

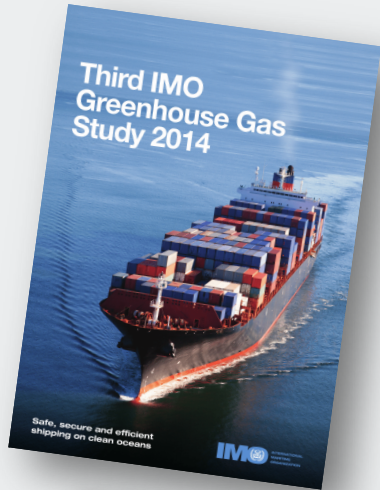
# Achieving the goals of the Initial IMO Strategy on reduction of GHG emissions from ships

## IMO policy context

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World Maritime University  
26-27 February 2020

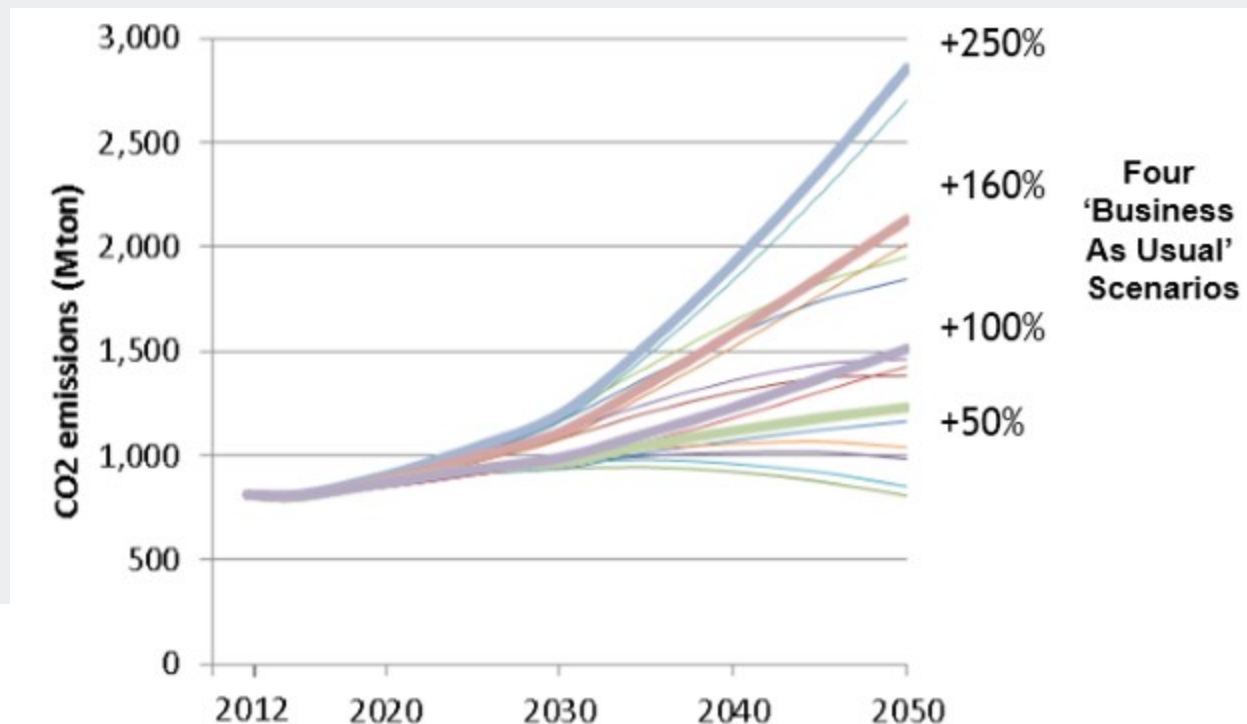
# Context: shipping GHG emissions



- In 2012, international shipping emitted approx. **800 million tonnes of CO<sub>2</sub>** => around 2.5% of global CO<sub>2</sub> emissions
- Demand is the key driver for growth in emissions.
- Expected growth of maritime trade: **+3.4% annually** in the five following years
- **50-250% increase in GHG emissions predicted by 2050** in the absence of regulations



