Maritime transport costs and trade flows

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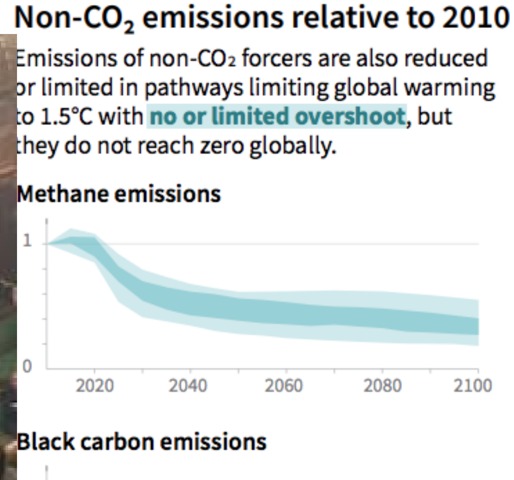
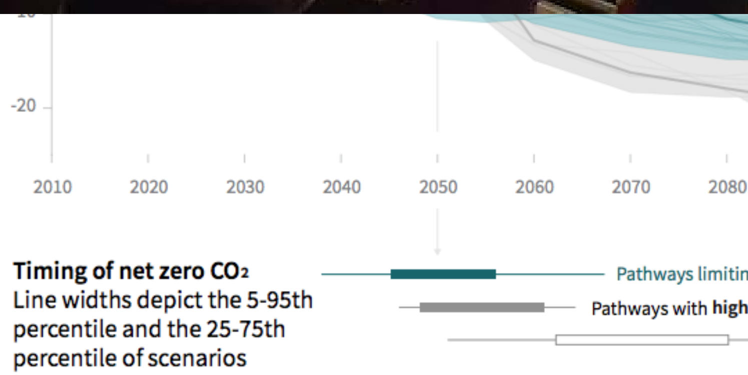
Content

- Context
- Maritime transport costs, potential for change
- Impacts on transport, global trade
- Concluding remarks

