



Finnish Transport and Communications Agency

# Emissions from Baltic Sea Shipping in 2006 - 2019

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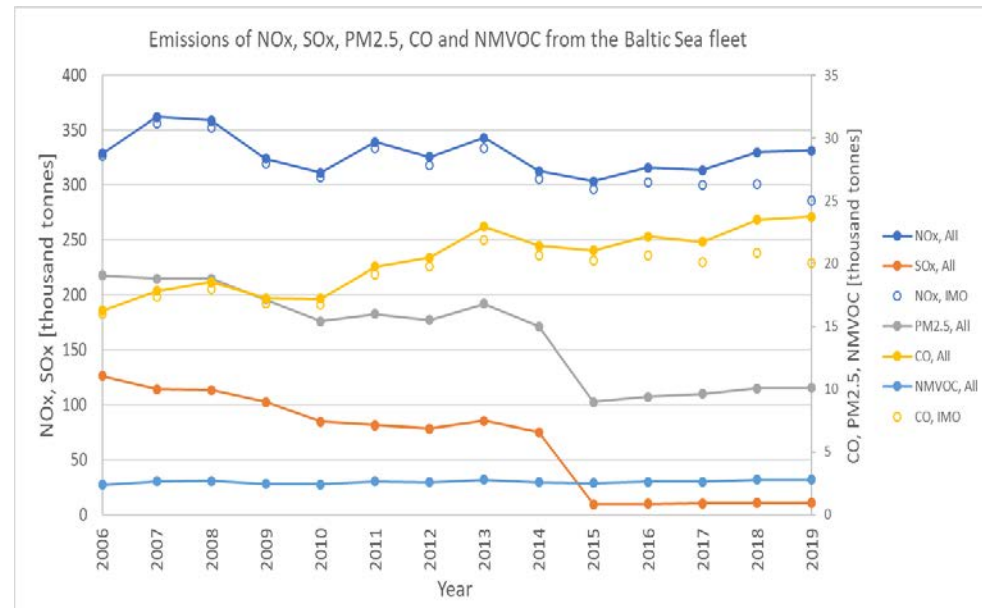
5 - 9 October 2020

# Emissions from the Baltic Sea Shipping

- The Finnish Meteorological Institute has made an estimate of fuel oil consumption and exhaust gas emissions from the Baltic Sea Shipping in 2006 - 2019, see document 5-2 of HELCOM Maritime 20.
- Emission estimates were made for NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>2.5</sub>, CO, NMVOC and CO<sub>2</sub> emissions.
- Emissions were estimated using the Ship Traffic Emission Assessment Model (STEAM).
- In addition to emission estimates, the development of operational energy efficiency of the Baltic Sea Shipping was calculated for the period 2006 – 2019.
- For the first time, the accuracy of emission estimates was done by comparing the calculated fuel oil consumption of the STEAM model with CO<sub>2</sub> emissions obtained from the MRV system.

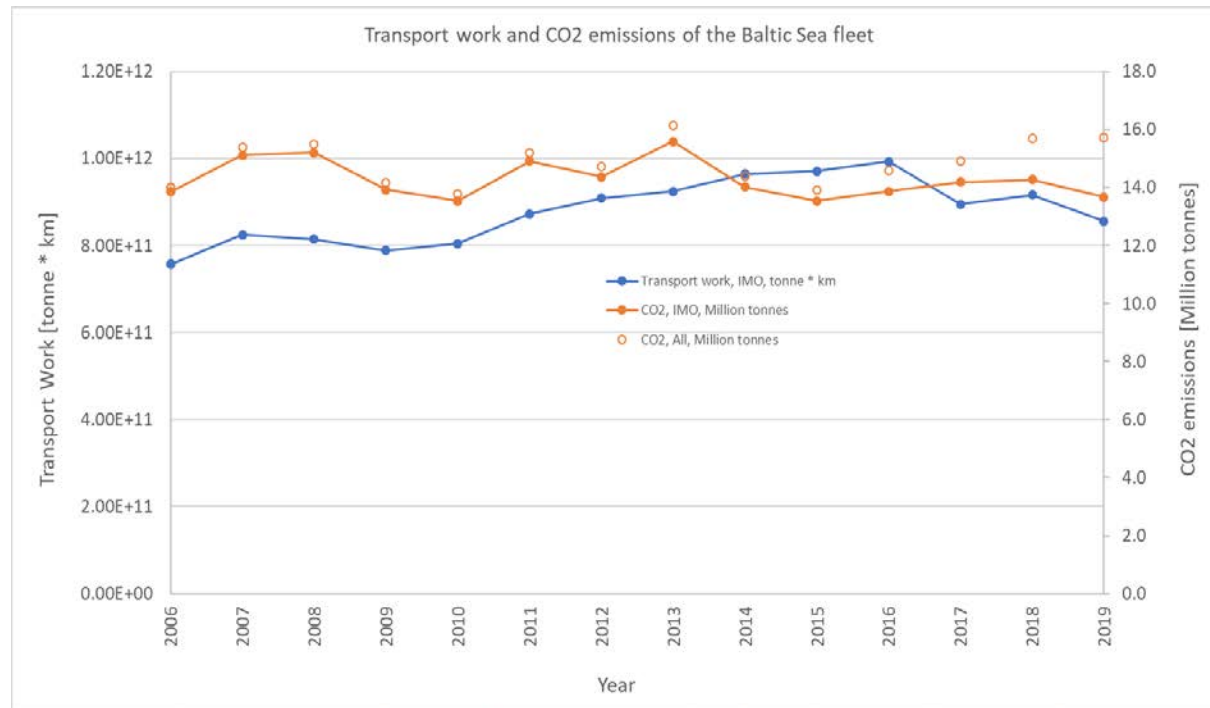
# Emissions of NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>2.5</sub>, CO and NMVOC from Ships in the Baltic Sea during 2006-2019

