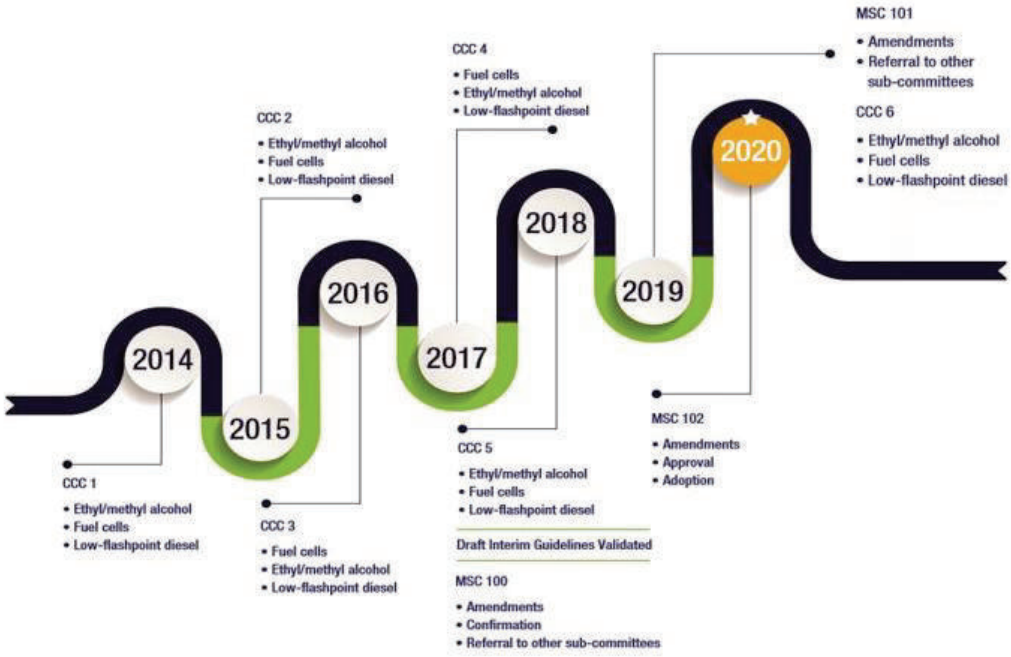


Bud Darr, Executive Vice President, Maritime Policy, MSC Group: *"Without the safety issues being thoroughly identified and properly addressed, we will not reach the end state we need. Safety and net zero GHG operations must go hand-in-hand in a world powered by future fuels at sea."*

https://togetherinsafety.info



Milestone 3: Regulatory Drive



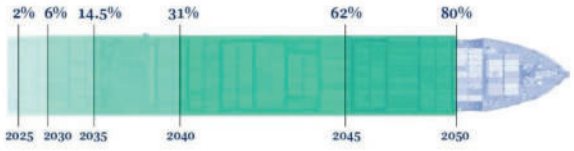
Milestone 3: Regulatory Drive

FuelEU Maritime Regulation

The FuelEU maritime regulation will oblige vessels above 5 000 gross tonnes calling at European ports (with exceptions such as fishing ships):

→ to **reduce** the **greenhouse gas intensity** of the energy used on board as follows

Annual average carbon intensity reduction compared to the average in 2020



→ to connect to **onshore power supply** for their electrical power needs while moored at the quayside, unless they use another zero-emission technology

ETS Extension to Shipping

Carbon cost of maritime emissions in the ETS
Extra-EU voyage and intra-EU voyage example

	Tonnes of CO_2 emitted	Year	Carbon cost in USD*
Extra-EU voyage		2023	14 500
		2024	32 500
NY - Antwerp - NY	1700	2025	50 500
		2026	72 500
Intra-EU voyage		2023	12 000
		2024	27 000
Le Havre - Riga-Amsterdam	700	2025	42 000
		2026	60 000

*The CO_2 cost per tonne cargo is based on the last settlement price of the spot European Emission Allowances (EUR 72.96). 1 EUR = 1.12 USD

