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1. Introduction

This deliverable is elaborated in the context of the Work Package T1 - *Port Environmental Framework* / Activity T1.4 – *Transfer of knowledge for waste management planning in port area.*

The activity collects data on waste management in port areas by technical experts: site inspections of ADRION ports, surveys about the general state of the port waterways, capacity building with port authorities will be proper means to have an overall vision. All data will be collected to edit transnational policies which will assist ADRION programme countries in planning and providing adequate port waste management reception facilities. It will encourage them to develop appropriate methods of disposing of ships' wastes and waste generated by port users**.** LB, PP2, PP3, PP4, PP5, PP6, PP8 and PP9 will carry out SWOT analysis of their current port regulation and action plan on waste management; PP6 will be responsible for the Organisation of a round table: results of previously performed analysis will be discussed and shared to transfer collected knowledge on waste planning and management in ports and foster environmental status.

The deliverable *T1.4.2 – Transnational guidelines for port authorities to enhance their environmental status* aims to provide common guidelines for port authorities based on shared protocols. The scope of these guidelines is to improve the role of the ports to the community outside. In particular, the Ports should have **a corporate social responsibility, strategic relations with stakeholders and environmental management**. This is very important as Ports improved relations with the surrounding society will defend and strengthen the port's 'license to operate'. The proposed joint guidelines should deal with conflicting interests linked to environmental protection, urban development, labor conditions, residents' interest, the overall economic development.

This report, consists of the following main sections:

- Presentation of the current waste planning and management policy/approach and current environmental status of the ports.
- Presentation of the applied protocols and initiatives of the ports concerning:
    - corporate social responsibility,
    - strategic relations with stakeholders and key actors
    - environmental protection & management – Environmental Sustainability.
- Identification of protocols/standards as best practices that can be applied in the Adriatic ports for enhancing their environmental status and their social responsibility.
- Identification of Key actors involved – Possible synergies
- Tailored transnational Guidelines for enhancing actual environmental status of the ports and their social profile.
- Conclusions

2. Presentation of the current waste planning and management policy/approach and current environmental status

2.1 Current waste planning and management policy/approach

2.1.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The Port System Authority of the Ionian Sea, in compliance with the provisions of art. 5 of the Legislative Decree of 24 June 2003, n. 182 "Implementation of Directive 2000/59 / EC relating to port collection facilities for waste produced by ships and cargo residues", drafted the "Port of Taranto waste collection and management plan" approved with the Resolution of the Regional Council n. 1407 of 12 June 2015 and in force since 28 November 2004 and subsequent updates. The most recent update of this Plan was approved by D.G.R. of the Puglia Region n. 1203 of 31 July 2020.

This Plan is updated and approved in accordance with the regional waste planning, in compliance with the provisions of the aforementioned legislation, at least every three years or in any case in the presence of significant operational changes in the management of the port.

The Authority, with the waste collection and management plan of the Port of Taranto, gives body to the regulation of the management of all the different types of waste produced in the port area, not only with reference to waste produced by ships but also to waste which are produced and managed throughout the area of the territorial jurisdiction. Therefore, the Plan addresses, in its entirety, the management and treatment of the different types of waste produced and collected in the port area.

The waste, which can be classified as hazardous and non-hazardous special waste, which can be delivered and disposed of by accommodation facilities, can be divided into the following types:

1) products from the ship;
2) cargo residues which consist of any material contained inside the cargo holds or tanks and which remained there at the end of the unloading and cleaning operations.

In turn, the waste produced by the ship is divided into:

a) special waste similar to urban RSAU (such as kitchen, other than load residues);
b) waste water;
c) bilge waters;
d) associated with the load.

Similarly, cargo waste can be classified into:

a) slop (washing water);
b) ballast water if it comes into contact with cargo;
c) surpluses.

Central Adriatic Ports Authority

The Central Adriatic Port Authority, in compliance with the provisions of art. 5 of the Legislative Decree of 24 June 2003, n. 182 "Implementation of Directive 2000/59/EC relating to port facilities forthe collection of waste produced by ships and cargo residues", drafted the "**Plan for the collection and management of waste produced by ships and cargo residues**", approved with Deliberation of the Regional Council of the Marche Region n. 1513 of 29 October 2012, and recently being updated to Revision no. 2 of 24 March 2021, soon to be approved.

In particular, Article 5, paragraph 6 of Legislative Decree 182/2003 provides that the Plan is updated and approved in line with the regional waste planning, at least every three years and in any case in the presence of significant operational changes in the management of the port. In compliance with the provisions of the aforementioned decree, the Port Authority with the Ordinance no. 12/2014 made the revision of the Plan approved with DGR no. 1513 of 29/10/2012.

This review aims to highlight and implement the collection of data for the updating of production coefficients and the review of multi-year waste production scenarios, as well as to integrate the same with any regulatory changes introduced by its issue.

Therefore, compared to the 2012 Plan, in force until the three-year period 2018-2021, the latest revision highlighted and tried to fill some gaps that emerged from the application of the plan itself.

The plan aims to plan the collection of waste produced by ships calling or stopping in the port of Ancona, at the roadstead and/or oil terminals, and to identify the treatment to which to submit them in compliance with Legislative Decree 152/2006 and subsequent amendments
The fundamental principle underlying the plan can be inferred from Article 7 of the Legislative Decree 182/2003, where the ship's captain is obliged to "... deliver the waste produced ... to the port reception facility before leaving the port"this provision implies the necessary release by the ship to the concessionaire of the service of all waste on board falling within the definitions referred to in points c) and d) of paragraph 1 of art. 2 of the aforementioned Legislative Decree, with a view to a "complete reclamation" of the ship before it embarks on a new navigation and this in the general interest of greater protection of the marine environment.

