

# Review of EU Maritime Transport Greenhouse Gas Emissions Reduction Policies: Better Prospects for Policy Makers in China?

Jacqueline Wang

*Faculty of Law, University of Macau, Macau S.A.R, China*

**Abstract:** *Amidst ongoing reforms in the carbon market, China has launched the Emission Trading System (ETS) and implemented environmental protection taxes as strategic tools to curtail carbon dioxide (CO<sub>2</sub>) emissions. However, these measures currently do not regulate the maritime transport sector. As a result, a renewed examination of the maritime transport greenhouse gas (GHG) emissions framework may be beneficial, particularly drawing from the experiences and methodologies applied in EU maritime transport GHG emissions reduction policies. This examination includes the selection of policy instruments for carbon emissions reduction from an internal policy standpoint and understanding carbon emissions mechanisms from an international policy perspective. Furthermore, this paper reassesses the legal parameters of the EU's unilateral action against international shipping under the frameworks of the United Nations Framework Convention on Climate Change (UNFCCC) and the International Maritime Organization (IMO). It then discusses the potential for more effective strategies in developing maritime transport GHG emissions reduction policies in China, given the evolving landscape.*

**Keywords:** *Carbon Trading, Climate Change Mitigation, EU ETS, EU Policy on GHG Emission Reduction in Maritime Transport, Reduction of GHG Emissions*

## 1. Introduction

Environmental concerns consistently feature prominently on the political agenda, particularly those related to greenhouse gas (GHG) emissions and climate change.[1] However, an internationally uniform response mechanism to climate change remains elusive, often due to apprehension about environmental regulation hindering economic development.[2] In this sphere, the European Union (EU) consistently stands as an exception.

When it comes to climate change, the EU's accomplishments are twofold. First, the success of the Kyoto Protocol underscores the EU's pioneering efforts,[3] with the EU leading the charge as the guardian of the Paris Agreement.[4] Second, the EU has successfully established legally binding emission reduction targets and enacted environmental legislation focused on renewable energy and the development of low-carbon technologies. Current emission reduction policies can be categorized into Command-and-Control Mechanisms (CCB) and Market-Based Mechanisms (MBM). The latter, which includes environmental taxation and Emission Trading Systems (ETS), is viewed as more flexible and has a greater environment-economic impact than the former.[5] The EU ETS, implemented in 2005, is regarded as the EU's cornerstone policy tool in the battle against climate change.[6]

In the context of the EU ETS, the EU's unilateral decision to include international aviation and shipping, two distinct transport sectors, in its ETS has significantly impacted the global carbon market. Article 2.2 of the Kyoto Protocol[7] delegates the regulation of GHG emissions from aviation and shipping sectors to the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), respectively. In response to rapidly increasing aviation emissions[8] and to allow the ICAO time to establish a global scheme for aviation emissions, the EU included all airlines flying within its borders in the ETS in 2012, exempting international flights to and from airports outside the EU.[9]

With shipping emissions also on the rise[10] and growing global pressure for states to exceed their existing obligations,[11] the EU proposed including the maritime transport sector in the ETS during extensive discussions between 2012 and 2017.[12] An alternative option for internal measures, the introduction of an emissions tax, was also put forward.[13] Currently, the maritime transport sector is

not included in the EU ETS,[14] but the European Parliament plans to include it from 2023 if the IMO's progress towards a GHG emissions strategy is deemed insufficient.[15]

## 2. Governance Architecture Regulating EU Maritime Transport GHG Emissions

Maritime transport contributes approximately 2.5% of global GHG emissions,[16] with projections indicating an increase of between 50% and 250% by 2050 based on future economic and energy developments.[17] This trajectory is not in line with the European Commission's goal of reducing the EU's maritime CO<sub>2</sub> emissions by at least 40% from 2005 levels by 2050.[18] Yet, the maritime transport sector remains inadequately regulated by both the international policy framework and the EU's current emissions reduction targets.

