

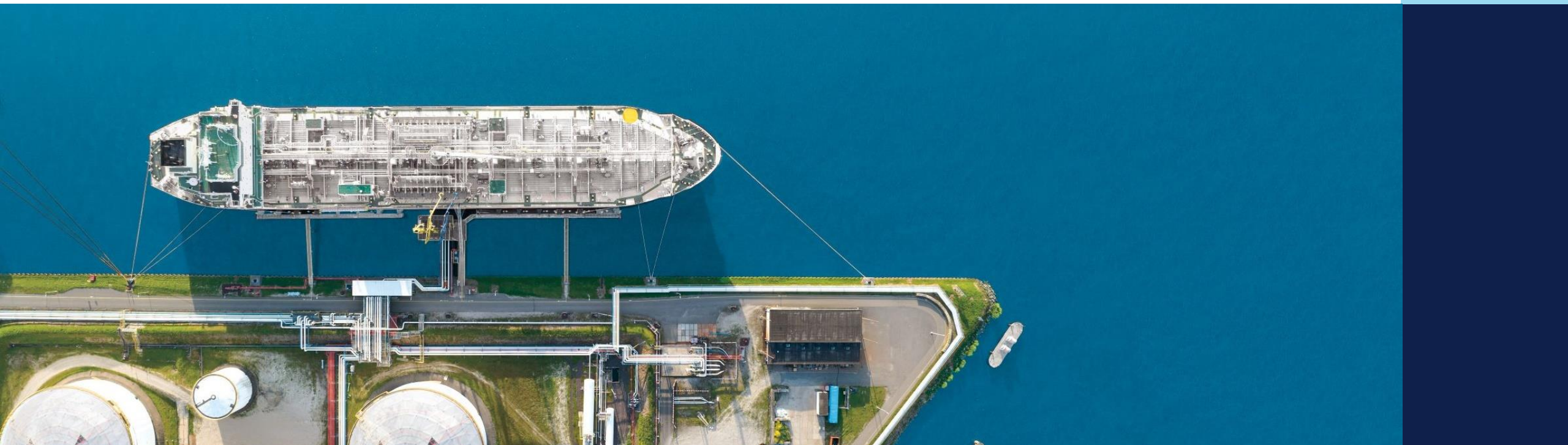


WHEN TRUST MATTERS

# Maritime Forecast to 2050

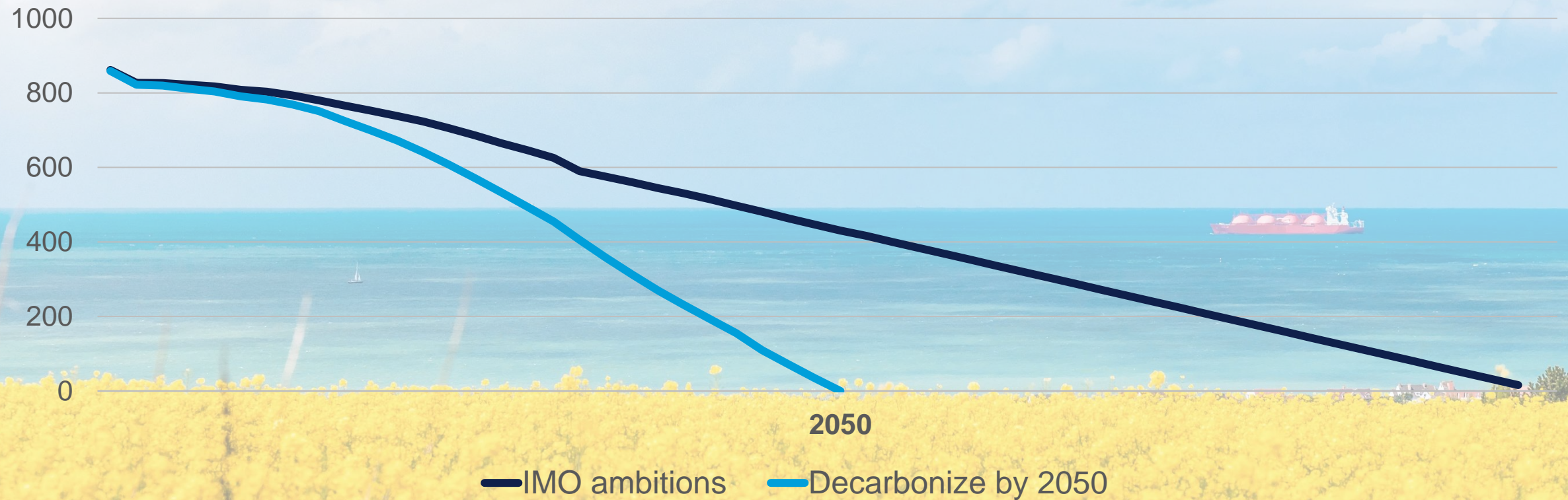
Energy Transition Outlook 2022

Captain Antonio Prestigiacomio , Director of Business Development Region Americas



# Shipping must decarbonize, but the pace of the transition is unclear

World fleet CO2 emissions (million tonnes)



# Maritime Forecast to 2050 – key findings

The fuel transition in shipping is accelerating, and key fuel technologies needed will be available in 3-8 years

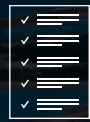
The fuel transition at sea hinges on developments on land, fuel availability becomes a key challenge

The transition will require large onboard investments, but even greater onshore investments

The future fuel mix is highly dependent on fuel price and policy ambitions

Shipowners need transition plans reflecting the uncertain future, and fuel-flexible solutions providing robustness and reducing carbon-risks

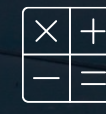
# Maritime Forecast report explores the future fuel mix and implications for decisions made today



