Emissions scenarios for international shipping from an energy technology perspective

Renske Schuitmaker

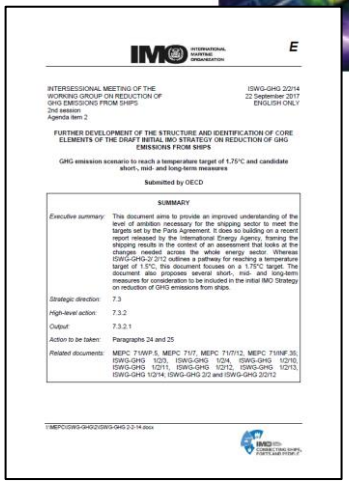
Paris, 20 November 2017

International Energy Agency (IEA) and the Mobility Model

- "The IEA is an autonomous organisation which works to ensure reliable, affordable and clean energy for its 29 member countries and beyond"
  - **Increasing cooperation with non-members, mainly BRICS**

- IEA mobility model (MoMo) used for most transport analysis

- Recently the IEA is more involved in the area of shipping
  - Energy Technology Perspective publication
  - Tracking clean energy progress publication
  - Involvement IMO climate negotiations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INTERSESSIONAL MEETING OF THE WORKING GROUP ON REDUCTION OF GHG EMISSIONS FROM SHIPS
2nd session
Agenda item 2

ISWG-GHG 2/2/14
22 September 2017
ENGLISH ONLY

FURTHER DEVELOPMENT OF THE STRUCTURE AND IDENTIFICATION OF CORE ELEMENTS OF THE DRAFT INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

GHG emission scenario to reach a temperature target of 1.75°C and candidate short-, mid- and long-term measures

Submitted by OECD

SUMMARY

Executive summary: This document aims to provide an improved understanding of the level of ambition necessary for the shipping sector to meet the targets set by the Paris Agreement. It does so building on a recent report released by the International Energy Agency, framing the shipping results in the context of an assessment that looks at the changes needed across the whole energy sector. Whereas ISWG-GHG-2/ 2/12 outlines a pathway for reaching a temperature target of 1.5°C, this document focuses on a 1.75°C target. The document also proposes several short-, mid- and long-term measures for consideration to be included in the initial IMO Strategy on reduction of GHG emissions from ships.

Strategic direction: 7.3

High-level action: 7.3.2

Output: 7.3.2.1

Action to be taken: Paragraphs 24 and 25

Related documents: MEPC 71/WP.5, MEPC 71/7, MEPC 71/7/12, MEPC 71/INF.36, ISWG-GHG 1/2/3, ISWG-GHG 1/2/4, ISWG-GHG 1/2/10, ISWG-GHG 1/2/11, ISWG-GHG 1/2/12, ISWG-GHG 1/2/13, ISWG-GHG 1/2/14, ISWG-GHG 2/2 and ISWG-GHG 2/2/12