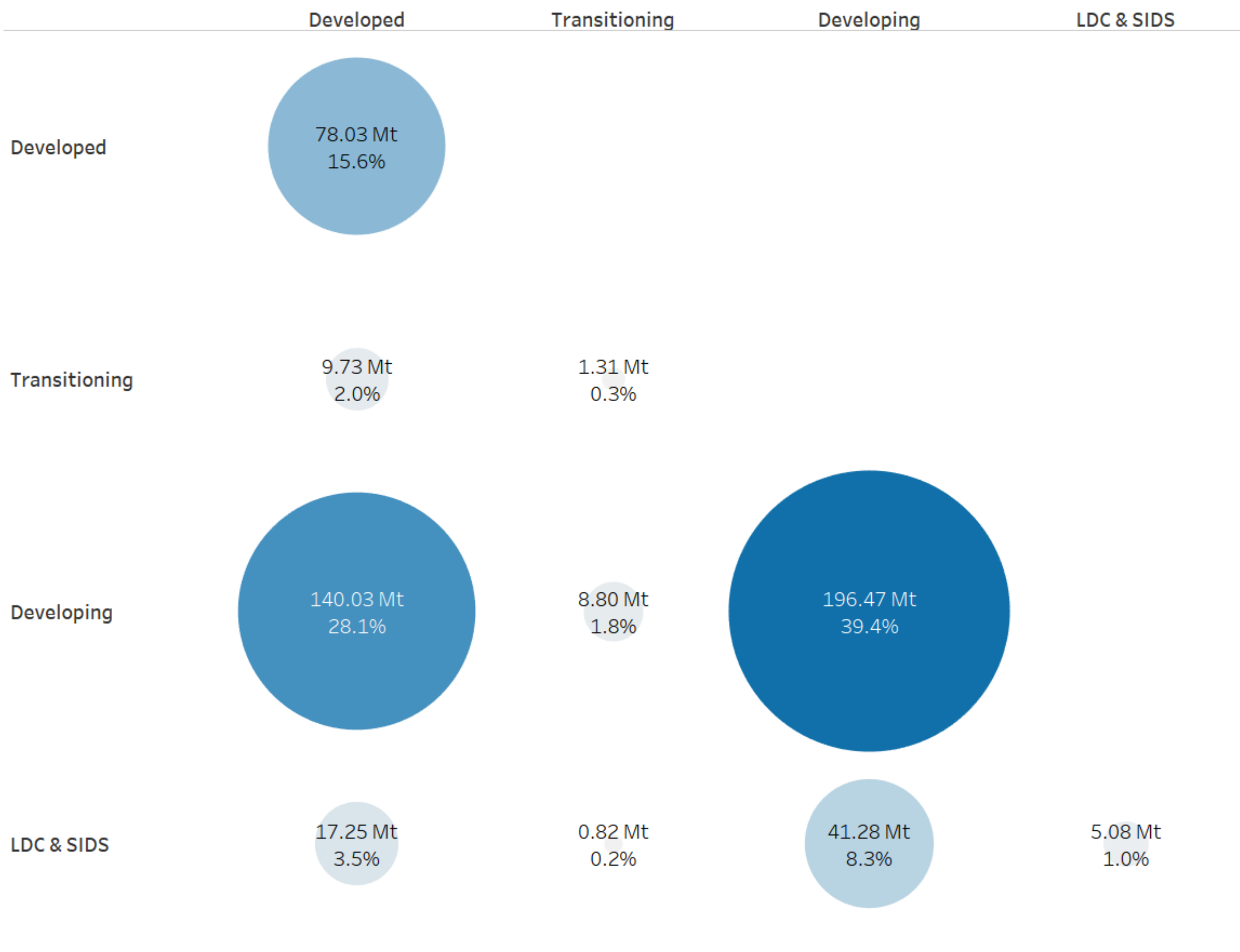

ASIA
China
Japan
Hawaii
(U.S.)
MARSHALL
ISLANDS
Philippines
Pacific
Ocean
Equator
Indonesia
Papua
New Guinea
Indian
Ocean
Australia
New
Zealand

