INTERSESSIONAL MEETING OF THE WORKING GROUP ON REDUCTION OF GHG EMISSIONS FROM SHIPS
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Agenda item 2

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FURTHER CONSIDERATION OF CONCRETE PROPOSALS TO IMPROVE THE OPERATIONAL ENERGY EFFICIENCY OF EXISTING SHIPS, WITH A VIEW TO DEVELOPING DRAFT AMENDMENTS TO CHAPTER 4 OF MARPOL ANNEX VI AND ASSOCIATED GUIDELINES, AS APPROPRIATE

Speed regulation for bulkers and oil and chemical tankers

Submitted by France

SUMMARY

Executive summary:	Considering the urgency to take early action to reach the objective of "peaking" GHG emissions from international shipping as soon as possible, France proposes an additional measure, in complement to a goal-based regulation. The objective of this additional measure is to avoid a speed increase in fleet segments that are highly sensitive to economic fluctuations, the bulk carriers, oil and chemical tankers.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 36
Related documents:	Resolution MEPC.304(72); MEPC.1/Circ.885; MEPC 74/7/8, MEPC 74/7/9, MEPC 74/7/18; ISWG-GHG 5/4/3, ISWG-GHG 5/4/9, ISWG-GHG 5/4/11; ISWG-GHG 4/2/8; MEPC 74/7/4, MEPC 74/7/2 and ISWG-GHG 5/4/1

Introduction

1 In document ISWG-GHG 5/4/11, France proposed a two-step approach consisting in regulating ships' speed by sectors as soon as possible and, in a second run, adopting a global goal-based measure assigning to fleets an annual emission cap (FAEC) based on the emissions of each ship.

2 On the other hand, several delegations submitted documents MEPC 74/7/4, ISWG-GHG 5/4/9, MEPC 74/7/2 and ISWG-GHG 5/4/1 advocating for the immediate development of a goal-based approach for the whole fleet.

3 During discussions at ISWG-GHG 5 and MEPC 74, it appeared that a large number of delegations expressed their preference for "speed optimization" instead of "speed reduction", meaning that while speed reduction is an interesting tool to achieve significant reduction targets, it is not the only one and that flexibility is needed for some ship types.

4 On the other hand, other delegations like Greece in document ISWG-GHG 5/4/3 and France in document ISWG-GHG 5/4/11 stressed that some other ships types would need a mandatory speed regulation in order to be able to actually reduce their speed.

5 Following this debate, France proposes to focus specifically on these ships and to develop a specific regulation for addressing bulk carriers and oil and chemical tankers.

Explanation of the main elements of the proposal ("the concept")

6 While supporting adoption of global goal-based measures for the entire fleet (cf. ISWG-GHG 6/2/7), France proposes an additional specific speed regulation for the sectors of bulkers and oil and chemical tankers for the years 2023 to 2025.

7 During this period, the maximum absolute speed through the water should be limited to 10.5 knots for bulkers and to 11 knots for oil and chemical tankers.

8 Combination between speed regulation and goal-based approach:

.1 speed optimization may be chosen by any ship, among other tools, to achieve the target set by a goal-based measure;

.2 speed reduction, as described above, should be mandatory for bulkers and oil and chemical tankers from 2023 to 2025; and

.3 after 2025, speed will remain as an option, but bulkers and oil and chemical tankers may use other tools, in order to comply with the target of the goal-based measure provides these ships emissions, at least, do not exceed the level reached in 2025.

9 This regulation would not replace in any case the other instruments (goal-based, EEXI, SEEMP, etc.) that will be developed.

Justification of the proposal

10 Among the candidate early measures, speed regulation is often cited. This measure does indeed have several advantages:

.1 recent history has proven it effective: After the 2008 financial crisis, to cope with the slowdown in global economic activity, and the overcapacity of the fleet, companies have reduced the operational speed of their ships. This brought a significant decrease in global GHG emissions from ships as measured by the *Third IMO GHG Study 2014*. This real-life experiment leads to a double finding:

.1 it is possible, at least for certain ships sets, to reduce the ship's operational speed; and

.2 this speed reduction leads to a significant emissions reduction.

.2 It can be implemented quickly: It is the only measure that requires little or no technical adaptation of the ships and several existing technological and legal means enable authorities to enforce vessel's continuous or average speed.