This plan includes:

a) the assessment of the needs of port reception facilities in relation to the needs of the ships that normally land in the port, providing a complete service to the ships, which includes the entire management cycle of urban, special, hazardous and non-hazardous waste both solids than liquids and which includes withdrawal, sterilization where required, transport, treatment, recovery or disposal, in order to discourage the use of landfills at sea; as well as the implementation of separate waste collection, in accordance with the objectives indicated by the regional waste management plan, providing for the insertion of a penalty for ships that do not carry it out and corresponding to the amount of the tariff for waste consigned in a manner

undifferentiated;

b) organization of a service that meets the criteria of ease of access, efficiency and cost-effectiveness, through the assignment, after a public tender procedure, to a single concession holder with proven specific experience in the sector and equipped with the necessary human and material resources and according to the provisions of art. 4 of the EU Regulation no. 2017/352.
c) a description of the type and capacity of the port reception facilities;
d) the indication of the port area reserved for the location of existing collection plants or any new plants envisaged by the plan, as well as anindication of the areas suitable for waste management;
e) a detailed description of the procedures for the collection of ship-generated waste and cargo residues;
f) the rough estimate of the costs of the port facilities for the collection of waste produced by ships and cargo residues, including those relating to their treatment and disposal, for the purpose of preparing the tender;
g) the description of the system for determining the tariffs;
h) the procedures for reporting any inadequacies detected in the port reception facilities, as well as the preparation of adequate control tools for monitoring compliance with quality standards;
i) the procedures relating to permanent consultations with port users, with the manager of the reception facilities, with the operators of loading and unloading terminals and coastal depots and with other interested parties, such as for example. the trade associations;
j) the type and quantity of waste produced by ships and cargo residues received and managed, as well as the implementation of a reduction in waste production, maximization of material recovery, minimization of the hazardous amount of waste destined for final disposal and improvement the performance of existing plants in accordance with the principles of the regional plan;
k) the summary of the relevant legislation and the formalities for the provision;
l) the indication of one or more persons responsible for the implementation of the plan;
m) initiatives aimed at promoting information to port users in order to reduce the risks of pollution of the seas due to waste being discharged into the sea and to encourage correct forms of collection and transport;
n) a description, where applicable, of the equipment and pre-treatment processes carried out in the port;
o) the description of the methods of recording the actual use of the port reception facilities;
p) a description of the procedures for recording the quantities of ship-generated waste and cargo residues delivered;
q) a description of the methods of treatment and / or disposal of ship-generated waste and cargo residues.

The waste that is produced by ships, whose collection and management are managed through the aforementioned Plan, can be divided into various types to each of which a different

discipline is applied and therefore must be regulated differently to take into account their peculiarities. They are:

1. food waste (garbage) subject to sterilization and not subject to sterilization (this type includes waste from the cooking and catering activities carried out by ships for their crews and passengers, both for merchant and passenger ships);

2. liquid waste divided into:

- (oil) oily waste, sludge, exhausted oils, slops (tank washing water, cargo residues, oily waste generated in machinery spaces (bilge water, sludge/emulsions, etc.);
- (sewage) liquid waste from latrines (black water), showers, kitchens, etc., generated by any type of ship;

3. residues of the load referred to in letter d) of paragraph 1 of art. 2 of Legislative Decree 182/2003;

4. oil filters, exhausted batteries, etc;

5. non-hazardous waste other than those referred to in numbers 1, 2, 3 and 4 produced by ships, pleasure craft, fishing vessels and units involved in port services as well as by units that perform non-commercial government services (plastic, wood , paper, etc.);

6. Other hazardous waste (WEEE, pharmaceuticals, etc.).

2.1.2 Greece – Igoumenitsa Port Authority S.A.

According to the instructions of the European Communities and the Greek Legislation, Igoumenitsa Port Authority (IPA S.A) implements a Waste Collection and Management Plan. The Plan which was approved by the Region of Epirus in 2008, aims at the compliance of the Port of Igoumenitsa S.A with the:

- Directive 2000/59/EC[1] of the European Parliament and of the Council of 27 November 2000 "on port reception facilities for ship-generated waste and cargo residues" (L 332, 28.12.2000),
- the Directive 2007/71/EC of 13 December 2007 amending Annex II of Directive 2000/59/EC of the European Parliament and the Council on port reception facilities for ship-generated waste and cargo residues,
- and the relevant Joint Ministerial Decision 8111.1/41/2009 - Government Gazette 412/B/ 6-3-2009 "Measures and conditions regarding port reception facilities for ship-generated waste and cargo residues in accordance with the provisions of Directive 2007/71/EC"

A revised and updated version of the previous plan was submitted for approval in 2017, in the framework of Article 5(4) of the Joint Ministerial Decision 8111.1/41/09 (Government Gazette 412 B). The Plan was drafted in alignment with the Greek and European legislation as well as

[1] The purpose of the Directive 2000/59/EC is to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the Community, by improving the availability and use of port reception facilities for ship-generated waste and cargo residues, thereby enhancing the protection of the marine environment.

in accordance with the revised IMO directives: [(MEPC 67/11 - 11/07/2014: Revision of the IMP Comprehensive Manual of Port Reception Facilities) and the (MEPC.1/Circ.834 – 15/04/2014: Consolidated Guidance for Port Reception Facilities Providers and Users) and EMSA (Technical recommendations on the implementation of Directive 2000/59/ EC Ver.1 Nov. 2016) for ship reception facilities.

The Plan applies to all types of ships, including fishing vessels and recreational ships which arrive or operate in the port, irrespective of their country of origin. Warships, auxiliary vessels, or other vessels belonging to the State, operated by the State, and currently used exclusively for governmental, non-commercial services, are exempted.

As mentioned above, the Plan fulfills the requirements for ship waste collection and management plans defined by Article 5 and Annex I of the Joint Ministerial Decision 8111.1/41/09 (Government Gazette 412 B). Plans fulfilling these requirements should include the following elements:

- an assessment of the need for port reception facilities, based on the needs of ships normally entering the port,
- a description of the type and capacity of the port reception facilities,
- a detailed description of the procedures followed for reception, collection, (intermediate storage, separation/ treatment and final disposal of waste generated on ships and cargo residues),
- a description of the charging system (fees),
- procedures for the notification of reported deficiencies at the port reception facilities,
- procedures for ongoing consultation with port users, waste contractors, transhipment station operators and other interested parties,
- a description of the types and quantities of ship-generated waste and cargo residues.

In addition, the plans should include:

- a summary of the relevant legislation and the standard reception procedures,
- details of the person or persons responsible for the Plan implementation
- a description of equipment and pre-treatment procedures at the port,
- a description of the methods used to record the actual usage of the port reception facilities,
- a description of the methods used to record the quantity of waste generated on ships and cargo residues,
- a description of the methods that ship-generated waste and cargo residues are disposed of.

