

REGULATING VESSEL-SOURCE AIR POLLUTION

STANDARD-SETTING IN THE REGULATION OF SO_x EMISSIONS



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ABSTRACT

Emissions of sulphur oxides (SO_x) cause considerable global environmental and human health impacts including acidification, climate change, and increased premature deaths in human populations due to serious heart and lung diseases. Although recently revised regulations in MARPOL 73/78 Annex VI are expected to decrease SO_x emissions from ships, it is clear that these regulations will need further development. Even forthcoming requirements for SO_x emissions from marine sources will still be considerably less strict in 2020 than the requirements for SO_x emissions from terrestrial emission sources in force today. Without further regulatory developments, emissions of harmful SO_x emissions from ships will persist, and will also indirectly hinder the efficient operation of available exhaust aftertreatment devices for other air emissions from ships.

This thesis examines the regulation of SO_x emissions from ships with a focus on the dominant type of regulation: 'command and control' (CAC) regulation. The purpose is to identify and examine historical and current differences between standard-setting in the regulation of SO_x emissions from terrestrial sources, and the regulation of SO_x emissions from marine sources. Standard-setting differences are considered across three regulatory scales (international, regional, national), with a theoretical and methodological foundation mainly in international environmental law and regulatory studies, and with the further aims of identifying the underlying rationales for the key differences in standard-setting, the regulatory effects of these differences, and the possibilities of improvement of SO_x emissions regulation in the marine setting. Five categories of environmental standard-setting are examined: (a) product standards; (b) process standards; (c) emission standards; (d) environmental quality standards; and (e) other standards.

In conclusion, this thesis argues that standard-setting in the regulation of terrestrial and marine SO_x emission sources differs on all regulatory scales, both historically and presently. A key difference in standard-setting is that the control of SO_x emissions from terrestrial sources has relied on combinations of standard-setting approaches, whereas marine emission sources have primarily been controlled with product standards. Arguably, the emission to be controlled has been a crucial decisive factor for the choice of standard-setting type. Other decisive factors were *inter alia* technical, economic, and institutional. The regulatory effects of the key differences are that experiences were gained in the terrestrial regulatory setting from using various forms of regulatory standards compared to the marine setting. The possibilities of improvement of SO_x emissions regulation in the marine setting depend on perspectives and priorities. If the ambition is to refine the precision of standard-setting in SO_x emissions regulation, there are improvement possibilities.

Three broader implications of this study's results are highlighted: regulatory studies can provide deeper understandings of the design of regulation; the analysis of standard-setting against a surrounding explanatory context can demonstrate the influence on standard choice of factors such as emission type, technology, and science; and regulatory studies can be used to analyse large quantities of multiscale regulatory material, which can yield better overviews of a regulatory landscape.

Keywords: ships, air pollution, SO_x emissions, regulation, regulatory design, command and control, standard-setting, international environmental law, regulatory studies