

FuelEU Maritime and shipping decarbonisation

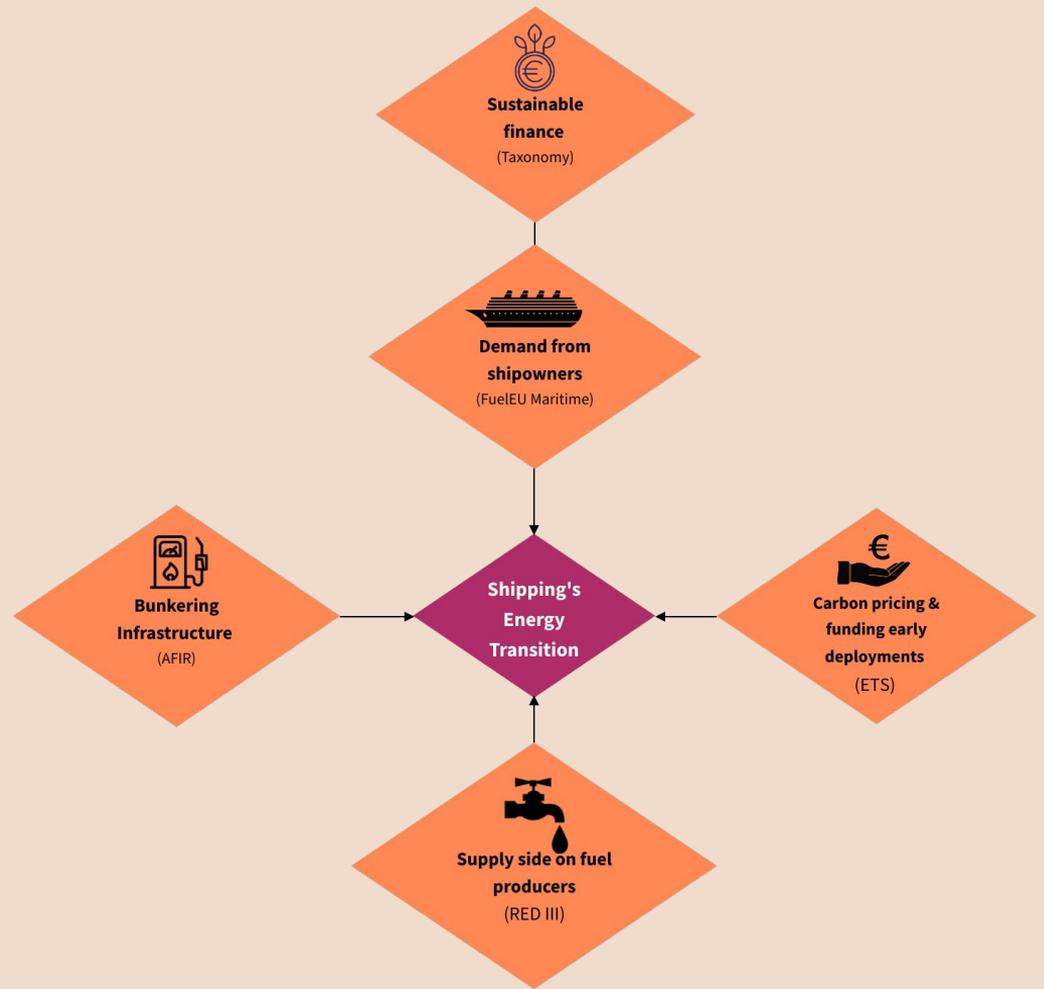
04/12/2025

Conference 'FuelEU and Beyond'