IPA's Waste Collection and Waste Management Plan is in line with the above elements. Specifically, the Plan consists of:

- Chapter 1: A brief introduction including general information, definitions and requirements for waste collection and management plans in ports.
- Chapter 2: Information about the ports for which IPA S.A is responsible (including Port of Igoumenitsa). Reference was made to historical and topological data of the areas,

legal form, mission, vision, activities, role, and responsibilities of IPA S.A. Additionally, reference was made to the basic structure of its services, as well to statistic data of passenger and vehicle traffic.

- Chapter 3: An extended analysis of the legal framework of ship waste reception facilities was made, presenting among others the international and Greek legal framework as well as the European legislation.
- Chapter 4: Types and quantities of waste produced on ships. This chapter presents both the individual types of waste generated by ships (petroleum waste, hazardous and harmful substances, ozone depleting substances, sewerage, and trash) as well as detailed methodologies for the quantitative assessment of waste and garbage ejected by the ships.
- Chapter 5: Assessment of the need for port reception facilities based on port traffic data. Considering the type of ships arriving/ docking in the port of Igoumenitsa, the needs of waste reception facilities are limited to Petroleum waste according to Annex I of the BoD. MARPOL 73/78, Waste according to Annex V of the BoD. MARPOL 73/78, Sewage according to Annex IV of the BoD. MARPOL 73/78.
- Chapter 6: Description of the type and capacity of the waste reception facilities of the ports for which IPA S.A is responsible (including Port of Igoumenitsa).
- Chapter 7: Organisational structure of ship waste reception facilities with special reference to the details of persons responsible for the implementation of the plan.
- Chapter 8: Ship waste receipt and management procedures. In this chapter extended methodologies regarding the collection, transport, processing and disposal of liquid, petroleum and solid waste are presented, while at the same time the registration process, the user consultation process as well as the inadequacy complaint procedure are presented.
- Chapter 9: An extended analysis of the Environmental Management System implemented by IPA S.A is presented with reference to relative definitions (environment, environmental policy, environmental performance, stakeholders etc.) and the system requirements according to ISO 14001.
- Chapter 10: IPA S.A has an approved fee charging system, for the receipt and management of liquid and solid waste and cargo residues of ships arriving in the marine areas within its competence. In this context a concise analysis of the fee charging system is made, with reference to decision approving the fee system.
- Chapter 11: Exceptions - Inspections – Controls. This chapter includes extended methodologies regarding the control of the adequacy of storage space on board.
- Chapter 12: Additional information for the port's users.

Concluding, it should be noted that even though the Plan is in full alignment with Directive 2000/59/EC and Directive 2007/71/EC, it does not take into consideration the Directive

2019/883/EC which was launched in 2019 and has not yet been adopted in the Greek legal framework.

2.1.3 Croatia – Zadar County Rural Development Agency

The government of Croatia has adopted a number of regulations and other instruments which deal with the provision of port reception facilities including waste management, which are as follows: Law on Environmental Protection ("Official Gazette",No.82/94 and 128/99), Maritime Law ("Official Gazette",No.17/94 74/94,and 43/96), Sea Port Law ("Official Gazette" No.108/95, 6/96, 97/00), Law on handling dangerous substances, loading and unloading dangerous substances, bulk cargo and other cargoes in ports ("Official Gazzette"No.108/95), Law on waste categories ("Official Gazette", No 27/96). Discharge at sea of oily water mixtures from the machinery spaces of ships and garbage might be carried out in the jurisdictional, navigable marine waters of the country in compliance with the respective criteria of MARPOL 73/78. Port Authorities are responsible to organize and provide reception facilities for ship-generated wastes. According to Sea Port Law No. 108/95, 6 (96 & 97/2000), basically all ports open for international traffic are required to provide reception facilities and namely those of Rijeka, Zadar, Split and Ploce. Sea Ports Law lays down criteria for classifying the ports of the country, it delineates the activities and the basis that they can be provided in the port area, the obligations of the respective port Authorities, port tariff, issues related with the construction of ports infrastructure and superstructure, etc. [7]

Pursuant to Article 56, 56 and 58 of the Maritime Code (Official Gazette nos. 181/04, 76/07, 146/08, 61/11, 56/13, 26/15, 17/19), Article 3 Paragraph 1 Item 7 of the Decree on the Conditions to be met by ports (Official Gazette 110/04), Article 62, paragraphs 1 and 2 of the Ordinance on the conditions and manner of maintaining order in ports and other parts of inland waters and territorial sea of the Republic of Croatia (OG 90/05, 10/08, 155/08, 127/10, 80/12, 56/13, 7/17), Articles 4 and 5 of Directive 2000/59 / EC, IMO guidelines MPEC.1 /Circ.834/Rev.1.1 from March 2018, and Article 19, paragraph 1, item 11 of the Statute of the Zadar Port Authority, the Managing Board of the Zadar Port Authority adopts the Ship Waste Management Plan in the port area which it manages. The plan is updated every three years.

Given that port authorities are conceived as administrative institutions that manage the development processes of Croatian state ports, the general approach and method of waste management is such that the collection and disposal of various types of waste from ships takes place through concessionaires. Let us cite the example of the Zadar Port Authority, however, a very similar way of waste management, taking into account the specifics of each port, can be found in all Croatian state ports.

The Ship Waste Management Plan prescribes the acceptance and handling of ship accumulated waste and ship cargo residues in the area managed by the Zadar Port Authority (hereinafter: the Port Authority area);

The area of the Port Authority includes the land and sea part as stated in the Decision on the Establishment of the Port of Zadar Authority (Official Gazette No. 19/97, 21/02, 154/03, 132/06, 127/07, 155/13, 83 / 15);

2.1.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

The SWOT analysis of available port regulations in the 2019 REMPEC report (REMPEC, 2019) states that the information available in English (which was also available through the website) is the tariff schedules and procedural information regarding the delivery of waste to ports and marinas. Detailed information on the management of ship-generated waste, such as the waste treatment plan of the port and marina, was not available in English." In the list of documents collected, it is noted that the Port Waste Handling Plan, is written in Slovenian.

Nevertheless, in the annual report of Luka Koper for the year 2020 (Anon., 2021a) one can find important information about the current waste management (section 3.8), according to their waste management plan. Let's start with the waste groups that are separately collected, recycled and recovered or transferred to authorized organizations during port operations. There are three groups of waste generated in the port:

- **Waste from port activities** (e.g. cargo residues, waste wood, packaging and metal, mixed municipal waste);
- **Other waste generated in the port area** (waste generated by users of the economic zone); and
- **Vessel waste left by vessels** berthed in the Port of Koper (e.g. sewage, oily water, kitchen waste, packaging waste, medicines, ash, mixed municipal waste).

