EUROPEAN
COMMISSION

Brussels, 19.5.2020
C(2020) 3184 final

REPORT FROM THE COMMISSION

2019 Annual Report on CO_2 Emissions from Maritime Transport

{SWD(2020) 82 final}

2019 Annual Report on CO_2 Emissions from Maritime Transport

1. Introduction

In December 2019, the European Commission adopted the European Green Deal[1] – a roadmap to make Europe the first climate neutral continent by 2050. It includes an ambitious package of measures for transforming the EU into a sustainable economy by turning climate and environmental challenges into opportunities across all policy areas and making the transition just and inclusive for all. The European Green Deal requires that all sectors play their part, including the waterborne sector.

Maritime transport plays an essential role in the EU economy. It transports 75% of EU's external trade, 36% of intra-EU trade flows and more than 400 million passengers each year at EU ports.[2] Maritime transport should continue to play a key role in a European climate neutral economy. However, like many other sectors of the EU economy, it will need to undergo major changes to lower its emissions while retaining its competitive edge and continuing to work in the interest of Europeans.[3] Waterborne transport is already one of the most energy-efficient modes of transport available, but the sector will need to engage in systemic change in how ships are being operated, fuelled, designed and built, and how they interact with ports. This is all the more important since greenhouse gas emissions from international shipping are likely to continue growing in the future in pace with expected growth in global trade, if action is not taken swiftly.[4]

The waterborne sector has the capacity and untapped potential to contribute to curbing greenhouse gas emissions. In Europe, the sector can lead the way in the efforts to achieve climate neutrality by 2050. The Commission will propose a number of actions as part of the European Green Deal to make the sector more sustainable and innovative, but the first step towards action to cut emissions is to understand how much is being emitted and where.

2. First data from the EU system to monitor CO_2 emissions from ships over 5.000 gross tonnage

In 2015, the EU adopted a new regulation to monitor, verify and report CO_2 emissions from maritime transport (Regulation (EU) 2015/757, also referred to as EU MRV Regulation). This legislation is the first step of a staged approach for the inclusion of maritime transport CO_2 emissions in EU Climate Policy. Its main objectives are to collect robust and verified CO_2 emissions data, stimulate the uptake of energy solutions with more transparency and support the development and implementation of future climate mitigation policies.

The legislation requires shipping companies to monitor their CO_2 emissions, fuel consumption and other relevant information during navigation to or from ports in the European Economic Area (EEA) for the purpose of transporting cargo or passengers for commercial reason. In practice, CO_2 emissions are determined based on the amount of fuel

[1] COM(2019) 640 final.

[2] https://ec.europa.eu/transport/modes/maritime/maritime-transport_en

[3] EPSC (2019). Clean transport at sea.

[4] According to the third International Maritime Organization (IMO) GHG study from 2014, shipping emissions at global level could increase by between 50% and 250% by 2050 depending on future economic and energy developments. This estimate will be updated in the fourth IMO GHG study due to be finalised by autumn 2020.

consumed in combination with an emissions factor. Once a year, starting from 2019, companies have to aggregate their data and have them verified by independent verifiers accredited by national accreditation bodies. The Commission subsequently publishes part of the verified data of each ship on a single portal (THETIS-MRV) and prepares an annual report to inform the public. This is the first Commission report on such data.

By measuring CO_2 emissions from vessels sailing, irrespective of their flag, and by limiting the monitoring requirements to ships over 5,000 gross tonnage (GT), the EU MRV system covers around 90% of all CO_2 emissions, whilst only including around 55% of all ships calling into EEA ports.[5]

The first reporting period took place in 2018 and the European Commission published the first dataset on 30 June 2019. This information is key to understanding the CO_2 emission profile of market actors and enables valuable analysis of the characteristics and energy efficiency of ships, helping identify the various factors influencing CO_2 emissions.

The first set of reported CO_2 emissions come from more than 11,600 ships, representing 38% of the world merchant fleet (above 5,000 gross tonnage), and covers the same types of ships. The fleet covered by the EU MRV system is relatively young (11 years old on average), but there are large age disparities between ship types. Bulk carriers are for instance the youngest ships, while passenger ships tend to be much older. Considering that ships can be used for 25 to 30 years, a large part of the monitored fleet is likely to still be operating in 2040, which underlines the need to address emissions from existing ships as well as new ships.

