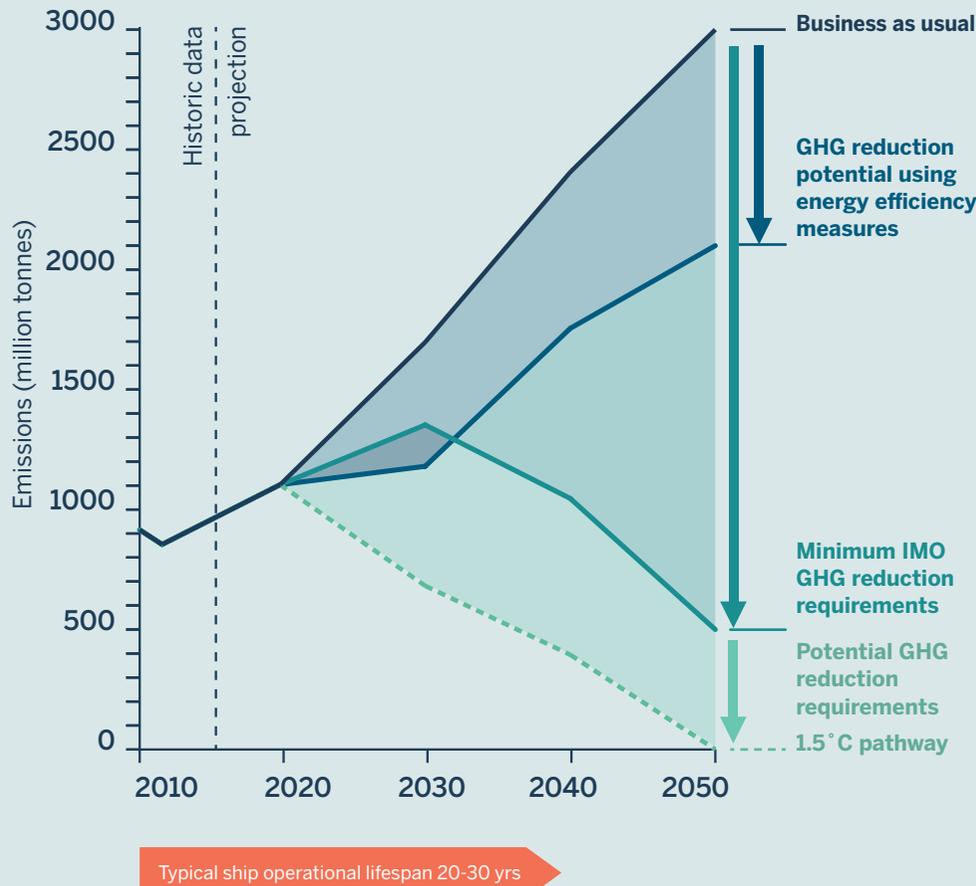


How can shipping decarbonise?

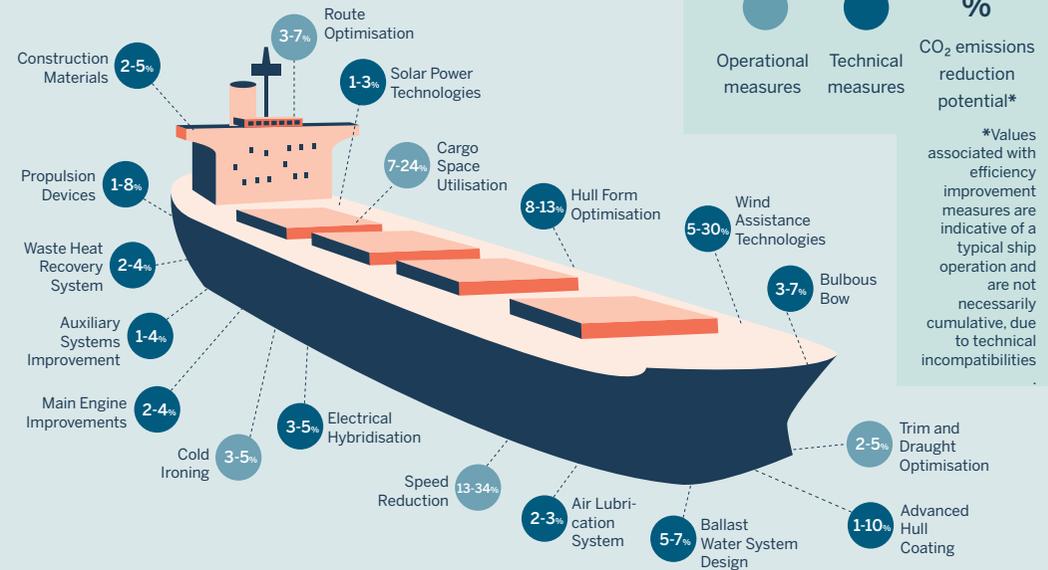
1 Pathways for international shipping emissions

