EUROPEAN UNION MONITORING, REPORTING AND VERIFICATION REGULATION AND ITS POSSIBLE FUTURE CONSEQUENCES FOR THE PORT OF PIRAEUS

EFSTATHIOU PANAGIOTIS
SUPERVISOR: Dr. LEKAKOU MARIA
## ABSTRACT

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ABSTRACT

This thesis aims to enlighten the issue of the Monitoring Recording and Verification (MRV) regulation enforcement by the European Union concerning the carbon dioxide emissions of the shipping industry. Initially, there is a description of the overall need of environmental action, its main actors and the overall EU environmental contribution during the past years, commencing from the very beginning of its environmental policy. Furthermore, there is a presentation of the general attempt to reduce the CO2 emissions of the shipping sector and a presentation of the legal framework imposed in the new regulation. Following, there is an analysis of the monitoring plan and all of its adaptation methods. Moreover, the possible market-based measures that derive from the MRV regulation are assessed and at the same time the potential economic and social consequences of the measures are analyzed. Finally through the gathering and the thorough study of opinions, interviews and scientific reports deriving from various shipping and political actors, a conclusion has been reached about the advantages and the disadvantages of the new regulation, alongside with future propositions.

1. INTRODUCTION: EU ENVIRONMENTAL POLICY

The European Union (EU) is considered by some to have the most extensive environmental laws of any international organization. Its environmental policy is significantly intertwined with other international and national environmental policies. The environmental legislation of the European Union also has significant effects on those of its member states. The European Union’s environmental legislation addresses issues such as acid rain, the thinning of the ozone layer, air quality, noise pollution, waste and water pollution. The Institute for European Environmental Policy estimates the body of EU environmental law amounts to well over 500 Directives, Regulations and Decisions.
1.1 The beginnings of the EU's environmental policy

The Paris Summit meeting of heads of state and government of the European Economic Community (EEC) in October 1972 is often used to pin point the beginning of the EU’s environmental policy. A declaration on environmental and consumer policy was adopted at this summit which requested the European Commission to draw up an action program for environmental protection. This (first) Environmental Action Program was adopted in July 1973 and represented the EU’s first environmental policy. Furthermore, the task force within the Commission that drew up this action program eventually led to the formation of a Directorate General for the Environment.

The primary reason at that time for the introduction of a common environmental policy was the concern that diverse environmental standards could result in trade barriers and competitive distortions in the Common Market. Different national standards for particular products, such as limitations on vehicle emissions for the lead content of petrol, posed significant barriers to the free trade of these products within the Economic Community (EC). An additional motivation driving the EU’s emerging environmental policy was the increasing international politicization of environmental problems and the growing realization from the beginning of the 1970s that environmental pollution did not stop at national borders, but had to be addressed by cross-border measures. At that time there was no mention of environmental policy in the founding treaties of the EU and therefore no explicit Treaty basis which underpinned EU environmental policy. However, the Treaty text was interpreted dynamically enabling environmental policy to be regarded as an essential goal of the Community, even though it was not explicitly mentioned. It was not until the middle of the 1980s and the signing of the Single European Act in 1986 that economic and ecological objectives were put on a more equal footing within the Community.
1.2 Main actors

EU environmental policy is shaped by a variety of actors including all of the main EU institutions as well as lobby groups which makeup the wider Brussels policy making community.

Member states shape EU environmental policy by working within the Council of Ministers. The Council is a central actor in decision making in the EU sharing its decision making power with the European Parliament under the ‘ordinary legislative procedure’. There are different Council formations (made up of ministers responsible for particular policy areas) one of which is the Environment Council. The number of Environment Council meetings has increased significantly over time. Heads of state meet in something different – the European Council – which until recently had very little to do with environmental policy. However, more recently the European Council has played an important role in EU climate change policy in particular.

The European Commission not only has an exclusive right to propose new environmental policy, but it also has a responsibility to ensure the implementation of environmental rules. Therefore, since its creation in the 1950s the European Commission has been at the heart of the European Union. However, it did not set up a unit dedicated to environmental issues until the 1970s and a full Directorate General for the environment until 1981. Initially DG Environment was perceived as a relatively weak DG but it has gradually become more assertive through the development of technical and political expertise. However, the Commission still has to depend on member states to implement its policies.

Traditionally, the European Parliament gained a reputation as a champion of environmental interests within the EU where it provided an access point for those excluded from decision making and a voice for green political parties. However, it was a reactive and relatively weak institution. More recently the Parliament has
benefited from treaty changes that have made it a co-legislator with the Council of Ministers. However, the empowerment of the Parliament seems to have reduced its green credentials as it now appears less willing to adopt green amendments.\footnote{11}

Over the last 40 years the EU has attracted the interest of a vast number of lobby groups including environmental NGOs. As early as 1974, environmental groups from all the member states established a central representation in Brussels, founding the European Environmental Bureau. Other environmental NGOs only set up shop in Brussels from the late 1980s onwards.\footnote{12} European institutions, especially the European Commission, provide relatively easy access to these groups compared to some national governments.\footnote{13} The European Commission has even actively encouraged their participation in policy making by setting up consultative committees and other bodies, and providing funds to establish and maintain certain core groups.\footnote{14}

\section*{1.3 The EU as a global environmental actor}

The EU is an important – even an ‘influential’ – actor in international environmental negotiations. Therefore, if one wants to understand the processes and outcomes of international environmental negotiations, one needs to be familiar with the role that the EU plays there. Also, developments at the international level have an influence on the EU, its policies and the extent to which it can be a global actor. Hence, European and international environmental politics and policies are constantly interacting and thus mutually constitutive.\footnote{16}

The EU is a party to all major Multi-lateral Environmental Agreements covering a whole variety of environmental issues. The EU is also able to fully participate in international environmental negotiations, either as an observer in the UN context or as a party to the mother treaty in various Conference of the Parties (COPs) and Meeting of the Parties (MOPs). The EU is often observed as a leader in global
environmental politics, but its leadership role can nowadays also be questioned, especially in the area of climate change. The EU’s international climate change policy consists of three building blocks (environmental integrity, multilateralism, a legally binding instrument), which are under pressure in the context of the current climate change negotiations. As in other areas of external action, the EU’s external environmental policy is often characterized by a mismatch between its ambitions and its ability to deliver in practice.