**Fourth IMO GHG Study**  
expected in Autumn 2020





# IMO action on reduction of GHG emissions from ships

2013

MARPOL Annex VI Regulations on **Energy efficiency for ships** entered into force:

- Mandatory design requirements (**EEDI**) for new ships, which set stricter carbon intensity standards in phased approach
- Mandatory Ship Energy Efficiency Management Plan (**SEEMP**) for all ships to improve the energy efficiency

2015

EEDI phase 1: 10% reduction in carbon intensity

2020

EEDI phase 2: up to 20% reduction in carbon intensity

2022

EEDI phase 3 part 1: from 30% up to 50% reduction for some ship types

2025

EEDI phase 3 part 2: up to 30% reduction for remaining ship types

New ships

All ships

2016

Mandatory **IMO Data Collection System**: fuel oil consumption data reporting to IMO, from 1 January 2019

2018

Initial **IMO Strategy on reduction of GHG emissions from ships**

2019

- Programme of follow-up actions of the Strategy
- procedure to **assess the impacts on States** of candidate measures

2023

- Short-term measures to be implemented
- Revised Strategy** to be adopted

# Initial IMO Strategy on reduction of GHG from ships (2018)



MEPC 72/17/Add.1  
Annex 11, page 1

## ANNEX 11

RESOLUTION MEPC.304(72)  
(adopted on 13 April 2018)

### INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

THE MARINE ENVIRONMENT PROTECTION COMMITTEE  
RECALLING Article 38(e) of the Convention on the International Maritime Organization (the Organization) concerning the functions of the Marine Environment Protection Committee (the Committee) conferred upon it by international conventions for the prevention and control of marine pollution from ships,

ACKNOWLEDGING that work to address greenhouse gas (GHG) emissions from ships has been undertaken by the Organization continuously since 1997, in particular, through adopting global mandatory technical and operational energy efficiency measures for ships under MARPOL Annex VI,

ACKNOWLEDGING ALSO the decision of the thirtieth session of the Assembly in December 2017 that adopted for the Organization a strategic direction entitled "Respond to Climate Change",

- RECALLING the United Nations 2030 Agenda for Sustainable Development,
1. ADOPTS the Initial IMO Strategy on Reduction of GHG Emissions from Ships (hereinafter the Initial Strategy) as set out in the annex to the present resolution;
  2. INVITES the Secretary-General of the Organization to make adequate provisions in the Integrated Technical Cooperation Programme (ITCP) to support relevant follow-up actions of the Initial Strategy that may be further decided by the Committee and undertaken by developing countries, particularly least developed countries (LDCs) and small island developing States (SIDS);
  3. AGREES to keep the Initial Strategy under review, with a view to adoption of a Revised IMO Strategy on reduction of GHG emissions from ships in 2023.

**adopted**



# Initial IMO Strategy on reduction of GHG from ships (2018)

## Vision:

**“IMO remains committed to reducing GHG emissions from international shipping and, as a matter of urgency, aims to phase them out as soon as possible in this century”**

.....the Initial Strategy identifies levels of ambition for the international shipping sector noting that technological innovation and the global introduction of alternative fuels and/or energy sources for international shipping will be integral to achieve the overall ambition.....

