



ANNUAL REPORT 2022

The Nordic Association of Marine Insurers



Cefor

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VESSEL CO₂ EMISSIONS

Decarbonisation:

Creating transparency through statistics

With the increasing focus on climate change and a decarbonised maritime economy, the shipping industry has set ambitious goals to reduce its CO₂ emissions. In 2018, the IMO launched the 'Initial Greenhouse Gas Strategy', setting the goal of reducing greenhouse gas emissions from shipping by at least 50% by 2050 compared to 2008. Several other initiatives were launched with slightly differing trajectories towards a final goal of net-zero emissions. Once such goals have been set, the next issue is the need to be able to measure the progress towards these goals and to do so in a consistent and realistically achievable way. A number of formulas were devised to measure the alignment of vessels with the proposed emission reduction trajectories.

In this article, the intention is not to explain the various initiatives in detail, as this information is available elsewhere. For the context and background information, refer to the Cefor sustainability report on p. 12 and the links to the IMO and Poseidon Principles for Marine Insurance documents included below.

A declared goal of all initiatives is not only to reduce vessel emissions but also to increase transparency over where the shipping industry and marine insurance currently stand and how the situation will evolve along the projected trajectories towards the final goal of net-zero emissions. Transparency is crucial to gain a

better understanding of the challenges ahead and the necessary collective effort, with all parties supporting each other on the path to the goal of zero emissions.

From the marine insurer point of view, this does not mean avoiding risk but rather understanding clients' needs even better and learning how marine insurers can actively support their clients on their transition path to decrease emissions.

Cefor could produce the following statistics with the kind support of Scope SE & Co. KGaA¹ who made CO₂ emission data for the year 2021 available to the Cefor administration and gave good advice on the quality and interpretation of the emission data. The data comprised both actual measured CO₂ emissions for individual vessels² and emission estimates for vessels without any actual emission data as of 2021. This comprehensive data enabled Cefor to analyse the NoMIS vessel portfolio in terms of its climate alignment against a 100% reduction target and in turn to gain valuable insights into the relationship between the calculated climate alignment by vessel type, vessel age and distance sailed. The following two graphs are intended to give an initial insight, to be followed up with a more comprehensive analysis of the data in 2023.

¹ <https://www.scopegroup.com/>

² Based on EU MRV data, see also here: <https://mrv.emsa.europa.eu/#public/emission-report>

To understand the graphs one needs to understand how 'climate alignment' is measured. This is done according to the following formulas (Poseidon Principles for Marine Insurance):

Annual efficiency ratio (AER)

= unit grams of CO₂ per tonne-mile

$$= \text{Sum}_i C_i / \text{Sum}_i (\text{dwt} * D_i)$$

where

C_i = carbon emissions for voyage i, computed using the fuel consumption and carbon factor of each type of fuel
 dwt = deadweight at maximum summer draught of the vessel

D_i = distance travelled over voyage i

The AER is computed for all voyages performed over a calendar year.

Climate alignment = percentage difference between a vessel's carbon intensity and the intensity on the decarbonisation trajectory at the same point in time (e.g. year). It is expressed as (+/-) %.

In mathematical terms, the climate alignment of a vessel i at the reported time is

$$\text{Delta}_i = (x_i - r_s) / r_s * 100$$

where

x_i = carbon intensity of the vessel, i.e. the computed AER

r_s = required carbon intensity for the ship type and size class for the reported year based on the

decarbonisation trajectory multiplied by 100 to convert to a percentage

A positive alignment score means a vessel is misaligned (above the decarbonisation trajectory), whereas a negative or zero alignment score means the vessel is aligned (respectively, below or on the decarbonisation trajectory).

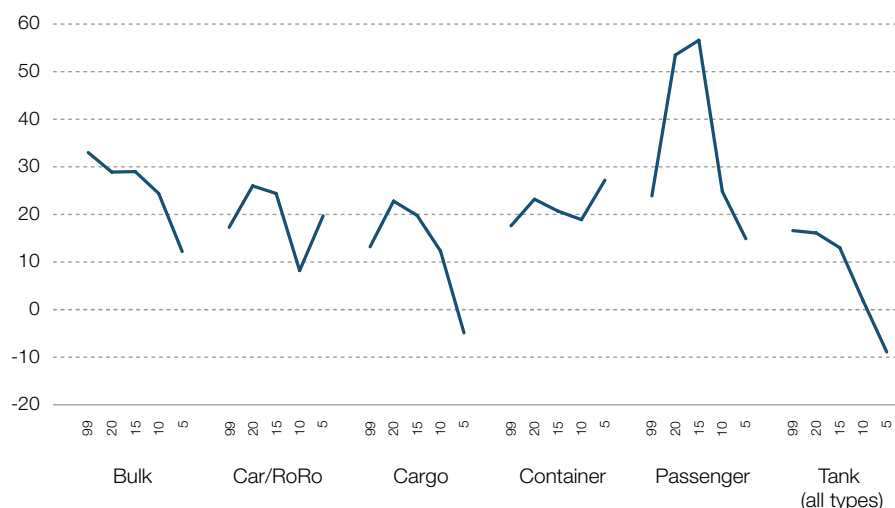
The climate alignment in the graphs in this article is measured against the 100% reduction trajectory.

