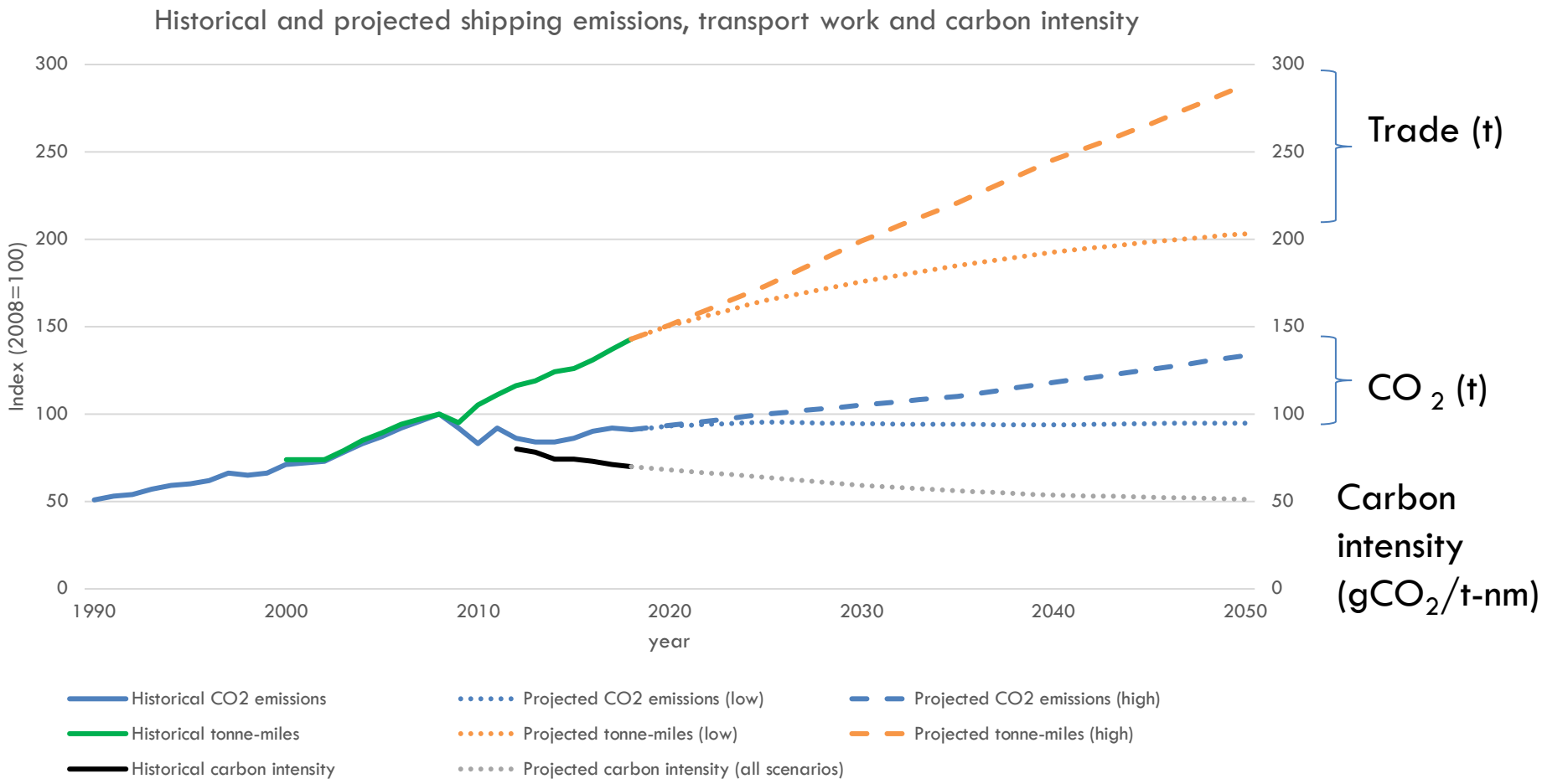
Shipping Energy Transition

Santiago Suarez de la Fuente + team

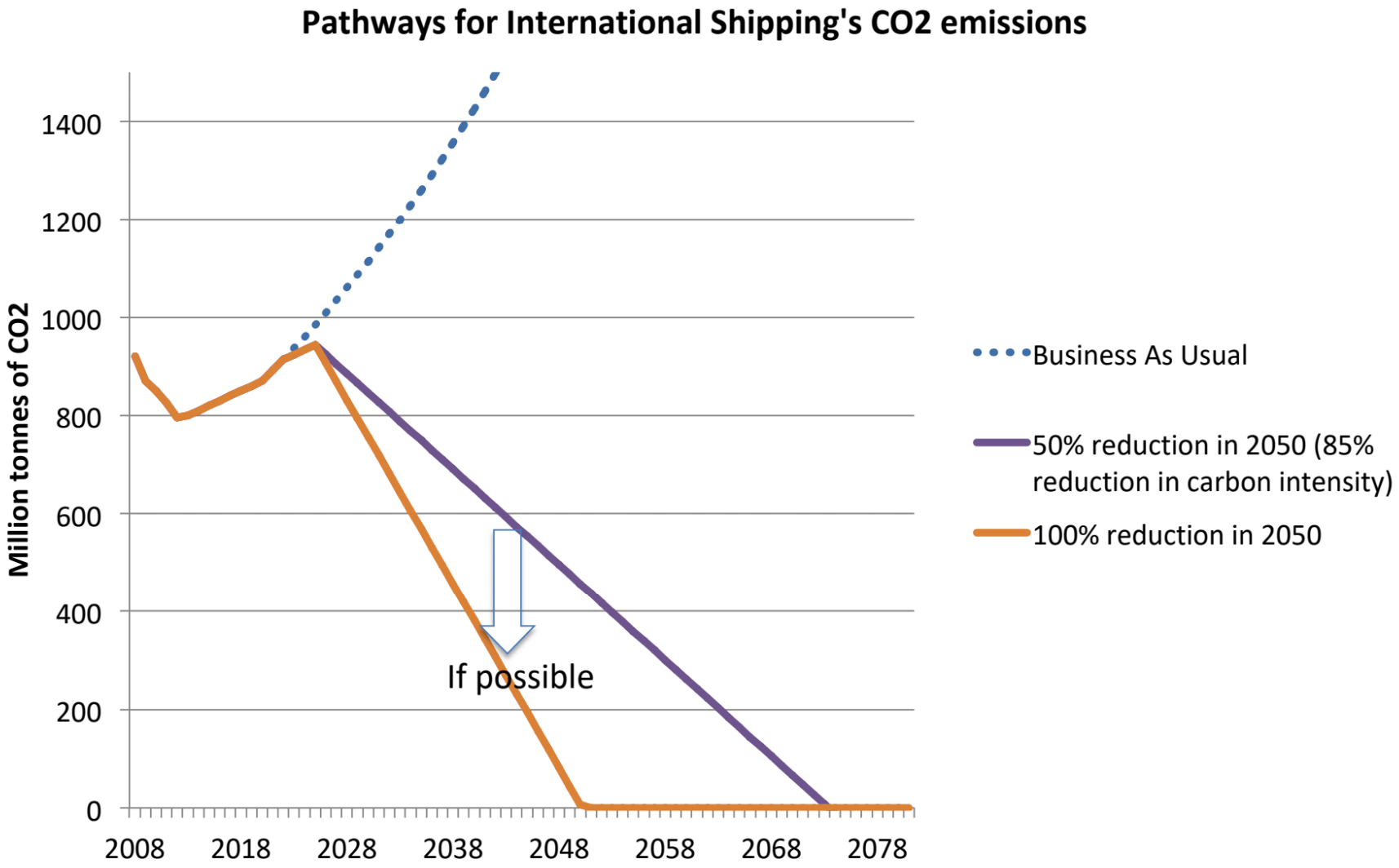
UMAS

Maritime consultancy delivering applied solutions for a carbon constrained future

Shipping CO_2 emissions, trade and carbon intensity

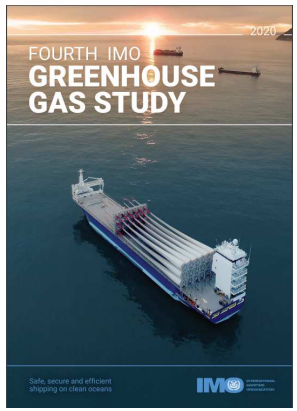


IMO Initial Strategy (April 2018)



Focus of our shipping research and consultancy work

2000's Now 2050



