



Mersey Maritime

The role of a maritime cluster

Ruth Wood
CEO | Mersey Maritime
25 June 2025

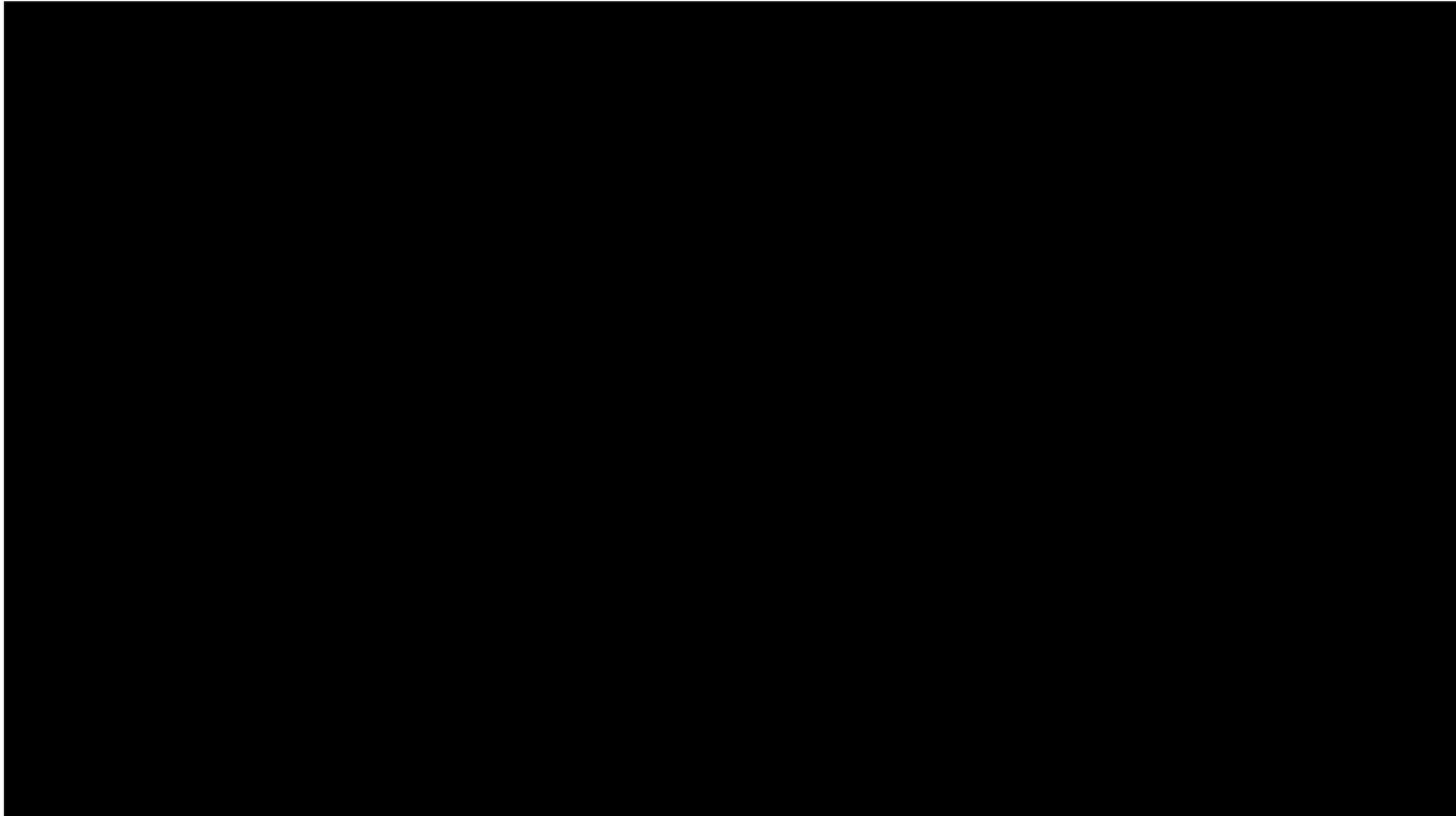




ABOUT MERSEY MARITIME

- Mersey Maritime is a not-for-profit North West based regional cluster organisation for the maritime industry.
- A regional cluster organisation champions a single industry in a specific region to create jobs and growth.
- Our mission is to champion, grow and protect the maritime industry in the Liverpool City Region.

STRONGER TOGETHER



MARITIME IN LCR TODAY



Worth
£5 billion

to the LCR economy through
business turnover



48,200

jobs supported

Productivity of workers

£93,301 v £56,670

(LCR maritime)

(UK economy average)



Supported
4.65 jobs

for every job generated by
the sector in 2019



7.2%

growth is expected
in real terms
between 2021-25



INNOVATION & DECARBONISATION



MERSEY
MARITIME



PEEL PORTS GROUP



BIBBY MARINE



R&D COLLABORATION



GT WINGS



CAMMELL LAIRD



HYDROGEN & HYPNET



NAVIGATING MARITIME INNOVATION

IN THE LIVERPOOL CITY REGION



NAVIGATING MARITIME INNOVATION IN THE LIVERPOOL CITY REGION



**NAVIGATING
MARITIME
INNOVATION**
IN THE LIVERPOOL CITY REGION

PROJECT AIMS



ATTRACT INVESTMENT | Build awareness of maritime investment opportunities in the LCR.



CREATE SYNERGIES | Share knowledge and encourage collaboration between regional industries – maximising funding opportunities as and when they emerge.



BUILD AWARENESS | Spotlight services and facilities in Liverpool as a leading maritime industrial ecosystem.



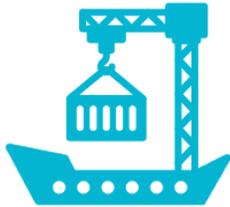
SUPPORT GROWTH | Nurture maritime opportunities for growth, employment, and delivery of wider socio-economic benefits across the area.

NAVIGATING MARITIME INNOVATION IN THE LIVERPOOL CITY REGION



**NAVIGATING
MARITIME
INNOVATION**
IN THE LIVERPOOL CITY REGION

PROJECT FOCUS AREAS



DECARBONISATION

Driving decarbonisation across ports, shipping, shipbuilding, and the full maritime supply chain.



ADVANCED TECHNOLOGY

Optimising maritime systems through cutting-edge digital tools and automation.



FUTURE ENERGY

Enabling the shift to renewables, electrification, and carbon capture across the sector.



STRATEGIC POSITION

Leveraging Liverpool City Region's global role as a hub for innovation, investment, and maritime leadership.

NAVIGATING MARITIME INNOVATION IN THE LIVERPOOL CITY REGION



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PROJECT APPROACH



Building a Maritime Industry Database | For the first time, we'll develop a comprehensive and agile reference database for regional maritime companies, services and products, as a shared resource.



Highlighting Innovations | Showcasing the latest developments and groundbreaking innovations emerging from within Liverpool City Region, with open-invite Technology Forum sessions.



Capturing Opportunities | Our industry engagement efforts for the database and forums will identify and assess investment opportunities (large and small) that need public or private funding to take off.



Bringing External Focus | Showcase our maritime strengths and future opportunities within the LCR to a wider audience with summit events to promote and capture interest for investments.



Seeking International Investment | The gathered opportunities will be prioritised to create a small package of attractive investment projects, and build a prospectus for overseas investors to attract further attention into our global port city region.

NAVIGATING MARITIME INNOVATION IN THE LIVERPOOL CITY REGION



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INNOVATION**
IN THE LIVERPOOL CITY REGION

HOW CAN YOU HELP MERSEY MARITIME DELIVER THIS PROJECT

GET STARTED



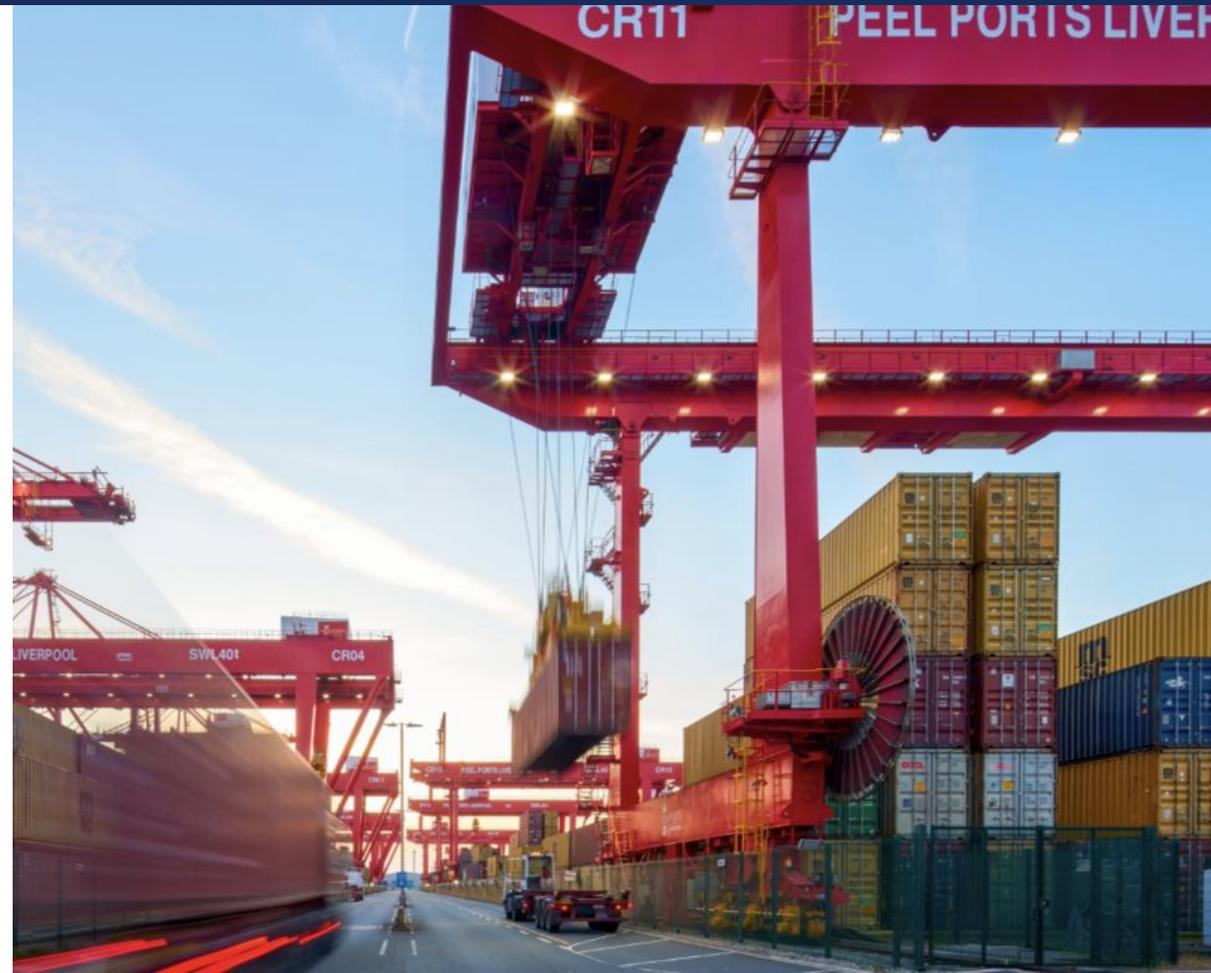
Please complete our registration form:



Once you have completed our registration form, we will email you a survey link for entry into the maritime industry database for you to share your products, services and innovation opportunities.



You can find out more about the project, view latest news, subscribe to our monthly innovation newsletter, and view upcoming events at merseymaritime.co.uk/innovation



INNOVATION & COLLABORATION



“I suppose leadership at one time meant muscles; but today it means getting along with people” Gandhi

“Great things in business are never done by one person, they’re done by a team of people” Steve Jobs

“Lonely innovation doesn’t happen. You need to have collaboration and a culture that allows for risk-taking and learning” Satya Nadella, CEO of Microsoft





THANK YOU

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IMO Net Zero Framework – Examples and Best Practice

Francesco Sandrelli, Policy Director (Environment)

25 June 2025, Clean Maritime Research Hub, Liverpool



Agenda

1. IMO Net-Zero Framework

- Elements' Functions – Why has been built in this way;
- Examples and Case studies;
- Reference Material EU ETS/Fuel EU and UK decarbonisation

2. Decarbonisation activities

- Short-term -2030(2)

Introduction – UK Chamber Members

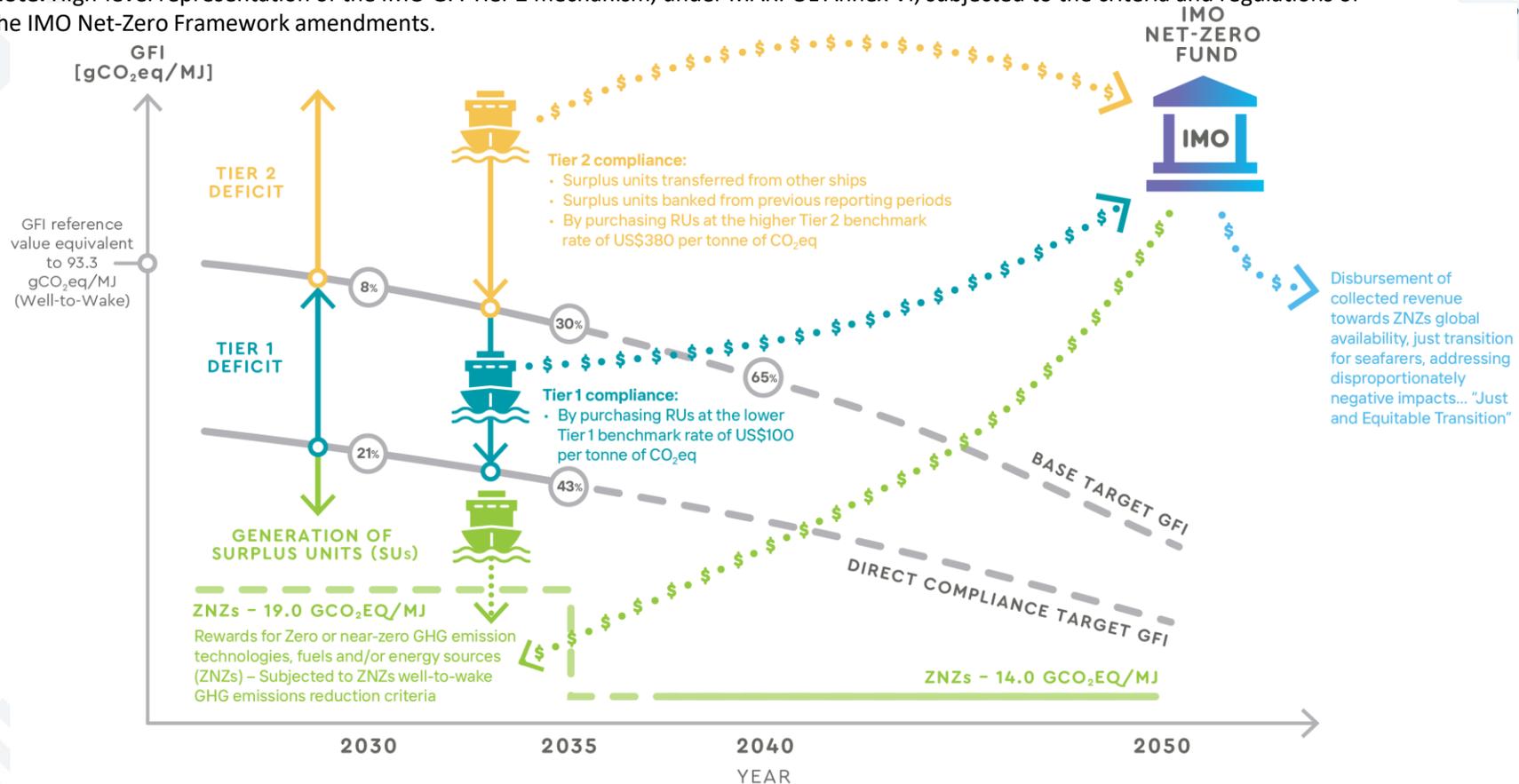
220 Members, 110 Shipowners, >800 vessels, >18m GT, operating globally and UK

- Passenger Shipping (Cruise & Ferry)
- Dry Trades (Container, Bulk, Short Sea, Aggregates)
- Wet Trades (Tankers, Gas Carriers)
- Offshore & BROA (OSV, AHTS, SOV, Dive, MODU, WTIV etc)
- Harbour Towing
- Ship Operators, Law firms, Insurers, Classification, Marine service providers etc..



IMO Net Zero Framework - Structure

Note: High-level representation of the IMO GFI Tier 2 mechanism, under MARPOL Annex VI, subjected to the criteria and regulations of the IMO Net-Zero Framework amendments.