Siglar

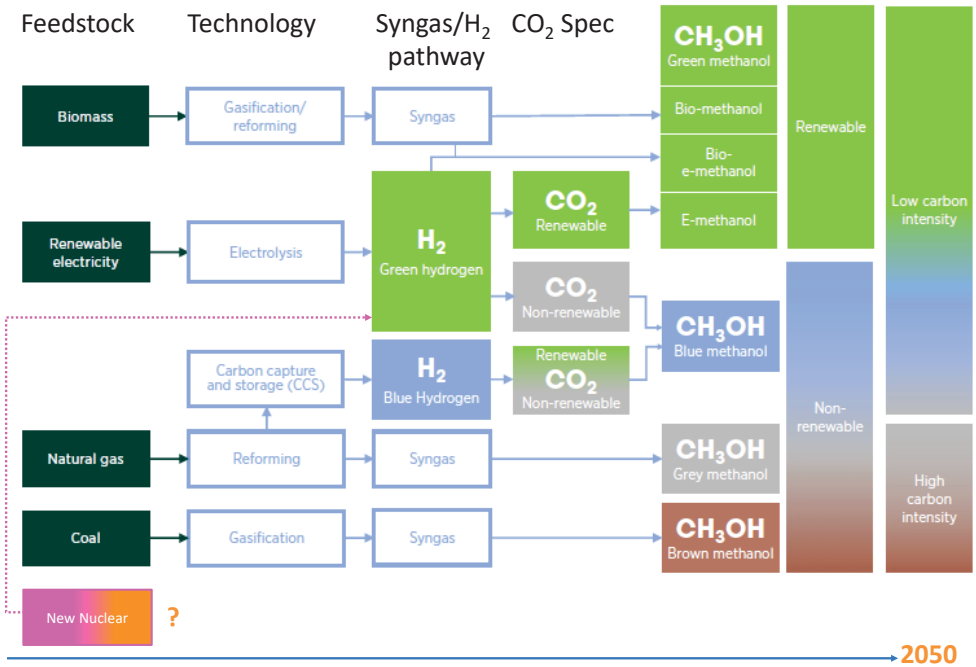
www.methanol.org/join-us

Methanol GHG Intensity

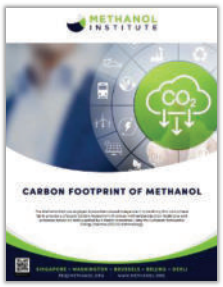
Year	IMO Targeted reductions relative to reference year*
2020	Reference year
2025	↓ 2%
2030	↓ 6%
2035	↓13%
2040	↓26%
2045	↓59%
2050	↓75%

**Likey to be revised 2023*

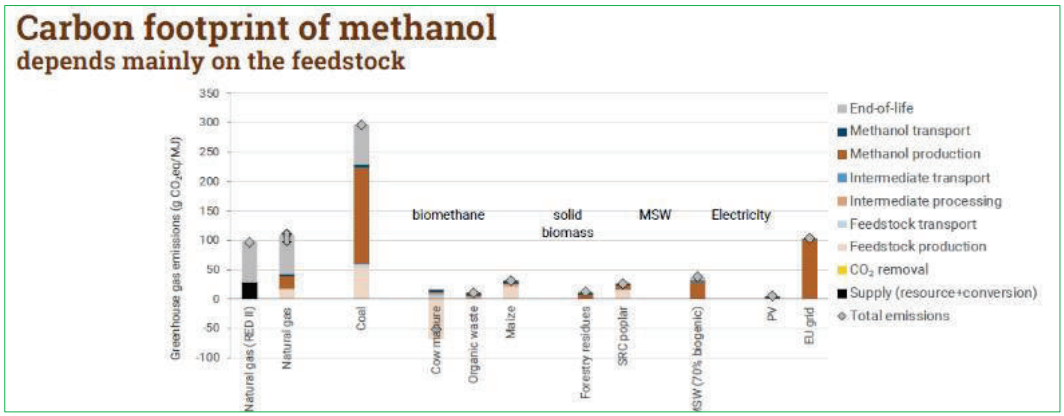
Sources: IMO, IRENA, MI



Methanol GHG Intensity



https://www.methanol.org/policy-initiatives/europe/



- In January 2022, MI released a report from Amsterdam-based consulting firm studio Gear Up on "Carbon Footprint of Methanol"
- Depending on feedstock and production process methanol's carbon footprint can be reduced by 65-95%, and even negative CI score from cow manure