**.1      *carbon intensity of the ship to decline through implementation of further phases of the energy efficiency design index (EEDI) for new ships***

to review with the aim to **strengthen** the energy efficiency design requirements for ships with the percentage improvement for each phase to be determined for each ship type, as appropriate;

**.2      *carbon intensity of international shipping to decline (for all ships)***

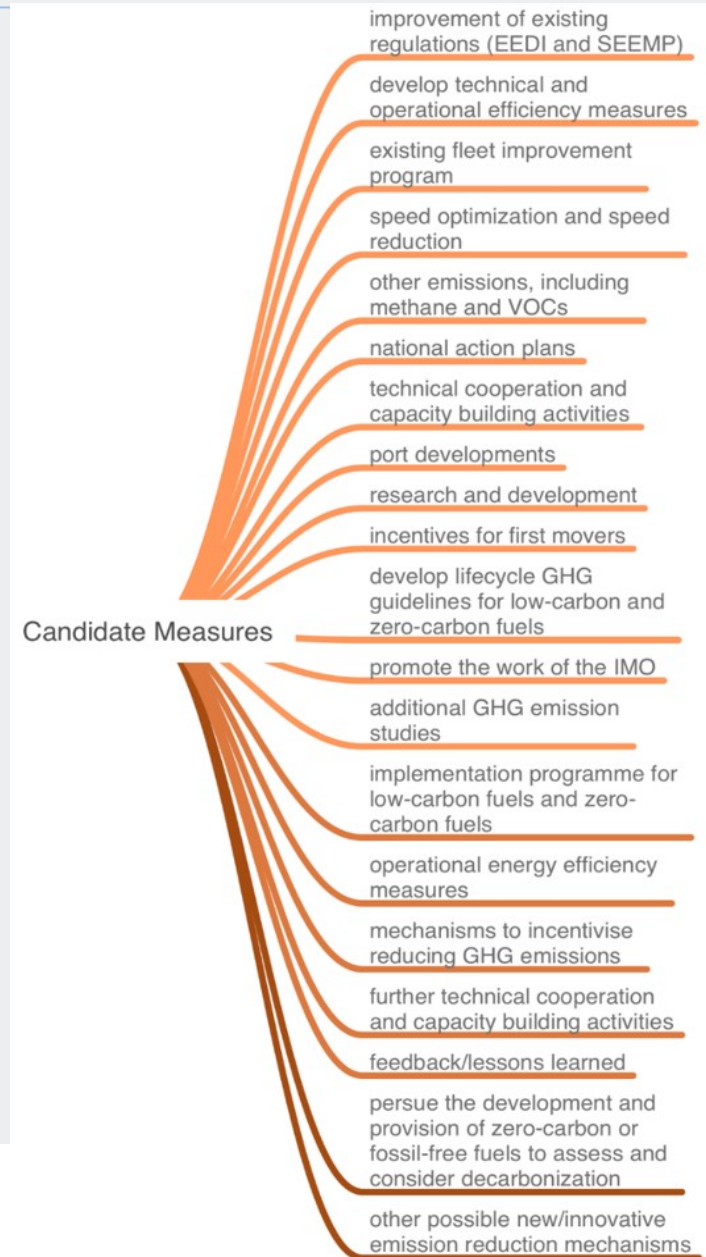
to reduce CO<sub>2</sub> emissions per transport work, as an average across international shipping, by **at least 40% by 2030**, pursuing efforts towards **70% by 2050**, compared to 2008; and

**.3      *GHG emissions from international shipping to peak and decline***

to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by **at least 50% by 2050 compared to 2008** whilst pursuing efforts towards phasing them out as called for in the Vision as a point on a pathway of CO<sub>2</sub> emissions reduction consistent with the Paris Agreement temperature goals.