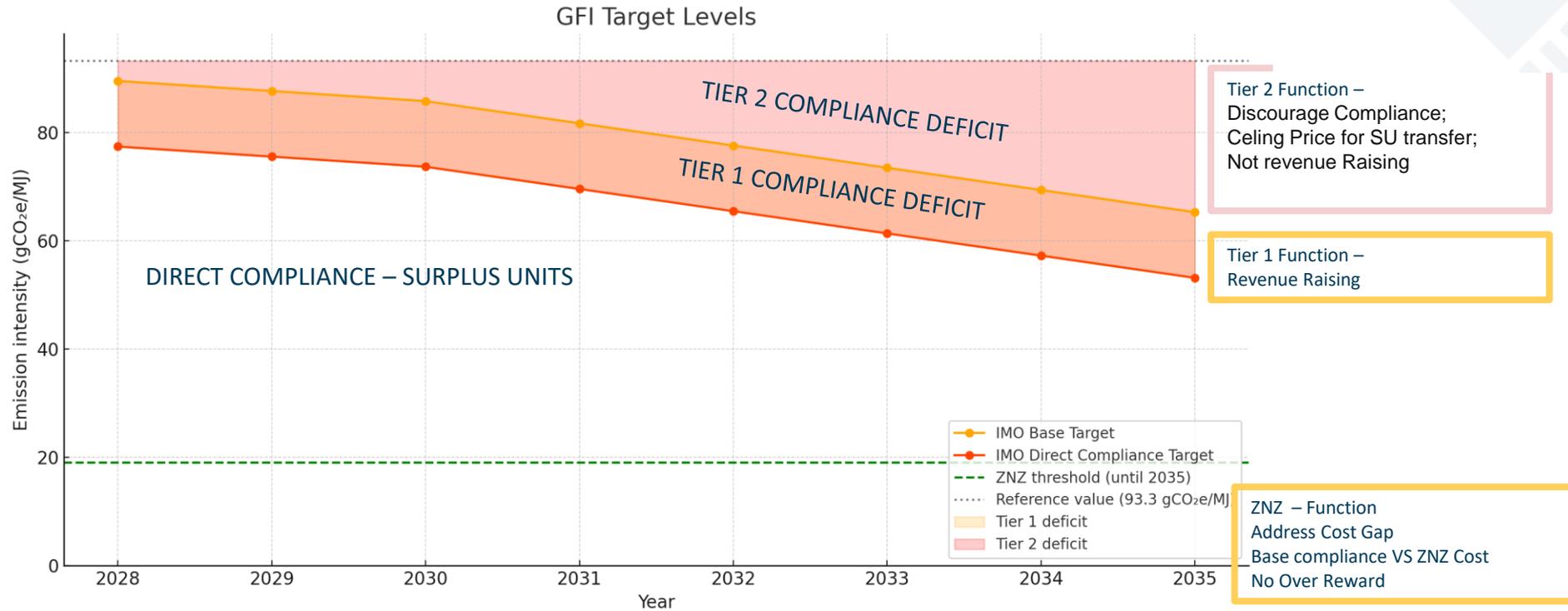


Next Steps - what's still to be done

- MEPC/ES.2 (Adoption) -
- GHG 20 (Guidelines) – such as – [Annex 2 MEPC.83 / WP.11](#)

Still to be defined	When
Default emissions Factors (LCA)	April 2026 clarified
Recognition of Fuels Certification	From April 2027
RU1 & RU 2 price (after 2030)	By 1 January 2028 (review)
Reduction Targets from 2036-2040	By 1 January 2032
ZNZ Technology and Reward	No later 1 March 2027
SEEMP Amendments	March 2027 (assuming)

IMO Net Zero Framework – Carrots and Sticks



Source: Dr. Shuang Zhang, [Two-Tier Z Proposal Assessment](#), presentation 19 March 2025, IMO GHG 19 – REORGANISED INFORMATION

IMO Net Zero - Decarbonising shipping

Table 2-3: Case study inputs (above bold line) and results (below bold line).

Parameter	Unit	Base	Low reward	Low RU1	High RU1	Low RU2	High G2 and RU2 price	No SU transfer	No SU transfer, high ZNZ reward	Equal fuel price	More access to low priced fuels*	Z-factors in 18/2/11	Z-factors in 17/2/2 + 3pp
Base target	% from ref	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	5 %	21 %
Direct compliance target	% from ref	26 %	26 %	26 %	26 %	26 %	26 %	26 %	26 %	26 %	26 %	9 %	33 %
Low GHG fuel G1	USD/tCO ₂ eq	335	335	335	335	335	335	335	335	469	335	335	335
Low GHG fuel G2	USD/tCO ₂ eq	469	469	469	469	469	550	469	469	469	469	469	469
Low GHG fuel G3	USD/tCO ₂ eq	1004	1004	1004	1004	1004	1004	1004	1004	469	1004	1004	1004
ZNZ fuel	USD/tCO ₂ eq	613	613	613	613	613	613	613	613	613	613	613	613
RU Tier 1	USD/tCO ₂ eq	100	100	50	200	100	100	100	100	100	100	100	100
RU Tier 2	USD/tCO ₂ eq	600	600	600	600	350	700	600	700	600	600	600	600
ZNZ reward	USD/tCO ₂ eq	200	100	200	200	200	200	200	200	200	200	200	200
Total emissions	MtCO ₂ eq	747.2	746.3	747.2	747.2	868.4	747.2	868.5	872.3	760.3	756.3	907.8	722.0
Total revenues	BUSD/year	4.8	4.7	2.4	9.7	43.8	4.8	71.3	82.3	5.8	5.4	8.0	8.6
Total reward	BUSD/year	7.1	0.0	7.1	7.1	0.0	7.1	7.2	7.2	7.2	7.2	3.0	7.0
ZNZ uptake	% of total energy	5 %	0 %	5 %	5 %	0 %	5 %	5 %	0	5 %	5 %	2 %	5 %
Min SU price	USD/tCO ₂ eq	516	516	522	503	349	607	516	516	516	512	491	568
SU transfer volume	MtCO ₂ eq	109	109	109	109	0	109	0	0	22	22	30	114

Total emissions	MtCO ₂ eq	747.2	746.3	747.2	747.2	868.4	747.2
Total revenues	BUSD/year	4.8	4.7	2.4	9.7	43.8	4.8

IMO Net Zero – What I have learned

- 1) The general objective of the Framework is for most of the ships to reach the Base Target;
- 2) If the IMO fund get bigger– shipping is not decarbonising;
- 3) It is important having vessels - Surplus Unit and ZNZ;
- 4) Clear Signal needs to work for all the stakeholders;
- 5) Efficient use of the IMO fund is essential;

MMM Center for Zero Carbon Shipping - Newsletter

▶ [MMM Center for Zero Carbon Shipping Webinar on IMO Net-Zero Framework, 28 May 2025 webinar](#)

- Case Studies/ Cost Impact;



Mærsk Mc-Kinney Møller Center
for Zero Carbon Shipping

Publications G



NEWS

Countdown: Historic IMO agreement lays groundwork for maritime decarbonization

Published - Apr 16, 2025



On 11 April 2025, IMO Member States reached agreement on a Net-Zero Framework — a set of regulations for the shipping industry to reach net-zero by 2050

Source: Maersk Mc-Kinney Møller, [Historic IMO agreement](#), newsletter 16 April 2025

Webinar

Net Zero Framework Practical Examples & Insights

Wednesday, May 28
10:00 - 11:00 CET



Mærsk Mc-Kinney Møller Center
for Zero Carbon Shipping



DanishShipping



UK CHAMBER
of SHIPPING



Norges
Rederiforbund
NORWEGIAN
SHIP OWNERS
ASSOCIATION



NAVIGATOR GAS

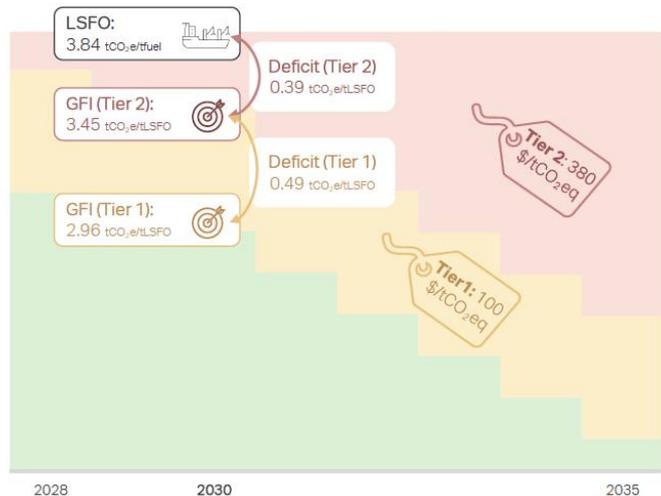
MMM Center for zero Carbon Shipping - Calculator

Fuel cost calculations			2028	2029	2030	2031	2032	2033	2034	2035	2
Fuel Costs	User Input / Lookups	Units									
LSFO	LSFO Emissions Factor	<i>LSFO</i>	<i>gCO2e/MJ</i>	95.63	95.63	95.63	95.63	95.63	95.63	95.63	95.63
	LSFO Emissions Factor (Converted)		<i>tCO2e/GJ</i>	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	LSFO Tier 2 Emissions Deficit		<i>tCO2e deficit/tLSFO</i>	0.24	0.32	0.39	0.56	0.72	0.89	1.05	1.22
	LSFO Tier 1 Emissions Deficit		<i>tCO2e deficit/tLSFO</i>	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
	LSFO Fuel Cost	<i>MMM LSFO</i>	<i>USD/GJ</i>	14.24	13.85	13.46	13.46	13.46	13.46	13.46	13.46
	LSFO Tier 2 RU cost per tonne of LSFO		<i>USD/tLSFO</i>	92.57	121.08	149.58	212.30	275.01	337.72	400.43	463.14
	LSFO Tier 1 RU cost per tonne of LSFO		<i>USD/tLSFO</i>	48.76	48.76	48.76	48.76	48.76	48.76	48.76	48.76
LNG	LNG Emissions Factor	<i>Diesel dual fuel (HP)</i>	<i>gCO2e/MJ</i>	77.17	77.17	77.17	77.17	77.17	77.17	77.17	77.17
	LNG Emissions Factor (Converted)		<i>tCO2e/GJ</i>	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	LNG Tier 2 Emissions Deficit		<i>tCO2e deficit/tLSFOeq</i>	0.00	0.00	0.00	0.00	0.00	0.15	0.31	0.48
	LNG Tier 1 Emissions Deficit		<i>tCO2e deficit/tLSFOeq</i>	0.00	0.06	0.14	0.30	0.47	0.49	0.49	0.49
	LNG Emissions Surplus		<i>tCO2e surplus/tLSFOeq</i>	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LNG Fuel Cost	<i>MMM LNG</i>	<i>USD/GJ</i>	13.51	12.46	11.41	11.40	11.40	11.39	11.39	11.38
	LNG Tier 2 RU cost per tonne of LSFOeq		<i>USD/tLSFOeq</i>	0.00	0.00	0.00	0.00	0.00	55.73	118.45	181.16
LNG Tier 1 RU cost per tonne of LSFOeq		<i>USD/tLSFOeq</i>	0.00	6.42	13.92	30.42	46.92	48.76	48.76	48.76	
Bio-diesel	Bio-diesel Emissions Factor	<i>Bio-diesel</i>	<i>gCO2e/MJ</i>	22.28	22.28	22.28	22.28	22.28	22.28	22.28	22.28
	Bio-diesel Emissions Factor (Converted)		<i>tCO2e/GJ</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Bio-diesel Emissions Deficit		<i>tCO2e deficit/tLSFOeq</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bio-diesel Fuel Cost	<i>LR/UMAS B100 - Avg Pri</i>	<i>USD/GJ</i>	33.90	35.20	36.50	37.90	39.30	40.70	42.10	43.50
Bio-methane	Bio-methane Emissions Factor	<i>Bio-methane (HP)</i>	<i>gCO2e/MJ</i>	20.62	20.62	20.62	20.62	20.62	20.62	20.62	20.62
	Bio-methane Emissions Factor (Converted)		<i>tCO2e/GJ</i>	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Bio-methane Emissions Deficit		<i>tCO2e deficit/tLSFOeq</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bio-methane Fuel Cost	<i>MMM Bio-methane Cost</i>	<i>USD/GJ</i>	37.73	38.34	38.94	39.68	40.41	41.13	41.83	42.53

Source: Maersk Mc-Kinney Moller, [_NZN Compliance Cost Calculator Version 3](#), Accessed 12/06/2025, extract Table Calculations

MMM Center– 2030-2035 LSFO Calculation

LSFO compliance deficit in 2030



Assumptions: We use a 95.63 gCO₂e/MJ LSFO as the reference, with the emissions factor from MEPC.39/18/1. Abatement cost of bio-diesel is based on the difference between the Center assumption for the cost of LSFO in 2030 (\$413/t) and a bio-diesel forecasted price from LR/UMAS 2020. <https://www.lr.org/en/knowledge/research-reports/2020/techno-economic-assessment-of-zero-carbon-fuels/>



Tier 2 Compliance Options in 2030 (8% reduction)

- 1  Pay the Remedial Unit (380 \$/gCO₂e)

$$380 \frac{USD}{tCO_2eq} \times 0.39 \frac{tCO_2eq_{deficit}}{tLSFO} = 150 \frac{USD}{tLSFOeq}$$
- 2  Use drop-in biofuel

$$314 \frac{USD}{tCO_2eq} \times 0.39 \frac{tCO_2eq_{deficit}}{tLSFO} = 124 \frac{USD}{tLSFOeq}$$
- 3  Purchase Surplus Unit Credits
We assume that the surplus unit is equivalent to drop-in biodiesel



Tier 1 Compliance Options in 2030 (13% reduction)

- 1  Pay the Remedial Unit (100 \$/gCO₂e)

$$100 \frac{USD}{tCO_2eq} \times 0.49 \frac{tCO_2eq_{deficit}}{tLSFO} = 49 \frac{USD}{tLSFOeq}$$

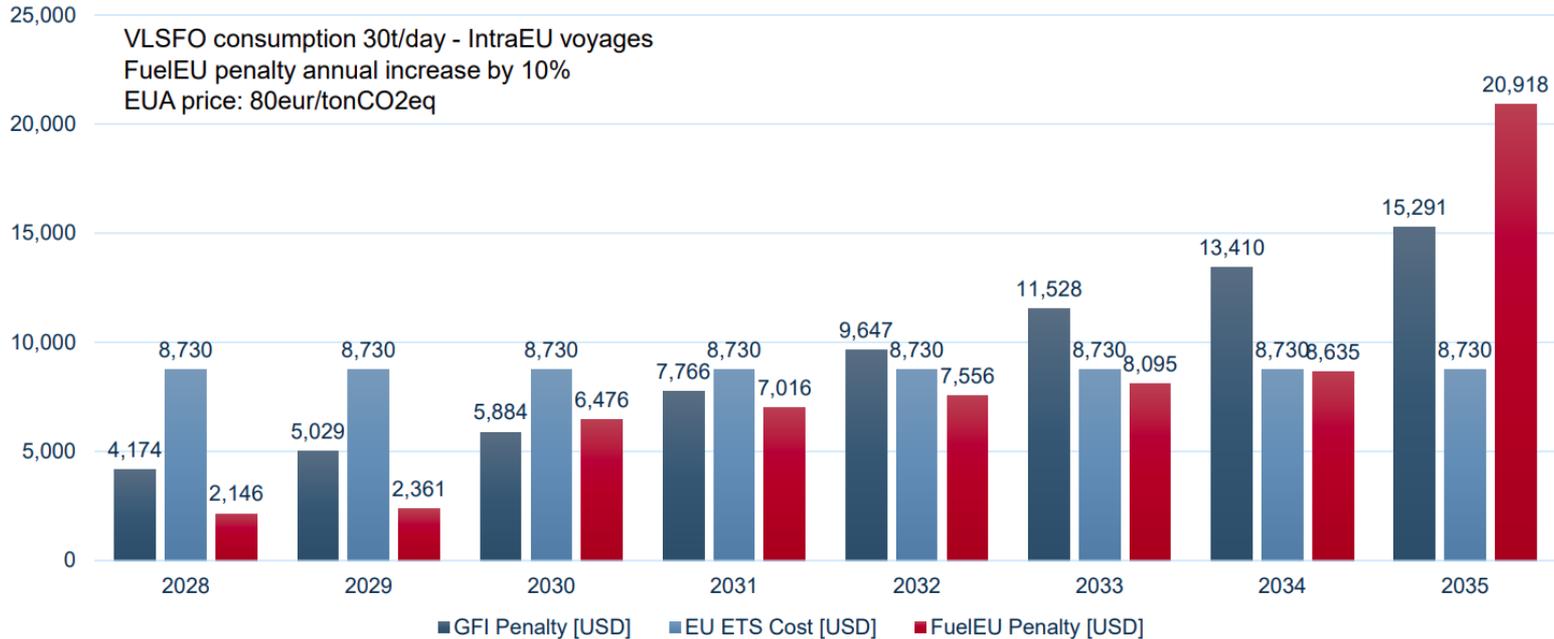
	LSFO gCo2/MJ	Ru2 and RU1 Cost
	95.63	
2028		RU2 = 93\$ RU1 = 49\$ Total 142\$
2030		RU2 = 150\$ RU1 = 49\$ Total 199\$
2035		RU2=463\$ RU1=49\$ Total =512 \$

Source: Maersk Mc-Kinney Moller, [Webinar Net-Zero Framework](#), dated: 28/05/2025 Accessed 12/06/2025, Slide deck

Source: Maersk Mc-Kinney Moller, [Calculator](#),
Information organised by myself 13/06/2025

Example comparison – cost IMO vs ETS

Daily Compliance Cost (\$): GFI vs ETS vs FuelEU



Source: ABS, MEPC 83 Outcome and Impact on International shipping, by Stamatis Fradelos, dated: 08 May 2025 , Slide deck

Fuel EU VS IMO Net Zero Framework

	IMO Net Zero Framework Base Line 93.3 gCo2eq/MJ		Fuel EU 91.16 gCo2eq/MJ
Year	Z for Base Target	Z for Direct Compliance Target	
2028	4.0%	17.0%	2025-2029 2% 89.57 gCo2eq/MJ
	89.57 gCo2eq/MJ	77.44 gCo2eq/MJ	
2029	6.0%	19.0%	2030 – 2035 6% 85.69 gCo2eq/MJ
2030	8.0%	21.0%	
	85.84 gCo2eq/MJ	73.71 gCo2eq/MJ	
2031	12.4%	25.4%	
2032	16.8%	29.8%	
2033	21.2%	34.2%	
2034	25.6%	38.6%	2035-2040 -14.5% 77.94 gCo2eq/MJ
2035	30.0%	43.0%	
	65.31 gCo2eq/MJ	53.18 gCo2eq/MJ	

Source: Information organised by myself 13/06/2025 – using Fuel EU Maritime and IMO Net Zero Framework.

- **EU ETS and Fuel EU
UK
- recent resources**

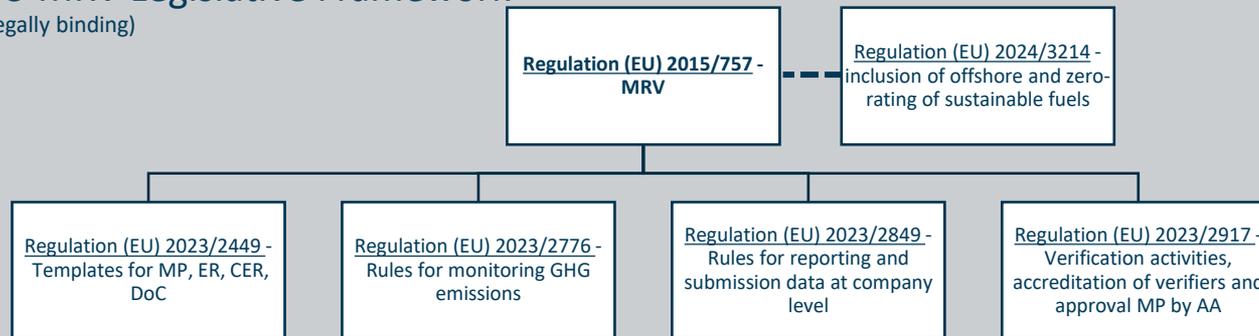


EU MRV & ETS regulations & guidance - state of play

Source: Jen Riley-James, LR, Internal UK Chamber Meeting Carbon WG , 29 May 2025.