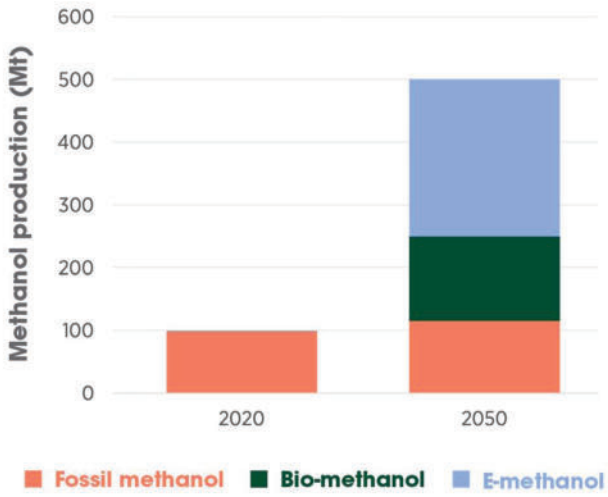
Availability in low-carbon formats

Conventional Methanol Emissions Reduction

- According to IRENA, the uptake for both bio and renewable methanol is set to increase substantially, by a factor of 5x compared with conventional methanol, from approximately 1mln mtpa in 2023
    - Existing infrastructure can be repurposed
    - Waste feed and CO_2 streams are readily available, allowing harder to decarbonize sectors to de-leverage
    - Cost effective and supports transition to carbon neutrality

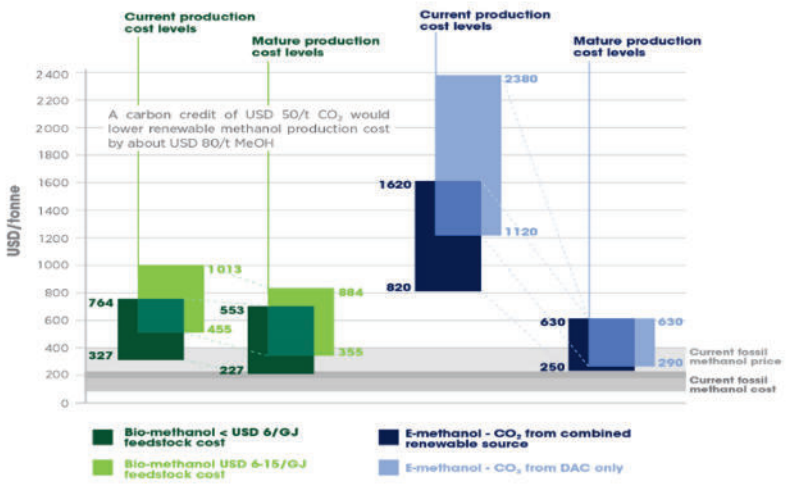
https://www.irena.org/publications/2021/Jan/Innovation-Outlook-Renewable-Methanol

Figure 47. Current and future methanol production by source



Availability in low-carbon formats

Figure 3. Current and future production costs of bio- and e-methanol



Notes: MeOH = methanol. Costs do not incorporate any carbon credit that might be available. Current fossil methanol cost and price are from coal and natural gas feedstock in 2020. Exchange rate used in this figure is USD 1 = EUR 0.9.

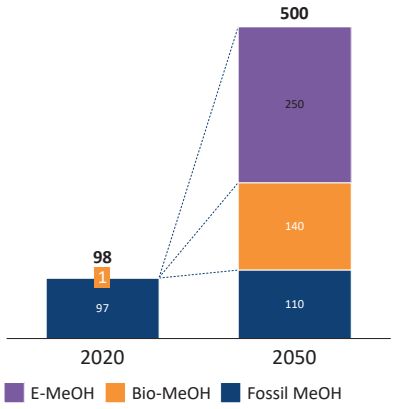
www.methanol.org/join-us

Availability in low-carbon formats

The outlook for methanol into 2050 is very promising. Strong additional potential in aviation and H2 long-distance transport – but only if key hurdles are mastered

Forecast by IRENA

[million t]