1.4 Environmental protection

When the EEC was established, environmental protection, let alone the broader concept of sustainable development, was not perceived as an important policy issue. The concept of sustainable development contains environmental, social and economic dimensions; finding practical ways to balance the three is widely regarded as a key challenge. The EU policies in the field of sustainable development evolved as a result of the interaction between internal political drivers and the EU’s response to a number of key UN conferences. One such influential conference was the first UN Conference on the Human Environment held in Stockholm in 1972. This not only addressed the environmental concerns of the industrialized countries in the North, but also, the development concerns of countries in the South. Sustainable development was only mentioned in European Council Conclusions for the first time in 1988. Wavering political support for ‘sustained growth’ and/or ‘sustainable development’ continued for some years and reveals just how ambivalent attitudes were to the concept. The 1997 Treaty of Amsterdam eventually ensured the formal recognition of sustainable development as a legal objective under the Treaties. Subsequently, the EU’s commitment to sustainable development was formalized as one of the EU’s fundamental goals. In 1997, the EU committed itself to draw up a ‘national’ strategy for sustainable development by 2002. The Commission published a Communication on a
European Union Strategy for Sustainable Development in 2001 which was discussed at the Göteborg European Council\(^\text{19}\). However, this strategy suffered from several governance weaknesses which inhibited its implementation. In particular, the Strategy has been heavily affected by its ambiguous relationship to the Lisbon Strategy for growth and jobs, which has received far higher political priority\(^\text{18}\). The political and institutional crisis that faced the EU in 2005 after the rejection of the EU Constitution pushed the Sustainable Development Strategy back up the political agenda. A ‘renewed’ SDS was subsequently adopted by the EU Council in 2006. The renewed strategy contained more detailed arrangements for implementation, monitoring and follow-up. The legal formalization of the EU’s commitment to sustainable development as a policy objective was completed by the Lisbon Treaty. Sustainable development is now repeatedly mentioned in the Treaties: as a basic objective of the EU in the new Article 3 TEU; in Article 21 TEU concerning the external action of the Union; and in Article 11 TFEU setting out the integration principle. The EU is now legally committed to pursue sustainable development both internally and externally (i.e. in its relations with ‘the wider world’). This legal commitment led to the setting up of an impact assessment process to be done ex ante, i.e. before the fact, to ensure that all future EU legislation would conform to the principles of sustainable development as laid down in the EU Strategy for Sustainable Development. In fact, multiple processes of impact assessment emerged: Commission-wide Impact Assessment for all future EU legislation\(^\text{20}\), Sustainability Impact Assessment (SIA) for DG Trade\(^\text{21,22}\) and Integrated Sustainability Assessment (ISA) as envisioned in EU-funded research projects such as MATISSE, In-Context and VISION RD4SD, which has been recommended for consideration as a methodology for future global assessments\(^\text{23}\).
2. EU ENVIRONMENTAL POLICIES FOR SHIPPING MRV

2.1 Reducing emissions from the shipping sector

Shipping is a large and growing source of the greenhouse gas emissions that are causing climate change. The European Union wants a global approach taken to reducing emissions from international shipping. As a first step towards cutting emissions, the European Commission has proposed that owners of large ships using EU ports should report their verified emissions from 2018. Emissions from the global shipping industry amount to around 1 billion tonnes a year, accounting for 3% of the world's total greenhouse gas (GHG) emissions and 4% of the EU's total emissions. Without action, these emissions are expected to more than double by 2050. This is not compatible with the internationally agreed goal of keeping global warming below 2°C, which requires worldwide emissions to be at least halved from 1990 levels by 2050.

2.2 The general EU's strategy

The Commission's 2011 White Paper on transport suggests that the EU's CO₂ emissions from maritime transport should be cut by at least 40% of 2005 levels by 2050, and if feasible by 50%. However, international shipping is not covered by the EU's current emissions reduction target. In June 2013 the European Commission set out a strategy for progressively integrating maritime emissions into the EU's policy for reducing its domestic greenhouse gas emissions.

The strategy consists of three consecutive steps:

- Monitoring, reporting and verification of CO₂ emissions from large ships using EU ports.
- Greenhouse gas reduction targets for the maritime transport sector.
- Further measures, including MBMs, in the medium to long term.²⁴
Co-Decision making and legislative flow chart of the European Commission:

1. Proposal from Commission
2. First reading by EP position
3. Amended proposal from Commission
4. First reading by Council
5. Council approves all EP's amendments
6. Council can adopt act as amended (without further amendments and in the wording of EP's position)
7. EP has approved proposal without amendments
8. Council can adopt act (without amendments and in the wording of EP's position)
9. Council position at first reading
10. Communication from Commission on Council position at first reading
11. Second reading by EP
12. EP approves common position or makes no comments
13. Act is deemed to be adopted
14. EP rejects Council position at first reading
15. Act is deemed not to be adopted
16. EP proposes amendments to Council position at first reading
17. Commission opinion on EP's amendments
18. Second reading by Council
19. Council approves amended Council position at first reading (i) by a qualified majority if the Commission has delivered positive opinion (ii) unanimously if the Commission has delivered negative opinion
20. Act adopted as amended
21. Council does not approve the amendments to the Council position at first reading
22. Conciliation Committee is convened
23. Conciliation procedure
24. Conciliation Committee agrees on a joint text
25. EP and Council adopt act concerned in accordance with joint text
26. Act is adopted
27. EP and Council do not approve joint text
28. Act is not adopted
29. Conciliation Committee does not agree on joint text
30. Act is not adopted
2.3 Monitoring, reporting and verification of ship carbon dioxide emissions

At the same time as publishing a Communication setting out the strategy, the Commission put forward a legislative proposal as the first step in the strategy. The Commission proposal has been adopted on 29 April 2015 as Regulation (EU) 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC. This Regulation seeks to establish an EU system for monitoring, reporting and verifying (MRV) emissions from large ships using EU ports. The shipping MRV Regulation will apply to shipping activities carried out from 1 January 2018 in relation to EU ports.