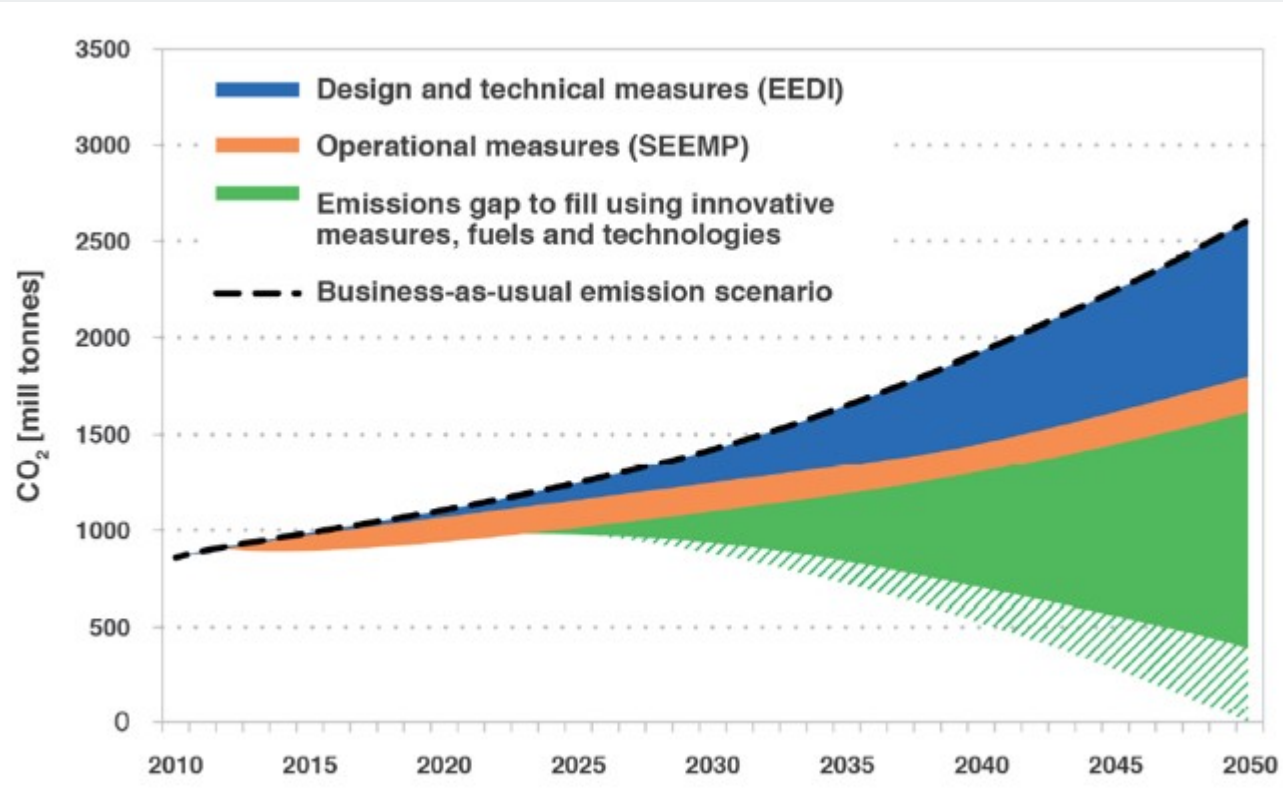
# Initial IMO Strategy on reduction of GHG from ships (2018)

- List of “**candidate measures**” with the following timelines:
  - Short-term measures could be finalized and agreed between 2018 and 2023
  - Mid-term measures could be finalized and agreed between 2023 and 2030
  - Long-term measures could be finalized and agreed beyond 2030
- **Assessment of impacts on States** through a dedicated procedure
- The **revised IMO strategy** is to be adopted in 2023.





# How to achieve the levels of ambition?



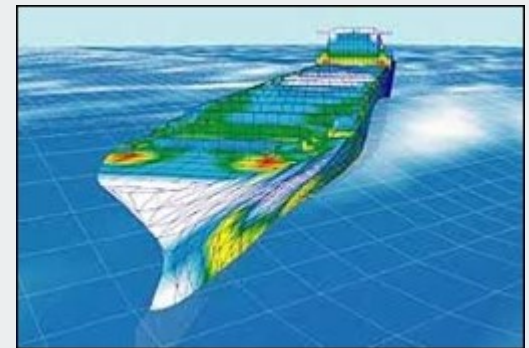
Energy efficiency improvements through the current framework (EEDI and SEEMP) are important, but will not be enough to reach the 2050 ambition

Innovative measures, fuels and technologies represent at **least 50% of the overall reduction effort**

Reduction % are indicative estimate.  
This is illustration purpose only and not approved by MEPC.