International efforts to regulate maritime transport GHG emissions, under the auspices of both the United Nations Framework Convention on Climate Change (UNFCCC) and the International Maritime Organization (IMO), have been somewhat disappointing. The Kyoto Protocol, under the UNFCCC, assigned the responsibility of regulating maritime GHG emissions to the IMO as stated in Article 2.2.[19] Furthermore, the Paris Agreement on Climate Change did not explicitly address the maritime transport sector. Under the IMO framework, the EU has consistently urged the IMO to take action on maritime transport emissions, given its belief that the IMO is the most appropriate international body to manage such emissions. In 2011, due to the efforts of EU member states, the international community reached the first global agreement on maritime transport emissions within the IMO framework, setting a series of technical and operational standards for vessels over 400 gross tonnage.[20] Nonetheless, the IMO has yet to develop sufficient mechanisms to effectively mitigate maritime GHG emissions.[21]

Simultaneously, the EU has begun legislating for maritime transport GHG emissions at the EU level. In 2009, the European Commission adopted strategic goals for maritime transport policy through 2018, identifying the reduction of maritime GHG emissions through market-based measures as a key priority,[22] a mandate reinforced in the 2011 White Paper on Transport.[23] The 2011 White Paper also established an overarching target for Europe's transportation sector for 2020, incorporating policy considerations on maritime transport GHG emissions. Specifically, the European Commission targeted a minimum 40% reduction in CO<sub>2</sub> emissions from international shipping by 2050, relative to 2005 levels. In 2013, the Commission issued a strategy to progressively integrate maritime emissions into the EU's domestic GHG emissions reduction policy. This strategy encompassed a three-step approach: establish the Monitoring, Reporting, and Verification (MRV) system,[24] define reduction targets, and implement a market-based measure. However, it simultaneously proposed a contrasting emissions reduction policy — the application of a regional EU ETS to all ships docking at EU ports. The MRV Regulation was enacted in 2015.[25]

As of 1 January 2018, large vessels (over 5000 gross tonnages) loading or unloading cargo or passengers at EU maritime ports must adhere to monitoring and reporting requirements for CO<sub>2</sub> emissions and other pertinent information in line with their monitoring plan.[26] These requirements were established by Regulation 2015/757 (amended by Delegated Regulation 2016/2071).

## 3. Main Experiences of EU Maritime Transport GHG Emissions Reduction Policies

### 3.1 Carbon Emissions Reduction: Emissions Trading System (ETS) vs. Maritime Transport Emissions Taxation

Carbon emissions reduction policies commonly fall into two categories: Command and Control Measures (CCM) and Market-Based Measures (MBM). CCMs, traditional administrative orders and penalties, demonstrate limitations in flexibility and environmental-economic impacts compared to MBMs. MBMs place a price on GHG emissions, incentivizing industries to adopt measures to curb emissions.[27]

For the EU maritime transport sector, the European Commission evaluated the most effective policy options to mitigate GHG emissions in 2008.[28] The Commission assessed emissions trading and an emissions tax, among others.

Initially, the EU opposed the ETS in GHGs, but the sentiment shifted over the years.[29] In 2001, the European Commission introduced the first international ETS for large industrial CO<sub>2</sub> emitters. The directive was adopted in 2003, and the EU ETS was operational by 2005.[30] The EU ETS, based on the

'cap and trade' principle, has been deemed the EU's most effective environmental and economic measure since its implementation.[31] Currently, the EU ETS is in its third phase (2013-2020), having undergone significant changes since its inception. Notably, in 2017, the EU decided against incorporating international shipping into the EU ETS,[32] and in 2018, the European Council approved the reform of the EU ETS for 2021 to 2030.[33]

Contrarily, a maritime emissions tax presents limitations. It risks legal disputes due to Article 26 of the UNCLOS agreement when levied on foreign ships,[34] and it exacerbates carbon leakage risks, as companies may re-register in non-charging or low-rate jurisdictions.[35] Due to these constraints, the EU ETS emerges as a more viable option for the EU maritime transport emissions sector than the emissions tax.