11 Recent experience of slow steaming. Four large sets of ships, covering one or several EEDI categories, can be distinguished based on the recent experience of slow steaming:

.1 those who were able to reduce their speed, who actually did and continue operating at a lower speed (case of containerships): Since the function linking the ship's speed and the emission level is not linear, a further speed reduction would hardly lead to any further significant emission reduction;

.2 those who were unable to reduce their speed for technical reasons, but mainly because of their very activity such as passenger ships;

.3 those for whom speed reduction is not desirable because it would necessarily result in a modal shift to more GHG-emitting modes of transport and, as a result, would lead to higher GHG emissions. For those three sets of ships, France recommends to address speed optimization through a goal based approach such as proposed in document ISWG-GHG 6/2/7 (France and Monaco); and

.4 those who were able to reduce their speed and who actually didn't (or did but could do more, mainly for fear of losing a competitive advantage or because they were bound by contractual obligations) **(case of bulkers and tankers)**. On one hand, they have a significant additional emission reduction potential; on the other hand, there is a real risk for them to speed up again, if the market dictates. It would therefore be wise to develop an international binding regulation, which would frame and limit possible contractual obligations and mandate them to reduce their speed while maintaining a level playing field.

Choice of speed limit

12 The table 1 below shows the average speeds of bulkers and oil and chemical tankers in 2019. The average speed for bulkers is 11.5 kts. The average speed for oil and chemical tankers is 12 kts.

Table 1: Average current speed of the bulkers and oil tankers in 2019

BULKERS FLEET					
Average speed per vessel size	HANDYSIZE [20-40 Kdwt[	SUPRAMAX [40-65 Kdwt[	PANAMAX - POST PANAMAX [65-120 Kdwt[		CAPESIZE - Very Large ORE CARRIER [120-400 Kdwt[
1 Jan 2019 to 15 Sep 2019	11,48	11,65	11,56		11,31
CRUDE/OIL PRODUCTS					
Average speed per vessel size	MEDIUM [35-60 Kdwt[	PANAMAX [60-80 Kdwt[	AFRAMAX [80-120 Kdwt[	SUEZMAX [120-200 Kdwt[	Very Large CRUDE CARRIER [200-325 Kdwt]
1 Jan 2019 to 15 Sep 2019	12,21	12,08	11,76	11,92	12,27

Source: Thomson Reuters Eikon Based on AIS data based on a sample of ships

13 According to these figures, France proposes to set the maximum absolute speed for each ship to 10.5 knots for bulkers and to 11 knots for oil and chemical tankers. Since the main engine power is used to counter the resistance of water, fuel consumption is an exponential function of speed through water. Accordingly, France proposes to regulate the speed through water.

Same goal, different situations and needs implies different approaches with the same stringency

14 Several proposals on goal-based approaches were submitted to ISWG-GHG 5 and MEPC 74 such as documents MEPC 74/7/4, ISWG-GHG 5/4/9, MEPC 74/7/2 and ISWG-GHG 5/4/1. France believes that such a measure is needed to foster both technological innovations and changes in operational practice. Therefore, they support adoption of one of these proposals or of a combination thereof for all ship types with the same level of stringency.

15 Nevertheless, as explained above, whereas certain set of ships will need flexibility in choosing the way to achieve their target, others will require a regulation that is more prescriptive.

16 Anyway, speed regulation is not applicable in the long run, since it does not reward technological innovation, especially in the field of energy efficiency and transition to carbon-neutral modes of propulsion, which are integral for achieving the medium and long-term objectives of the strategy. Thus, it is an excellent transitory and early measure, but it can only be provisional.

17 In order to foster technological innovations that might be motivated by possibility to sail faster whereas emitting it or less GHG, the measure will not be applicable after 2025. Nevertheless, emissions form bulkers and oil and chemical tankers should not at least, exceed the level reached in 2025.

Description of legal nature

18 France proposes amendments to MARPOL Annex VI for mandatory application to any bulker and oil and chemical tankers with more than 400 gross tonnage (see annex 2), including ships not currently subject to EEDI.

19 Guidelines for implementation of the measure and amendments to the existing Port State Control guidelines should be developed by the Organization.

