

Fuels & Geopolitics

Clean Maritime Assembly 2026

Dr Claire Copeland
24 June 2026



Funded by
UK Government



Engineering and
Physical Sciences
Research Council

Introduction

- Geopolitics have long shaped the energy system with effects varying from short to long term
- Shipping responsible for moving around 85% of global trade
 - fuel choices matter to economies around the world
- Fuel choice:
 - Not just techno-economic
 - Strategic and geopolitical
- New fuels – new bunkering requirements – new centres of economic power?
- Associated industries e.g. critical minerals

Geopolitics Examples:

Strait of Hormuz blockade in the US-Iran war – but there are many other examples:

- Red Sea & Bab el-Mendeb Strait / Houthi attacks
- Russia-Ukraine War
- Suez Canal blockade
- Panama Canal drought
- COVID

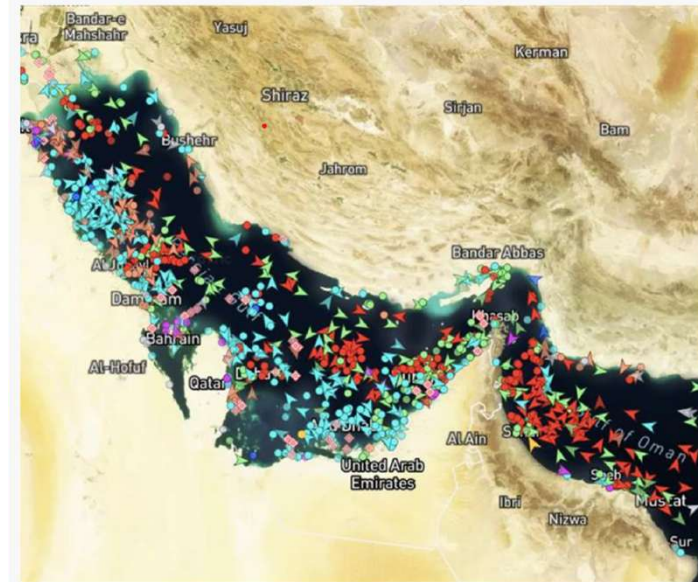
Impacts:

- Delays in cargo delivered and fuels
- Constrains energy supply
- Higher freight/container shipping costs passed on to consumers

Debates:

- Energy costs and resilience
- Energy security / sovereignty
- Push for particular fuels/technologies

Broadcast locations of ships in the Gulf
Hundreds of vessels waiting to pass through Strait of Hormuz

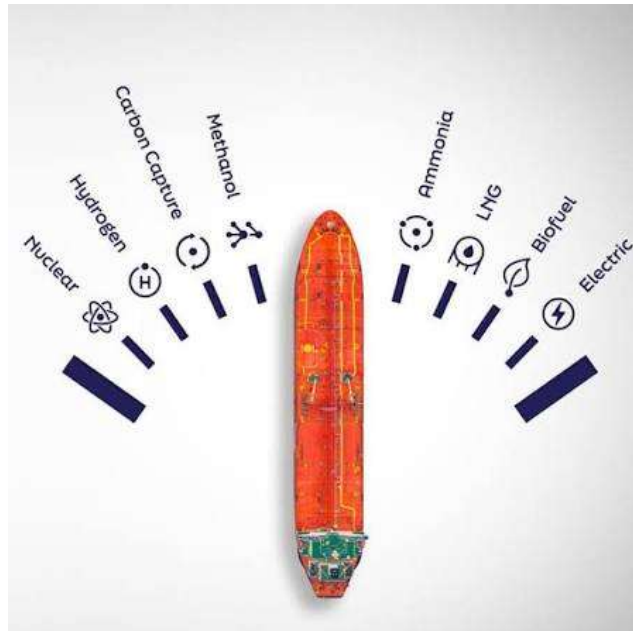


Source: MarineTraffic 11:15 BST, 15 April



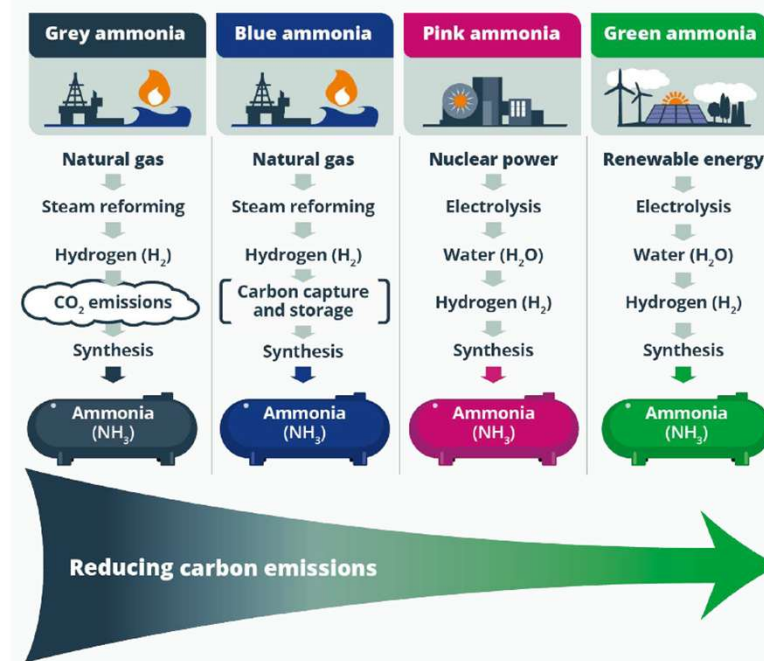
Objective

To explore how different maritime fuel scenarios create geopolitical risks and opportunities, and what this means for UK policy and strategy for stakeholders.



<https://www.lr.org/en/knowledge/research/fuel-for-thought/>

Figure 1: Ammonia production pathways



Norris, L., Copeland, C. (2026). Ammonia as a Shipping Fuel: Policy challenges and recommendations. Policy Briefing. MariNH3 & UK National Clean Maritime Research Hub. <https://doi.org/10.17639/21E2-E926>