### ***3.2 Carbon Emissions Monitoring: EU's Monitoring, Reporting, and Verification (MRV) System***

Monitoring of fuel consumption and CO<sub>2</sub> emissions remains a key focus for the EU and the International Maritime Organization (IMO).[36] In 2009, the EU's Climate and Energy Package stated that the international maritime transport sector must contribute to GHG emissions reduction.[37] Consequently, the MRV system was established, basing emission reductions on ships' fuel consumption.

Starting from 1 January 2018, the MRV system mandates large ships involved in maritime transport activities to/from European Economic Area (EEA) ports to monitor and report verified data on their CO<sub>2</sub> emissions under Regulation (EU) 2015/757.[38] The MRV system plays a central role in the EU's maritime transport GHG emissions reduction initiative, helping establish precise emission reduction targets and assess progress towards a low-carbon economy.

## **4. Legal Analysis of EU Maritime Transport GHG Emissions Reduction Regime within the International Framework on Climate Change**

Marine bunker fuel GHG emissions remain an unresolved issue in global climate change negotiations. Article 2.2 of the Kyoto Protocol, the only clause addressing this, guides the evaluation of EU policies, including the EU maritime ETS. Unique features of marine bunker fuel emissions [39], complex maritime sector dynamics, differing national interests, and conflicting principles of the UNFCCC's CBDR[40] and IMO's non-discrimination[41] resulted in the issue's delegation to the IMO.

### ***4.1 Under the UNFCCC Legal Framework***

The UNFCCC only provides a framework for international climate change cooperation, establishing basic principles and general commitments. In the matter of GHG emissions from marine bunker fuels, the Kyoto Protocol does not impose substantive reduction obligations for Annex I Parties, but Article 2.2 urges these parties to limit or reduce GHG emissions from marine bunker fuels through the IMO.

The ambiguous provisions of Article 2.2 of the Kyoto Protocol, a product of international compromise, allow different stakeholders to interpret them from various perspectives. The controversies include whether emission reduction applies only to Annex I Parties, which principle between CBDR and non-discrimination should guide these parties, and whether this provision represents an international cooperation obligation. Article 2.2 does not restrict Parties from adopting unilateral measures to reduce maritime transport GHG emissions, but it emphasizes the need for international cooperation and agreement within the IMO framework before implementing unilateral measures.

### ***4.2 Within the IMO Framework***

A pertinent question is whether the EU can adopt unilateral measures to reduce maritime transport GHG emissions if it fulfills the international cooperation obligation in good faith under Article 2.2 of the Kyoto Protocol within the IMO framework.

Despite its observer status in the IMO, the EU demonstrated good faith in international cooperation by striving to reduce maritime sector GHG emissions from 2012 to 2017. If the IMO fails to adopt alternative measures by 2023, the EU might progress with unilateral measures. In May 2015, the IMO's MEPC developed a "Data Collection System" (DCS) for fuel oil consumption,[42] differing from the EU MRV system mainly in its global application.[43] Considering the IMO's commitment to a global maritime transport GHG emissions regime, the EU is discouraged from implementing its unilateral

maritime ETS measures, reinforcing the need for substantial IMO progress in addressing shipping CO<sub>2</sub> emissions.

## 5. Conclusion: Insights for Policy Makers in China

China took a significant step towards low carbon transition, being the world's leading CO<sub>2</sub> emitter, by launching its national carbon ETS on 19 December 2017, initially focusing on power generation and expanding over time to seven additional sectors including cement, steel, and aluminum.[44] Also, from 1 January 2018, China began imposing a new environmental protection tax.[45] According to the polluter-pays principle, taxable pollutants include air pollutants, water pollutants, solid waste, and noise.[46] With ongoing reforms towards a carbon tax market, China has employed the ETS and environmental protection taxes as tools for CO<sub>2</sub> emissions reduction. However, these tools have yet to regulate the maritime transport sector, necessitating a fresh approach to maritime emissions based on the experiences of EU policies.