Application of the proposed measure

Scope

20 The measure shall be applicable to any bulker and oil and chemical tankers with more than 400 gross tonnage, including ships not currently subject to EEDI.

Timeline

21 In order to achieve GHG emissions reductions by 2023 and help to peak global emissions from international shipping as soon as possible, the measure should enter into application in 2023.

22 The measure will not be applicable after 2025.

Type of speed regulated

23 The reference speed would be the maximum absolute speed of 10.5 knots through water for bulkers and 11 knots for oil and chemical tankers.

Exemptions

24 Already zero carbon emitting ships, and those, which already comply with the 2025 EEDI standards of their category, would be exempted from the speed regulation. The speed limitation would not be applicable in case of force majeure (especially when the safety of the ship, its crew or other ships is at stake). Those events should be expressly noted in the logbook for further examination by port state's authorities.

Estimation of number of ships affected and expected benefits in terms of GHG emissions reduction

25 According to GISIS database, the numbers of ships affected are: 11,901 for bulkers and 14,883 for oil and chemical tankers. For these two categories together, the GHG reduction is estimated around 10%.

Indication of the additional workload for the Organization

26 The Committee's priority should be to approve and adopt the amendments first. A proposal for amendments to MARPOL Annex VI is attached in annex 2.

27 As soon as MEPC 75 approves the amendments, the Committee should continue its work on the guidelines.

28 In addition, the III Sub-Committee should be requested to consider the issue for the creation of a guideline on port State control, as well as amendments to the resolution on the Harmonized System of HSSC Visits.

29 Finally, France reaffirm its wish that a "standing technical group", as presented in document MEPC 74/7/1 (Secretariat), be set up without delay. The establishment of this group would make it possible to develop the various guidelines necessary for the implementation of the amendments, without any significant impact on the Organization's budget.

If the proposal implies amending MARPOL Annex VI, it should provide in annex the text of draft amendments in the usual format

30 A draft amendment to MARPOL Annex VI is proposed in annex 2.

Review of implementation aspects

Compliance and enforcement

31 AIS data of the ship must include the ship's current speed through water.

32 Ensuring consistent compliance, States would need to ensure that appropriate financial tools (e.g. fines) are put in place to punish non-compliance.

33 Furthermore, additional flag/port State control mechanisms will be put in place to discourage future non-compliance. Notably, flag States shall suspend ship IEE certificate once non-compliances are detected. This would prevent ships from sailing and incurring opportunity costs (forgone revenues owing to inability to use the ship).

34 Furthermore, port State control tools can be put in place to punish and discourage non-compliance. In addition to fines, PSC could either arrest the ship for a number of weeks/months to discourage non-compliance or enforce de-prioritised access to port or port services preventing the discharge of cargo and cancelling the commercial gain of sailing over the speed limit.

Initial impact assessment, as per the procedure for assessing impacts on States of candidate measures (MEPC.1/Circ.885)

35 The initial impact assessment is set out in annex 1 to this document.

Action requested of the Working Group

36 The Group is requested to consider the elements contained in this document and in particular to invite the Committee to schedule and initiate the work with the aim of being able to submit for approval of MEPC 75 a draft amendment to MARPOL Annex VI stetting a speed regulation as an early measure as presented above.

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ANNEX 1

INITIAL ASSESSMENT OF IMPACTS

Introduction

This appendix is written in accordance with the circular MEPC.1/Circ.885 of 21 May 2019. In accordance with paragraph 8 of the circular, each "impact" item presented below presents the description thereof, its quantification as well as its positive and negative aspects if any.

The impact of potential gains for operational measures is documented, for example, in the OECD (2018) study. The GHG reduction potential by influencing the speed parameter varies from 0% to 60% depending on the speed reduction value. It is today the only operational parameter that can provide such a reduction in the context of rapid implementation.

Measures	CO_2 emissions reduction potential
Speed	0-60%
Ship size	0-30%
Ship-port interface	1%
Onshore power	0-3%

(source OECD 2018)

Speed has been the subject of numerous studies that have already largely assessed the various possible impacts of the variation of this parameter regarding emissions, ship operations and potential cost.

1 Impacts on ships and emissions

Investments

The proposed measure does not impose any technological option. It imposes no additional investment for new or existing ships.