Evidence of recent trends in energy efficiency
Using big data to understand trends and drivers of shipping activity, energy demand/emissions

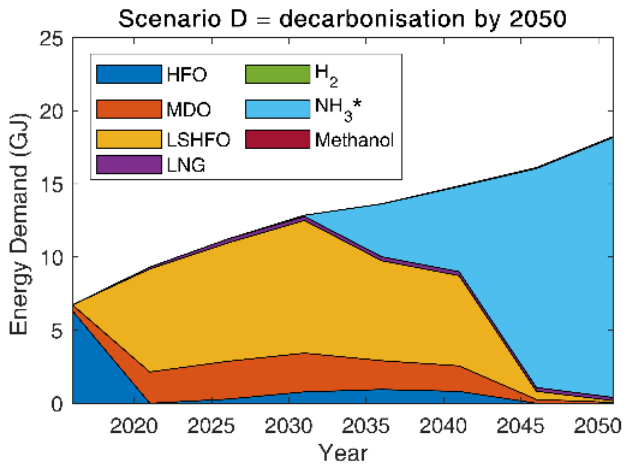
Evidence of how the future of energy efficiency/GHG might look
Using models to explore what-ifs for future market and policy

UMAS

Zero-emission fuel adoption 2030-2050 needs to be rapid, irrespective if the target is zero by 2050 or 2070