Details on the infrastructure and operation related to (ship) waste were described in report T1.2.2 Joint report on the availability and use of port waste reception facilities, where the link with European Directives was also mentioned. Report T1.4.1 SWOT Analysis of Available Port Regulations described the Waste Management Action Plan, which largely follows REMPEC's (2019) report. Report T.1.2.2 describes the waste separation center and composting facility, which is an important infrastructure in waste management, we briefly summarize it here:

Waste separation center and composting plant

The importance of waste management is constantly increasing, especially with regard to the collection, separation, processing and disposal of waste. The waste generated in the Port of Koper can be divided into three main categories:

1) Non-primary products generated by port operations (cargo residues, wood waste, packaging, metal scrap, mixed municipal waste).
2) Waste generated by other entities operating in the free zone, and

3) Waste generated by vessels docking in the Port of Koper (ranging from sewage sludge, oil polluted waters and food waste to packaging waste and mixed municipal waste).

All waste is collected in the Waste Management Center of the Port of Koper (Figure 1), which has been in operation since 1997. Some categories of waste are processed at the center, while others are delivered to authorized organizations for further processing. The center also includes a facility where biodegradable organic waste is processed into compost. Out of concern for the environment, the company ensures regular waste sorting, recycling, processing and delivery for further treatment. Waste is sorted at all terminals, at users of the economic zone and on ships. All collected waste is transferred to authorized waste management companies, while organic waste is processed into compost at the composting

plant in the port.

Figure 1 - The waste management center, built in 1997. In the center, which covers an area of 12,700 m2, the modernization of the fire protection system has started and the construction works will be completed in 2021 (Photo: courtesy of Port of Koper report (Anon., 2021b)).

In recent years, the introduction of modern waste management methods has led to a reduction in the total amount of waste generated per ton of cargo handled. This reduction not only underpins the Port of Koper's efforts to maintain a clean environment, but also improves the company's operational efficiency. All Port of Koper employees participate in ensuring waste separation by type and all facilities within the port zone have material-specific collection bins that are collected separately.

Management and quantities of the different types of waste

The composting plant processes between 4,000 and 5,000 m3 of waste per year. Biodegradable waste (including green waste from parks and gardens) is also delivered by the municipal utility (Javno podjetje Marjetica Koper). Although the annual amount varies (between 500 and 1,700 tons), this source still accounts for the majority of composted waste. The processed compost is then used by Javno podjetje Marjetica Koper in the landscaping of the city parks, and we are pleased to see our expertise and facilities being used to meet the needs of the local community. However, the latest information on this topic is that 2021 will be the last year that the Port of Koper will use composting within the port area. The organic waste will be transferred for composting to another company in Slovenia outside the port area (Franka Cepak, priv. comm.).

A total of 21,491 tons of scrap metal, classification number 19 12 02 (ferrous metals) and several tons of metal, classification number 17 04 02 (aluminum) were handled. In accordance with the environmental permit issued, the scrap shipments were measured for radioactivity to verify the legality of the shipments. Detailed records are kept of all transhipments of scrap metal, which are reported annually to Slovenian Environment Agency in accordance with legal requirements.

Luka Koper, d. d., also holds an environmental permit for the processing of waste paper pulp, which is mixed with water and applied over coal and iron ore to reduce dust. In 2020, 1,521.64 tons of paper sludge were used, which is 206.36 tons more than the previous year.

Waste generated in the port includes waste from port operations (e.g. cargo residues, waste wood, packaging and metal, mixed municipal waste), waste generated by users of the economic zone, and ship waste left behind by ships docking in the Port of Koper. Some hazardous waste is generated during emergency clean-up, mainly absorbent materials used in repairing damage to hydraulic systems of trucks.

In 2020, the Port area collected a total of just over 3,883 tons of waste, including 2,367 tons of sorted waste (hazardous, non-hazardous), 233 tons of mixed municipal waste, and 1,283 tons of marine waste (hazardous, non-hazardous, including mixed municipal waste). Construction waste is reported separately. Subsequent disposal of waste is largely driven by disposal capacity at the national level; choice and options are limited.

Collected hazardous and non-hazardous waste is transferred from Waste Management Center for subsequent disposal to specialist companies that have the appropriate permits to transport, process or dispose of waste and are on the Slovenian Environment Agency (ARSO) lists for waste management companies in their jurisdiction. Luka Koper reports the marine waste collected annually to the Ministry of Environment and Spatial Planning.

Alignment with Directive EU 2000/59 at European level

About the alignment of the current waste management with Directive EU 2000/59 we can clearly say that this alignment is in place, which follows from numerous (more than 15) annual reports from Luka Koper. However, we must add that this directive is not so much in the foreground of consideration. It is the DIRECTIVE (EU) 2019/883 on port reception facilities for the delivery of ship-generated waste, which amends Directive 2010/65/EU and repeals Directive 2000/59/ EC (Directive, 2019). The transposition of this Directive into Slovenian legislation is the main concern, as this should be done by 28 June 2021 at the latest. of the Port of Koper. As mentioned in the report of SWOT Analysis of existing port regulations, after pressure from "civil society" (authors of this report) on the Ministry of Infrastructure and the Ministry of Environment and Spatial Planning (as well as on the governmental institution for legal affairs), the first step towards the implementation of this directive was taken: the proposal for a relevant regulation (on amendments and additions to the regulation on formalities in Maritime Notification) was published by the Ministry of Infrastructure on 20 May 2021. It is now (14 June 2021) under public discussion. After that, it is to be published in the official Slovenian Gazette. The regulation states that it will enter into force on 28 June 2021 - the deadline for implementation in EU member states.

2.1.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

Current waste management approach according to the Law on navigation and inland waterways ports prescribe prevention of pollution from vessels as following:

- It is prohibited to discharge, spill or discharge into the inland waters harmful objects or substances, including oil, oil derivatives, which may cause pollution of inland waters or create an obstacle or danger to navigation.