This operational measure does not request investments for ships. In addition, the measure helps reduce the cost of operating the ship (see paragraph 5 below).

The only provision that can generate additional cost is the need for new setting of the AIS transmitter to add speed through water in the ship's AIS data.

Safety

Regarding technical impacts, changing the speed requires modifying some engine settings. However, the technique of "slow steaming" is already implemented in many companies with existing ships, without particular problems.

For new ships, the minimum power requirements should be framed in EEDI to ensure that safety conditions are not jeopardized. Current work on the principle of Shaft Power Limitation (MEPC 74/5/5 (France et al.)) will facilitate the implementation of these provisions.

Emissions

As an example, the 2009 Stopford study shows the potential for reducing consumptions of a Panamax bulk carrier.

Speed	Main engine fuel consumption	Fuels savings
[kn]	[tons/ day]	[%]
16	44	0%
15	36	17%
14	30	35%
13	24	45%
12	19	58%
11	14	67%

Source: Stopford (2009), own calculations.

So does the 2017 CE Delft study (Regulating speed: a short-term measure to reduce maritime GHG emissions)

Table 6 - Average annual CO_2 emission savings in the period 2018-2030

[Mt]	10% speed reduction	20% speed reduction	30% speed reduction
Container fleet	34	62	85
Dry bulk fleet	32	59	83
Crude & product tanker fleet	10	19	25
Total	76	140	193

Source CE Delft

Reducing CO_2 emissions through a reduction in fuel oil combustion will mechanically reduce emissions of other pollutants such as SO_x, NO_x and Black Carbon.

Speed reduction also has benefits in reducing ship noise and also limits the risk of collisions with cetaceans.

Impacts on world fleet

Decreasing the speed of ships may lead to increase the number of ships. This relationship has already been documented by IMarEST in 2010:

$$F_1 = F_0 \left(\frac{\frac{DAS}{1-\Delta s} + (365 - DAS)}{365} \right)$$

Where
F_0 – the number of ships of ship type and size category in the fleet
DAS – days at sea per year for ship type and size category
Δs – speed reduction as % of the baseline speed.

The CE Delft study of 2017 showed that the impact of the increase in the number of ships due to a constant demand for transport supply from the market was relatively low (around 4% to 6% of emissions reductions achieved) not really undermining the benefit of the speed optimization measure.

In the specific case of bulkers and oil or chemical tankers, it is very unlikely that additional ships will be needed, since those both segments have been experiencing chronic overcapacity since 2010.

This overcapacity is illustrated by the remaining low freight rates in these sectors and by the fact that, despite spontaneous speed reductions (- 2.5 knots since 2010 for bulk) no new additional ship has entered the fleet.

	10% speed reduction	20% speed reduction	30% speed reduction
Container fleet	7% (6-8%)	15% (14-18%)	26% (23-30%)
Dry bulk fleet	6% (5-6%)	13% (12-14%)	22% (21-25%)
Crude & product tanker fleet	5% (5-8%)	12% (11-17%)	21% (18-29%)
Total	**6%**	**13%**	**23%**

(Percentage ranges in brackets give fleet growth range, depending on ship size categories.)

Growth of active fleet required in 2018 in terms of number of ships
(source CE Delft)

2 Geographic remoteness of and connectivity to main markets

A decrease in speed leads to longer travel times, which could result in additional supply chain costs for shippers. Nevertheless, studies show that this impact on cost is low as developed below.

3 Cargo value and type

Several studies have moved beyond theoretical considerations to see whether slow steaming impacts the import prices of certain products, if additional operating costs occur, and are passed through to consumers.

Krammer (2016) estimated the value of time for seaborne shipping for multiple types of manufactured goods, which ranged from 0.04€ per tonne per hour for manufactured food to 1.08€ per tonne per hour for machinery and vehicles. Based upon the formula by Krammer (2016) that time costs are equal to the value of time multiplied with the transit time, a key finding from the study is that a longer travel time will result in relatively higher costs for machinery and vehicles than for manufactured food products.

However, it is important to firstly acknowledge that the share of the shipping cost in the total value of the import is likely to be considerably lower for products with a higher value to weight ratio and secondly the longer travel time may not necessarily result in switching from distant exporters to nearby exporters as it crucially depends upon whether exporter substitutes are available to the importing country.