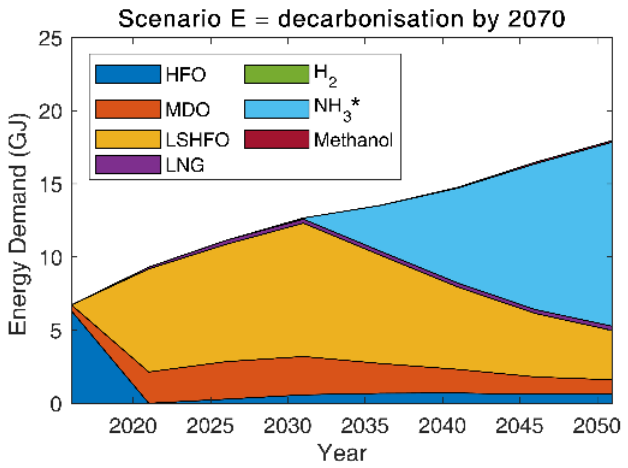
2050 decarbonization (1.5ºC aligned)

GJ



2070 decarbonization (IMO aligned)

GJ



Graphs show optimal fuel mix reached in analysis of several candidate zero emission fuels for UK's Clean Maritime Plan in 2019

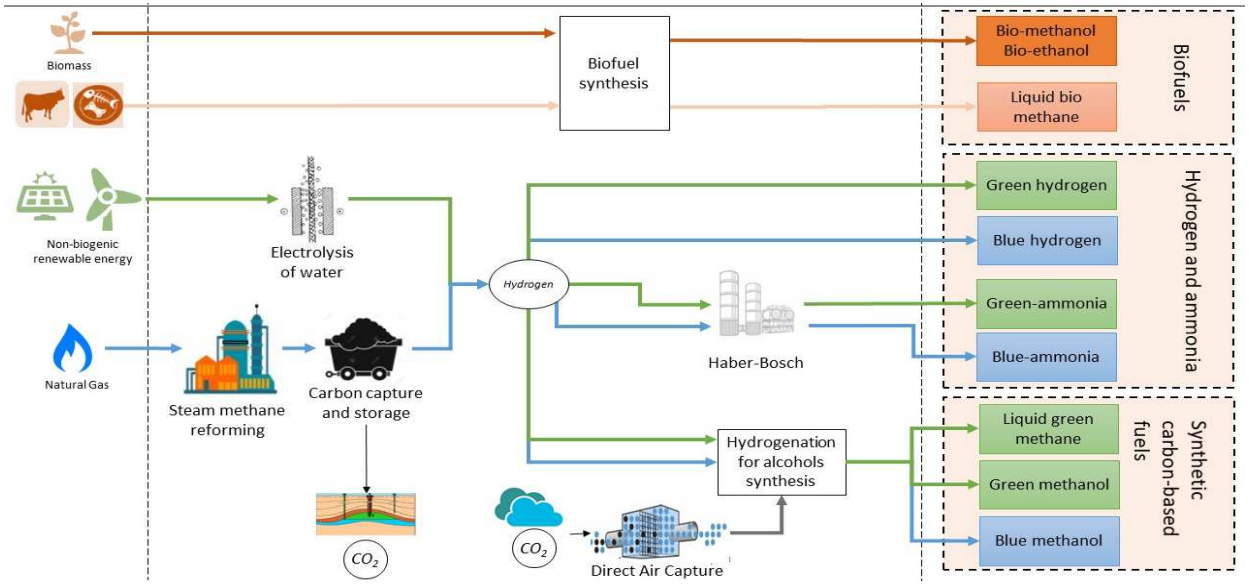
Source: UMAS GloTraM (2019), UK Clean Maritime Plan

Total cost of operation

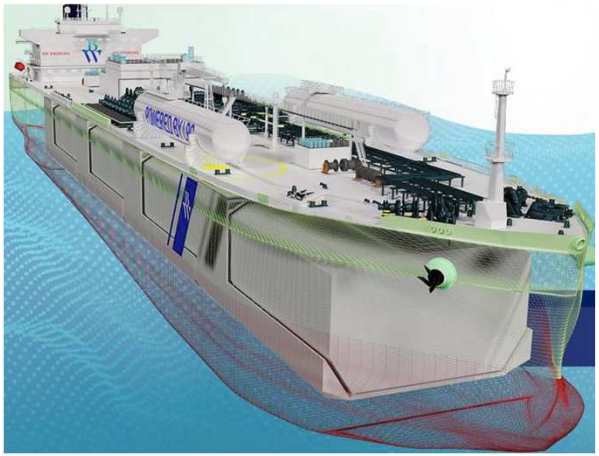
Feedstock prices

Production process capex/opex/efficiency

Machinery and storage, capex, efficiency, size



UMAS and World Bank forthcoming



BW

= additional fuel cost + additional capital cost of mcy + additional capital cost of storage - lost capacity (revenue)

