



EST. 1961

GLANDER
INTERNATIONAL
BUNKERING

Alternative Fuels

MUSTAFA EL ZEIN



GLOBAL POSITIONING

- ✓ Strategic locations cover all time zones
- ✓ Up to date training on new fuels
- ✓ New fuel experts & partnerships
- ✓ Worldwide supplier of alternative fuels

AGENDA



01 Updates on EU ETS

02 Updates on FuelEU Maritime

03 IMO Net-Zero Framework

04 Biofuels (HVO & FAME)

05 LNG & Bio-LNG

Thank you to Einar, for making IRSO curious about decarbonization

Thank you to Per: “knowledge sharing is cool”

Thank you to Per’s wife: “the best way to learn something is to teach it”

EU ETS

Since January 2024, the EU Emissions Trading System (EU ETS) has been extended to cover emissions from large commercial ships calling at EU ports.

The system applies to 100% of emissions from intra-EU voyages and port activities, and 50% of emissions from voyages between EU and non-EU ports

-1.03956

+63.18

4395792

2126548

4567356

3852575

48.04

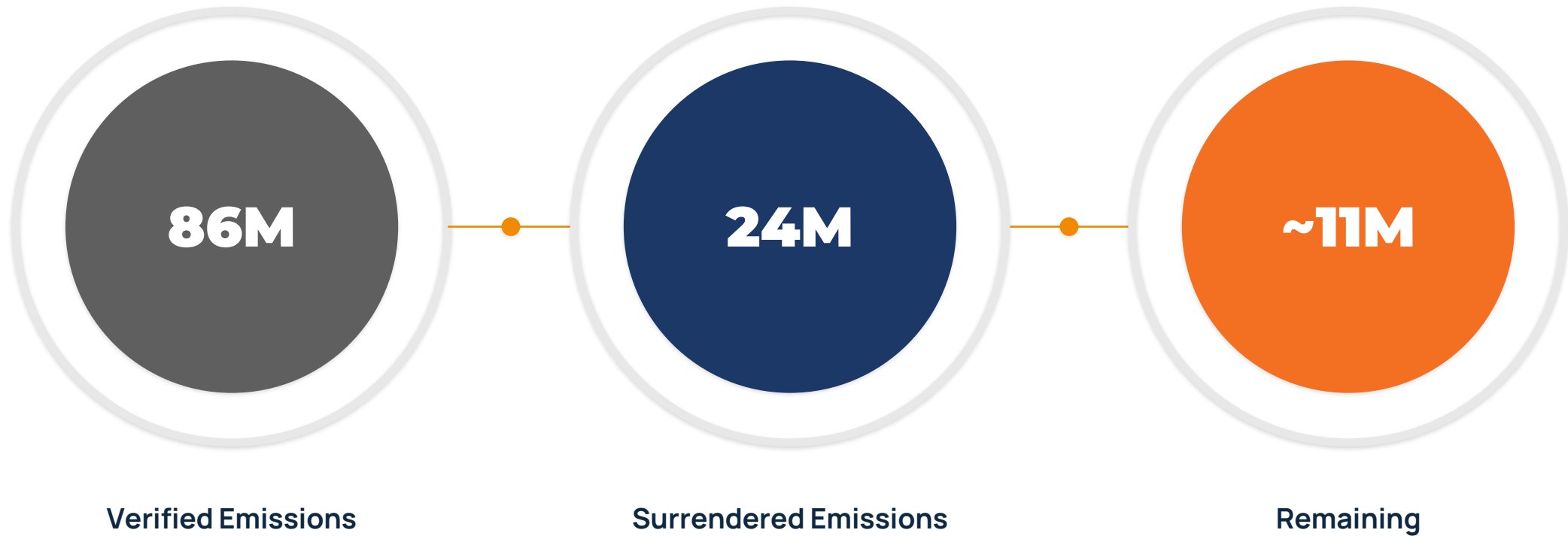
-4.39801

PHASE-IN

	COMPLIANCE SCHEME	2023	2024	2025	2026	2027	2028	2029 and onwards
TYPE OF VESSEL	ETS	N/A	Cargo & Passengers			Cargo, Passengers & Offshore Vessels		
	MRV	Cargo & Passengers		Cargo, Passengers & Offshore Vessels				
SIZE OF VESSEL	ETS	N/A	>5000GT			>400GT and Offshore 1)		
	MRV	>5000GT		>400GT (General Cargo and Offshore vessels)				
GEOGRFICAL SCOPE	ETS	N/A	100% intra EU/EEA, 50% in&out EU/EEA					
	MRV	100% intra EU/EEA, 50% in&out EU/EEA						
PHASE-IN TIMELINE	ETS	N/A	40%	70%	100%			
	MRV	100%						
GHG SCOPE	ETS	N/A	CO2		CO2, Methane(CH4) & Nitrous Oxide (N2O)			
	MRV	CO2	CO2, Methane (CH4) & Nitrous Oxide (N2O)					

1) To be discussed in 2026 2) to be decided in EU review before 2028

EMISSIONS IN MARITIME (2024)



*Shipping needs to surrender 40% of Verified emissions

Source: Union Registry Public Website
19th Sept 2025

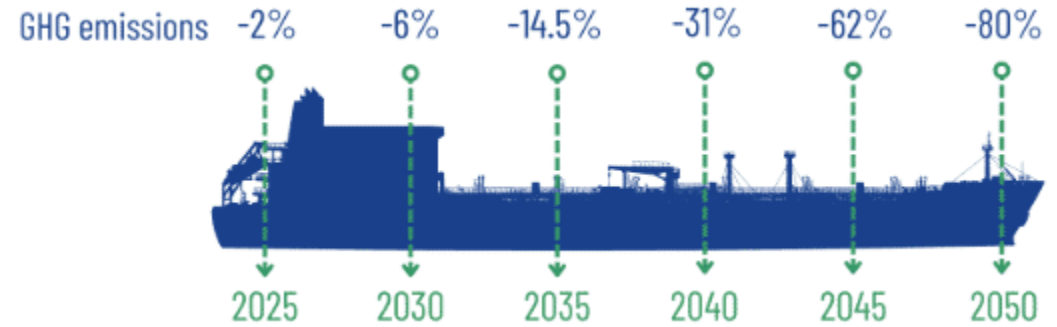
FUELEU MARITIME



FueIEU Maritime requires large ships visiting EU ports to reduce the GHG intensity of their fuel. It uses a well-to-wake approach, meaning it counts emissions from fuel production to use onboard.