Internally, China's carbon emission reduction policy selection could benefit from two primary Market-Based Measures (MBM): ETS and Maritime Transport Emissions Tax. For the ETS, China could learn from the EU's harmonized, centralized approach and its "cap and trade" principle, which provides flexibility and cost-effectiveness. However, China should also note the EU ETS's shortcomings, such as consistently low carbon pricing due to surplus allowances and low fuel prices and the minimal impact on CO<sub>2</sub> emissions reduction due to the complexity of shipping industries. As for the Maritime Transport Emissions Tax, while environmentally efficient, China must remain aware of its limitations and adopt sensible tax measures to avoid legal challenges, leakage, and competitive disadvantages.

From an international policy perspective on maritime transport GHG emissions reduction, China could take note of the EU's emissions mechanism and the legal analysis of the EU's unilateral marine ETS application under the UNFCCC and IMO frameworks. China could learn from the EU's MRV system, compatible with the IMO's global Data Collection System (DCS), focusing particularly on its subject and scope. However, China should approach with caution the EU's unilateral application of the ETS to shipping, as a regional ETS application to all ships entering EU ports could potentially lead to trade disputes. Given the EU's unsuccessful attempts to apply its ETS to international aviation, this is an area of potential concern. Lastly, Chinese policy makers should consider new regulations based on the IMO-DCS system and act accordingly.

## References

- [1] Barichella, A. (2017). "How Europe can and should become the guardian of the Paris Agreement on climate change." *European Issues Fondation Robert Schuman*, 450.
- [2] Feiock, R. C., & Stream, C. (2001). "Environmental protection versus economic development: A false trade-off?." *Public administration review*, 61(3).
- [3] Falkner, R. (2007). "The political economy of 'normative power' Europe: EU environmental leadership in international biotechnology regulation." *Journal of European public policy*, 14(4).
- [4] Rayner, T., & Jordan, A. (2016). "Climate change policy in the European Union." *Oxford research encyclopedia of climate science*.
- [5] Görlach, B. (2013). "What constitutes an optimal climate policy mix. Defining the concept of optimality, including political and legal framework conditions." *CECILIA2050. Deliverable, 1*.
- [6] Watanabe, R., & Robinson, G. (2005). "The European Union emissions trading scheme (EU ETS)." *Climate Policy*, 5(1).
- [7] *Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 2303 U.N.T.S. 162.*
- [8] Hasan, M. et al. (2021). "Climate change mitigation pathways for the aviation sector." *Sustainability*, 13(7).
- [9] Efthymiou, M., & Papatheodorou, A. (2019). "EU Emissions Trading scheme in aviation: Policy analysis and suggestions." *Journal of Cleaner Production*, 237.
- [10] *International Maritime Organization. (2021). Fourth IMO Greenhouse Gas Study 2020.*
- [11] *European Commission. (2012). Climate Action: Questions and Answers on the UN Climate Conference in Doha. No. 12/888.*
- [12] *Directive(2008).29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community, OJ L 140/63,[S].*