High price scenario, 80,000dwt bulk carrier, total annual additional cost

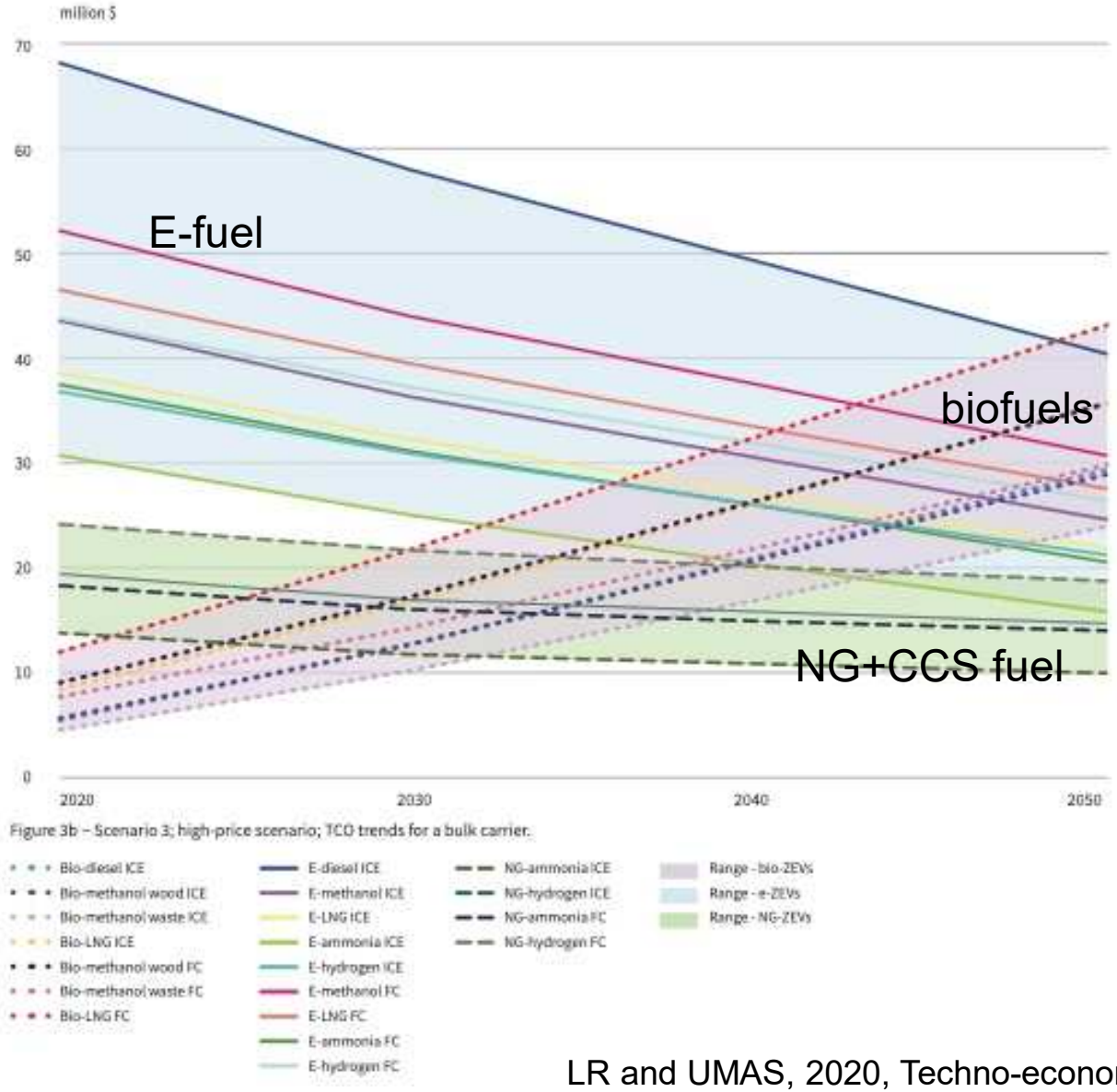


Figure 3b – Scenario 3; high-price scenario; TCO trends for a bulk carrier.

Biofuel increases in price

NG+CCS fuels consistently cheaper than e-fuel (but not zero)