GHG REDUCTION IN FEUM

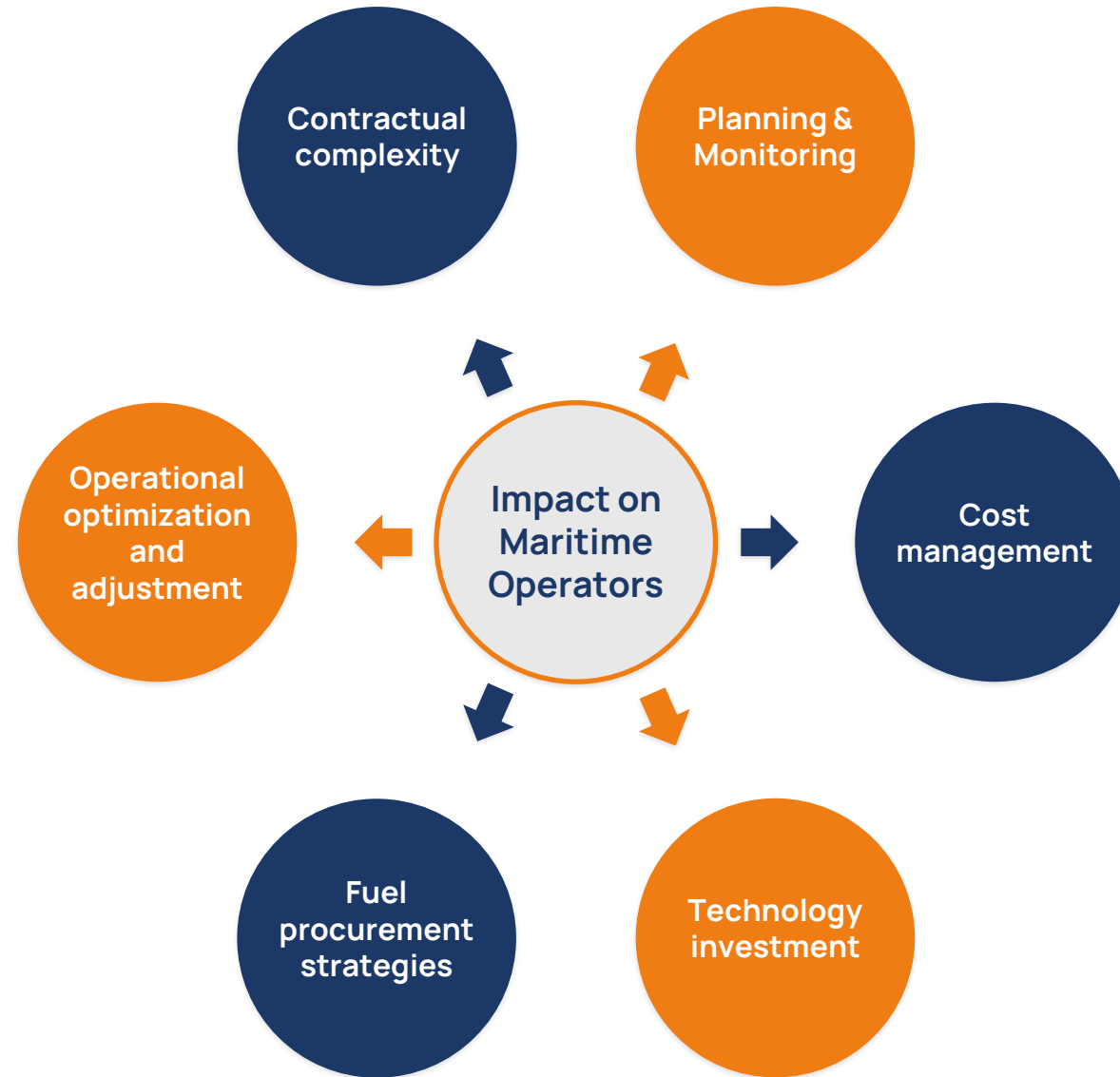
The history leading to the FuelEU Maritime regulation is rooted in the European Union's broader efforts to combat climate change via the Fit for 55 package aiming at reducing greenhouse gas (GHG) emissions by at least 55% by 2030 compared to 1990 levels and making the EU climate-neutral by 2050.



GHG Intensity limit

Reference 2020: 91.16 gCO₂e/MJ







IMO NET-ZERO FRAMEWORK

The last one! (hopefully)



11 April 2025

IMO approves net-zero regulations for global shipping



- Under the IMO Net-Zero Framework, maritime operators will be required to measure and reduce the GHG intensity of the fuels their ships use.
- This framework includes mandatory emissions limits and a global pricing mechanism for emissions, setting a precedent for industry-wide decarbonization.
- The measures are set to be formally adopted in **October 2025** and will become mandatory for large ocean-going ships over 5,000 gross tonnage starting in 2028.



IMO NZF COMPLIANCE

KEY TAKEAWAYS

If a ship's GFI exceeds the set threshold, it must either use surplus units banked from previous years or purchase remedial units by paying into the IMO Net-Zero Fund.

Ships that emit below the threshold can bank or trade surplus units, and those using zero or near-zero emission fuels may receive financial rewards.



Zero- and near-zero emission fuels

These fuels are defined by their GHG intensity: under 19.0 gCO₂eq/MJ until 31 December 2034, and thereafter no more than 14.0 gCO₂eq/MJ.