The International Maritime Organization (IMO) has committed to reducing greenhouse gas (GHG) emissions from international shipping by **at least 50%** by 2050 (compared to 2008 emissions), with a strong emphasis on reaching zero emissions.



2 Efficiency measures

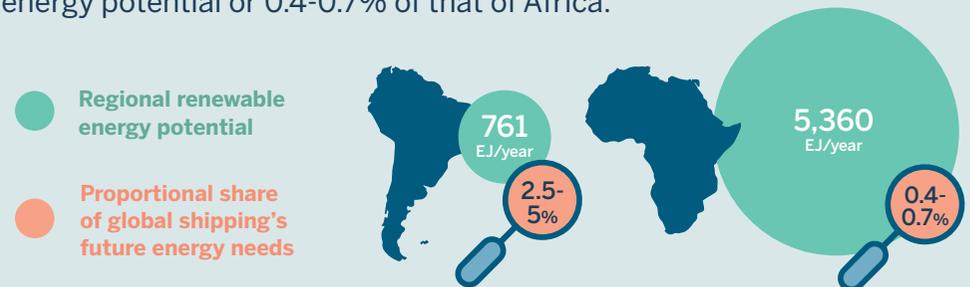
Some of the needed emissions reductions can be achieved immediately using technical and operational energy efficiency measures.



3 Renewable energy potential

Efficiency gains alone can't achieve the IMO's GHG reduction targets. A transition to zero-carbon fuels and electricity from renewable energy resources is needed.

International shipping will need approximately **20-40EJ of energy a year**. For example, this is about 2.5-5% of South America's total renewable energy potential or 0.4-0.7% of that of Africa.

