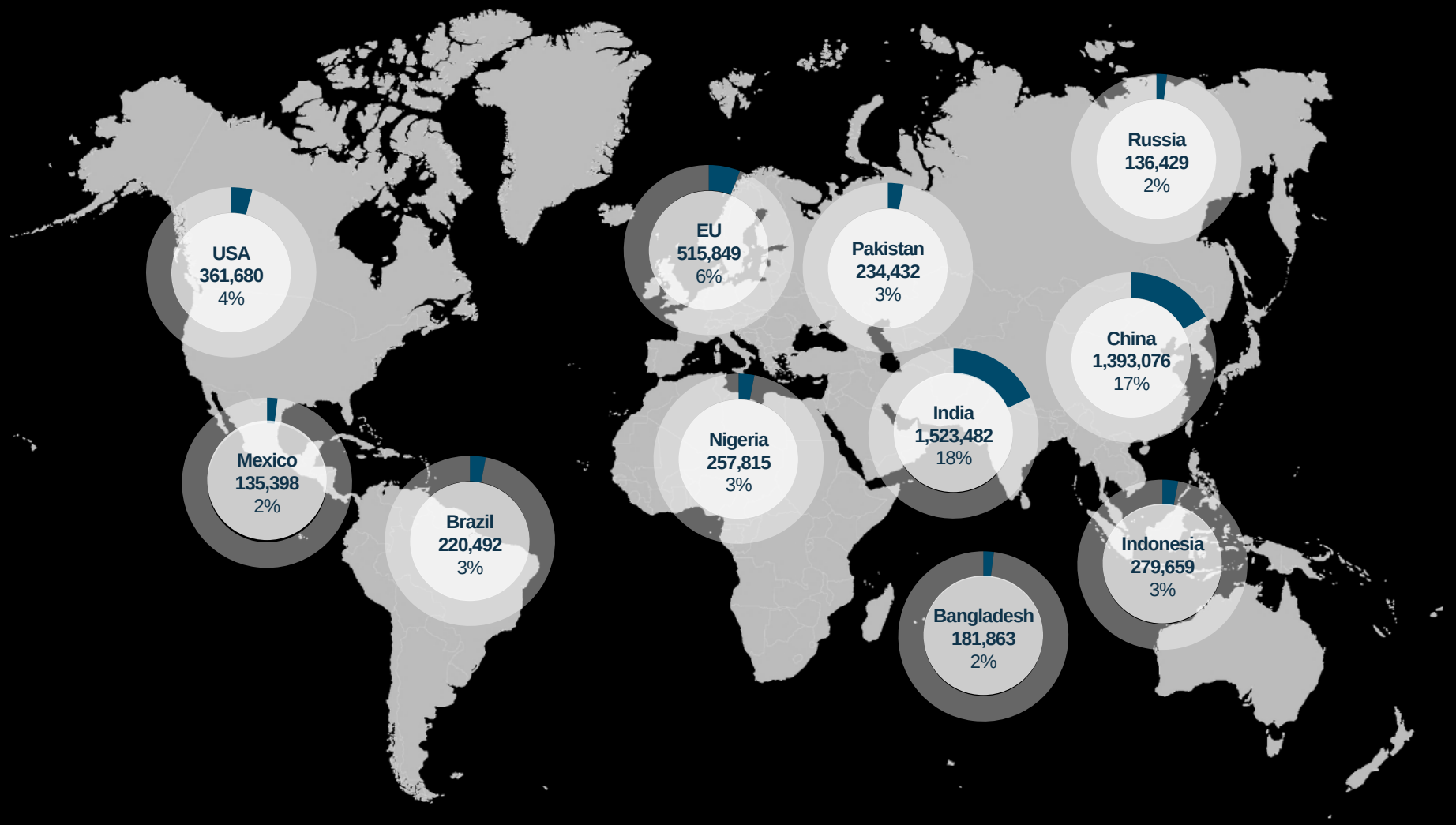
The Ship of 2050

Andreas Feys — WF
Tanno Weeda — Feadship
Teus van Beek — Wartsila

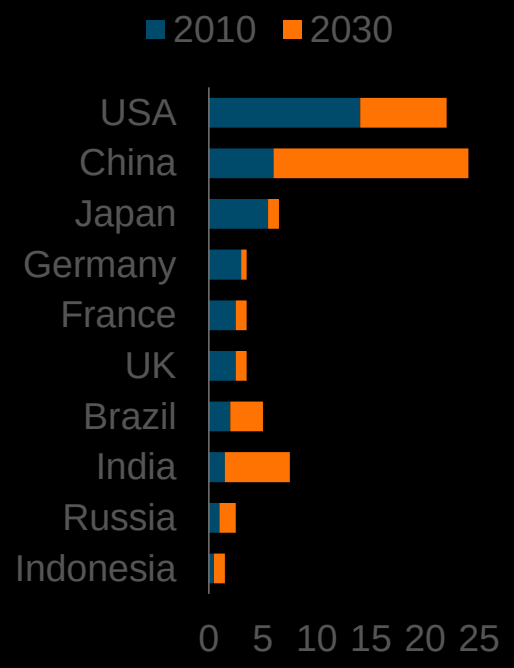
POPULATION GROWTH

The 10 most popular countries/regions in 2030 (thousands)



GDP growth

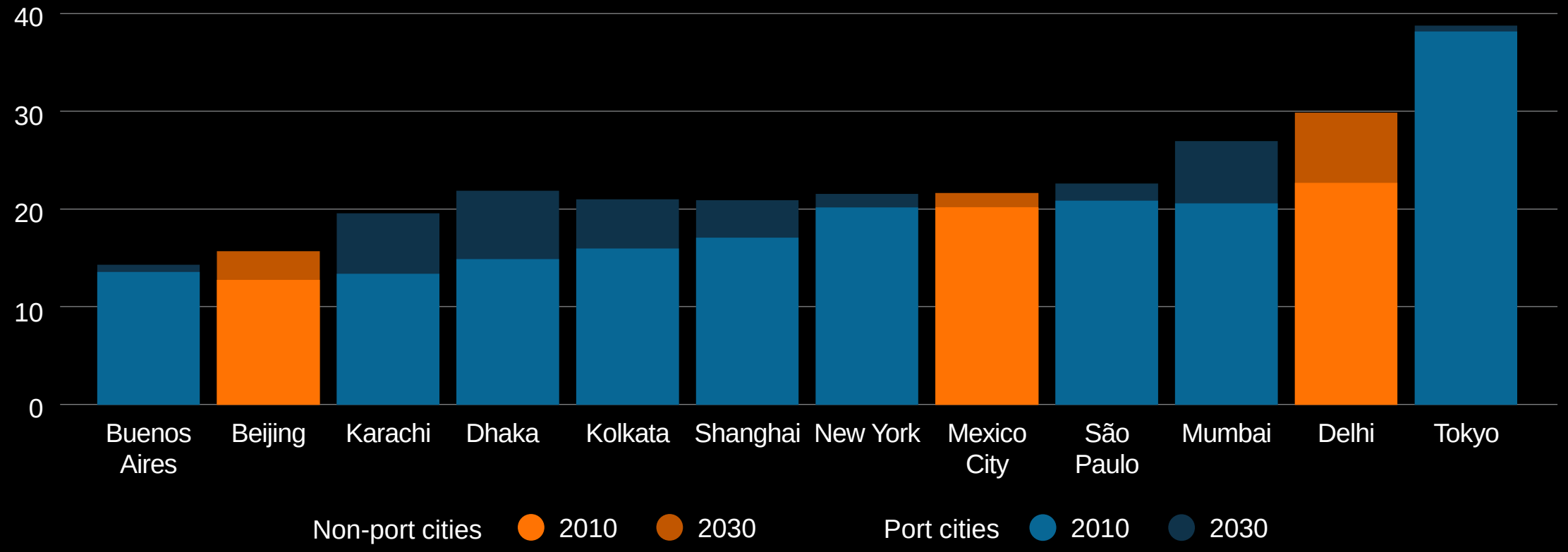
A list of countries ranked by real GDP (trillion $2010)



20% China's contribution to world GDP in 2030

Urbanization

Population of top urban agglomerations in 2010 and 2030 (million people)