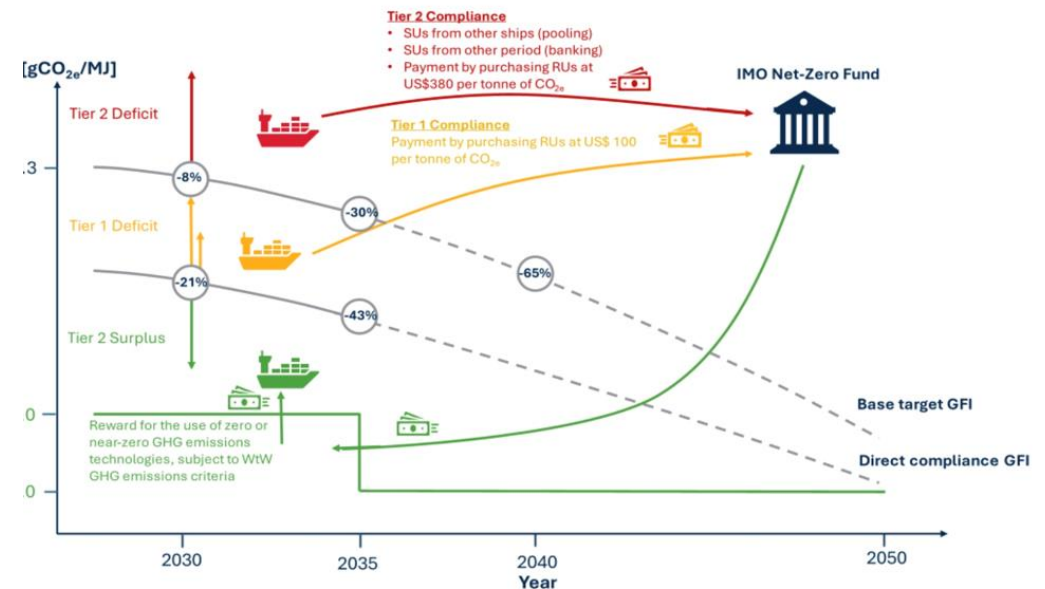


Revenue Disbursement

Areas for revenue spending include rewards, development of ZNZ fuels and technologies, training for seafarers, technology transfer, support for capacity building, and addressing disproportionate negative impacts.

	Reduction Factor Base	Reduction Factor Direct Compliance
2028	4.0%	17.0%
2029	6.0%	19.0%
2030	8.0%	21.0%
2031	12.4%	25.4%
2032	16.8%	29.8%
2033	21.2%	34.2%
2034	25.6%	38.6%
2035	30.0%	43.0%
2040	65.0%	To be determined

Compared to the GFI reference value equivalent to 93.3 gCO₂eq/MJ (Well-to-Wake).