The EU system for monitoring, reporting and verifying shipping emissions is designed to contribute to building an international system. First steps in this direction have already been taken at the IMO, with active support from the EU and partner countries. By yielding further insights into the sector's potential to reduce emissions, the EU-shipping MRV system will also provide new opportunities to agree on efficiency standards for existing ships.26 The Shipping MRV Regulation creates an EU-wide legal framework for collecting and publishing verified annual data on CO₂ emissions and energy-efficiency related information from all large ships (over 5 000 gross tons) that use EU ports, irrespective of where the ships are registered.

From January 2018 onwards, companies will have to monitor and report the verified amount of CO₂ emitted by their large ships on voyages to, from and between EU ports. Companies are also required to provide certain other aggregated annual information, such as data to determine the ships' energy efficiency.

A valid document of compliance issued by an independent verifier has to be carried on board of ships having performed shipping activities falling under the shipping MRV Regulation during the previous year when visiting EU ports and might be subject to inspection by Member States' authorities.27

The Japan P&I Club has published an article on its website to provide a summary of the latest developments regarding the Implementation Requirements for the Monitoring, Reporting and Verification of CO₂ emissions from vessels (EU MRV). The new EU Regulation 2015/757 came into force on 1 July 2015.
The Regulation follows the European Parliament’s Resolution of 5th February 2014, which called upon the Commission and Member States to set a binding target of reducing domestic greenhouse gas emissions by at least 40% compared with levels observed in 1990.

Maritime transport has an impact on the global climate and on air quality, as a result of carbon dioxide and other emissions. CO2 emissions from international shipping, related to the European Union alone, increased by 48% between 1990 and 2007. However, as yet international maritime shipping remains the only means of transportation which has not been included in Community proposals to reduce greenhouse gas emissions.

In light of the developing scientific understanding of the impact of maritime transport on the global climate, it has been decided that this should be assessed regularly and that the European Commission should consider implementing policies and measures to reduce both CO2 emissions and other kinds of emissions from vessels in future. According to data provided by the IMO, the energy consumption and emissions of ships could be reduced by up to 75% by applying operational measures and implementing technologies which already exist. It is believed that the best option for reducing CO2 emissions from shipping is to set up a system for monitoring, reporting and verification (MRV) of CO2 emissions based on the fuel consumption of ships. The MRV system is set out in the form of a Regulation due to the complex and highly technical nature of the provisions introduced the need for uniform rules applicable throughout the European Union, and to facilitate implementation of these proposals throughout the European Union.

2.4 Methods for determining CO2 Emissions

Article 4 of the regulation sets out ‘common principles’ for monitoring and reporting. For each ship with a gross tonnage above 5000GT, ship owners must provide a complete report covering CO2 emissions from the combustion of fuels whilst ships are at sea as well as at berth. It is important to apply appropriate measures to prevent any gaps in the data – the whole period must be covered (Article 4(2)). The data produced must also be accurate – the burden is on the ship owner to identify the source of any inaccuracies and prevent them (Article 4(5)) Monitoring and reporting must also be consistent. The same monitoring methods
and data sets should be used so that the data acquired can be compared overtime and any increase or decrease in emissions can be accurately monitored (Article 4(3)). The monitoring data itself must be collected and documented in a transparent manner. This will enable any independent verifier to reproduce the methods used to determine the vessel’s CO2 emissions (Article 4(4)).

Article 5 of the Regulation sets out specific methods for monitoring and reporting vessel emissions, as well as other relevant information, by reference to Annexes I and II. By Article 5(1) any of the methods set out in the Annexes may be used to determine CO2 emissions and other relevant information.

Four methods for determining CO2 emissions are given in the Regulation, as set out in the following formulae: (from Annex I):

\[ \text{Fuel consumption} \times \text{emission factor} \]

For the emission factor, default values shall be used unless the company decides to use the fuel quality data set out in the bunker delivery note for that fuel.

For the actual consumption of fuel, Annex I provides the following approved methods:

**Method A: Bunker Delivery Notes and Periodic Stock-Takes of Fuel Tanks**

This method is based on the quantity and type of fuel as defined in the bunker delivery notes, compared with information gained from periodic stock-takes. The fuel at the beginning of the monitoring period, plus deliveries, minus fuel available at the end of the period and de-bunkered fuel will indicate how much fuel has been consumed.

Fuel tank readings must be carried out by methods such as automated systems, soundings and dip tapes. Whichever method is used, it must be specified in the monitoring plan. (See below.)

**Method B: Bunker Fuel Tank Monitoring On-Board**

This method is based on fuel tank readings for all the fuel tanks on board. The readings must take place daily when the ship is at sea and each time the ship is bunkering or de-bunkering. The cumulative variations of the fuel tank level between two readings will constitute the fuel consumed over the period, which might be the time between two port calls or time spent within a port.

As above, the method of taking fuel tank readings must be an ‘appropriate method’ and be specified in the monitoring plan.
Method C: Flow Meters for Applicable Combustion Processes

This method is based on measured fuel flows on board. The data from all the flow meters linked to relevant emission sources will be combined to determine all fuel consumption for a specific period. Again, the period might be the time between two port calls or time spent within a port.

