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SUBMISSION TO THE ENVIRONMENTAL AUDIT COMMITTEE OF THE UK PARLIAMENT ON ERADICATING AN OPERATIONAL INEFFICIENCY IN OCEAN CARGO TRANSPORT, SO AS TO REDUCE GHG EMISSIONS

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Summary

1. The authors of this report are co-ordinators of a Consortium of international commercial entities and organisations (including the UK Hydrographic Office), which is in the process of testing and refining a system (the "Blue Visby Solution"), which is aimed at removing a systemic operational inefficiency of ocean cargo transport ("Sail Fast, Then Wait" or "SFTW").

2. Two proofs of concept have been completed: by systems optimisation experts at Aalborg University in Denmark, and by the software and engineering company Napa Oy in Finland, which have shown that implementing the Blue Visby Solution across the dry bulk and tanker fleet would deliver GHG emission reductions of about 9-14% on average.

3. Applying the above percentage to the totality of the dry bulk and tanker fleet would produce CO_2 savings of around 45 million tonnes, which are comparable to the total annual emissions from any source of a medium-sized European country. By way of illustration, the total CO_2 emissions of Finland in 2019 were 43 million tonnes.

4. While UK ports experience a relatively small problem from SFTW, the improved coordination of arrival times would deliver significant CO_2 reductions. Moreover, there is an additional reason why the UK can play a pivotal role in eradicating SFTW: the Blue Visby Solution is based on a novel contractual architecture under English law, which is the law of choice in the global maritime industry. This puts the UK in a unique position to embrace the Blue Visby Solution and lead the global decarbonisation efforts in this particular area.

The SFTW inefficiency

5. Ocean cargo transport is a highly fragmented industry in terms of ship types, cargoes and trades, as well as types and outlook of the entities involved: containerships, dry bulk carriers, wet bulk carriers, general and project cargo carriers and roll-on/roll-off ships.

6. Approaching ocean cargo transport from the perspective of its role in supply chains, a similarly fragmented picture emerges: the supply chains for containers are very different to those for petroleum and its products, grains and other agricultural commodities, general cargo, vehicles or industrial equipment.

7. The common thread running through that fragmented industry and supply chains is that the ocean journeys of cargo ships are not systemically optimized. While there has been great progress in the last 30 years in satellite coverage, communications, weather forecasting, and data processing, all of which have enabled the development of sophisticated and effective weather routing and voyage planning systems, this has only led to the optimization of the voyages of individual ships. Optimization of cargo vessels as a system remains elusive. Indeed, those outside the industry are often surprised to hear that there is no equivalent to "airspace management systems" for cargo ships in the world's oceans.

8. This absence of systemic optimization means that cargo vessels follow the same operational model since the age of sail: each vessel departs towards its destination at

its own optimal speed (often, the service speed, which is very similar to that of every other vessel in the same ship type), and without regard for other vessels or for the conditions at the destination. This operational model, known as "Sail Fast, Then Wait" or "Rush-to-Wait", has recently attracted the public's attention: the congestion outside Suez increased day-by-day as a result of the grounding of the vessel Ever Given; another example is the congestion outside various ports in China and the USA as a result of supply chain bottlenecks ashore. In all cases, congestion seemed to increase without any apparent co-ordination attempt amongst ships to adjust their speed and adapt to the changing circumstances.

9. This inefficiency has been tolerated for various reasons: the cost of wasted fuel is a fraction of the value of the cargo on board; the uncertainties at sea have traditionally discouraged long-term voyage planning; emissions has not been a concern until recently; and, perhaps above all, the contractual architecture of maritime trade gave rise to "split incentives", or a type of "agency problem", amongst the various industry participants.

The contractual foundations of SFTW

10. The operational practice of SFTW is underpinned by the contractual architecture of international maritime trade in various ways:-

    a. Bulk cargo vessels perform voyages at the instruction of their charterers, who have the right to give orders as to the commercial employment of the vessels. The relevant contracts (voyage and time charterparties) contain speed warranties and the obligation for the vessel to sail with utmost dispatch, or similar.

    b. Many of those charterparties contain requirements for the vessel's arrival at a loading port by a particular date ("laycan"), or else the charterer has the option to cancel the charterparty.

    c. In some types of charterparties (voyage charterparties), the vessel's prompt arrival at the port of destination triggers financial consequences in the form of "demurrage", which is legally defined as "liquidated damages for delay" but, from a financial perspective, is an income stream for the shipowners.

    d. In other types of charterparties (time charterparties), the fuel cost falls on the charterer, meaning that shipowners have no incentive to optimise operations and, indeed, are contractually obliged to follow the charterers' operational instructions.

11. The above features give rise to what is sometimes referred to as an "agency problem" or "split incentives" in charterparties.