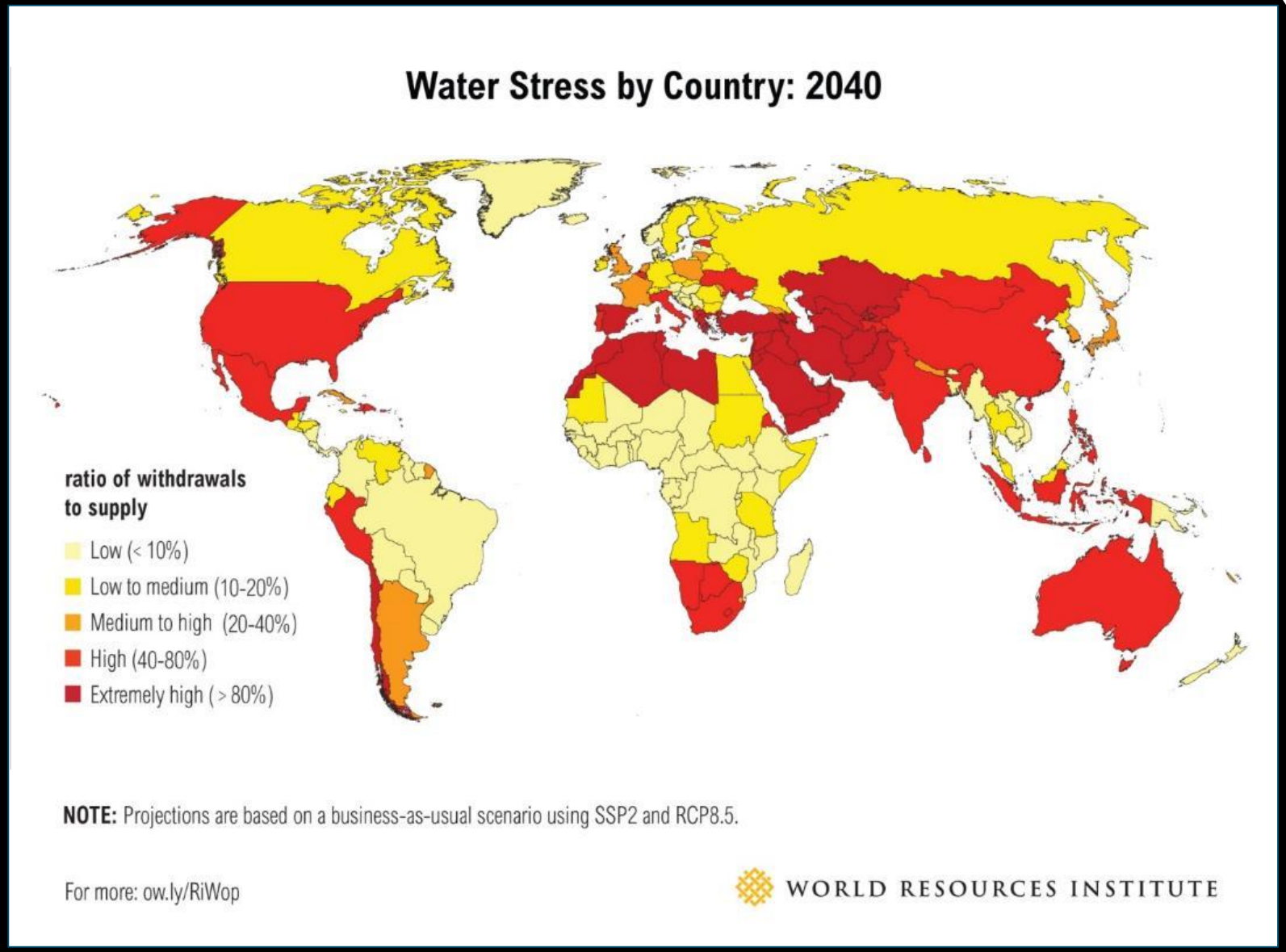
URBANISATION – CLEAN EFFICIENT CITIES

Public Opinion driving local legislation

IMO

CLEAN WATER SCARCITY

Water scarcity will continue to grow in densely populated areas.



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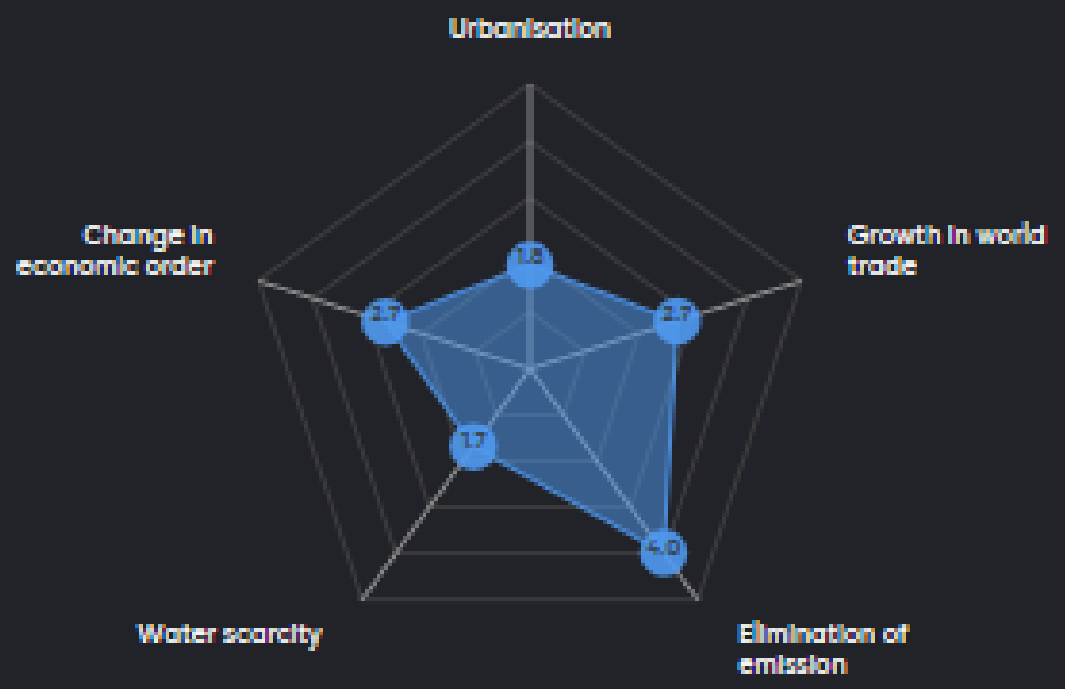
What will be the major trend that shipping has to follow?

Mentimeter



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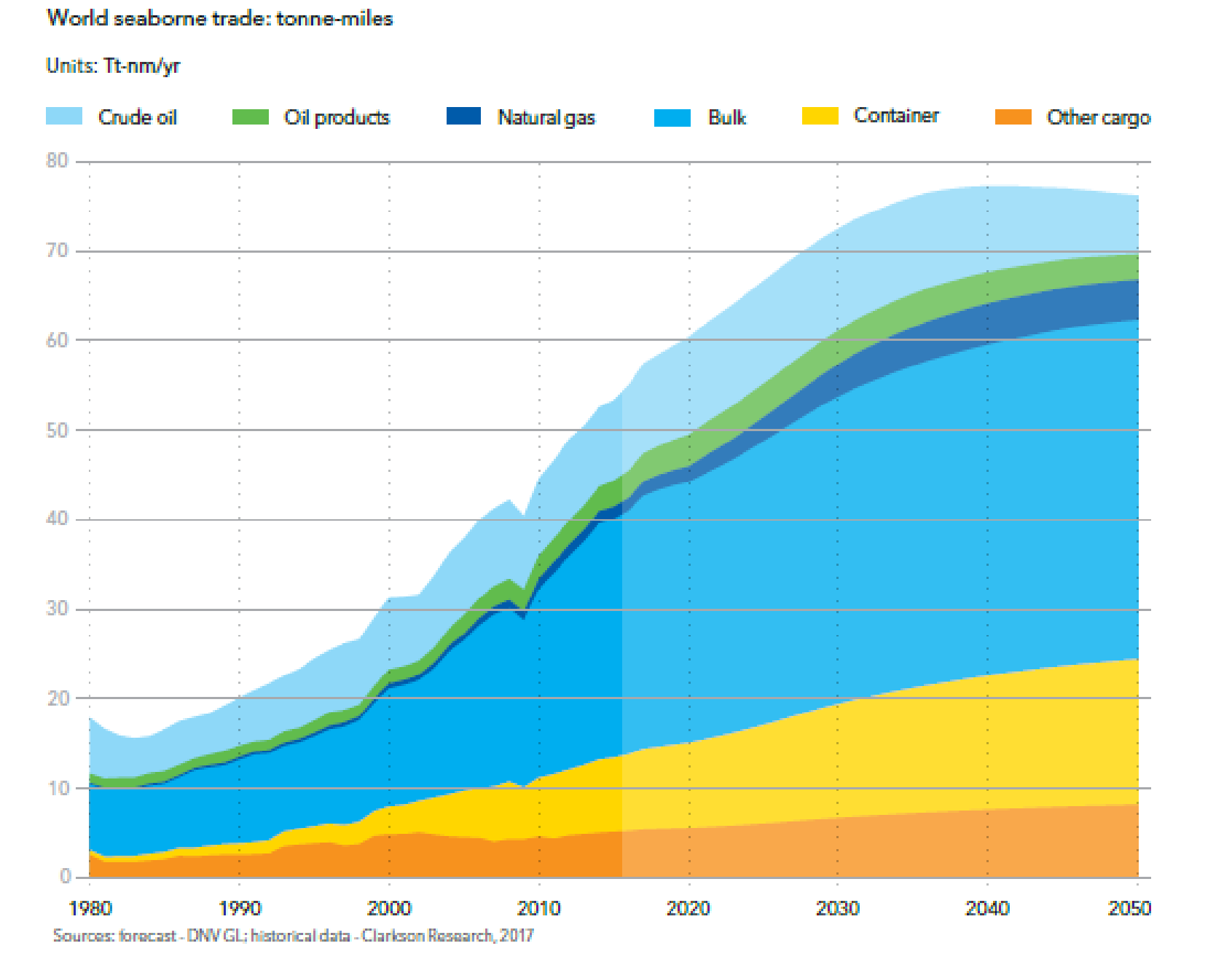
World cargo flows predicted



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What will be the major trading route?