Agenda

1. Geopolitics of Energy Transitions

Prof Gavin Bridge, Durham University

2. LCA of Maritime Fuels

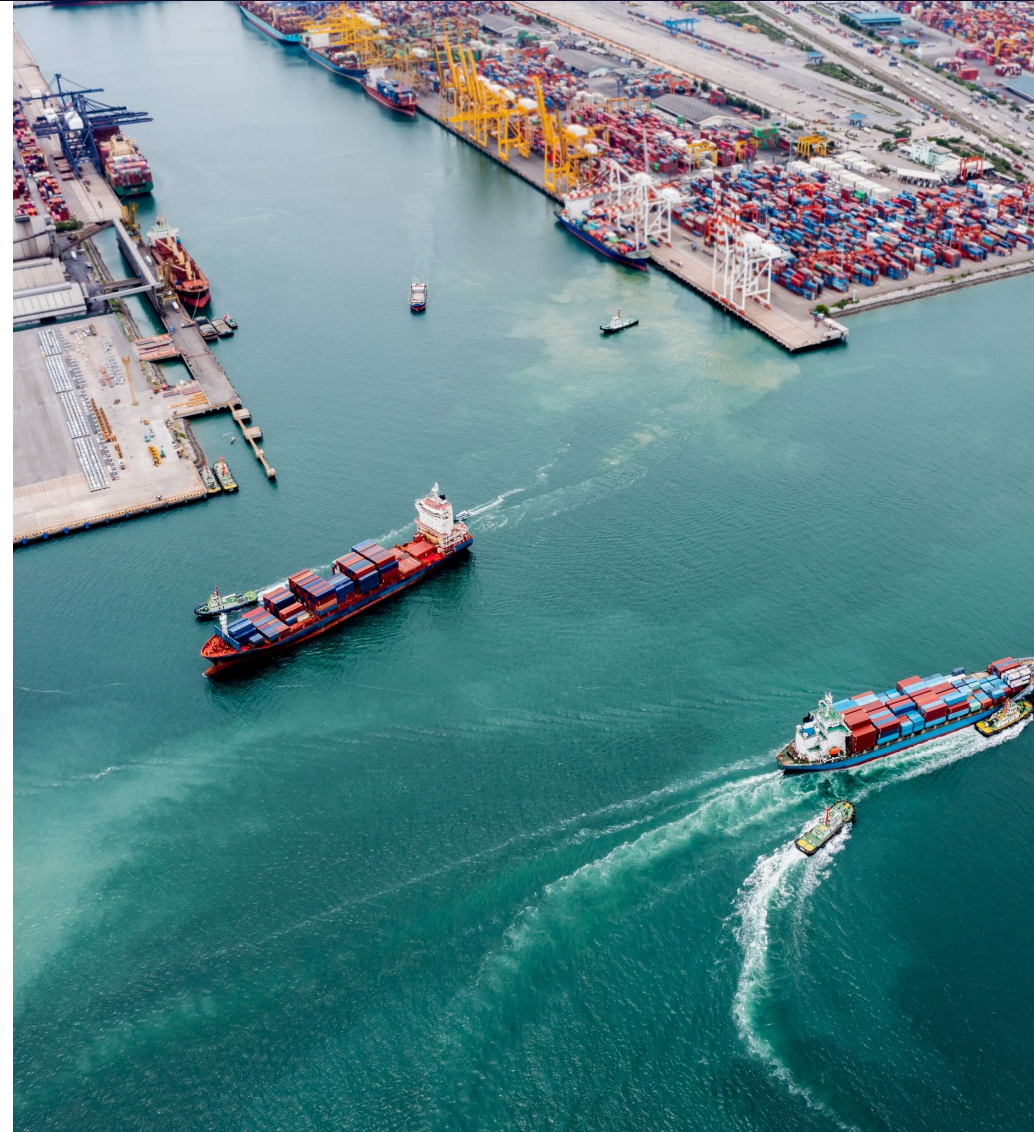
Prof Rachael Rothman, University of Sheffield

