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Legal Mechanisms for Reducing Carbon Dioxide Emissions from Commercial Maritime Transport

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Abstract

The rapid growth of maritime transport has made the sector a significant source of greenhouse gas emissions. Carbon dioxide (CO₂) from ship fuel combustion is a major contributor. The International Maritime Organization (IMO) has adopted measures to improve ship energy efficiency and reduce emissions. Its 2023 strategy aims for net-zero greenhouse gas emissions from international shipping by or around 2050.

Regional institutions have adopted complementary measures. The European Union has introduced monitoring, fuel-intensity rules, and emissions trading for maritime transport. Algeria is also taking steps to modernize ports and reduce emissions. Its participation in some international treaty instruments, however, differs from its commercial exposure to EU requirements.

Keywords: ships; maritime transport; carbon dioxide; MARPOL Convention; European Union law; Algerian law.

I. Introduction

Maritime transport carries more than 80% of world merchandise trade by volume. Its climate impact is substantial. In 2024, international shipping accounted for approximately 2.5% of global energy-related CO₂ emissions, according to an OECD study¹.

In response to this challenge, the international community has intensified efforts to reduce greenhouse gas emissions from maritime activities, including carbon dioxide (CO₂). The IMO has led these efforts at the international level. At the regional level, several institutions, particularly the European Union, have worked to make maritime transport more sustainable.

The principal international convention on ship-source pollution is MARPOL, adopted in 1973 and modified by the 1978 Protocol. The 1997 Protocol added Annex VI on air pollution from ships. Annex VI entered into force on 19 May 2005. Further amendments on ship energy efficiency were adopted in 2011².

The 2015 Paris Agreement provides a wider international climate framework. The IMO regulates greenhouse gas emissions from international shipping through its own measures. Resolution MEPC.377(80), adopted in 2023, contains

¹ De Queljoe, M., Herrero, P., Sakata, S., Astolfi, R., & Edens, B. (2025). Analysing recent trends and drivers of maritime transport CO₂ emissions: Insights from a decomposition analysis for the OECD and the world. OECD Statistics Working Papers, No. 2025/03. <https://doi.org/10.1787/6bb2bd69-en>

² International Maritime Organization. (2011, July 15). Resolution MEPC.203(62): Amendments to MARPOL Annex VI (inclusion of ship energy-efficiency regulations). <https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Technical%20and%20Operational%20Measures/Resolution%20MEPC.203%2862%29.pdf>

the revised IMO Strategy on Reduction of GHG Emissions from Ships. It is a strategy adopted by the Marine Environment Protection Committee, not a separate treaty requiring ratification¹.

The European Union has also developed regional legislation. A prominent example is Regulation (EU) 2023/1805 of 13 September 2023, which began to apply on 1 January 2025.

This study therefore addresses the following legal question: How effective is the legislative framework in reducing carbon dioxide emissions from maritime transport while respecting the specific characteristics of this sector?

Research Methodology

The study adopts an analytical approach to examine the relevant legal instruments and clarify the strategies used to reduce carbon dioxide emissions from ships. A comparative approach is also employed. It identifies similarities and differences among IMO rules, European Union legislation, and Algerian law. Finally, the historical method is used to trace the development of international, regional, and national legislative efforts over time.

II. International and Regional Legal Mechanisms for Reducing Carbon Dioxide Emissions

This section first examines the legal mechanisms adopted by the IMO. It then considers the measures introduced by the European Union to reduce carbon dioxide emissions.

1. Legal Mechanisms Adopted by the International Maritime Organization

To reduce carbon dioxide emissions from ships, the IMO adopted Resolution MEPC.304(72) in 2018. It contained the initial strategy for reducing greenhouse gas emissions from shipping. This strategy was subsequently replaced by Resolution MEPC.377(80) in 2023. The latter resolution sets out the revised strategy for reducing greenhouse gas emissions from ships.