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What will be shipped in 2050 that is not shipped today?

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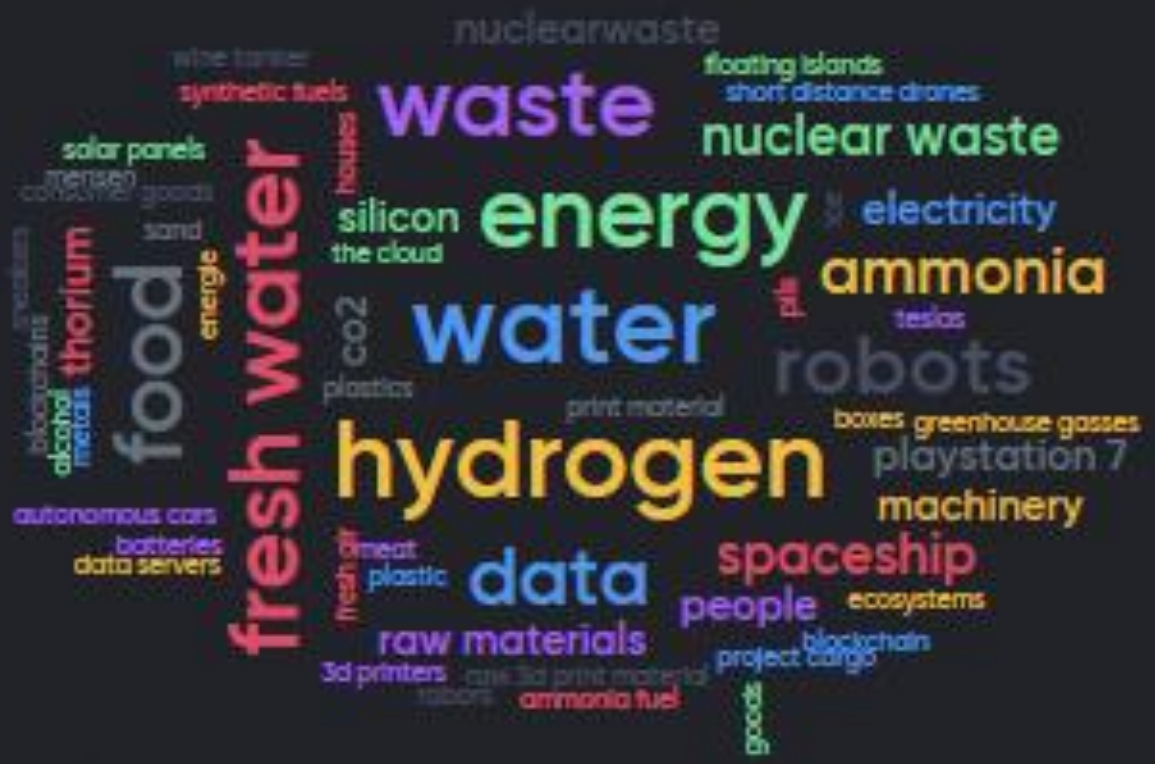

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Inland transport

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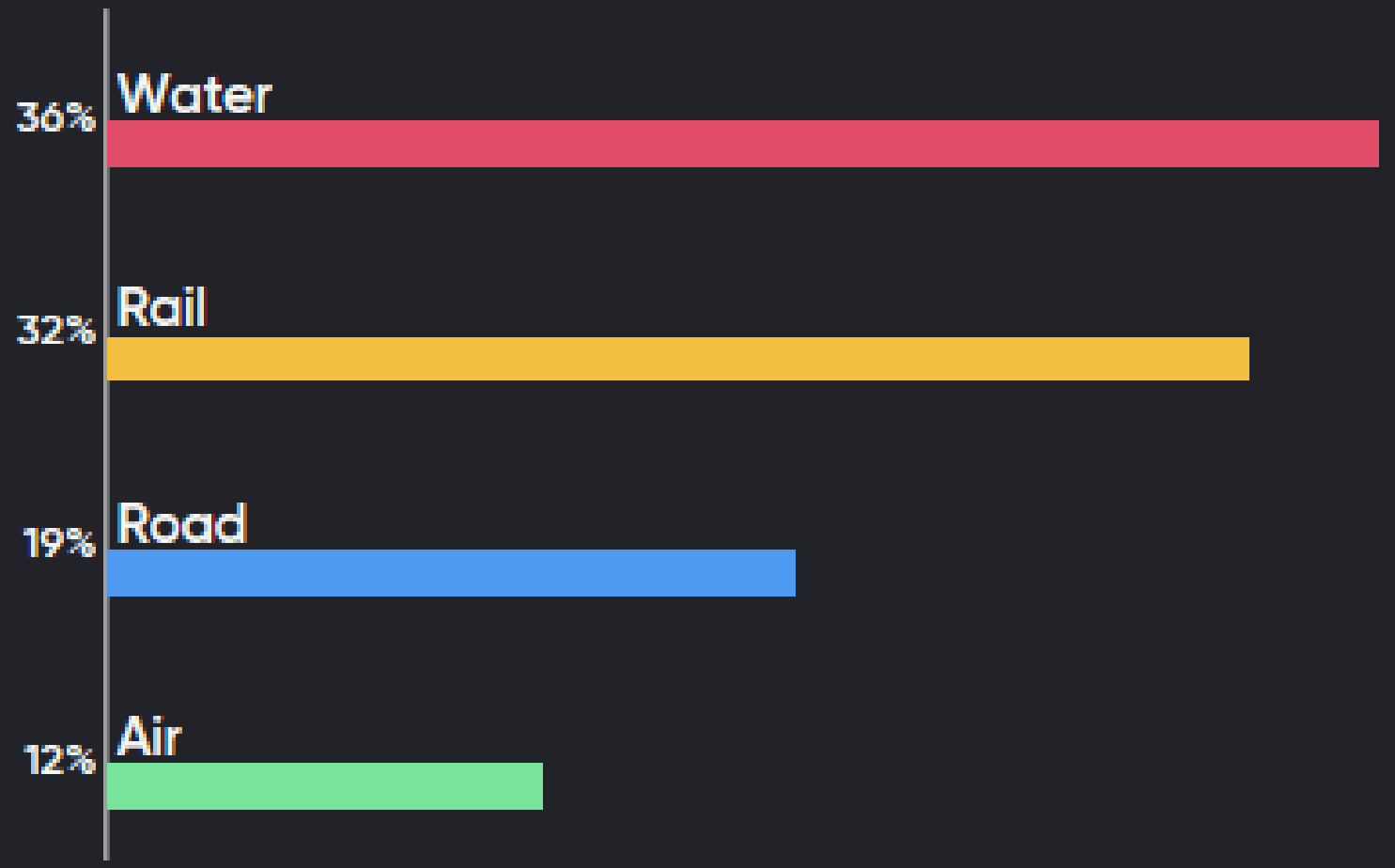

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This is what we know on disrupting technologies in 2019