GLANDER SUPPORTS ITS CLIENTS WORLDWIDE



Over 600 supplies
successfully
completed



No quality disputes
or off-spec
products



PoS GHG
reductions ranging
from 80% all the
way up to 94%



Options of different
types and blend ratios



+200 ports mapped for
availability of New Fuels



Full scope solutions to
meet ship owners needs

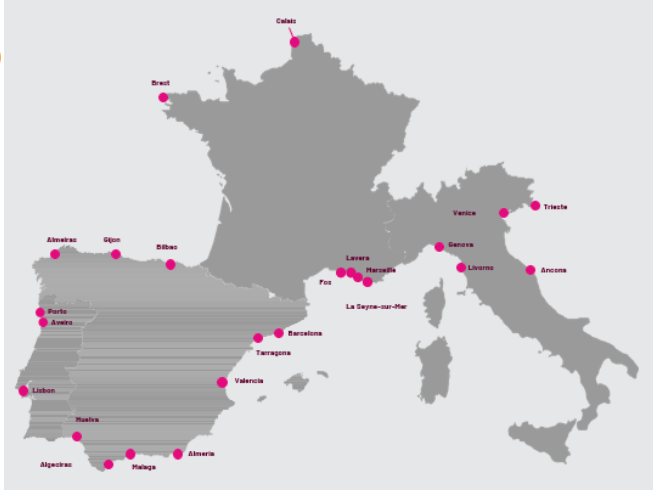


ALTERNATIVE FUELS

DENMARK, SWEDEN



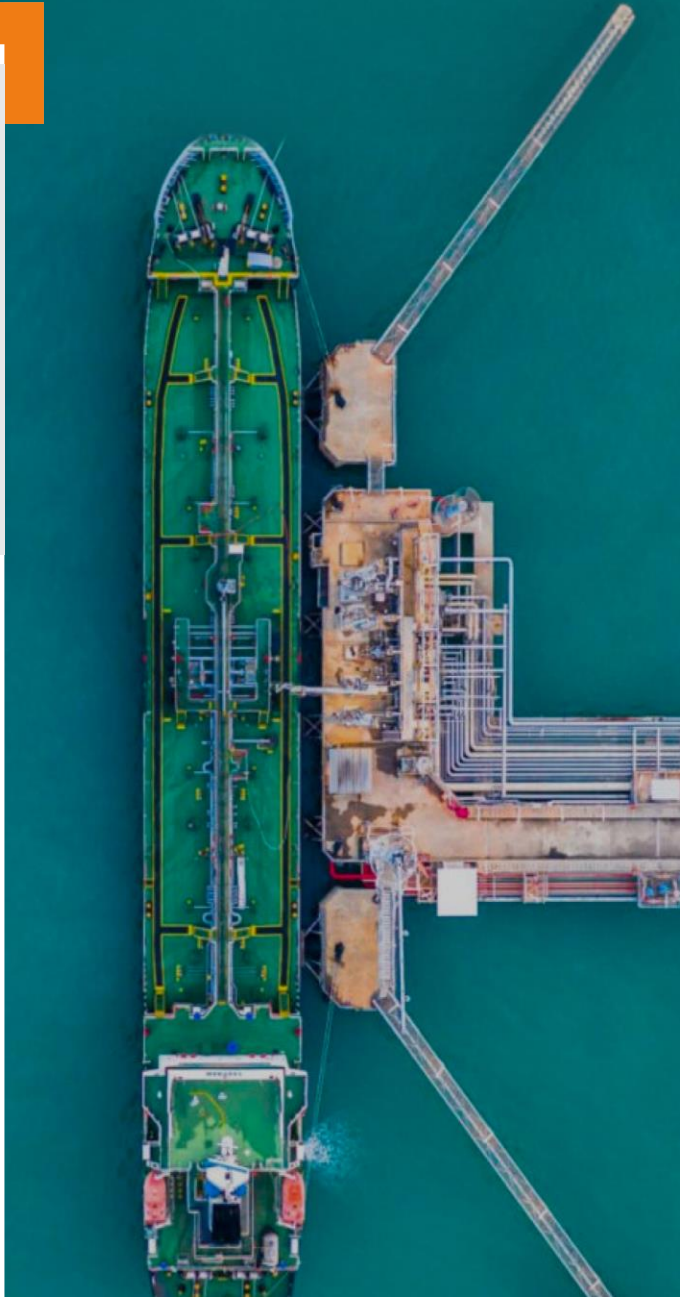
PORTUGAL, SPAIN, FRANCE, ITALY



UK, ARA, GERMANY



GREECE