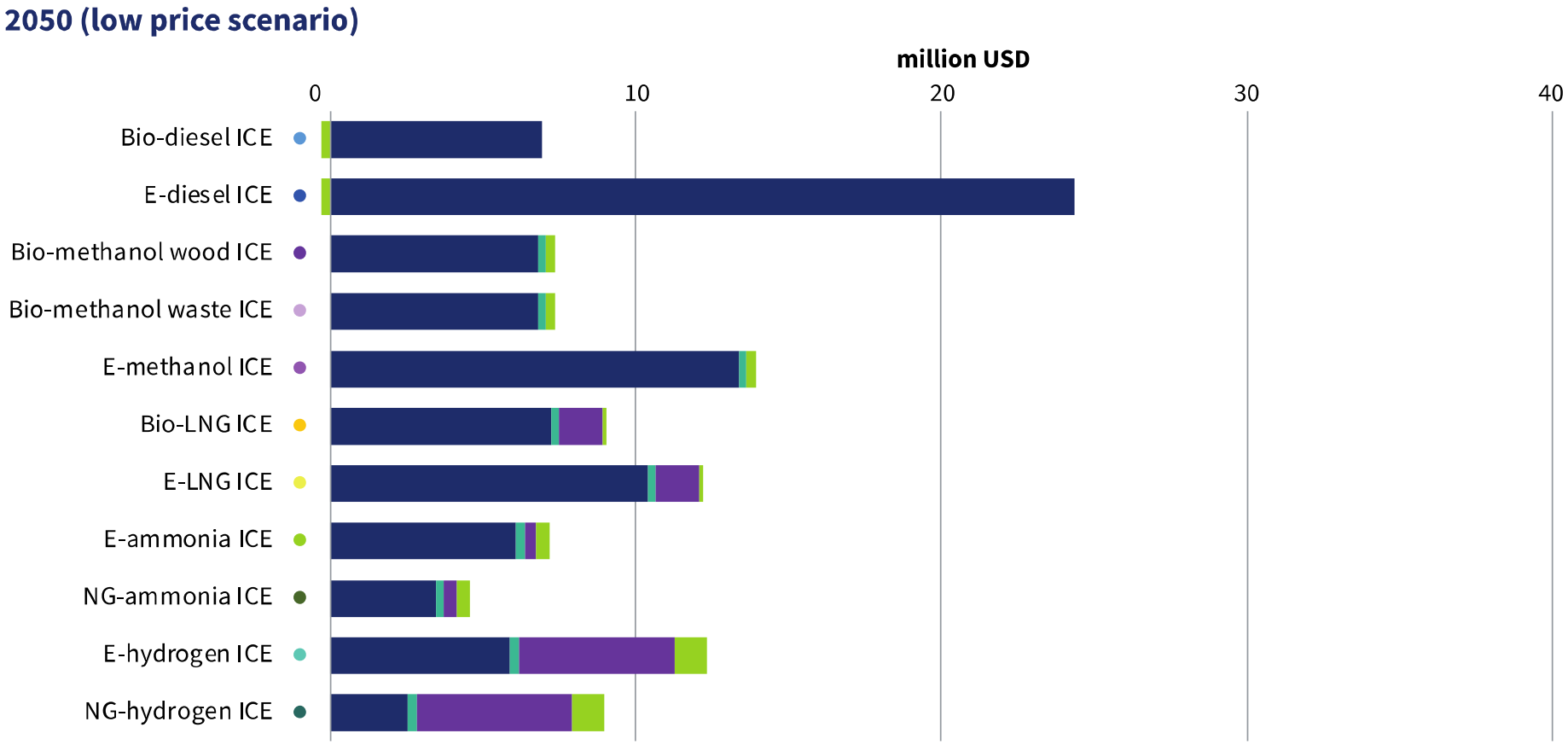
Ammonia consistently cheaper than synth hydrocarbons,

Hydrogen and e-LNG 20-50% more expensive on total cost basis

Ammonia competitiveness improves with time

LR and UMAS, 2020, Techno-economic assessment of zero carbon fuels

Total cost of operation, component costs



Figures 4a – Relative cost implications of ZEV technologies for bulk carrier under low-price scenario and no carbon price.