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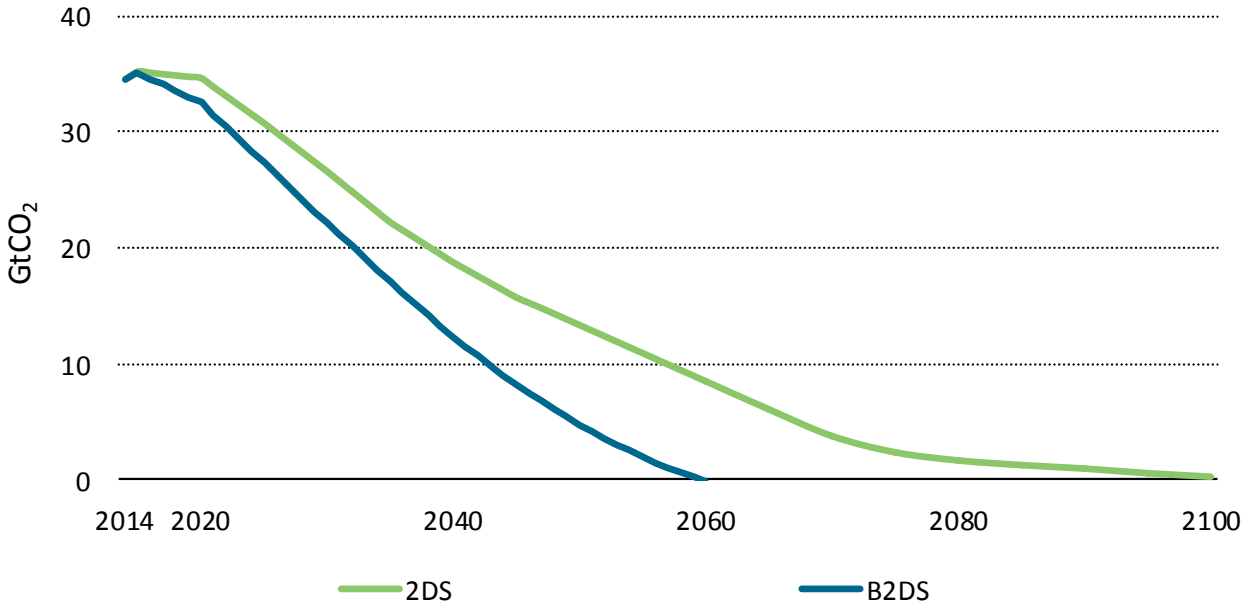
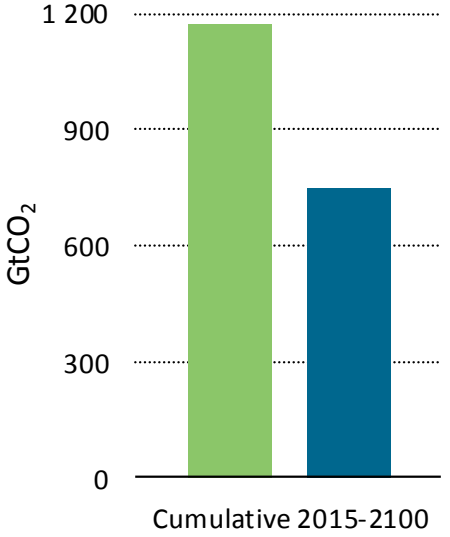
GHG emission budgets and trajectories for the global energy sector

The 2°C Scenario (2DS) and the Beyond 2°C Scenario (B2DS)





To meet the ambition of the Paris Agreement, energy sector CO_2 emissions need reach net zero in the second half of the century

Decarbonizing Transport is a formidable challenge

Transport accounts for 28% of global final energy demand and 23% of global carbon dioxide (CO_2) emissions from fuel combustion. **In 2015, international shipping accounted for 2% of global CO_2 emissions from fuel combustion.**

Decarbonising long-distance transport modes – in particular aviation, heavy-duty road transport and shipping – **is most challenging**.

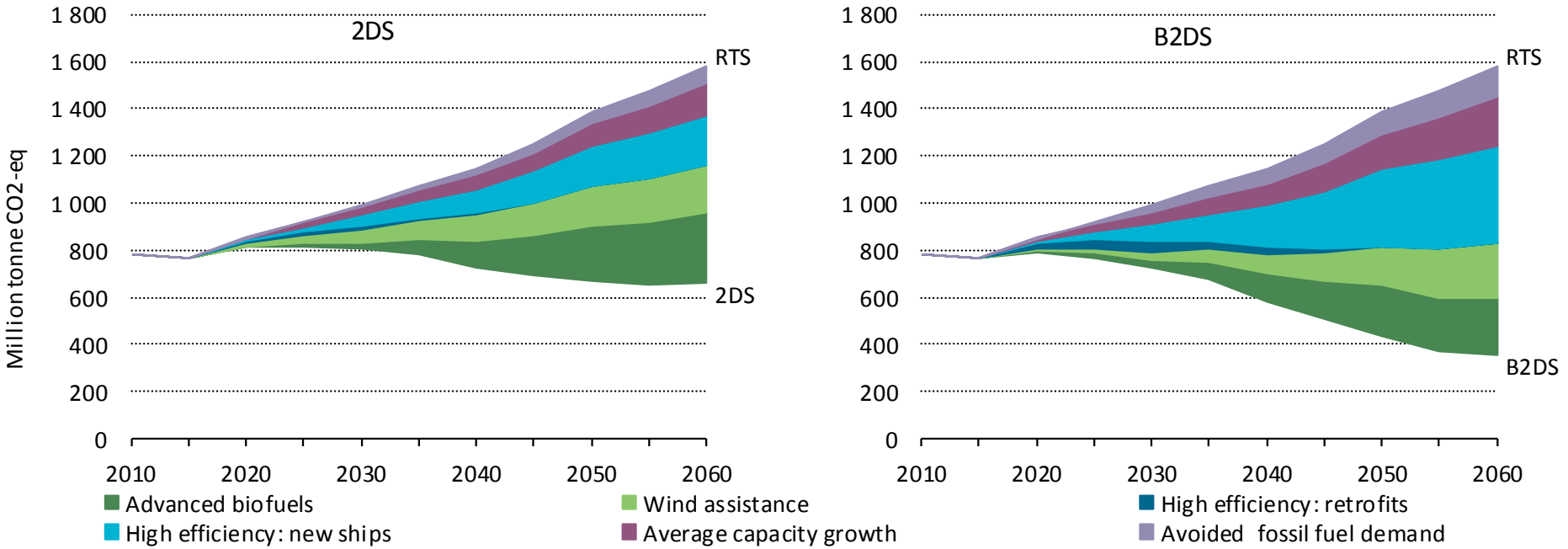
Decarbonising the international shipping sector requires:

- major improvements in efficiency
- rapid transitions in the energy mix to low-carbon fuels

Increased policy efforts are necessary to support the reduction of GHG emissions

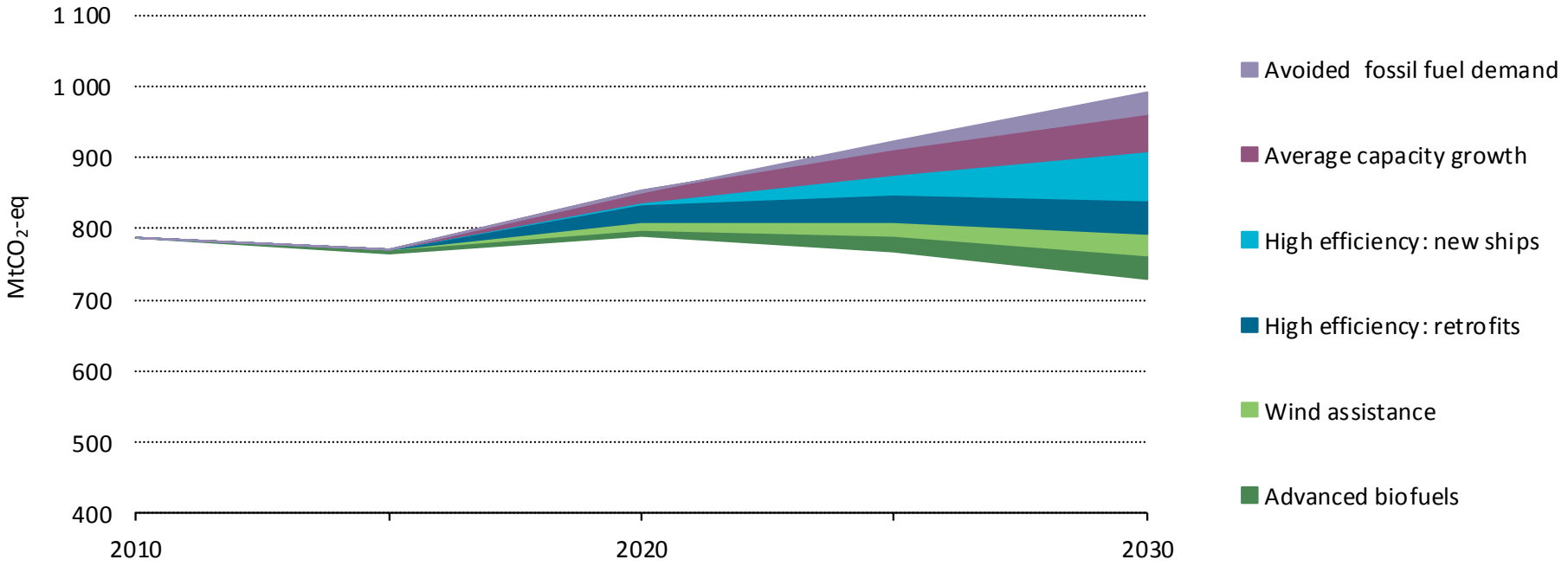
A broad portfolio of measures is needed

WTW GHG emissions in international shipping (freight) in the 2DS and B2DS relative to RTS