Method D: Direct Emissions Measurement

This method may be used for voyages within the scope of the Regulation and emissions occurring in ports located in a Member State’s jurisdiction. For ships on which reporting is based on this method, fuel consumption will be calculated using measured CO2 emissions and the applicable emission factor of the relevant fuels. This method is based on the determination of CO2 emission flows in exhaust gas stacks (funnels) by multiplying the CO2 concentration of exhaust gas by the exhaust gas flow.

2.5 Monitoring Plan

Under Article 6(1), by 31st August 2017 a monitoring plan must be submitted to the verifiers which indicate the method chosen to monitor and report emissions and other relevant information. Each ‘company’ must submit a separate plan for each ship to which the Regulation applies. Should ships fall within this Regulation only after the 31st August 2017, the plan must be submitted without undue delay (Article 6(2)).

The monitoring plan is meant to be a complete, transparent documentation of the monitoring methodology for the specific ship. It must contain:

1. a) the identification and type of ship (including its name, IMO number, port of registry and owners’ name);
2. b) contact details for the ‘company’ responsible for monitoring and reporting;
3. c) a description of the emission sources on board (the main engines, auxiliary engines, gas turbines, boilers, inert gas generators) and the fuel types used;
4. d) a description of procedures, systems and responsibilities used to update the list of emission sources;

5. e) a description of procedures used to monitor the completeness of the list of voyages;

6. f) a description of the procedures for monitoring fuel consumption, emission factors for each fuel type used (including how these were calculated in the case of alternative fuels);

7. g) a description of the procedures used to determine activity data per voyage, a description of the method to be used to determine surrogate data (in the case of data gaps); and

8. h) A revision record sheet to show any revisions which have been made.

As can be seen from the above this is a comprehensive document and therefore templates will be provided in order to streamline and standardize this process. The form these will take is as yet undecided, but it is indicated by Article 6(4) that these will be determined by means of implementing acts in the near future.

Under Article 7, the company is required to modify the monitoring plan in certain situations:

1. a) if there is a change of company (i.e. another party takes on that role in relation to the vessel);

2. b) if there are new emission sources or fuels are used which are not yet referred to in the monitoring plan;

3. c) where there is a change in the availability of data (e.g. because new methods are being used to collect it);

4. d) where data resulting from previously used methods has been found to be incorrect; or

5. e) if the monitoring plan does not conform to the above requirements. (If the monitoring plan does not conform, the verifier will request that the company modifies the plan. In other circumstances, the company must notify any planned modifications to the verifiers without undue delay.)

Having chosen a method and prepared a monitoring plan, companies must then monitor emissions for each ship both on a per-voyage and annual basis (Article 8).
Where emissions are monitored on a per-voyage basis, Article 9 stipulates that the following information must be monitored:

1. a) the ports of departure and arrival (including date and time of departure/arrival);
2. b) the total amount and emission factor for each type of fuel consumed;
3. c) CO2 emitted;
4. d) distance travelled;
5. e) time spent at sea;
6. f) cargo carried; and
7. g) Transport work.

However, ships are exempted from the need to monitor emissions on a per-voyage basis if all the ship’s voyages either start or end at a port under the jurisdiction of a Member State or the shipper forms more than 300 voyages in a year.

Where emissions are monitored on an annual basis, for each ship the company must monitor:

1. a) the amount and emission factor for each type of fuel consumed in total;
2. b) the total aggregated CO2 emitted;
3. c) the aggregated CO2 emissions from all voyages:
   (1) Between ports under a Member State’s jurisdiction,
   (2) Which departed from ports under a Member State’s jurisdiction,
   (3) To ports under a Member State’s jurisdiction, and
   1. d) Any CO2 emissions which occurred at berth within ports under a Member State’s jurisdiction.
   2. e) In addition, the total distance travelled, total time spent at sea, total transport work and average energy efficiency of the vessel must be monitored.

Although the monitoring plan must be submitted to verifiers by 31 August 2017, Recital 39 makes clear that the “first reporting period” begins on 1 January 2018. The purpose of the delay is to allow Member States, ship owners and others time to prepare for the MRV obligations provided by the Regulation.
The Regulation 2015/757 ('Shipping MRV Regulation') came into force on 1 July 2015 after a two-year legislative process. The first regulatory deadline is 31 August 2017 when all ships exceeding 5,000 GT calling at EU ports will have to submit a monitoring plan to a verifier for approval.

The following is a Timeline of the legislative process that took place until the adaptation of the act and what is to be expected in the future:

*June 2013* - The European Commission published its original legislative proposal to require operators of ships exceeding 5,000 GT calling at EU ports regardless of country or flag to monitor and report their ships’ annual carbon dioxide (CO2) emissions starting from 2018.

*January 2014* - The ENVI Committee of the Parliament voted its report on the proposed regulation that supported the proposal but recommended that the regulation should apply to ships exceeding 400 GT and include all greenhouse gas (GHG) not only carbon emissions.

*April 2014* - The Parliament adopted the proposal but rejected the ENVI Committee's proposal to lower the exemption threshold to 400 GT and include other GHG emissions.

*September 2014* - Inter-institutional negotiations between the Parliament, the Commission and the Council started with the objective of finding a compromise on the regulation. Key issues were the reporting of the energy efficiency index and transport work.

*November 2014* - A compromise was found between the European institutions. Apart from data on carbon emissions and distance sailed, the negotiators agreed that the regulation would also require ships to report cargo-related information.

*December 2014* - The text was examined and voted by the ENVI Committee on 3 December. Two weeks later, the Council formally adopted its common position at the Environment Council meeting on 17 December.

*March 2015* - The ENVI Committee voted the text through with no amendments.

