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.


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 20-40 EJ 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.


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Designer: Margherita Gagliardi
Zero-carbon fuels for shipping

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.

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.

Deep-sea shipping requiring electro-fuels
Large tonnage and considerable range requirements, including large container ships, bulk cargo and gas carriers, larger tankers, cruise ships, RoRo ferries, etc.

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

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

Renewable energy source options + products

Electro-fuels
Production of gaseous/liquid zero-carbon electro-fuels from sustainable sources.

Electrification
Production of electricity from renewable energy resources in combination with battery storage technology.

Bio-fuels + limitations

1st Generation
Produced from food resources, such as wheat and sugar.
Resource competition
Life-cycle emissions

2nd Generation
Produced from bio-mass resources such as wood and organic waste.
Resource competition
Land use alteration

3rd Generation
Produced from sustainably cultivated organic materials such as algae.
Life-cycle emissions
Commercial viability

4th Generation
Produced from bio-mass resources in combination with carbon dioxide capture and storage.
Resource competition
Land use alteration

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