3. Fuel Markets

Michael Green, WFS

4. Exercise: UK Risks & Opportunities

5. Final Discussion & Close



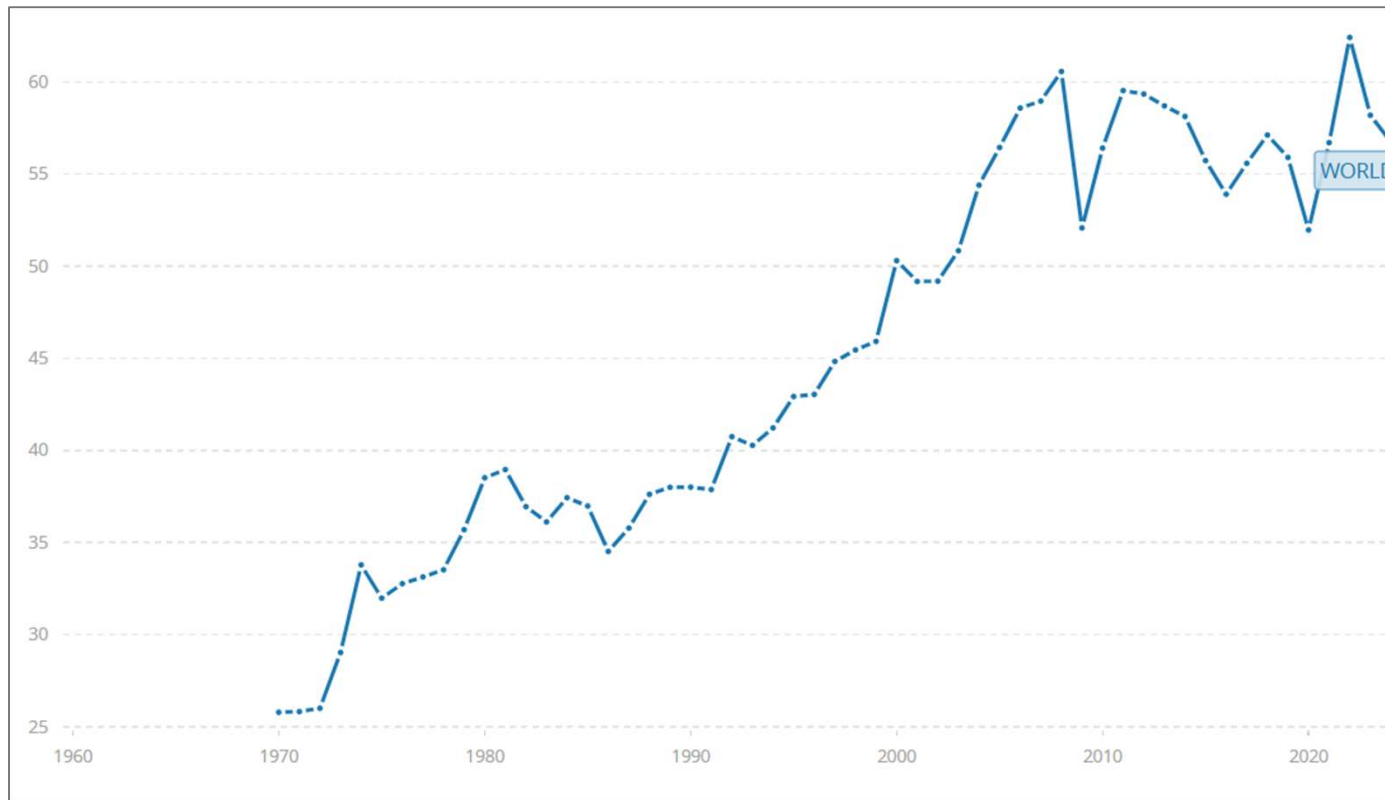
Fuels and Geopolitics

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Gavin Bridge

Professor of Economic Geography & Fellow, Durham Energy Institute



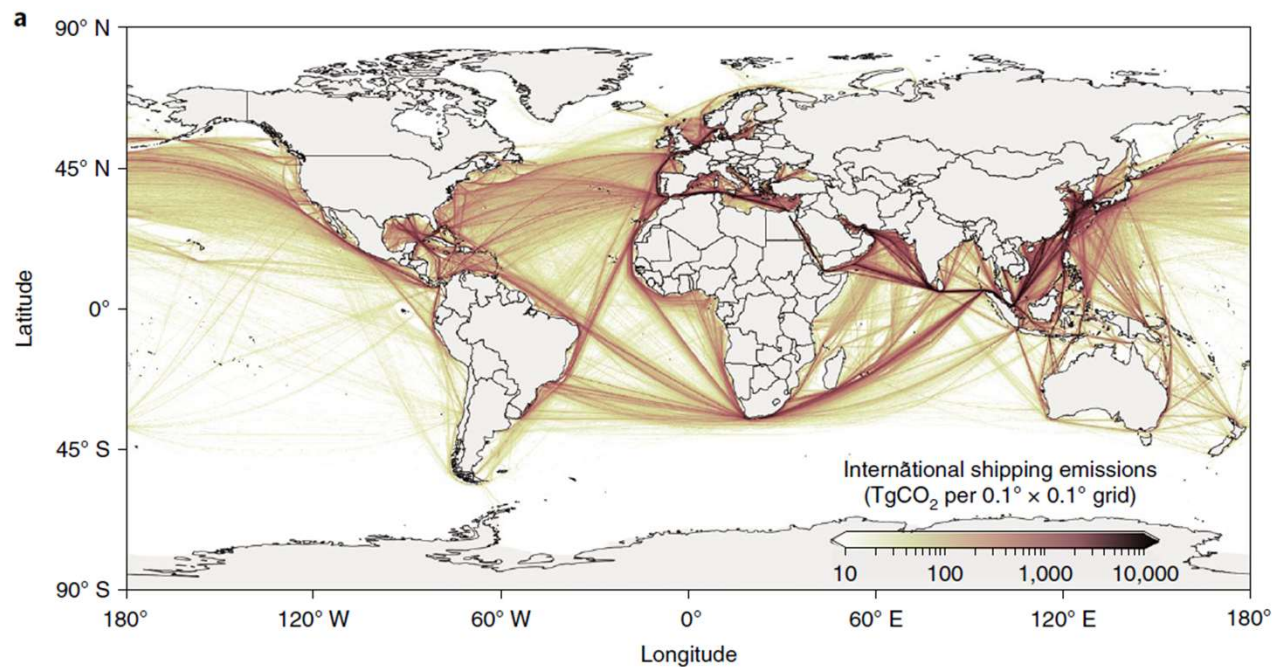


Slowbalisation,
deglobalisation....
trade as a percentage
of GDP has plateaued

Source: World Bank

Era of globalisation – in which trade rose faster than global GDP – now challenged

De-globalisation: world of geoeconomics, where politics enters economic policy (e.g., concerns about import dependency), industrial strategy, onshoring, supply chain diplomacy

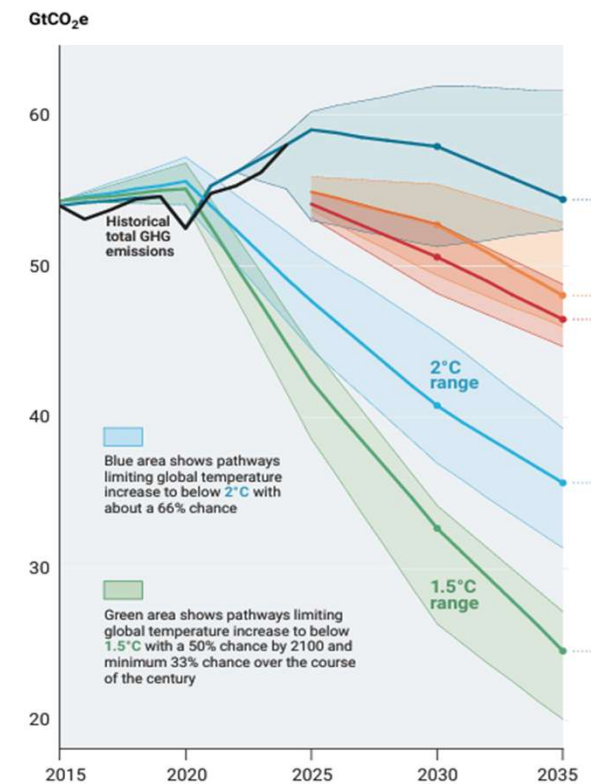


Addressing shipping's fossil fuel dependency

Fuel shifts drive new energy geopolitics

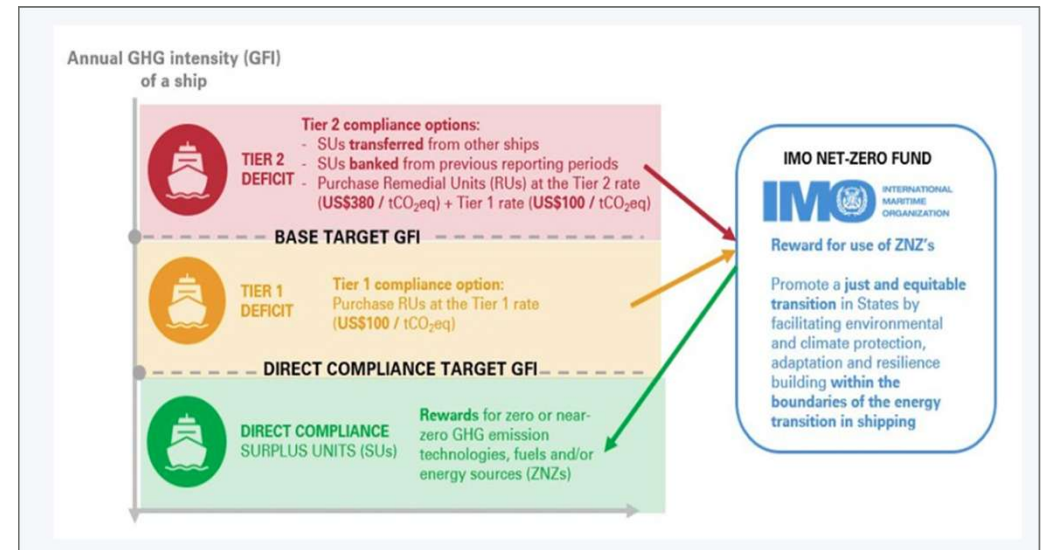
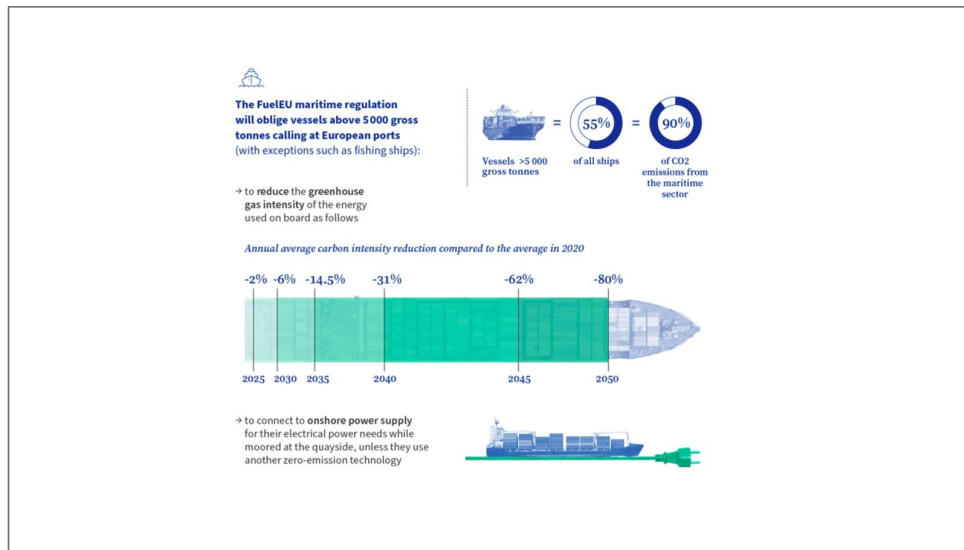
Distribution of international shipping emissions by observed vessel voyages (modelled)