Le Havre



European policy framework for sustainable shipping

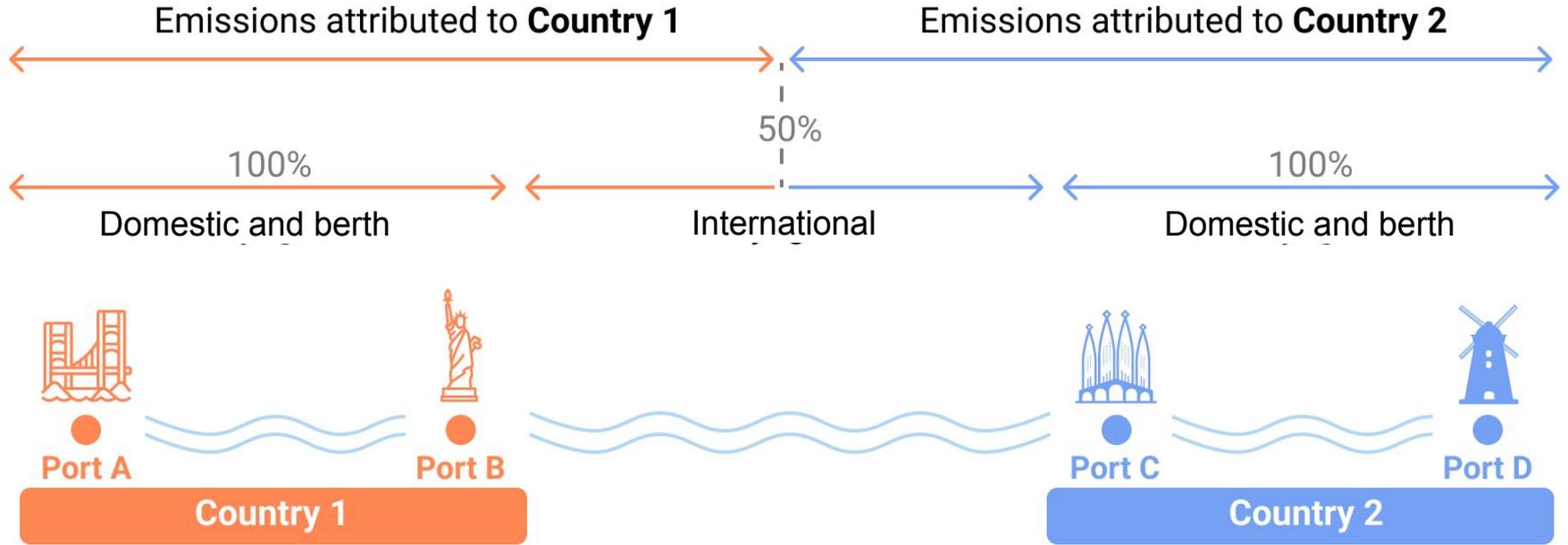


FuelEU Maritime

Mandating the uptake
of alternative fuels

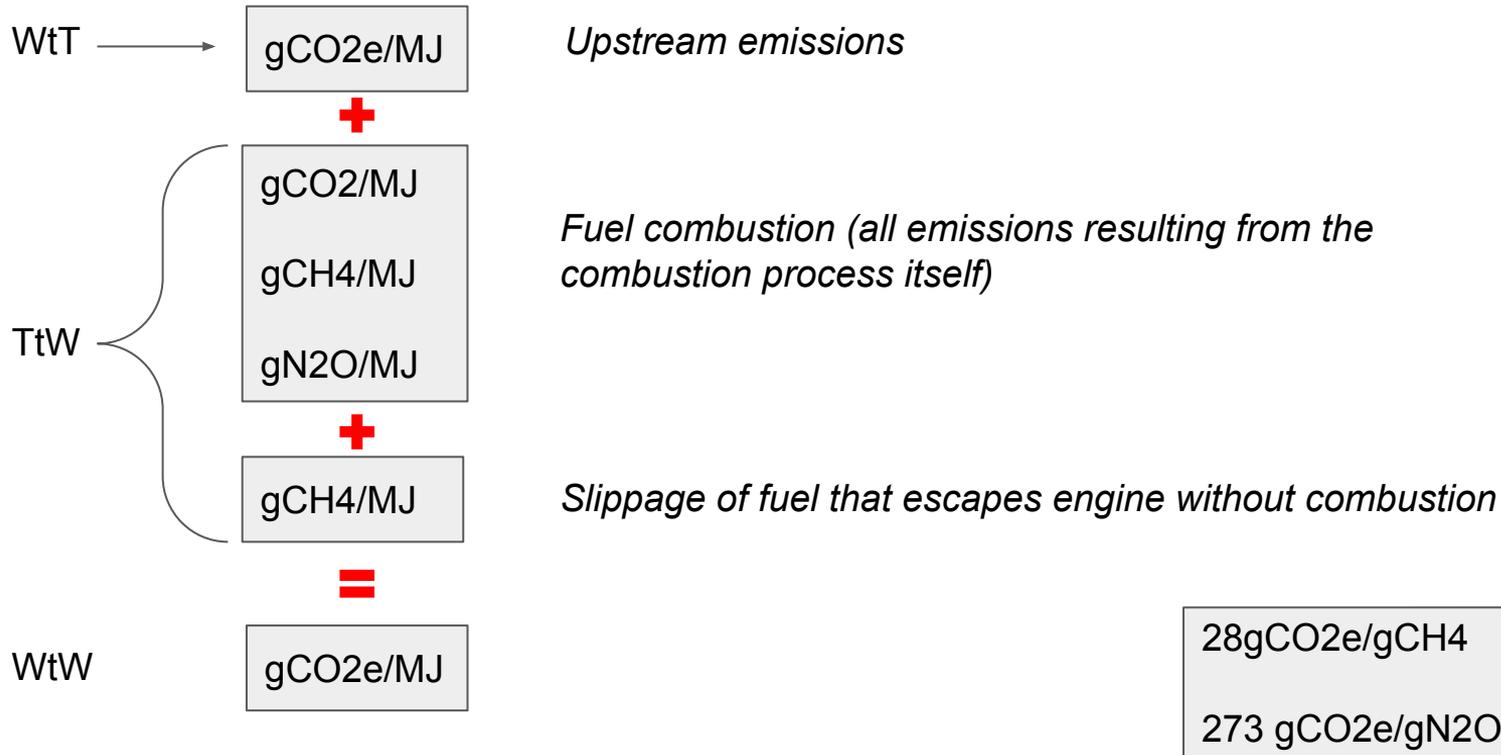


Attribution of global shipping emissions to individual port states



Source: T&E

Simplified WtW CO₂e methodology of FEUM



Fuel EU Maritime

EU's 2040 goal requires more ambitious FuelEU targets

— Current FuelEU
 — 1.5°C (high demand low efficiency)
 - - - 1.5°C (low demand high efficiency)
 — EU 2040 target

WtW fuel intensity limits (gCO_{2e}/MJ)