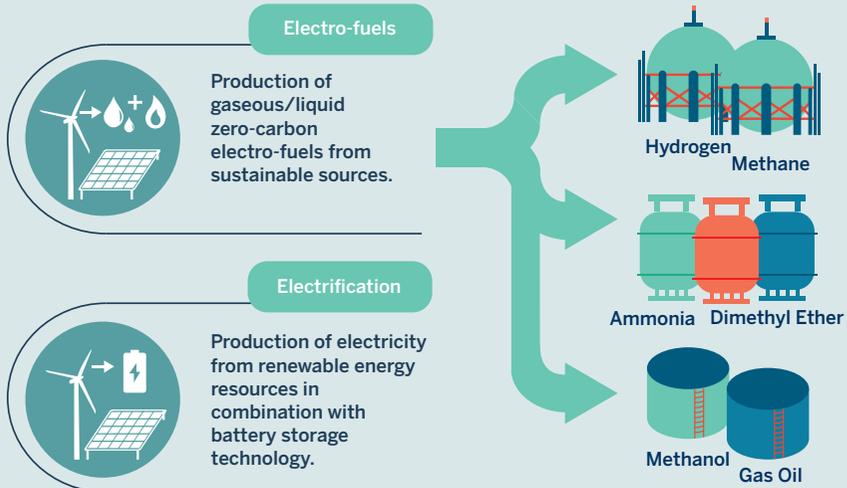


Zero-carbon fuels for shipping

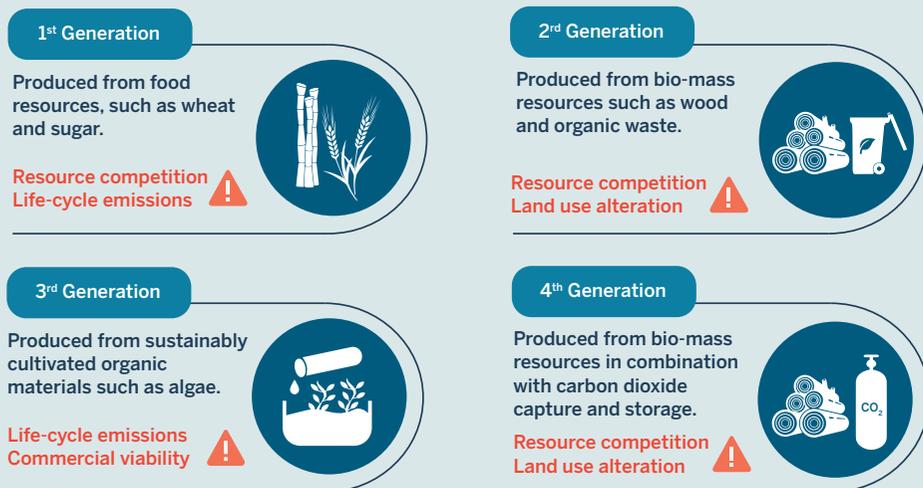
1

Using a mix of electro-fuels and electricity, both made from renewable energy, plus some limited bio-fuels, shipping can achieve the IMO GHG target and reduce its emissions further.

Renewable energy source options + products



Bio-fuels + limitations

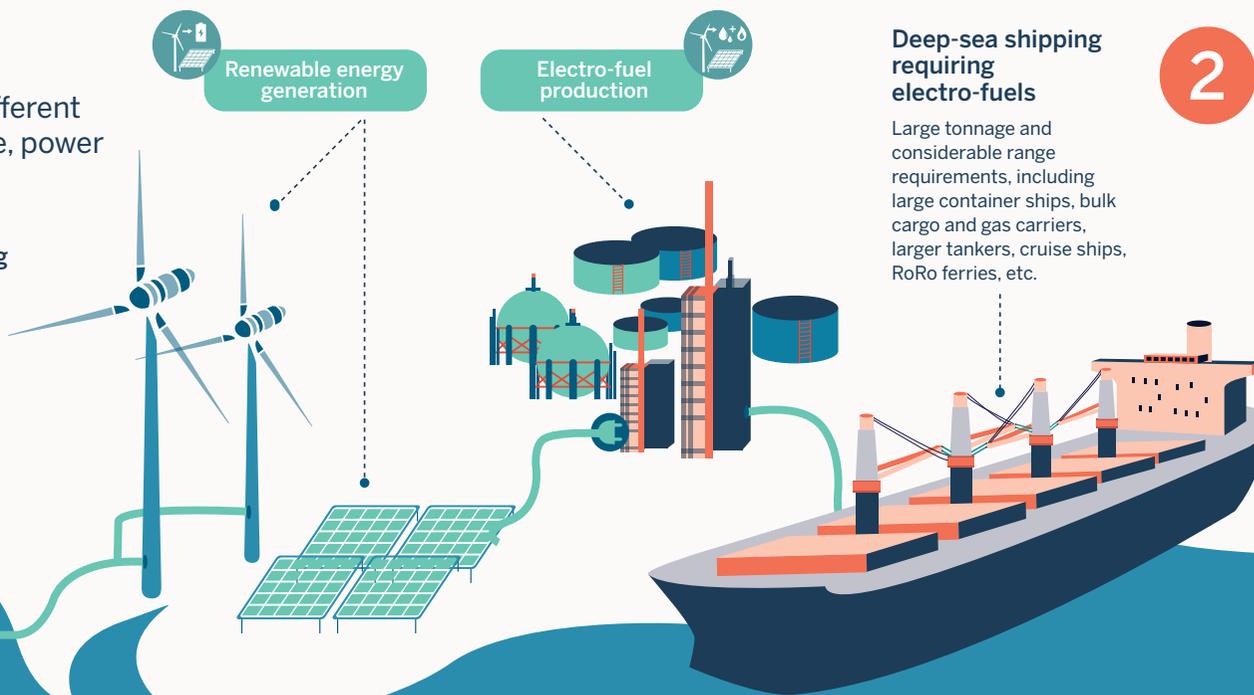


A number of limitations are associated with bio-fuels. That is why electro-fuels and electricity generated from renewable energy are likely the more sustainable option.

No one solution fits all. Different solutions suit different vessel types based on size, power and range requirements.

Short-sea or domestic shipping suitable for electrification

Relatively small tonnage and limited range requirements, including small cargo ships and tankers, barges, ferries.



2

Further work is needed to transition the maritime industry to zero-carbon fuels.

3

- Infrastructure**
 - Scale up production of renewable energy production & zero-carbon fuels
 - Improve availability and reduce costs
- Ship level**
 - Scale up deployment of zero-emission vessels
- Regulations**
 - Develop supportive policy, standards and rules

