

The collaboration between port and city in low carbon transition: the case of Livorno

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ABSTRACT

The importance of low carbon transition is particularly high in port-cities, especially in the Euro-Mediterranean area, where the characteristics of ports are linked to their location, which remains strongly rooted inside urban system. Maritime transport accounts for about more than 80% of global merchandise trade by volume, and it is responsible for 3% of global CO₂ emissions. The increasing awareness of the growing global air pollution issue and its impact on health resulted in the adoption of international, national and local measures to reduce ship emission into the atmosphere. This paper explores low carbon transition in shipping and port services, with a focus on the city-port collaboration in reducing urban pollution derived by port activities, of which the Livorno Blue Agreement is an example.

This paper is complementary to the [video](#) *The role of port cities in efforts to reduce greenhouse gas emissions from shipping*, presented by the author at Blue Planet Economy (BPE) European Maritime Forum 2021.

KEYWORDS: shipping, low carbon transition, city-port collaboration, environment, governance.

HOW TO CITE THIS ARTICLE

Bonciani, B. (2022). The collaboration between port and city in low carbon transition: the case of Livorno. In Vitali, G. & Zoppi, I.M. (eds). *CNR case histories in the Blue Planet Economy* (pp. 33-38). Quaderni IRCrES 16. Moncalieri, TO: CNR-IRCrES.

<http://dx.doi.org/10.23760/2499-6661.2022.16.05>

1 INTRODUCTION

This paper is complementary to the video *The role of port cities in efforts to reduce greenhouse gas emissions from shipping*¹, presented by the author at Blue Planet Economy (BPE) European Maritime Forum 2021. Other interviews released on the European Project PASSAGE (Interreg). The aim of the project was to promote public Authorities support in low carbon growth in European maritime border regions².

Since 1990s, climate change has risen on the agenda of urban government. The conjunction of the growing prominence and plurality of urban climate change responses and the emergence of calls for low carbon transition raises important questions about the future of port-cities.

Within this framework, the low carbon city is a sustainable urbanization approach that focuses on minimizing or abolishing the utilization of energy sourced from fossil fuels.

The importance of low carbon transition is particularly relevant in port-cities, especially in the Mediterranean area, where characteristics of ports are linked to their location, which remains strongly rooted inside urban system. Coastal areas, and especially port-cities, concentrate factors that have been proved to have a direct influence on CO₂ emissions (Mat et al., 2016).

Indeed, ports generate heavy traffic and congestion with associated health impacts for local residents (citizenship and port workers). Ship emissions are often one of the major sources of urban pollution in and around port-cities. Indeed, although the most of these emissions are emitted into the sea, a noticeable portion of shipping emissions takes place in port areas, mainly where docked ships keep their engines running. In many port-cities, citizens claim for a reduction of ship emissions in order to reduce their impact on health.

Maritime transport accounts for about more than 80% of global merchandise trade by volume. Shipping is responsible for 3% of global CO₂ emissions.

The increasing international awareness of the growing global air pollution issue resulted in the adoption of measures to reduce ship emission into the atmosphere.

Since 1973, international regulation (IMO, 1998) has aimed at preventing and minimizing pollution from ships – both accidental and routine pollution.

The Marpol convention with 1997 Protocol amendments included a new Annex VI, which regulates harmful compounds emitted from ships on international voyages for the first time.

Within this framework, ports became central to climate change initiatives and energy/technology development for marine and offshore energy, biomass imports, and maritime freight that present a diversification challenge for port cities (Dario, Bonciani & Spadoni, 2021). More recently, the European Green Deal, aimed to make Europe climate neutral by 2050, boosts the economy through green technology, creates sustainable industry and transport, and cuts pollution. Turning climate and environmental challenges into opportunities will make the transition just and inclusive for all. Within this framework, ports need to become new clean energy hubs, contributing to better living conditions for workers and nearby residents.

2 EVOLUTION OF THE PORT CONCEPT AND OF PORT-CITY RELATIONSHIP

Within the fourth-generation ports, the environmental and human factor features become particularly important for port competitiveness (Unctad, 1992; 1999).