Drones:
2007 $ 100.000
2013 $ 700

Industrial robots:
2007 $ 550.000
2013 $ 20.000

Solar (cost/ kWh):
1984 $ 30
2014 $ 0,16

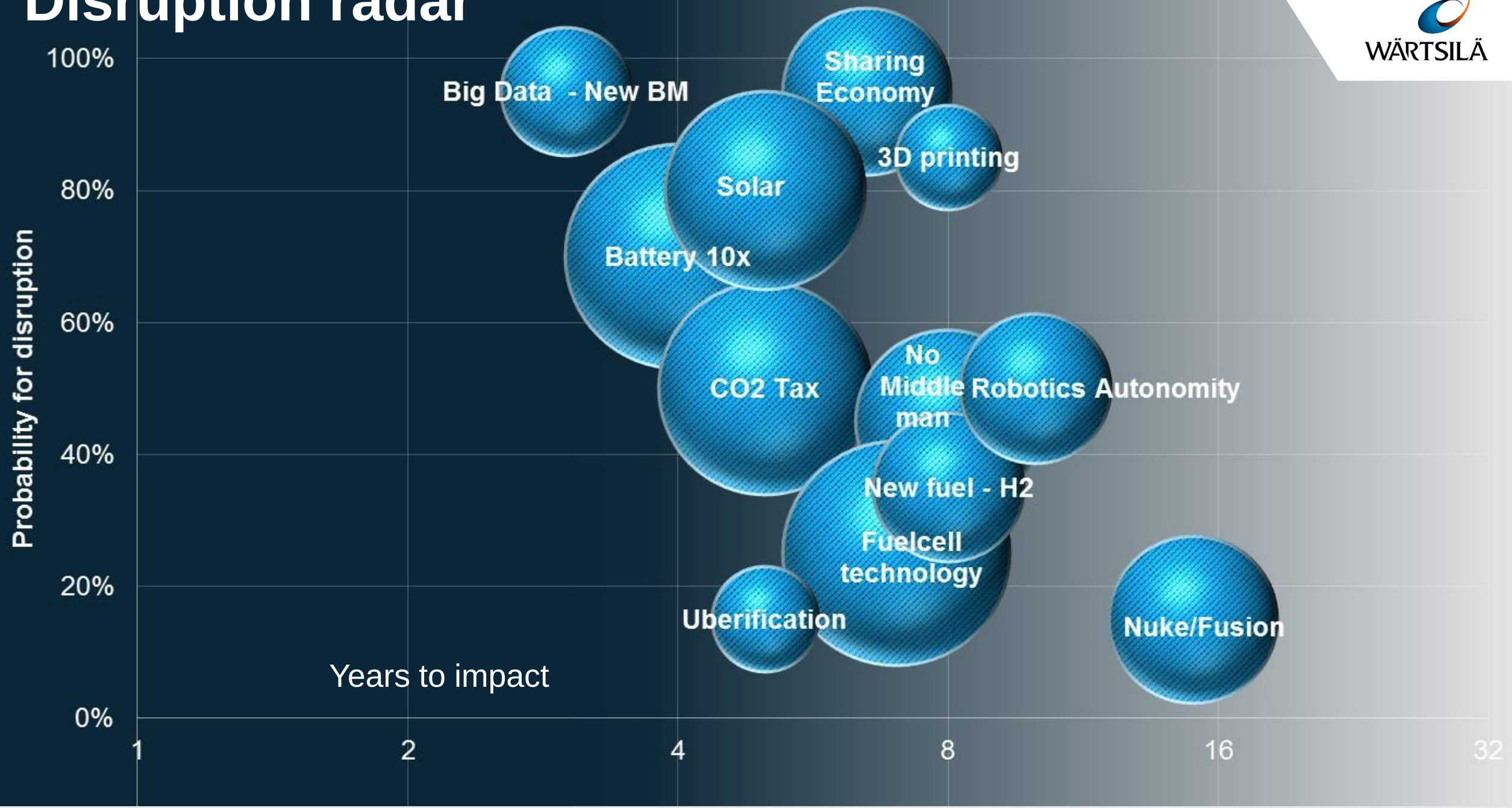
3 D Printing:
2007 $40.000
2014 $ 100

Mobile phones:
2007 $ 499
2013 $ 10

Sensors(3D):
2009 $ 30.000
2014 $ 80

Avento ventures

Disruption radar



CONVERGING TRENDS

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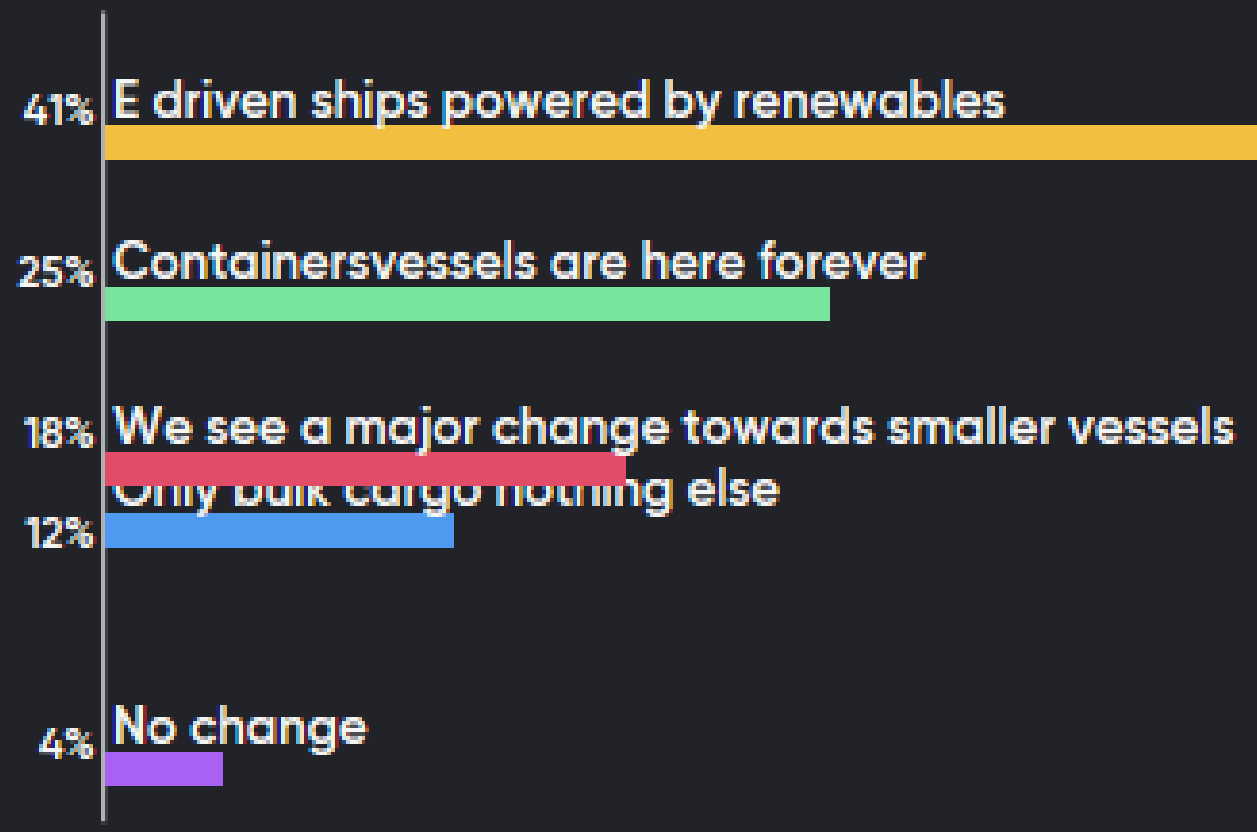
How will these technologies change the ships of the future ?