- Coloured symbols depict total emissions from all ships with an active AIS transceiver, empty symbols indicate the contribution from IMO-registered ships only.
- Significant decreases in SO<sub>x</sub> and PM<sub>2.5</sub> in year 2015 are results of regulatory changes concerning the maximum Sulphur content of fuel oil.



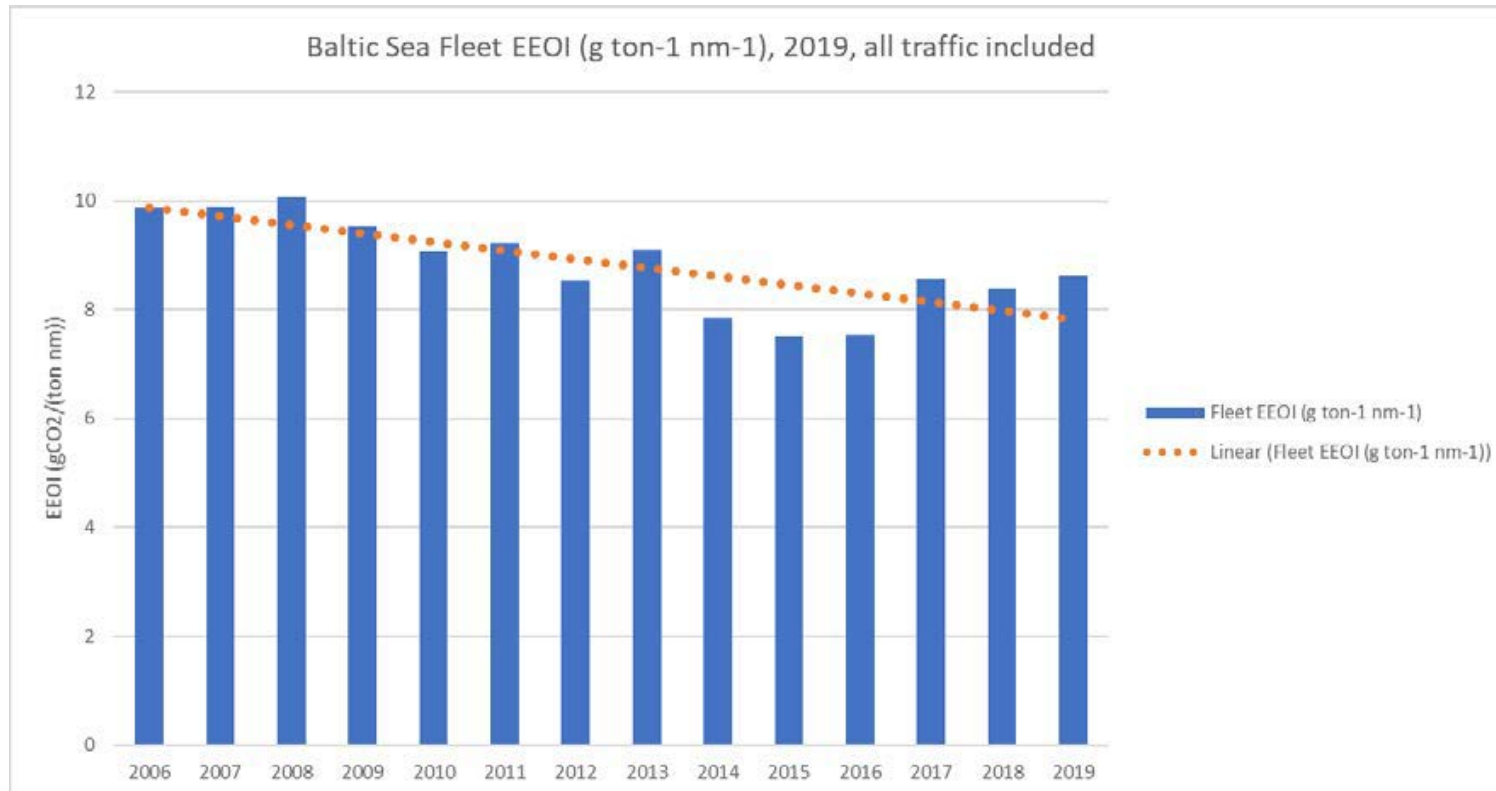
# Development of CO<sub>2</sub> Emissions and Transport Work over the Period 2008-2019