1.5 and climate activism go mainstream

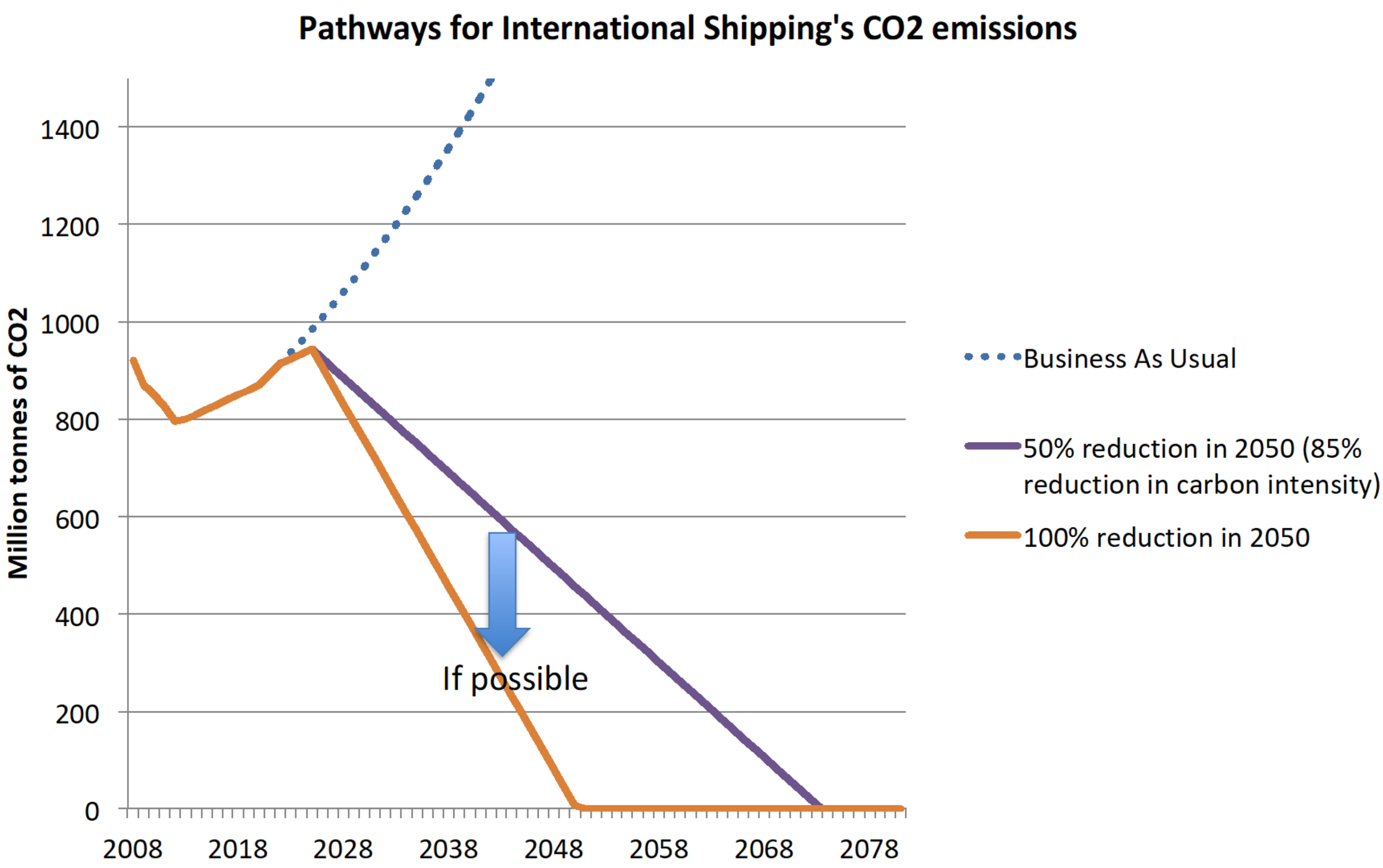




Emissions on trade routes by economic status

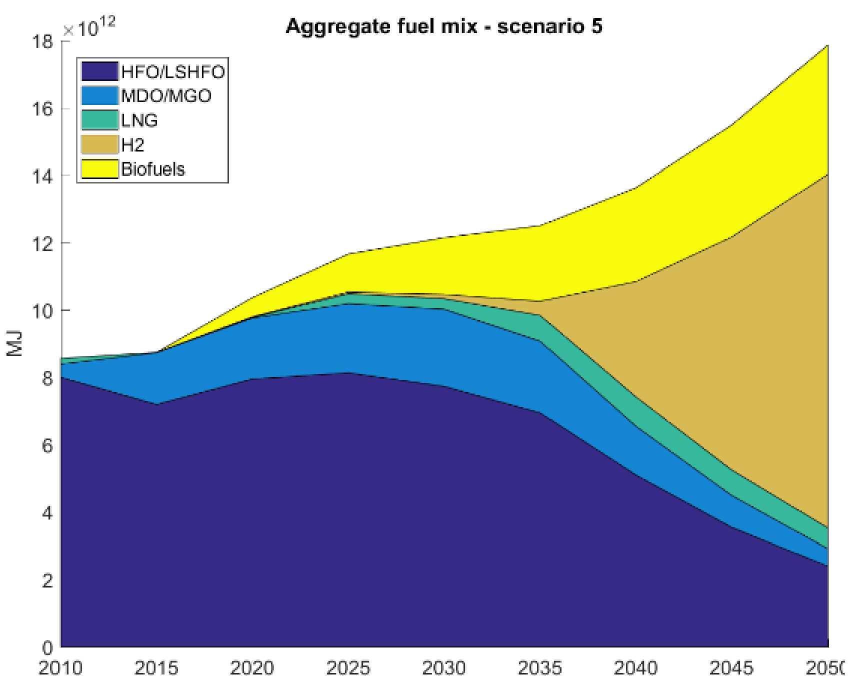


IMO GHG Objective 3:

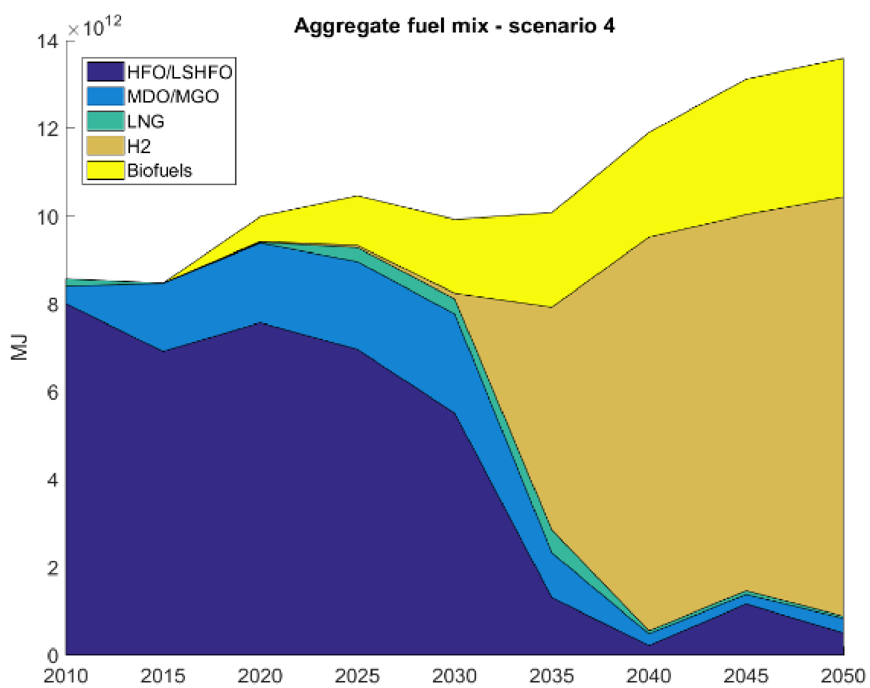


Estimating policy-related changes in maritime transport costs

This means a rapid shift to wind assistance and zero emission fuels



2 degrees



1.5 degrees

ISWG 1 INF.2

How do costs change relative to a conventional ship (9000TEU container)?

LR UMAS (2017). Zero-Emission Vessels 2030. How do we get there?

What additional carbon price / levy is needed to achieve different levels of ambition?