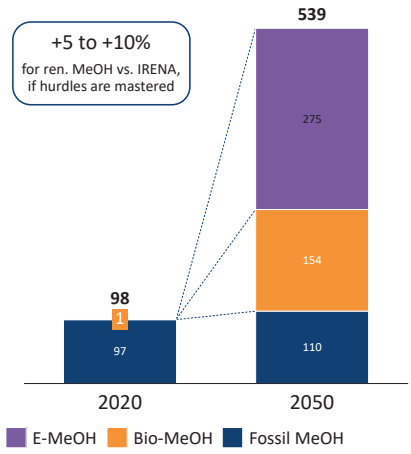
Growth drivers in key segments

Segment	Growth drivers	Outlook (vs. IRENA)
Maritime	• Decarb targets, e.g., IMO • Safe, infrastructure easy handling	↗
Auto	• FC-vehicles in PC limited use, but potential in long-haul HD transport	→
Aviation	• ASTM approval for MtJ required • Potential for bio- and e-MeOH (PtL)	↗
Power	• Use for off-grid power & heat (direct of via FC solution) • Competes with diesel, LPG, EtOH wind & solar power solutions	→
H2 chain	• Build-up of H2 chains (US, EU, ME) • MeOH robust and safe H2 carrier • MeOH awareness fallen behind NH3	↗
Chemicals	• Chemicals to decarbonize replacing fossil with green MeOH as feed • CCS solutions in MeOH production drive robustness (blue-MeOH)	→

→ well covered by IRENA ↗ strong upside potential, but hurdles

Updated forecast by Roland Berger

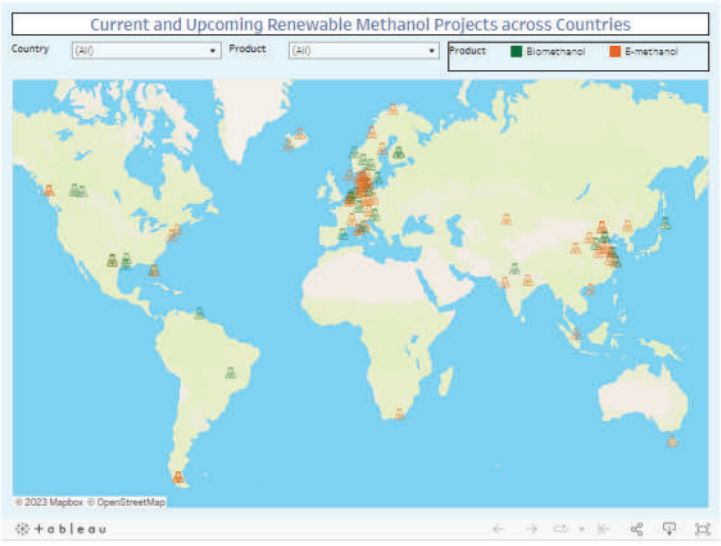
[million t]

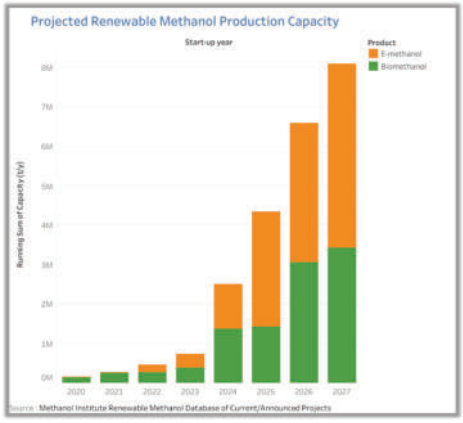


Source: IRENA, Roland Berger

Availability in low-carbon formats

www.methanol.org/renewable/





"With 80 renewable methanol projects already announced, we are seeing clear signs of an incoming wave of bio-methanol and e-methanol production"
Gregory Dolan, CEO, Methanol Institute

https://www.einpresswire.com/article/594328267/methanol-institute-sees-renewable-methanol-production-growth

www.methanol.org/join-us

Increasing Scale – Bigger Players

- Increasing scale: To date, e-methanol and biomethanol plants have been in range of 4,000-10,000 tons/year, and we are now seeing announced plants with planned capacity of 50,000, 100,000, 250,000 tons/year
- Expanding from project developers like Carbon Recycling International, Enerkem, Liquid Wind and Gidara, we are seeing major utilities like European Energy, Orsted, Iberdola, SunGas Renewables, and Engie
- We are also seeing interest in methanol from oil/gas majors including new MI members Aramco, BP, ENI/Ecofuel, TotalEngines as well as Chevron, ExxonMobil, and Sinopec





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