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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 (CO₂) 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 CO₂ 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 CO₂ 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 CO₂ 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


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 CO₂ emitters. The directive was adopted in 2003, and the EU ETS was operational by 2005.[30] The EU ETS, based on the
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 CO₂ 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 CO₂ 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 CO2 emissions.

5. Conclusion: Insights for Policy Makers in China

China took a significant step towards low carbon transition, being the world’s leading CO2 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.

Also, from 1 January 2018, China began imposing a new environmental protection tax. According to the polluter-pays principle, taxable pollutants include air pollutants, water pollutants, solid waste, and noise. With ongoing reforms towards a carbon tax market, China has employed the ETS and environmental protection taxes as tools for CO2 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 CO2 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