- [13] European Commission (2011). *A Roadmap for Moving to a Competitive Low Carbon Economy in 2050* [R]. Brussels.2011.
- [14] Hughes, E. (2020). *Implications of application of the EU Emissions Trading System (ETS) to international shipping, and potential benefits of alternative Market-Based Measures (MBMs)*. ECSA.
- [15] Psaraftis, H. N. (2019). "Decarbonization of maritime transport: to be or not to be?" *Maritime Economics & Logistics*, 21.
- [16] Tatar, V., & ÖZER, M. B. (2018). *The impacts of CO2 emissions from maritime transport on the environment and climate change*. *International Journal of Environmental Trends (IJENT)*, 2(1).
- [17] European Commission. (2011) *White Paper, "Roadmap to A Single European Transport Area – Towards a Competitive and Resource Efficient Transport System"*, COM(2011) 144 final.
- [18] Rogelj, J. et al. (2010). "Analysis of the Copenhagen Accord pledges and its global climatic impacts—a snapshot of dissonant ambitions." *Environmental research letters*, 5(3).
- [19] Article 2.2, Kyoto Protocol (1997).
- [20] MARPOL Annex VI (1997). *Prevention of Air Pollution from Ships*.
- [21] Scott, J. et al. (2017). "The promise and limits of private standards in reducing greenhouse gas emissions from shipping." *Journal of Environmental Law*, 29(2).
- [22] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, "Strategic Goals and Recommendations for the EU's Maritime Transport Policy until 2018"*, COM(2008) 8 final, 21 January 2009.
- [23] European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, "Integrating Maritime Transport Emissions in the EU Greenhouse Gas Reduction Policies"*, COM(2013) 479 final, 28 January 2013.
- [24] Regulation (EU) 2015/757. *Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending directive 2009/16/EC*, OJ L 123/55, 2015.
- [25] Duyck, S. (2014). "MRV in the 2015 Climate Agreement." *Carbon and Climate Law Review*, 3.
- [26] Thuy, P. et al. (2021). "The role of mangroves in supporting shipping industry commitments to environmental protection and sustainable development." *CIFOR Occasional Paper*.
- [27] Wang, K. et al. (2015). "Modeling the impacts of alternative emission trading schemes on international shipping." *Transportation Research Part A*, 77 (35).
- [28] CE Delft Report (2009). *Technical Support for European Action to Reducing Greenhouse Gas Emissions from International Maritime Transport*. Tender DG ENV. C3/ATA/2008/0016.
- [29] Skjærseth, J. B., & Wettestad, J. (2009). "The origin, evolution and consequences of the EU emissions trading system." *Global Environmental Politics*, 9(2).
- [30] European Commission (2015). *EU Emissions Trading System*.
- [31] European Commission (2015). *EU ETS Handbook*.
- [32] Wang, X. et al. (2019). "Green tramp shipping routing and scheduling: effects of market-based measures on CO 2 reduction." *Sustainable Shipping: A Cross-Disciplinary View*.
- [33] European Council, "EU Emissions Trading System reform: Council Approves New Rules for the Period 2021 to 2030", (last visited 16 November 2022).
- [34] Article 26(1) (2), *United Nations Convention on the Law of the Sea (UNCLOS)*, 10 December 1982, 1833 U.N.T.S. 397.
- [35] Truby, J. M. (2010). "Towards overcoming the conflict between environmental tax leakage and border tax adjustment concessions for developing countries." *Vermont Journal of Environmental Law*, 12.
- [36] CE Delft Report (2013). *Monitoring of Bunker Fuel Consumption*. CE-137A4023.
- [37] Decision No 406/2009/EC. *Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020*, OJ L 140/136, 2009.
- [38] Deane, F. et al. (2019). "Measuring, monitoring, reporting and verification of shipping emissions: Evaluating transparency and answerability." *Review of European, Comparative & International Environmental Law*, 28(3).
- [39] International Institute for Sustainable Development (2007). *A Summary Report of the Technical Workshop on Emissions from Aviation and Maritime Transport*.
- [40] Articles 3 and 4, UNFCCC, New York, 9 May 1992, *United Nations Treaty Series* no. 1771.
- [41] Kopela, S. (2013). "Climate Change and the International Maritime Organization: Another Breakthrough at the Marine Environment Protection Committee?" *American Society of International Law Insights*, 17(24).

[42] Adamowicz, M. (2022). "Decarbonisation of maritime transport–European Union measures as an inspiration for global solutions?" *Marine Policy*, 145.

[43] Safty4Sea Opinion (2018). *Key Challenges for Shipping Emissions Regulations in 2018*.

[44] European Commission (2018). *Emissions Trading: European Commission and China Hold First Policy Dialogue*.

[45] *Law of the People's Republic of China on Environmental Protection Tax (2016)*. Order No. 61 of the President of the People's Republic of China,

[46] Article 3, *Law of the People's Republic of China on Environmental Protection Tax (2016)*.