Source: Wang et al. 2021 *Nature Climate Change* 11: 945–951



Source: UN Emissions Gap Report, 2025

Decarbonising shipping from fuel switching pathways to geopolitics

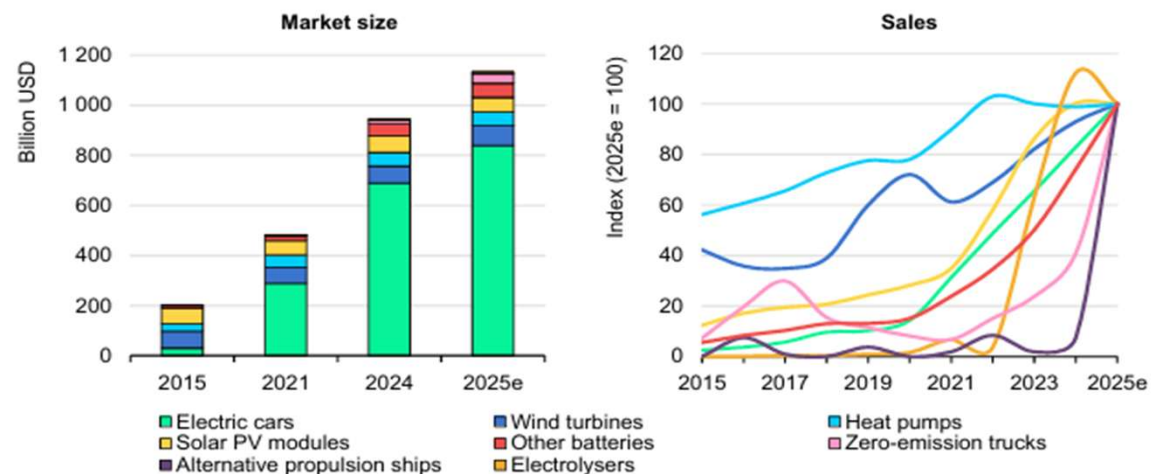


Geopolitical co-benefits from switching to low carbon fuels?
Geopolitical influences on trajectory of decarbonisation?
accelerate, impede?

Energy Technology Perspectives 2026

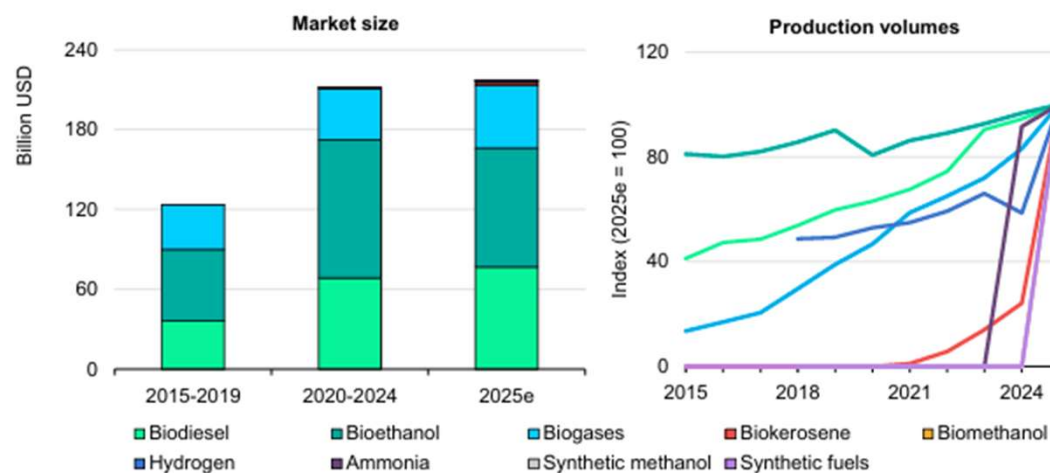
iea

Figure 2.1 Global market for selected clean energy technologies, 2015-2025e



IEA. CC BY 4.0.

Figure 2.5 Low-emissions fuels market size trends, 2015-2025e

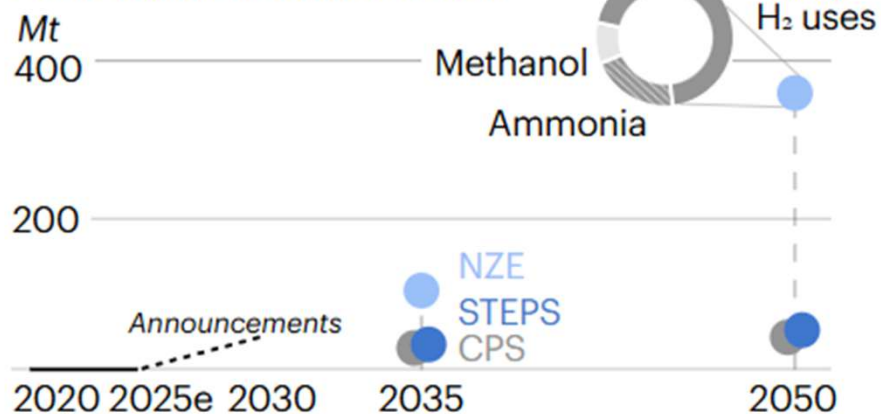


15 LOW-EMISSIONS HYDROGEN, AMMONIA & METHANOL

Production is growing, though at a slower pace than anticipated

Market

Low-emissions H₂ production



Market status

Pre-commercial Awaiting adoption Building momentum Strong growth Consolidation

Market size: Ammonia (bn USD)

2025e **0.5** 2035 **11 13 115** 2050 **24 27 243**

Methanol (bn USD)

2025e **0.2** 2035 **2 3 74** 2050 **5 5 114**

Other H₂ uses (bn USD)

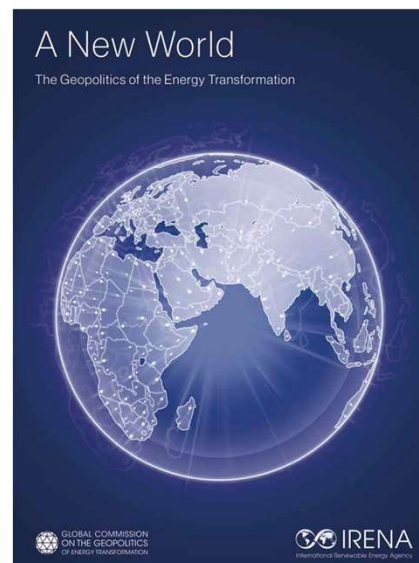
2025e **1.5** 2035 **34 38 361** 2050 **131 145 1 074**

Source: IEA ETP 2026

Geopolitical co-benefits of fuel switching?

“The accelerating deployment of renewables has set in motion a global energy transformation that will have profound geopolitical consequences. Just as fossil fuels have shaped the geopolitical map over the last two centuries, the energy transformation will alter the global distribution of power, relations between states, the risk of conflict, and the social, economic and environmental drivers of geopolitical instability”

IRENA 2019: 12



Energy dependence shifts from global markets (fossil fuels) to regional grids (electricity)

From stock resources to flows
limited opportunities for resource rents

Ubiquity & abundance of renewables
dispersed energy production
less reliant on chokepoints
deployable at multiple scales –
'democratizing effect'

Shifting alliances and new geographies of trade

A fully renewable global energy system potentially has fewer geopolitical tensions

Winners and losers from energy transition?