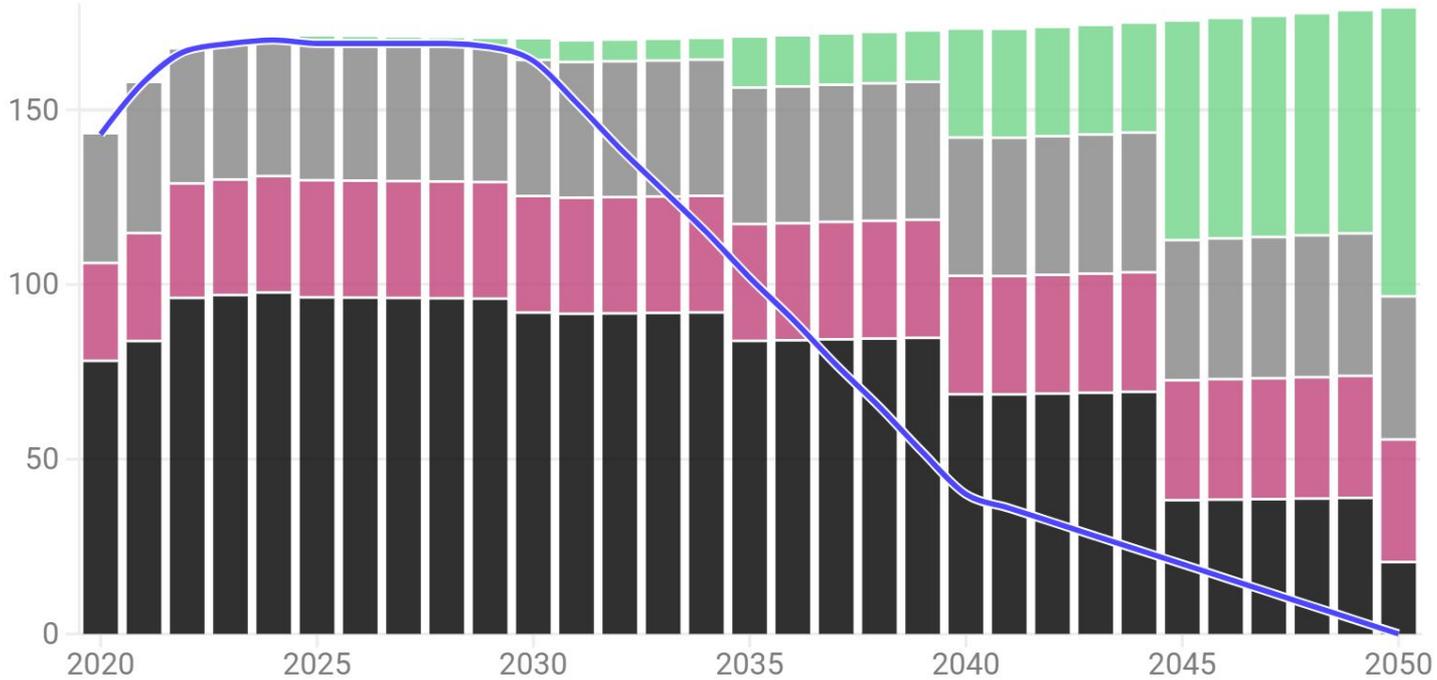


FEUM	Reduction targets	GHG thresholds (gCO _{2e} /MJ)
2020 baseline	-	91.16
2025-2029	-2%	89.34
2030-2034	-6%	85.69
2035-2039	-14.5%	77.94
2040-2044	-31%	62.90
2045-2049	-62%	34.64
2050+	80%	18.23

Post-FF55 EU Shipping Emissions

- Trajectory compatible with new 2040 climate target
- Regulated but not abated GHG
- Exempted small vessels GHG
- Regulatory-gap on EU-related GHG
- FF55 abated GHG

TtW CO₂e (Mt)

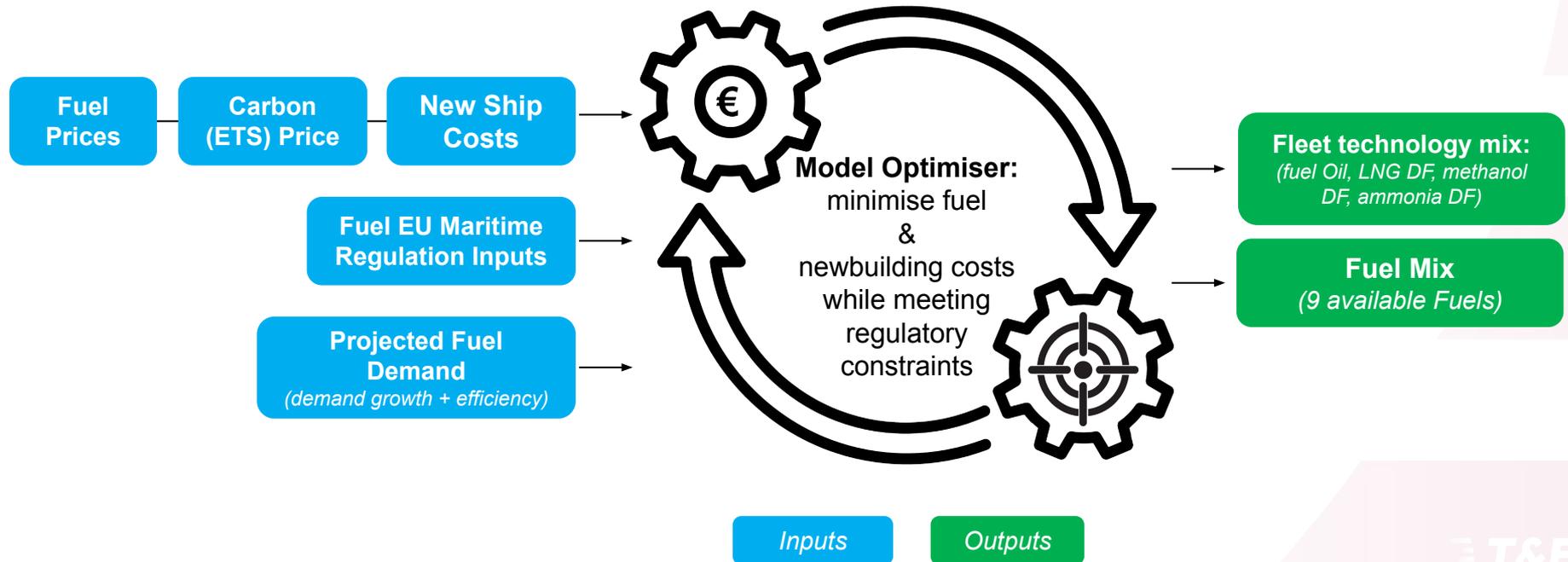


"Regulatory-gap on EU-related GHG" refers to EU-related emissions not regulated by FF55, i.e. 50% of extra-EU MRV emissions. Small vessels are those <5000 GT. Proposal for a 2040 target assumes 80% emissions reduction over 2008 levels.