ZE machinery, energy efficiency options, wind assistance

Scenario assumptions

Carbon Price

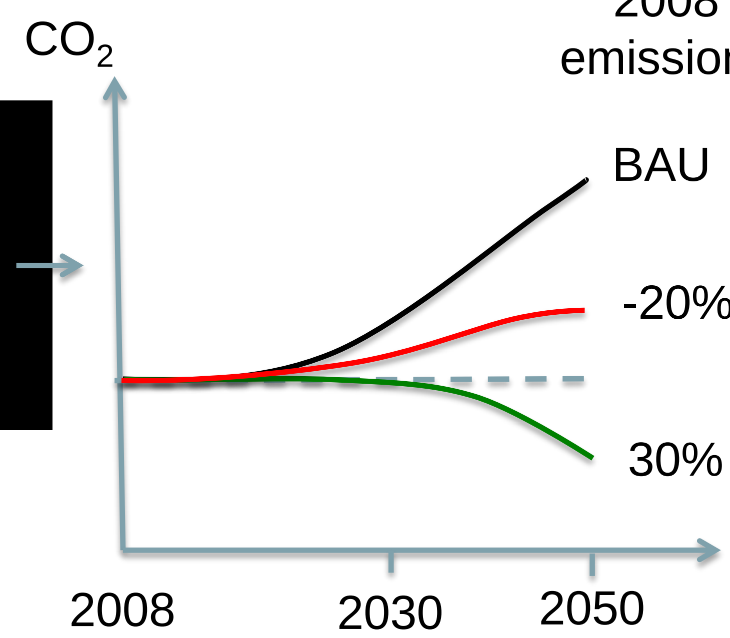
0 $/t

50 $/t

100 $/t

GloTraM + Whole Ship Model

% reduction in 2030 and 2050 on 2008 emissions

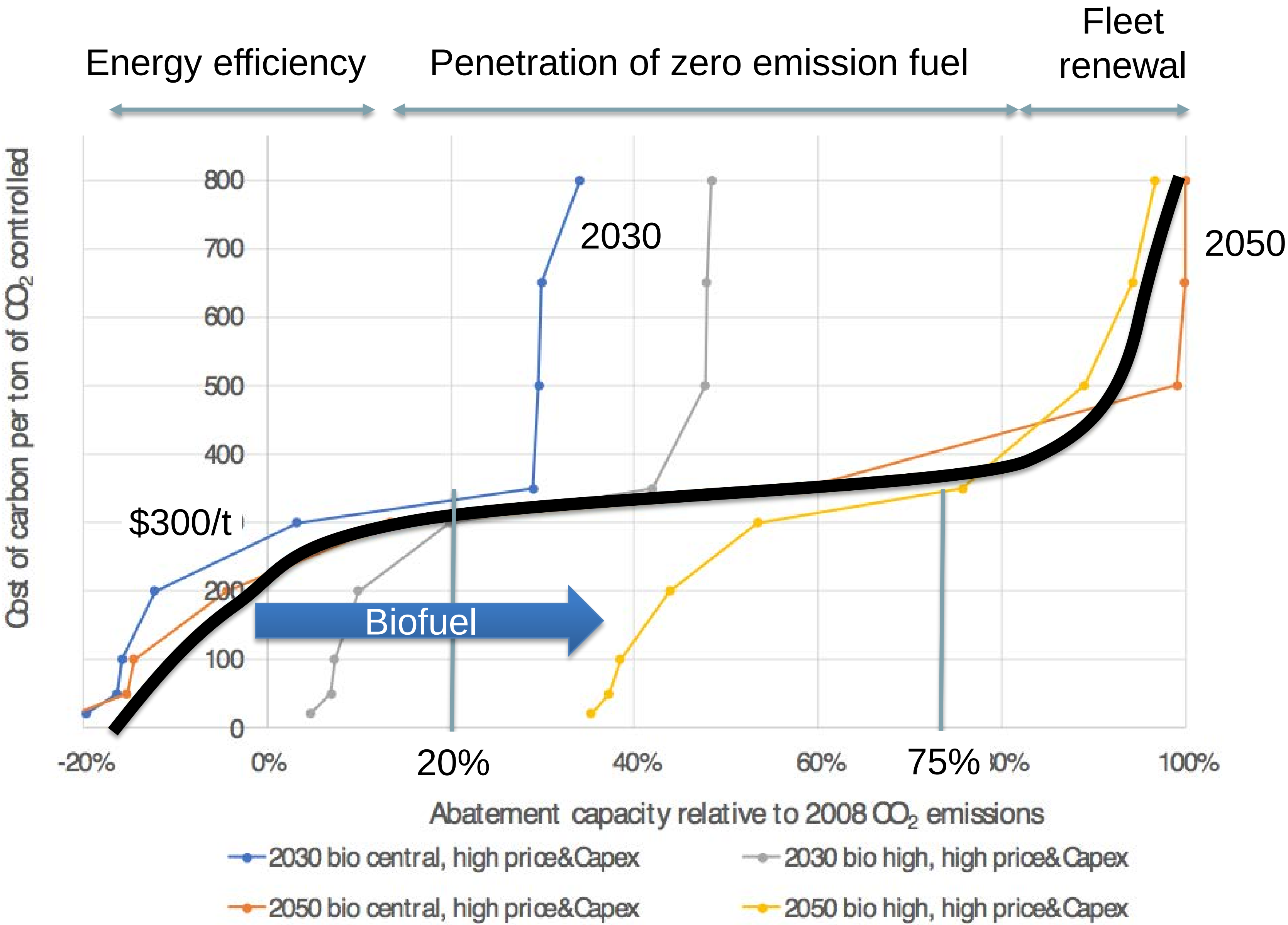


IMarEST: IMO ISWG-GHG 3-3

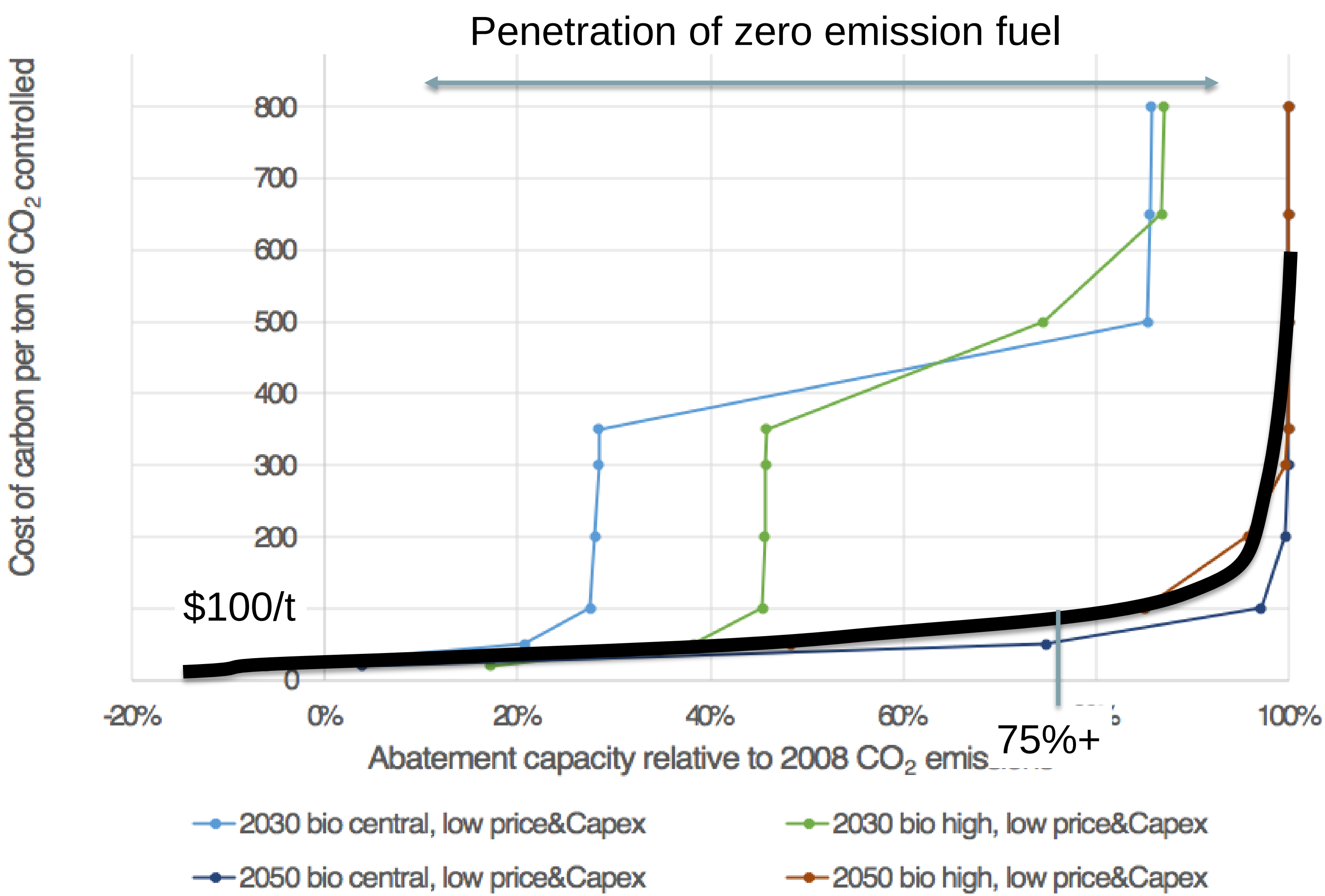
Four scenarios, key assumptions

	Bioenergy availability	Fossil fuel price $/t		Hydrogen price $/t	
		2030	2050	2030	2050
High renewable price	low	HFO – 514 MDO – 747 LNG - 546	HFO – 664 MDO – 943 LNG - 744	3025	3760
	high				
Low renewable price	low			1860	2310
	high				

High renewable fuel price



Low renewable fuel price



50-100$/t CO_2 by 2030

World Bank

Estimating impacts on trade and States

Impacts on States

- The impacts on States of a measure should be **assessed and taken into account** as appropriate **before adoption of the measure**. Particular attention should be paid to the needs of **developing countries, especially SIDS and LDCs**.

- Disproportionately negative impacts should be **assessed and addressed**, as appropriate.

What do we mean by impacts on states?

