

Maritime Ports

The Impact of Climate Change

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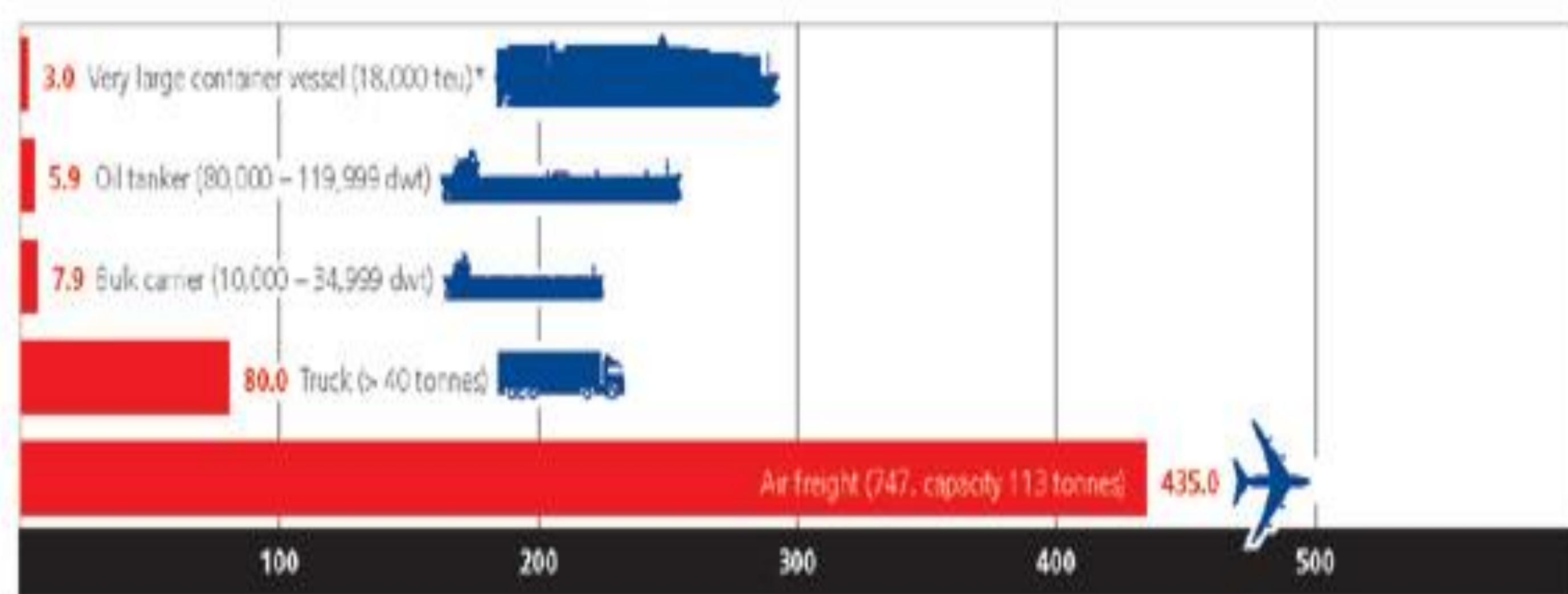
ABSTRACT

The shipping industry continues to expand: transport of cargo to maritime ports for distribution to a growing population is the lifeblood of global trade. Maritime trade begins with overland transportation, usually truck or rail, either delivering cargo to, or receiving cargo from, a maritime port. The movement of cargo in a port involves the following activities: 1) the shipping industry delivers and receives cargo, 2) port operations load and unload cargo, and 3) the overland transport delivers the cargo to be loaded on a ship, or, the overland transport is loaded with cargo the ship has delivered to the port, for delivery to customers. Therefore, as will be presented, the maritime port is a hub of activity in which the movement of cargo results in the release of tons of GHG emissions. In this paper we will discuss the growing impact of the three areas of maritime port activities on climate change. A review of current and proposed environmental programs, established by government agencies, NGOs, and private companies to promote awareness of the growing impact of global trade on climate change is discussed. Authorities at the ports of Aalborg, Denmark and Tangier Med Port, Morocco, are interviewed and data collected. It is concluded that although the ports are operating in different countries and cultures, management in both ports are aware of current environmental programs and the need for a focus on reduction of GHG emissions. A comparison of each port's specific activities to address climate change is presented. Results demonstrate that no matter the type of port, or where the port is located, enhancing and building stakeholder networks, including ship operators, port managers, and overland transport distributors, is needed to optimize efforts in reducing GHG emissions.

Movement of Cargo

COMPARISON OF TYPICAL CO₂ EMISSIONS BETWEEN MODES OF TRANSPORT

Grams per tonne-km



Source: IMO GHG Study: 2009 (*AP Moller-Maersk, 2014)



Tangier Port MED, Morocco



Global Maritime Ports

North America	2,293
South America	253
Oceania	373
Africa	421
Asia	1,719
Europe	3,024