*April 2015* - The Parliament voted the final text through on 28 April.
May 2015 - The final text was published in the Official Journal of the European Union (OJEU) on 19 May as Regulation 2015/2015.

July 2015 - The text came into force on 1 July. The European Commission put together an MRV group of experts and started work on the delegated and implementing acts pursuant to Regulation 2015/757. Going forward

August 2017 - Shipping companies must submit a monitoring plan indicating the methodologies chosen to monitor and report emissions and other relevant information for each of their ships above 5,000 GT.

January 2018 - Shipping companies must monitor fuel consumption, carbon emissions and other relevant information for each ship on a per-voyage and an annual basis in accordance with the approved monitoring plan.

April 2019 - Shipping companies must submit to the authority a report including carbon emissions and other relevant information during the 2018 monitoring period for each ship under their responsibility. The report must previously have been verified by an accredited verifier.

June 2019 - Ships arriving at or departing from an EU port must carry on-board a document of compliance certifying the ship's compliance with the monitoring and reporting obligations for the 2018 period. This document will be subject to inspection by port state authorities.

2.6 Reduced emissions and costs

The MRV system is expected to cut CO2 emissions from the journeys covered by up to 2% compared with a 'business as usual' situation, according to the Commission's impact assessment. The system would also reduce net costs to owners by up to €1.2 billion per year in 2030.
In addition it will provide useful insights into the performance of individual ships, their associated operational costs and potential resale value. This will benefit ship owners, who will be better, equipped to take decisions on major investments and to obtain the corresponding finance.\textsuperscript{30}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{estimated_co2_emissions.png}
\caption{Estimated CO2 emissions from maritime transport (EU related\textsuperscript{4} and globally\textsuperscript{5}, considering EEDI)}
\end{figure}

\textbf{2.7 Towards global action}

The European Union and its Member States have a strong preference for a global approach to reducing GHG emissions from international shipping led by the International Maritime Organization (IMO). This should include the use of global market-based measures (MBMs).

Considerable efforts have been made over recent years, within both the IMO and the United Nations Framework Convention on Climate Change (UNFCCC), to reach such an agreement. In 2011 IMO made progress by adopting the Energy Efficiency Design Index (EEDI), which sets compulsory energy efficiency
standards for new ships, and the Ship Energy Efficiency Management Plan (SEEMP), a management tool for ship owners. However, the international discussions have yet to bring agreement on global MBMs or other instruments that would cut GHG emissions from the international maritime transport sector as a whole, including existing ships. After years of international discussions, the IMO’s Marine Environment Protection Committee achieved some important milestones including the adoption of the Energy Efficiency Design Index and the Ship Energy Efficiency Management Plan. However, according to the EU these measures alone will not lead to an absolute reduction in shipping emissions. Discussions within the IMO now focus on a more gradual approach, with monitoring, reporting and verification of emissions (MRV) as a first step, further efficiency measures for existing ships, and market based measures in the mid-to-long term. Research shows that ship owners or operators are more likely to take measures to improve their vessel’s energy efficiency if these are based on accurate information provided by monitoring and reporting schemes. Moreover, reliable information on the effectiveness of technologies in improving energy efficiency also reduces the financial risk for investors.31

2.8 IMO discussions and proposals-market based measures

In line with the work plan adopted at MEPC 55 (October 2006), potential Market-Based Measures (MBMs) have been considered in-depth since MEPC 56 (July 2006). MEPC 55 work plan ceased at MEPC 59 (July 2009), where the Committee recognized that technical and operational measures would not be sufficient to satisfactorily reduce the amount of greenhouse gas (GHG) emissions from international shipping in view of the growth projections of world trade. It was therefore agreed by overwhelming majority that an MBM was needed as part of a comprehensive package of measure for the effective regulation of GHG emissions from international shipping. In this regard, the Committee agreed upon a new work plan for the further consideration of MBMs culminating in July 2011 at MEPC 62. The new work plan guides the future discussions on MBMs as follows: Member States, Associate Members and observer organizations should endeavor to submit further detailed outlines of possible MBMs to MEPC 60 (March 2010). MEPC 60 would further consider the methodology and criteria for feasibility
studies and impact assessments in relation to international shipping, giving priority to the overall impact on the maritime sectors of developing countries; taking into account the outcome and conclusions of the studies mentioned in paragraph 2 above and any other contribution made, the Committee would be able, preferably by MEPC 61 (September/October 2010), to clearly indicate which MBM it wishes to evaluate further and identify the elements that could be included in such a measure; and based on the outcome mentioned in paragraph 3, MEPC 62 (July 2011) could be in a position to report progress on the issue to the twenty-seventh regular session of the Assembly, to identify possible future steps.

MBMs place a price on GHG emissions and serve two main purposes:

Providing an economic incentive for the maritime industry to reduce its fuel consumption by investing in more fuel efficient ships and technologies and to operate ships in a more energy efficient-manner (in-sector reductions); and

- Offsetting in other sectors of growing ship emissions (out-of-sector reductions). In addition, MBMs can generate funds that could be used for different purposes such as adaptation and transfer of technology.

The MBMs proposals, from governments and observer organizations, that have been considered by the Committee so far range from contribution schemes for carbon dioxide (CO₂) emissions from international shipping (to be collected and transferred to a fund), via emission trading systems, to schemes based on the actual ship's efficiency both by design and operation.

To date, Governments and observer organizations proposed the following MBMs:

1. **International Fund for GHG emissions from ships (GHG Fund)** *(Cyprus, Denmark, the Marshall Islands, Nigeria and IPTA (MEPC 60/4/8))*: Establishes a global reduction target for international shipping, set by either UNFCCC or IMO. Emissions above the target line would be offset largely by purchasing approved emission reduction credits. The offsetting activities would be financed by a contribution paid by ships on every tonne of bunker fuel purchased.
2. **Leveraged Incentive Scheme (LIS) (Japan (MEPC 60/4/37))**: GHG Fund contributions are collected on marine bunker. Part thereof is refunded to ships meeting or exceeding agreed efficiency benchmarks and labeled as “good performance ships”.