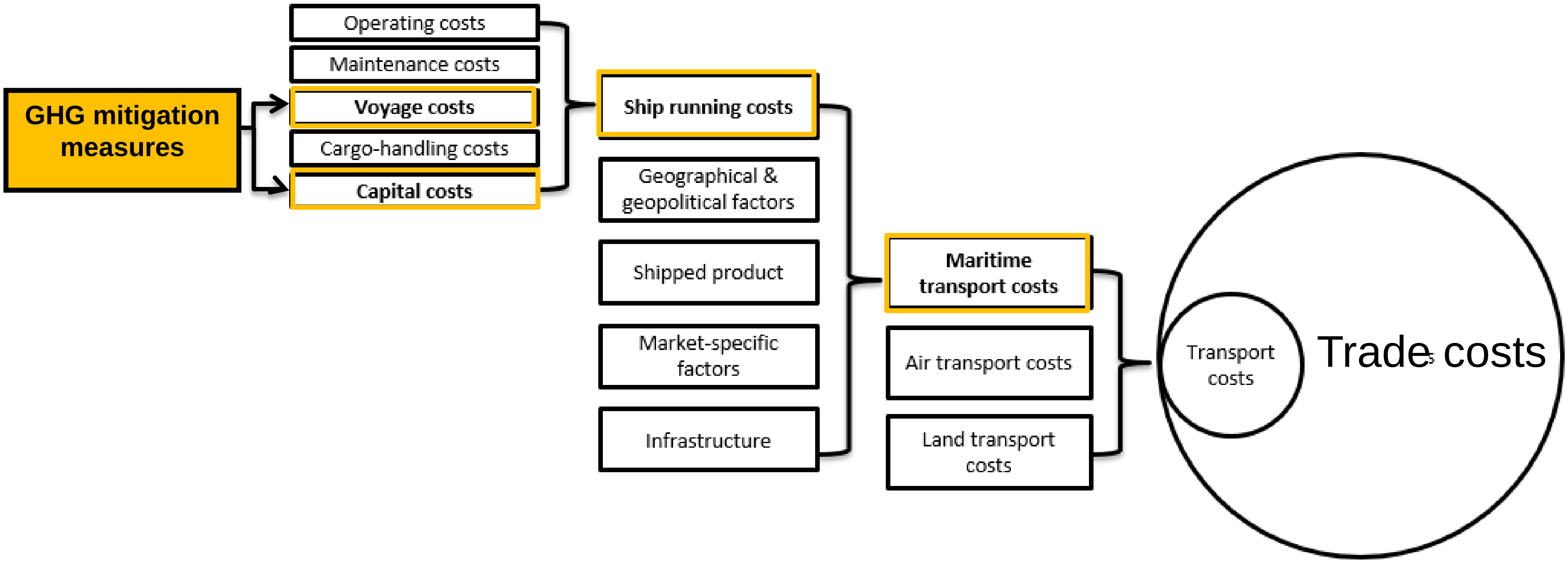
1 geographic remoteness of and connectivity to main markets;
2 cargo value and type;
3 transport dependency;
4 transport costs;
5 food security;
6 disaster response;
7 cost-effectiveness; and
8 socio-economic progress and development.

The nature of potential policy-related changes in transport cost

Increased capital costs and fuel costs – increase in transport cost

Increased capital costs but lower operating cost – no net increase or even a decrease in transport costs