ALTERNATIVE FUELS

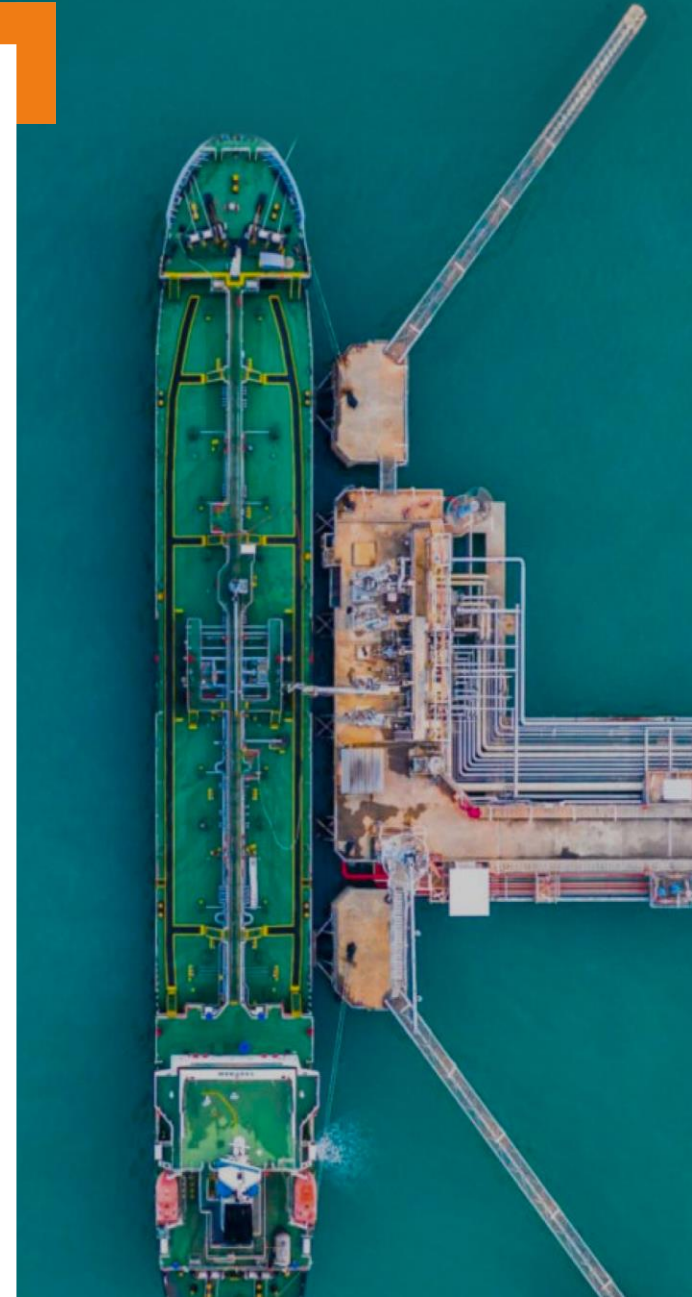
AMERICAS



AFRICA

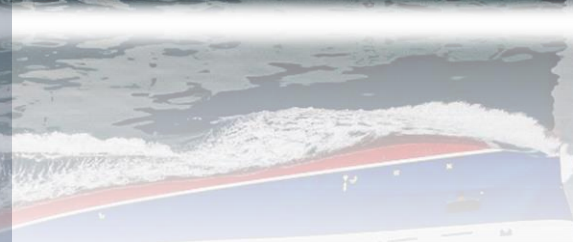


APAC



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Royal Netherlands
Institute for
Sea Research

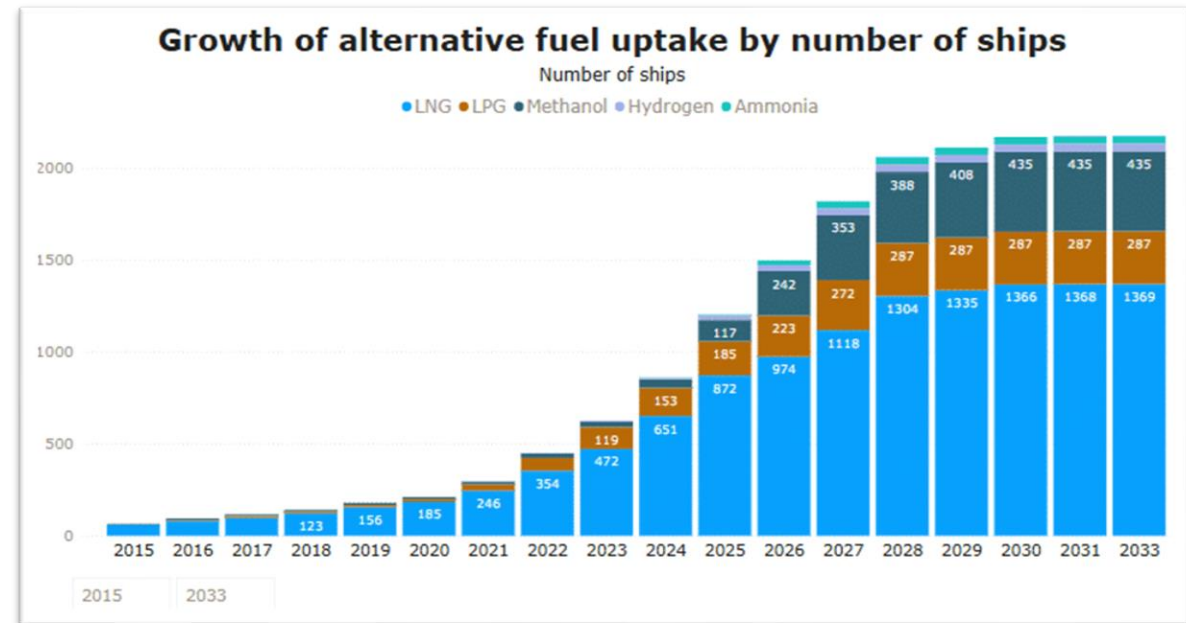


Bermuda Institute of
Ocean Sciences



LNG'S ROLE IN MARITIME SHIPPING

- Continuous improvements in LNG technology and infrastructure are making it more accessible and affordable, making it a good choice for ship owners.
- Dual fuel ships are important in this change. These ships have engines that can run on both LNG and conventional marine fuels like Very Low Sulfur Fuel Oil (VLSFO) or Marine Gasoil (MGO). This flexibility allows ship operators to switch between fuels based on availability, cost, and regulatory requirements.
- Methane slip concerns The amount of methane contained in the engine exhaust varies greatly between engine combustion types, specific engine designs and engine loads. The percentage varies between 0.2% and 3.1% of the mass of the fuel used by the engine.