3. **Port State Levy (Jamaica (MEPC 60/4/40))**: Levies a uniform emissions charge on all vessels calling at their respective ports based on the amount of fuel consumed by the respective vessel on its voyage to that port (not bunker suppliers).

4. **Ship Efficiency and Credit Trading (SECT) (United States (MEPC 60/4/12))**: Subjects all ships to mandatory energy efficiency standards. As one means of complying with the standard, an efficiency-credit trading program would be established. These standards would become more stringent over time.

5. **Vessel Efficiency System (VES) (World Shipping Council (MEPC 60/4/39))**: Establishes mandatory efficiency standards for new and existing ships. Each vessel would be judged against a requirement to improve its efficiency by X% below the average efficiency (baseline) for the specific vessel class and size. Standards would be tiered over time with increasing stringency. Existing ships failing to meet the required standard through technical modifications would be subject to a fee applied to each tonne of fuel consumed.

6. **Global Emission Trading System (ETS) for international shipping (Norway (MEPC 61/4/22))**: Sets a sector-wide cap on net emissions from international shipping. A number of allowances (Ship Emission Units) corresponding to the cap would be released into the market each year via a global auctioning process. The units could then be traded.

7. **Global Emissions Trading System (ETS) for international shipping (United Kingdom (MEPC 60/4/26))**: Differs from the Norwegian ETS proposal in two aspects: the method of allocating emissions allowances (national instead of global auctioning) and the approach for setting the emissions cap (set with a long term declining trajectory).
8. **Emissions Trading System (ETS) for International Shipping (France (MEPC 60/4/41))**: Sets out additional details on auction design under a shipping ETS. In all other aspects the proposal is similar to the Norwegian ETS proposal.

9. **Market-Based Instruments: a penalty on trade and development (Bahamas (MEPC 60/4/10))**: Insists that the imposition of any costs should be proportionate to the contribution by international shipping to global CO2 emissions.

10. **Rebate Mechanism (RM) for a market-based instrument for international shipping (IUCN (MEPC 60/4/55))**: Compensate developing countries for the financial impact of a MBM. It could be applied to any maritime MBM which generates revenue.

MEPC 60 called for an expert group to undertake a feasibility study and impact assessment on MBMs that had previously been proposed by governments and observer organizations. The results of the expert group were presented at MEPC 61 where an extensive debate was held on how to progress the development of suitable MBMs. The Committee agreed to hold an Intercessional Meeting of the Working Group on GHG Emissions from Ships (GHG-WG 3) that was held in March/April 2011 and its report was submitted to MEPC 62. However, due to time constraints and the busy agenda of MEPC 62, it was agreed to postpone the consideration of MBMs to the next MEPC session (MEPC 63 in February/March 2012). MEPC 63 continued its consideration of proposed MBMs, and agreed on the need to undertake an impact assessment of the MBM proposals with focus on possible impacts on consumers and industries in developing countries, in general, and in particular, least developed countries, small islands developing States and remotely located developing countries with long trading distances, and considered in detail the methodology and criteria it should be based on. MEPC 65, in noting several submissions on this matter, agreed to suspend discussions on MBMs and related issues to a future session.\textsuperscript{32}
2.9 Only a comprehensive approach grants cost-efficiency

Thanks to their effectiveness in establishing financial incentives for emission abatement in the form of an emission price and the cost-efficiency that comes along with it, market based mechanisms are generally acknowledged by economists to be a superior approach to deal with the externalities of CO2 emissions\textsuperscript{33}. Thereby the potential advantages of such mechanisms depend crucially on what they cover and initially hold only within the system. Cost-efficiency in the EUETS for example is only granted among entities regulated by the EUETS (e.g. other EU power plants) and not relative to entities outside the EUETS (e.g. domestic heating in EU or US power plant). But while usually this problem relates to the question which entities are incorporated, in a regional system covering mobile entities such as ships, cost-efficiency may not always be granted even among regulated entities and may not be achieved for certain designs of the scope of the system. The stringency of a scheme is generally seen as the parameter determining the costs of the regulation. The mere scaling of the emissions should have no effect. This however neglects that the neutrality of the scope holds only if the scaling of the emissions is homogenous across entities. In the context of regulating transport emissions this may however not be the case. Transport services with European involvement feature a highly varying share of regulated emissions with respect to different definitions of the scope. In such a case, emission costs of entities are not distributed solely on the basis of their share of emissions.

As a consequence, from an economic point of view, policy makers should choose a comprehensive definition of the scope and include all emissions arising on the whole route that is travelled by a ship\textsuperscript{34}.

3. ECONOMIC & SOCIAL IMPACTS
3.1 Economic impacts

The future MRV policies will increase investment costs for the shipping industry as the sector will have to renew its fleet by investing in new vessels and abatement technology to achieve better fuel efficiencies. In contrast, it is expected that by 2030 the regulations will generate a result of lower fuel consumption and possibly reduced operational costs, leading to a 22.6 to 51.9 million billion euros of additional profits. Thus by 2030 it is expected that all realistic policies will save money for the industry in terms of overall operating costs. An open emissions trading system (ETS) with free allowance would generate the most profit mainly due to the lower capital costs implied by this option. The second choice would be a closed ETS with higher constraints leading to a need of higher capital investments that would be balanced by larger operational and fuel savings as the industry efficiency rises. All options will generate revenues which can be recycled to support investments in abatement technologies leading to more efficient emissions reduction. The open ETS consistently result into lower freights rates than the baseline. Another group of choices are the open ETS with full auctioning, the target based fund which have the same approach, the low emission tax and the compensation based funds that follow a similar model. All these systems have common effects.