Repositioning of states

position in fossil fuel trade vs.
clean energy

Fossil fuel exporters
vulnerable

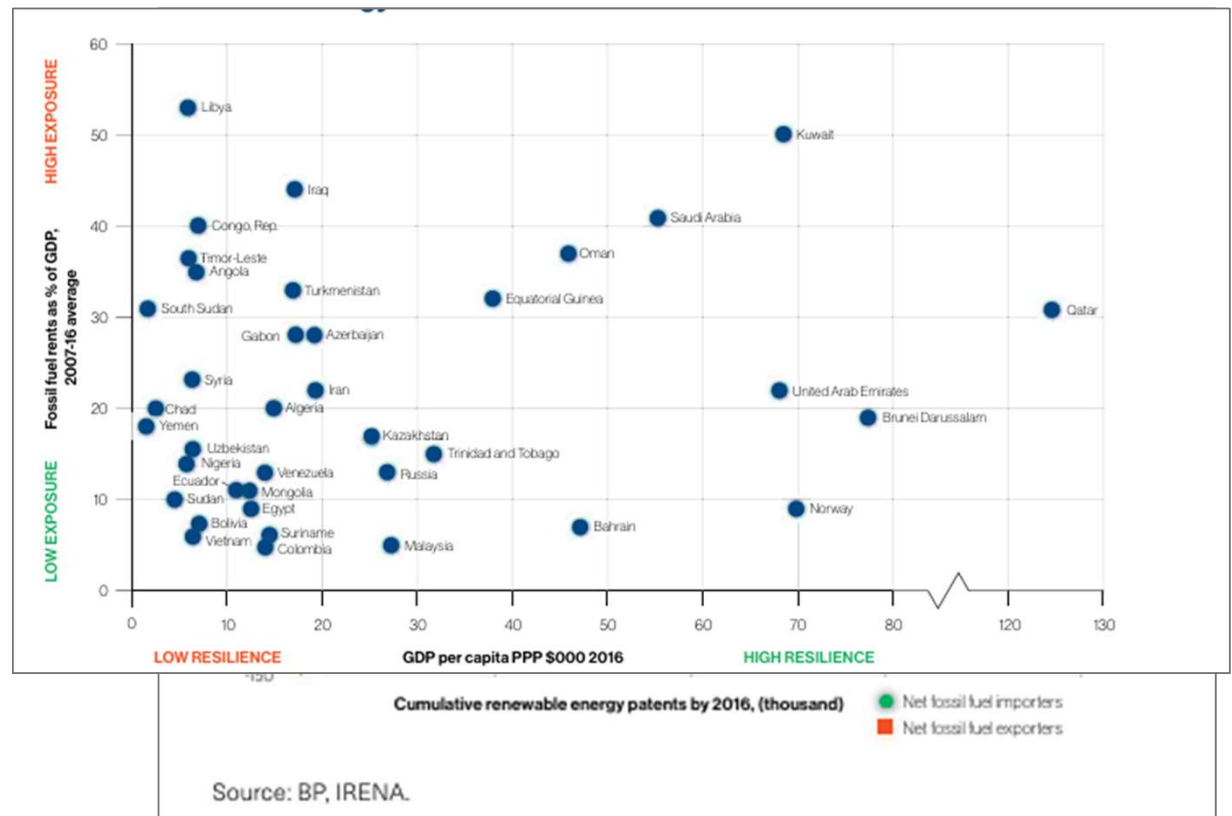
decline in oil & gas rents
exposure vs. resilience

Rise of new energy leaders

exporters of renewable electricity
or fuels

mineral exporters

technological innovators

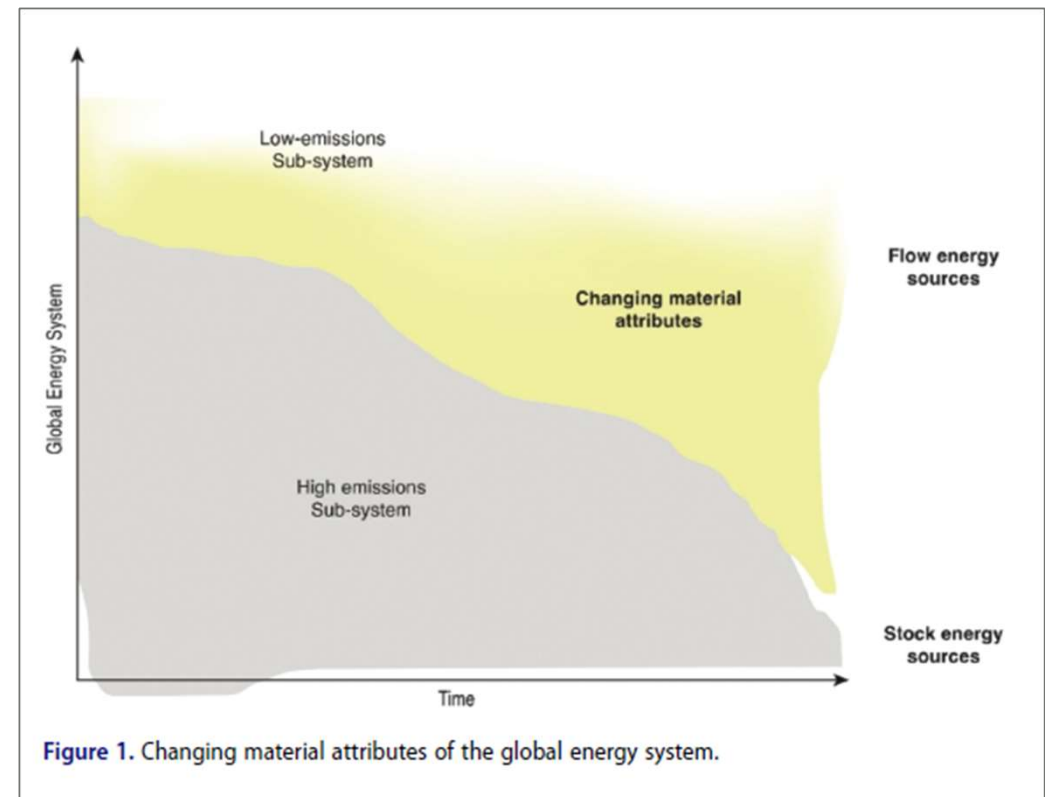
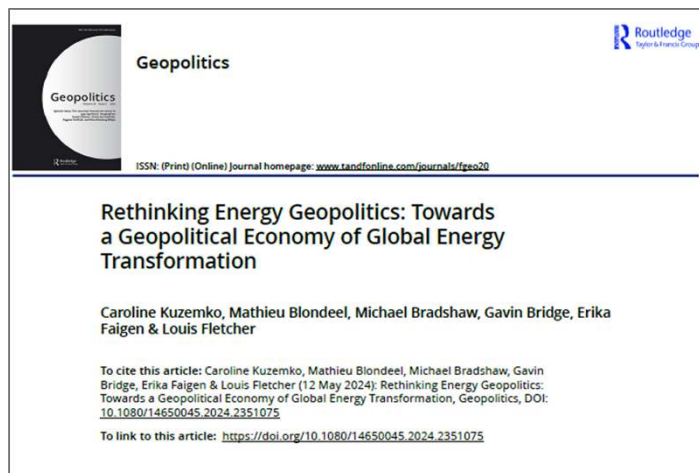


Source: IRENA 2019

Geopolitics of the transition – the ‘messy mix’ vs. end-state of renewables

Twin challenges: an incumbent high-carbon system
+ ‘build phase’ of low-carbon

Where geopolitical rivalry, geoeconomic
competition and multiple crises undermine
cooperation on transition



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Alternative Maritime Fuels and Pathways