Mentimeter



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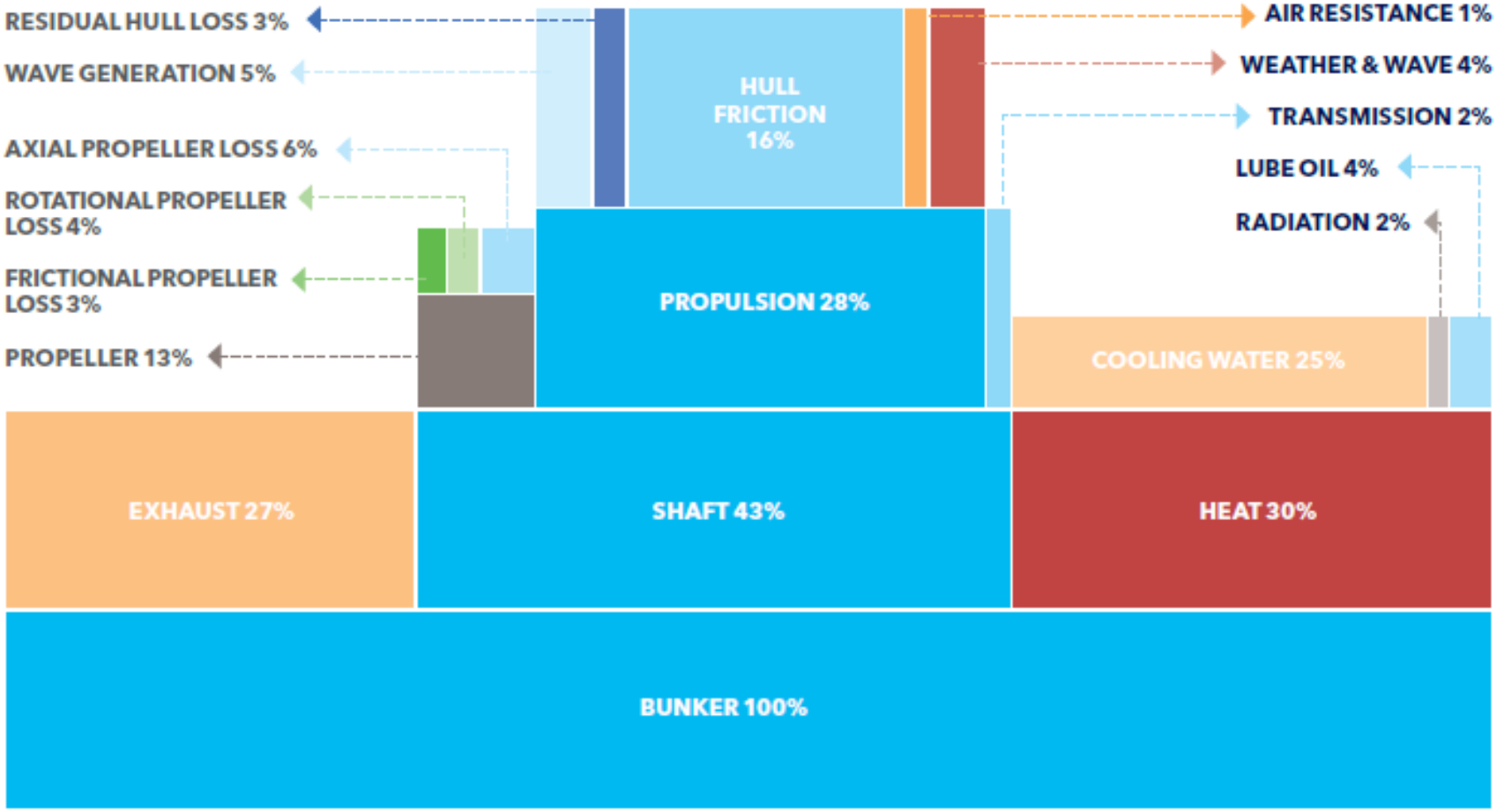
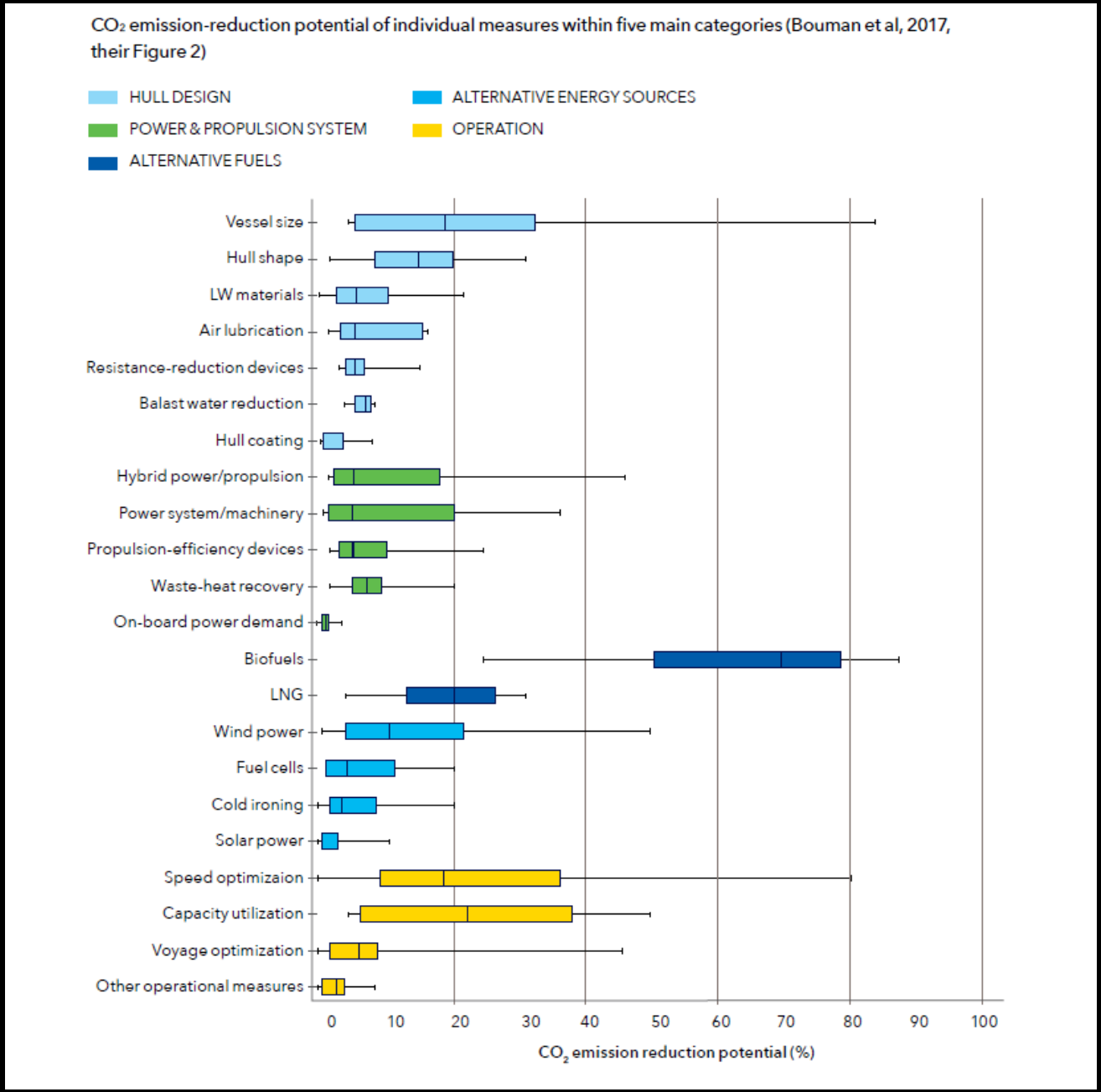
Here are the losses

Use of propulsion energy on board a small well-maintained cargo ship, head sea, Beaufort 6 (Buhaug et al, 2009). The bottom bar in the diagram represents the energy input to the main engine from the fuel.



Improvement areas in CO2



ENERGY STORAGE PRICES

FUEL OPTIONS

ICE	Biofuel	LNG	METHANOL	AMMONIA	HYDROGEN		ELECTRICAL
GHG							
NOx							
SOx							
PM							
Noise							

FC	Biofuel	LNG	METHANOL	AMMONIA	HYDROGEN		ELECTRICAL
GHG							
NOx							
SOx							
PM							
Noise							

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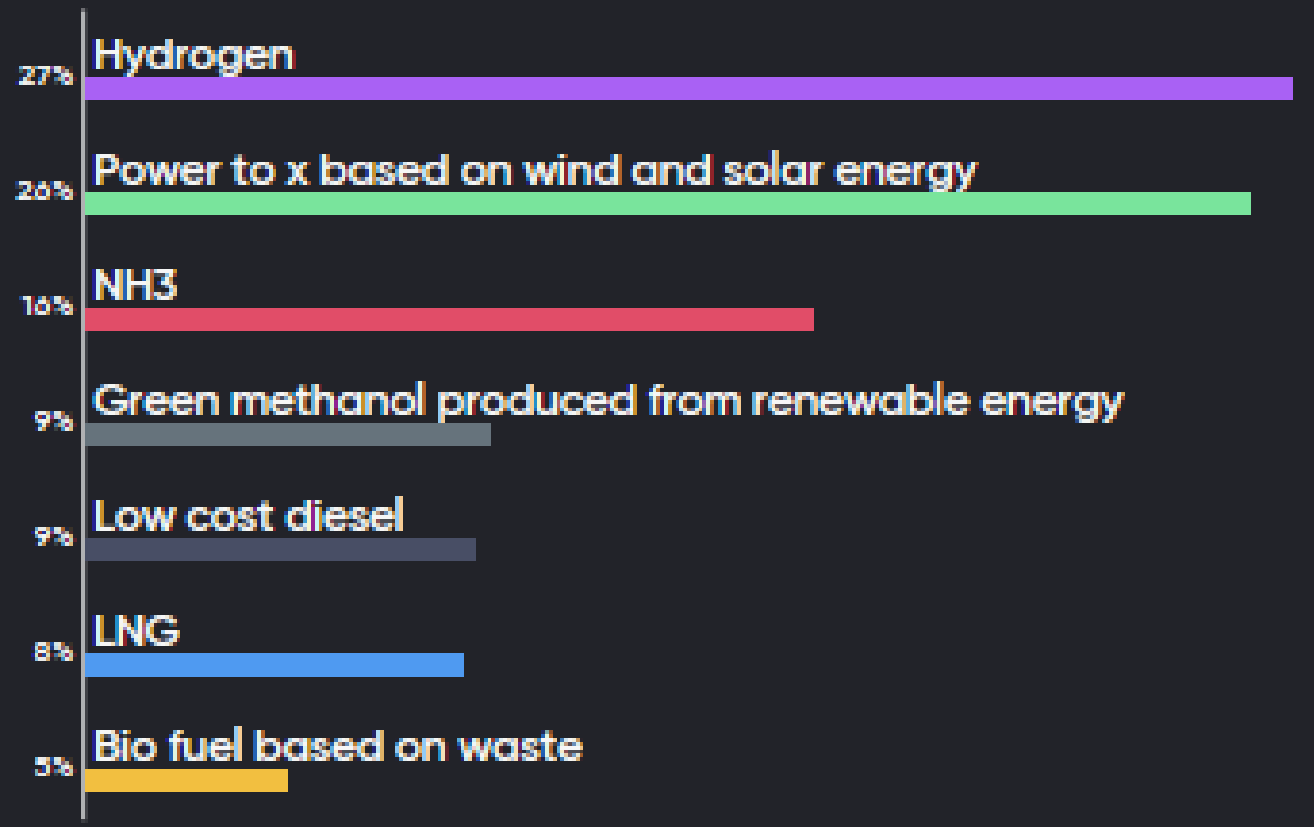
What is the main shipping fuel that will be used in 2050?