**Which fuels does FEUM
incentivise?**

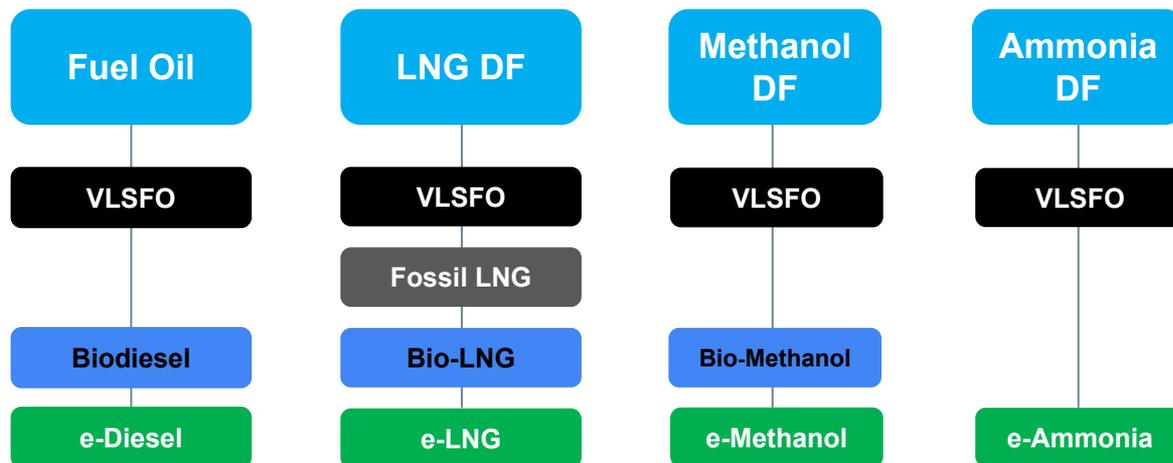
FuelEU Maritime Optimisation Model

T&E containership optimisation model allows us to look at the impact of different scenarios by forecasting how operators would minimise costs when faced with different regulatory constraints, incentives, fuel prices or other factors.



FuelEU Model: Technologies & Fuels

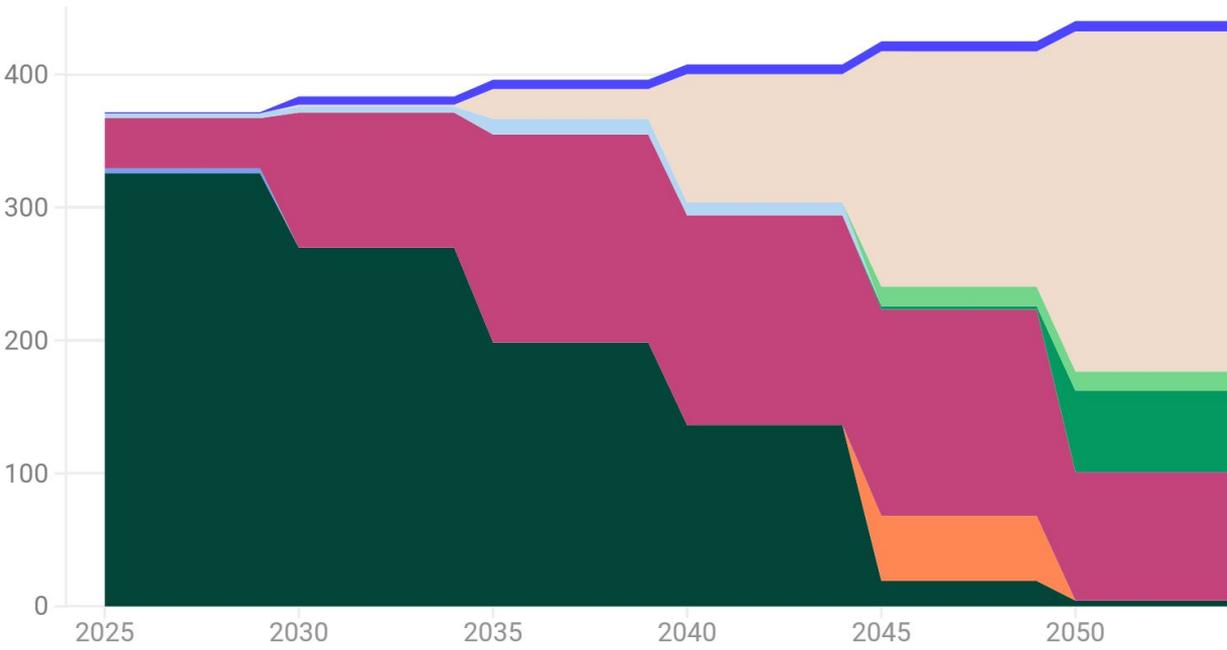
Model includes 4 vessel technologies, each of which allows operators to use a choice of fuels - focus on those with most technological potential and available pricing data.