Rachael Rothman



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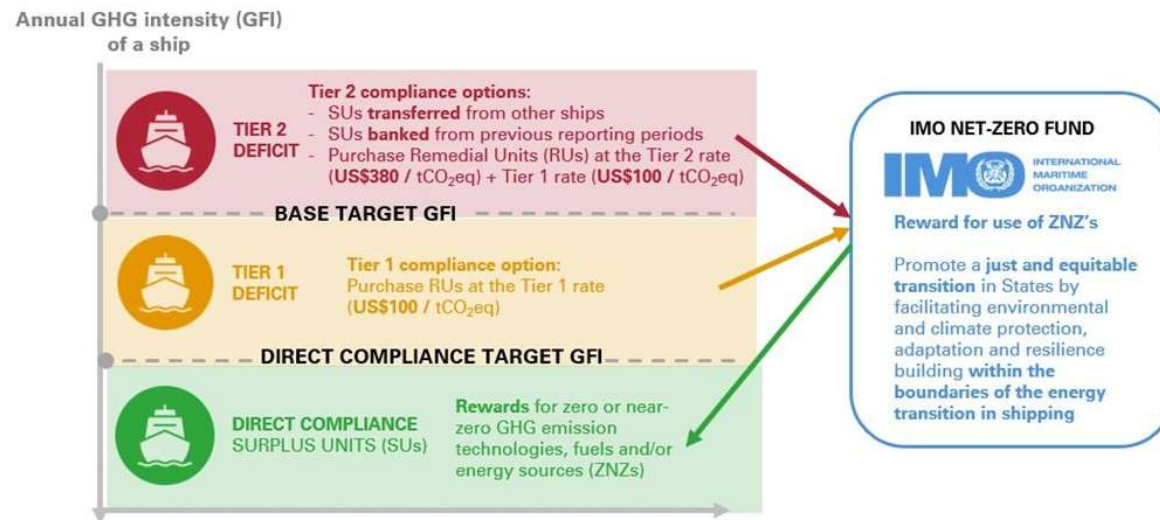


Department
for Transport

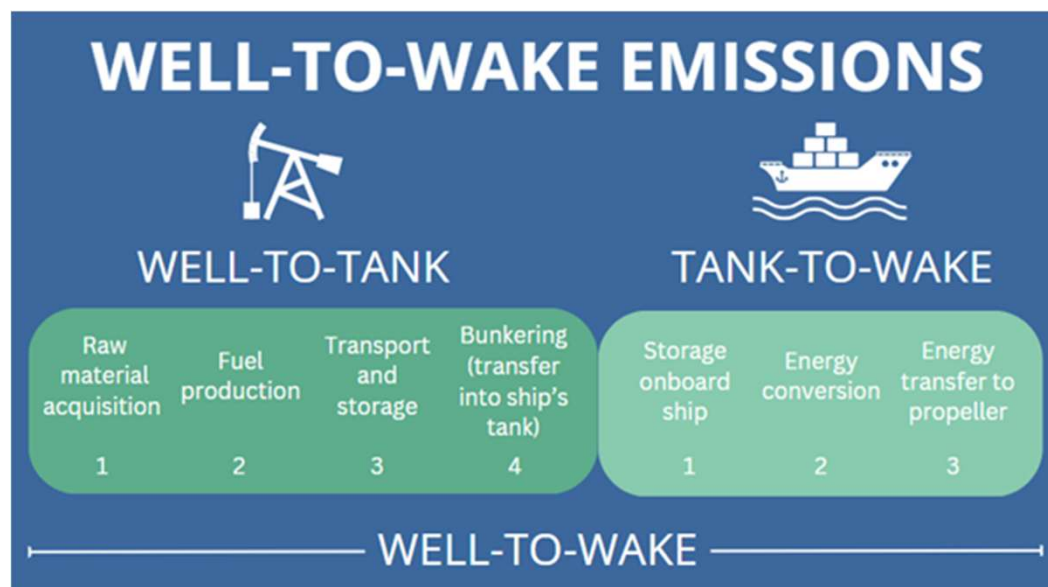
The New Maritime Reality

Regulatory push - IMO Net-Zero Framework:

- Includes two elements:
 - Global fuel standard that requires ships to gradually reduce life cycle emissions of the fuel
 - Pricing mechanism with set prices on the greenhouse gases that ships emit
- Approved by MEPC 83 (April 2025) but discussions with member states then adjourned until late 2026
- Covers ships over 5,000 GT



Well-to-Wake



Working Group on Life Cycle GHG Intensity of Marine Fuels (GESAMP-LCA WG)

- Refining calculation methodologies (CO_2 , CH_4 , N_2O)
- Indicators and metrics
- Certification
- Review of default emission factors

Alternative Fuels

Fuel	Operational Status	Advantages	Challenges
LNG & Bio-LNG		• Globally available infrastructure • Immediately lowers emissions	• Concerns with methane slip • Requires cryogenic storage
Methanol		• Liquid at room temp • Methanol-ready retrofit common	• Lower energy density (= greater storage volume)
Ammonia		• Zero carbon TtW • Commercial engines entering market	• Highly toxic • Not suitable for passenger vessels
Hydrogen		• Zero carbon TtW	• Cryogenic or highly compressed storage • Takes up a lot of storage volume
Biofuels		• No engine change required	• Supply limitations • Competition with other biomass pathways

Alternative Fuels – pathways forward

Immediate

- Energy efficiency first – hull coatings, wind assisted propulsion, voyage optimisation
- Biofuel blending as a bridge – 20% biofuel blend (e.g. HVO, FAME) requires no engine modification

Medium-term capital

- Dual-fuel vessels dominating new orders
- Build ready designs to avoid stranded assets e.g. ammonia-ready, methanol-ready

Route dependent fueling

- Short sea and coastal – electrification
- Deep sea containerhips and tankers (fixed route) – green corridors (e.g. green methanol, e-ammonia)
- Dry bulk and tankers (not on fixed route) – cautiously switching to LNG

Alternative Fuels – reality

- The future will be a myriad of alternative fuels
- Green fuels are currently expensive and scarce
- Meeting future targets requires huge shifts in alternative fuels including production, distribution and storage
- Capital flexibility will be important – dual-fuel ready



Clean Maritime Assembly 2026.

UK National Clean Maritime Research Hub.

Fuels and Geopolitics!

Michael Green
Senior Quality Manager - Marine Technical
World Fuel.



A World Kinect Company



World Fuel – At a glance.



Distribution Platform		Volumes Distributed	Network	Key Offers
	Aviation	7.1B gallons	4,000+ airports 24/7 operational support	Jet fuel and SAF Trip support Payments FBO & airport solutions 
	Marine	4B+ gallons ¹ (approx. 15.8M MT)	1,200+ seaports Operational support group	Marine fuel Lubes and additives 
	Land	5.6B gallons ²	Country coverage in US Select regional coverage Latin America and Europe	Diesel and gasoline Renewable diesel Lubes and additives Fleet cards 
	Energy and Sustainability	Supporting power, natural gas, sustainability products and services.		

¹ Converted from metric tons to gallons at a rate of 264 gallons per metric ton.
Marine segment volumes were 15.8 metric tons for the year ended December 31, 2025.

² Includes gallons and gallon equivalents of British Thermal Units (BTU) for our natural gas sales and Kilowatt Hours (kWh) for our power business.

What do buyers want (need) at this time?

Legislative Compliance... (short-term vs long-term – two v different conversations!)

Different regimes...

The IMO ✓ EU ETS / FuelEU? ✓ Regional?? ✓

How do buyers comply??

The “easy” option (at the moment) is Bio!!