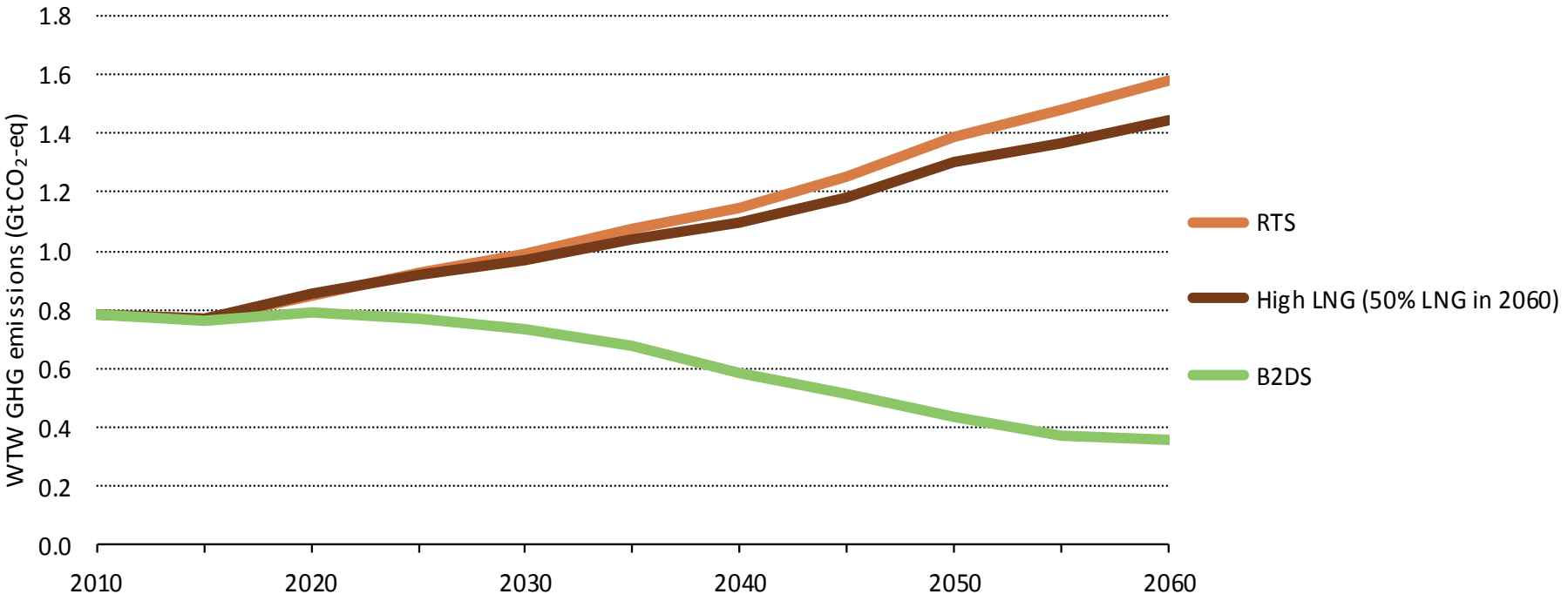
The largest share of GHG abatement in shipping results from operational and technological efficiency improvement combined with wind assistance in the 2DS and B2DS.

WTW GHG emissions in international shipping (freight) in the B2DS relative to RTS: 2010-2030



In earlier years the contribution of retrofits to reducing GHG emissions is significant

Why is LNG not included?



Switching 50% of the international Marine bunker fuel mix to LNG reduces GHG emissions by only 10%

How is hydrogen addressed in the 2DS and B2DS?

H_2 could play a role in the future of international shipping. Technologically feasible.

Barriers:

- High costs: limited technology learning and economy of scales
- Limited prospects of growth H_2 demand in other sectors
- Need for low-carbon hydrogen production
- Global refueling infrastructure network needed

H_2 is not included in the MoMo shipping model, but considered as a future option

IMO policy needs: short-term measures (2018-2023)

- **Raise the ambition of the EEDI**, and implement changes as soon as possible
- Fast track the development of an **operational efficiency standard**
- **Develop a mechanism introducing a CO_2 price for maritime fuels** taking into account the lifecycle performance of energy carriers
  - making conventional fuels more expensive and low carbon fuels more cost competitive
- **Start the development of a low-carbon fuel standard or mandate**
- **Expand port-based incentives**

IMO policy needs: medium-term measures (2023-2030)

- **Further raise the ambition of the EEDI**, preferably requiring new ships to be 50-60% more efficient by 2030 compared with the EEDI baseline
- Implement and strengthen an **operational efficiency standard**
- **Fully implement a CO_2 pricing mechanism**
- **Fully implement a low-carbon fuel standard or mandate,** aiming to have a share of 5-10% of low-carbon fuels (advanced biofuels or better) in the marine fuel mix by 2030

WTW GHG emissions reductions by mode in the 2DS and B2DS relative to RTS, 2060

Transport mode	2DS	B2DS
2- and 3-wheelers	99%	> 100%
LDVs	73%	92%
Trucks	70%	91%
Bus	65%	93%
Rail	87%	> 100%
Aviation	69%	85%
Shipping	54%	71%

Carbon reduction rates differ by transport mode