LNG BUNKER MARKET



The global LNG bunker market is projected to grow to approximately c. 20-24 mtpa by 2030, with around 740 LNG fuelled ships now in operation and a further c.640 ships on order.



Orders for LNG fuelled vessels are dominated by the container and car carrier segments, with well capitalized operators committing to extensive LNG fuelled fleets (MSC control over 150 in operation and on order, CMA CGM around 85).

The scale of a handful of buyers in LNG gives them an outsize level of control in the market with their tenders covering an ever bigger part of the supply capacity.

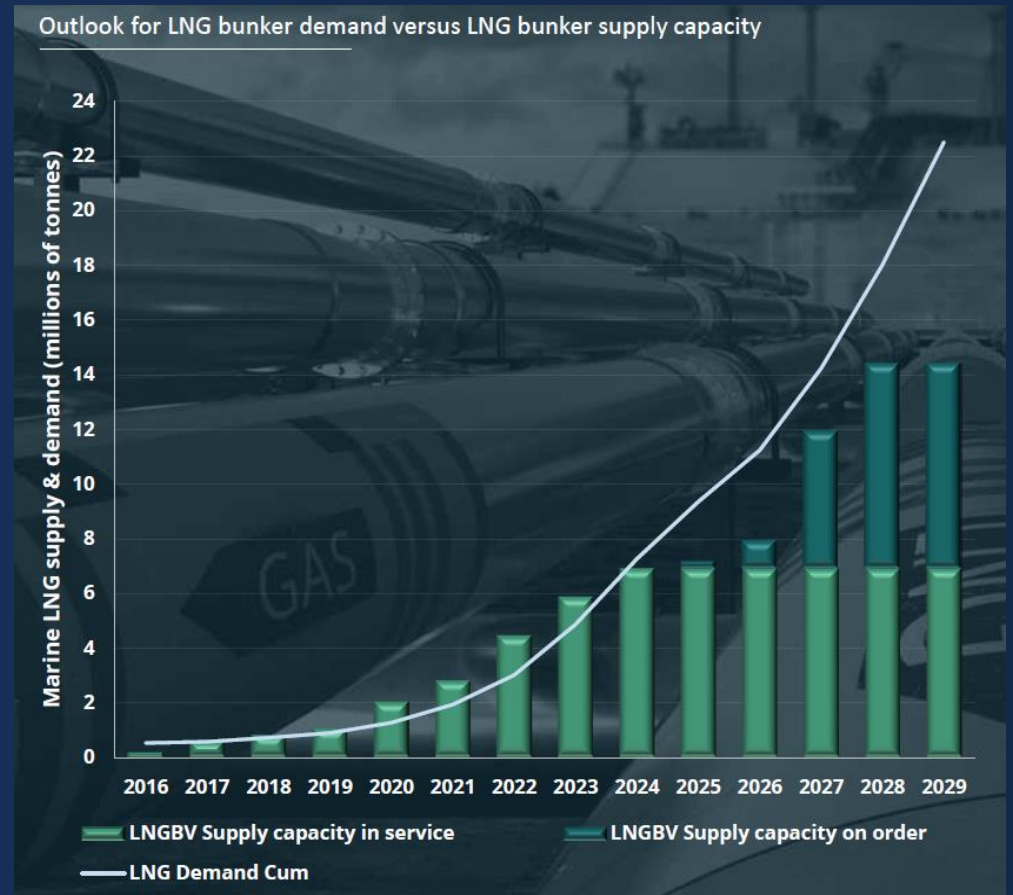


Regular, scheduled demand profile covered by a term contract will benefit from supply and price security.



The market is also expected to ask increasingly for bio-LNG as part of future tenders.