The 2023 IMO strategy distinguishes carbon intensity from total emissions. It calls for at least a 40% reduction in the carbon intensity of international shipping by 2030, compared with 2008, measured as CO₂ emissions per unit of transport work. It also sets indicative checkpoints for total annual greenhouse gas emissions: at least 20% lower by 2030, striving for 30%, and at least 70% lower by 2040, striving for 80%, compared with 2008. The long-term ambition is net-zero greenhouse gas emissions by or around 2050².

To achieve these objectives, the IMO adopted two measures. Both took effect on 1 January 2013 following the entry into force of the amendments to MARPOL Annex VI. These are the Energy Efficiency Design Index (EEDI)³ and the Ship Energy Efficiency Management Plan (SEEMP)⁴.

1. Energy Efficiency Design Index (EEDI): The EEDI is a technical measure of energy efficiency in the design of new ships with a gross tonnage of at least 400. It is expressed in grams of carbon dioxide (CO₂) per tonne-nautical mile. The calculation takes account of engine power, fuel consumption, and resulting emissions, as well as the vessel's capacity⁵. The EEDI requirements were introduced in phases for specified categories of new ships. Phase 1 generally required a 10% improvement from 2015, and Phase 2 raised the requirement to 20% from 2020. Phase 3 generally set a 30% reduction from 2025, with earlier implementation or more stringent factors for certain vessel types. The rules apply by ship type and size, including bulk carriers, tankers and container ships⁶; separately, ships of 5,000 gross tonnage and above account for more than 85% of emissions from international shipping⁷.

¹ International Maritime Organization. (2023, July 7). Resolution MEPC.377(80): 2023 IMO Strategy on Reduction of GHG Emissions from Ships. <https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/annex/MEPC%2080/Annex%2015.pdf>

² International Maritime Organization. (2023). 2023 IMO Strategy on Reduction of GHG Emissions from Ships. Resolution MEPC.377(80). <https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx>

³ EEDI: Energy Efficiency Design Index.

⁴ SEEMP: Ship Energy Efficiency Management Plan.

⁵ International Maritime Organization. (n.d.). Improving the energy efficiency of ships. <https://www.imo.org/en/ourwork/environment/pages/improving%20the%20energy%20efficiency%20of%20ships.aspx>

⁶ International Maritime Organization. (n.d.). Improving the energy efficiency of ships. Historical EEDI phase-in requirements. <https://www.imo.org/en/ourwork/environment/pages/improving%20the%20energy%20efficiency%20of%20ships.aspx>

⁷ International Maritime Organization. (2025). The IMO Net-Zero Framework: Frequently asked questions (vessels of 5,000 GT and over represent more than 85% of international shipping emissions). <https://www.imo.org/en/mediacentre/hottopics/pages/faqs-the-imo-net-zero-framework.aspx>

2. Ship Energy Efficiency Management Plan (SEEMP): The IMO developed the SEEMP to improve ships' operational efficiency through effective and cost-efficient energy use. Shipowners and operators are required to follow its various stages when introducing new technologies and practices intended to improve vessel performance.

The IMO introduced the SEEMP through the 2011 amendments to MARPOL Annex VI. It later issued the 2022 SEEMP guidelines under Resolution MEPC.346(78)¹, which replaced the 2016 guidelines under Resolution MEPC.282(70)²; the 2021 MARPOL Annex VI amendments entered into force on 1 November 2022. In 2024, Resolution MEPC.395(82) superseded the 2022 SEEMP guidelines. The 2024 text was subsequently amended in 2025 and 2026.

The SEEMP is structured around three main components, reflecting the applicable requirements and successive IMO guidelines.

A. Part I: Ship Management Plan to Improve Energy Efficiency. This part establishes a mechanism for ships of 400 gross tonnage or above to improve energy efficiency and reduce carbon dioxide emissions. It must be linked to the energy management policy of the company that owns or operates the vessel. Differences among companies and their operating conditions must also be considered. This part does not apply to ships without mechanical propulsion, such as floating production and storage facilities, floating storage units, and offshore platforms³.