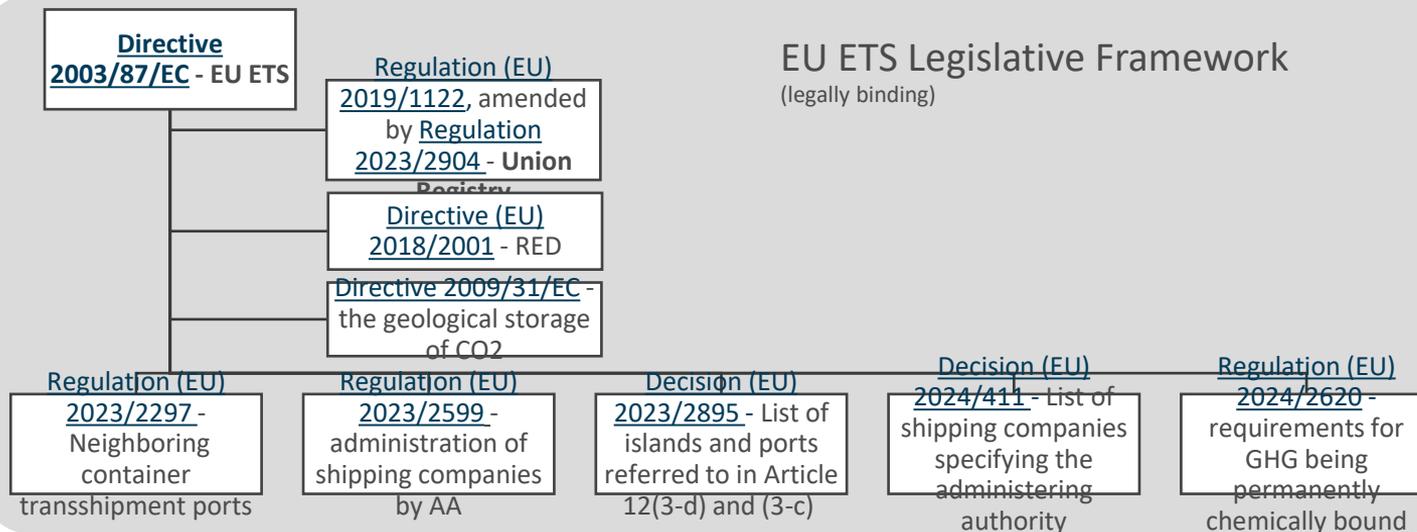
EU MRV Legislative Framework

(legally binding)



EU ETS Legislative Framework

(legally binding)



Guidance

(not legally binding)

Maritime GD1 – General guidance

Maritime GD2 – AA MP approvals

Maritime GD3 – Accreditation & verification

EU verification report template (ER & CER)

DG CLIMA FAQs

MRV / ETS EMSA webinars

ESSF Fuel Certification Guidance

Netherlands – guidance on zero rating biofuels

FuelEU regulations & guidance - state of play

Source: Jen Riley-James, LR, Internal UK Chamber Meeting Carbon WG, 29 May 2025.

Legislative Framework (legally binding)

Regulation
2023/1805 FuelEU
Maritime regulation

FuelEU fuel
sustainability
requirements

Directive (EU)
2018/2001 - RED
Directive 2024/1788
- Gas Directive

FuelEU Article 2(3),
2(4) and 2(6) – voyage
and route exemptions

C/2024/7469 Greece
C/2024/7470 Italy
C/2024/7471 Denmark
C/2024/7472 Malta
C/2025/356 Spain
C/2025/357 France
C/2025/358 Portugal
C/2025/635 Cyprus
C/2025/626 Croatia
C/2025/969 Finland

Regulation
2024/2027 -
verification
activities

Regulation
2024/1805 -
template for
monitoring
plans

Regulation
2025/192 -
accreditation of
verifiers

*Pending
regulation -
OPS
communicati
ons (Q3
2025?)*

*Pending
regulation -
zero emission
technologies
(tbc)*

*Pending
regulation -
neighbouring
transhipment
ports (Q1 2025)*

*Pending
regulation -
FEU
database
(Q1 2025)*

Guidance (not legally binding)

EC Pending FEU Guidance document

FuelEU [FAQ's](#)

ESSF SAPS [Fuel Certification guidelines](#)

ESSF SAPS [Report on FuelEU
Calculations](#)

Outstanding ESSF work

*Update & upkeep of FuelEU Annex-II – on hold.
Work via MEPC for now.*

OPS – k/o meeting in April 2025

Carbon Capture – k/o delayed to Q3 2025(?)

Black Carbon - unknown

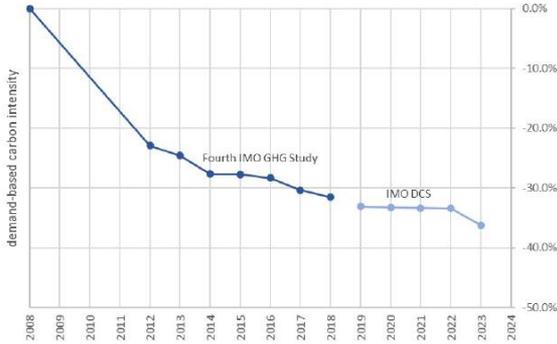
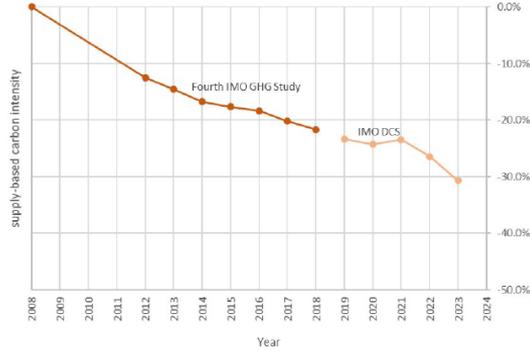
UK Decarbonisation

- ▶ UK ETS Expansion Maritime Sector CoS replied to the consultation on 23 January 2025; Shipowners/Ship-operators need certainty
- ▶ Maritime Decarbonisation Strategy 25 March 2025 – week before GHG 19 and MEPC.83
- ▶ Call for Evidence Net zero ports: challenges and opportunities - GOV.UK – which closes on 24th June
- ▶ Call for Evidence Decarbonising smaller vessels - GOV.UK – which closes on 25th July
- ▶ Shipping is an International business – we should not be subjects to numerous regional requirements

Shipping Decarbonisation, Fuels, Energies



Shipping is Decarbonising



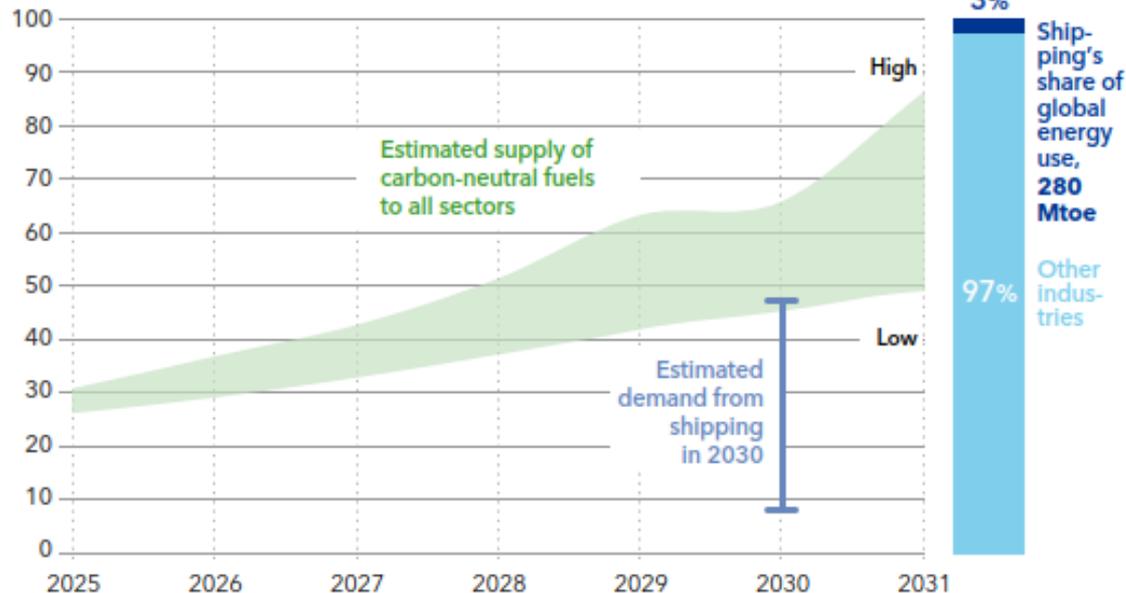
Year	Anthropogenic CO ₂ emissions	International shipping CO ₂ emissions	International shipping contribution to total	Reduction of international shipping contribution
2008	32,204	921	2.86%	
2012	34,959	775	2.23%	22.16%
2013	35,225	761	2.18%	23.93%
2014	35,239	764	2.17%	24.21%
2015	35,380	780	2.21%	22.65%
2016	35,810	811	2.29%	19.90%
2017	36,573	838	2.34%	18.22%
2018	34,793	830	2.27%	20.69%
2023	37,400	656	1.75%	38.67%

Source: INTERTANKO, MEPC.83/6/13, [Comments on the Report Short-Term GHG Measure](#), MEPC83/6/10

Source: IMO Secretariat, MEPC.83/6, [Report on annual carbon Intensity and efficiency of the fleet \(2023\)](#). Supply-based (AER) LEFT and Demand-Based (EEOI) On the right

Energy Transition – Challenges ahead

Units: Million tonnes of oil equivalent (Mtoe)

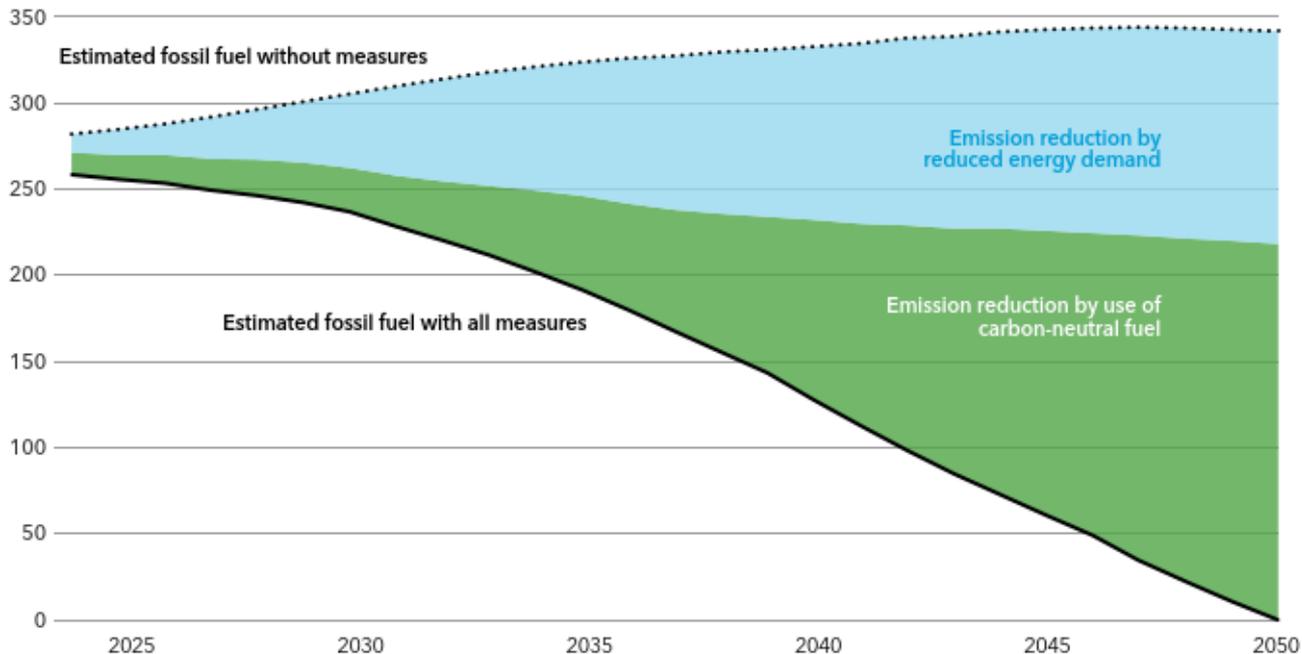


Source: DNV, Energy Transition Outlook 2024 – Maritime Forecast to 2050, DNV

1. Competition with other sectors.
2. Methanol and Ammonia also used as industrial production feedstock
3. Capacity development will take time
4. Price likely to be high
5. Infrastructure requirements
6. Shipping needs every solutions

Energy Efficiency is still essential

Units: Million tonnes of oil equivalent (Mtoe)



Source: DNV, Energy Transition Outlook 2024 – Maritime Forecast to 2050, DNV

Best Practices – Short Term 2030(2)

Disclaimer:

The cases presented are just a sample of some available technologies in the market, we do not endorse, favor them – Each vessel/operation is based on specific activities and is different for each Vessels/Operators.



Best Practice - Measuring

- BDN and Noon Report – Lack Granularity
- Coriolis type mass flow meters – Cost 25.000\$ each;
- Shaft power Meter (Fuel Consumption/power – g/kWh);
- Ship Performance Monitoring (Smart Ship);



Sources: P&O Ferries, Navigating the Future: Smart Ship on P&O Ferries



Sources: P&O Ferries, Fleet Support Centre, Fuel & Energy

PURSUING NET ZERO

THROUGH NEW TECHNOLOGIES AND LOWER-EMISSION FUELS



Itinerary Planning

Energy-efficient itineraries to reduce emissions



Shore Power Capability

Plug in to shoreside electric power vs. running engines. Nearly 70% of ships fitted. Connected over 1000 times in the last 12 months



Improved Hulls

Optimize design & state of art paint to minimize drag



Operational Improvements

Optimize ship speed, trim, weather routing & regular hull and propeller cleaning



Biofuels

Piloting biogas and liquid biofuels as replacement for fossil fuel to power ships



Battery Technology

Battery storage system to help power ships



Liquefied Natural Gas

Lower-carbon fuel option available today to power ships. Technology compatible for biomethane and e-methane.



Air Lubrication Systems

Ships glide on air bubbles with less friction



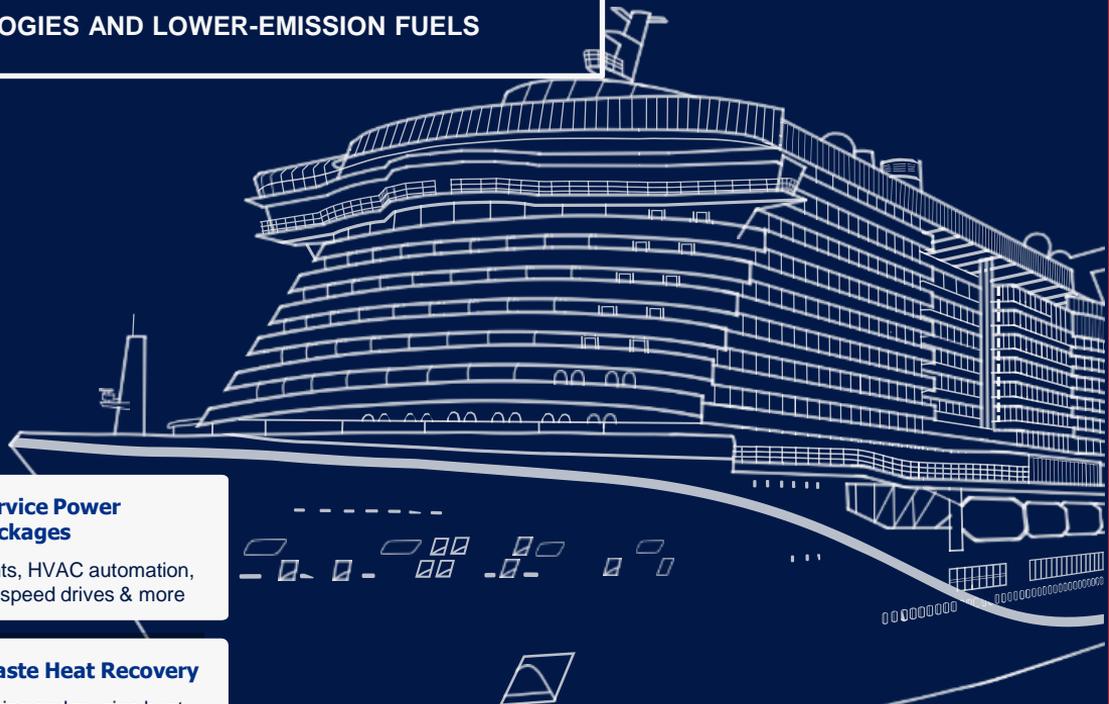
Service Power Packages

LED lights, HVAC automation, variable speed drives & more



Waste Heat Recovery

Recapturing and reusing heat energy that would otherwise be lost



← Reducing greenhouse gas emissions through fuel and energy-saving innovations, emission-reducing technologies and lower-emission fuels.