# Recent progress on the EEDI framework (for new ships)

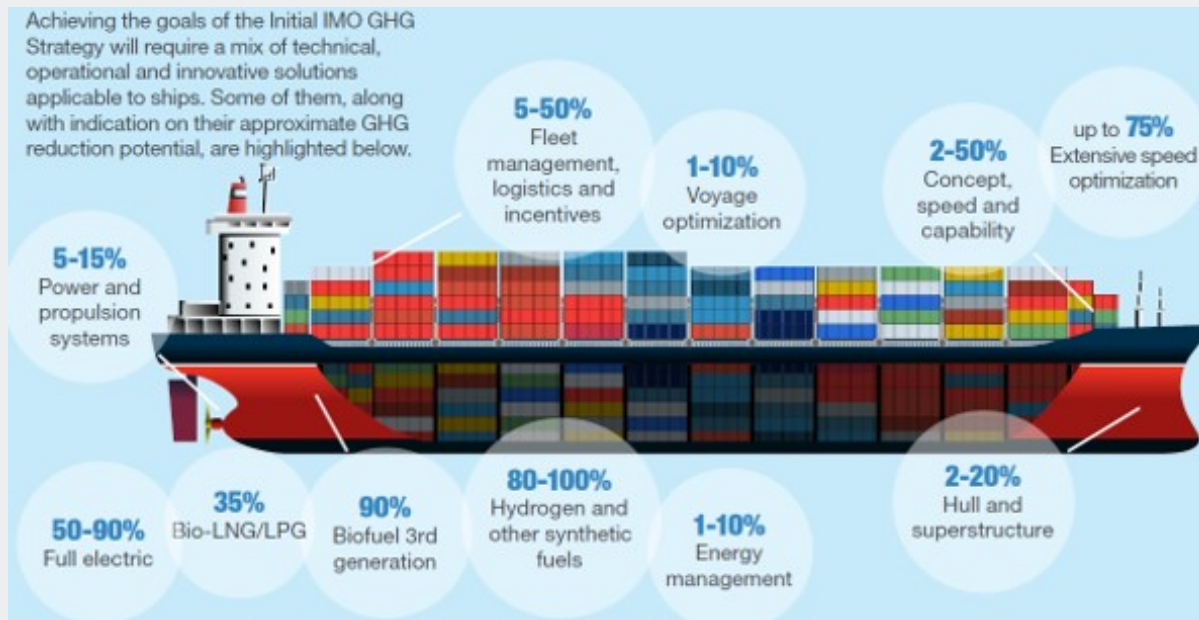
- MEPC 74 approved, for adoption in April 2020, draft amendments to MARPOL Annex VI to **strengthen the EEDI phase 3** requirements:
    - bring forward the entry into effect date of phase 3 to 2022 (from 2025) for several ship types, including gas carriers, general cargo ships and LNG carriers;
    - enhance the EEDI reduction rates for containerships (35%, 40%, 45%, 50%).
- Example: for a containership of 200,000 GT, the EEDI reduction rate is expected to be set at 50% from 2022, instead of 30% from 2025
- Establishment of a Correspondence Group to look into the introduction of a **possible EEDI phase 4**.





# Discussion on short term measures for existing ships

- Outcome of ISWG-GHG 6: agreement on a need for a short-term (i.e. 2023 max) **mandatory goal-based measure for existing ships**, possibly including:
    - a technical approach and/or
    - an operational approach
    - a combination of both?
- => Would provide **flexibility** and **incentive for innovations** to shipowners



# Discussion on short term measures for existing ships

- Discussion to continue at ISWG-GHG 7 (and MEPC 75)
- Chair proposed a **draft legal framework** to facilitate discussions
- Different submissions proposing **amendments to MARPOL Annex VI**, for example:
  - technical approach such as the Energy Efficiency Existing Ship Index (EEXI)
  - strengthening of the SEEMP with mandatory audits
  - operational carbon intensity rating mechanism
  - an operational approach such as the strengthening of the SEEMP based on mandatory carbon intensity indicators and annual reduction factors
- Various other submissions covering:
  - impact assessments of proposed measures
  - specific needs of SIDS
  - proposals to reduce methane slip