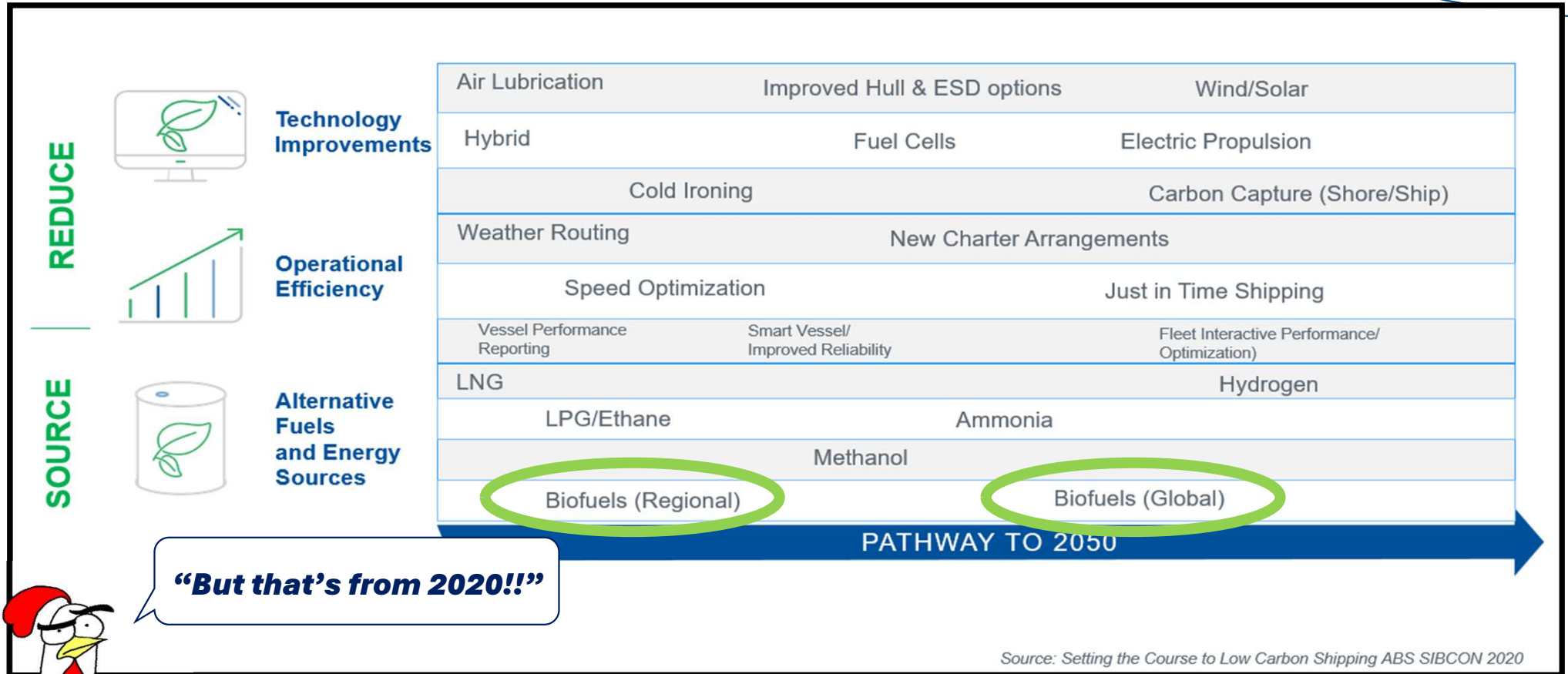
Still new-ish for marine but experience is growing...

That said it’s a rapidly evolving environment and there are STILL a lot of unknowns... And a lot of unanswered questions...

And...it’s not as straight forward as it is for other transport sectors...



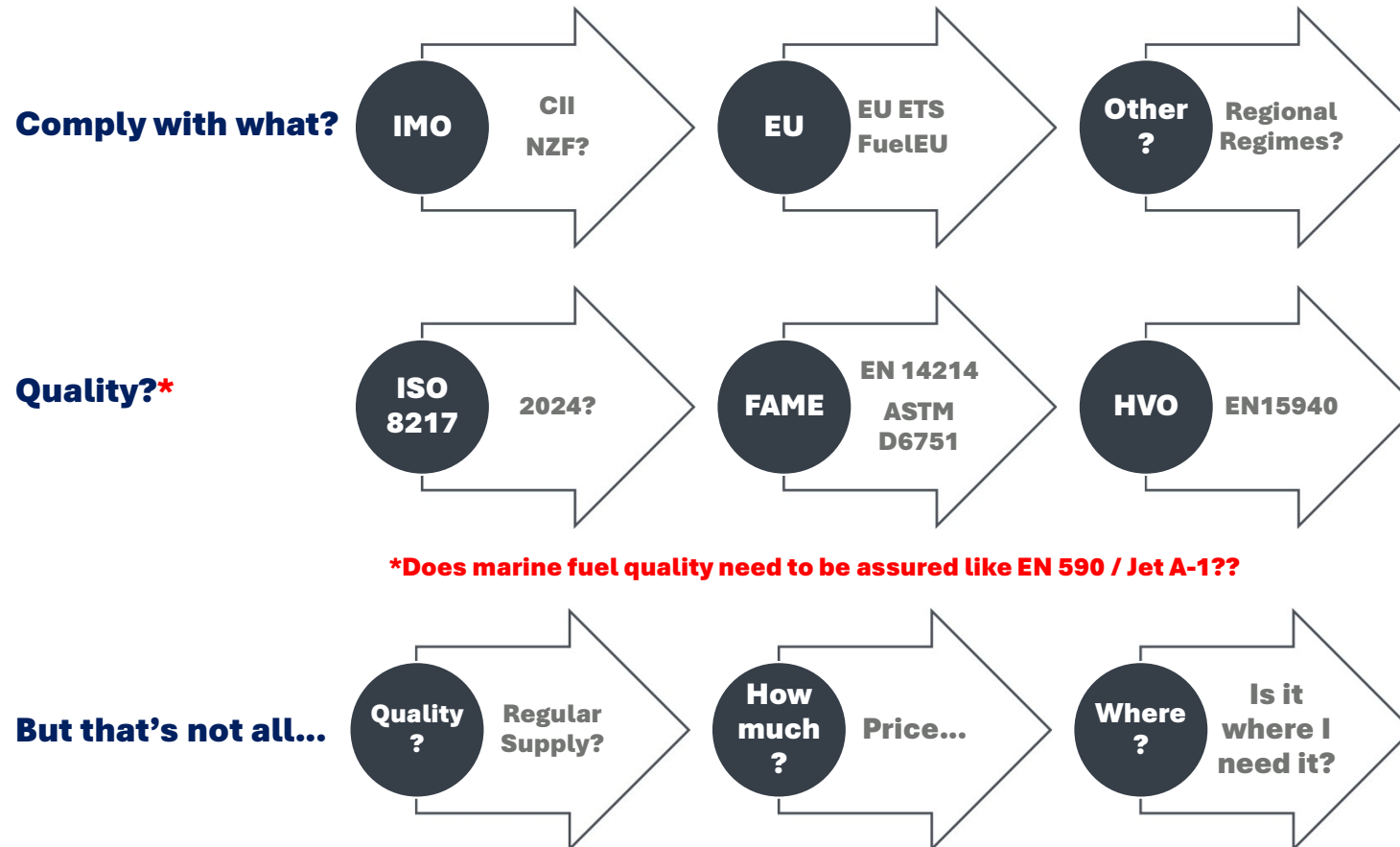
Let's go back to the beginning... The Path to Net Zero!!



It may be a little old but it's still gold 🤪

Fuels & Geopolitics!!

Quality for Compliance?



But we also need to think about...

