

## Decarbonisation of the shipping sector – Time to ban fossil fuels?

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### ABSTRACT

Shipping contributes roughly 2.8 % of global anthropogenic greenhouse gas (GHG) emissions, and this is projected to increase in the decades to come. The main regulator of the shipping industry, the International Maritime Organization (IMO), bears the responsibility for developing climate change regulation. Yet the IMO decarbonisation target remains only a 50 % reduction by 2050, and, while regulatory measures have been adopted, these mostly focus on increasing the energy efficiency of ships, not the reduction of total sector GHG emissions. The result is that carbon emissions from shipping continue to rise and are projected to increase by anything up to 50 % by 2050. While many studies are undertaken on the impact of efficiency regulations or the potential for market-based mechanisms, we argue in this piece that missing from this discussion is the potential for a target of full decarbonisation, in line with the IPCC recommendation, allied with a complete ban on the use of fossil fuels in shipping by 2050. This policy would provide certainty to the market and allow industry actors to undertake the transition in a level playing field. Without such a clear signal, carriers and shipowners will transition much more slowly to alternative fuels alongside continued long-term use of fossil fuels. We argue that this position should be actively considered and evaluated, with a tapered timeline to phase out the use of fossil fuels by this date. Instead of focusing research only on the marginal gains of partial policies, scholars and policymakers should prepare plans and evaluate scenarios linked to a clear goal of real zero by 2050.

### 1. Introduction

Maritime transport is vital for our global economy and continues to rely on fossil fuels. Greenhouse gas (GHG) emissions from ships will continue to grow if no action is taken beyond the current focus on energy efficiency and market-based mechanisms (MBMs). In this short commentary we argue for a bold ambition of zero carbon emissions and banning of fossil fuel use in shipping by 2050. Setting such a deadline would provide a clear signal to the maritime industry to start with the transition to alternative energy systems for the propulsion of ships today and to remain in line with the Paris Agreement targets.

In 2019, 11.08 billion tonnes of goods were transported by sea, a growth of 85 % since 2000 [1], almost the entirety of which was powered by fossil fuels. Heavy fuel oil (HFO), essentially refinery waste, fuels 79 % of maritime transport, with the remainder coming from Marine Diesel Oil, Marine Gas Oil and Liquefied Natural Gas (LNG, i.e., cooled methane) [2]. The scale of the decarbonisation challenge within maritime transport is therefore enormous, yet there is currently no

mandatory timeline for full decarbonisation of the shipping sector.

The IPCC 2050 target for full decarbonisation is clear and much work is underway to ensure that countries adopt this target along with measures to achieve it. The 1997 Kyoto Protocol declared that international shipping emissions are too difficult to apportion to Nationally Determined Contributions (NDC), therefore they remain the purview of the International Maritime Organisation (IMO). Yet the IMO still retains only a 50 % reduction target by 2050. Two types of policies for decarbonisation currently dominate political debates at the IMO: the only measures currently in place focus on efficiency improvements (the Energy Efficiency Design Index and the Ship Energy Efficiency Management Plan were adopted in 2011), with the potential for MBMs in future widely discussed but not yet agreed [3,4].

Since 2000, total goods loaded, tonne miles and carbon emissions have increased, while carbon intensity has declined (see Fig. 1). More than half of this improvement occurred before 2012, largely due to the adoption of slow steaming to save fuel. After the financial crisis of 2008–2012, carriers were struggling financially due to the overcapacity

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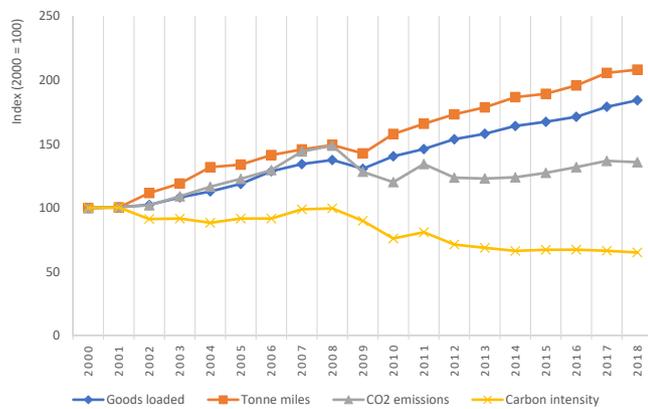


Fig. 1. Carbon intensity vs goods loaded, tonne miles and CO<sub>2</sub> emissions, 2000–2018 (2000 = 100).

