Chapter 15

GHG Emissions from the International Goods Movement by Ships and the Adaptation Funding Distribution

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ABSTRACT

The GHG reduction from ships has attracted international attention. As the major transportation mode in international trade, how the reduction cost influences the international trade is becoming a major concern. How to allocate the funds collected from the emission regulation is also in controversy. This chapter summarizes the policy instruments under discussion in the International Maritime Organization and discusses the advantages of market based instruments. Using the Ship, Trade, Traffic and Emission Model, this chapter calculates the impact of ship-based GHG reduction cost on the international trade. The impact is small for most countries, but relatively large for small island countries, creating an equity issue ready to be resolved. The ongoing debate between the common but differentiated responsibility and equal treatment for ships principle is documented. This chapter proposes that all countries need to reduce GHGs but developing countries, especially small island countries, should get more benefits.

INTRODUCTION

The transportation sector is the second largest source of CO_2 emissions, accounting for more than 22% of the world inventory in 2005 (IPCC, 2007).

CO_2 from ships has been an increasing concern in recent years. It accounted for more than 10% of CO_2 emissions from the transportation sector in 2005. Furthermore, data from UNCTAD shows that the sea-based transport accounts for more than 80% of world freight transport in volume (UNCTAD, 2007) and contributes twice as much

Table 1. CO_2 Emission in 2020 and 2050 (Unit: Mmt) (Buhaug et al., 2009)

Year	A1B	A1F	A1T	A2	B1	B2
2020	1345	1293	1294	1188	1167	1114
2050	3595	3644	3634	2878	2735	2449
	A1B: Balanced scenario across energy sources A1F: Fossil-intensive scenario A1T: A1T: Technologically advanced and predominantly non-fossil scenario A2: Heterogeneous world with continuously increasing global population B1: Increasing population growth with rapid change in economic structures B2: Emphasis on local solution of economic growth and sustainability					

to carbon emissions as does freight transport by air, even though shipping emissions are 40 times lower than air emissions per ton of freight (Buhaug *et al*., 2009). Except for the short term disruption due to global economic crisis from 2008 (The Economist 2009), international trade will not cease grow. The IMO projected the CO_2 growth in year 2020 and 2050 under six scenarios used by the IPCC (Table 1). Under the business-as-usual scenario, CO_2 from ships will be at least double between now and 2050. Because of the trade growth, faster ships, and fewer ship retirements, the emissions will be almost tripled at the worse scenario, showing how urgent it is to control and reduce CO_2 from the maritime industry (Buhaug *et al*., 2009).

CO_2 is the most important Greenhouse Gas (GHG) among various GHGs emitted by ships. The total ship-based CO_2 emissions were around 1,046 million metric tons or about 3.3% of the world total in 2007 (Buhaug, *et al*., 2009). Ships are one major source of some other GHGs as well (Buhaug, *et al*., 2009; Wang *et al*., 2009), including volatile organic compounds (VOC), methane (CH_4), black carbon (BC), particulate organic matter (POM), nitrogen oxide (N_2O) and carbon monoxide (CO). The emissions have been reported by the Marine Environmental Protection Committee (MEPC) under the International Maritime Time Organization (IMO), the major regulatory body of the international shipping industry (Buhaug *et al*., 2009). The MEPC is also the major platform where the international com-munity discusses policy instruments to reduce ship-based GHGs.

The international community has recognized that the shipping industry is one of the least regulated industries. The Kyoto Protocol has put most industries in most developed nations into a binding commitment to reducing GHG. However, the authority to regulate GHG from the shipping industry and the aviation industry was given to the International Maritime Organization (IMO) and International Civil Aviation Organization (ICAO), respectively. Since then, the MEPC has conducted several meetings to discuss GHG inventories and available policy instruments since 1996.

The objective of this chapter is to review policies focusing on vessel-based GHG reduction and investigate the impact of regulation costs on vessel-based GHG reduction. The impact of GHG reduction costs on maritime industry and international trade will be discussed. It will also look at the fund distribution issue and the potential impact on various countries.

BACKGROUND

Policy Options in Reducing Vessel-Based GHGs

Policy makers and stakeholders have identified a number of policy instruments in reducing CO_2 emissions, including the Marine Emission Trade System (METS), the International Compensation

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