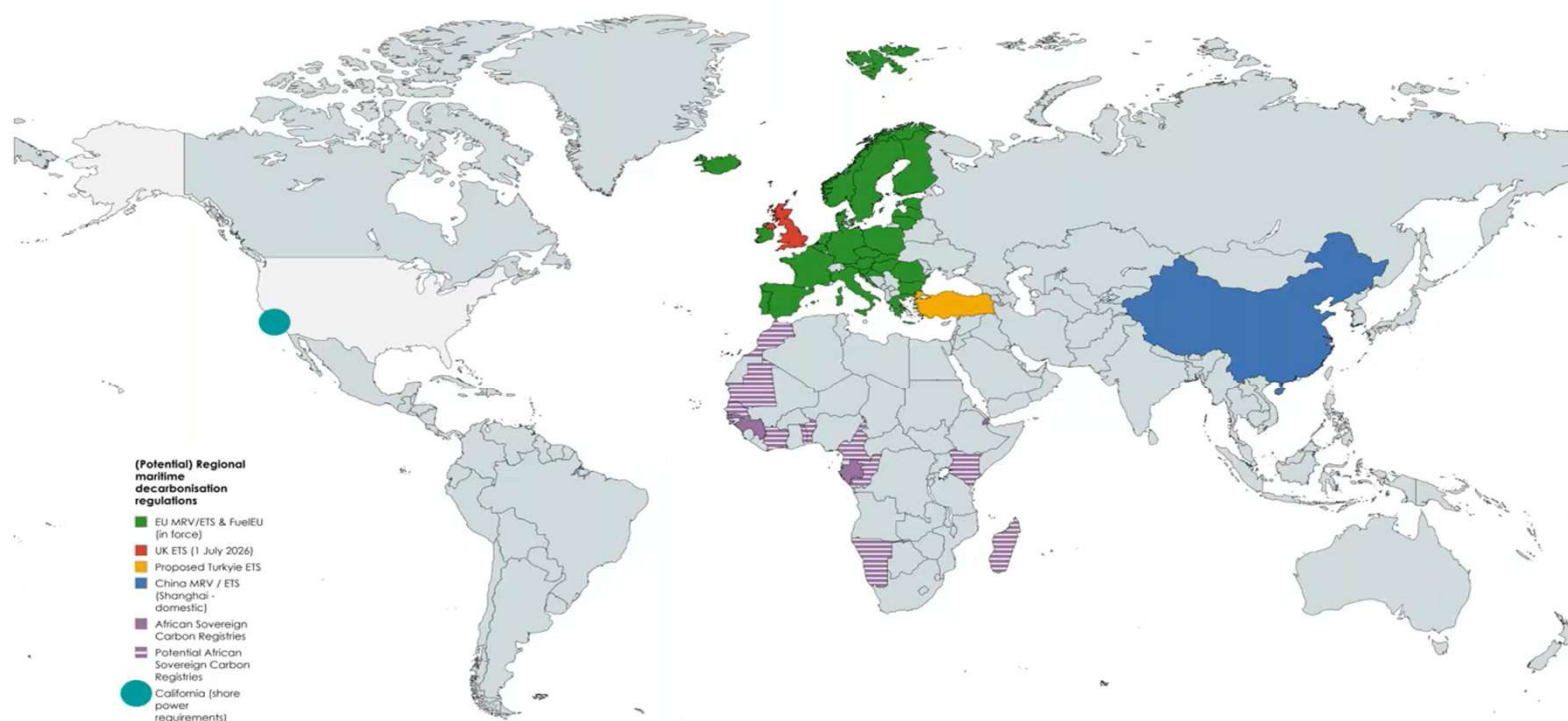
- **Off Spec FAME...**
 - NEN 7427-1
- **Other products!!**
 - FAME Bottoms?
 - CNSL?
 - Tyre Pyrolysis Oil?
 - Co-processed Oil?
- **Certification...** 😊
 - Sustainability isn't quality...
 - POS /POC vs COQ!
- **Supporting Guidance...**
 - CIMAC!
 - IBIA!
 - Tools for buyers & suppliers!

A fragmented approach...

What does this mean – certainty in regional regulations?



In the absence of a clear global policy framework to decarbonise shipping, regional policies may continue to fill the gap. This will create a fragmented regulatory system shipowners/operators will have to comply with.



Regional Framework Fragmentation.

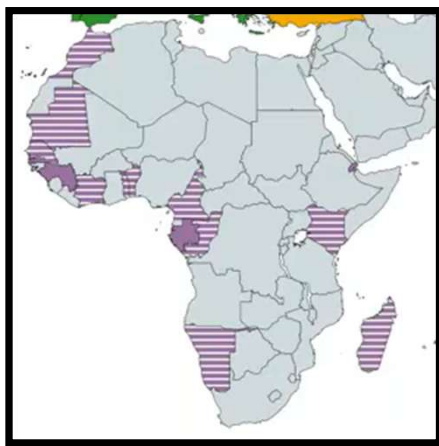
(Potential) Regional maritime decarbonisation regulations

- EU MRV/ETS & FuelEU (in force)
- UK ETS (1 July 2026)
- Proposed Turkey ETS
- China MRV / ETS (Shanghai - domestic)
- African Sovereign Carbon Registries
- Potential African Sovereign Carbon Registries
- California (shore power requirements)

UK – UK ETS for Maritime July 2026 & possible UK fuel standard?



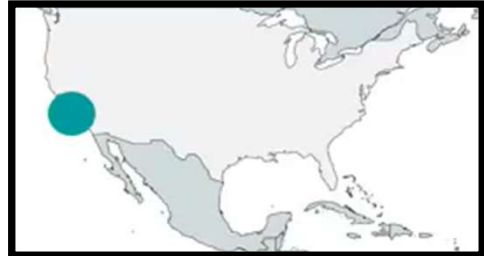
Africa – has its own ETS style system through the African Sovereign Carbon Registry. 3 Countries already fully engaged (Djibouti, Gabon & Guinea).



China – existing MRV & ETS system but it doesn't fully cover maritime. Domestic ETS scheme in Shanghai port region. To be extended to maritime?



California – requirements for use of onshore power...



Turkey – developing an ETS scheme under national legislation which would include maritime. Entry into force by July 2028 with a pilot phase prior to full implementation. No details / technical clarity as of yet...



And there are others...

Norway – looking at an offshore ETS Scheme?

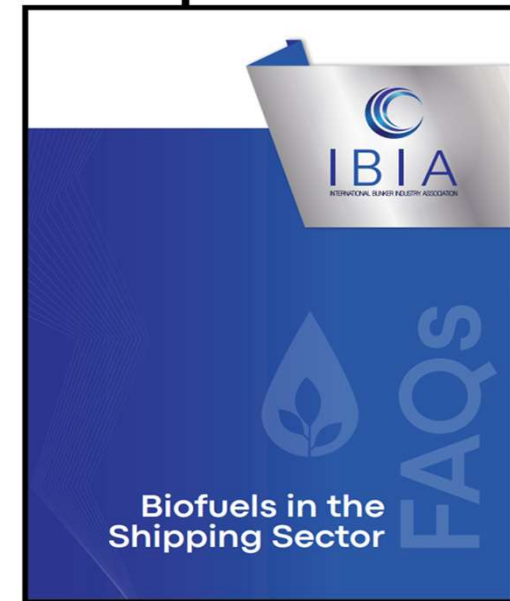
So, we are already seeing a significant degree of fragmentation which provides further possibility for variation and confusion!!

Takeaways and a lifeline (or two)...

- Short, Medium and Long-term goals all require very different solutions...
- The more immediate concerns for vessel owners / operators are 2030 targets!!
- “Bio is the way to go!!” for now...
- **BUT** (and it’s a **BIG** but) not all Bio is created equal!!
- Conversations regarding quality are vitally important...
- “What is my “B”?” ...
 - Regulated FAME?
 - Non-regulated FAME?
 - Something else?
- And feedstocks play a HUGE part in how “green” your bio really is...
- And legislative regimes also define sustainability – IMO LCA, EU RED III (and probably IV)...
- PLUS...Quality & Sustainability are **NOT** the same thing!!!
- “My fuel has been certified as sustainable, that means its good quality!! 😊”



Industry published guidance... CIMAC and the IBIA Biofuels in the Shipping Sector FAQ 😊
(with more to come...Watch this space!! 😊)



Not just for buyers!!!

Valuable tools for suppliers too!!!

THANK YOU!





Clean
Maritime
Policy Unit

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