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of ship tonnage. Only around 1–2 % efficiency improvements have been achieved annually since 2015. The IMO’s own study predicts that under the best-case scenario, carbon emissions from international shipping will remain unchanged by 2050, with a worst-case scenario of a 50 % increase [2].

While the figure demonstrates that the current policy focus on efficiency is clearly not working, the other main policy option being discussed at the IMO is MBMs [6]. As the industry is generally reactive rather than leading on environmental issues [7], treating such investments as an additional cost for customers, the IMO favours MBMs such as a carbon tax or an emission trading scheme, but that discussion took place ten years ago and was abandoned in 2013 without resolution [8]. Once again a small carbon levy is on the table but so far without success and action on this front is unlikely to happen in the short term and at any meaningful level. Such levies or even a significant level of carbon tax may be used to raise research funds and accelerate the transition, but will not lead to decarbonisation on their own [9].

While no readily available alternative fuel or technology exists to decarbonise the sector at present [10], research and trials of renewable fuels are ongoing, whether that is zero-carbon (e.g. hydrogen and ammonia), carbon-neutral (e.g. synthetic methanol) or propulsion assistance (e.g. wind) [11]. However, just as investments in renewable energy by banks and fossil fuel companies cannot be evaluated outside the context of their much larger continued investments in fossil fuel exploration and exploitation, efforts in the shipping industry towards renewable fuels cannot be considered outside the context of their much larger continued investment and plans for fossil-fuelled operations [12]. Given the long commercial life of ships (20–30 years) and the long timeframe needed to transition to a new fuel system (not just the vessels themselves but the production of alternative fuels, their transportation to and storage at refuelling points, etc.), action is long overdue if we are to decarbonise by 2050. If policy action is not taken now, even while alternative fuels such as hydrogen and ammonia are slowly scaled up, they will remain small-scale and proceed alongside continued long-term use of fossil fuels.

## 2. The current IMO policy process remains stuck

The IMO is a venue to achieve agreement between 174 member states which is already difficult in and of itself, and climate policy at the IMO has been stuck for some time [13]. The IMO is inward looking, focusing on technical issues and subject to industry lobbying and economic interests. Technological uncertainty regarding the future availability of alternative fuels to fully decarbonize shipping are preventing the industry and many maritime states from supporting ambitious climate change policies within the IMO. Shipping industry organizations

such as the International Chamber of Shipping (ICS), the World Shipping Council (WSC) and the Baltic and International Maritime Council (BIMCO) argue that they prefer a unified global approach to maritime policy making, yet they have actively obstructed the development of climate change policies by the IMO [14,15]. It is also not unusual for countries to be represented at the IMO’s Marine Environment Protection Committee (MEPC) meetings by industry actors, which allows them to influence negotiations within the MEPC.

The maritime governance system is therefore stuck or even broken, beholden to a “business-as-usual” logic [4]. Continuing with a position of non-decision is only creating more uncertainty in the industry, which delays the transition. The IMO has postponed long-term action to at least 2030, electing to focus first on short- and mid-term measures. Yet, given the urgency of the task and the long lifetime of ships, the debate on long-term measures that the IMO has pushed to after 2030 has to happen now. Alternatives to efficiency and MBMs need to be proposed and evaluated as a matter of urgency but the current policy process centred around the IMO is stalled [4].

Slow progress by the IMO has led other actors to take some unilateral actions. In industry, various groups have made voluntary pledges and developed schemes to go beyond IMO regulation and stimulate reduction of GHG emissions from shipping, such as the Clean Cargo Working Group, the Environmental Ship Index, and the Sea Cargo Charter [16, 17]. However, the use of these tools is limited and mostly evidenced by those companies that are susceptible to external pressure and customer demands [5,17]. In the policy sphere, the EU has been ahead of the IMO in, first, introducing the Monitoring, Reporting and Verification (MRV) regulation to measure GHG emissions of ships, and, second, planning to include shipping in the EU emission trading scheme from 2023 [18]. These policies will have only a small effect at the global level because the IMO remains the primary venue for maritime policy making. However, with the EU being a powerful group of willing countries and taking unilateral action, they are putting pressure on both the industry and the IMO to step up their game. The EU has in fact influenced the IMO in the past, acting first to accelerate regulations on double hulls to prevent oil spills, implementing stricter Port State Control for ship inspection and developing sulphur emission regulations before the IMO later followed [19].