Case Study – LO Pumps

Operation of the LO pumps when ME is stopped

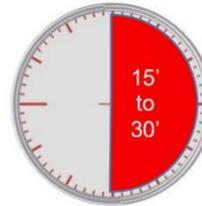


Source: Desmi pumps

Operations AFTER Arrival in Port

When the 'FINISHED WITH ENGINE' order is received in the control room:
Wait minimum 15 minutes after stopping the engine, then:
– stop the lube oil pumps

Source: MAN Technical Bulletin



Source: Jose Gonzales (CLIA), Role of the crew in the Sustainability and energy Efficiency Agendas, IMHFS International Maritime Human Factor Symposium, , 28 November 2024

Case Study – LO Pumps



45 MT of Fuel saved in a year / ship

2,210 MTs of Fuel saved for a fleet

7,072 Tons of CO₂



Source: [Desmi pumps](#)

Source: Jose Gonzales (CLIA), Role of the crew in the Sustainability and Energy Efficiency Agendas, IMHFS International Maritime Human Factor Symposium, , 28 November 2024

Blue Visby Solution - Outline

BLUE VISBY
SOLUTION

UK CHAMBER
of SHIPPING

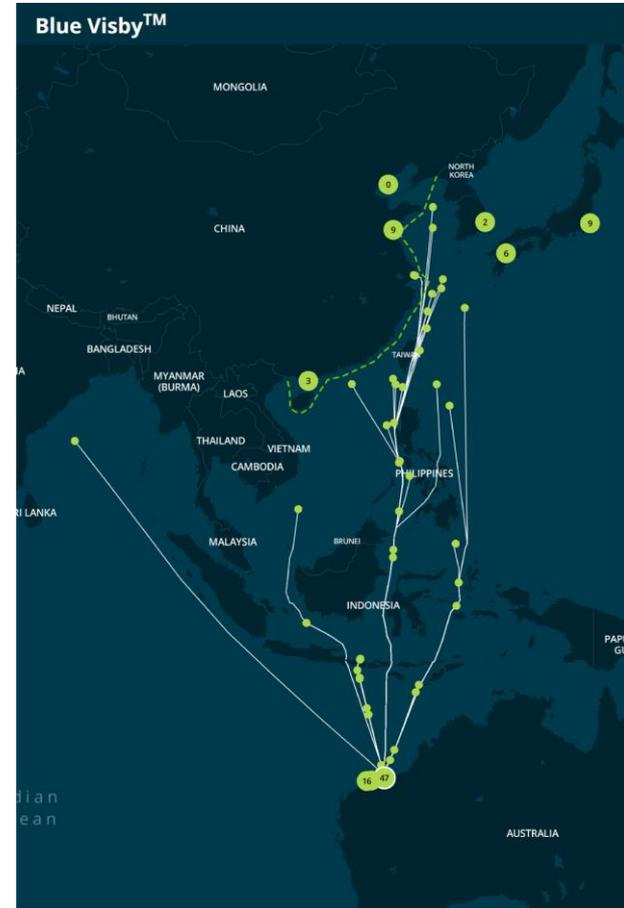
The Blue Visby Solution –

- Platform/Software;
- Algorithm/Operational System;
- Contractual architecture;
- Sharing Mechanism – in a holistic way.

<https://bluevisby.com/>

BIMCO Webinar – Blue Visby for Beginners – 24/10/2023

First Prototype Trials March/April 2024;



Blue Visby Solution – Benefit

BLUE VISBY
SOLUTION

UK CHAMBER
of SHIPPING

• Optimising the ocean passage - 15% - 20% GHG reduction;

Hindcast
Simulations

- **242 voyages** analysed between 2021 to 2023
- Average savings **25.6%**

Digital Twin
Virtual Pilot

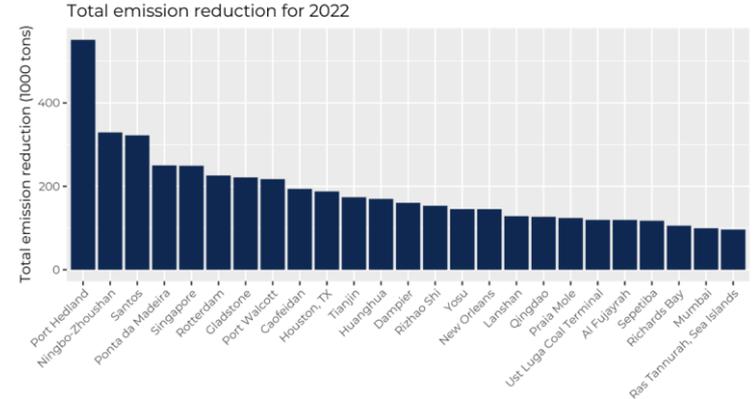
- **10 voyages** conducted in 2024
- Average savings: **18.9%**

Prototype
Trials

- **2 voyages** underwent the Prototype Trials in 2024
- Average savings : **17.3%**

Operational
Deployment

- **12+ voyages** completed since late December 2024
- Average savings: **~15%**



Sources: Blue Visby Solution, Green Ports & shipping Congress Singapore, May 2024, Hindcast simulations geographical distribution;

May 2025 – Bureau Veritas Validates the methodology

Safety of Alternative Fuel WG - Biofuel Workshop

- UK CoS – Safety of Alternative Fuel WG – established May 2024;
- Two Chairs - Shell and V Group;
- Biofuel Workshop April 2025 – Different Speakers (LR/FOBAS, MAN, Gibunkering, Svitzer)

UK CHAMBER of SHIPPING		Safety of Alternative Fuels Working Group		Biofuel Risk Assessment			
p-in Biofuel		Date conducted:		29/04/2025			
Risk ID	Risk Description	Associated Activity	Impact Rating (1-5)	Impact Description	Probability Rating (1-5)	Probability Description	Risk Score
Assign a unique identifier to each risk (001, 002...)	Provide a detailed description of the risk using a structured risk statement. (As a result of [cause], [uncertain event] may occur, leading to [consequence].*)	Indicate the specific activity or operation where the risk is relevant (e.g., fuel transfer).	Rate the impact of the risk on a scale of 1 (Minor) to 5 (Catastrophic).	Describe the consequences if the risk materialises, covering all areas of impact.	Rate the likelihood of the risk occurring on a scale of 1 (Rare) to 5 (Almost Certain).	Explain the reasoning behind the probability rating, referencing data or scenarios.	Calculate score by Impact x Probability.
6	As a result of incompatibility between biofuel and other onboard fuels (such as MCO or residual marine fuel grades), fuel instability or separation may occur, leading to operational disruptions or potential damage to fuel systems / equipment.	on board Handling and Use		Operational disruptions, fuel system damages, increased maintenance, safety risks, environmental impact, sludging and fuel starvation.			
7	As a result of incompatibility between biofuel and filter material, or due to the presence of impurities or degradation by-products, filter clogging may occur, leading to restricted fuel flow, engine performance issues or unplanned maintenance.	on board Handling and Use		Restricted fuel flow, engine performance issues, unplanned maintenance, operational delays and safety concerns.			
8	As a result of prolonged exposure to certain fuel properties or contaminants, accelerated wear or degradation of fuel system components may occur, leading to reduced performance, increased maintenance needs, or potential system/component failure.	on board Handling and Use		Reduced performance, increased maintenance needs, potential system or component failure, safety risks and operational downtime.			
9	As a result of changes in fuel composition or the presence of contaminants, degraded purifier performance may occur, leading to insufficient fuel cleaning, increased wear on downstream components or operational disruptions.	on board Handling and Use		Insufficient fuel cleaning, increased wear on downstream components, operational disruptions, maintenance burden, environmental and safety risks.			
10	As a result of leakage from biodiesel systems, the release of fumes in the engine room or purifier room may occur, leading to potential health risks for personnel, fire hazards or the need for emergency response and cleanup.	on board Handling and Use		Health risks to personnel, fire hazards, operational disruptions, environmental impact and increased			

This risk assessment template is designed to help identify potential risks associated with the information gathered will be used to inform regulatory guidance and industry best solutions but rather for gathering insights and expert suggestions. Please complete each section of the template as thoroughly as possible. For detailed information see the full template.

Biofuel Workshop – Svitzer experience

1ST EXPERIENCE – HVO SUCCESSFULLY INTRODUCED TRULY DROP-IN FUEL – HOWEVER MAYBE TOO ”GOOD”

CONCLUSION

- Fuel is truly a no-prep drop-in fuel
- Accepted by all OEMs
- Undramatic conversion – no service interruptions

SAFETY

- Change management conducted (standard)
- Crew safety familiarisation
- Fuel free of smell / colour (leakages)

MARKET / SUPPLIERS

- Slowly maturing fuel offering and no. of suppliers
- ISCC certification not given
(often not required for shore-based customers)
- It's the most expensive fuel available

FUEL

- EN 15940 for HVO
- Standard flash point 55 → 60 degrees SOLAS
- ISCC 2nd generation feedstock requirement
- Unused extra fuel filters onboard

Biofuel Workshop – Svitzer experience

2ND EXPERIENCE – TESTING FAME B100

BATTLE TESTING BOTH FUEL AND PROCUREMENT FLOW

Vessel

- Svitzer Lynx

Fuel used

- Specification EN14214
- Max. -10 degrees CFPP
- ISCC certified 2nd generation feedstock

Period

- Oct 2022 – Jan 2023

Location

- Ijmuiden, The Netherlands

Preparation / Evaluation

- Internal change management + close coordination with CAT
- Tank cleaning due to FAME's "cleaning properties"
- Extra spare fuel pumps and injectors onboard as backup
- Oil filter replacement prior to start + every 250 hrs during test
- Safety familiarisation to crew
- Lower calorific value compensated by ECM

Running hours completed

1000

B100 burned (cbm)

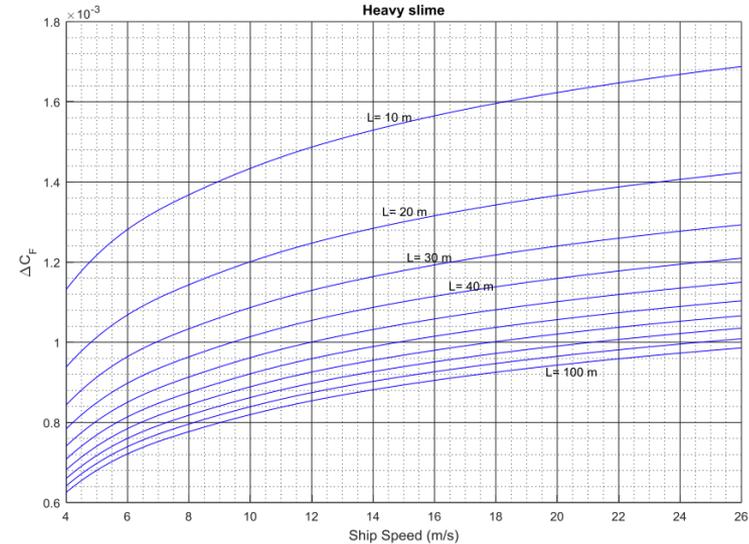
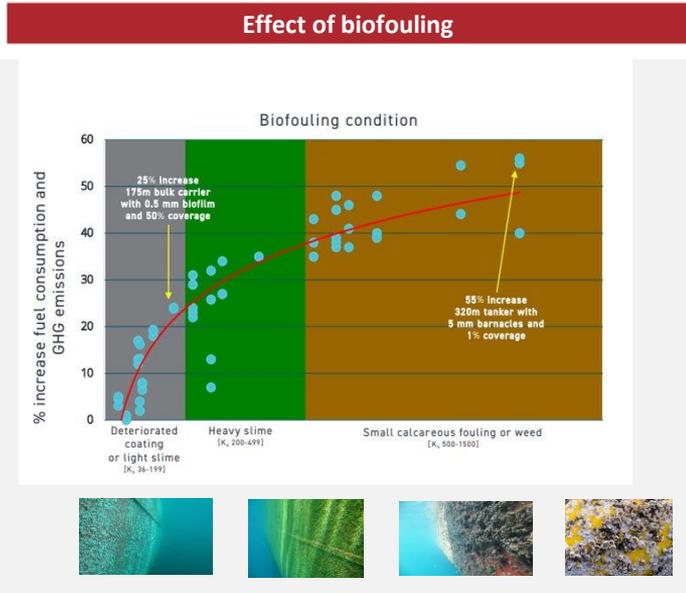
100

Tug jobs performed

500

Introduction – Why Biofouling Management

Ship efficiency, reduce resistance and improve fuel consumption and GHG emissions – (cost effective) improvement



Source: Yigit Kermal, [Practical Added resistance diagrams to predict fouling impact on ship performance](#), 2019 Strathclyde

Source: IMO GloFouling – [Impact of Marine Biofouling on the Energy Efficiency](#) 2022

Biofouling management – not straightforward

Biofouling management



Increase ship efficiency



Reduce GHG emissions by ensuring the hull remains smooth and clean between dry dockings

Prevent transfer of invasive species



Prevent the spread of non-native aquatic species which can become invasive

Minimize chemical contamination

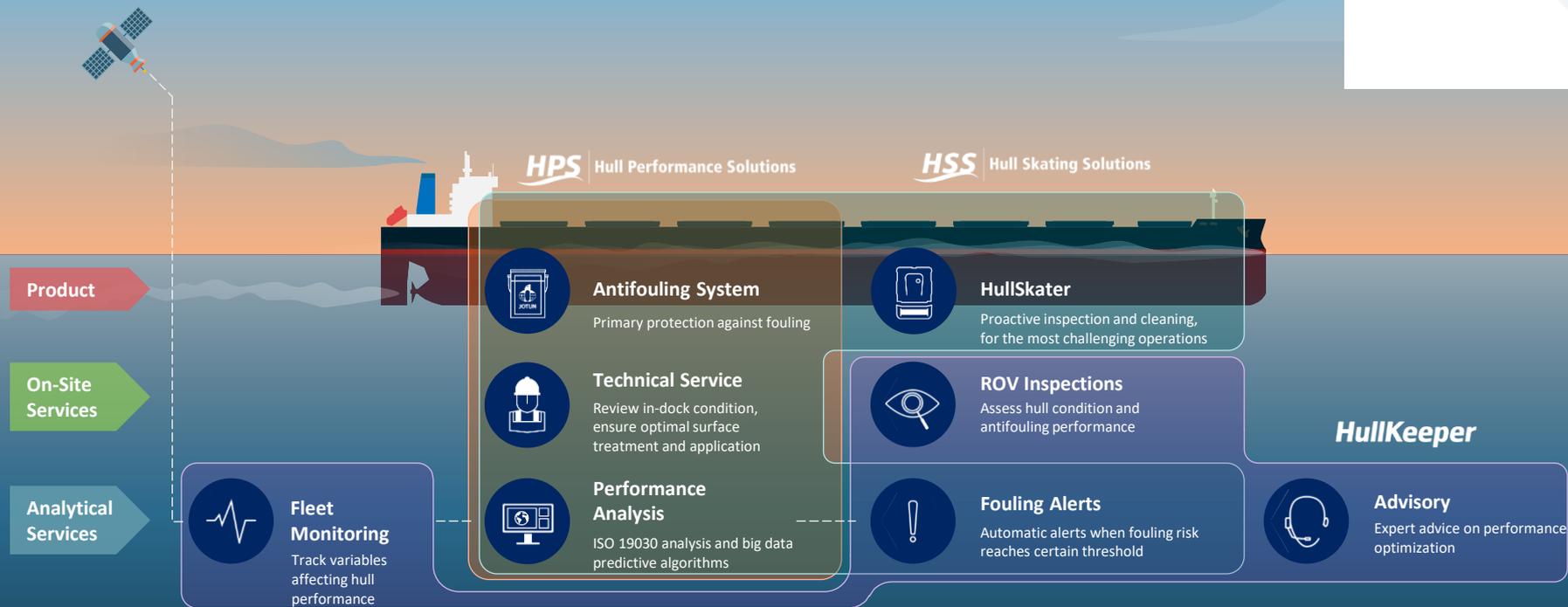


Minimize the release of unwanted chemicals to the water column due to in-water cleaning activities or coatings systems polishing by design

Different Ways

- Monitoring and Awareness;
- Reactive Hull &/OR Propeller Cleaning; (Dry-Dock, Underwater cleaning);
- Proactive Cleaning (ROV, Ultrasonic etc..);
- Coating;

Achieving vessel efficiency and cleaner shipping with Jotun Hull Performance



HSS | Hull Skating Solutions



Combining state-of-the-art antifouling and proactive hull cleaning:



High performance coatings



Proactive condition monitoring



Inspection and proactive cleaning



High-end technical service



Clean hull guarantee

Only solution offering a reliably and documented clean hull, even in the most challenging operations.

Always clean hull.