- It is prohibited to discharge, spill or discharge parts of cargo or cargo waste from vessels into inland waters, as well as their discharge, spillage or discharge into vessels of legal entities that do not provide port service for receiving parts of cargo or cargo waste.
- It is forbidden to burn garbage, sludge, sediment and special waste on the vessel.
- It is forbidden to discharge wastewater with:
    - vessels intended for the transport of passengers with more than 50 cabins;
    - passenger vessels, intended for the transport of more than 50 passengers.
- It is forbidden to:
    - use of mobile storage facilities placed on deck as storage facilities for waste oil collection;
    - insertion into the bilges of the machine space of cleaning products that dissolve oil or lubricant and emulsifiers, except for products that do not hinder the purification of wastewater from bilges at receiving stations.
- It is forbidden to coat the vessel with oil or clean the outside of the vessel with products whose discharge into the water is prohibited.
- The use of anti-fouling systems of vessels containing elements of mercury, arsenic, organic elements used as biocides, as well as hexachloricyclohexane is prohibited.
- The Minister, with the consent of the Minister responsible for environmental protection and the Minister responsible for water management, prescribes measures to be taken in order to prevent pollution from vessels, treatment of oily and fatty substances, waste oils and fuel residues, measures related to collection, sorting and marking of municipal and other special waste, requirements that must be met by ships, floating facilities and receiving stations in order to prevent pollution, the method of cleaning cargo space, ie tanks, as well as the method of discharging cargo residues and requirements for waste containers, wastewater treatment on board a passenger ship, as well as limit and control values at the outlet of the wastewater treatment plant on a passenger ship, types of technical means needed to react to spills, manner of action of bodies responsible for reacting to pollution caused by navigation and mandatory elements of technical and operational plans for pollution prevention, ie axial reduction and mitigation of the consequences of the resulting pollution.
- The master of the vessel, crew members and other persons on the vessel are obliged to take due care to avoid pollution of inland waters, depending on the specific circumstances, to reduce the amount of waste generated on the vessel to a minimum and to avoid possible interference of various type of waste.
- In case of discharge, spillage or discharge of harmful objects or substances, or danger of discharge, spillage or discharge of harmful objects or substances, the master of the vessel is obliged to notify the competent Harbour Master's Office without delay, as well as vessels located near the spill and as accurately as possible to provide information on the location, quantity and type of harmful objects or substances that have been released.

- Discharge of water from a bilge water separation plant, approved by the Minister responsible for water management, into inland waters shall be exempted from the prohibition referred to in Article 63, paragraph 1 of this Law, if the maximum oil residue content after separation, without prior dilution, is less than 5 mg / l.
- The prohibition does not apply to washing water from cargo residues and substances whose discharge into inland waters is explicitly permitted by law.
- The prohibition does not apply to passenger vessels whose wastewater treatment plants have a type-approval certificate.
- The master of the vessel keeps and regularly updates the books of oil, sanitary waste and bilge water and the logbook of ship garbage and provides them for inspection at the request of the state authorities.
- The port must be equipped in such a way that oil, oil derivatives as well as other hazardous substances that are spilled on the operational shore, are not spilled into the water.
- In case of spillage of hazardous substances, the best available techniques for limiting the spread and removal of spilled substances shall be applied.
- The port referred to in paragraph 1 of this Article must be supplied with floating dams, as well as other equipment for limiting and preventing the spread of oil, oil derivatives and other dangerous substances in port waters.
- The master of the vessel is obliged to hand over harmful objects and substances to the receiving stations.
- Garbage from the vessel is collected and, when possible after the sorting of recyclable materials, handed over to receiving stations, ie facilities for the treatment of non-hazardous waste.
- Harmful objects and substances that occur on the vessel shall be collected from the vessel, stored and handed over for treatment to a waste treatment plant under the conditions prescribed by the law governing waste management.
- The treatment of harmful objects and substances referred to in paragraph 1 of this Article does not include hazardous waste from foreign vessels, unless otherwise prescribed by a special law.

National legislative is mostly aligned with Directive EU 2000/59, but waste management is not fully established.

2.1.6 Albania - Port of Vlora

Every port operator and legal entity that performs transshipment cargo outside the designated port area, in accordance with the Law on Waste Management, is obliged to classify waste in the prescribed manner, in accordance with the waste catalogue, to appoint a person responsible for waste management, to develop a Waste Management Plan and organizes its implementation.

Regarding the Port of Vlora, there is no clear management plan for waste management nor a well-defined regulation for the behavior of ships regarding the tasks they have in the internal

waste management.

Until now, waste management has been realized through contracts with foreign companies in the country, which collect waste from ships and incinerate them, which exceeds the competencies of the port. The Port of Vlora has in its administration only the management of solid waste inside the quay, which again does not provide an effective good management.

The only very effective management in the Bay of Vlora are the cases of waste spills in the maritime space near the port facilities which require a clear action plan for taking precautionary and quick measures during such situations, as in cases of spills of petroleum products and various oils.

Emergencies, such as spills of fuel or hazardous and toxic substances into the sea, require prompt, decisive and well-informed action. A control and management system, is as primary as the knowledge and expertise required to implement this system. These are used especially during operations of stage 3.

The national structure for managing response operations to a major marine pollution incident (level 3) in Albania is described as follows:

- The response to a major incident of contamination by fuel or hazardous and toxic substances in Albania shall be coordinated by IOMC. The representative of the *Inter-Institutional Maritime Operational Center (IACC)*, accepts the role of National Coordinator and will notify the Ministry of Interior, the General Directorate of Civil Emergencies, the minister responsible for the hydrocarbon sector, the ministry responsible for the environment.
- The National Coordinator will be assisted by the Incident Management Team and will be supported by a Technical Committee. A team of consultants will assist the National Coordinator in some specific areas such as legal advice, media relations, security, etc. In the event of a major incident of marine pollution, for important economic and political decisions, the Council of Ministers on the proposal of the Administrative Director of IOCC may decide to establish an Inter-Ministerial Committee for Emergency Management.
- In order to carry out an effective response to marine pollution incidents and to undertake various tasks as effectively as possible, four functional groups will be established, hereinafter referred to as response groups, which will be established in Level 3;: planning group, operational group, logistics group, as well as finance and administrative group, which have precisely defined responsibilities.
- The same response groups may also be established as a responsible need for the management of Level 2 and Level 1 incidents.

In Level 3, and if necessary, Level 2 of marine pollution incidents, IOMC plays a leading role and provides a platform for cooperation between institutions that have their interests at sea, in line with its planning mission, organizing and directing naval operations in the Albanian maritime territory.

2.1.7 Montenegro – Ministry of Capital Investments

As presented in the previous deliverables regarding Montenegro, Port of Bar is, according to the country's national legislation the main commercial port of Montenegro. This also means that it is also subject to major maritime traffic and operations, creating heavy pressures for the local marine environment. To counter this set of conditions, Port of Bar a Waste Management Plan has been produced and adopted period 2015/2018 according to the national respective law of 2011, for with an update produced for 2018-2021 period.