Drivers  
regulations



Onboard  
technology



Fuel availability  
and cost



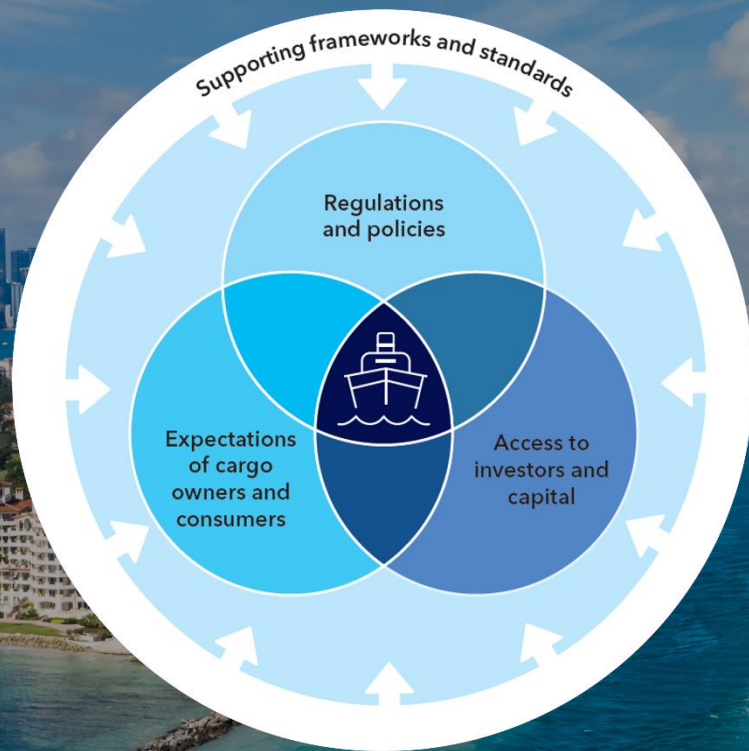
Fuel uptake  
scenarios



Decision-making  
support

# Emerging frameworks and standards enable regulators, cargo owners and investors to drive decarbonization

By 2030, 5% of fuel will have to be carbon-neutral



**IMO's ambitions will be reviewed and could be strengthened to decarbonize shipping by 2050**

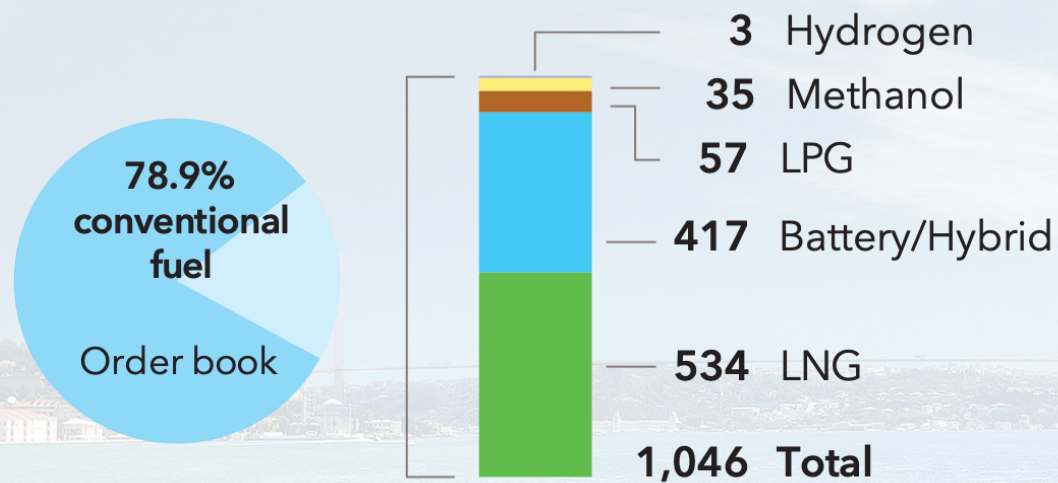
**Lifecycle GHG emissions standards are being developed to ensure fuel sustainability**

**Major cargo owners expect low- and zero-emission shipping services to be in place this decade**

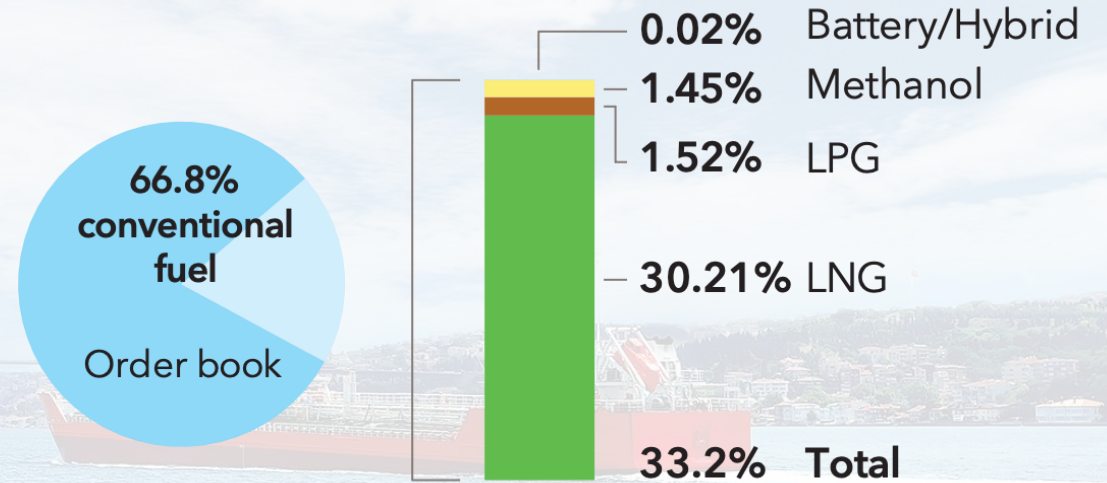
**Access to capital depends increasingly on environmental credentials**