According to CE Delft (2017), "the impacts of slow steaming on [the] economies of exporting countries that are far removed from their main markets are modest". In their study, CE Delft (2017) focus on trade from Argentina to the Netherlands for (…) oil cake and estimate the extra transit days associated with a speed reduction of 10%, 20% and 30% and to then calculate the additional interest expense (derived by multiplying the value of exports in year *t* by an assumed annual interest rate of 10% and by the ratio of the extra days travelled relative to the number of days in a year) and the additional insurance expense (derived by the multiplying the extra travel days by an assumed fixed daily insurance cost of 2% of the total value). (..) The study illustrates that the additional expenses calculated as a result of a speed reduction were minimal, ranging from 0.08% to 0.31% of the total value for oilcake exports.

Source: Healy and Graichen (2019), Impact of slow steaming for different types of ships carrying bulk cargo, Öko- Institut e.V.

Speed reduction	Extra travel days	Additional interest expense (€ 1,000)	Additional insurance expense (€ 1,000)	Total additional expenses (€ 1,000)	Additional expenses % of total value
10%	2.42	254	51	305	0.08%
20%	5.45	572	114	686	0.18%
30%	9.35	980	196	1,176	0.31%

Source: CE Delft calculations based on Eurostat. EXTRA EU Trade Since 2000 By Mode of Transport (HS6).

4 Transport dependency

In view of the different studies, and provided that the reduction in speed is not more than 30%, the speed optimization measure constitutes a gain in terms of operation. However, the flow of goods could be slowed down.

However, in the bulk and tanker sectors where transport overcapacity exists, the issue of slowing flows will be less relevant than in sectors with no overcapacity.

5 Transport costs

The OECD Ronald A. Halim 2018 study presented the intensity of CO_2 emissions along major shipping route

Visualisation of CO_2 emission across global shipping routes in 2015 (top) and 2035 (bottom)
Source: OECE, Ronald A. Halim, 2018

Different projections for shipping's CO_2 emissions to 2035
Source: OECE, Ronald A. Halim, 2018

The Rodrigue and Notteboom study of 2012 highlights that the cost of shipping represents only a small part of the total cost of transportation. In particular, 80% of the transport cost is linked to land transport.

The UNCTAD study of 2017 mentions that average transport costs represent about 21% of the value of "for least developed countries" imports. As mentioned in the Öko-Institut e.V. study of 2019, this means that on average, sea freight costs represent only about 4% of the cost of the final product. A change in transport costs, for example for bulk, will have a negligible impact in almost all cases.

For other countries, the potential impact on product prices will be even lower than average transport costs worldwide averaging only 15% of the value of imports (UNCTAD 2017).

The Öko-Institute eV study of 2019, studied the case of bulk carriers, considering several scenarios for the fuel cost (between US$750 / ton and US$250 / ton), for the cost of chartering (between US$5,000 and US$15,000) or the rate of use of auxiliaries. In the case presented below, which concerns a Panamax class ship, considering the median values (fuel, charter and auxiliary cost), the speed reduction generates a reduction in the cost of the trip which can reach a value of 30%.

The main objective of slower steaming – to reduce energy consumption and thereby CO_2 emissions – will bring the freight costs down. Unlike the other elements discussed here this parameter does not depend on the extra days at sea for each trip. The relationship between speed reduction and fuel consumption is based on Stopford (2009).

The cost-increasing elements depend only on the time at sea and scale linearly with the speed reduction.

The fuel consumption of the main engines on the other hand decreases by a cubic function. Speed reductions closer to the standard speed will have the highest relative fuel saving compared to additional reductions when already steaming well below the standard speed. Owing to these two contravening effects, there is a break-even point where additional speed reductions will not be viable from an economic point of view.

Based upon the outcomes of previous research into the impact of slow steaming, the financial benefits are likely to offset the additional operational costs, at least in theory, especially if the carrier maximises all the advantages of slow steaming i.e. such as enabling the carrier to absorb excess fleet capacity during periods of low demand.

In each of the scenarios, the adoption of progressively higher speed reductions extends the number of days at sea and this results in additional bulk freight costs (i.e. the longer voyages due to the introduction of speed reductions leads to an increase in operational, capital and revenue costs).