# Other recent achievements



## Ports

- *Resolution MEPC.323(74) on Invitation to Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships*
- *GIA work on a Just-in-time arrival Guide (for MEPC 75)*

## Technical cooperation

- Establishment of the "GHG TC-Trust Fund"
- New international project "GreenVoyage2050"

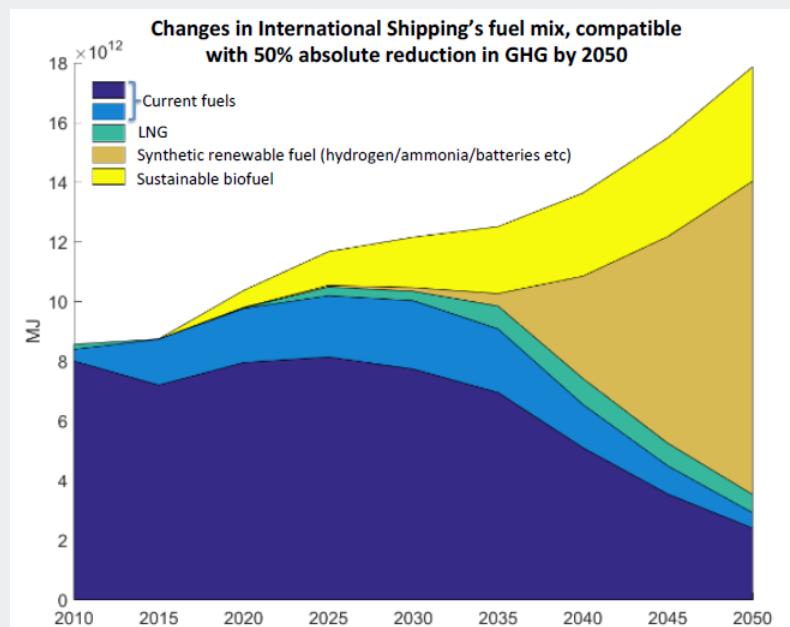
## Encouraging actions at national level

- *Draft MEPC resolution to encourage the development and submission to IMO of National Action Plans by Member States related to reduction of GHG emissions from international ships to be considered by MEPC 75*

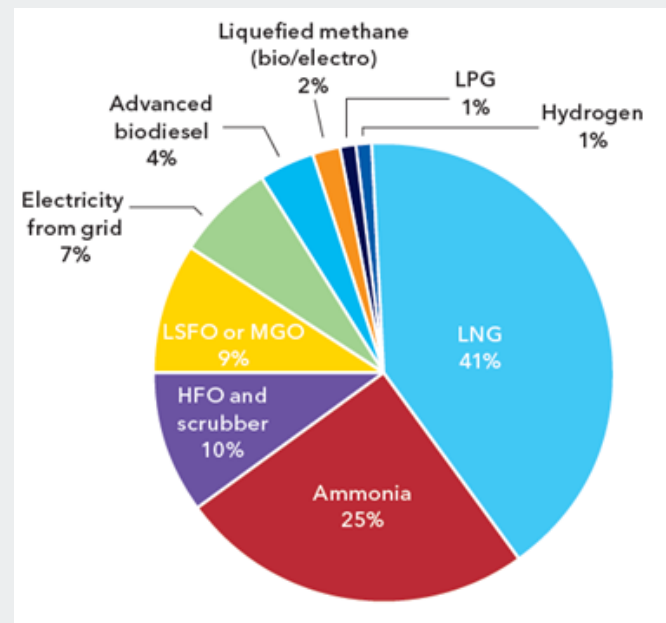


# Mid-long term perspectives: how to decarbonize shipping?

- Uncertainty on the decarbonization pathways => examples of different scenarios possible for the fuel mix towards 2050 (50% total GHG reduction):



Source: UCL. IMO's 2018 climate agreement explained



Source: DNV-GL. Maritime Forecast to 2050

- ISWG-GHG 6 agreed on the establishment of a workstream for the development of **life cycle GHG/carbon intensity guidelines** for all relevant types of fuels.
- Further work expected on **mid- and long-term candidate measures** in the Initial GHG Strategy, possible including **market-based measures**.