B. Part II: Ship Fuel Oil Consumption Data Collection Plan (DCS). Resolution MEPC.278(70)⁴ was adopted by the MEPC at its seventieth session. It established a data collection system for ship fuel oil consumption. This part of the plan applies to ships of 5,000 gross tonnage or above. From 1 January 2019, these vessels have been required to record and report consumption of every type of fuel oil. The purpose is to provide the IMO with more information to support the reduction of greenhouse gas emissions from ships⁵.

The 2022 SEEMP guidelines, which have since been superseded, described several ways to calculate and verify fuel consumption data. These included the following methods⁶:

Use of bunker delivery notes. These documents make it possible to determine the total quantity of fuel oil used each year. Predefined calculations are then used to establish the amount consumed and the amount remaining on board during the same period. The resolution also requires bunker delivery notes to be retained for three years.

Use of flow meters. The resolution places considerable importance on flow meters for collecting daily and annual fuel oil consumption data on board. If a meter fails, manual readings of ship tanks may be used as an alternative, alongside other measures. Owners and operators must also record information on meter calibration and maintenance in the ship's records for future reference.

Use of onboard fuel oil tank monitoring systems. To obtain accurate daily and annual consumption measurements, the resolution allows the use of automated systems, sounding equipment, and measuring tapes. The resulting data must be available on board the vessel.

¹ International Maritime Organization. (2022). Resolution MEPC.346(78): 2022 SEEMP Guidelines [superseded by Resolution MEPC.395(82), as amended in 2025 and 2026]. <https://www.imo.org/en/ourwork/environment/pages/index-of-mepc-resolutions-and-guidelines-related-to-marpol-annex-vi.aspx>

² International Maritime Organization. (2016, October 28). Resolution MEPC.282(70): 2016 guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP) [historical; superseded]. [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.282\(70\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.282(70).pdf)

³ Davis, E. (2026, June 29). Ship Energy Efficiency Management Plan (SEEMP): Guide to Parts I, II, and III. Retrieved from Inspection maritime IA: <https://marineinspection.app/article/ship-energy-efficiency-management-plan-seemp-parts-guide>

⁴ International Maritime Organization. (2016, October 28). Resolution MEPC.278(70): Amendments to MARPOL Annex VI (data collection system for ship fuel oil consumption). [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.278\(70\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.278(70).pdf)

⁵ Wang, D., Chen, Y., Huang, C., Chen, L., & Wu, C. (2020, February 19). Study on IMO New Requirement: Ship Fuel Oil Consumption Data Collection and Reporting. *American Journal of Water Science and Engineering*, 6(1), 50 – 59. from <https://article.sciencepublishinggroup.com/pdf/ajwse.20200601.16/d0b6a6f7-e07d-4528-a39c-cee6b8d319a3/p5n6>

⁶ International Maritime Organization. (2022). Resolution MEPC.346(78), section 7, on methods of measuring fuel consumption [historical guidance superseded in 2024]. <https://www.imo.org/en/ourwork/environment/pages/index-of-mepc-resolutions-and-guidelines-related-to-marpol-annex-vi.aspx>

Use of monitoring systems for liquefied natural gas cargo tanks. This method calculates the mass of natural gas consumed by multiplying its volume by a methane density of 422 kg/m³. The calculation assumes that the density of liquefied natural gas in transport corresponds to that of pure methane at its boiling point. The resolution also allows nitrogen consumed during each voyage to be deducted. Nitrogen is not considered to contribute to carbon dioxide emissions into the atmosphere.

For ships using fuels other than liquefied natural gas, annual fuel oil consumption is determined from appropriate tank readings for the type of fuel used. The calculation must follow the method set out in the SEEMP.

C. Part III: Ship Operational Carbon Intensity Plan. The third SEEMP component addresses the Carbon Intensity Indicator (CII). The 2021 amendments to MARPOL Annex VI introduced operational carbon-intensity requirements¹; these entered into force on 1 November 2022. CII assessment applies to the ship types and thresholds specified in the regulations, generally ships of 5,000 gross tonnage or more. It relates annual CO₂ emissions to transport capacity and distance travelled, using the applicable IMO calculation method². Regulation 28 of MARPOL Annex VI establishes the operational CII framework. The assessment and reporting steps are as follows.