TRANSPORT Costs are a small COMPONENT OF TRADE COSTS



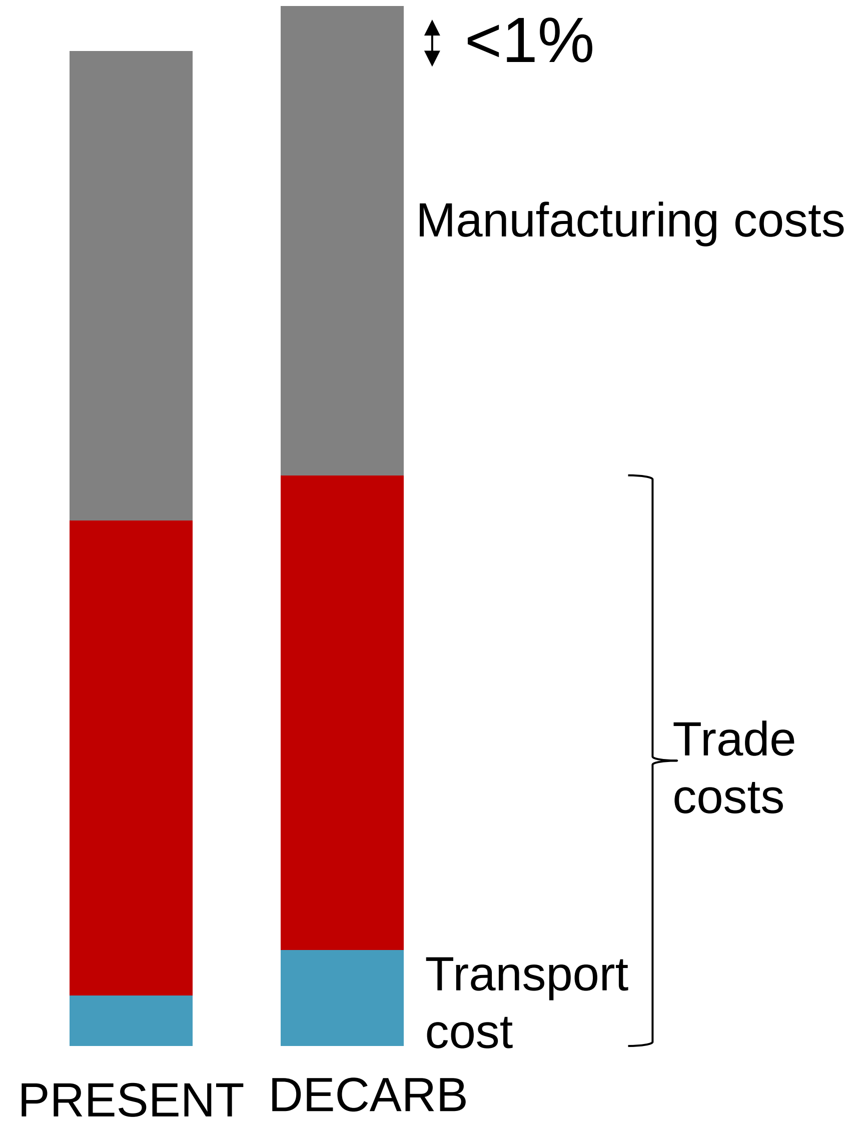
- Diverse share of maritime transport costs in product values
  e.g. *5% (manufactory) vs. 11% (agriculture) vs. 24% (raw materials industry)*
- Wide range of transport costs across products and countries of origin and destination

Source: Rojon et al.(2018)

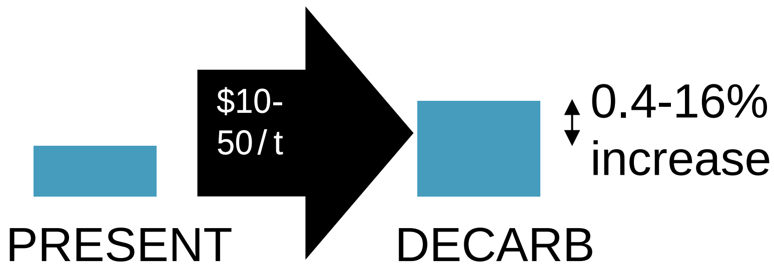
The Importer’s perspective

Source: Rojon et al.(2018)