Aside from the impacts at EU level, this report also considers how they will be distributed geographically. The countries and regions most sensitive are those which rely most on shipping for their international trade. As expected, these countries are mostly islands or countries with long coastlines. The most vulnerable of all are Ireland, Malta and the Netherlands. Overall, the implementation of a policy to reduce GHG emissions from the shipping sector is expected to have broadly positive or negligible economic impacts through cost savings to the industry; the development and uptake of innovative technologies and more productive practices; and limited impacts on the trade of most commodities and the competitive position of Europe.35.
3.2 Social Impacts

The impacts of the regulations on the labor market are expected to be generally positive taking in account the rise of employment in maritime energy efficiency and GHG abatement technology suppliers, mainly because of the first mover advantage that the already leading European companies of the sector will have. All of the policies will lead to net cost savings and shipping activity levels will remain the same as in the baseline projection. Considering this, no significant impacts are expected on port employment, distribution hubs and on board ships.

3.3 What does the future hold

Environmental policies on maritime transport are in the middle of great change. The price of marine fuel is set to increase as a result of new regulations on limiting sulphur emissions and of the potential introduction of a price per tonne of CO2 over the medium-term. These regulatory changes will produce differing effects upon the different maritime transport activities. Regular deep sea shipping lines will see their costs increase. However, this increase will have little effect on demand for transport and operators should even be able to offset these rising costs through operational solutions. The future may prove more complex, however, for bulk carriers and for short sea services in direct competition with hinterland and/or air transport. The future competitiveness of these services lies essentially in the implementation of technology limiting emissions: use of LNG to fuel ships appears at the moment to be the best solution. Under these conditions, public authorities have an important role to play. They must contribute to the modernization of ports to allow them to accommodate the ships of the future. They must also ensure that the implementation of environmental policies in the maritime transport industry increase the regional surplus. This will be achieved in particular by a fair internalization of environmental externalities among the different means of transport.
4. STAKEHOLDERS VIEWS

In the following pages there are listed some interviews, articles and reports of certain shipping personalities and actors, concerning the enforcement of the MRV regulations to the European Union. The common characteristic of these views is the belief that dealing with the CO2 environmental threat is essential for Europe and the rest of the world and action must of course be taken. Thus the shipping sector can’t be left a side and must contribute in its turn to the efforts of environmental protection.

Nevertheless, all of them share the belief that such determined actions as the MRV regulation must be adopted on a global platform, by means of the IMO and not only on a regional level such as Europe, so as to avoid creating competitive disparities in the market.

According to parliament's reporter on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and member of the Committee on the Environment, Public Health and Food Safety José Inácio Faria:

The EU has moved forward cautiously and used a staged approach in its aim to curb CO2 emissions. The MRV proposal would help achieve progress at international level. The system applies to all ships calling at EU ports, regardless of their flag, and requires the reporting of information on CO2 emissions and other relevant data in order to determine the vessel's efficiency.

If an international agreement imposing CO2 reduction targets is ever reached, then a functional monitoring and reporting system for CO2 emissions would be a key stepping stone for the implementation of such goals. We can only assess progress towards the targets if we have a functional measuring system.

It is key that the EU's MRV system is accepted by stakeholders and our international partners. This effort must be made through the IMO.

The regulation is careful to avoid unnecessary administrative burdens. It only applies to ships bigger than 5000 gross tonnes - meaning 55 per cent of those in
transit in the EU, but responsible for as much as 90 per cent of CO2 emissions - and it makes use of information already available on board - regarding cargo carried and distance travelled, for example - to fulfill reporting obligations.

Ship operators can also choose between a number of different monitoring methods, and if the IMO adopts its own MRV system, the European regulation allows for the relevant alignment with the international agreement where necessary.

Another important argument in favor of this legislation is economic. The commission will provide ship users with aggregate and transparent data identifying the most fuel-efficient vessels, bringing competitiveness to the sector, with new technologies and operational measures adopted to improve efficiency and lower operational costs.

This in turn will translate into market opportunities that will open up a dynamic and innovative shipping sector.

An important IMO meeting took place this month. The Marshall Islands, which are simultaneously the third biggest global ship registry and a small archipelago threatened by climate change and rising sea levels, has called for a reduction target for maritime carbon emissions.

Considering the pressing need for a global climate agreement later this year in Paris, it is time for the EU to ensure the shipping sector makes a contribution towards CO2 reduction targets.

The world urgently needs an international agreement, and there now seems to be the right momentum. It is time to establish a fully-fledged diplomatic offensive that can deliver a fair deal for our planet.

**Sotiris Raptis, Policy Officer, Transport & Environment presentation during the 2015 GREEN4SEA Forum:**

What is coming up next? Shipping is the only transport mode and one of the few sectors of the EU economy currently not covered by the EU reduction targets. Global shipping emissions have increased by 70% since 1990. The third IMO GHG study found that the increase in shipping emissions will be up to 250% by
2050. What this study also found is that the increased transport demand will offset any efficiency gains resulting by the implementation of the EEDI targets. What we urgently need is a reduction target at European and international level. If we are interested in creating a level playing field among the different sectors of the economy, in fighting against climate change and if we are ready to listen to what science says about the level of the risk climate change poses on the environment and our economy, it’s fair to say that it’s time for the shipping sector to make its contribution and to pay its share to this fight.

According to journalist David Black back in September 2012 Europe's carbon tax set to deal big blow to shipping:

The global shipping industry is facing controversial emissions charges similar to those dogging global airlines as the European Commission draws up harsh new environmental regulations.

Such a move would drive up shipping costs at a time when the industry is struggling to make a profit against the effects of the euro crisis, a downturn in Chinese manufacturing, already high fuel costs and a chronic over-capacity of ships.