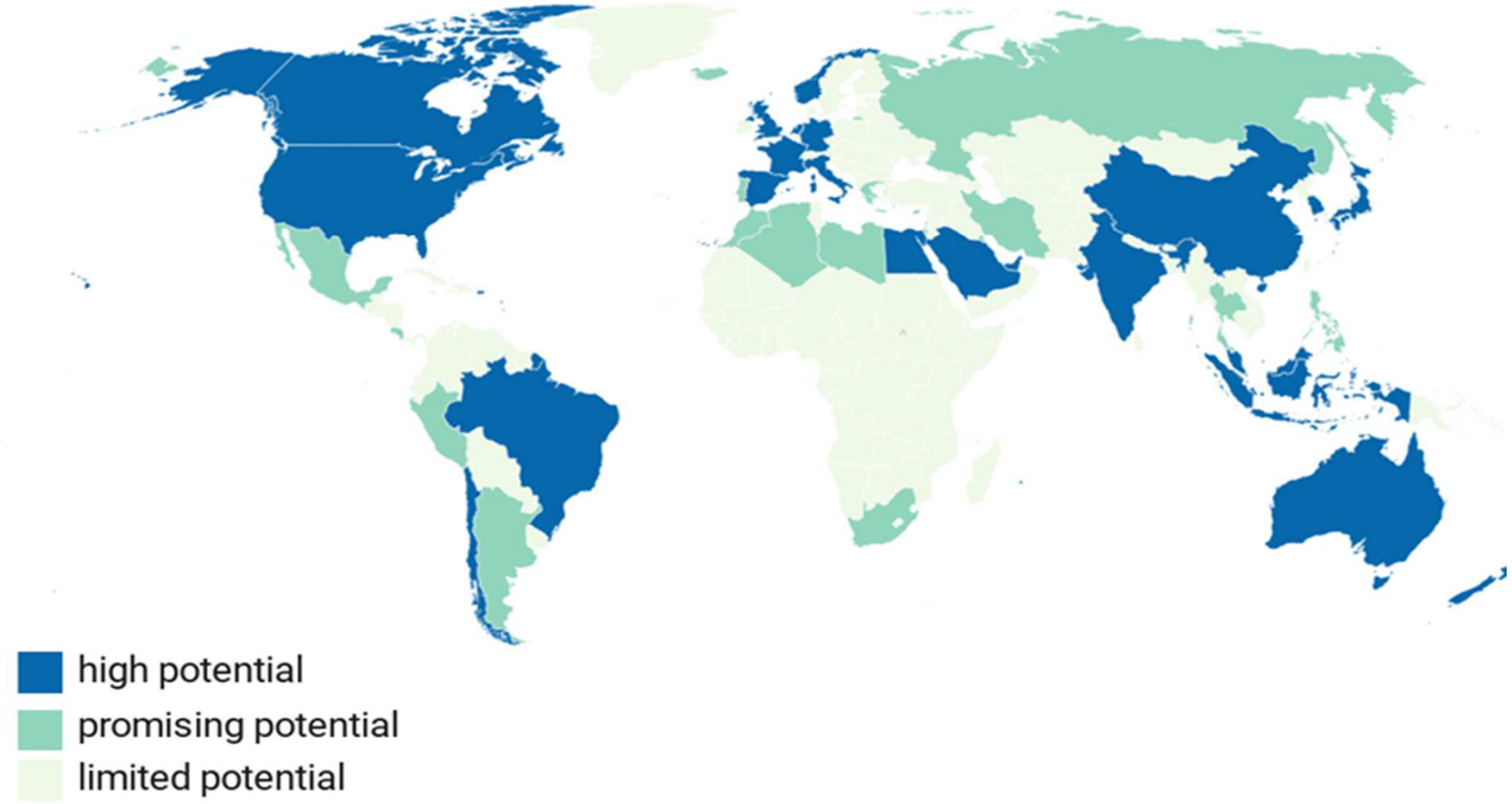
Voyage Engine Storage Storage impact

LR and UMAS, 2020, Techno-economic assessment of zero carbon fuels

How might the transition happen?

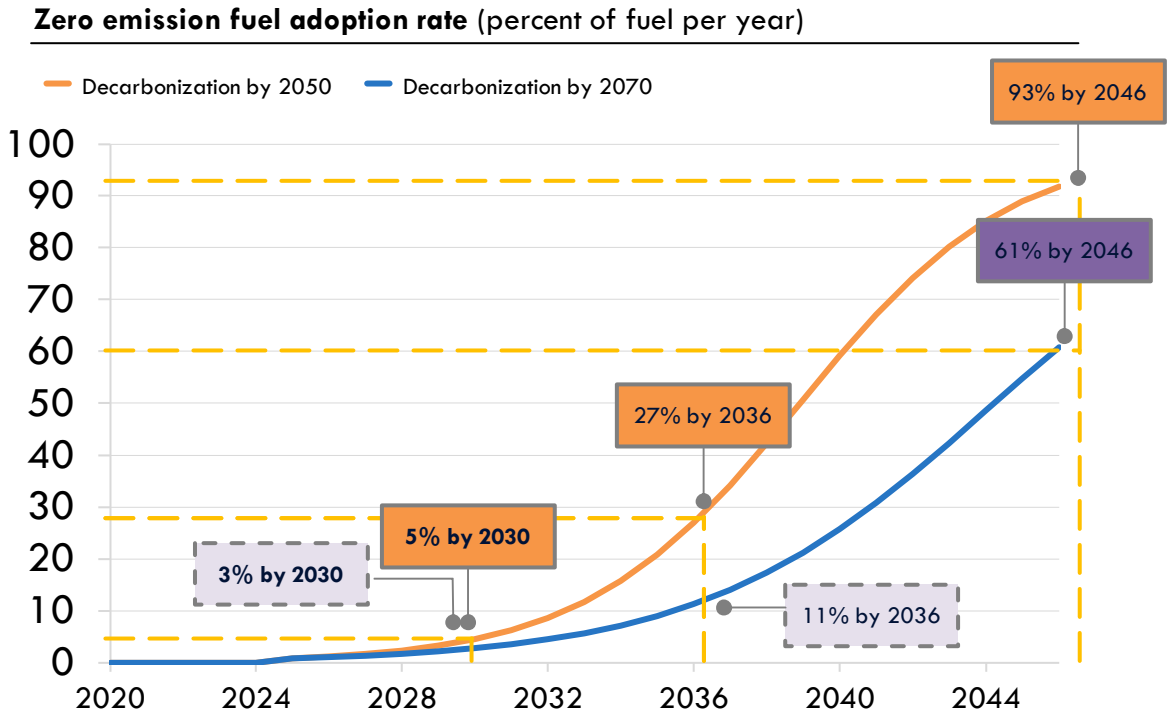
Where will the hydrogen/ammonia come from?