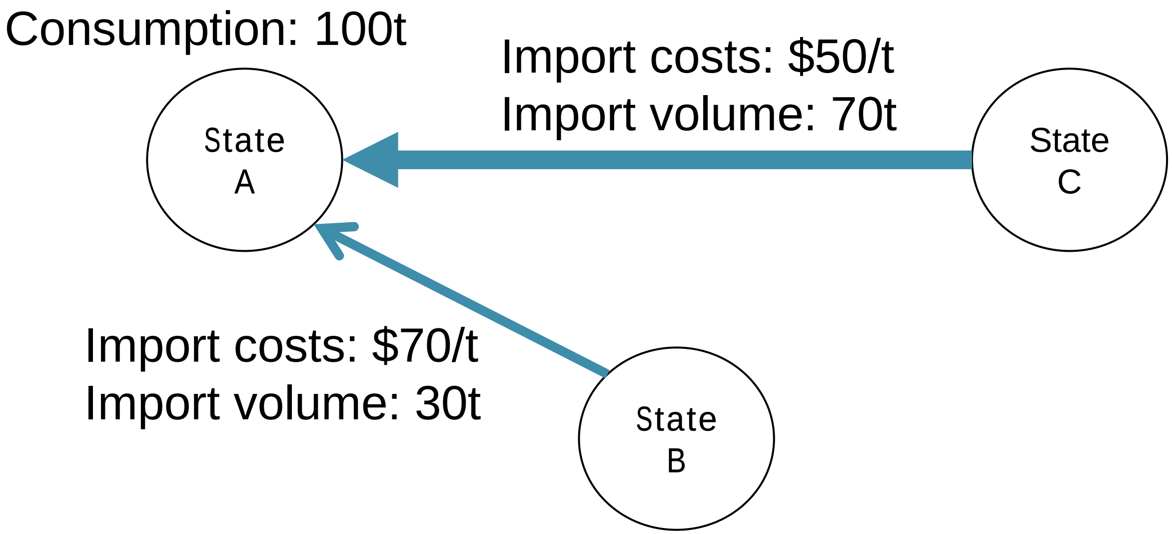
Change in
cost of import



Change in
transport
cost

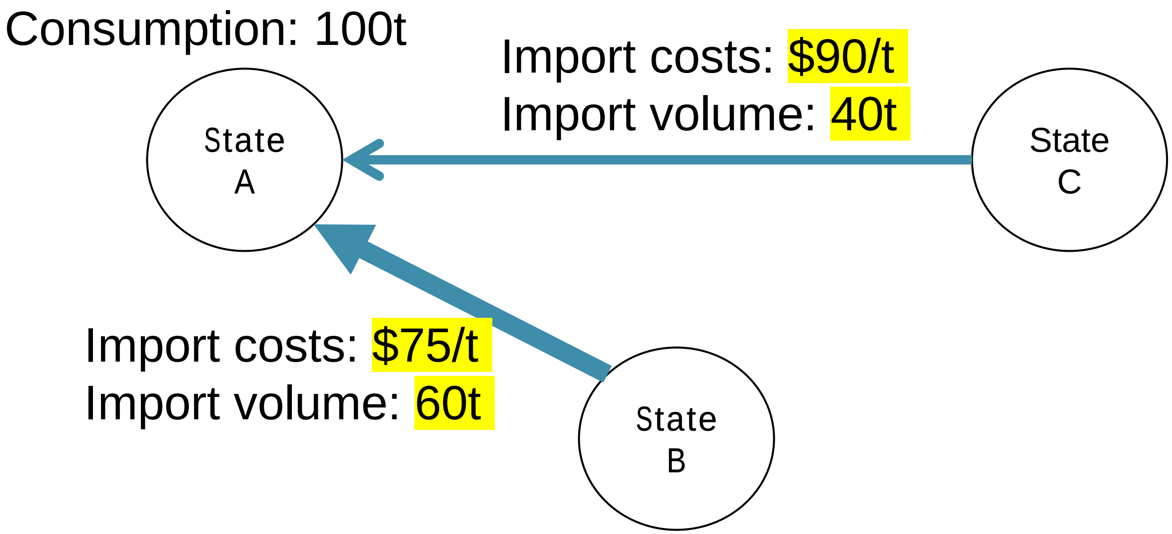


The exporter’s perspective



- **Consumers will substitute products** from different producers depending on the changes in import prices
- States with higher import costs might not be favorable over states with lower import costs anymore causing **shift of volume of demand**.

The exporter’s perspective



•**Potential asymmetric increase in import costs** due to GHG mitigation measures could lead to:

- Decline of export in State C which could lead to decline in GDP
- Increase of export in State B could lead to increase in GDP
- Reduced consumption in State A
- Increased domestic production in State A

Generally, modest impact on:

- GDP of individual countries (-0.02% to -1%)
- Mode shift from sea to land based transport (-0.16%)

Literature	GHG mitigation measures	Economic Indicators	Findings
Lee et al. (2013)	Carbon price 30, 60, 90 USD/ ton CO_2 for the year 2007	Real GDP	-0.002% to +0.004%, Global average : -0.0003%
		Volume of container flows	Reduction of 925 KTEU (Twenty-Foot Equivalent Units) globally
Sheng et al. (2018)	Carbon price 40 USD/ton CO_2 by 2030	Real GDP	-0.06% to +0.001%
		GDP growth	-0.17% to +0.01%
L.A. Tavasszy et al. (2014)	Carbon price 49 euros/ton CO_2 by 2040	Global trade flows	- 0.9% in total trade flows
		Commodity trade flows	-0.2% (food) to- 4.2% (agriculture)
Anger et al. (2013)	Carbon price 10,30,50 euros/ ton CO_2 by 2025	Real GDP	<-0.01% in global GDP
		real GDP changes for developing countries	-1% GDP for one country <-0.2% for majority
Halim et al. (2018)	Slow steaming (25-65% speed reduction), and carbon price on maritime transport with 100% increase in maritime transport by 2030	Volume of international maritime transport	-34 Mtonnes in demand for maritime transport
		Shift to freight rail mode (e.g. Eurasian railways)	-0.16% in modal share of maritime transport.

Policy options to mitigate impacts – could have an impact…

- Exemptions (routes/ships/cargos)
- Revenues
  - To reduce negative impacts, incl. increase in transport costs
  - To support countries' general climate change mitigation & adaptation plans
  - To support the decarbonisation of the maritime industry
- Capacity building/development

Concluding remarks

- Landscape
  - In 2030, we will have hit 1.5, ~44 countries will be in major existential and economic crisis
  - Political pressure driven by disasters/impacts will increase over time
- Technology costs
  - The sector’s move from fossil fuels needs to start in 2030’s
  - An estimate of the potential cost increase can be derived from modelling of the carbon price, $50-250/t can provide a basis to test the sensitivities of impacts
- Impacts
  - GHG reduction policy related trade impacts have received particular prominence
  - Globally trade volume, GDP and modal shift impacts appear small
  - However, the case of individual countries could be different
  - Importers and exporters have different perspectives and risks
  - Little work has been done so far on transport cost increases related to upper bound of cost
  - Further work is needed, particularly to understand the case for SIDS and LDCs
  - Policy to address potential impacts is under-studied and may also create its own impacts

Yara and Engine 50MW Green NH_3 (2021)

~100MW Solar array
50MW electrolyser
80tpd ammonia