Mentimeter



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What is the size of the future vessel?

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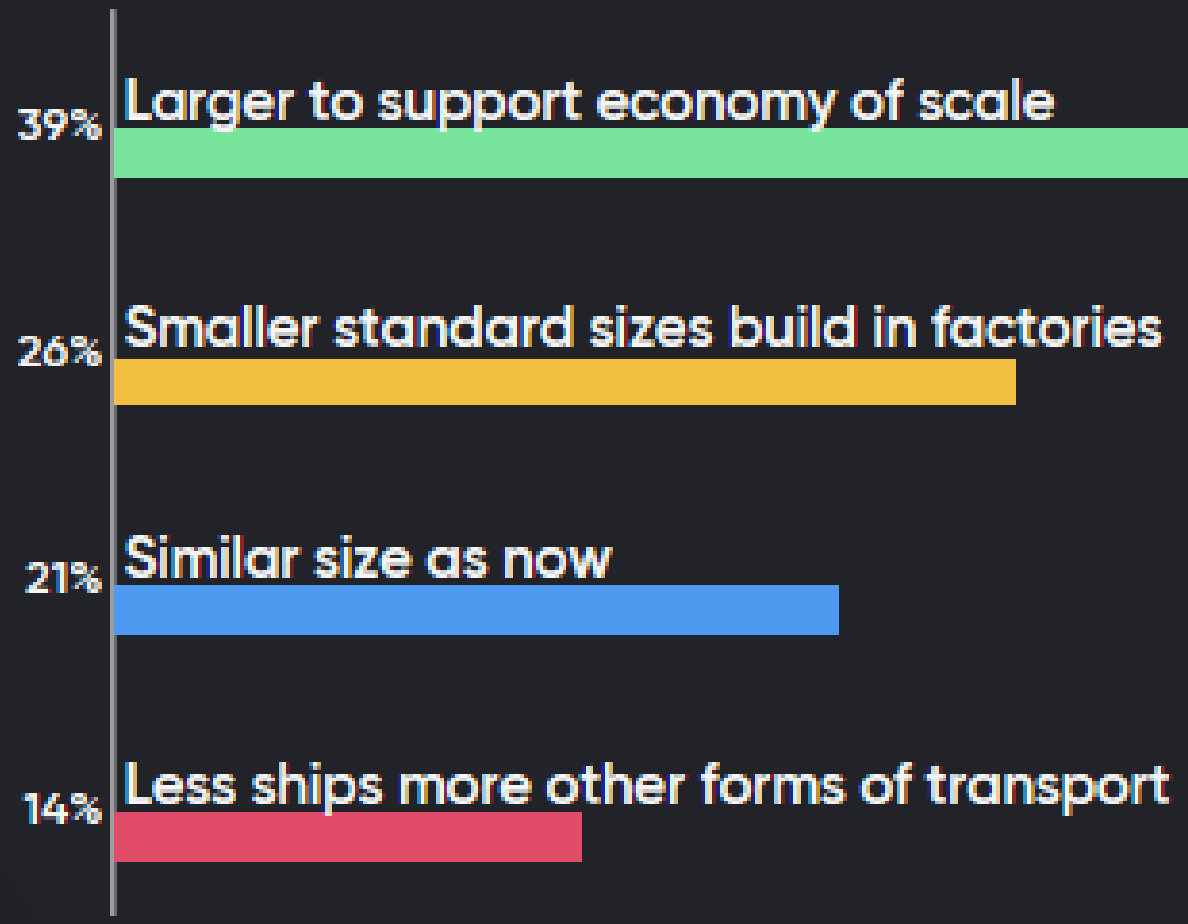

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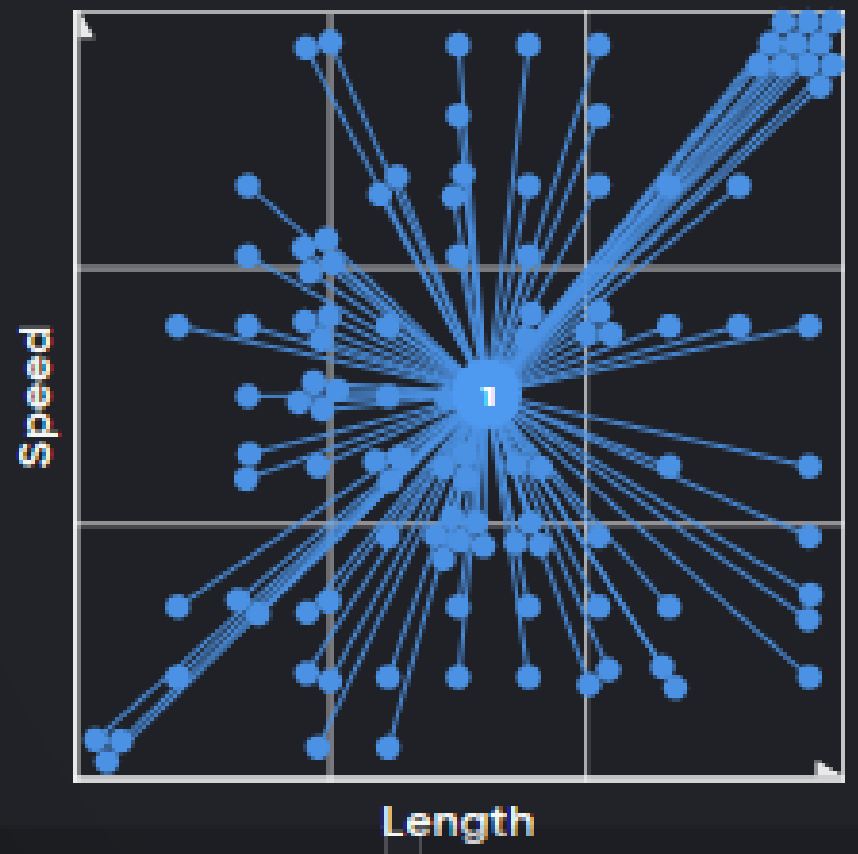
Size (0 to 1000m) vs speed (0 to 50knts)

Mentimeter



1 Size vs speed

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Hull configuration

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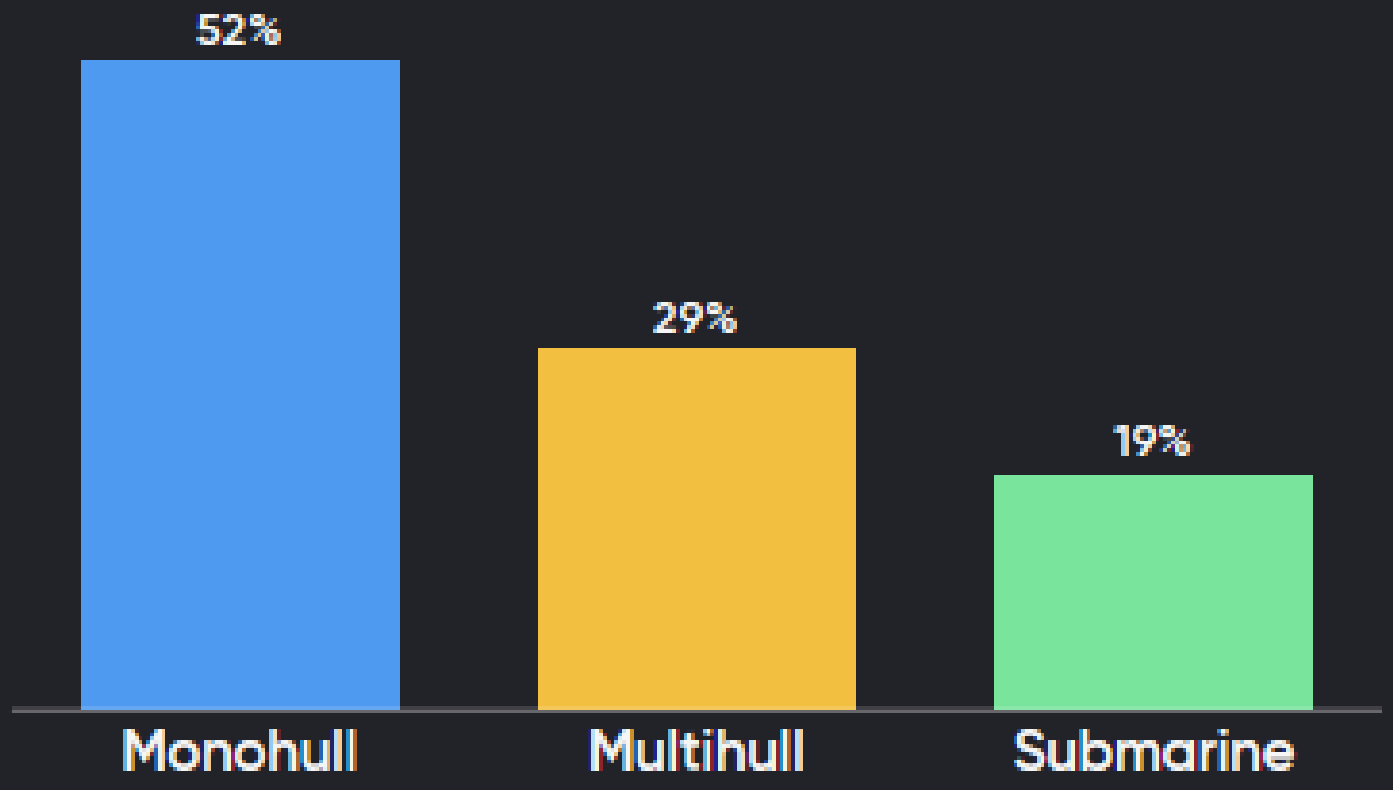