The Waste Management Plan of Port of Bar for the period 2015/2018 was a key document which defined aims and ensures the conditions for sustainable waste management in the area of port of Bar. As a direct result of the Waste Management Law, the Plan was prepared with the goal to establish optimized waste management, creating one of the main preconditions for:

- Alignment of the working activities with relevant legislative framework;
- Prevention, removal and reduction of risks on environment and humanhealth;
- Minimizing waste quantity and at the same time reduction of operatingcost by optimal use of resources and reducing waste disposal costs;
- Development of efficient waste management system in Port of Bar, due to legal obligations, using modern technologies and best practices fromother ports;
- Establishment and development of the ecologically sustainable operating, similar to "green port" concept;
- Creation of positive image and optimal relations with the clients, stakeholders and competent authorities.

The approach taken by the Waste Management Plan as to the Environmental management system in the Port of Bar, is based on the assumption that both wastes generated during the performing of regular port activities and waste from vessels must be treated in a way to avoid:

- Danger for human health;
- Danger to the local flora and fauna;
- Pollution of water, soil and air above the limits set by relevant legal acts;
- Uncontrolled waste disposal and incineration;
- Explosions, fires and other incidents;
- Noise and unpleasant odors;
- Appearance and reproduction of harmful flora and fauna organisms, as well as development of pathogenic organisms (eutrophication);
- Unnecessary disturbance of public peace and order.

The most direct result of this approach is the strict prohibition of discharge into to the sea of oily or otherwise polluted water, waste oil, or any other oily and solid material within the port's area. Such materials (wastes) are expected to be collected and treated safely according to the respective legislation.

The main principles of the management of vessels' waste are:

- The selective waste collection and separation for the sake of secondary recovery;
- The controlled (and safe) waste disposal;
- The prevention of irresponsible waste management;
- The avoiding of unnecessary delays of vessels caused by waste collection;

Under these principles, the responsible authority has set its waste management plan goals, with the aim to:

- Protect the marine environment and its development;
- Protect human health;
- Align the port and waste management operations with the relevant legal framework;
- Raise awareness on importance of environmental protection and responsibility of each individual involved;
- Organize the area of waste management in systematic and planned manner;
- Create conditions which enable that the management waste system could be properly developed on a sustainable manner for the environment protection
- Remove or at the very least reduce the waste impact on environment

In addition, one of the most important aspects of the Waste Management Plan was the emphasis placed in record keeping, both for port users and for the waste operator. The waste producers have to retain waste records and monitor on regular base activities with the aim to minimize generation of waste streams. Part of the above is the obligation to measure, keep records and conduct analyses on quality, quantity and type of the waste materials, including:

- Data on produced waste and causes of its occurrence;
- Waste storage;
- Waste disposal and final disposal.

In practical terms, each collected waste shipment, must include a dual record sheet, prepared by the waste producer, one for the Operator and another for its own archive. The Contracted Operator (as discussed in the stakeholder section later) must, upon request of the Port of Bar or competent state authority, provide adequate, correct and forehand information on types and quantity of waste, its place of origin, chemical content and characteristics, collection, treatment, transport, disposal etc. As part of the record keeping procedures, the operator is obliged to keep logs on waste generation and its movement, update all relevant data, and keep them for a period of five years. In addition, the operator is obliged to submit in written the following reports:

- Quarterly report, including the total amount and type of waste collected, treated and shipped, within 30 days of the end of the trimester.
- Annual report on total amount and type of waste collected, treated and shipped, within 30 days of the end of the year

The specific measures and interventions adopted by the examined Waste Management Plan; these include the following categories:

- **Measures to prevent or reduce waste production and its negative impact on the environment**

  The concept of "Reduction and prevention of waste" in Port of Bar implies the following elements:

  - Improvement of existing and implementation of new approaches (both organizational and technological)
  - Development of recycling activities
  - Education of complementary firms, etc.

- **Protection measures related to solid waste**

  In order to manage waste adequately, the following measures are to be implemented by the waste owners / produces:

  - The owner of the waste is obliged to manage the waste in line with the Law on Waste Management, plans and programmes for waste management and requirements of environment protection.
  - Waste producer is obliged to prepare waste management plan, if the total production of the dangerous waste exceeds 200kg per year, or more than 20 tons of undangerous waste.
  - Evacuation of municipal waste: further development in managing municipal waste involves also introduction of additional metal containers of adequate volume.
  - Improper disposal of waste material on open surfaces shall not be performed.

  The contracted Operator for solid and liquid waste management with the Port of Bar is obliged to keep records on place of origin, quantities and method of treatment of waste generated in port area. At this point it is important to mention that the port's contracted operator is also liable to the waste producers and the third parties for damage caused by acting contrary to ratified international conventions, laws and bylaws, waste management plan or any other internal rule of the Port.

- **Measures in case of accident**

  Finally, the Waste Management Plan includes extra- ordinary provision for the following cases:

  - Spillage of oil and its derivatives
  - Fires

With regards to the legislation and regulatory compatibility with Directive EU 2000/59 in European level as well as with the relevant legislation at national level, the Waste Management Plan has been direct result of EU requirements and is under periodical review to meet them, in terms of management monitoring and environmental hazards, as well as being linked directly to the applicable Waste Management Legislation and has been specially designed for the Port of Bar.

2.2 Current environmental status

2.2.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The Framework Directive 2000/60 / EC of the European Parliament and of the Council of 23 October 2000 which establishes a framework for community action in the field of water, has introduced an innovative approach in European legislation on water, both from the point of view environmental, as well as administrative-management. The directive pursues ambitious objectives: to prevent qualitative and quantitative deterioration, to improve the status of water and to ensure sustainable use, based on the long-term protection of available water resources. It was implemented in Italy through the Legislative Decree of 3 April 2006, n.152.

The Puglia Region considers the protection and safeguarding of water and the marine environmental context among the main objectives to be pursued for the environmental protection of the territory; for this purpose, various bodies and institutions operate on the regional territory whose mission is the implementation of an effective environmental policy according to sustainability criteria, the monitoring and evaluation of ecosystems and the promotion of technological innovation and scientific research of sector.