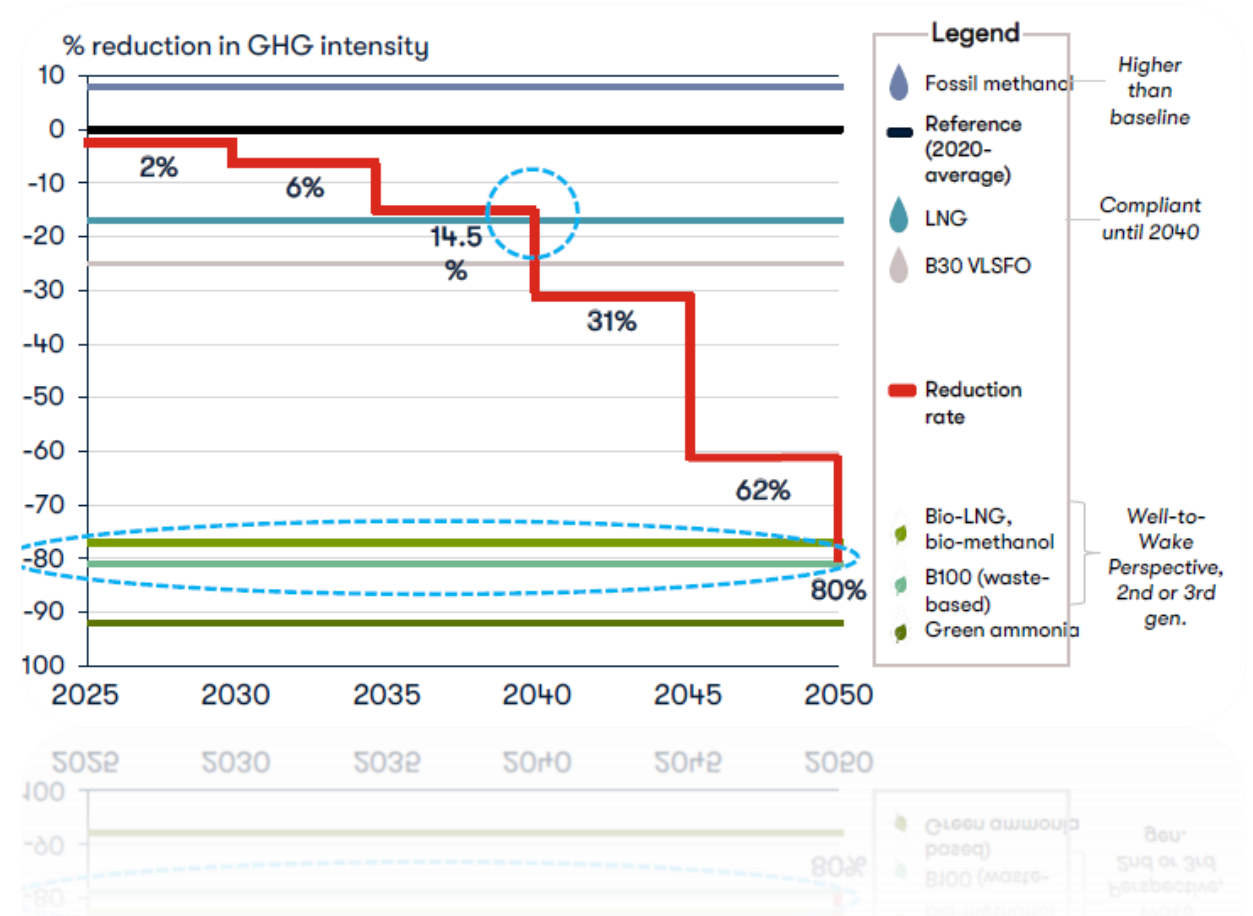
LNG bunker demand vs LNG bunker supply capacity



Source: Fearnleys 2025/Q1

CLEAR SHORT-MID-TERM GAINS WITH LNG

- FuelEUMaritime - fossil LNG is compliant until 2039 (basis 2-stroke, slow speed, high pressure engine)
- Bio-LNG can provide significant reductions in CI. (if methane leakage in the production process and on-board methane slip are minimized)
- Depending on feedstock, has the potential to have a negative CI score.





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THANK YOU

An aerial photograph of a dark-colored ship moving across a deep blue ocean, leaving a white wake. The ship is oriented vertically in the frame. Overlaid on the upper left portion of the image is the text '60+' in a large, bold, orange font. The background is the textured surface of the water.

60+

YEARS OF
EXPERIENCE