Projected fuel mix under FF55 for the container fleet

■ VLSFO
 ■ Biodiesel
 ■ e-Diesel
 ■ Fossil LNG
 ■ e-LNG
 ■ Bio-Methanol
 ■ e-Methanol
 ■ e-Ammonia
 ■ SSE

Energy demand (Pj)



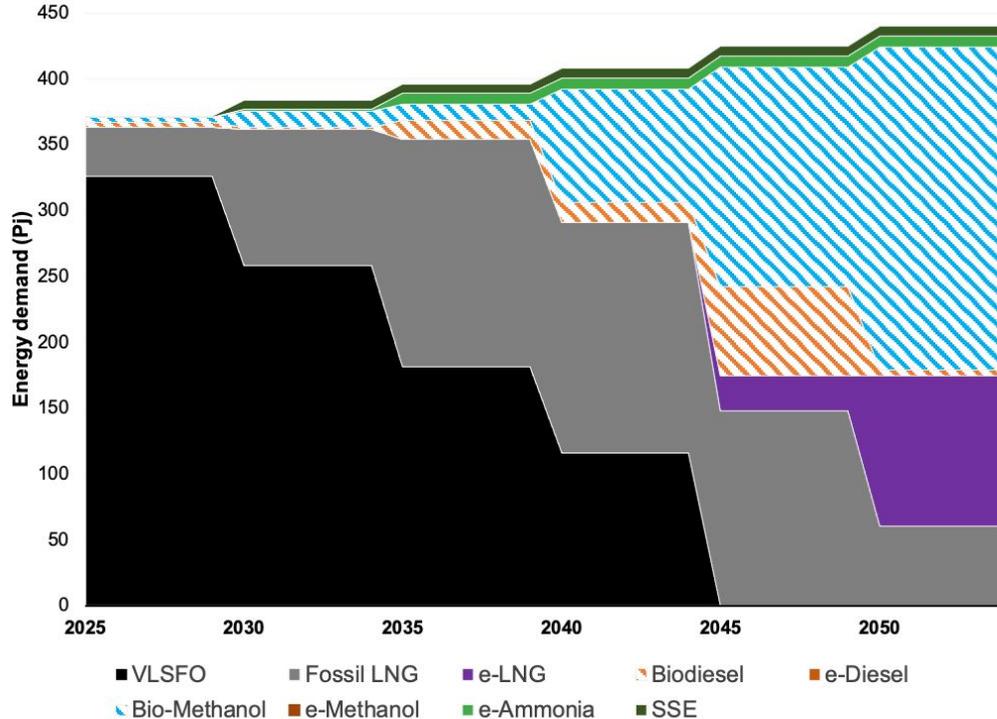
Source: Source: T&E containership fuel optimisation model (2023). FEUM pathway, base-case.

Base case fuel prices

- FuelEU still allows ships to burn fossil VLSFO & LNG into the 2050s.
- If technically feasible, e-Ammonia likely to see the biggest demand from new ships from 2040 onwards.
- Limited demand for biofuels if competition from other sectors and limited scalability result in higher prices.
- LNG still the main option for early switching given relatively weak FEUM targets in the early years.