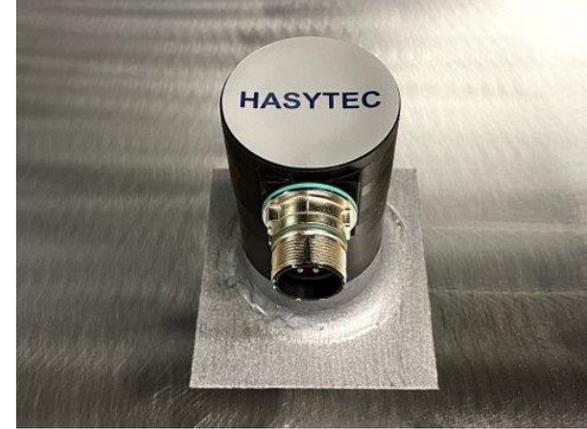
Biofouling - It is not new at all



Source: V-Group/Sea Tech, [HMS queen Elisabeth Propeller cleaning](#) ,



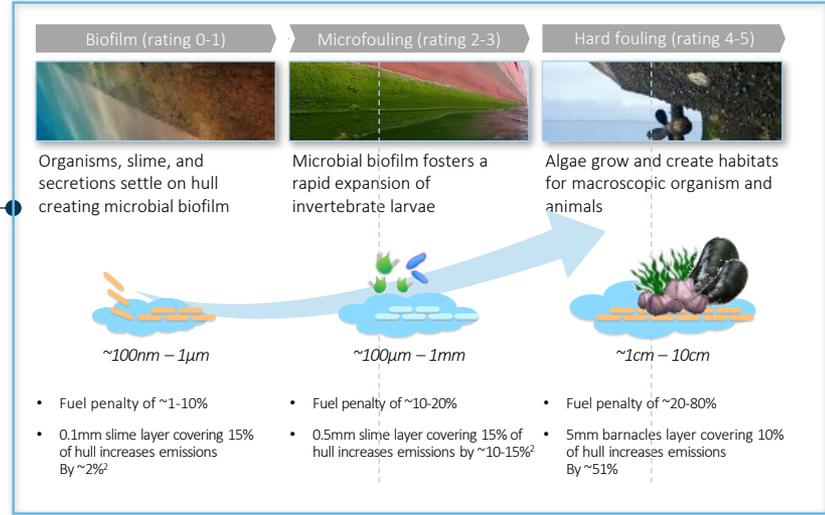
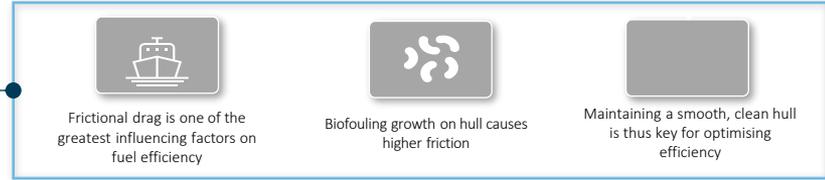
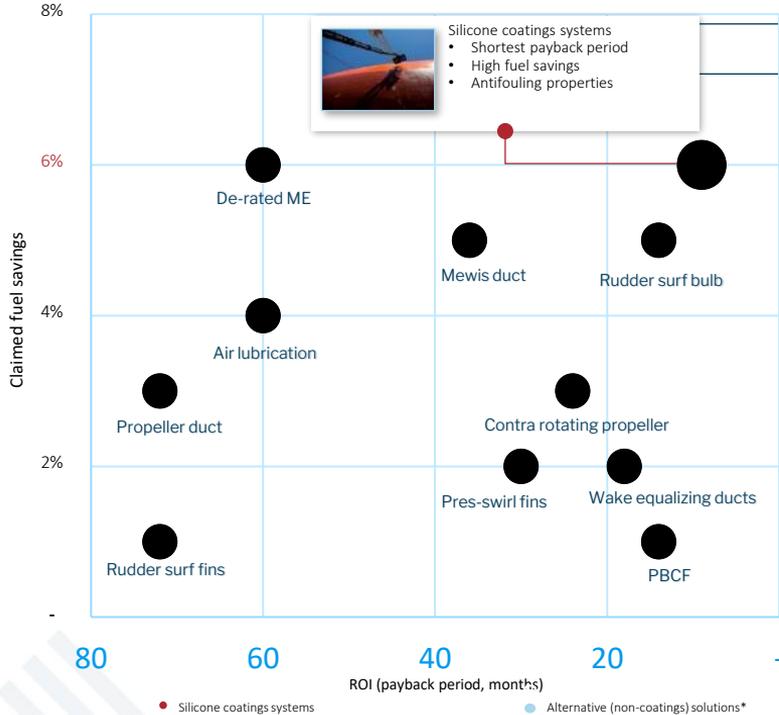
Source: LomarLabs and AliciaBot, Biofouling from a Shipowner Prospective, February 2024 – Webinar UK Chamber of Shipping.



Source: Hasytec transducer – Website accessed 04/09/2024

Silicone Based Hull Coatings

Overview of ESD upgrades

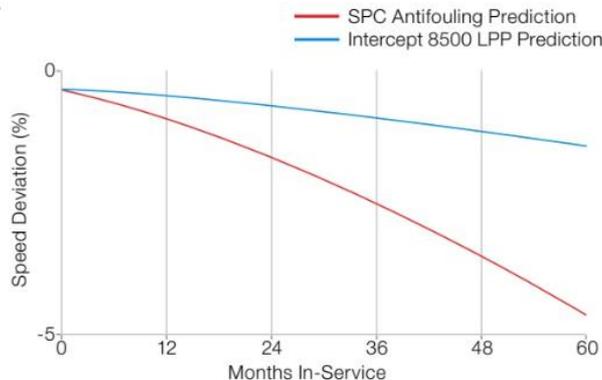


HEMPAGUARD X7

Predict Coating Impact on Fuel

• *Intertrac Vision Tool helps vessel operators forecast and achieve decarbonisation goals*

- Selection of best suited fouling control coatings for vessel operations, performance, and budget
- Intertrac Vision is used for tailored coating recommendations to achieve vessel performance and decarbonisation goals
- Whitepaper study



Coating	*Speed Deviation [%]	Power Deviation [%]	Total FOC [MT]	Total CO ₂ Em. [MT]
SPC antifouling	-4.6	17.0	67,754	210,987
Intercept 8500 LPP	-1.4	3.0	65,033	202,514
Savings	3.2	14.0	2,721	8,473

[Intercept 8500 LPP - Optimizing Vessel Performance Whitepaper](#)

Financial/Regulatory example

Ship sailing from Port Said to Algeciras mid June 2025
ECA area from 1st January 2025
Sailing on MGO
Ship's daily consumption: 24 Tons

MGO price: 747 USD/MT*
NM: 2,278
Sea voyage: 9.5 days

* Source: Global 20 ports average 6th Sept 2024 – Ship&Bunker

Fouling scenario: Light
Impact: 2%
Additional consumption per day: 0.48 Tons
Additional consumption for the voyage: 4.56 Tons
Additional emissions for the voyage: 105.84 Tons of CO2
Additional expense for the voyage: 346.27 USDs

Fouling scenario: Medium to Moderate
Impact: 8%
Additional consumption per day: 1.92 Tons
Additional consumption for the voyage: 18.24 Tons
Additional emissions for the voyage: 58,36 Tons of CO2
Additional expense for the voyage: 13,625 USDs

Fouling scenario: Heavy
Impact: 15%
Additional consumption per day: 3.6 Tons
Additional consumption for the voyage: 34.2 Tons
Additional emissions for the voyage: 109.44 Tons of CO2
Additional expense for the voyage: 25,547 USDs

Wind - Efficient Use of Limited Renewable Energy

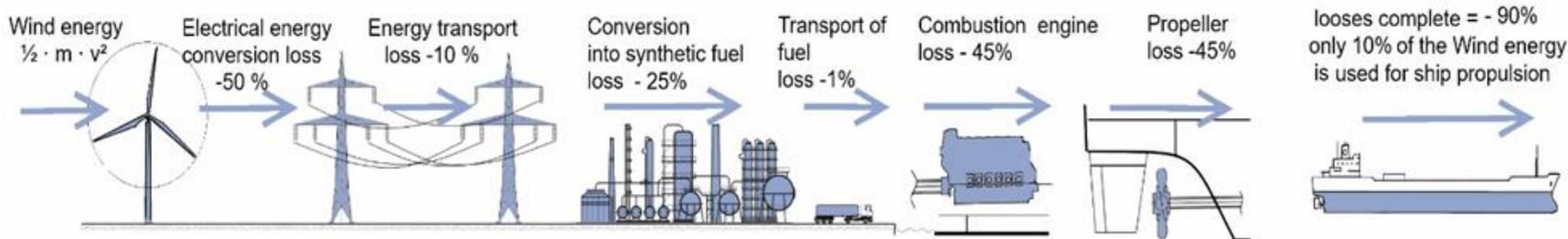
International
Windship
Association



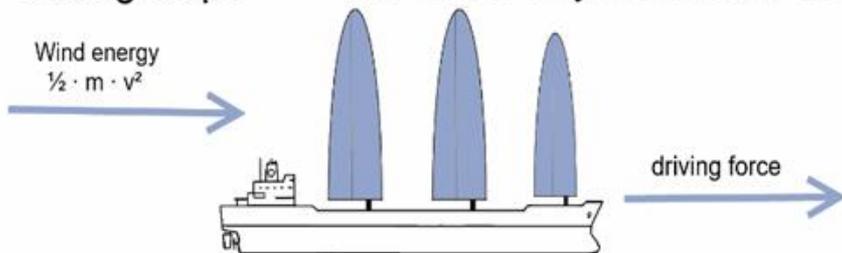
ABL Group



power 2 fuel concept: the long way from wind energy to driving force...



sailing ship : the short way from wind energy to driving force



advantages of a sailing ship:

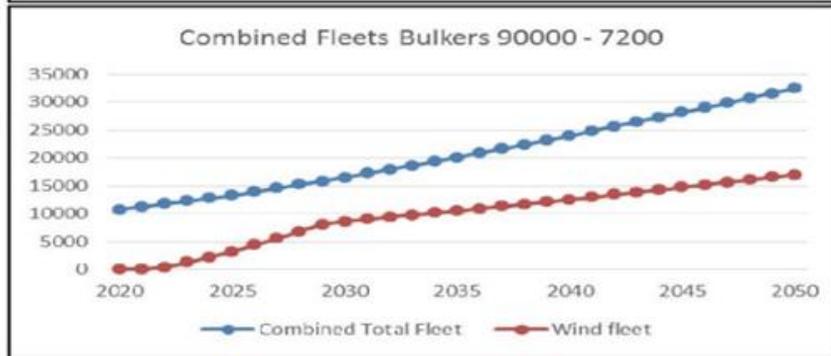
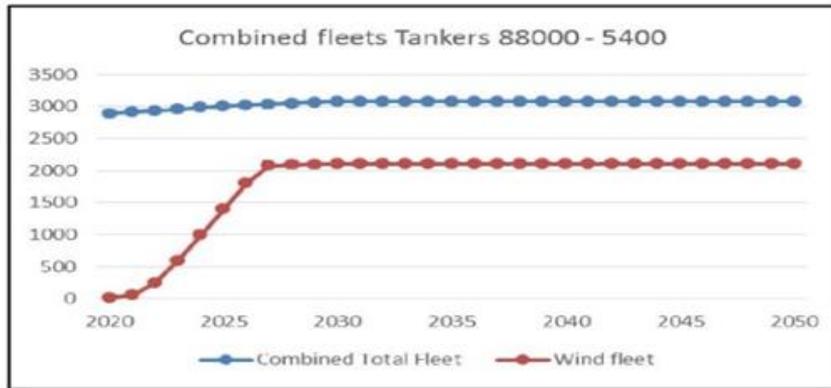
- uses high wind potential on the open sea
- No losses due to energy conversion
- No losses due to energy transport
- No land-based infrastructure necessary
- One sailing ship replaces 10 land based wind power plants
- No fuel costs for the shipping company (wind is for free)
- less dependency of shipowners on fuel producers

Herbert Blümel ,2019

Source: ABL Group Stefano Scarpa, Maritime Decarbonisation Challenge: The Role of Wind Propulsion, IMaerEST, Dublin 6 February 2025

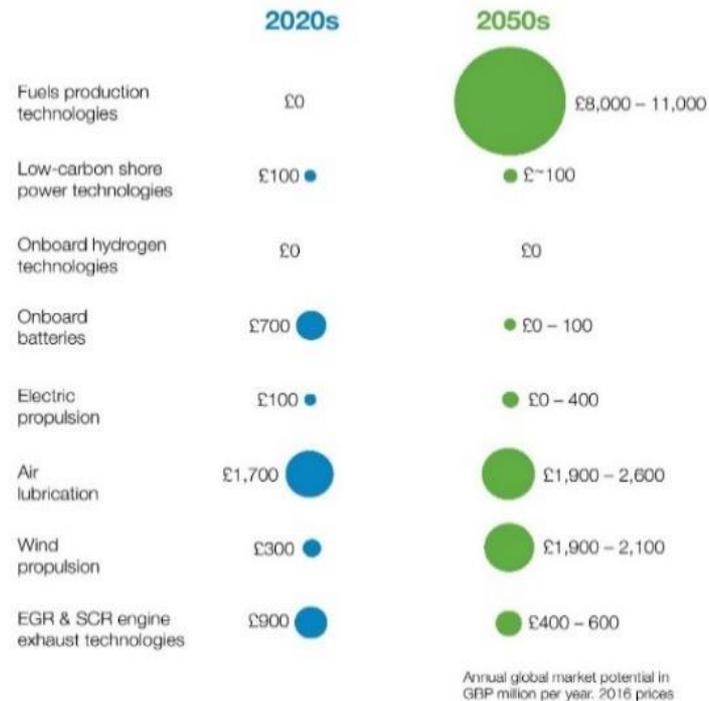
Wind Propulsion: Market Potential

Adoption pathways by ship type



EU Report: 10,700 ships with WPS by 2030

Figure 4: Potential annual future global market for maritime emission reduction options⁴⁹



Source: Frontier Economics for DfT

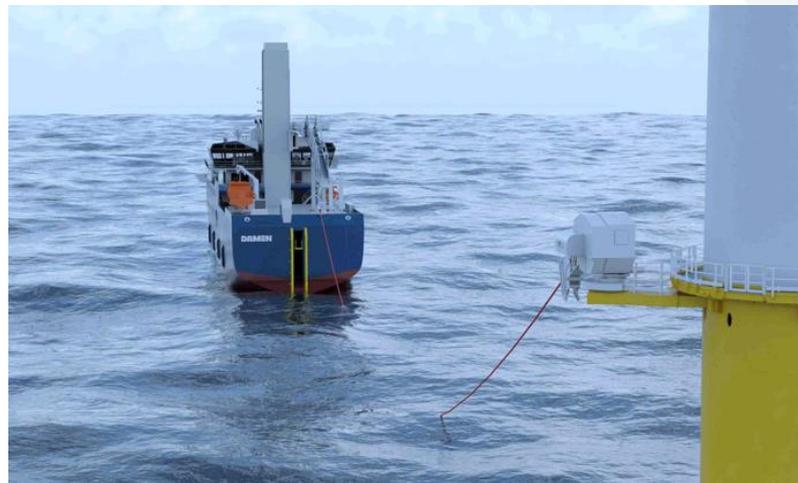
UK Govt - 40,000 vessels with WPS (40-45% of fleet)

Wind – Fleet order



Source: windShipAssociation, Gavin Allwright, Potential for wind Propulsion in Shipping , Webinar, UK coS, Danish Shipping, Norway Shipowners and Belgium, 17 June 2025

E-CTV & SOV Offshore Charger CMDC/ZEVI



CTV & SOV OFFSHORE CHARGER development is part of the Clean Maritime Demonstration Competition (CMDC) and Zero emissions Vessels and Infrastructure (ZEVI) funded by the DfT and delivered in partnership with Innovate UK.

E-CTV Offshore Charger – Concept

CHARGING SYSTEM:

- Mountable on either WTG or OSS
- Modular kit packaged for ease of transport, lifting and installation on Asset
- Up scalable to 2 MW charging power
- Fully un-manned connection, charging and disconnection
- Passive & active charge/mooring line tension & length control
- Skid & slew functions for weather vaning in changing wind & tide
- Automatic and manual instant safety release system
- Subsea rated IP67 electrical connection assembly on Asset and CTV



E-CTV Offshore Charger – Status

CHARGER STATUS JUNE 25

- System fully tested in onshore & harbor conditions, including validation and type testing
- Full offshore validation trials on an OSS in Belgium completed
- First 1.2 MW commercial unit now under production and due for offshore installation Q1 26
- CTV electrification design contract for Tidal Transit ongoing (ZEVI)



E-CTV Fleet Fast Growth – Status

Current electrified CTV fleet (sampling)	Owner / Shipyard
Fully electrical CTVs: 4 retro fit delivery 2025 onwards 9 new built delivery 2026 onwards	TIDAL TRANSIT
Fully electrical CTVs : 8 new built delivery 2026 onwards	ARTEMIS
Fully electrical CTV: Design ready	DAMEN
Fully electrical CTVs: 2 units under construction Hybridised CTV: 1 in operation	NOS
Hybridised CTVs: 2 units in construction	HST



E-SOVS Fleet Fast Growth – Status

Owner / Shipyard	Current electrified SOV fleet (sampling)
BIBBY	Fully electrical SOV : 1 Under construction Highly hybridized : 2 Conversions under design
EDISON C.	Highly hybridized : 1 Under construction
DAMEN	Fully electrical : Design ready
ESVAGT	Hybridized: 1 Under construction
LDA	Highly hybridized : 1 Planned under option 2026



Roadmap for Commercialisation



Power &
Automation



MILESTONE	DATE
CTV CHARGER UP TO 2.2MW READY FOR COMMERCIALISATION	First 1.2MW unit under production
SOV CHARGER UP TO 4MW READY FOR COMMERCIALISATION	Q1 26
SOV CHARGER UP TO 8MW READY FOR COMMERCIALISATION	Q4 26

Vessel Specification – Bibby Wavemaster Zero

BIBBY
MARINE LIMITED



Under construction

Armon, Vigo Spain, 2027

UK Flagged & DNV Classed

Dynamic Positioning

DYNPOS(AUTR-CB) DP2

Accommodation

120 POB with 84 single cabins

Energy storage system:

Corvus Energy

Lithium Iron Phosphate (LFP)
24,400 kWh

Split across 3 compartments
(Increased Redundancy)

Engines :

Wartsila

6L32, Dual Fuel
Methanol



Main Particulars

Length Overall	89.63m
Breadth Moulded	19.80m
Depth Moulded	7.55m
Draught (Design)	5.00m
Gross Tonnage	6773Te

Environmental :

Noise and Vibration V(2)C(2)
Expected to Meet:

SILENT E (Environmental)
SILENT A (Acoustic)

Main Propulsion:

Kongsberg

2 off 2000 KW **RIM Drive Main Azimuth Units**
2 off 1500kW **RIM Drive Tunnel Units**
1 off 1200 KW Retractable Unit

Zero Emission Operation



Average Power Required/day 17MWh



24 Hour battery endurance, 1.5Hs

>20 Hours, 2.5Hs

>15 Hours, 3.5Hs

Full charge = transits over 130NM @10kts

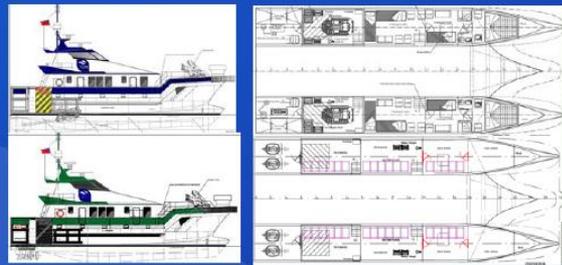
Dual Fuel Engines ready to come online for safety/emergencies/charging

Connected to charger at night



UKShore ZEV Winner Retrofit CTV – e-Ginny

- Project Partners: Tidal Transit, MJR, Artemis, Goodchild Marine
- Key Suppliers: MJR, Artemis, Goodchild, Volvo, Danfoss, Corvus, Capilano & MECAL
- 2011 GRP Mercurio 20m/12pax CTV – Ginny Louise
- 9t MGO → 3.4mwh Corvus Batteries
- 2x FPP → 4 x Volvo IPS30 / 4 x Danfoss Motors
- Artemis 320kw shoreside charger & BESS
- MJR 1.2mw offshore charger
- 100% electric – no additional generators
- Site range 20nm (Range @ 20kn = 53nm / 10kn = 183 miles)
- 3 Demonstration period 2025-28





Are Retrofits Feasible without Grant Funding?