# The fuel transition in shipping has started and is accelerating

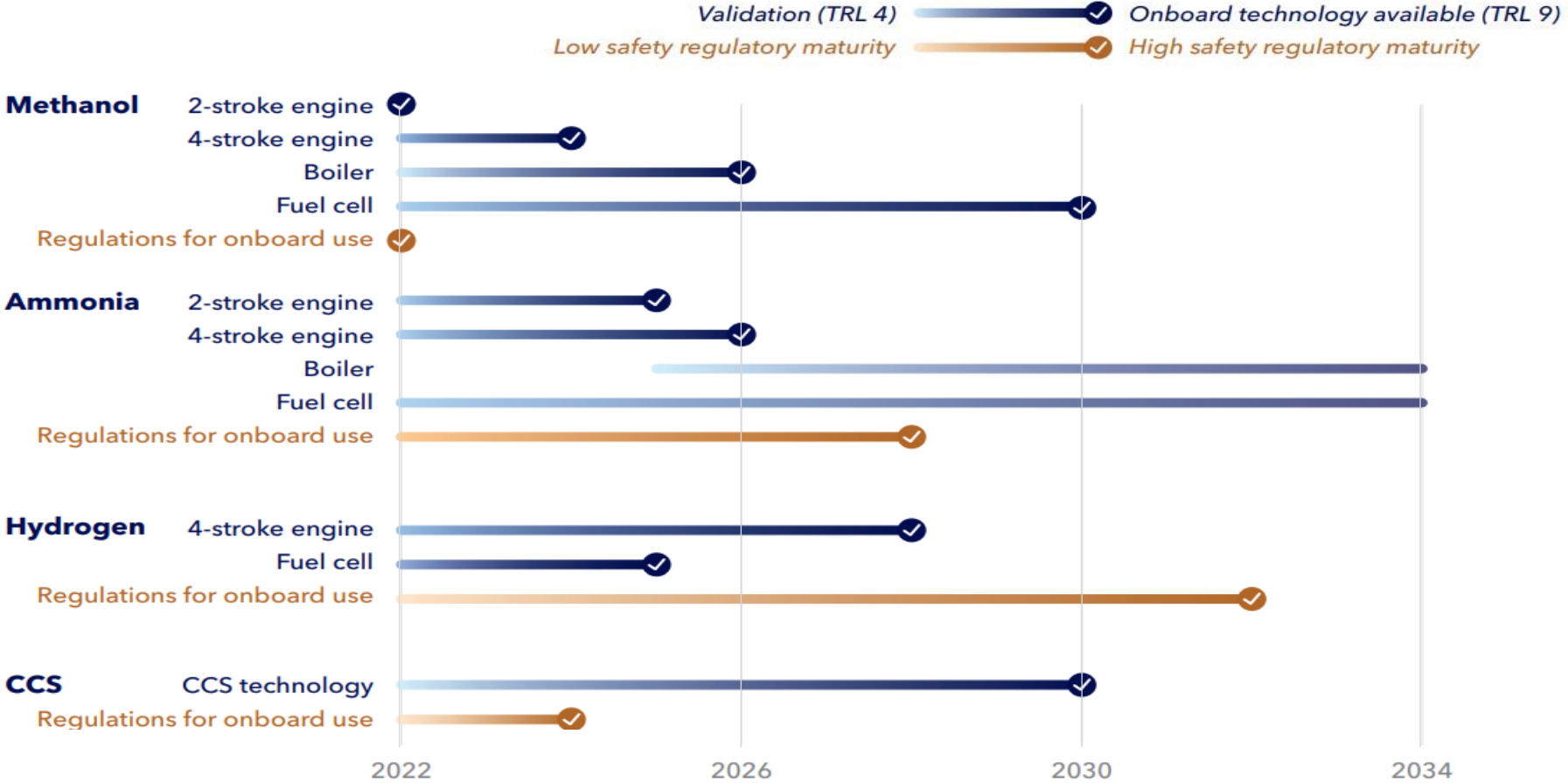
## Number of ships on order



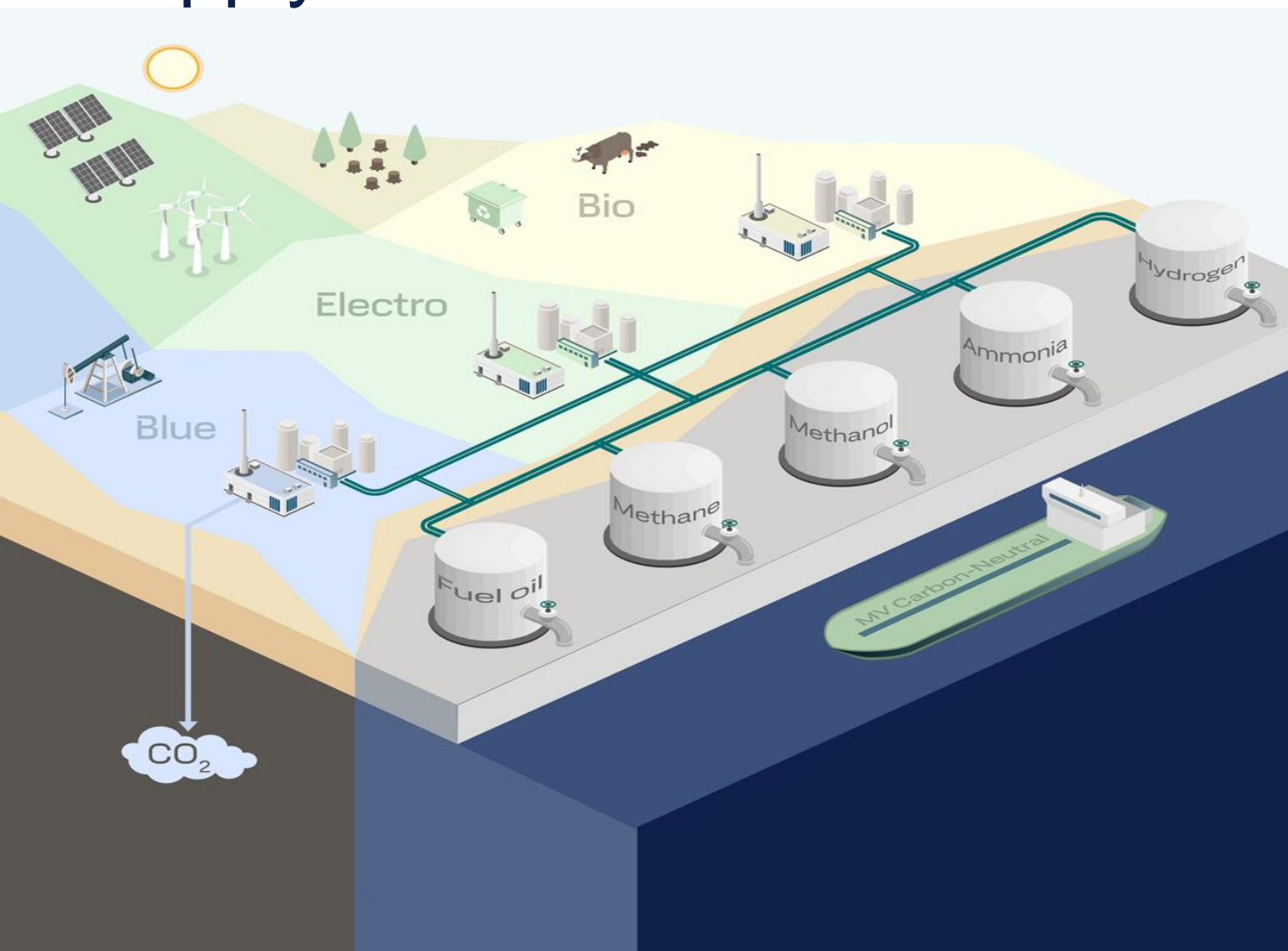
## In % of gross tonnage



# Key fuel technologies will be available in 3-8 years



# Shipping needs to switch to carbon-neutral energy supply chains



Sustainable biomass for biofuels

