

A study of the Potential and Feasibility of Incentive-based Instruments for Reducing Air Pollution from Ships

Chengfeng Wang

Abstract

Ship emissions are a non-negligible environmental issue. Globally, ships account for 31% and 7% of nitrogen and sulfur emissions from fuel combustion respectively. Shipping makes significant contribution to air pollution problems in areas with heavy sea traffic, sensitive environment and where land based sources have been well regulated, e.g. Baltic Sea and North Sea. Being aware the magnitude and the contribution of air pollution from ships and the related damage, recognizing the fact that shipping is one of the least regulated industries in terms of air pollution, thus offering the opportunity for mitigating air pollution problems in a more cost effective way than controlling land-based sources, for which the marginal costs are already generally high, policy makers have been paying more and more attention on controlling air emissions from ships.

Due to the complexity of this industry, regulating ship air pollution is not easy. Developing a cost-effective control policy package is one of the great challenges that the policy makers face. Currently, command and control is the main type of control policy, e.g. MARPOL annex VI as global uniform requirement, which is expected to enter into force in the near future, and other national rules. Besides the common disadvantages of command and control regulation, this control policy is challenged by environmental advocates to be too lax, and ineffective. Illuminated by the success of economic instruments on land-based environmental problems, countries, like Sweden and Norway, have been offering rewards to green ships calling at their ports to induce them to be environmentally friendly, including reducing air emissions.

Based on environmental economics theory, economic incentive instruments have a number of advantages over command and control, at least on controlling land-based air pollution sources. However, how economic instruments will work for reducing air pollution from the shipping industry, which has a number of unique issues, like multi-jurisdiction, flag of convenience, that other industries don't have, is not quite clear yet.

Ship owner/operators play an important role in determining the outcome of the ship air pollution control policy, either for a command & control or an incentive-based policy, especially for the latter. Understanding their decision-making mechanisms could contribute to developing more cost-effective policy and help policy makers foresee the possible outcome of policy with more confidence. By modeling ship owner/operators' decisions with environmental concerns included and

simulating their environmental behavior under different policy packages, this research is going to assess the potential and the feasibility of incentive-based instruments for reducing air pollution from ships and forecast the cost-effectiveness, and compare them with traditional policy.

This is a generalized research of the New York ferry project, which aims to evaluate the incentives to reduce emissions from ferries. This presentation is going to show you a simplified case as a demonstration.

Presentation Outline

1. Why study this?
2. Research objective
3. Policy Relevance
4. Research design
5. A Simplified case
6. New York ferry case study
7. Expected results