¹ https://www.youtube.com/watch?v=CDKob_REGAY

² Other interviews released on the European Project PASSAGE (Interreg) are available at <http://retedigital.com/en/progetto-passage-interreg-europe-porti-e-citta-una-comune-strategia-ambientale-intervista-a-barbara-bonciani-comune-di-livorno/>;

www.academia.edu/40337358/city_port_collaboration_in_reducing_shipping_emissions

The aim of the project was to promote public Authorities support in low carbon growth in European maritime border regions.

In this framework, the collaboration between cities and ports on common environmental objectives is the fundamental condition for preventing conflicts, and on which to orient policies focused on port growth, urban development and life quality improvement.

One might wonder why ports have to consider city communities in their environmental strategy and how cities and ports could collaborate to develop a common strategy in order to reduce urban pollution derived by port activities.

To answer these two questions, first of all we need to highlight the port concept evolution.

During the last twenty years, ports have undergone major changes due to the containerization and mass transportation with profound effects on their hinterland.

Today, the competitiveness and sustainability of ports are not only determined by operational features but depend on a proper integration of three dimensions: operational, spatial and societal. The societal dimension addresses ecosystem and human factors (Verhoeven, 2015).

Table 1. Three dimensional “fourth generation” port concept

Dimension	Sub-dimension	Key features
Operational	Ship-shore operations	Technological changes, introduction of new services (e.g. shore-side electricity, waste reception facilities).
	Value-added logistics	Shift from core to non-core port activities.
	Industrial activities	Shift from traditional to sustainable industries (e.g. LNG terminals, biofuel plants).
Spatial	Terminalization	Multinational operators develop networks of terminals under corporate logic. Competitive emphasis shift to terminal level, extending into the supply chain.
	Port-city relationship	Loosening of spatial relationship combined with the weakening of economic and societal ties (although first signs of re-integration initiatives appear – see societal dimension).
	Regionalization	Network development beyond the port perimeter, involves co-operation with inland ports and dry ports (load center development) as well as with other seaports in proximity.
Societal	Ecosystems	Seaport in part of a wider (coastal) ecosystem where it has a variety of environmental interactions with the outside.
	Human factors	Sustainable co-habitation with local communities, focus on avoiding negative (pollution, congestion, etc.) and stimulating positive externalities.

Source: Verhoeven, 2015, p. 21.

Ecosystem means that the seaport is a part of a wider coast ecosystem where it has a variety of environmental interactions with the outside.

Human factors refer to sustainable co-habitation with local communities focused on avoiding negative externalities, and stimulating the positive ones. Many ports are already planning for the development of environmental facilities to support green transition.

In this context, the port-city goal is to accelerate the economic strength of ports, improve competitiveness of ports and reduce emission incurred by international and domestic shipping.

Ports are central to some climate change initiatives and in green transition policies. In this framework, port authorities play a very important role for their potential to face socioeconomic and environmental pressures from stakeholders and for their role in implementing green economy policies.

Furthermore, recently the erosion of public support from port authority has been recognized as an issue that need attention from the port management, embracing co-habitation and dialogue with cities and local communities (Verhoeven, Espo & Backx, 2010).

In this context, the mitigation of urban pollution derived by shipping became an important question for port-cities, where city communities are more engaged in climate actions, asking for greenhouse gas reduction.

Today, the port-city relationship is experiencing a new dynamism driven on both sides, by aspiring to improve port competitiveness, and, at the same time, by making the most of their potential as a stimulus for city life and regeneration.

In this framework, cities and ports can establish a new relation and exercise their potential to address environmental externalities. Balancing the environmental impact of port on the city is a challenging task for both port and city management.

Societal integration has been recognized as an essential part of port governance and concerns actions that aim to optimize the relation between port and its surrounding societal environment.

3 THE ADVANCED NODE OF LIVORNO: TOWARDS A SMARTER PORT-CITY COLLABORATION ON GREENHOUSE GAS REDUCTION

The port of Livorno is a multipurpose port, adjacent to the urban fabric of the city, where ships operate near areas that are heavily populated and sensitive to the phenomenon of emissions into the atmosphere by ships.