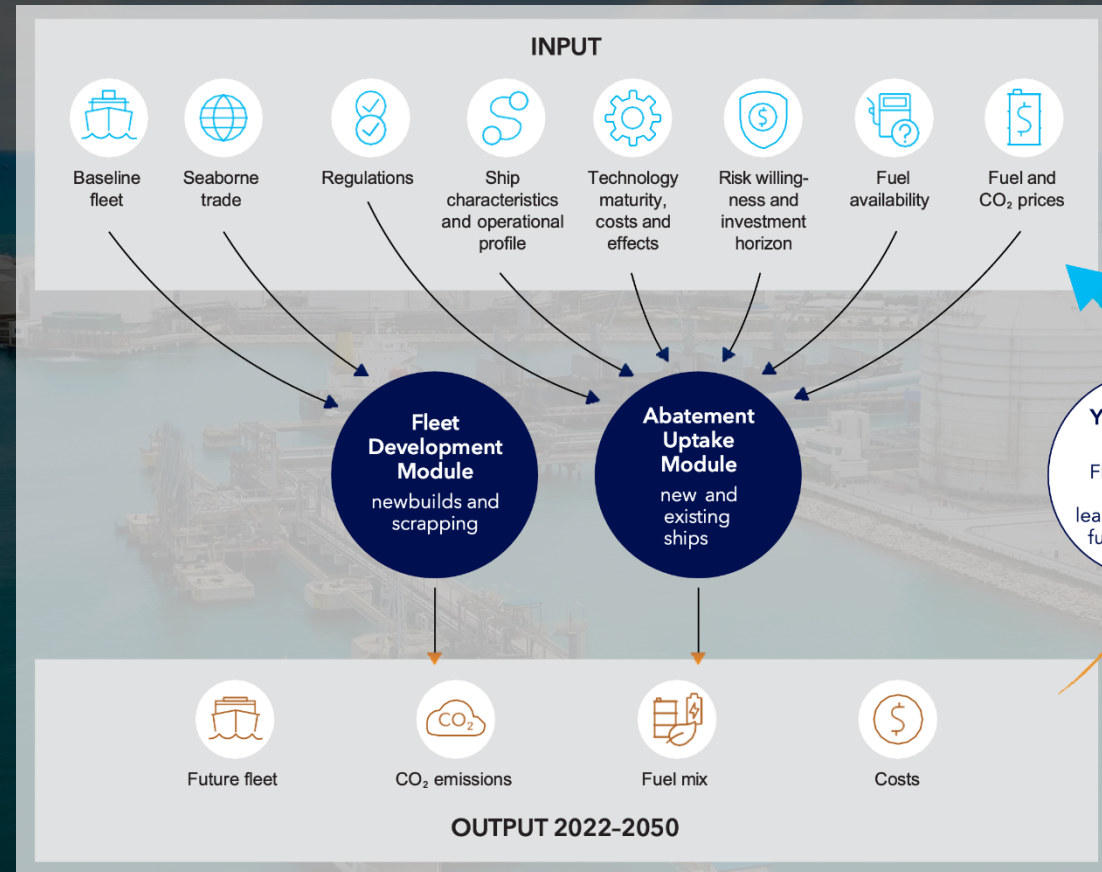
Renewable electricity for electrofuels

Sustainable carbon for carbon-based electrofuels

Large scale CCS

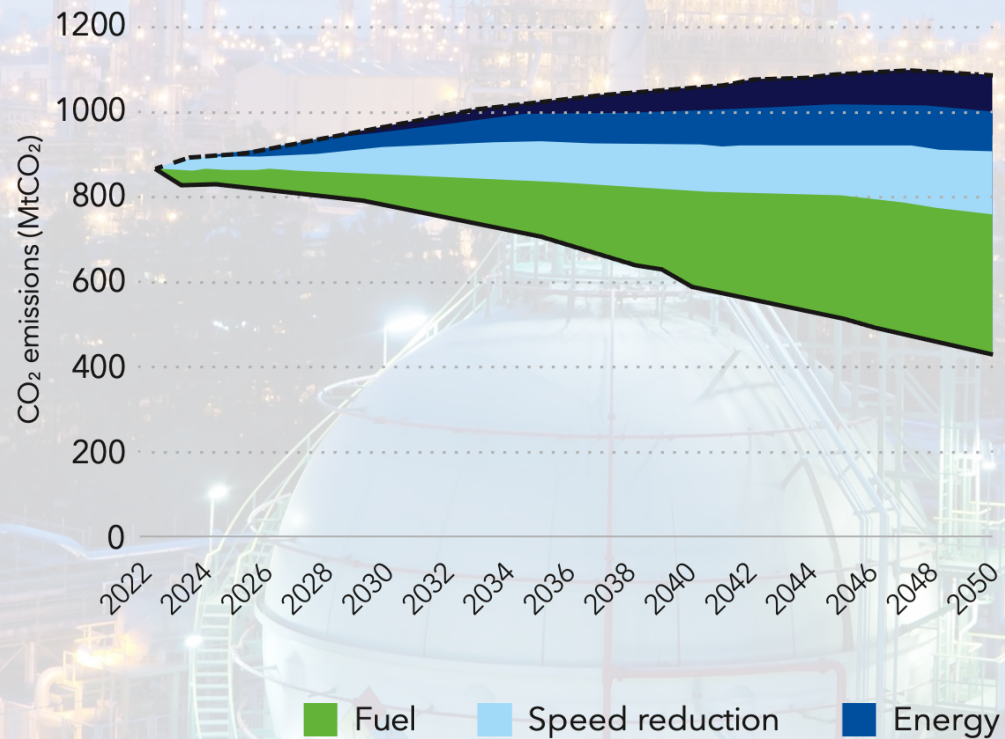


# DNV's GHG Pathway Model enables understanding of the complex landscape

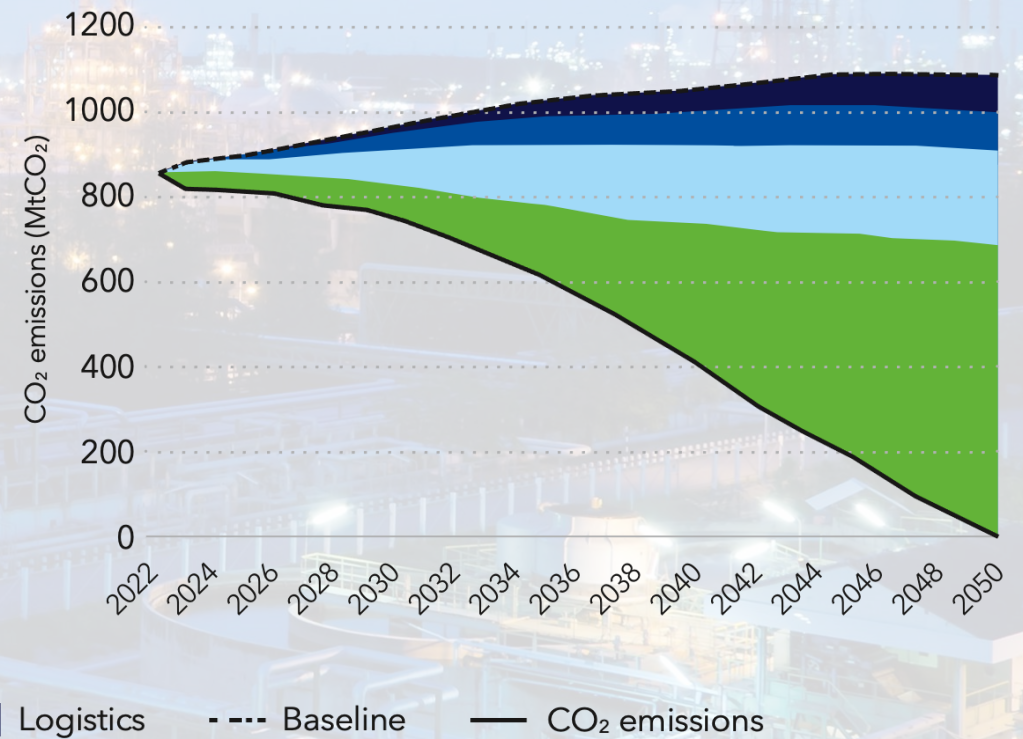