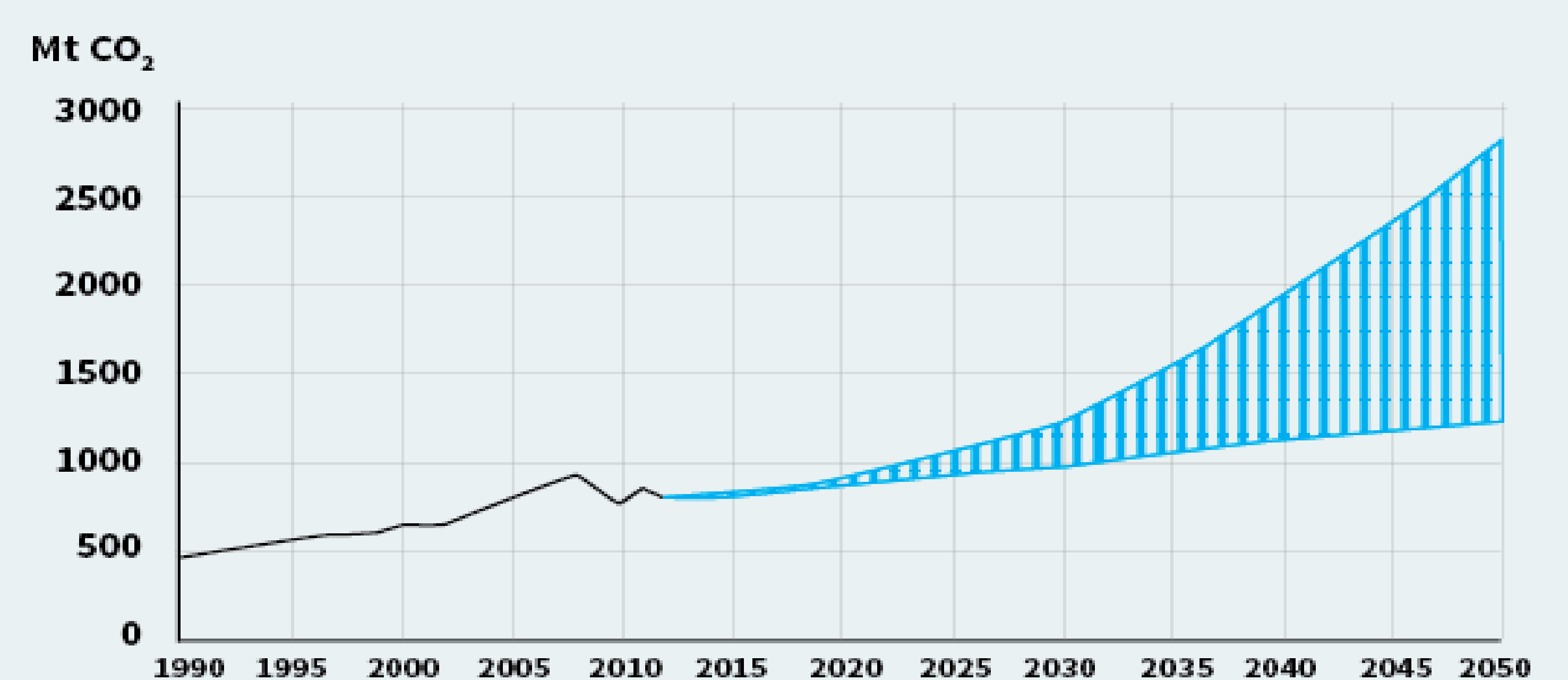
Global Ports, Ports.com, 2018

Contributors to a Port's Environmental Impacts

- 1) Port activity itself;
- 2) Ships calling at the port,
- 3) Inter-modal transport networks

OECD, 2018

Range of expected increase in GHG emissions from shipping



Source: Third IMO GHG Study (2014) Transport & Environment

A Case of Two Ports

In the following case study, each port is implementing and enhancing sustainable development plans. In developing the plans, each port understands how port activities contribute to detrimental environmental impacts, including energy use and GHGs. The ships at berth consume fuel and produce noise and vibrations generating different types of pollution to all the natural coastal elements: the water, the air, and the seabed (Borriello, 2013). Transport of cargo by trucks and rail increase the port's GHG emissions. In our comparison of the Tangier Med Port and The Port of Aalborg, Denmark, we will continually go back to how each port implements and maintains programs to reduce GHG emissions.



Aalborg Port, Denmark

Conclusion: A Continuing Study of Ports and Stakeholders

Ship transport emits the least amount of GHGs, but when in port the amount of GHGs increase due to port operation from cranes, trucks, and other equipment using fossil fuel. In addition, the emissions of trucks and rails to transport goods to customers continues to increase the GHG effect on global warming. This combination of sources that contribute to the causes of climate change is becoming a top priority of the UN, country regulating bodies, private organizations, and NGOs as they realize the continued growth of global trade. In this paper we have discussed programs designed to assist the shipping industry, port authorities, and transport supply chains in identifying and implementing strategies to reduce climate change impact as well as the lack of an international framework for stakeholder networks. The case study of the two ports provided a look at how port internal and external stakeholder networks can be established to better coordinate programs across global shipping partnerships. Through a review of these ports we conclude that despite the similarities of their methods in managing environmental protection, the port of Aalborg and the Tanger Med port have a unique and specialized approach to reducing emissions contributing to climate change. It is recommended that the Tangier Med Port increase its attention on reduction of fossil fuel consumption, energy use, and CO₂ emissions. The port of Aalborg continues to implement its CO₂ reduction plans, but should build upon internal and external stakeholder coordination. The study of these two ports is ongoing by the authors, which include contacts within each identified port network. Continued research into programs such as the new EU 2018 emissions requirement in shipping as well as established partnerships in the Mediterranean is ongoing. Included in this study's continuing research is to better understand how the connection between the flag state and the port state can be coordinated to enhance GHG data collection within the shipping, port operations, and transport supply chains. Through initiating this study the authors have concluded that the complex global maritime trade industry, and its impact on climate change, will continue to be a growing area of research.