The quality of the water and the characteristics of marine sediments, as resulting from the monitoring carried out and in progress, testify to the impact mainly attributable to the important industrial settlements attributable to the integrated cycle steel center and the oil products refinery. The industrial wastewater deriving from these activities, although brought back to the legal limits by means of due treatments, has been discharged into the waters facing the Mar Grande of Taranto for several decades.

This paragraph reports a summary about the assessment of the ecological and chemical status of the Apulian surface waters and marine sediments and the results of the chemical, microbiological and ecotoxicological investigations carried out on the sediments of the Port of Taranto.

In particular, from the analysis carried out by ARPA Puglia on coastal marine waters, in compliance with the Water Framework Directive, both for the water matrix and for the sediment matrix, of the Surface Water Bodies of Capo San Vito - Punta Rondinella and Punta Rondinella - Foce Fiume Tara, area where the Ionian Sea Port System Authority is located, the following emerged:

Table 1 - Ecological and chemical status of coastal marine waters as part of Ionian Sea Port System Authority 2016-2018

SURFACE WATER BODIES	ECOLOGICAL STATE	CHIMICAL STATE
Capo San Vito – Punta Rondinella	MODERATE	FAILING TO ACHIEVE GOOD
Punta Rondinella – Foce Fiume Tara	MODERATE	FAILING TO ACHIEVE GOOD

The port of Taranto was also the subject of chemical, microbiological and ecotoxicological investigations carried out on marine sediments.

The Port System Authority, in agreement with ICRAM (now ISPRA), has signed a framework agreement aimed, in particular, at carrying out the environmental characterization of the seabed, at the study of the state of quality of the marine environment in the port areas and at preparation of the sediment management plan affected by excavation projects for the construction of port works.

Therefore, in 2009 the Port Authority of Taranto (now the Port System Authority of Taranto) carried out a detailed characterization of the marine sediments, of which a summary is provided below:

Table 2 - Volumes and quality of dredging sediments

	SEDIMENTI CARATTERIZZATI							
AREE DI DRAGAGGIO	**Argille**	**Conc. < LCB (Manuale ICRAM-APAT)**	**LCB (Manuale ICRAM-APAT) < Conc. < Limite Intervento ICRAM**	**Limite Intervento ICRAM < Conc. < Col.B Tab.1 All.5 Tit. V Parte IV D.Lgs.152/06**	**Col.B Tab.1 All.5 Tit. V Parte IV D.Lgs.152/06 50 < Conc. < Pericolosi**	**Conc. > Pericolosi**	**SEDIMENTI NON CARATTERIZZATI**	**Volumi totali aree**
D7: IV Sporgente	593 327	12 931	462 808	60 176	600	0		1 129 843
D6: Darsena Servizi (darsena a ovest IV Sporgente)	26 158	625	42 031	23 672	529	0		93 014
D1: Molo Polisettoriale		0	434 398	345 417	70 400	1 987	1 418 314	2 270 515
D2: Molo V		0	2 584 108	1 424 770	66 064	1 515	5 967 249	10 043 706
D3: VI Sporgente Ponente e Testata		0	1 656 095	360 716	5 162	0	2 489 464	4 511 438
D4: VI Sporgente Levante		0	141 301	84 164	0	0	179 147	404 611
D5: Pontile petroli		605 564	524 551	0	0	0	352 905	1 483 021
TOTALI	**619 485**	**619 121**	**5 845 291**	**2 298 915**	**142 755**	**3 502**	**10 407 080**	
	9 529 069						**10 407 080**	
	19 936 149							

Table legend:

Sedimenti caratterizzati = Characterized sediment		
Aree di dragaggio = Dredging areas	Argille = Clays	
Conc.=Concentrations	LCB (Manuale ICRAM APAT)=LCB (ICRAM APAT Handbook)	
Limite intervento ICRAM = ICRAM intervention limit		
Colonna B Tabella 1 Allegato 5 Titolo V Parte IV del D.Lgs. 152/06= Column B Table 1 Annex 5 Title V Part IV of Legislative Decree 152/06		
Pericolosi= Dangerous	Sedimenti non caratterizzati = Not characterized sediment	
Volumi totali aree = Total volumes of areas		

As regards air quality, in Puglia, the Regional Agency for the Protection of the Environment (ARPA) monitors the air through the Regional Air Quality Network (RRQA)[2], which is a network of monitoring stations. scattered throughout the region that take into consideration PM10, PM2.5, NO_2, ozone and benzene as pollutants.

In the Municipality of Taranto there are stations for measuring the quality of traffic air (Via Adige), industrial (Machiavelli, Archimede, Paolo VI - CISI) and bottom (Talsano and San Vito), pursuant to Legislative Decree 155/2010. In particular, the control units of the "Machiavelli" and "Archimede" stations are those closest to the port area.

Please note that the Arcelor Mittal Italia network control unit, located in Via Orsini, is also classified as "industrial" and detects the following pollutants: PM10, PM2.5, BTX, Black Carbon, VOC, NO_2, H_2S, IPA_{TOT}.

[2] Defined by D.G.R. 2420 of 16.12.2013, consists of 53 fixed stations (of which 41 are public and 12 private).