However, based upon our analysis these additional bulk freight costs are offset by the lower fuel costs in the majority of the scenarios, unless the fuel price is very low or a "break-even point" speed reduction is exceeded where the marginal fuel cost reductions no longer offset the marginal operational cost increases under slow steaming. The reason for this is that the extra time has a linear relationship with the speed reduction whereas the marginal benefits of reducing speed on fuel consumption are highest at full speed and decrease the slower a ship is already going. Even in circumstances where slow steaming may result in an increase in bulk freight costs (i.e. under the assumption of low fuel costs or high daily earnings), it likely to only have a negligible impact on product prices in most cases as maritime transport only accounts for a minor share of the total transport costs of a product.

The results of the study also demonstrate that the impact of slow steaming on the total costs of smaller ships, such as Handysize bulk carriers, is considerably less than for larger ships such as either Panamax or Capesize bulk carriers. This is due to the fact that the relative importance of time-based costs (i.e. crew, insurance, capital costs etc) compared to fuel costs are higher for smaller ships than for larger ships. The same relative fuel savings therefore have a lower impact on the total costs of the trip.

Finally, it is important to add that changes to the bulk freight costs of an individual ship will not necessarily lead to a corresponding adjustment to freight rates. The extent to which changes to freight costs will be passed through to freight rates will ultimately depend on the market situation and this topic may warrant further research in the future.

Source Öko-Institute eV study of 2019

Another parameter must be taken into consideration. This is the "design speed" especially considering the impact of the change in speed on engine performance. Several studies have documented this negative impact. In particular, the 2012 study (Yu, et al., 2012) presents the example of a ship equipped with a slow engine at which a 33% speed reduction is applied. In this case, the engine runs at only 25% of its MCR. The authors show that in this case there is a deterioration of the yield of 12% and the saving of fuel is only 67% instead of 71% because of the yield loss. A speed reduction of 33% is an important value. However, the additional consumption due to the significant difference between the speed and the "design speed" remains relatively weak. This example simply demonstrates that the consumption gain related to a reduction in speed is very much higher than an additional consumption linked to a lower efficiency of the propulsion system.

In operation, the ship's fuel consumption depends on its hull condition and the speed of travel. Ships are designed in such a way that the hull and power plant are optimized for a certain design speed. Operating a ship at lower speeds therefore results in fuel savings because of the reduced water resistance, which is proportional to the cube of the proportional reduction in speed (Stopford 2009).

The following formula to express this relationship was advanced by Stopford (2009):

$F = F^* (S/S^*)^a$
Where:
F is the actual fuel consumption (tons/day),
S is the actual speed,
F* the design fuel consumption,
and S* the design speed.
The exponent (a) is equivalent to a value of 3 for diesel engines following the cube rule that the level of fuel consumption is strongly influenced by speed.

This relationship is exemplified by Stopford (2009) for a Panamax bulk carrier in table 2 to show how lower speeds can significantly reduce fuel consumption. However, fuel consumption, in reality, is likely to also vary depending upon additional factors such as the ship's draft and displacement, weather force and direction, hull and propeller roughness (Bialystocki and Konovessis 2016).

Source: Stopford (2009).

MODAL SHIFT

Furthermore, the risk of slow steaming leading to a shift to other modes of transport has also been recently dismissed by Halim et al. (2018) on the basis that demand for shipping is inelastic.

Table 9 below shows the impact of a 100% increase of sea transport costs.

Table 9. Impact of increased sea transport cost on modal share of international freight transport.

	Baseline 2030 (MTonnes)	Share (%)	100% Increase in Maritime Transport Cost (MTonnes)	Share (%)	Difference in Share (%)	Differences in Weights (MTonnes)
Air	70	0.33	72	0.34	0.01	2.60
Rail	598	2.84	611	2.90	0.06	13.17
Road	2539	12.06	2557	12.15	0.09	17.92
Sea	17,813	84.65	17,780	84.49	−0.16	−33.70
Waterways	22	0.11	22	0.11	0.00	0.01

Source Halim et al. (2018)

This risk is particularly low in the sector of bulker and oil or chemical tankers: for bulk, the only alternative transport mode is rail for which transport cost are much higher, capacity smaller and transoceanic connections non-existent; for oil or chemical tankers, the main alternative transport mode is pipes, which are not available for many routes and, anyway, less GHG emitting as shipping.