Initial Project cost of £6.3m – 80% grant

- Retrofit of CTV
- Supply offshore charger
- Supply shoreside charger

Retrofit Costs

- Batteries – Higher kwh but costs falling
- Propulsion – efficiency is key
- Power/Battery Management – C rates
- Hull age & changes – Expensive!
- Total: £5m + chargers (Total £8m)
- Cost to replace from new: £8/10m + Chargers

Operating Costs

- Lower energy cost per nm
- £0.75 MGO = £0.23 per kwh
- Potential for +/- £0.01 per kwh offshore
- Lower maintenance cost
- Consumables & Engineers
- Increased working hours – no fuelling
- Greater efficiency all round!

Safety of Alternative Fuel WG - Battery Workshop

- UK CoS – Safety of Alternative Fuel WG – established May 2024;
- Two Chairs - Shell and V Group;
- Battery Workshop March 2025 – Different Speakers (Shell, Corvus and Calmac)

RISK ID	Risk Description	Associate	Impact	Rat	Impact	Description	P	P	R	P	T	E	EX	Suggested Mitigation Options	P	C	I	R	S	E	C	Comments and Ad
Assi	Provide a detailed description of the risk using a structured risk statement. (As a result of [cause], [uncertain event] may occur, leading to [consequence].")	Indicate the specific activity	Rate the impact of the risk on a scale of 1			Describe the consequences if the risk materialises, covering all areas of impact.	R	E	C	C	S	J		Outline the measures proposed to reduce the likelihood or impact of the risk.	I	P	R	S	E	C	Add any additional or comments relate	
gn a	[cause], [uncertain event] may occur, leading to [consequence].")					Impact	t	a	x	a	a	e	u		L	d	r	d	e	p	a	l
uni	[cause], [uncertain event] may occur, leading to [consequence].")						e	a	i	c	e	e	i	Layers or protection at cell level, module level and system level	n	v	n	e	c	t	e	s
que	[cause], [uncertain event] may occur, leading to [consequence].")																					
2	As a result of a failure in the battery cooling system, the battery overheats, leading to thermal runaways and fire which could cause a loss of propulsion, severe damage to the vessel and endanger crew safety.	Daily operations				Catastrophic consequences, including the risk of fatalities, severe vessel damage, and loss of the vessel's integrity.								Redundancy - Secondary means of cooling Thermal impacting system linked to alarm and shut down system Include thermistors in the modules (Class rules) Cooling system design Maintenance - Support contracts with OEM's, remote monitoring Onboard maintenance Design interfaces. Management. Responsibility matrix. Some OEM's include cooling in scope, others do not								
4	As a result of the failure of the battery converters/inverters, inadequate power is provided to vessel systems, leading to loss of power to critical ship systems leading to loss of propulsion, grounding/collision endangering crew safety and asset.	Daily operations				Catastrophic consequences, including the risk of fatalities, severe vessel damage, and loss of the vessel's integrity.								Redundancy Design and configuration Treat batteries as static generators.								
5	As a result of a failure of the battery management system, the battery is overcharged, leading to damage to batteries which could cause fire, severe damage to the vessel and endanger crew safety.	Battery charging				Catastrophic consequences, including the risk of fatalities, severe vessel damage, and loss of the vessel's integrity.								Redundant systems monitoring battery operating parameters 2 bus systems online at all times, deviation monitoring Class rules Software systems updates Appropriate alarm and shut down systems Isolation procedure in case of loss of charging/discharging capability								
6	As a result of a failure in the communication protocol, alarms are not given to the ships crew, leading to a failure to respond to unsafe situations which could lead to fire, severe damage to the	Daily operations				Catastrophic consequences, including the risk of fatalities, severe vessel damage, and loss of the vessel's integrity.								Redundant systems monitoring battery operating parameters 2 bus systems online at all times, deviation monitoring Class rules Software systems updates								

Calmac's Hybrid Ro-Ro Vessel's

M.V Hallaig

- ❖ Builder – Ferguson Marine Engineering Ltd, Port Glasgow
- ❖ Age -13 years old
- ❖ Entered service – 2013
- ❖ Tonnage – 499 GT
- ❖ Vessel Type – Passenger/Vehicle RO RO
- ❖ Operational Service Route – Isle of Raasay to Isle of Skye
- ❖ Battery Supplier – European Batteries



M.V Catriona



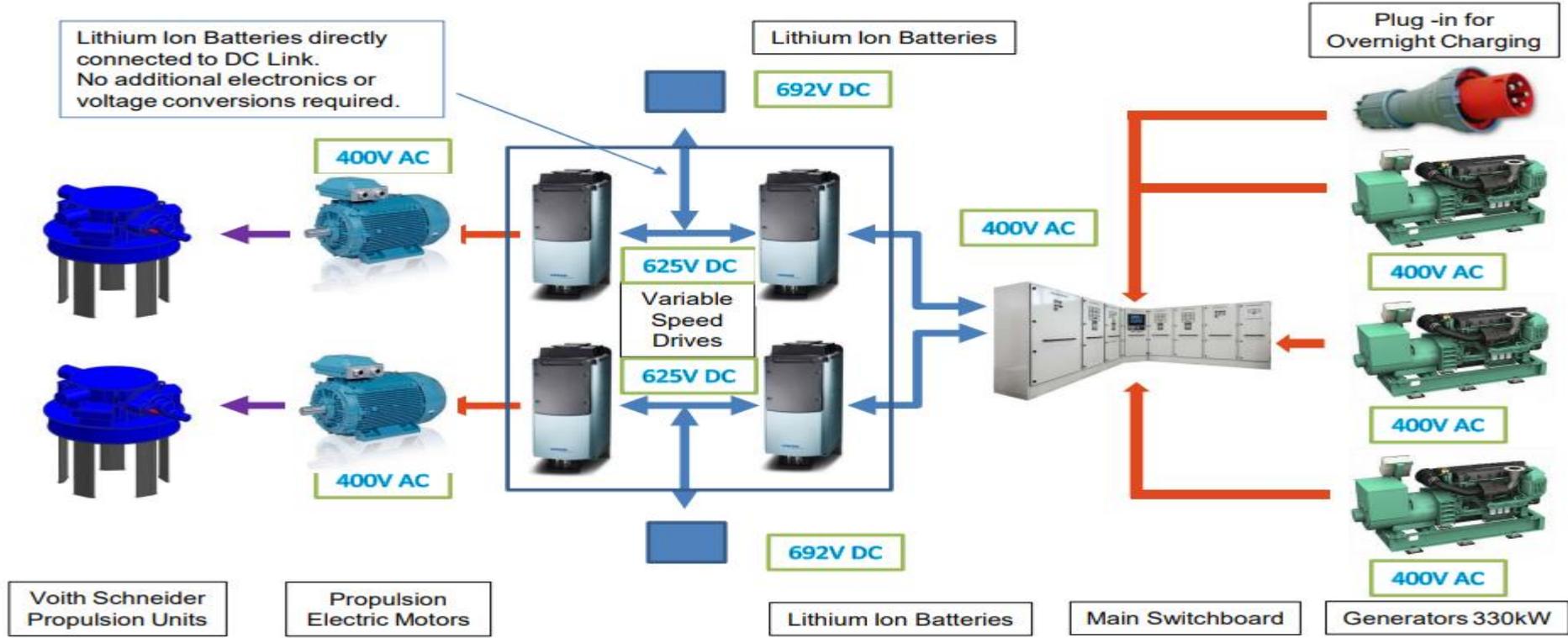
- ❖ Builder – Ferguson Marine Engineering Ltd, Port Glasgow
- ❖ Age – 9 years
- ❖ Entered service - 2016
- ❖ Tonnage - 499 GT
- ❖ Vessel Type – Passenger/Vehicle Ro Ro
- ❖ Operational Route – Loch Ranza (Isle of Arran) to Claonaig (Kintyre penisular)
- ❖ Battery Supplier – SAFT Batteries

M.V Lochinvar

- ❖ Builder – Ferguson Marine Engineering Ltd, Port Glasgow
- ❖ Age – 12 Years
- ❖ Entered Service – 2014
- ❖ Tonnage – 499 GT
- ❖ Vessel Type – Passenger/Vehicle RO RO
- ❖ Operational Service Route – Fishnish (Isle of Mull) to Lochaline (Morvern Peninsula)
- ❖ Battery Supplier – European Batteries



Calmac – Hybrid System Design



Sources: Calmac, UKCoS – Battery Experience Extract from Slide from UK CoS workshop 11 March 2025;

P&O Ferries – Fusion Class – MV Pioneer and Liberte

A double-ended design and two bridges on the ship, meaning that there is no need for it to turn around and reduces fuel use.

Panoramic sea views for passengers.

Outside deck areas to provide viewing platforms of the White Cliffs of Dover.



DOVER ← → CALAIS



Cutting fuel use by 40 per cent through a combination of fuel and battery propulsion.



The heat recovery system saves fuel which reduces the vessel's carbon footprint.



A power management system to close down parts of the ship when not in use.

Revolutionary new shape of hull for the English Channel and azimuth thrusters which increase manoeuvrability of the ship.

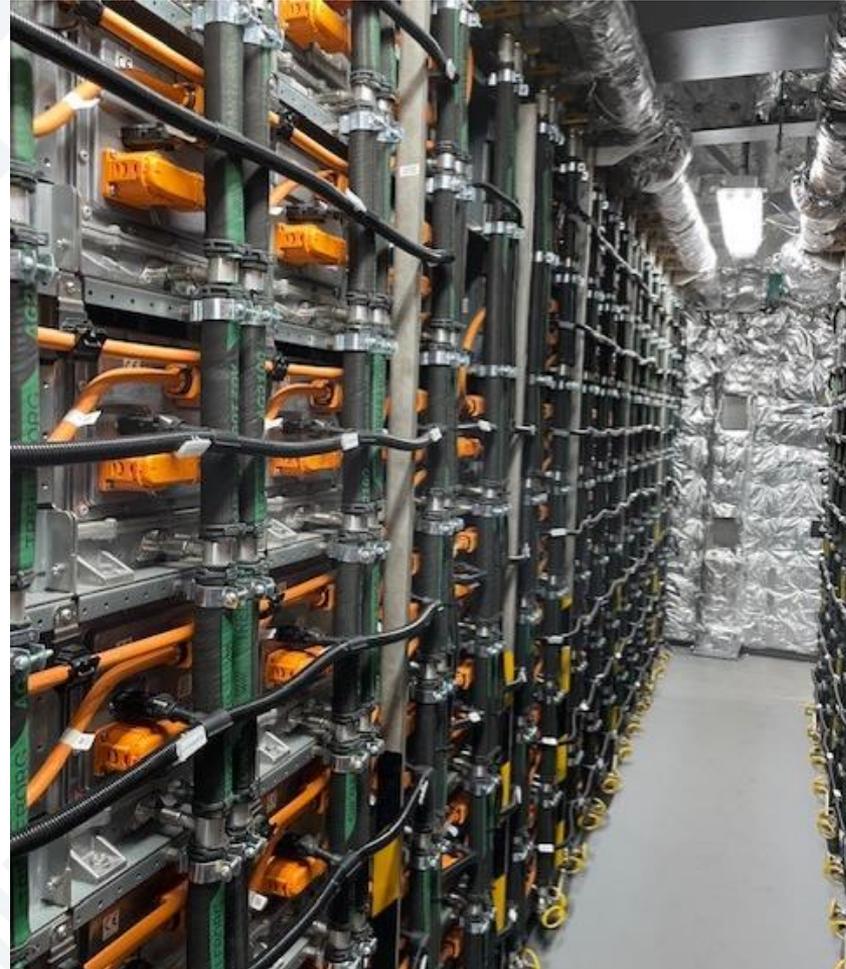


Future proofing anticipates the 'zero carbon emissions ship'.



P&O – Fusion Class

- Battery Technology is evolving.
- P&O Ferries - Fusion class vessels are to the fore of hybrid technology.
- We now look to increase the ships power delivery from 8.5MW to 13.5 MW.



P&O – Safety Training



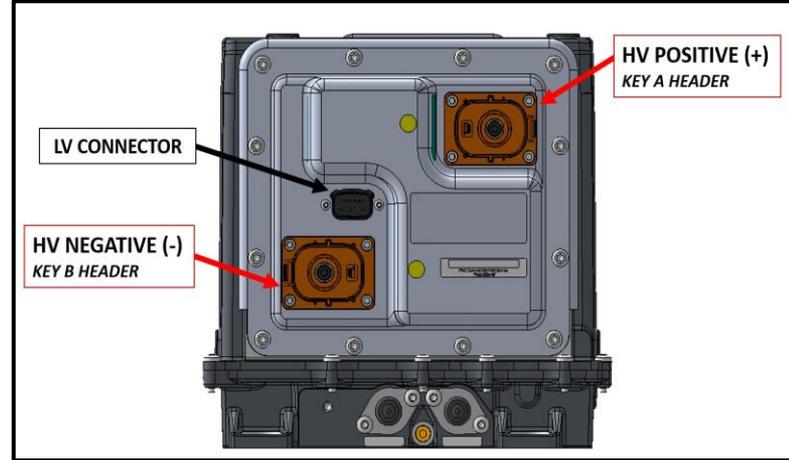
Figure 2: Electrically insulating gloves (left) & Leatbox protective gloves over electrically insulating gloves (right)



Figure 3: Electrical hazard shoes (left) & arc-Rated face shield (right)



Figure 4: Flame resistant overcoat and Rescue hook

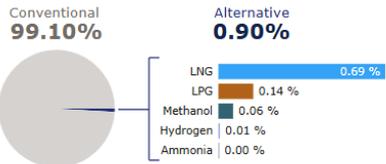


F 1:X S-p with TE HV electrical

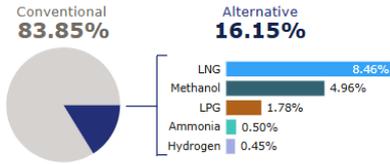


Dual-Fuel Vessels - Uptake

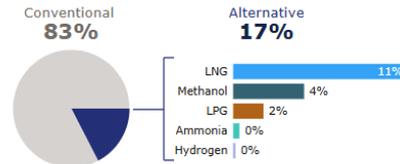
In operation



On order



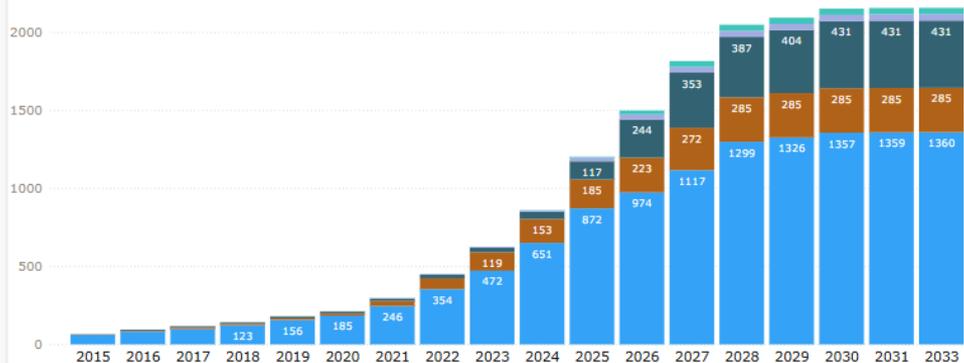
New contracts in the last 12 months



Growth of alternative fuel uptake by number of ships

Number of ships

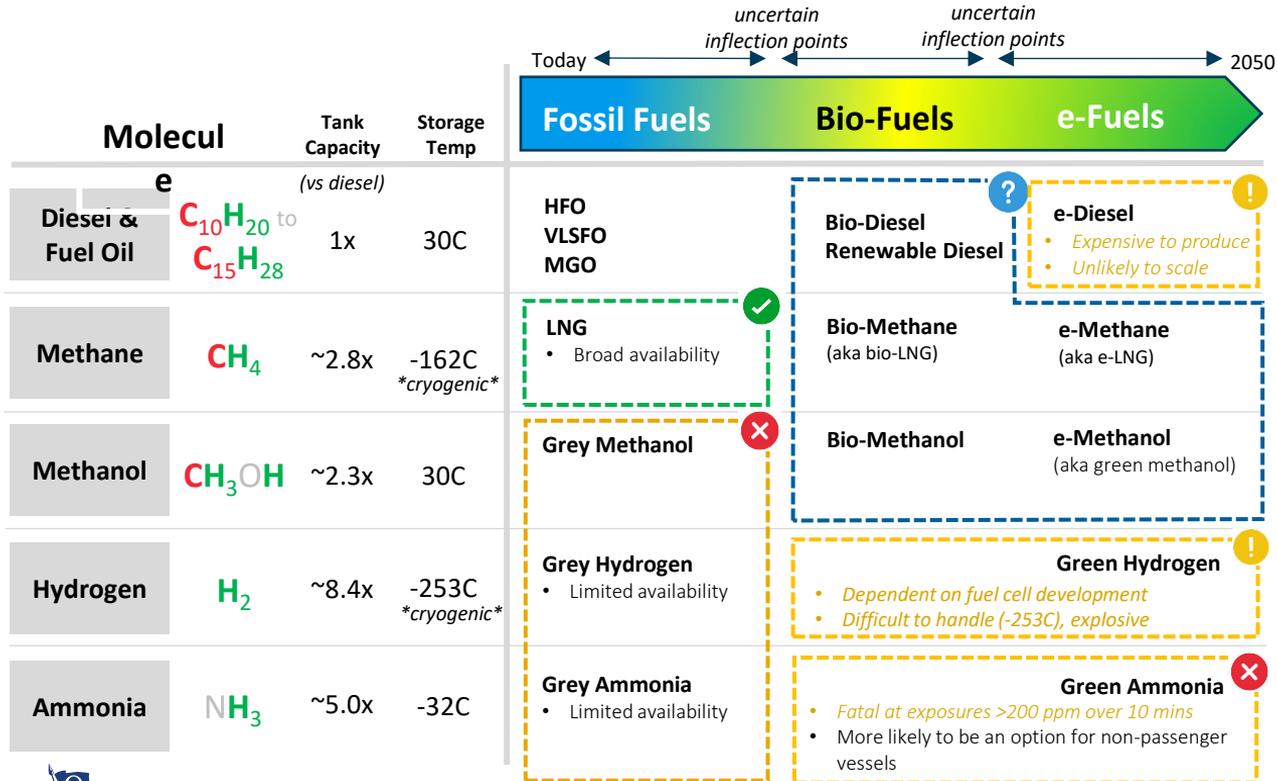
● LNG ● LPG ● Methanol ● Hydrogen ● Ammonia