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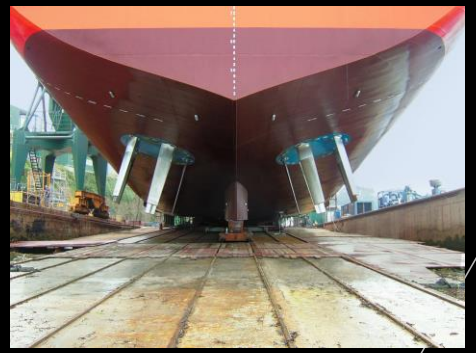
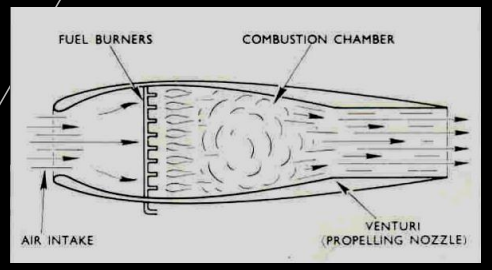
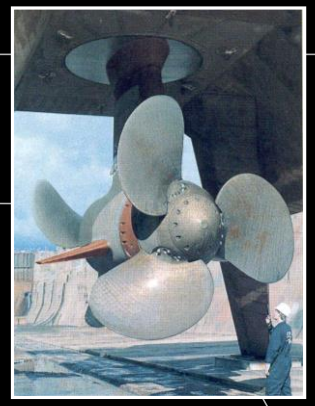
Propulsion options







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Propulsor selection

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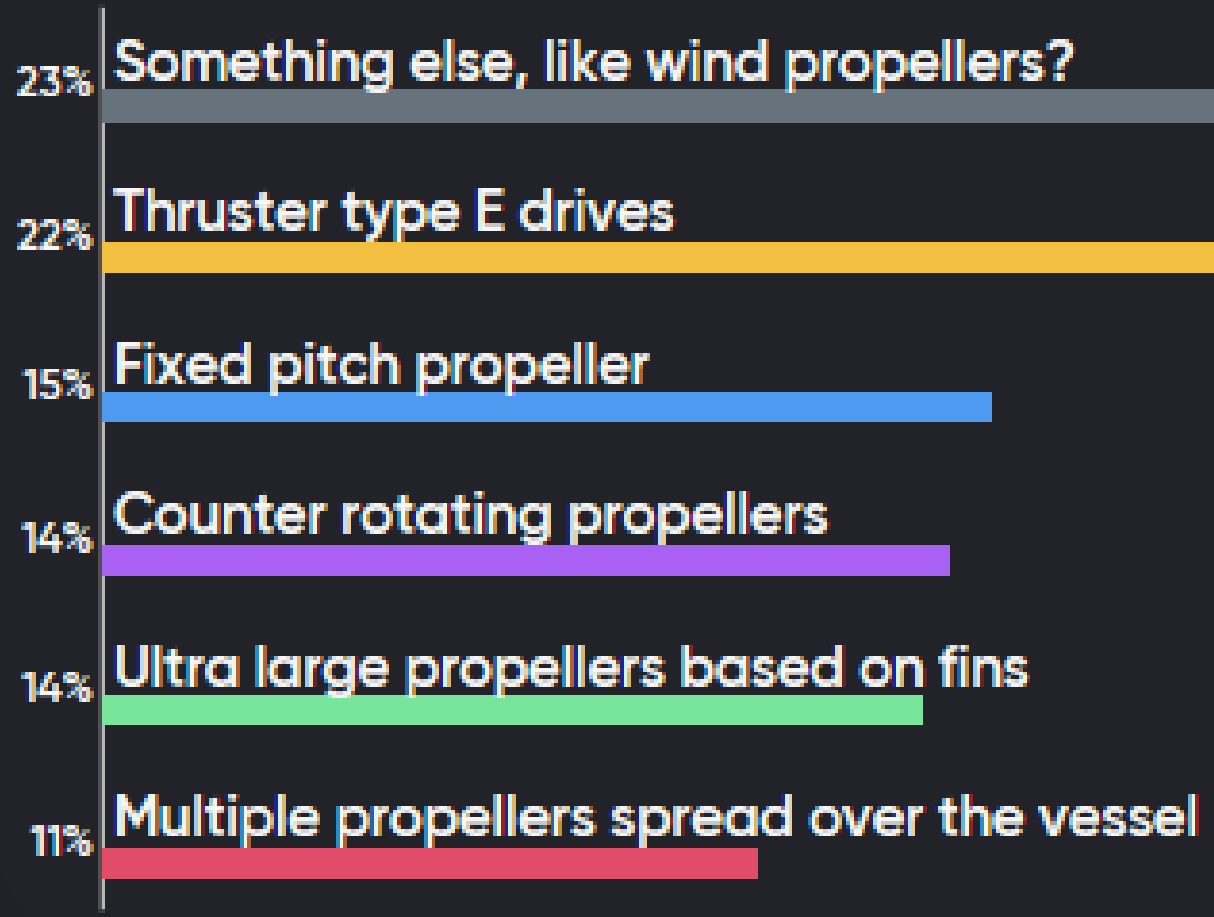

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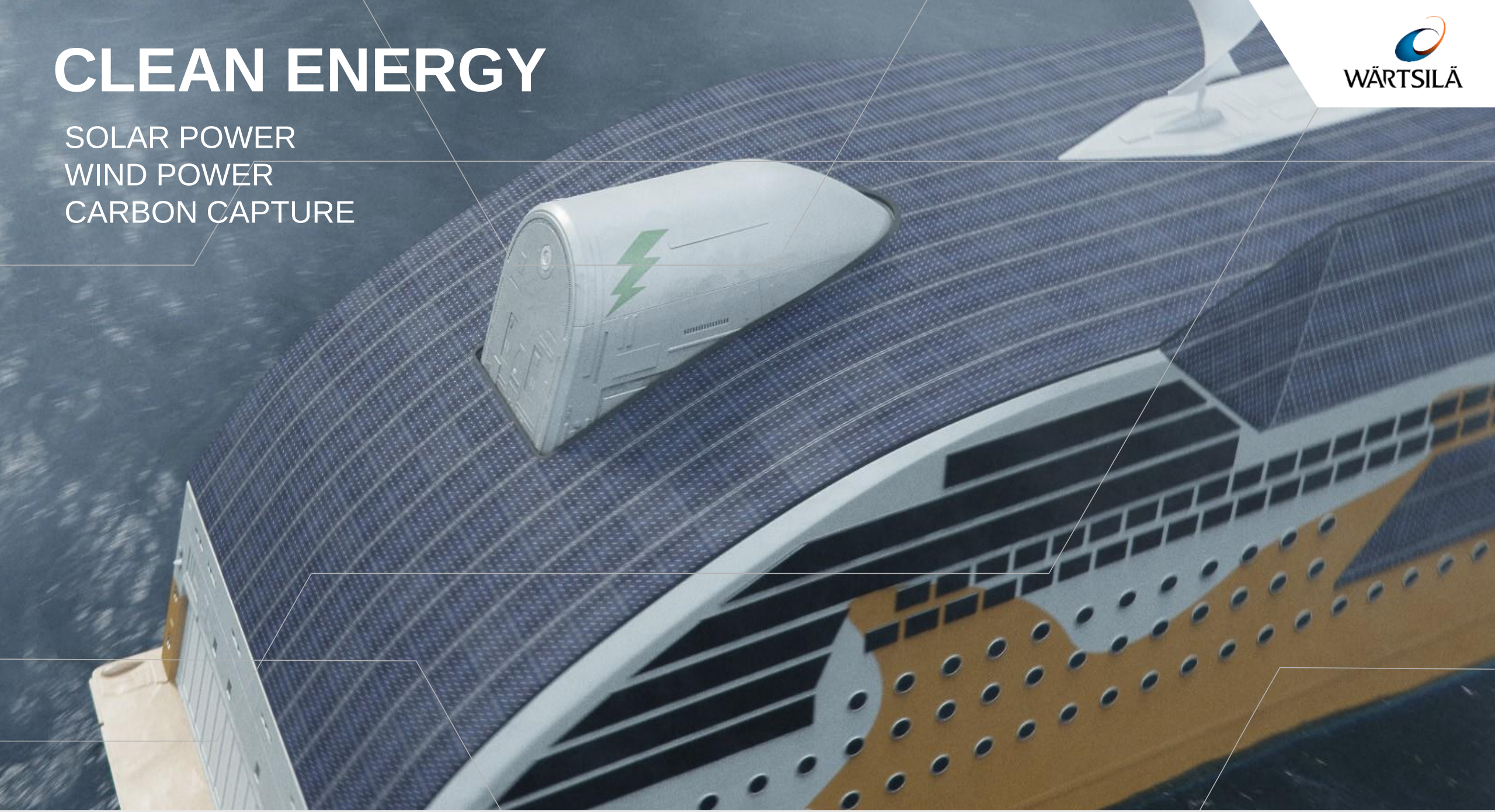
ZERO EMISSION