Any added cost to the shipping industry automatically increases prices for everything carried by sea, from oil to soya beans and natural gas.

More than 90 per cent of the world's trade travels by sea, equivalent to 8.5 billion tonnes a year.
Mr. Patrick Verhoeven, Secretary General of ECSA (European Community Shipowners’ Association), gave an interview to GREEN4SEA team about European Shipping Week 2015 and latest developments in maritime environment. Among other questions he answered:

Regarding EU MRV, the issue of CO2 monitoring for shipping emissions, what further developments do you expect over the forthcoming months? Should key stakeholders and especially ship owners act further?

P.V.: In November last year, the EU institutions reached political agreement on the MRV Regulation. This agreement still needs to be officially approved by Council and Parliament, which will probably be the case by summertime. The Commission will then engage with industry and other stakeholders in the implementation process. In practice, the Regulation will see its concrete implementation as of 2018, but until then, there is still quite some work to be done, for instance on the cargo metrics. We also expect the EU to engage with its global partners in the IMO to ensure that, come 2018, there will be a global MRV instrument. This will require substantial diplomatic efforts, as the EU Regulation is more ambitious than what is currently being envisaged at IMO level.

The following is taken from the 2014-2015 Union of Greek Ship-owners annual report:

The UGS fully supports the efforts towards reduction of the environmental impact from ships in the context of international negotiations leading to an international framework. These efforts must take into account that shipping is a facilitator of globalization and world prosperity and that the size and activity of world shipping reflect the transport needs of other industries and of consumers. Hence, this international effort should not be used by governments as an excuse to impose regional measures serving non shipping purposes. The establishment of a simple global system of Monitoring, Reporting and Verification (MRV) of CO2 emissions, irrespective of flag or area of operation, will calculate more precisely
the participation of shipping in the above emissions and will allow IMO to assess the need and scope of the application of any further actions. To this effect, the contracting parties to the UN Framework Convention on Climate Change have recognized IMO as the global legislator for the reduction of green-house gases from international shipping. Unfortunately, this realistic approach does not seem to be recognized in principle by the EU in its effort to enforce as of 2018 a complex MRV system purportedly with the same purpose, but with the ultimate aim of adopting a market based measure accompanied by a financing mechanism which will in effect be a tax on world trade and the revenues used by the EU for other purposes. Ongoing efforts to devise the most appropriate benchmark (index) for the energy efficiency of ships and the relevant cargo metrics depending on ship categories indicate inadequate knowledge of the operational and technical characteristics of cargo shipping. The EU and the IMO have to take into account, on the one hand, the different way of operation of bulk shipping regarding the rest of the shipping sector and even more so of civil aviation and, on the other hand, the implications of their decisions on world trade in connection with the avoidance of regional measures serving non shipping purposes. In the long term, further relative reductions may be achieved through innovative hull designs, technology and use of fuels with lower CO2 emissions. However, in the foreseeable future, fossil fuels will remain the primary source of energy for maritime transport. The cost of fuel per se is a very strong incentive for ship operators to reduce fuel consumption, so that the energy efficiency of the entire supply chain is improved and, thereby, fuel consumption and associated CO2 ship emissions are reduced. Hence, ship operators do not need complicated or aspirational and non-realistic legislative initiatives to reduce fuel consumption. Market forces by themselves exercise a strong pressure in this direction.

According to the ICS’ (International Chamber of shipping)”Preliminary ICS Comments on Draft EU Regulation on MRV”

ICS recognizes that there is a growing expectation amongst many EU Member States (and other EU stakeholders) that IMO should develop additional measures due to the belief that this will facilitate a further improvement of fuel efficiency by
ships. However, in view of IMO’s recent track record, there is no reason to believe that IMO will not succeed in developing additional mandatory measures to address these issues at the global level.

ICS therefore believes that it is not appropriate for the European Union to consider the adoption of a unilateral regional regulation on monitoring and reporting of ships’ fuel consumption (and CO2 emissions) in advance of the debate that is currently taking place at IMO.

In particular, ICS respectfully suggests that it is premature to consider proposals for the development of a system for the mandatory indexing of the operational efficiency of individual ships, in advance of this major step being debated again at IMO in March 2014.
CONCLUSION

The new EU Monitoring, Reporting and Verification (MRV) regulation was enforced on the 1st of July 2015 and is surely a test for the shipping industry’s ability to adapt to changes in the markets legal framework.

The first step of the strategy involves the design of a robust MRV system of carbon emissions for ships exceeding 5,000gt on all voyages to, from and between EU ports applicable from 2018. These vessels will have to submit a monitoring plan to a verifier for approval, indicating the methodologies chosen to monitor and report emissions and other relevant information.

The first annual monitoring period starts on January 1 2018. Throughout that year, operators will be required to keep track of carbon emissions and other relevant information by following the procedures described in the approved monitoring plan. As soon as the year is over, they will gather all relevant information pertaining to 2018 and, for each qualifying ship, compile an emissions report.

The biggest worry of the shipping industry regarding the new regulation is that the verification process is expected to be very costly for the sector and there is always the fear of creating a competitive disadvantage for the EU states due to the lack of a global monitoring system. Plus, the countries that are heavily depending on shipping are expected to take a heavy blow, at least in the short term future.

In contrast to these reasonable worries the MRV regulation is expected to benefit ship owners in the future mainly on the decision making process due to the information and statistics that will be provided by the monitoring process.

For good or ill, however, these regulations are now in place and are not going anywhere. Clearly it is now necessary for ship owners to find an efficient MRV solution for their entire fleet, tailored to their needs and minimizing the risks and costs of compliance and verification. And, while the establishment of such systems may be painful at first, if they result in more efficient fleets, they are to be welcomed.
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