# Energy efficiency is important, but carbon-neutral fuels are needed to decarbonize the world fleet

## IMO ambitions scenario 7

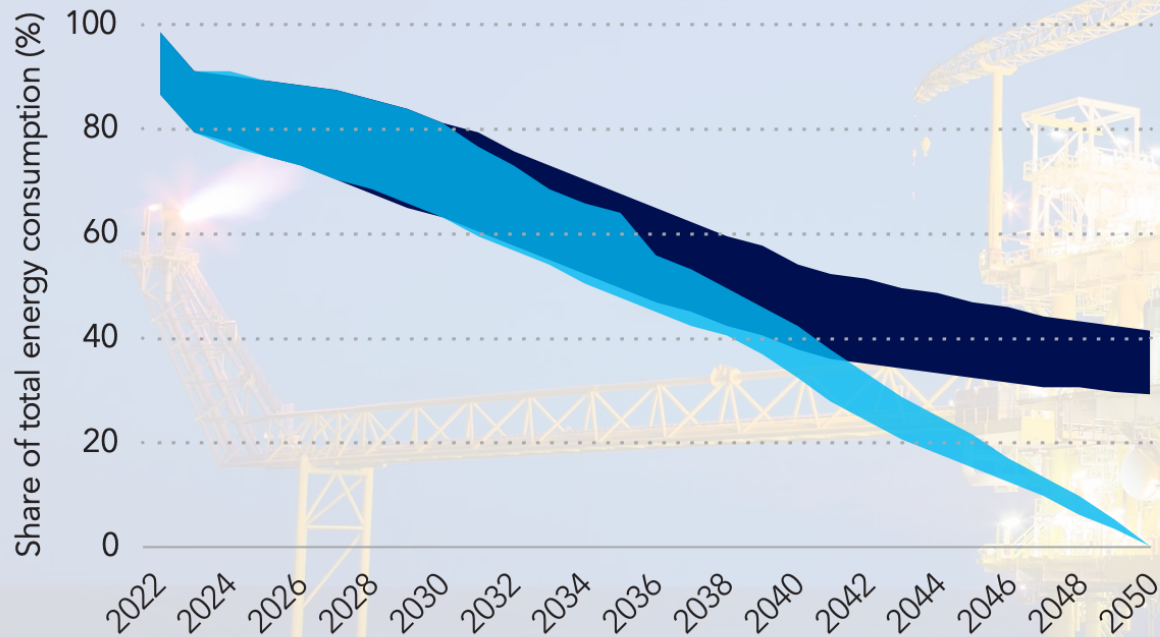


## Decarbonization by 2050 scenario 19

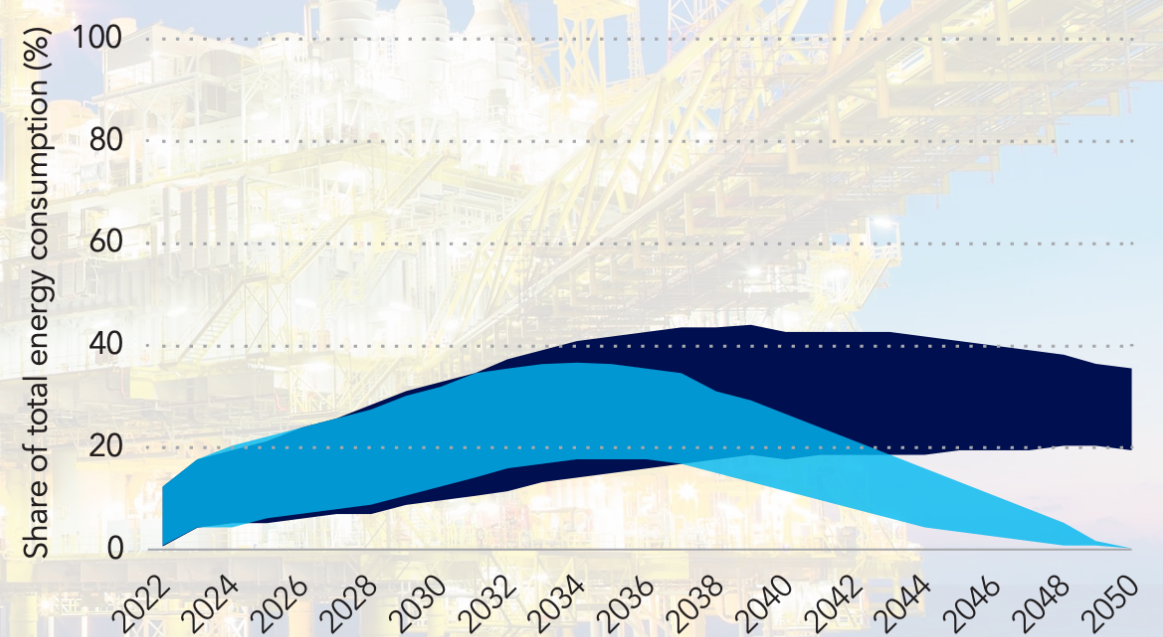


# Fossil fuel use in shipping will decrease or be eliminated

