Introduction

- In September 2017, DNV GL issued the *Energy Transition Outlook* forecasting the world’s energy future through 2050.
- Shipping is a vital part of the world’s transport system, and the energy future holds significant impact for the future of shipping.
- We use the independent DNV GL model of the energy future to give a forecast for *maritime trade growth*, and the implications for the world fleet.
The ETO study gives us an unique insight into...

- Trade in commodities between and within **10 regions** towards 2050

- We provide a **long term outlook** for:
  - Crude oil
  - Oil products
  - Gas
  - Bulk cargo
  - Containerized cargo
  - Offshore

- The shipping impacts are derived from the DNV GL **Energy Transition Outlook**
Demand for seaborn transport will grow 60% 2050

Average growth of 2.2%/yr to 2030, then 0.6%/yr towards 2050
The greatest increase after gas carriers (146%) will come in the container segment (143%)
Shipping’s fuel mix will diversify

Compared to the short sea segment, deep sea vessels have fewer options for reducing fuel and CO₂ emissions.
Area of operation of LNG fuelled vessels

Operating area of the 121 ships in operation

- Europe: 61
- Norway: 15
- Asia: 22
- America: 14
- Middle East: 1
- Oceania: 7
- Global: 2
- Unknown: 0

Operating area of the 126 ships on order

- Europe: 57
- Norway: 38
- Asia: 1
- America: 14
- Middle East: 7
- Oceania: 9
- Global: 0
- Unknown: 0

Updated 1 April 2018
Excluding LNG carriers and inland waterway vessels
Status electrification of electrical and battery hybrid ships

CO₂ emissions for international shipping will fall by a quarter from 800 Mt to 594 Mt by 2050

FIGURE 5.6 INTERNATIONAL SHIPPING: EMISSIONS PATHWAY 2015-2050

Source: DNV GL
Potential game-changers towards 2050

Decarbonization and environmental awareness

Major shifts in transport demand

Digitalization and innovation
The carbon robust ship
Navigation in a low emission future– framework to test competitiveness under possible future scenarios
Environmental regulations - timeline towards 2030

**Adopted**
- Core ports in Chinese area 0.5% sulphur
- All ports in Chinese area 0.5% sulphur
- Chinese DECA 0.5% sulphur
- 0.5% global sulphur cap
- Baltic / North Sea NECA

**Local pollution**
- Ballast Water Convention - entry into force
- EU CO2 Monitoring, Reporting and Verification
- Global fuel consumption Data Collection System
- EEDI phase 2
- EEDI phase 3

**Global warming**
- 0.5% global sulphur cap
- Baltic / North Sea NECA
- EU Recycling
- IMO GHG strategy
- EEDI Phase 4
- BC, noise, bio-fouling and VOC regulation?
- Operational requirements to CO2 emissions
- Carbon pricing / MBM
- HK Recycling convention
- Additional ECAs established?

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*In the pipeline, or possible...*
Alternative fuels for shipping

**Traditional fuels**
- HFO
- MDO
- MGO
- (Hybrids)

**Realistic alternatives**
- Liquefied Natural Gas (LNG)
- Biodiesel and biogas
- Electricity
- Hydrogen
- Methanol and Ethanol
- Liquefied Petroleum Gas (LPG)
- Wind powering

**Future options**
- Synthetic fuels
- Solar
- Wave
- Straight vegetable oil?
- Nuclear fuel?
- Etc

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[Image sources: Various websites and sources mentioned in the text]
A conceptual framework for vessel and fleet carbon robustness

RISK AND OPPORTUNITY DRIVERS

- Physical risk and opportunities
- Regulatory, legal and liability risk and opportunities
- Technology risks and opportunities
- Market risks and opportunities
- Stakeholder risks and opportunities

SCENARIO STRESS-TESTING

Assess impact on key performance indicators for each scenario

CARBON ROBUSTNESS

Evaluate carbon robustness and mitigation strategies

Source: DNV GL
Key conclusions

- The **world energy system** will undergo a major **transition** towards 2050 and this will have significant implications for shipping
  - Overall the demand for seaborne transport will increase **by 60% by 2050** with the pace of growth being highest up to 2030
  - Largest growth in seaborne transport will be for container, bulk and gas
  - Seaborne transport growth will be strongest in the **Asian and African** regions
  - Maritime fleet will grow, but slower than trade growth due to digitalization and assumed improved utilization

- The energy required to **transport the cargo** will have reduced carbon footprint in 2050, and and by then **nearly half** of shipping energy will be supplied by non-oil-based fuels

- The **“carbon robust ship”** framework is introduced in order to manage risk, and effectively evaluate future competitiveness and profitability in light of great uncertainty
MARITIME FORECAST TO 2050

Energy Transition Outlook 2017

NAVIGATE Expo 16th of May
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