Relevant links:

- [IMO GHG \(Greenhouse Gas\) Strategy](#)
- [Poseidon Principles for Marine Insurance](#) (PPMI)
- [First PPMI Annual Disclosure Report January 2023](#)

Graph 26 shows the average climate alignment by vessel segment and age group. It clearly shows that the climate alignment in most vessel segments is best for the youngest vessels. This holds particularly true for tanker vessels. However, there is one exception, which is container vessels. For container vessels, all age groups have a similar, relatively high percentage figure in graph 26 which signifies a correspondingly bad alignment. This must be viewed in light of the high demand in the wake of the Covid-19 pandemic, which led, for example, to vessels travelling at higher speeds, which usually also means higher carbon emissions.

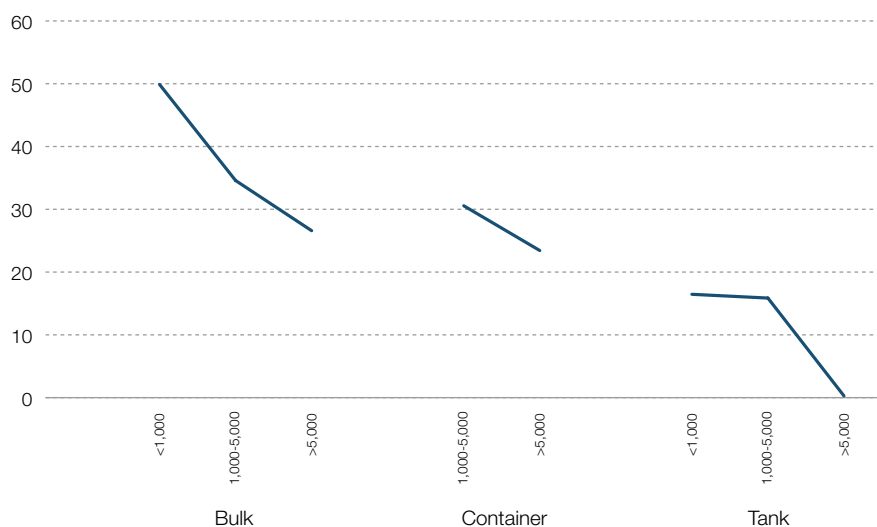
26. Average climate alignment 2021 (% , weighted with dwt), by vessel type and age intervals



Graph 27, on the other hand, shows clearly that the distance sailed has a bearing on a vessel's climate alignment according to the above formulas. One factor which comes into play here is that vessels which are e.g. waiting outside ports or otherwise less

active may have lower emissions in absolute terms but higher emissions per nautical mile, and thus a higher climate alignment percentage (meaning they are less aligned with the decarbonisation trajectory).

27. Average climate alignment 2021 (% , weighted with dwt), by vessel type and distance sailed



The overall climate alignment percentage for the whole NoMIS fleet which could be matched with CO₂ emission data as provided by Scope, 19,004 vessels in all (excluding supply/offshore vessels), was calculated as 16.0% against the 100% CO₂ reduction trajectory for 2021. In this average all vessels are weighted equally, i.e. at 100% for each vessel, and not according to the share of the vessel covered by Cefor members. The 16.0% average is somewhat lower than the average score of 20.8% against the 100% CO₂ reduction trajectory published in the first Annual Disclosure report from Poseidon Principles for Marine Insurance in January 2023³. This may be attributed to the weight of very large tanker vessels (ULCC) which represent the majority of vessels over 300,000 dwt. Excluding these vessels over 300,000 dwt, the average climate alignment of the remainder of the NoMIS fleet is 18.1%.

Needless to say, the above findings represent just the beginning of a journey. Cefor will continue to analyse the NoMIS portfolio with regard to decarbonisation and share more insights along the way.

The above statistics are derived solely by analysing the NoMIS portfolio against CO₂ emission data kindly provided by Scope to the Cefor administration. They do not include any vessel emission data that individual Cefor members may have reported for the first Poseidon Principles for Marine Insurance report.

³ <https://www.poseidonprinciples.org/insurance/wp-content/uploads/2023/01/Poseidon-Principles-for-Marine-Insurance-Annual-Disclosure-Report-2022.pdf>