The City of Livorno, together with the new Councilor for port and port-city integration, launched a new cooperative working framework (open governance process) focused on improving port-city relations in different fields: economic development, environment, planning and technologies, human factors and social issues.

The Municipality of Livorno has joined RETE³ (the international association for the collaboration between port and cities), giving life to the *Advanced node of Livorno*, a permanent operational center aimed at promoting and strengthening collaboration between stakeholders for a better integration of the port in the urban and territorial context, as well as shared development of the port-city.

The general aim of the *Advanced node of Livorno* is to foster the collaboration between public and private at a local level for a better integration of the port in the urban context, and also to create a dynamic platform of collaboration between city and port that can be considered as an example at local, national and international level.

As a part of the RETE Agreement, the Municipality of Livorno has set up the Environmental working group on sustainability and circular economy with a focus on greenhouse gas reduction, engaging port communities (institutional/public and private), the local research Institute and the laboratory. The specific aim was to encourage port-city collaboration on reducing emissions from the shipping sector and to explore and share the best practices and current solutions realized by other ports and cities in Europe, in order to reduce pollution generated by ships and port operations (use of environmentally friendly technologies and propulsion; low emission electric power supplies at berth, LNG PowerPacs, low emission and energy efficient machinery and equipment, etc.).

In this scenario, on 20th January 2020 the Municipality of Livorno, together with the Coast Guard Office and the shipping companies which have regular lines in the port of Livorno, signed the *Livorno Blue Agreement*, a voluntary agreement focused on mitigating the gas emission derived by ships. It is considered appropriate to adopt some best practices in order to reduce

³ <http://retedigital.com/en>

atmospheric emissions from those ships frequently berthing to Livorno port, especially during the time of stay of ship in port (dockside, berthing and un-berthing), to protect the health of citizens and port workers.

This also considered the obligations introduced by international legislation which entered into force on 1st January 2020. On October 2008, the International Maritime Organization (IMO) had adopted a set of amendments to Annex VI of the MARPOL Convention which, among other things, strengthened the requirements on the sulphur level permitted in ship fuels. The amendments provide for a progressive reduction of the sulphur content of marine fuels (so called “Sulphur cap”) which avoid the use of marine fuels with sulphur content greater than 0,50% by mass in territorial waters and particularly established that ships at berth in Italian ports do not have to use marine fuel with a sulphur content exceeding 0,10% by mass.

Thanks to the *Livorno Blue Agreement*, it was possible to introduce more severe best practices in order to mitigate green gas emissions as follows: using main and auxiliary engines at the best speed and power rate for an optimal combustion; starting the engines in such a way as to limit the smoke at low engine speeds; avoiding the passage between engines if not necessary; avoiding to blow the exhaust pipes in port; carrying out frequent checks on the correct implementation of maintenance programs and retain all the documentary evidence on board.

4 CONCLUSIONS

Port cities are emblematic of complex and integrated socio-ecological systems, which are experiencing challenges and opportunities related with green port transition and, in general, with the interactions between bio-geo-physical territorial components and governance.

Characteristics of Euro Mediterranean and Italian ports are linked to their location, which remains strongly rooted inside urban systems. The air pollution and health impacts of ports on urban and marine system cause environmental conflicts between city and port community.

Indeed, ports can be considered as major hubs of economic activity, but at the same time the major sources of pollution derived by shipping and operational activities. Among the low-carbon strategies, the projects developed by ports and cities at local level become particularly important for their ability to add value to international and national policies. Local communities in city port ask for urban pollution mitigation strategies and ports are central to the green transition process. In this framework, the *Livorno Blue Agreement* represents a best practice about port-city collaboration in green gas emission mitigation. The voluntary agreement, signed by the Municipality of Livorno, the Port Network Authority of the North Tyrrhenian Sea and the Coast Guard of Livorno, includes some best practices and engagements for ship companies signatories focused on reducing atmospheric emissions derived by those ships frequently berthing to Livorno port. The *Livorno Blue Agreement* is the first goal of port-city collaboration focused on atmospheric pollution reduction. It represents a social responsibility practice, a first step in port-city collaboration in ship emission mitigation.

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