12. However, the charterparty perspective is too narrow, and the obstacle to eradicating SFTW is in fact greater. Ocean cargo transport is a link in the supply chain. Viewed from the perspective of supply chains, a further obstacle appears: the contracts for sale and purchase of commodities on board the vessels also contain provisions that require prompt arrival of the vessel. For example, sale and purchase contracts often contain provisions for laycans and demurrage (similar to provisions in charterparties), as well as for delivery periods of the goods on board.

13. Finally, contracts of carriage evidenced by bills of lading incorporate terms from charterparties, creating a further layer of complexity: a vessel carrying cargo that operates in any way other than with due dispatch is committing the cardinal sin in maritime law of an unlawful deviation.

14. It is clear from the above that the present contractual architecture of international maritime trade stands in the way of a GHG reduction of an order of magnitude equivalent to the entire emissions of a country.

The limitations of past and present efforts

15. There have been great strides in the last fifteen years in the area of weather routing and voyage planning. This has resulted in increased efficiency of individual vessels (unilateral optimisation), but that does not assist with the systemic problem of SFTW.

16. In addition to the unilateral voyage optimization progress, there have been further attempts in two other areas of vessel efficiency: virtual arrival ("VA") and just-in-time arrival ("JiT").

    a. VA attempted to deal with some of the obstacles described above in relation to the split incentives of charterparties. VA is, by its nature, a bilateral contractual mechanism and does not address the wider supply chain. Similarly, it does not address the systemic optimization problem, i.e. the fact that other vessels are proceeding to the same port and would steam at a higher speed in order to gain an advantage.

    b. JiT, on the other hand, targets optimization beyond one individual ship, and operates outside any bilateral relationship between shipowners and charterers of one ship. However, JiT suffers from another weakness: it seeks to optimise port operations at a given port (the variables include the different requirements of individual terminals, tugs, port pilots, customs authorities etc.), rather than optimise the approaching vessels as a distinct system. Moreover, as every port is different, JiT solutions are difficult to deploy at scale.

Decarbonisation and SFTW

17. Operational optimization is no longer merely desirable, but has become an imperative in ocean maritime trade and supply chains: not only does the trajectory towards decarbonisation require existing vessels to become more efficient, but also all new fuels under consideration (methanol, ammonia, hydrogen) have a much lower energy density than present marine fuels. Therefore, future vessels powered by such new fuels will need to operate at maximum fuel efficiency. It is in this context that eradicating SFTW is now an imperative.

18. A illustration of that imperative is the Clydebank Declaration, which has been signed by several governments, including the UK and the USA, and envisages decarbonized routes between certain ports. It is inconceivable that such green corridors can operate alongside the archaic and inefficient operational model of SFTW.

The Blue Visby Solution

19. The Blue Visby Solution[1] ("BVS") is a multilateral optimisation platform consisting of various elements: technological, as well as contractual. It differs from VA and JiT because it approaches SFTW from the perspective of systems optimization, rather than unilaterally (individual vessel voyage planning), or bilaterally (as in VA), or form the perspective of port/berth management (as in JiT). In addition, the Blue Visby Solution includes a contractual mechanism for the sharing of costs and benefits amongst the platform participants, so as to remove the obstacle of split incentives.

[1] Blue Visby is a trademark and the Blue Visby Solution has patent-pending status.

20. The potential for reducing GHG emissions has been modelled on the basis of a sample of about 150,000 voyages of about 12,000 cargo vessels, and produced the results set out in the table below per vessel type:-

Ship type	Number of voyages	Average CO2 savings %
Capesize	10134	12.3
Panamax	11982	11.2
Supramax	16317	12.9
Handysize	14697	11.2
VLCC	2222	8.6
LR2	4759	10.3
LR1	14612	13.7
MR	8311	13.3

21. The Blue Visby Solution is currently being tested and refined by a Consortium of entities with expertise in shipowning, commodities trading, maritime economics, carbon consulting, as well as academics, and other non-commercial entities. In addition, the Blue Visby Consortium is collaborating with the Moller Center for Zero Carbon Shipping and with the Global Maritime Forum, two of the most prominent international NGOs in maritime decarbonisation.

22. The aim of the Blue Visby Solution is to eradicate SFTW, deliver very substantial GHG savings from the existing fleet, and create the operational efficiencies necessary for the era of new fuels, all of which will be more expensive and have a lower energy density than marine fuel oil. The Blue Visby Solution is compatible with every other decarbonisation initiative and is new-fuel-agnostic. The Blue Visby Solution is a neutral, transparent, independent and collaborative platform that leverages the maritime industry's best traditions: concerted action to deal with common perils except that this time it's not a maritime emergency but the climate emergency; and the Blue Visby Solution is delivered through freedom of contract under English law.

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