Projected fuel mix for container fleet

If biodiesel prices remain low, green e-fuels will struggle for market share



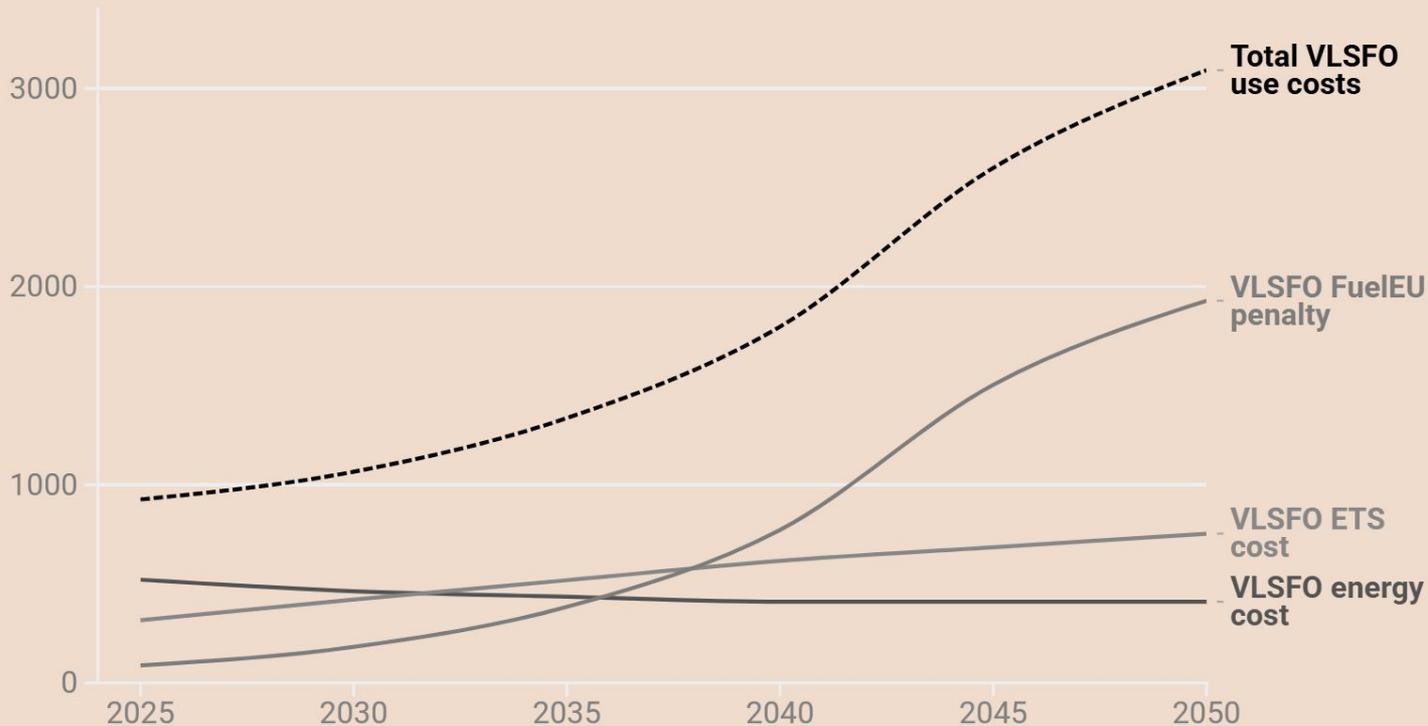
Base-case + low biodiesel price

- Bio-methanol could make up over half of EU shipping fuel demand if prices are sufficiently low
- Bio-methanol uptake grows across 2040s, instead of e-ammonia
- LNG remains primary option for compliance in 2030s even under low biofuel pricing.

Source: T&E fuel optimisation model (2023). FEUM pathway, low biodiesel price + base-case.

Comparative impacts of ETS and FEUM penalties

Cost of using 1 tonne of VLSFOeq fuel (mix) (€)

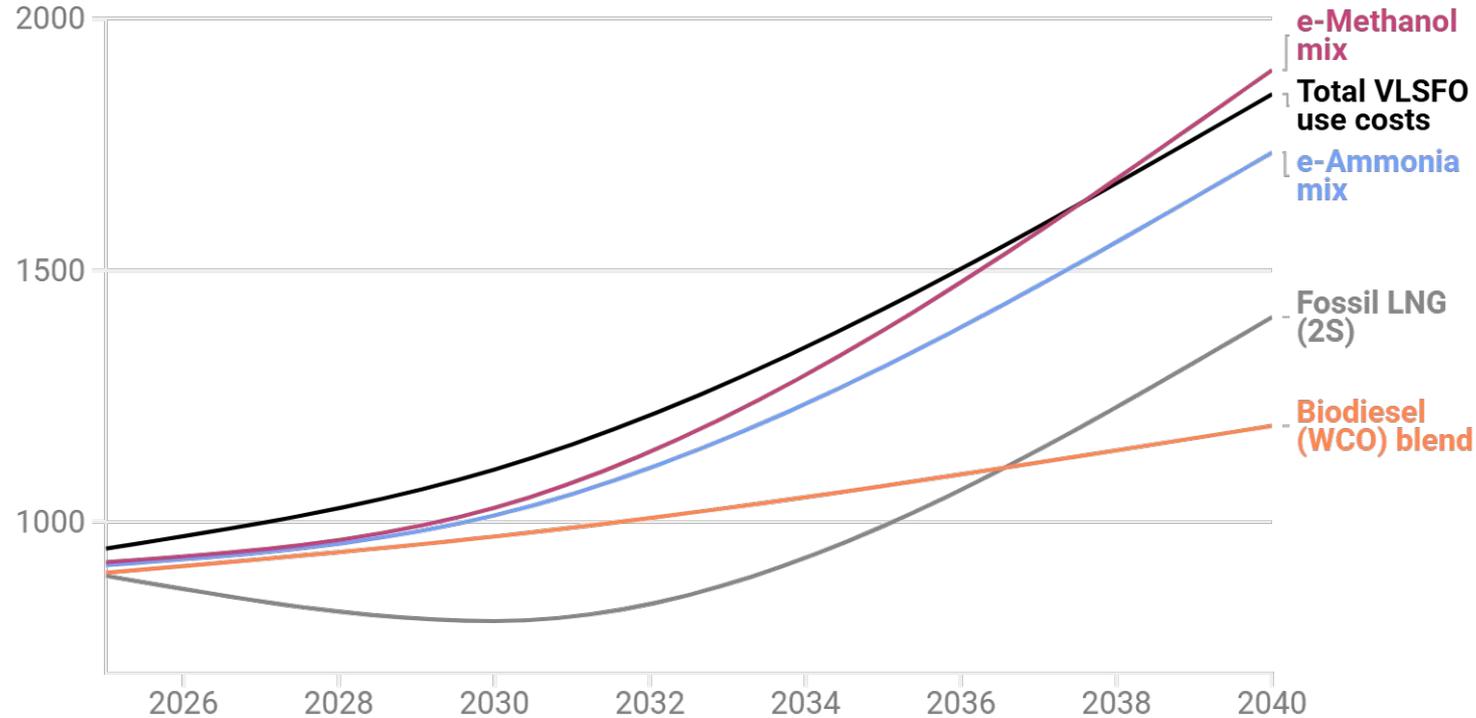


Source: Transport & Environment (2024)

Analysis assumes that ships co-combust/blend only the minimum level of alternative fuels needed to meet the FEUM targets and that this is technically possible with DF engines.