There have been some proposals to overcome the IMO’s failure by returning shipping emissions to the UNFCCC and NDCs and apportioning them to the country of the shipowner who, it is argued, is better placed to act than the country of the vessel flag (registration) or the location of the import/export port [20]. This change would allow individual countries and blocs such as the EU to include international shipping within existing decarbonisation targets that already apply to domestic transport. Yet, regardless of whether maritime decarbonisation responsibility remains with the IMO or reverts to the national level, we need to stop legitimising business-as-usual and propose alternative and ambitious solutions.

## 3. A ban on fossil fuel use in shipping?

Climate scientists are clear that we must leave fossil fuels in the ground. Planned extraction and production of fossil fuels is already in excess of the amount we need if we are to decarbonize by 2050, not including future finds [21]. Unless this supply is stopped, industry will keep using it, regardless of advances in other fuels. The “wait and see” attitude within the shipping industry will remain legitimized and the transition to alternatives will be continually postponed well beyond 2050.

Instead of focusing only on the development of the supply of alternative fuels and propulsion systems or influencing demand through efficiency targets and taxes, we need to address the continued supply of fossil fuel for shipping [22]. In order to achieve decarbonisation of international shipping, we argue that it is necessary to ban the use of fossil fuel by ships with a timeline tapering to 2050.

We can look to other transport sectors for inspiration. For example, multiple countries, including France, the UK and the Netherlands have banned the sale of new fossil-fuelled cars and in some cases trucks from 2030 to 2040. A similar approach could be considered for international shipping, banning the use of fossil fuels by 2050 and banning the sale of new fossil-fuelled vessels at least a decade before. Any fossil-fuelled vessels still in operation would need to retrofit their engines or fuel systems to renewable fuels in order to continue operation past 2050. Such regulation should not be seen as constraining but rather an opportunity to bring new technologies to the market, as evidenced by individual truck manufacturers such as Volvo and even the European Automobile Manufacturers' Association (ACEA) publicly calling for all new trucks sold from 2040 to be free of fossil fuels [23]. Why not the shipping sector?

#### 4. Momentum and a clear message

The momentum for strong action is growing. At COP26 various countries called on the IMO to adopt a target of zero GHG emissions by 2050 [24], and the same target has gained support from some industry actors [25], although we should take care that net zero is not used as greenwash in favour of real zero. In October 2021, several major shippers such as Amazon, Ikea and Unilever signed the Cargo Owners for Zero Emission Vessels (coZEV) declaration, pledging to use only zero carbon shipping by 2040 [26].

Although challenging, banning fossil fuel use is not an idealized scenario only for environmentalists but in fact has many advantages. While it will raise political resistance and practical concerns about its implementation, and may entail risks of carbon "leakage" if international agreement is not achieved and only some countries enact the policy, any serious decarbonisation policy that challenges business-as-usual will meet similar challenges. Yet, it is a more attractive policy than the present complicated policy environment, based on many different regulations and endless technical debate on MBMs, carbon capture, measurements and reporting of GHG emissions related to transport work done by ships. From a practical perspective, bans are easier to enforce than reductions or payments because no measurement or penalty is needed [27]. From the market perspective, the policy would provide certainty to the market and allow industry actors to undertake the transition – inevitable if we want to reach the Paris Agreement climate targets – in a level playing field. It will accelerate efforts to invest in and work towards making new fuel systems available at the required scale, rewarding the first movers and enabling them to take a long-term view of their investments in zero-carbon shipping. Without such a clear signal, the pace of change by carriers and shipowners to alternative fuels will be too slow.

A supply-side position that aims clearly at real zero by 2050 would send a clear message to funders, researchers, shipowners and shipping lines to focus on fully decarbonising shipping. This is necessary to avoid being side-tracked with partial measures that are valuable on their own but in aggregate will not produce the necessary transition at system level by 2050.

#### CRedit authorship contribution statement

**Judith van Leeuwen:** Conceptualization, Writing – original draft, Writing – review & editing. **Jason Monios:** Conceptualization, Writing – original draft, Writing – review & editing.

#### Data Availability

No data was used for the research described in the article.

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