BATTERY POWERED DRONES

CLEAN ENERGY

SOLAR POWER
WIND POWER
CARBON CAPTURE



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Auxiliary power

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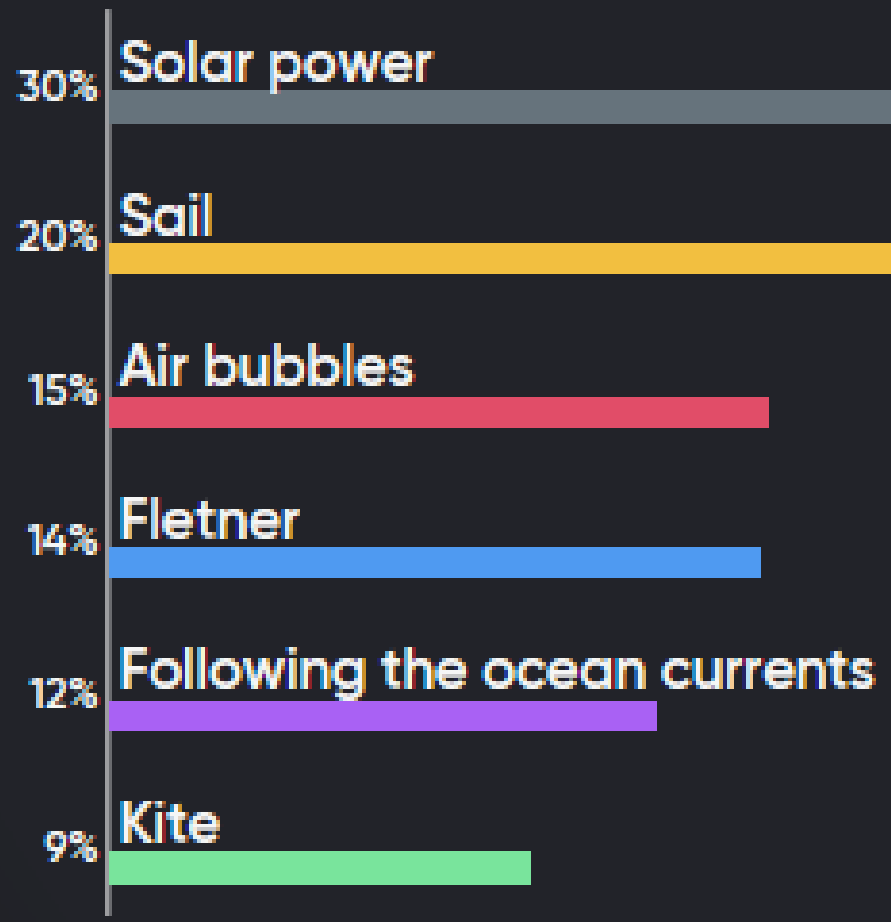

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All connected – remote operated

New business models: Sharing assets

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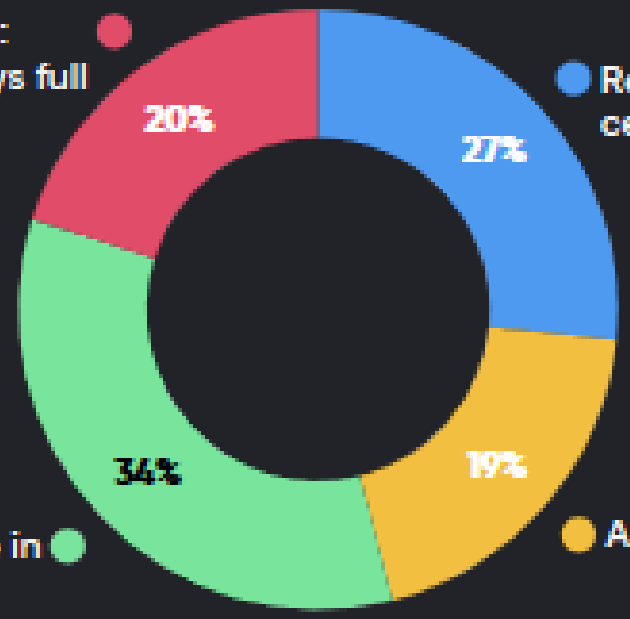
How do we operate vessels?

Mentimeter



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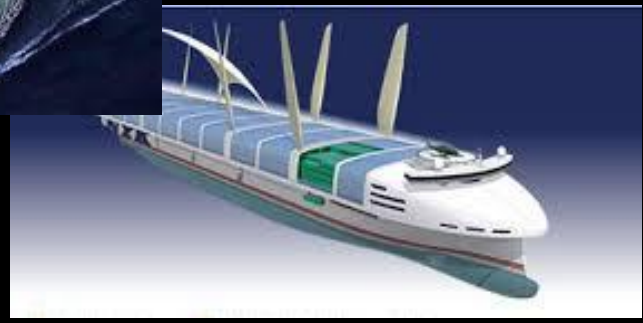
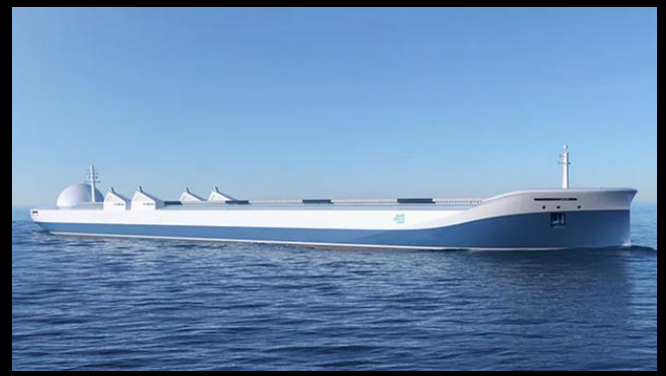
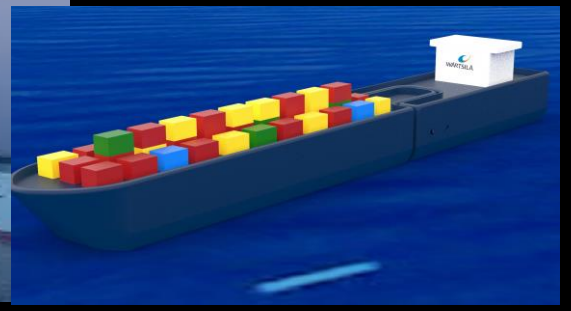
Future ships inspiration slide







MODULAR TRANSPORT

SHARING CAPACITY

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The 2050 ship will be designed and build by/as:

Mentimeter

56%
Team of people with multi-disciplinary skills

12%
Similar as Tesla builds cars today (one design for 100 ships)

19%
Modular ships exist we work on the modules

3%
Shipyards that are called ship-factories

10%
From 3D printed customized parts

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What are the most important skills of a 2050 navel architect.

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Go to **www.menti.com** and use the code **77 99 10**

What are the most important skills of a 2050 navel architect.

Mentimeter

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Thank you for your input, we will be back with the ship of the future

http://www.wartsila.com/marine/visions-of-future-shipping