For the first reporting year, 2023, and for subsequent years, ships subject to the CII provisions must calculate their attained annual operational CII. The reporting period is a calendar year, from 1 January to 31 December. Companies must report the required data to the flag Administration or its authorized organization within three months after the year ends. The attained value is compared with the required annual CII, using IMO guidelines.

The operational CII ratings are A (major superior), B (minor superior), C (moderate), D (minor inferior) and E (inferior). A ship rated D for three consecutive years, or E for one year, must prepare a corrective action plan as part of its SEEMP. Rating C is the minimum generally acceptable performance level. High-performing ships may receive incentives from competent authorities.

In addition to these measures, the MEPC adopted the Energy Efficiency Existing Ship Index (EEXI)³ under Resolution MEPC.328(76), mentioned above. It also aims to reduce greenhouse gas emissions, particularly carbon dioxide.

3. Energy Efficiency Existing Ship Index (EEXI): The EEXI is a technical energy-efficiency requirement for existing ships within the applicable ship categories and size thresholds, generally starting at 400 gross tonnage. It compares the attained EEXI with a required limit based on the relevant reference line and reduction factor. The rules became effective on 1 January 2023. EEXI compliance is normally demonstrated at the first relevant survey and is not an annual rating⁴; annual operational ratings instead belong to the separate CII framework, beginning with 2023 performance data and first ratings in 2024

2. Legal Mechanisms Adopted by the European Union

The European Union has established extensive climate legislation affecting maritime transport. Its 'Fit for 55' package aims to reduce net greenhouse gas emissions by at least 55% by 2030 compared with 1990 and to achieve climate neutrality by 2050⁵; the package includes measures for energy, industry and transport, among other sectors.

In shipping, Regulation (EU) 2023/1805, known as FuelEU Maritime, has applied principally since 1 January 2025⁶; it limits the lifecycle greenhouse gas intensity of energy used on board covered ships. The required reduction starts at 2% in 2025 and rises to 6% in 2030, against the regulation's reference value. Other provisions address monitoring and, from 2030 for specified ships and ports, shore-side electrical power.

¹ International Maritime Organization. (2021). Resolution MEPC.328(76): 2021 revised MARPOL Annex VI, including EEXI and operational CII requirements. [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.328\(76\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.328(76).pdf)

² Rauca, L., & Batrinca, G. (2023). Impact of Carbon Intensity Indicator on the vessels' operation and analysis of onboard operational measures. *Sustainability*, 15(14), 11387. <https://doi.org/10.3390/su151411387>

³ EEXI: Energy Efficiency Existing Ship Index.

⁴ Czernański, E., Oniszczyk-Jastrząbek, A., Spangenberg, E. F., Kozłowski, Ł., Adamowicz, M., Jankiewicz, J., & Cirella, G. T. (2022). Implementation of the Energy Efficiency Existing Ship Index: An important but costly step towards ocean protection. *Marine Policy*, 145, 105259. <https://doi.org/10.1016/j.marpol.2022.105259>

⁵ Bessa Vilela, N., Serra Castihlos, D., Murphy, A., & Oplotnik, Ž. J. (2024). EU's 'Fit for 55' plan, its economic impact and intergovernmental perspective. *Journal of Infrastructure, Policy and Development*, 8(9), 8445. <https://doi.org/10.24294/jipd.v8i9.8445>

⁶ European Parliament and Council. (2023). Regulation (EU) 2023/1805 on the use of renewable and low-carbon fuels in maritime transport, Article 4. <https://eur-lex.europa.eu/eli/reg/2023/1805/oj>

The European Union also uses a monitoring, reporting and verification (MRV) system¹; regulation (EU) 2015/757 established the framework²; it was later amended, including by Regulation (EU) 2023/957. The system initially covered CO₂ emissions from large ships calling at EU ports. From 2024, the reported greenhouse gases also include methane and nitrous oxide. The coverage of certain smaller general cargo and offshore vessels expanded from 2025.