Evaluation of potential for a “first blue then green” hydrogen transition



WB, UMAS (2020) Role and potential of zero-carbon bunker fuels

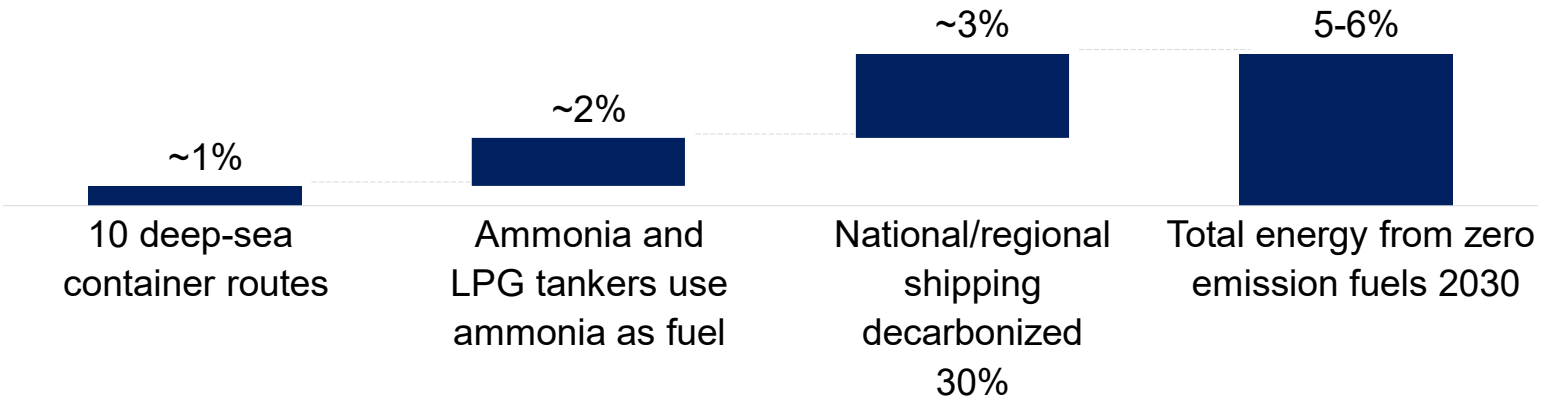
Based on this, S-curve modelling implies a need for ~5% of zero emission fuels in international shipping by 2030



- S-curves generated to match UMAS scenarios as closely as possible
- Works well for 1.5C scenario. For IMO scenario the implied increase from 27% to 61% in 2046 cannot be fitted to an S-curve, hence a lower value for 2036 is generated here, 11%
- Curves suggest 3-5% needed by 2030. As the IMO-aligned curve produces a too low result for 2036 (11%) it is likely **best to aim for 5% regardless of scenario**

Which ships will want zero carbon fuels?

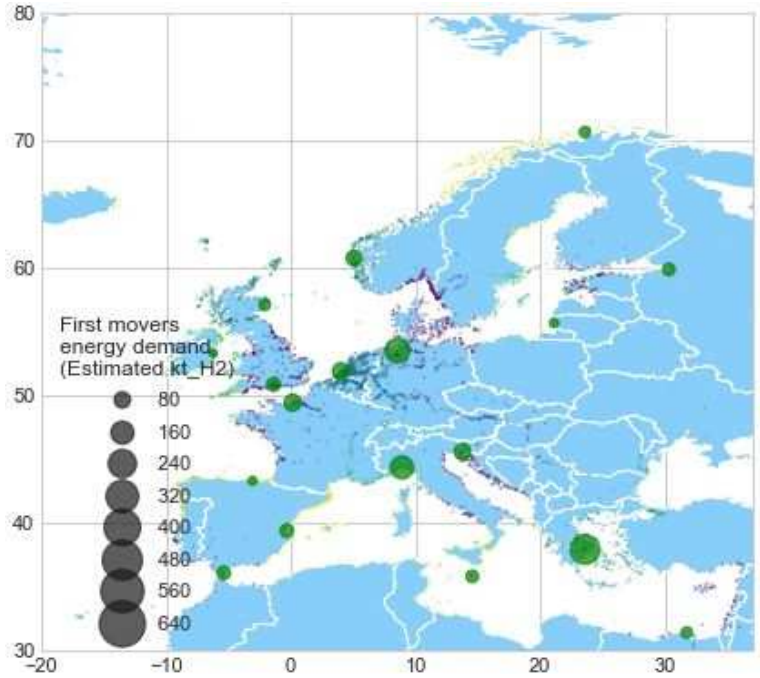
5% zero-emission fuels in 2030 could be achieved by a combination of container, tanker and domestic shipping