- In 2030 –
LNG – 1357 vessels;
Methanol – 431 Vessels;

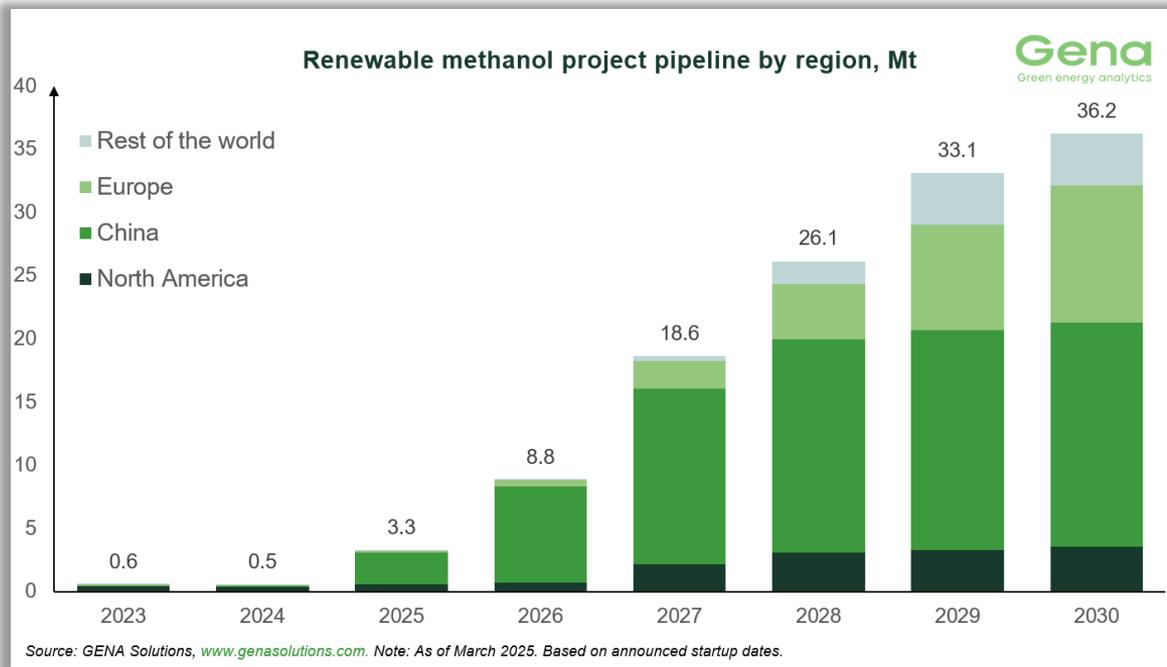
Source: DNV, Alternative Fuel Portal in DNV Veracity, Accessed on 13 06 2025;

Molecule choice: methane and methanol are the most probable pathways for large, ocean-going Cruise



- ✗ Fuels we wouldn't use because they **emit more GHGs than fossil diesel or LNG**
- ! Fuels that are theoretically feasible but **expensive to produce or difficult to handle**
- ? **Most probable** biofuel and e-fuel pathways
- ✓ If methane slip resolved, **lowest GHG option** in absence of bio and e-fuels

Renewable Methanol Project Pipeline



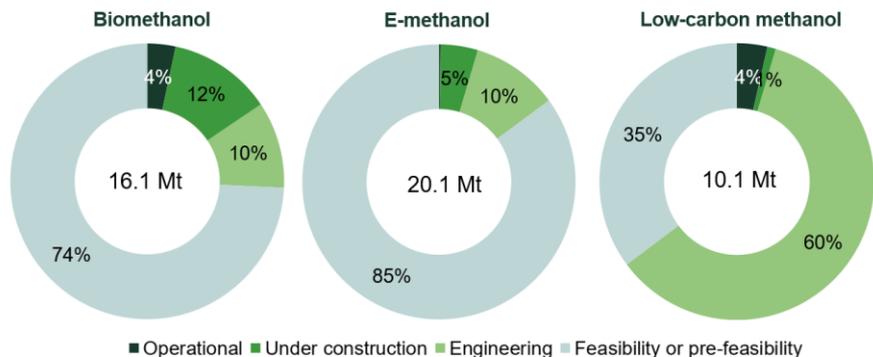
- China continues to rapidly expand its renewable methanol capacities.
- China advantaged with production solar panels, wind turbines and electrolyzers.
- Many projects in China are large-scale hybrid based on biomass gasification and renewable hydrogen.



Renewable/Low-Carbon Methanol Project Pipeline

Renewable and low-carbon methanol by status

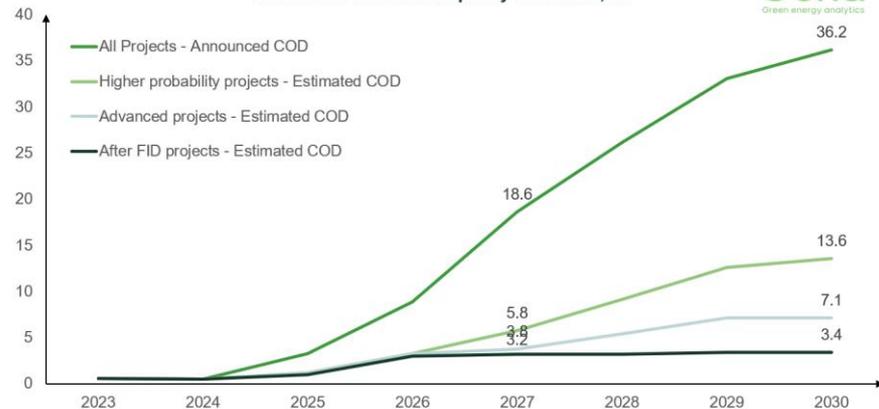
Gena
Green energy analytics



Source: GENA Solutions, www.genasolutions.com. Note: As of March 2025.

Renewable methanol capacity scenarios, Mt

Gena
Green energy analytics

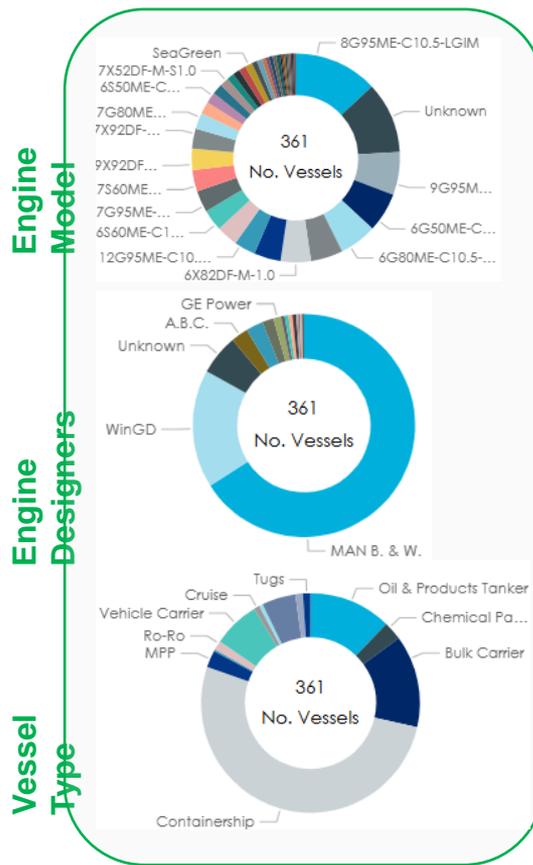
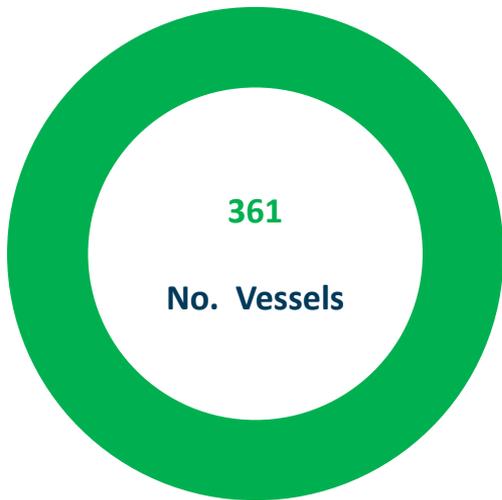


Source: GENA Solutions, www.genasolutions.com. Note: As of March 2025. Advanced projects - operational facilities, projects under construction and in engineering. After FID projects - operational facilities and projects under construction. Higher probability projects - projects with higher probability to startup by GENA estimate.

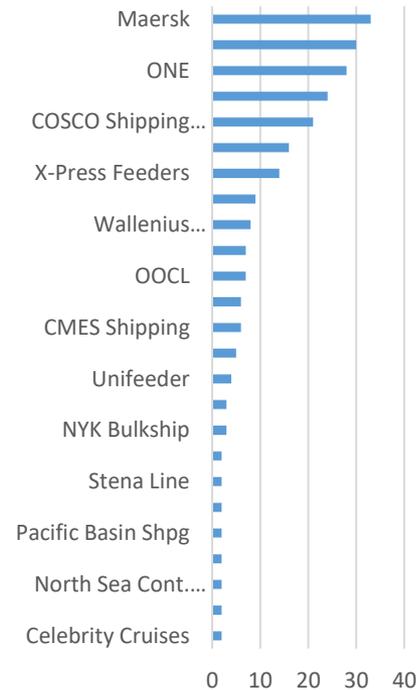


New Vessel | Order Book | 2025 April

Alt Fuel Uptake by Number of Vessels				
Alt Fuel	Fleet	% Fleet	Order Book	% Order Book
Methanol	55.0	0.0%	306.0	4.4%



Top Owner

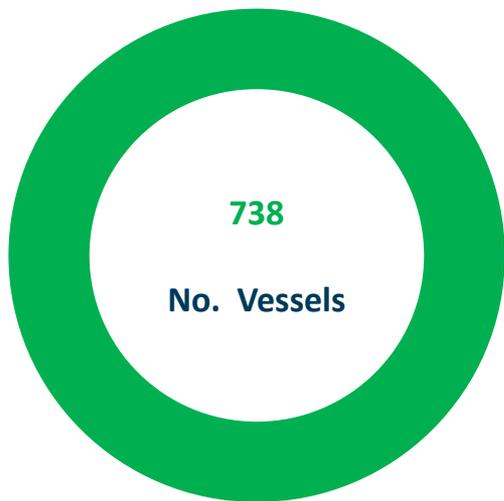


Source: Clarksons

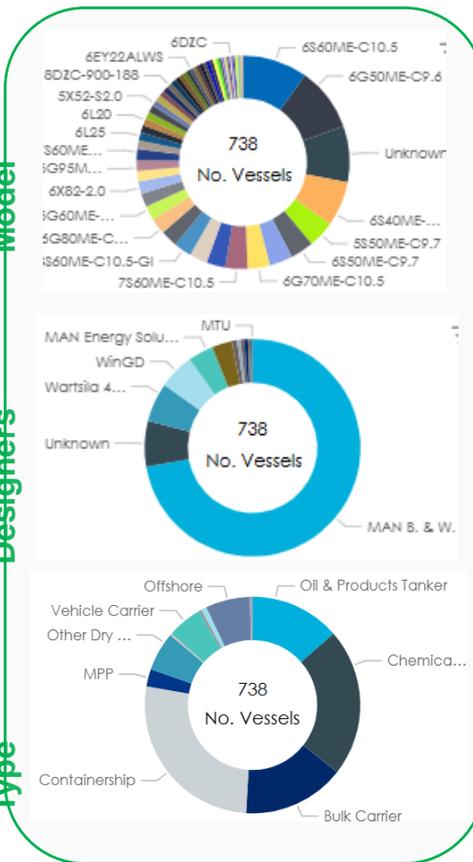


New Vessel | Ready Book | 2025 April

Alt Fuel Uptake by Number of Vessels				
Alt Fuel	Fleet	% Fleet	Order Book	% Order Book
Methanol Ready	136	0.1%	602.0	8.7%



Engine Model
Engine Designers
Vessel Type



Top Owner

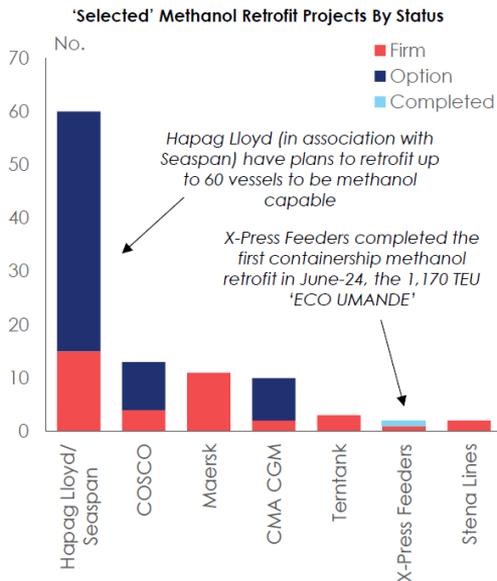


Source: Clarksons



Retrofit Book

Number of liner companies retrofitting vessels for use on 'green services'



Source: Clarksons Research, September 2024



Source: Clarksons

Methanol Conversion Project Update

- **Maersk and MAN Energy Solutions** signed a contract to retrofit **11 containerships** currently powered by **MAN B&W "8G95ME-C9.5"** main engines. The **"MAERSK HALIFAX"** is undergoing retrofits work at **Zhoushan Asia Pacific** as of Jul-24, with the other conversions starting from '27 onwards.
- **MAN Energy Solutions, Seaspan and Hapag-Lloyd** have signed a Conversion Commitment Agreement to retrofit **15 MAN B&W "S90" fitted vessels** with **ME-LGIM methanol DF engines** (plus options for 45 more ships).
- **CMA CGM** will convert **2 boxships** to methanol DF at **Qingdao Beihai** in 2025 (with the option to retrofit 8 more).
- **Wartsila and MAN** will retrofit **4 containerships** owned by **COSCO** at a **COSCO HI** repair yard starting in 2025 (with options to convert 9 more)
- **X-Press Feeders** is retrofitting **2 x 1,170 TEU ships** recently delivered by **New Dayang**. The **"ECO UMANDE"** became the first containership to be converted to methanol DF, with the conversion taking place at **PaxOcean Zhoushan**.
- **Tertank** has ordered **4 x 15,000 dwt methanol ready chemical carriers** at **CMJL** for delivery in 2025-26. The vessels will be delivered with conventional **WinGD "5X52-S2.0"** engines, three of which will be upgraded to **XDF-M**.
- **Stena Line**, in collaboration with **Wartsila**, will retrofit the **"SUPERFAST VII"** and **"SUPERFAST VIII"** passenger ferries to be methanol DF in 2025-26. Stena and Wartsila previously collaborated to retrofit the **"STENA GERMANICA"** in 2015.



Thanks!

ABL Group – Stefano Scarpa Director of Decarbonisation;

ABS – Stamatis Fradelos, Vice President, Regulatory Affairs

Bibby Marine – Matt Thomas, Compliance Manager;

Blue Visby – Haris Zografakis

Calmac – Oliver McKellar Technical Specialist

Carnival Corporation – Anna Ziou Director, Maritime & regulatory Affairs Chair of UKCoS Carbon WG

CLIA Europe – Dr. Jose Gonzales, Senior Director Decarbonisation

International WindShp Association – Gavin Allwright, Secretary General

LR – Jennifer Riley-Jame, Lead Regulatory Specialist

Methanol institute – Alexander Doll , CEO

MMM Center for Decarbonising Shipping – Joe Bettles, Climate Policy & Analysis Manager

Mjr Power & Automation - Dimitri de Gunzburg, Charger Development Lead

Jotun – Petter Korslund, Regulatory Affairs Manager

P&O Ferries – Maritn O’Rouke, Fleet Fuel & Energy Efficiency/Capex Manager

SGMF – Giampaolo Benedetti, Principal Advisor, Energy Transition & Regulatory Affairs

Svitzer – Gareth Prowse, Head of Decarbonisation

Tidal Transit – Leo Hambro, Director

DNV, Hempel, Interpaint, V Group, Alicia Boats, Hasytec, Workboat Association

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Department
for Transport

Clean Maritime Innovation

A Pathway to Impact

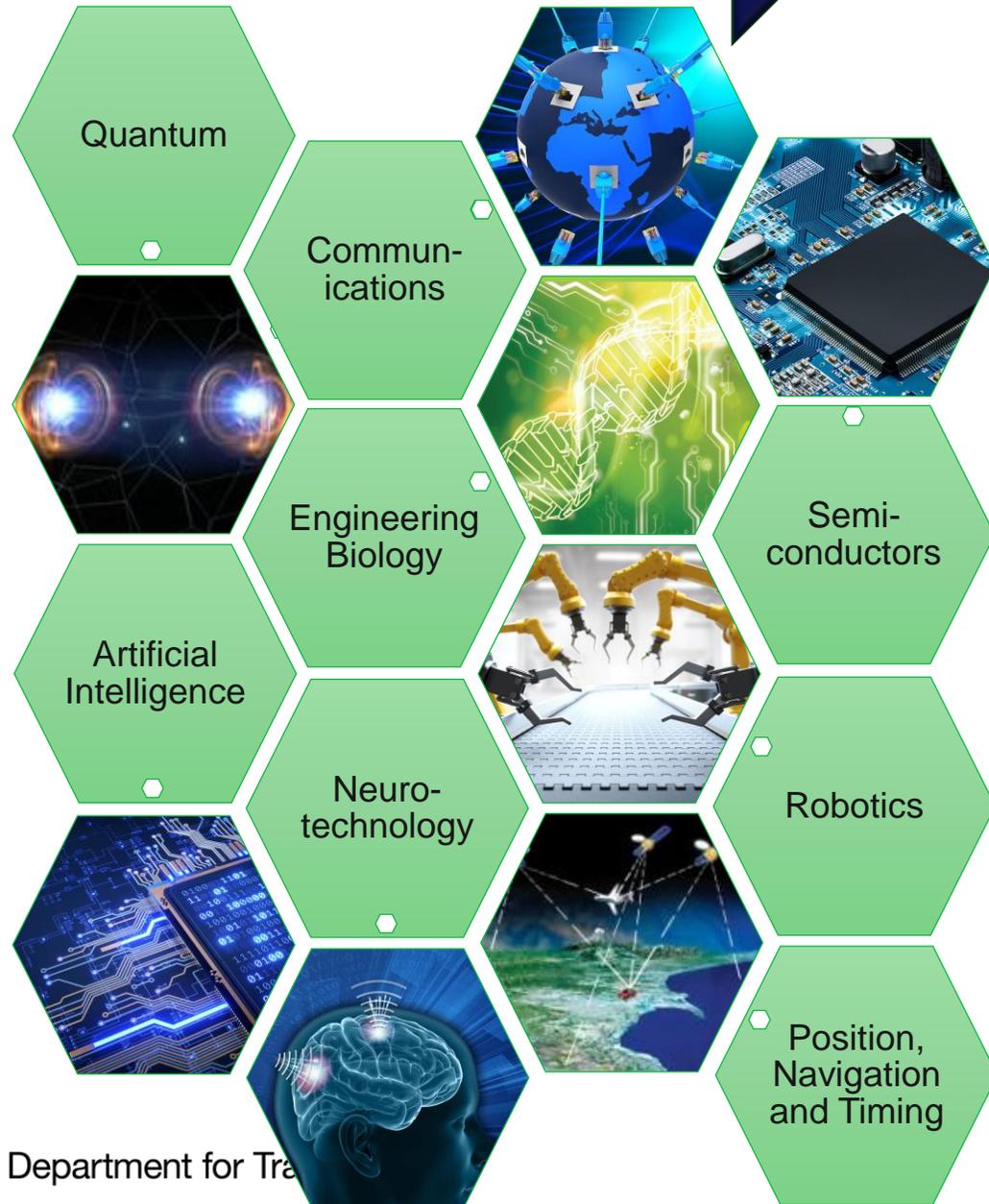
Professor Sarah Sharples FREng
Chief Scientific Adviser, DfT

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Transport in 2050?