## Fuel oil (LSFO/MGO/HFO)



## LNG (fossil)

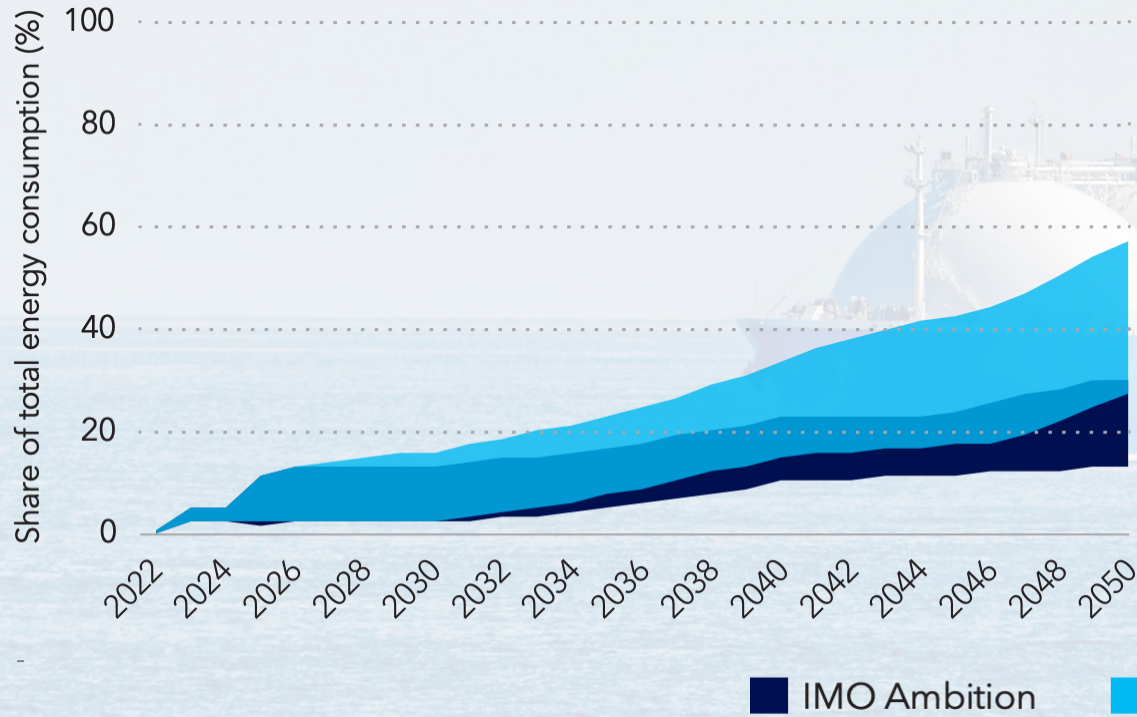


■ IMO Ambition    ■ Decarbonization by 2050

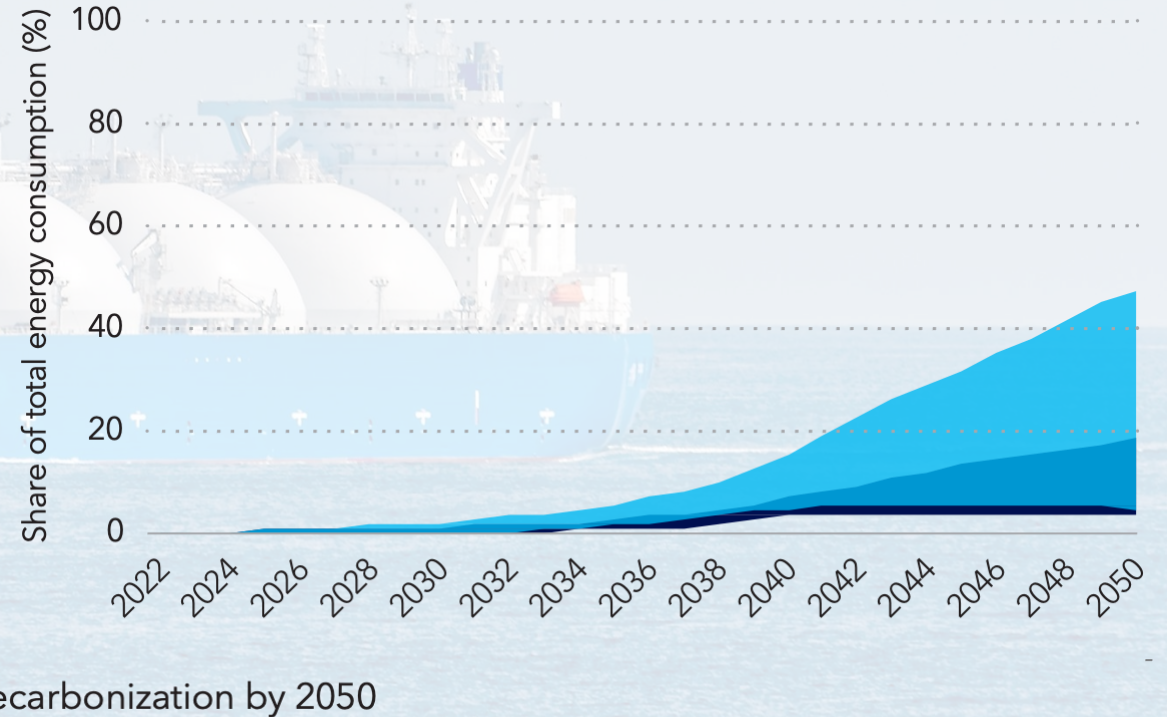
Hydrogen, compressed and liquified, is included in the model. Liquid organic hydrogen carrier, onboard CCS and nuclear are not included in the model.