Under MRV, shipping companies must maintain vessel-specific monitoring plans and submit verified annual emissions reports. Accredited independent verifiers assess the data. The results are submitted through the EU electronic reporting system, and ships receive documents of compliance when applicable. Port State Control authorities may check these documents when vessels call at EU ports. The competent authorities are not simply the authorities at the ship's port of registry. Relevant verified information is also made publicly available³

3. Obstacles to Legal Regulation of Carbon Dioxide Emissions

The legal frameworks introduced by the IMO and the European Union to address carbon dioxide emissions from ships have encountered several challenges. The main obstacles may be summarized as follows⁴:

1. Maritime transport is highly competitive. The transition to lower-emission energy sources requires substantial investment. Liquefied natural gas (LNG) may reduce some local air pollutants compared with conventional marine fuels, but it is principally methane and is not a zero-emission fuel. Methane slip and upstream leakage can limit its climate benefits. Alternative fuels, new engines and port infrastructure can raise operating and capital costs. These costs may affect freight rates and consumer prices.
2. Maritime transport requires large investments and involves many parties. These include carriers, shipowners, charterers, masters, and port authorities. Their different roles raise the question of responsibility for carbon dioxide emissions that contribute to global warming. Is the carrier liable for failing to provide clean fuel? Is the ship's master responsible for neglecting this requirement? Should responsibility fall on port authorities that do not make such fuel available, or on its producer and supplier? The position differs from oil pollution, for which civil liability is governed by a specific international convention.
3. Cost is among the greatest barriers to the transition from conventional shipping to environmentally sustainable maritime transport. Building vessels that use clean fuels, preparing ports to store those fuels, and producing adequate quantities of green hydrogen, ammonia, and electricity all require major investments. Some shipping companies and States lack the resources needed to finance these projects. Under these circumstances, the universal application of IMO rules and regional legislation, including EU requirements, is extremely difficult for certain countries.

III. Algerian Legal Mechanisms for Reducing Carbon Dioxide Emissions from Maritime Transport:

Algeria ratified the Paris Agreement through Presidential Decree No. 16-262 of 13 October 2016. It is a Party to MARPOL as amended by the 1978 Protocol. However, the IMO treaty-status information available in September 2026 does not list Algeria among the Parties to the 1997 Protocol introducing Annex VI⁵; Algeria nevertheless took part in regional technical exchanges. REMPEC organized an IMO workshop in Istanbul, Türkiye, on 3–5 November 2014, attended by 27 participants from 15 Mediterranean countries⁶.

This treaty-status distinction has legal consequences. The 1997 Protocol does not bind Algeria as a contracting party when it has not acceded to that Protocol. The 2023 IMO GHG Strategy, adopted by Resolution MEPC.377(80), is not itself a treaty that Algeria must separately ratify. Moreover, the absence of treaty-party status does not remove the need for

¹ MRV: Monitoring, Reporting and Verification.

² European Parliament and Council. (2015). Regulation (EU) 2015/757 (MRV), as amended by Regulation (EU) 2023/957. <https://eur-lex.europa.eu/eli/reg/2023/957/oj>

³ Doudnikoff, M. (2015). Réduire les émissions du transport maritime : les politiques publiques et leurs impacts sur les stratégies des compagnies maritimes de lignes régulières [Doctoral dissertation, Université Paris-Est], p. 157. https://theses.hal.science/tel-01214518v1/file/TH2015PEST1079_complete.pdf

⁴ Alavoine, Z. (2022). La réglementation de la décarbonation du transport maritime [Master's thesis, Aix-Marseille Université], pp. 56–58. https://pole-transports-facdedroit.univ-amu.fr/sites/pole-transports-facdedroit.univamu.fr/files/public/master_maritime_alavoine_zoe_la_reglementation_de_la_decarbonation.pdf