Science and Technology Enablers



Transport Challenges



How does DfT engage with Science, Engineering, Innovation and Technology?

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Science is core to delivery of:

- reduction of cost of transport systems
- reduction of environmental impact
- improvement of the experience of transport for users
- harnessing of the economic impact of transport technologies
- accelerating adoption and diffusion of new solutions

Evidence to inform policy design and implementation

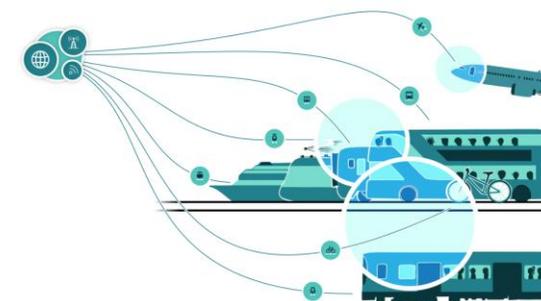
Innovation to develop and test new concepts

Research to mitigate and manage risk

Evidence base for project appraisal

Large-scale demonstrators

Research to explore specific policy-related issues



The Imperative for Clean Maritime Innovation

Map of modelled PM2.5 concentrations across England in 2018, the base year for the PM2.5 targets (produced by Imperial College London).

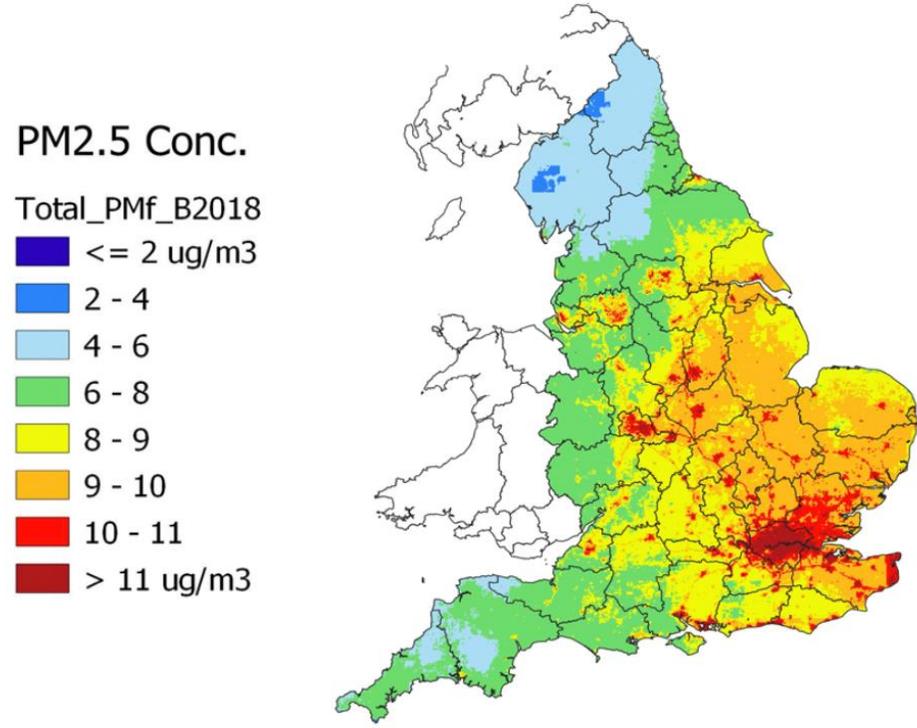
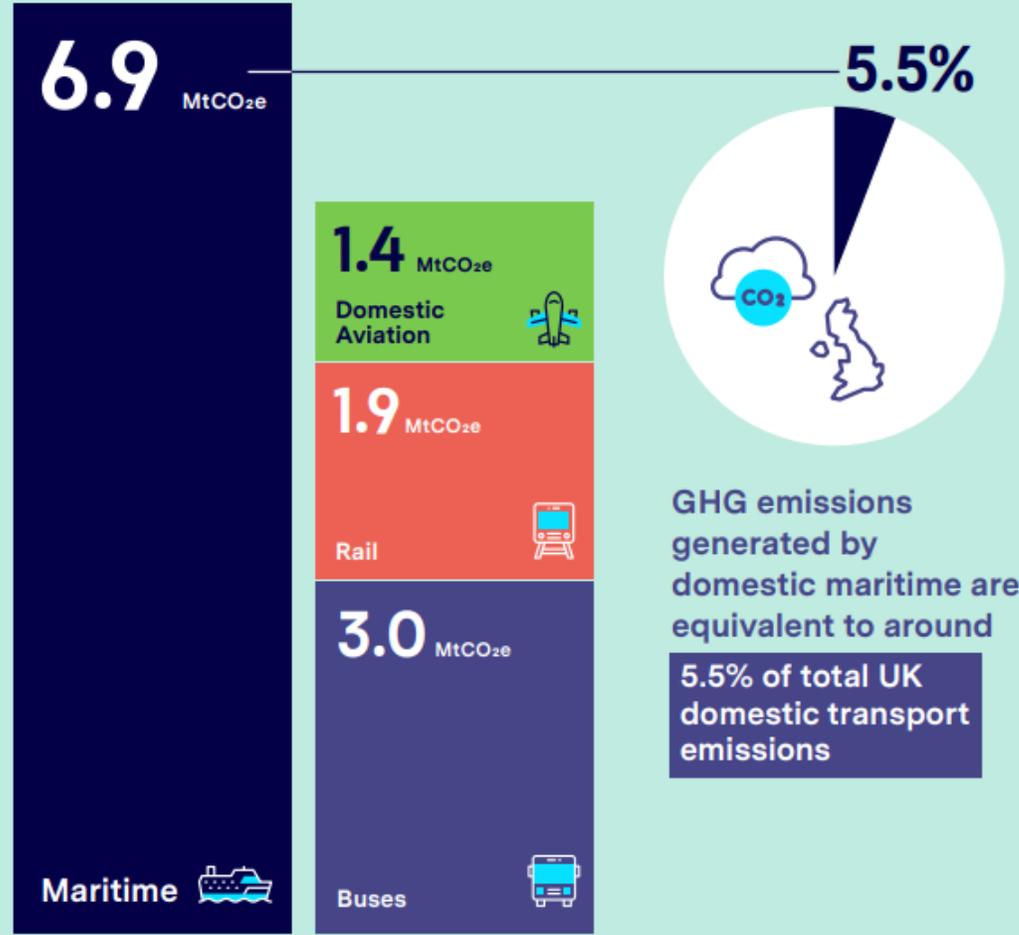


Figure 3: The domestic maritime sector's emissions compared to other modes of transport.

UK Domestic tank-to-wake Transport Emissions in 2019



The scope of the challenge

Figure 1: The different emission sources and how they combine to make WtW emissions.

Well-to-Wake Emissions

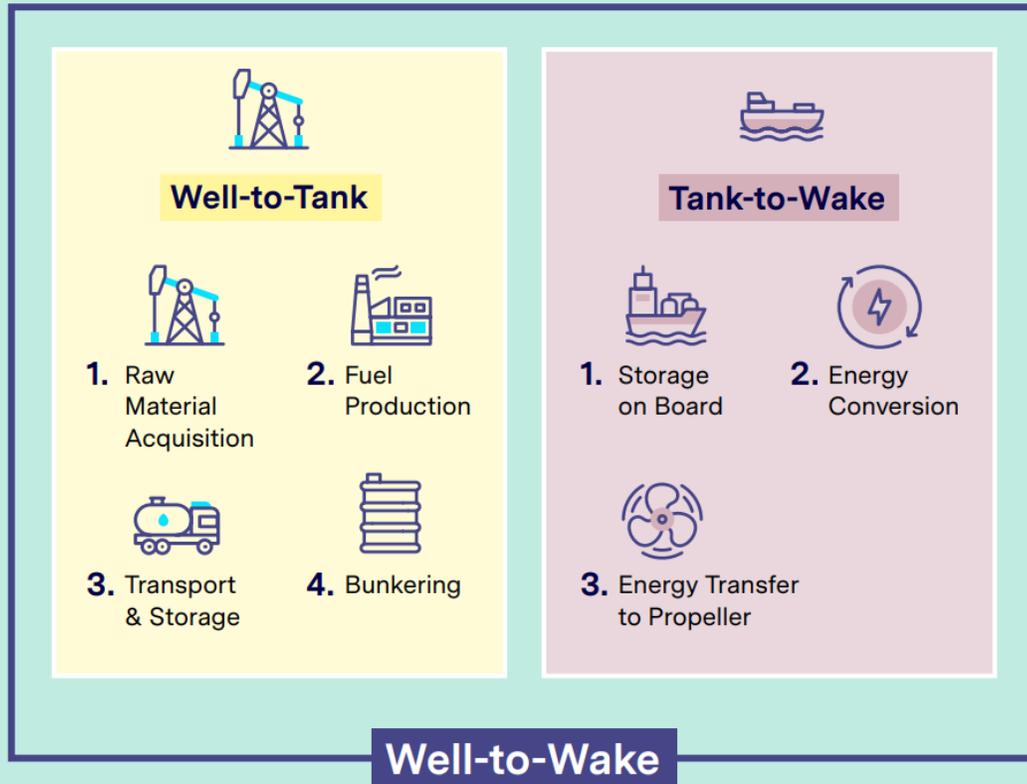


Figure 4: Estimated GHG emissions from UK domestic maritime in 2019 by vessel type (MtCO₂e)



Note: Figure 4 shows the estimated GHG emissions produced by UK domestic maritime in 2019, split by vessel type. The amount of emissions produced by each subsector is indicated by the size of the box, with the estimate for each subsector provided in units of MtCO₂e. Shown in blue are the subsectors that are within scope of the maritime emissions model, measured on a WtW basis. Shown in green are the inland waterways and other subsectors which are currently outside of the scope of the maritime emissions model but still contribute towards UK domestic maritime GHG emissions. These are presented on a TtW basis, due to a lack of evidence on the WtW emissions from these subsectors. Further information on the treatment of the inland waterways subsector is provided in Box 3 above and in the Analytical Annex.

UK SHORE Programme 2022 - 2025

TRL 1-3

Early Concept

- Transport Research & Innovation Grants (TRIG) - **£1.2m**
- Clean Maritime Research Hub - **£3.7m**

TRL 3-6

Testing of concepts in lab conditions

- Clean Maritime Demonstration Competitions (round 2-6) - **£135.6m**
- Smart Shipping Acceleration Fund - **£8m**

TRL 7-9

Testing in real world environment

- Zero Emission Vessels and Infrastructure (ZEVI) - **£80m**

Evaluation plays a key role in **UK SHORE**, with an ongoing, independent evaluation providing findings on the processes and impacts of UK SHORE competitions, which will support the design of any future competitions and policy.

Partnering with Innovate UK, the Engineering and Physical Sciences Research Council (EPSRC), the Connected Places Catapult and the wider maritime sector.



Case Study: Winds of Change

- Stowable Fast Rig wing sails
 - Digitally enabled system solution designed for quick installation and de-installation
 - Do not require portside infrastructure.
 - Save up to 40% fuel and greenhouse gas (GHG) emissions annually.
- *“The funding received through CMDC3 has been absolutely pivotal in enabling the development of FastRig and ensuring the success of the Winds of Change project. Crucially, it supported technology testing and demonstration — one of the most challenging stages to fund — allowing us to prove concept and demonstrate real-world viability. As we now move toward commercial scale and global deployment, further investment will be essential if the UK Government is to capitalise on its early high-risk support. Without it, the resulting jobs, manufacturing, intellectual property, and reputational benefits risk being realised overseas instead. “*



The Winds of Change

RAD Propulsion

- **RAD Propulsion** - four pivotal UK SHORE projects:
 - ZENOW (under the Zero Emission Vessels and Infrastructure – ZEVI - initiative),
 - Innovative Electric Boat and Drive System Development (Clean Maritime Demonstration Competition 1 - CMDC1),
 - Ultra-Efficient Electric Boats (CMDC4), and
 - Smart Shipping Safety & Cyber Assurance (Smart Shipping Acceleration Fund- SSAF). This sustained commitment has underpinned the rapid development of their cutting-edge propulsion technology from its early stages.
- Clean and quiet 40kW electric propulsion system; RAD Propulsion conservatively estimates it saves 45 tonnes/year CO₂e for leisure users, with significantly greater reductions for commercial applications.
- Awarded Clean Maritime Innovator Award at the Maritime UK Solent Awards 2024.
- Their collaborative project, [ZENOW](#), represents the largest network of electric boats in a commercial setting across the UK. This groundbreaking initiative has fostered extensive engagement with local councils, businesses, universities, and Lloyds Register, highlighting a truly collaborative approach to maritime decarbonisation.



RS Electric Pulse 63 RAD 40 Boat Show London March 2025

UK SHORE is kickstarting economic growth

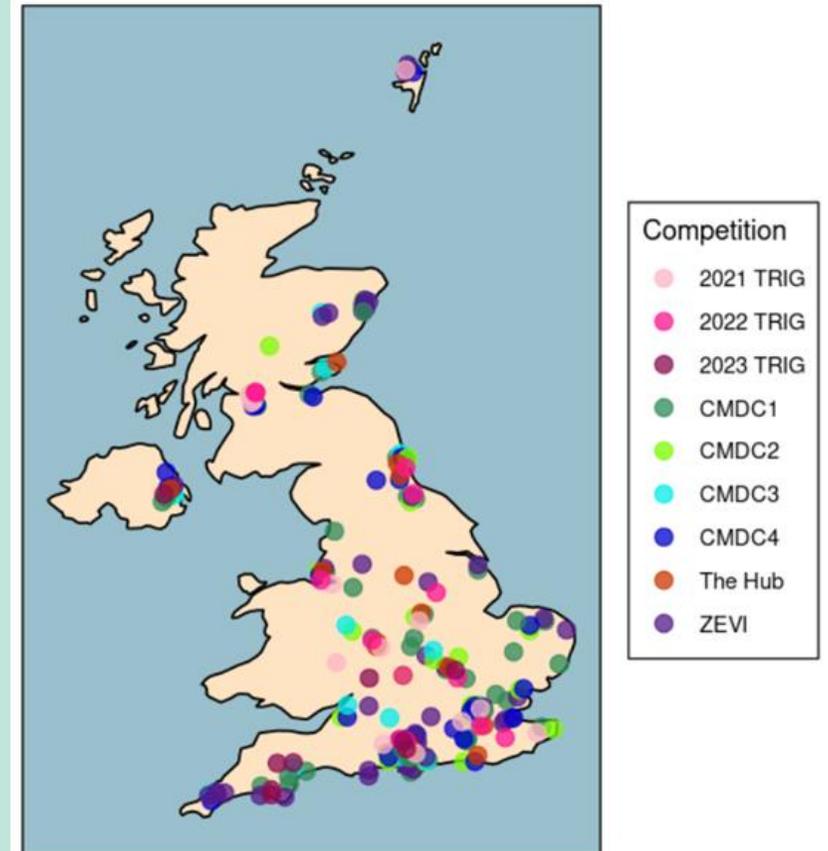
UK SHORE projects

- Leveraged over **£100m** in match funding
- Supported over **150 projects**, located across the UK and particularly in coastal communities
- Provided funding to over **350 organisations**, including over 200 SMEs
- Retaining and creating jobs in green and highly-skilled sectors, with crossover to other parts of the green economy

Evaluation findings

- 68% of completed projects would not have gone ahead at all without UK SHORE funding, with the remaining 32% indicating they may have proceeded with a smaller scope or slower pace.
- CMDC1 and CMDC2 projects estimate they have supported the creation and retention of 780 jobs during the delivery phase
- Completed projects estimate that UK SHORE will lead to increase of £0.7m (CMDC1) and £1.1m (CMDC2) per organisation in annual financial impacts*
- These statistics are likely to be significantly higher for CMDC3-5 and ZEVI given they are much larger schemes

Map of UK SHORE Projects



only includes lead orgs for CMDC projects

*Completed UK SHORE projects were asked to estimate the future financial impact of participating in their competition, the estimated increases are through increased sales and licensing revenue, cost reductions, and other financial impacts.

The journey to successful R&D