Source: UMAS, 4th IMO GHG Study

First mover opportunities can be seized

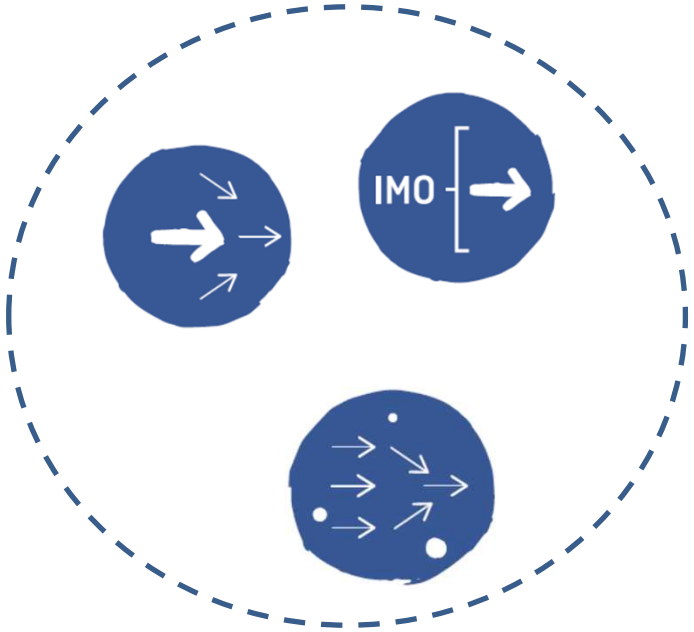
- There is more than enough first mover potential – about 2x – to put shipping on the right track by 2030.
- Strategies should target routes where complexity is most manageable and fuel supply most feasible.
- First mover routes can almost by definition be stimulated by individual governments alone or in collaboration.



https://www.globalmaritimeforum.org/press/launch-of-getting-to-zero-coalition-transition-strategy-with-concerted-collaborative-action-full-decarbonization-of-international-shipping-by-2050-is-doable

Leadership can emerge from many levels

- **Individual countries can drive the early stages of the transition,** using policy to push zero-emission fuels and influencing neighbours and trading partners.
- **Multiple countries may act in parallel** and in coordination to implement policies and solutions that have greater impact.
- **Commitments** on commercial fleet decarbonisation, ports and bunkering infrastructure and green finance can move faster than the IMO.



Leadership can emerge from many levels

PRESS RELEASE

L.A. City Council adopts Councilmember Raman's resolution calling for transition to 100% zero-emission shipping at port of Los Angeles by 2030

NOVEMBER 9, 2021

The resolution also requires support for legislation or administrative action to rapidly decarbonize the maritime shipping industry and to create zero-emission shipping corridors along the California coast, the West Coast of the United States, and across the trans-Pacific trade route.

https://shipitzero.org/l-a-city-council-adopts-shipping-resolution/

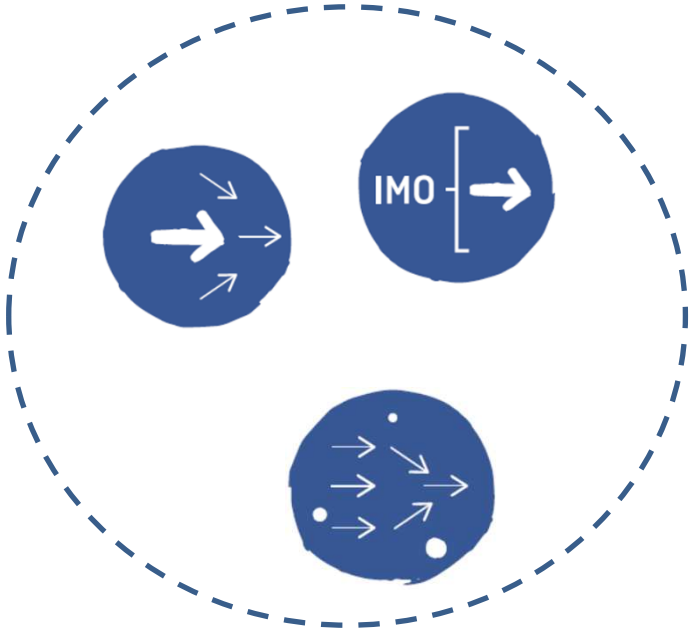
Leadership can emerge from many levels

- **Individual countries can drive the early stages of the transition,** using policy to push zero-emission fuels and influencing neighbours and trading partners.

- **Multiple countries may act in parallel** and in coordination to implement policies and solutions that have greater impact.

- **Commitments** on commercial fleet decarbonisation, ports and bunkering infrastructure and green finance can move faster than the IMO.

- Global action led by the IMO may prove challenging in the early phases, but will be highly impactful as the transition reaches scale.



Thank You!

Contact

Email: santiago.fuente.11@ucl.ac.uk

LinkedIn:
Uk.linkedin.com/in/santiagosuarezdlf

For more information visit:

www.u-mas.co.uk

Twitter: @umas_15

Subscribe to the UMAS mailing list bit.ly/31WHfmv

UMAS

Maritime consultancy delivering applied solutions for a carbon constrained future