⁵ Algeria. (2016). Presidential Decree No. 16-262 ratifying the Paris Agreement. Official Journal No. 60, p. 3. <https://www.joradp.dz/FTP/jo-francais/2016/F2016060.pdf> ; International Maritime Organization. (2026, September 30). Status of Conventions: Parties to MARPOL 1973/1978 and the 1997 Protocol. <https://www.imo.org/en/about/conventions/pages/statusofconventions.aspx>

⁶ International Maritime Organization. (2014, November 4). Energy efficiency workshop, Istanbul, 3–5 November 2014 (15 countries). <https://www.imo.org/en/mediacentre/pages/whatsnew-262.aspx> ; REMPEC. (2014). Workshop final report (27 participants from 15 countries). <https://www.rempec.org/en/knowledge-centre/online-catalogue-items/activity-reports/reports-by-year>

Algerian-owned or Algerian-flagged vessels to meet applicable rules when entering foreign ports. Practical implementation also depends on ships' technical capabilities and port infrastructure.

Algerian maritime operators may face additional requirements when trading with the European Union. The EU Emissions Trading System (EU ETS) has included covered maritime voyages since 2024. It is an emissions-allowance system, not a uniform carbon tax. For covered ships, it generally accounts for all emissions on voyages between EU ports and half of emissions on voyages between an EU and a non-EU port. The surrender obligation is phased in: 40% for 2024 emissions, 70% for 2025, and 100% for 2026 onward. These costs may affect freight charges and the prices of goods traded with Algeria¹

At the domestic level, Algerian authorities are working to reduce the carbon footprint of maritime transport. At a study day on maritime transport decarbonization organized by the Port Services Group (Serport) in Algiers on 9 February 2026, the Minister of the Interior, Local Authorities and Transport, Saïd Sayoud, stressed the importance of reducing emissions from shipping. He called for port development based on sustainability and environmental protection. This would involve modernizing port infrastructure and using alternative fuels to improve energy efficiency and reduce carbon dioxide emissions. The Minister also highlighted the Algerian State's support for scientific research and its efforts to encourage researchers to develop practical solutions for sustainable maritime transport²

On 16 March 2026, the Port of Annaba Company and the Environmental Research Centre in Annaba signed a partnership agreement. Their project envisages electrification of port berths using technology developed by researchers at that centre. It would allow ships at berth to receive electricity from the quay and shut down their engines. This may reduce local noise, air pollution and carbon dioxide emissions within port basins³

Conclusion

This study shows that the IMO, as an international organization, and the European Union, as a regional institution, have led efforts to establish ambitious legislative policies for the coming years. Their principal purpose is to reduce greenhouse gas emissions from ships, particularly carbon dioxide emissions that contribute to global warming.

MARPOL Annex VI, introduced through the 1997 Protocol, provides the main treaty framework addressing air pollution and ship energy efficiency. Amendments adopted in 2011 introduced technical and operational measures, including EEDI and SEEMP. The IMO's 2023 greenhouse gas strategy sets goals and indicative checkpoints, but its legal character differs from binding MARPOL requirements.

The EU has adopted complementary laws, including the FuelEU Maritime Regulation, the MRV regime and maritime emissions trading. These measures have different functions. FuelEU reduces the greenhouse gas intensity of onboard energy. MRV establishes verified emissions data. The EU ETS requires allowances for emissions from covered maritime activities.

Algeria is already a Party to the 1973/1978 MARPOL Convention and to the Paris Agreement. It is not listed as a Party to the 1997 MARPOL Protocol in the IMO status information reviewed for September 2026. It has nevertheless begun practical port-decarbonization initiatives. Its maritime operators are also affected by requirements applying to ships calling at European ports.

Despite legislative efforts at international, regional, and national levels, the achievement of the stated objectives faces several obstacles. The most important are the following.

Although IMO and EU rules complement one another, differences in ambition and in the level of commitment among EU Member States and IMO members may lead to different results in both the short and long term.

In April 2025, the IMO's Marine Environment Protection Committee approved a draft Net-Zero Framework. The proposal combines a global marine-fuel greenhouse gas standard with an emissions-pricing mechanism. Approval of a draft did not make the framework legally binding. At the extraordinary MEPC session held from 14 to 17 October 2025, Member States postponed formal adoption discussions for one year. The United States opposed the proposal and announced possible trade, port-fee and visa measures against supporters. Those announcements should not be presented as proof that all threatened measures had been imposed.