3. CO_2 emissions from maritime transport

Data collected from the EU MRV system confirmed that CO_2 emissions from maritime transport are substantial, with over 138 million tonnes of CO_2 released into the atmosphere in 2018. This represents over 3.7% of total EU CO_2 emissions, and is comparable to the CO_2 emissions of Belgium. Compared to other modes of transport, maritime transport emissions represent 80% of the emissions generated by aviation (international and domestic), or around 15% of the road transport emissions. At the global level, the reported CO_2 emissions represent around 15% of the total CO_2 emissions emitted by international and domestic shipping.

Around two-thirds of the CO_2 emissions reported by the monitored fleet came from voyages to or from a port outside the EEA, with slightly more emissions coming from incoming international voyages than outgoing ones. Voyages inside the EEA represented 32% of total CO_2 emissions, whereas emissions from ships in EEA ports stood for 6% of total emissions. This is broadly consistent with port statistics (from 2017) where cross-border transport between EU ports represented 25% of all maritime transport activities, and where voyages between national ports made up to 9% of the same total.

Expressed in terms of fuel consumption, these emissions correspond to 44 million tonnes of fuel, or close to 7% of the EU total oil demand that amounted to 635.8 million tonnes in 2018.

[5] The Regulation covers CO_2 emissions from EEA outgoing and incoming voyages, intra-EEA voyages and those occurring when the ship is at berth.

According to the reported MRV data, around 70% of fuel consumed by the monitored ships consisted of heavy fuel oils, which is a residual fuel and a heavy pollutant. The use of Liquefied Natural Gas (LNG) represented only 3% of the total amount of fuel consumed.

4. Container ships emitted the most CO_2 emissions in absolute terms

When comparing the CO_2 emissions among different ship types, containerships represented the largest share of total emissions, with over 30%. In absolute terms, these ships reported more than 44 million tonnes of CO_2. This pollution originated from 1,742 ships that travelled over 70 million nautical miles. In comparison, bulk carriers emitted approximately 13% of all reported CO_2 emissions for a distance travelled of around 55 million nautical miles. In general, the amount of CO_2 emissions depends on a number of factors including technical (e.g. hydrodynamics, machinery, age, size) and operational parameters (e.g. distance travelled, operational speed, cargo carried, fuel used, weather conditions). According to the propeller law, vessel speed is one of the key variables that directly influence CO_2 emissions and varies significantly among ship types. For instance, container ships operate at much higher speeds compared to bulkers, in line with their specific business model and standards. This being said, the analysis showed that the vast majority of ships have reduced their speed compared to 2008 (by -15 to -20%).

5. Technical and operational energy efficiency of ships under the EU MRV system

The technical (design) energy efficiency of the monitored fleet is generally comparable to that of the world fleet, except for small-size container ships that tend to have higher installed engine powers and higher design speeds compared to similar ships in the world fleet. Most monitored ships built after 2015 already comply with global energy efficiency standards applicable over the period 2020-2025 (EEDI phase 2), confirming the need to revise the reduction factors in the EEDI legislation to ensure that new ships have a higher technical energy efficiency than ships built in previous phases. In most cases, the technical energy efficiency improvements are the results of lower installed power and reduced design speeds.

In terms of operational energy efficiency, the EU MRV system provides mandatory and voluntary information to understand how ships are performing under real circumstances. While a number of indicators can be used, their analysis requires careful interpretation as there are a number of fluctuating and influencing factors. For instance, the Energy Efficiency Operational Indicator (EEOI) has a high degree of sensitivity when it comes to cargo variations, which makes it difficult to compare with the Energy Efficiency Design Index (EEDI) based on ships' carrying capacity, contrary to the Annual Efficiency Ratio (AER).

After the first reporting year, the data shows that the technical and operational energy efficiency levels in terms of AER for both bulkers and tankers are relatively similar for the bigger ship segments, while smaller size segments tend to be less efficient in operational terms due to higher diversity of operating conditions. The picture is different for containerships. When monitored in terms of AER, their operational energy efficiency performance is generally better compared to their technical energy efficiency but when monitored in terms of EEOI using real cargo carried, their operational energy efficiency performance is generally worse than their technical efficiency (especially for small-size container ships).

6. Lessons learned from the implementation of the EU MRV system

The analysis showed that the data generated during the first reporting year accounts for at least 94% of EEA port calls made by ships covered by the Regulation. The transparency of the system and the granularity of the reported data is key to addressing market barriers and stimulating the uptake of energy-efficient behaviours and technologies.

The first reporting year involved a learning curve for all actors. In terms of data quality, the data from the MRV system is generally complete and sound, following some corrections completed after their initial publication. The lessons learned from this first reporting year will inform improvements to the MRV process and to the next MRV report in the coming years.