FuelEU Maritime targets will be met with fossil LNG and biofuels unless green fuels receive support

Cost of compliance (€/tonne of VLSFOeq fuel mix)

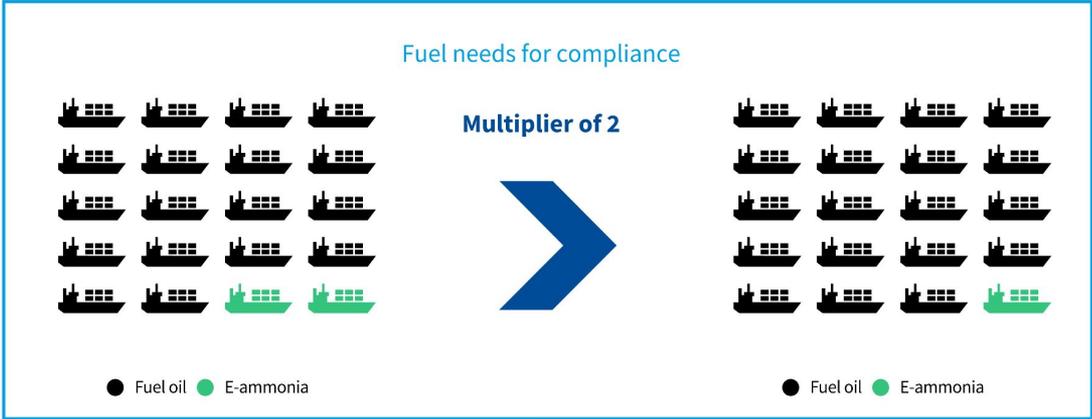


Source: T&E (2024). Fuel prices from H2 Bank pilot auction and DNV CIA (2024).

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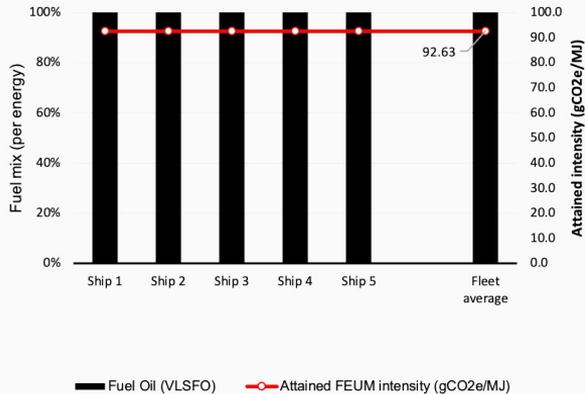
Additional requirements and incentives

EU multiplier of 2 for green e-fuels

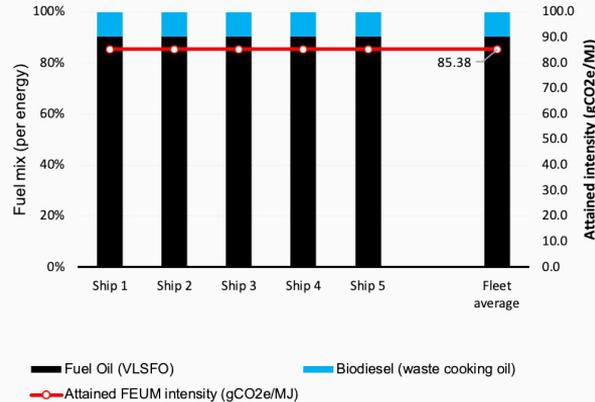


Pooled compliance at a company level

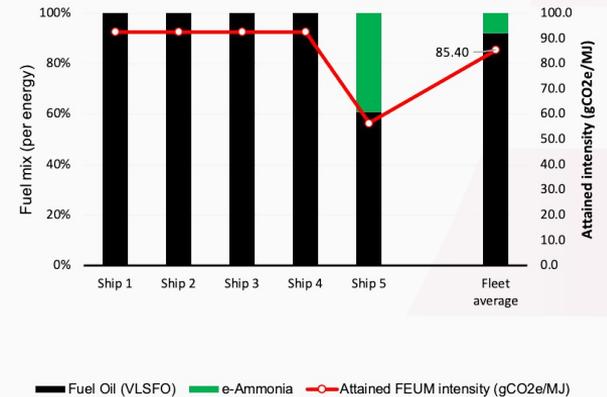
2020 baseline



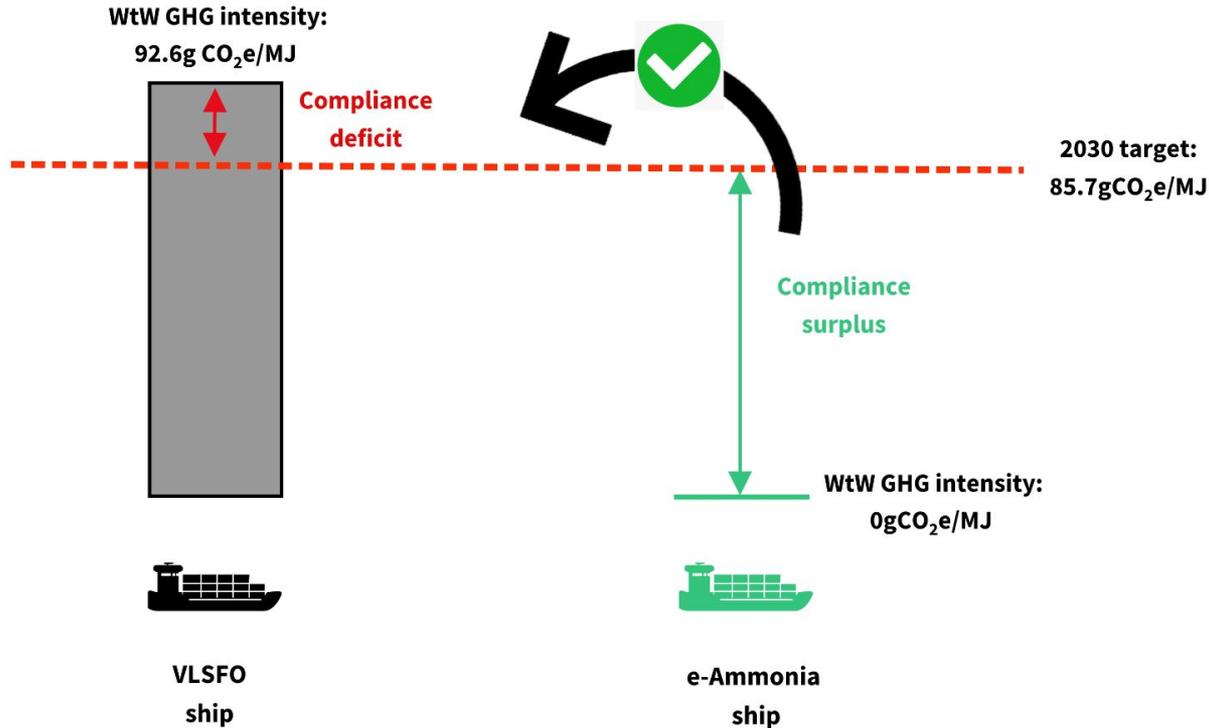
Ship-level compliance 2030 (scenario 1)