¹ European Commission. (2026). Maritime transport and the EU Emissions Trading System: FAQs (50% of covered EU–non-EU voyage emissions; 40%/70%/100% phased surrender). https://climate.ec.europa.eu/areas-action/transport-decarbonisation/reducing-emissions-shipping-sector/faq-maritime-transport-eu-emissions-trading-system-ets_en

² Eco, A. (2026, February 10). *Serport is organizing a seminar dedicated to the decarbonization of maritime transport..* Retrieved October 10, 2026, sur <https://algerie-eco.com/2026/02/10/serport-organise-une-journee-detude-consacree-a-la-decarbonation-du-transport-maritime/>

³ Port of Annaba Company. (2026, March 16). Signing of a partnership agreement with the Environmental Research Center–Annaba. <https://annaba-port.com/en/article-%C3%A0-la-une/128>

References

Legal Instruments

- International Maritime Organization. (2011, July 15). Resolution MEPC.203(62): Amendments to the Annex of the Protocol of 1997 to amend MARPOL (inclusion of regulations on energy efficiency for ships in MARPOL Annex VI). <https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Technical%20and%20Operational%20Measures/Resolution%20MEPC.203%2862%29.pdf>
- International Maritime Organization. (2016, October 28). Resolution MEPC.278(70): Amendments to MARPOL Annex VI (data collection system for fuel oil consumption of ships). [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.278\(70\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.278(70).pdf)
- International Maritime Organization. (2016, October 28). Resolution MEPC.282(70): 2016 guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP). [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.282\(70\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.282(70).pdf)
- International Maritime Organization. (2021). Resolution MEPC.328(76): Amendments to MARPOL Annex VI (2021 revised MARPOL Annex VI). [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.328\(76\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.328(76).pdf)
- International Maritime Organization. (2022, June 10). Resolution MEPC.346(78): Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP). [https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.346\(78\).pdf](https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.346(78).pdf)
- International Maritime Organization. (2023, July 7). Resolution MEPC.377(80): 2023 IMO strategy on reduction of greenhouse gas emissions from ships. <https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/annex/MEPC%2080/Annex%2015.pdf>
- European Parliament and Council. (2015, April 29). Regulation (EU) 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC. Official Journal of the European Union, L 123 (19 May 2015).
- Algeria. (2016, October 13). Presidential Decree No. 16-262 ratifying the Paris Agreement on climate change, adopted in Paris on 12 December 2015. Official Journal of the People's Democratic Republic of Algeria, No. 60, p. 3. <https://www.joradp.dz/FTP/jo-francais/2016/F2016060.pdf>
- European Parliament and Council. (2023, September 13). Regulation (EU) 2023/1805 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC. Official Journal of the European Union, L 234 (22 September 2023).