# Need for a clearer picture of all energy options

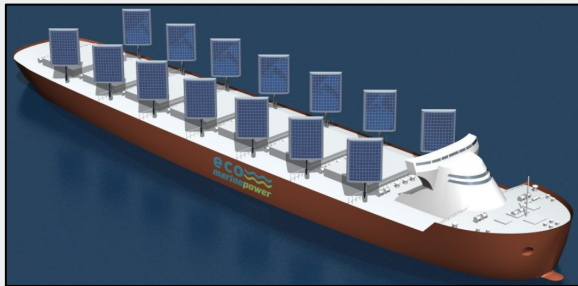
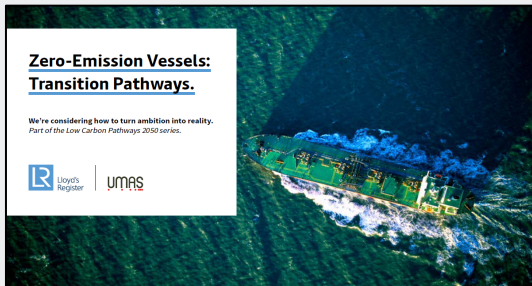
Energy source		Fossil (without CCS)					Bio	Renewable <sup>(3)</sup>		
Fuel		HFO + scrubber	Low sulphur fuels	LNG	Methanol	LPG	HVO (Advanced biodiesel)	Ammonia	Hydrogen	Fully-electric
<b>High priority parameters</b>										
• Energy density		●	●	●	●	●	●	●	●	●
• Technological maturity		●	●	●	●	●	●	●	●	●
• Local emissions		●	●	●	●	●	●	●	●	●
• GHG emissions		●	●	● <sup>(2)</sup>	●	●	●	●	●	●
• Energy cost		●	●	●	●	●	●	●	●	● <sup>(4)</sup>
• Capital cost	Converter	●	●	●	●	●	●	●	●	●
	Storage	●	●	●	●	●	●	●	●	●
• Bunkering availability		●	●	●	●	●	●	●	●	●
Commercial readiness <sup>(1)</sup>		●	●	●	●	●	●	●	●	● <sup>(5)</sup>
<b>Other key parameters</b>										
• Flammability		●	●	●	●	●	●	●	●	●
• Toxicity		●	●	●	●	●	●	●	●	●
• Regulations and guidelines		●	●	●	●	●	●	●	●	●
• Global production capacity and locations		●	●	●	●	●	●	●	●	●

Source: DNV-GL, *Comparison of alternative fuels*, 2019

For illustrative purpose only, not approved by MEPC

- There is no “silver bullet” or perfect fuel.
- Each fuel has its own challenges (production, energy density, storage, safety, economic feasibility, etc.
- Future fuel mix expected to be more diversified than it is today

# The “4<sup>th</sup> propulsion revolution”?



IMO provides a global forum for discussions on zero-carbon shipping



# Conclusion

- IMO's 2018 GHG Strategy sets out an ambitious and realistic pathway to zero-carbon global shipping
- Amendments to MARPOL Annex VI defining short-term measure(s) to achieve the 2030 level of ambition are expected to be agreed by the end of 2020
- Decarbonization of shipping requires the development, widespread availability and affordability of zero-carbon marine fuels
- IMO's 2018 GHG Strategy will drive R&D and boost mobilization of funds to support development and uptake of low/zero carbon-technology and fuels
- IMO, being part of the UN-family, ensures a truly global framework for cooperation and inclusion of all regions, countries and stakeholders worldwide



# Thank you for your attention

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