Pooled compliance 2030 (scenario 3)

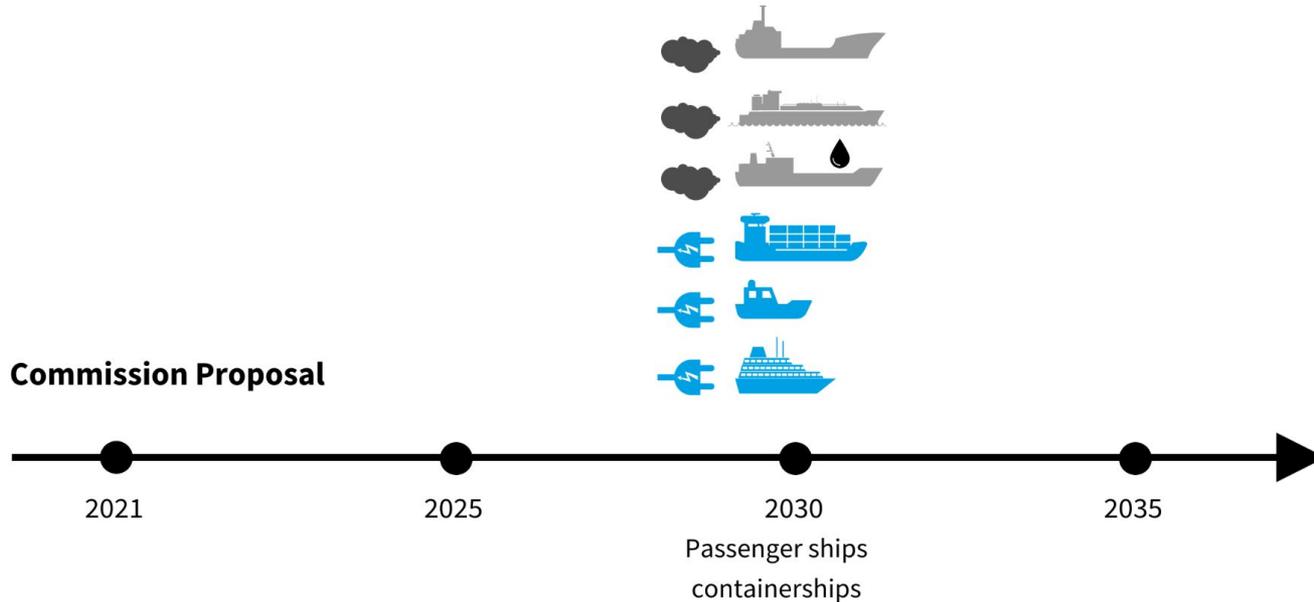


How does the pooling system work in FuelEU Maritime?



Note: Example of compliance with the 2030 GHG intensity target (-6% = 85.7gCO₂e/MJ), using the pooling system for two given fuel GHG intensities per unit of energy (VLSFO and e-ammonia). This results in a positive compliance balance for the pooled ships.

Timeline for the introduction of zero-emission berth mandate



Ships mandated to use onshore power supply (OPS) or zero-emission energy source at berth



Remaining ships

Policy and commercial considerations

	2020	2025	2030	2035	2040	2045	2050
FEUM GHG targets (gCO ₂ e/MJ)	Baseline (91.16 CO ₂ e/MJ)	-2%	-6%	-14.5%	-31%	-62%	-80%
FEUM RFNBO multiplier = 2		→ (< 2034)					
FEUM RFNBO sub-target			(2034 <) 2%				
FEUM pooling mechanism		→					
ETS price (€/tonne CO ₂ e)		97	129		189		231
FEUM SSE mandate (contr. to targets)			→				
Fleet composition/evolution		→					
Fuel price evolution		↑ ↓ ↔	↑ ↓ ↔	↑ ↓ ↔	↑ ↓ ↔	↑ ↓ ↔	↑ ↓ ↔

Policy recommendations

- 1** Improve the e-fuel multiplier in FuelEU Maritime.
- 2** Increase the 2% RFNBO use by 2034 subquota.
- 3** Add “Made in Europe” requirements for ships refuelling at EU ports.
- 4** Introduce the 1.2% RFNBO supply target for shipping.
- 5** Keep the GHG methodology for RFNBO rules untouched.

Thank you

Inesa Ulichina
Shipping Policy Manager

inesa.ulichina@transportenvironment.org