Scientific Articles and Scholarly Works

- Alavoine, Z. (2022). La réglementation de la décarbonation du transport maritime [Master's thesis, Aix-Marseille Université]. https://pole-transport-facdedroit.univ-amu.fr/sites/pole-transport-facdedroit.univ-amu.fr/files/public/master_maritime_alavoine_zoe_la_reglementation_de_la_decarbonation.pdf
- Doudnikoff, M. (2015). Réduire les émissions du transport maritime : les politiques publiques et leurs impacts sur les stratégies des compagnies maritimes de lignes régulières [Reducing emissions from maritime transport: Public policies and their impact on liner shipping companies' strategies] [Doctoral dissertation, Université Paris-Est]. HAL Open Science. https://theses.hal.science/tel-01214518v1/file/TH2015PEST1079_complete.pdf
- Wang, D., Chen, Y., Huang, C., Chen, L., & Wu, C. (2020, February 19). Study on IMO new requirement: Ship fuel oil consumption data collection and reporting. American Journal of Water Science and Engineering, 6(1), 50–59. <https://article.sciencepublishinggroup.com/pdf/ajwse.20200601.16/d0b6a6f7-e07d-4528-a39c-cee6b8d319a3/p5n6>
- Chadli, Y., & Lasserre, F. (2022, October 1). Reducing greenhouse gas emission from shipping: Assessment of the International Maritime Organisation's policies. International Journal of Progressive Sciences and Technologies (IJPSAT), 35(1), 1–11. <https://ijpsat.org/index.php/ijpsat/article/download/4670/2871>
- Czermański, E., Oniszcuk-Jastrząbek, A., Spangenberg, E. F., Kozłowski, L., Adamowicz, M., Jankiewicz, J., & Cirella, G. T. (2022). Implementation of the Energy Efficiency Existing Ship Index: An important but costly step towards ocean protection. Marine Policy, 145, Article 105259. <https://doi.org/10.1016/j.marpol.2022.105259>
- Rauca, L., & Batrinca, G. (2023). Impact of Carbon Intensity Indicator on the vessels' operation and analysis of onboard operational measures. Sustainability, 15(14), Article 11387. <https://doi.org/10.3390/su151411387>
- Bessa Vilela, N., Serra Castihlos, D., Murphy, A., & Oplotnik, Ž. J. (2024). EU's 'Fit for 55' plan, its economic impact and intergovernmental perspective. Journal of Infrastructure, Policy and Development, 8(9), Article 8445. <https://doi.org/10.24294/jipd.v8i9.8445>

- De Queljoe, M., Herrero, P., Sakata, S., Astolfi, R., & Edens, B. (2025). Analysing recent trends and drivers of maritime transport CO₂ emissions: Insights from a decomposition analysis for the OECD and the world. OECD Statistics Working Papers, No. 2025/03. OECD Publishing. <https://doi.org/10.1787/6bb2bd69-en>
- Davis, E. (2026, June 29). Ship Energy Efficiency Management Plan (SEEMP): Guide to Parts I, II, and III. Inspection maritime IA. <https://marineinspection.app/article/ship-energy-efficiency-management-plan-seemp-parts-guide>

Web Sources

- International Maritime Organization. (2025, October 17). IMO net-zero shipping talks to resume in 2026. <https://www.imo.org/en/mediacentre/pressbriefings/pages/imo-net-zero-shipping-talks-to-resume-in-2026.aspx>
- Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC). (2014). IMO regional workshop on MARPOL Annex VI: Ship energy efficiency and technology transfer (Istanbul, 3–5 November 2014). <https://www.imo.org/en/mediacentre/pages/whatsnew-262.aspx>
- European Commission. (2026). Maritime transport in the EU Emissions Trading System (EU ETS): Questions and answers. https://climate.ec.europa.eu/areas-action/transport-decarbonisation/reducing-emissions-shipping-sector/faq-maritime-transport-eu-emissions-trading-system-ets_en
- Algérie Éco. (2026, February 10). Serport is organizing a seminar dedicated to the decarbonization of maritime transport. Retrieved October 10, 2026, from <https://algerie-eco.com/2026/02/10/serport-organise-une-journee-detude-consacree-a-la-decarbonation-du-transport-maritime/>
- Port of Annaba Company. (2026, March 16). Signing of a partnership agreement with the Environmental Research Center–Annaba. <https://annaba-port.com/en/article-%C3%A0-la-une/128>
- United Nations Conference on Trade and Development (UNCTAD). (2025). Review of Maritime Transport 2025. <https://unctad.org/publication/review-maritime-transport-2025>
- International Maritime Organization. (2026). Index of MEPC resolutions and guidelines related to MARPOL Annex VI (including MEPC.395(82), MEPC.401(83), and MEPC.413(84)). <https://www.imo.org/en/ourwork/environment/pages/index-of-mepc-resolutions-and-guidelines-related-to-marpol-annex-vi.aspx>
- International Maritime Organization. (2026). Status of Conventions (30 September 2026), Vol. I: SOLAS and MARPOL. <https://www.imo.org/en/about/conventions/pages/statusofconventions.aspx>