# Carbon-neutral LNG and MGO will largely replace fossil versions

## MGO (carbon neutral)



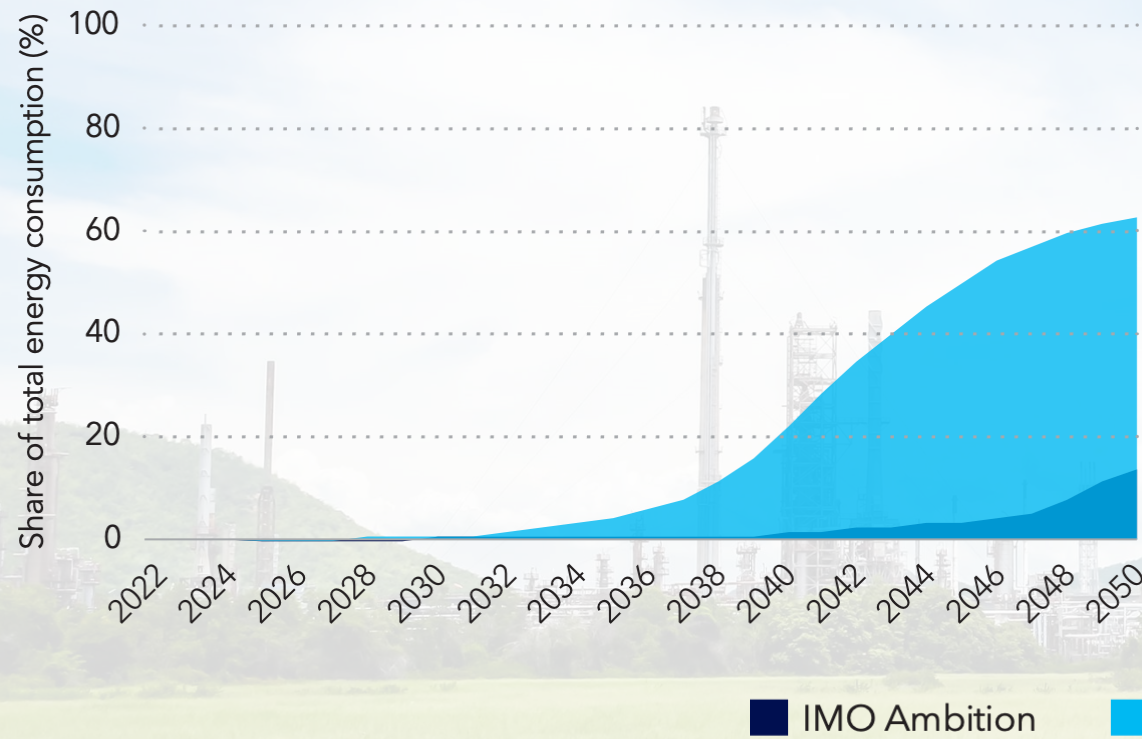
## LNG (carbon neutral)



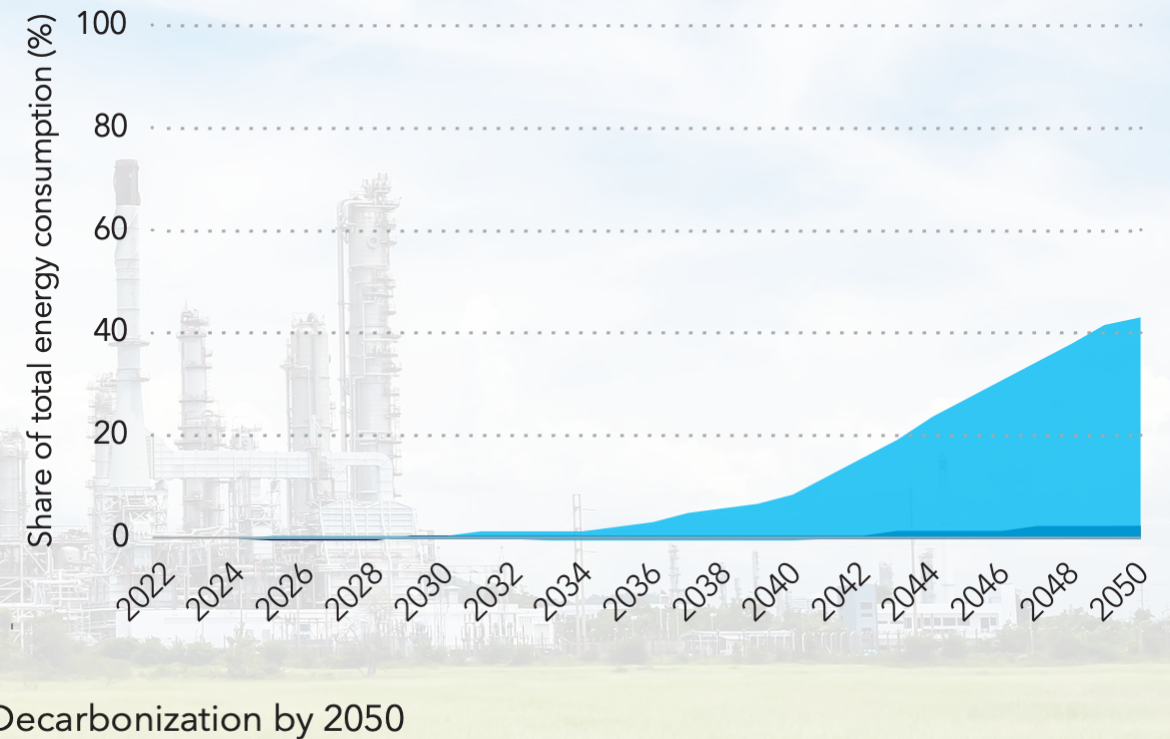
Hydrogen, compressed and liquified, is included in the model. Liquid organic hydrogen carrier, onboard CCS and nuclear are not included in the model.