The recent experience in spontaneous slow steaming (- 2.5 kts since 2010 for bulk) shows no sign of any modal shift.

6 Food security

For the territories highly dependent on maritime connections, the size and type of vessels providing this type of voyage might have to be adapted.

7 Disaster response

MARPOL Annex VI regulation 3.1.1 exempts from the application of this Annex any emission necessary to ensure the safety of a ship or to save lives at sea. This proposal is in line with this principle.

SEEMP flag State certification can only be delivered if the proposed provisions do not contradict the provisions of other conventions such as SOLAS in particular.

8 Cost-effectiveness

The cost-effectiveness ratio results from the analysis presented in paragraph "5 Transport Cost" and "1 Impacts on ships and emissions». This cost-effectiveness ratio is a function of a very large number of parameters (fuel cost, vessel size and types, presence or absence of overcapacity, type of operation, etc.) and a global response would be very imprecise.

The Öko-Institut e.V. study of 2019 presents these different cases for bulk carriers. For this fleet, it is clear that reducing the speed to a certain threshold, depending on the size of the vessels, has a significant efficiency in reducing emissions and a significant decrease in the cost of operation. We can therefore state that for this category the benefit of a speed optimization measure is important.

9 Socio-economic progress and development

The proposed measure should have no impact, either positive or negative, on socio economic progress and development.

10 indicate both positive and negative potential impacts

In view of the elements presented above (paragraphs 1 to 9) the following elements can be considered as negative impacts related to the implementation of an objective approach based on speed optimization:

.1 low risk of modal shift for some shipping lines;

.2 low cost of shipping;

.3 limited impact for countries highly dependent on maritime transport; and

.4 low impact on the increase in the number of vessels needed to maintain a constant transport flow.

The possible positive impacts are as follows:

.1 abatement capacity in line with the IMO GHG strategy;

.2 respect of the deadline of 1 January 2023; and the goal of capping emissions as soon as possible;

.3 taking into account the efforts made in the framework of EEDI;

.4 the consequences of speed limitation are:

.1 significant reduction in ship consumption (example for bulk carrier 1kt = 17% fuel economy);

.2 reduced cost of operating vessels;

.3 investment required for the vessel and infrastructure;

.4 no impact on safety subject provides the SHAPOLI mechanism is implemented;

.5 maintaining the competitiveness of maritime transport with respect to other modes of transport;

.6 possible implementation without delay; and

.7 no impact for emergency situations.

11 References

.1 Stopford, Martin. 2009. *Maritime Economics*, 3rd Edition, London/New York: Routledge;

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.3 Healy and Graichen (2019), *Impact of slow steaming for different types of ships carrying bulk cargo,* Öko- Institut e.V;

.4 *Regulated Slow Steaming in Maritime Transport - An Assessment of Options, Costs and Benefits* – Jasper Faber , Dagmar Nelissen, Galen Hon, Haifeng Wang, Mikis Tsimplis – Delft,CE Delft, February 2012;

.5 *Regulating speed: a short-term measure to reduce maritime GHG emissions* – Jasper Faber, Thomas Huigen, Dagmar Nelissen – Delft, CE Delft, 18 October 2017;

.6 Smith, T. et al. (2016), *CO_2 emissions from international shipping: Possible reduction targets and their associated pathways*, prepared by UMAS, London, October 2016.

.7 UNCTAD (2017), *Review of Maritime Transport*, United Nations Conference on Trade and Development, Geneva

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ANNEX 2

DRAFT AMENDMENTS TO MARPOL ANNEX VI

(Operational speed limits for bulk carrier and oil or chemical tankers)
(shown as additions/~~deletions~~)

Regulation 22B
Speed limitation

This regulation is applicable between 1 January 2023 and 31 December 2025

Any bulk carrier, oil and chemical tanker of more than 400GT may not have a maximum speed greater than 10.5 knots through water.
Any oil and chemical tanker of more than 400GT may not have a maximum speed greater than 10.5 knots through water.

This provision shall not apply to a ship using decarbonized energy nor to ships complying with the 2025 EEDI standards of their category.