- The total CO<sub>2</sub> emissions in 2019 were 15.8 million tonnes, which corresponds to roughly 1.9% of the global shipping CO<sub>2</sub> emissions in 2019.
- In absolute terms, **the CO<sub>2</sub> emissions from IMO registered ships have decreased by 10% and transport work has increased by 5.1% when compared to year 2008 totals.**



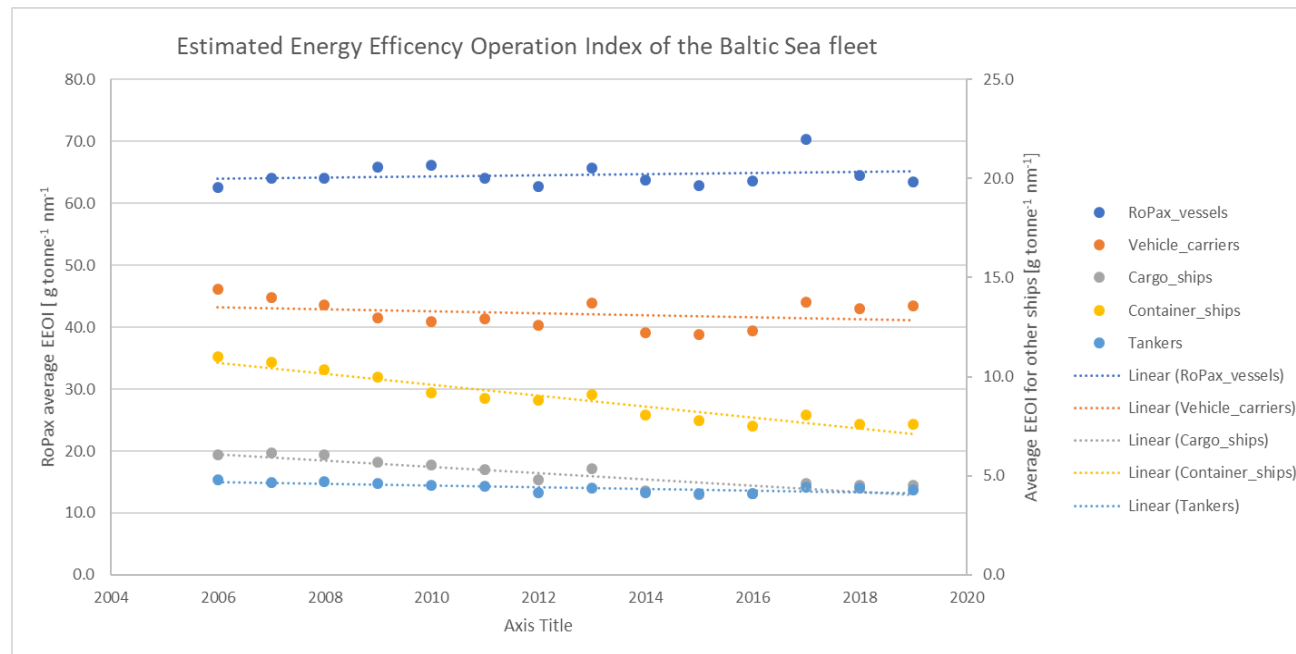
# Development Ship Operational Energy Efficiency over the Period 2008-2019

- The results of the analysis indicates an **18% increase in operational energy efficiency of the Baltic Sea fleet during 2008-2019.**



# Development of Operational Energy Efficiency of Some Ship Types over the Period 2008-2019

- According to the report, **operational energy efficiency of container ships has improved significantly** over the period 2008 – 2019.
- **Operational energy efficiency of vehicle carriers and general cargo ships has also slightly improved** during the same period.
- Operational energy efficiency of ropax ships and tankers has been on the same level during this period.



# Accuracy of Fuel Oil Consumption Estimates

- The accuracy of emission estimates was done by comparing the calculated fuel oil consumption of the STEAM model with CO<sub>2</sub> emissions obtained from the MRV system. Note, that this comparison only includes ships which have consistent annual sailing distance in both datasets.
- Value of 100% in the second column indicates perfect match between the STEAM model and MRV data, positive values in parenthesis indicate overprediction, negative values signal underprediction.
- The rightmost column lists average absolute deviation between the STEAM model and MRV total fuel oil consumption.

Vessel type	STEAM total from MRV	N	AAD,%
RoRo/RoPax	104 % (+4 %)	370	15 %
Chemical/Oil Product tanker	106 % (+6 %)	329	17 %
Vehicle Carrier	105 % (+5 %)	73	16 %
Bulk Cargo ship	91 % (-9 %)	394	15 %
General Cargo ship	83 % (-17 %)	301	19 %
Containership	121 % (+21 %)	401	26 %
Crude Oil tanker	93 % (-7 %)	151	18 %
<b>All</b>	<b>100.2 % (+0.2 %)</b>	<b>2550</b>	<b>19 %</b>

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## THANK YOU!

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