

Scaling Wind Propulsion in Shipping

Seas At Risk's International Maritime Organization policy recommendations in light of new global fleet analysis

Overview

Our new global study shows that wind-assisted propulsion can deliver **immediate emissions reductions from existing ships** while reducing fuel demand across a large share of the fleet.

The study models approximately **40,000 vessels**, representing around 60% of global shipping emissions, using real-world AIS data and detailed wind modelling.

This is the most comprehensive study to date assessing how wind propulsion can scale across the global fleet and contribute to shipping decarbonisation.

Its central finding is clear: **Reducing fuel demand is critical to making shipping decarbonisation achievable, affordable, and equitable** and wind propulsion is one of the very few solutions available today that directly addresses this challenge.

Key findings

Immediate impact from existing ships: Wind propulsion can be **retrofitted onto existing ships**, or the ships that will in 2030 need to meet the short-term measures already agreed, delivering **fuel and emissions reductions now, without waiting for new fuels, infrastructure or fleet replacement.**

Targeted action delivers disproportionate results

- Top **16%** of vessels assessed (around 5,000 ships)
- Deliver **50% of total emissions reduction potential.**

These vessels are primarily bulk carriers and tankers, operating on long-distance routes with high utilisation.

This means **rapid and sizeable progress is achievable** through targeted deployment.

The study shows a conservative baseline, not the full potential

The results of the study represent a minimum, **real-world scenario:**

- Retrofitting existing ships that are actually at sea today, however...
- No weather routing
- No operational optimisation
- No slow steaming
- No vessel redesign

In practice combining wind propulsion with routing and operational measures is expected to **significantly increase savings.**

Previous work, with the [Wind First!](#) Study, demonstrates that combining wind propulsion with route optimisation and favourable wind utilisation (weather routing) can significantly increase performance outcomes, with higher fuel savings and stronger emissions reductions observed under optimised conditions.

Taken together, this confirms that the results presented here represent a minimum, real-world deployment scenario, and that the full potential of wind propulsion across the fleet will be considerably higher.

Measured savings across the fleet

Under these conservative assumptions the minimum fuel savings are:

- **6.3% to 9.4% across the modelled fleet**
- **up to 12.5% depending on ship type**

Critical contribution to 2030 targets

Most ships that will need to meet IMO's 2030 targets are already at sea. Wind propulsion is one of the very few solutions that can:

- deliver **near-term emissions reductions**
- contribute to the IMO ambition of **5-10% uptake of zero or near-zero solutions by 2030**

It helps bridge the gap before e-fuels are available at scale.

Wind-assisted propulsion is scalable within the realities of today's fleet. It is ideal for retrofitting on ships aged 5 - 20 years, without forcing early retirements or disrupting operational patterns, including dry-docking cycles, and integration into newbuilds.

Under strong policy support:

- installation rates can reach **up to 5,000 ships per year. This is achievable using existing shipyard and retrofit capacity.**
- **the current global fleet can be retrofitted by 2037**

This means:

- a relatively small share of vessels can deliver large early gains
- wind propulsion works on **existing ships today**
- the results presented are **conservative minimum estimates**
- reducing fuel demand makes the transition **more feasible and less costly**
- without policy support, uptake remains **negligible**

Implications for IMO policy

1. Net-Zero Framework

The IMO framework is being designed around fuel standards and economic mechanisms. Within this structure, **reducing fuel demand directly lowers the cost and complexity of the transition**. Without demand-side measures:

- **fuel demand remains high**
- **pressure on supply increases**
- **compliance costs rise**
- **access becomes more difficult**, especially for countries most exposed to transition risks.

Scaling wind propulsion reduces these risks and supports a more manageable transition pathway.

The study highlights that the benefits of demand-side solutions are not uniform across all vessel and fuel types. For example, in the case of gas tankers using boil-off gas, wind propulsion is more likely to affect operational performance than deliver direct fuel savings. Underlining the importance of carefully assessing long-term investment choices and reinforcing the need to avoid investing in fossil fuels including LNG and prioritise solutions that reduce overall fuel dependence and system exposure to fuel related risks.

2. Carbon Intensity Indicator (CII)

The findings are directly relevant to the ongoing CII review. Energy efficiency remains one of the most immediate and cost-effective mitigation options, yet uptake remains low due to market and regulatory barriers. Wind propulsion:

- **directly improves carbon intensity by reducing fuel consumption**
- **supports compliance with current and future tightening CII requirements**
- **lowers operating costs**

A strengthened CII is essential to deliver emissions reductions in the short term.

Seas At Risk recommendations

Net-Zero Framework	Carbon Intensity Indicator (CII)
Reflect real emissions reductions: Verified fuel savings should be fully reflected in ships' GHG performance, so that vessels deploying wind propulsion and other efficiency measures see a clear improvement in carbon intensity	Maintain full system scope: The CII should continue to reflect total operational emissions, rather than being limited to "under way" emissions only, in order to capture the full range of efficiency opportunities.
Prioritise action over compliance: Reducing fuel consumption must remain more attractive than relying on compliance mechanisms, with remedial units priced to incentivise real emissions reduction	Strengthen enforcement and compliance: Clear consequences for non-compliance are essential to ensure that the CII drives real improvements in ship performance.
Limit over-reliance on flexibility mechanisms: The use of surplus units and trading should be constrained so that each ship retains a clear incentive to reduce its own emissions.	Address structural barriers to efficiency: Split incentives and operational constraints that prevent uptake of cost-effective efficiency measures must be addressed.
Recognise demand-side solutions: Reducing energy demand is essential to easing fuel constraints, lowering system costs, and enabling a more manageable transition.	Explore a shift toward an energy-based metric: Moving toward an energy-based metric would better support energy efficiency improvements and complement future fuel-focused measures.

Direct revenues toward a fair transition:

Revenues should support solutions that deliver immediate and reliable emissions reductions, including retrofit technologies, operational optimisation, and capacity-building with particular attention to SIDS and LDCs.

Conclusion

Wind propulsion is a practical, available solution that reduces emissions today while easing the transition ahead.

The challenge is no longer technological. It is whether policy can **enable deployment at scale.**