# Ammonia and methanol need to have significantly lower cost than carbon-neutral MGO to compete

## Ammonia (carbon neutral)



## Methanol (carbon neutral)



Hydrogen, compressed and liquified, is included in the model. Liquid organic hydrogen carrier, onboard CCS and nuclear are not included in the model.

# The transition entails large onboard investments, but even greater onshore investments



# Alternative Fuels Insights (AFI)



- Open platform for evaluating the uptake of AF technologies
- Complete overview on developments of alternative fuels and technologies
- Covering both investments on ships and in bunkering infrastructure

# AFI – Alternative Fuels Insight

www.dnv.com/afi

### Map

Explore the development of fueling infrastructure for alternative fuels. You can also see where ships using alternative fuels and technologies are already operating.

[Explore](#)

### Statistics

Get detailed insights into the uptake of alternative fuels and technologies on ships. Filter on ship type, region, technology and more to create your own graphs.

Conventional

**84.14%**

Alternative

**15.86%**

[Explore](#)

### Fuel Prices

Explore prices for Liquefied Natural Gas (LNG), Methanol, LNG, and other alternative fuel benchmarks against conventional fuels.

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- LNG
- LPG
- Methanol
- Scrubbers

## LNG

LNG Family report

[About Statistics](#)

[View in Map](#)

#### Distribution of LNG fuelled ships

LNG fuelled ships by ship type

LNG fuelled ships by gas engine designer

LNG fuelled ships by engine concept

LNG fuelled ships by class society

#### Growth of LNG fuelled fleet

#### Trends of LNG consumed by LNG fuelled ships

#### List of LNG fuelled vessels

Ship name	Operator	IMO	Construction year	Ship type	LNG technology (ship name)	IMO number (LNG vessel)	Ship name (LNG vessel)	Operator (LNG vessel)	Construction year (LNG vessel)	Capacity (m³)
MS Golden Breeze	Golden Breeze	9111	2016	Gas carrier	Golden Breeze	9111	Golden Breeze	Golden Breeze	2016	15,000
MS Golden Breeze	Golden Breeze	9112	2016	Gas carrier	Golden Breeze	9112	Golden Breeze	Golden Breeze	2016	15,000
MS Golden Breeze	Golden Breeze	9113	2016	Gas carrier	Golden Breeze	9113	Golden Breeze	Golden Breeze	2016	15,000



# FuelBoss



- A fully digital and collaborative tool for fuel suppliers and ship owners
- Allows to plan, execute and communicate about LNG bunkering operations
- Improved operational efficiency and industry collaboration

# Maritime Forecast to 2050 – implications

The development of sustainable fuel-supply chains must be accelerated to achieve the transition, 5% carbon-neutral fuels are needed by 2030

It's required to have clear criteria for and increased production of sustainable biomass, renewable electricity, sustainable carbon and carbon storage

The transition entails large annual onboard investments of 8-28bn USD, but even greater onshore investments of 30-90bn USD.

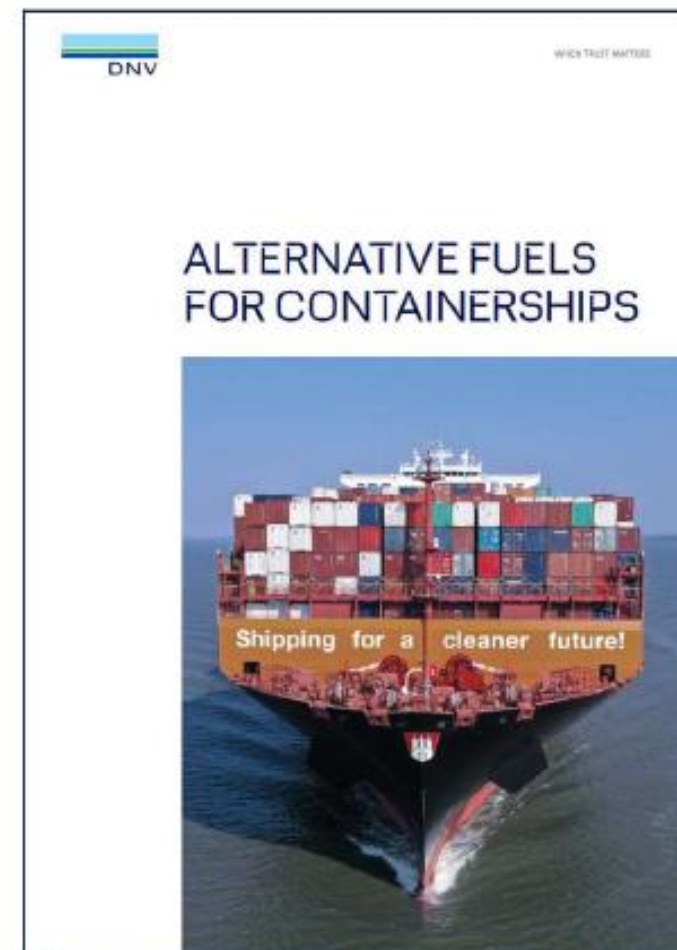
Fuel flexibility and Fuel Ready solutions, combined with improved energy efficiency, provide business robustness and reduce carbon risk

**! This requires collaboration across industries and authorities !**

# Relevant reports



Launch: May 2023



<https://www.dnv.com/maritime/publications/alternative-fuels-for-containerships-methanol-download.html>


# DNV tools and resources on decarbonization (selection)

**Alternative Fuels  
Insight**



[www.dnv.com/afi](http://www.dnv.com/afi)

**Emissions Insights**  
CII ratings and more  
(included in DNV's  
DCS solution)



[www.dnv.com/dcs](http://www.dnv.com/dcs)

**Decarbonization  
hub**



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# Thanks !

**DNV : A trusted voice to tackle the Maritime Industry transformations !**

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