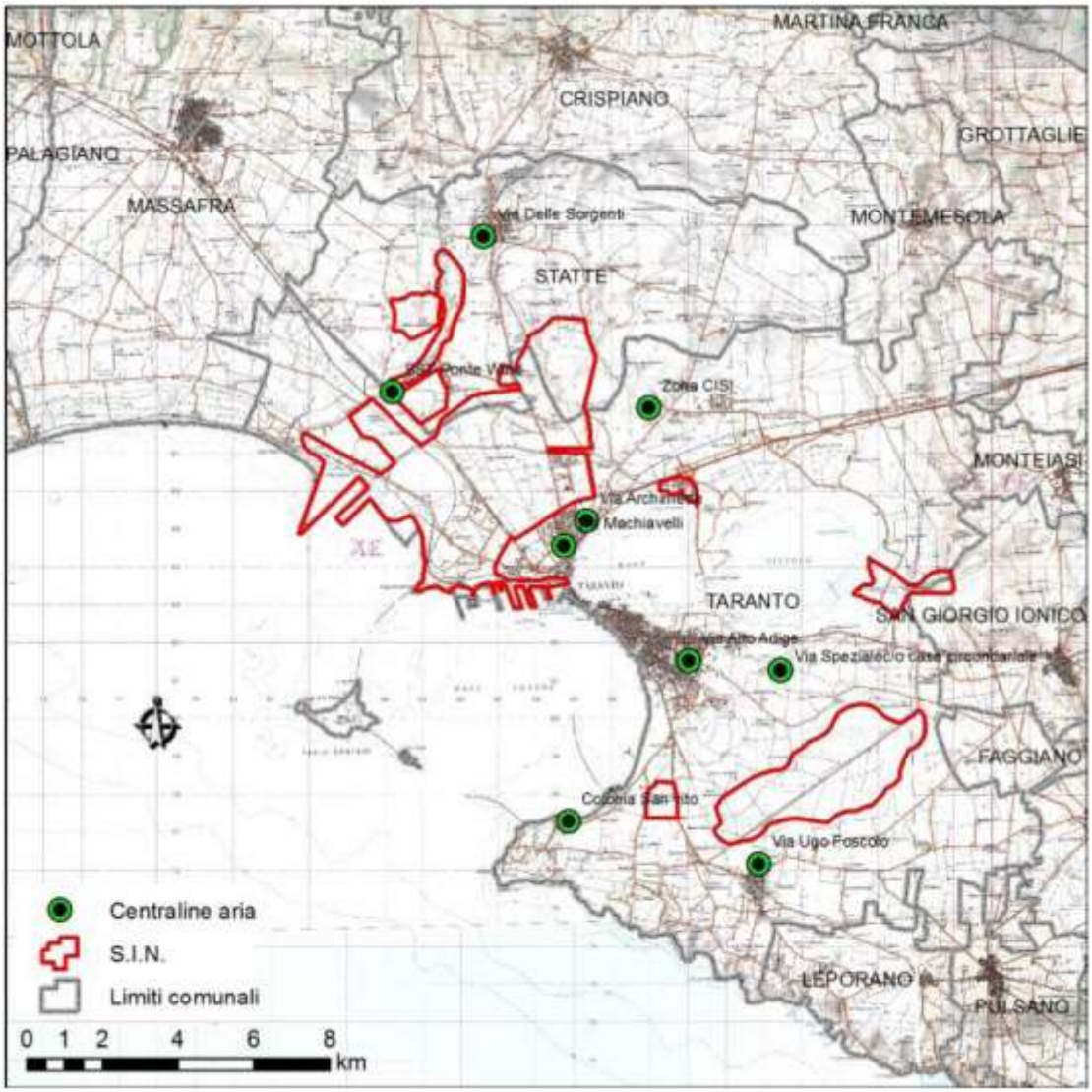


Figure 2 - Location of regional air quality control units in Taranto and Statte

Therefore, the current Public Air Quality Monitoring Network (RRQA) in the Taranto area, to which the concentration limits provided for in Legislative Decree 155/2010 apply, includes the monitoring stations that are listed in the following table.

Table 3 - Air quality monitoring stations in Taranto – RRQA.

PROV	COMUNE	STAZIONE	TIPO STAZIONE	E (UTM33)	N (UTM33)	PM10	PM2,5	NO2	O3	C6H6	CO	SO2
TA	Taranto	Machiavelli	Industriale	688642	4484370	x	x	x		x	x	x
		Archimede	Industriale	689238	4485033	x	x	x			x	x
		Via Alto Adige	Traffico	691924	4481337	x	x	x		x	x	x
		Paolo VI CISI	Industriale	690889	4488018	x	x	x		x	x	x
		Colonia San Vito	Fondo	688778	4477122	x		x			x	x
		Talsano - via U. Foscolo	Fondo	693783	4475985	x		x	x			x
	Statte	SS7 per Massafra - Ponte Wind	Industriale	684114	4488423	x		x				x
		via delle Sorgenti	Industriale	686530	4492525	x		x	x			x
	Grottaglie	Grottaglie	Fondo	705279	4490271	x		x	x			
	Martina Franca	Martina Franca	Traffico	697012	4508162	x		x		x		
	Massafra	Massafra- via Frappietri	Industriale	679111	4495815	x		x		x		x

Table 4 - Legend of parameters detected by air monitoring stations

Legenda parametri rilevati	
PM10	Polveri inalabili (con diametro aerodinamico <10um) (ug/m³)
PM2.5	Polveri respirabili (con diametro aerodinamico <2.5um) (ug/m³)
NO_2	Biossido di azoto (ug/m³)
O3	Ozono (ug/m³)
C_6H_6	Benzene (ug/m³)
CO	Monossido di carbonio (mg/m³)
SO_2	Biossido di zolfo (ug/m³)

ARPA Puglia then proceeds to the processing of recorded air quality data. The limit values for pollutants taken into account for air quality analysis in February 2021 are given in the following table:

Table 5 - Current limit values for the various parameters monitored

Limit values in force for each parameter detected		
PM10		
REFERENCE STANDARD	**LIMIT CONCENTRATION**	**LIMITS IN FORCE**
Legislative Decree 155/2010	50 mg/m³	Daily limit value not to be exceeded more than 35 times in the year
	40 mg/m³	Annual limit value
PM2.5		
REFERENCE STANDARD	**LIMIT CONCENTRATION**	**LIMITS IN FORCE**
Legislative Decree 155/2010	25 mg/m³	Annual limit value to be reached at 01/01/2015
NO_2		
REFERENCE STANDARD	**LIMIT CONCENTRATION**	**LIMITS IN FORCE**
Legislative Decree 155/2010	200 mg/m³	Daily limit value not to be exceeded more than 18 times in the year
	40 mg/m³	Annual limit value
	400 mg/m³	Alarm threshold to be measured over 3 consecutive hours
O_3		
REFERENCE STANDARD	**LIMIT CONCENTRATION**	**LIMITS IN FORCE**
Legislative Decree 155/2010	**120 mg /m³** maximum daily average of 8 hours, not to be exceeded more than 25 times per calendar year, as an average over three years	Target value
	120 mg /m³ maximum daily average over 8 hours over a year	Long-term objective
	180 mg /m³ (hourly average)	Information threshold
	240 mg /m³ (hourly average, for three consecutive hours)	Alarm threshold
C_6H_6		
REFERENCE STANDARD	**LIMIT CONCENTRATION**	**LIMITS IN FORCE**
Legislative Decree 155/2010	5 mg/m³	Annual limit value

Below are the graphs for the average daily concentrations of the various parameters recorded in February 2021[3].

[3] Regional Environmental Protection Agency ARPA Puglia, "*Monthly trend of Air Quality in Puglia*", February 2021

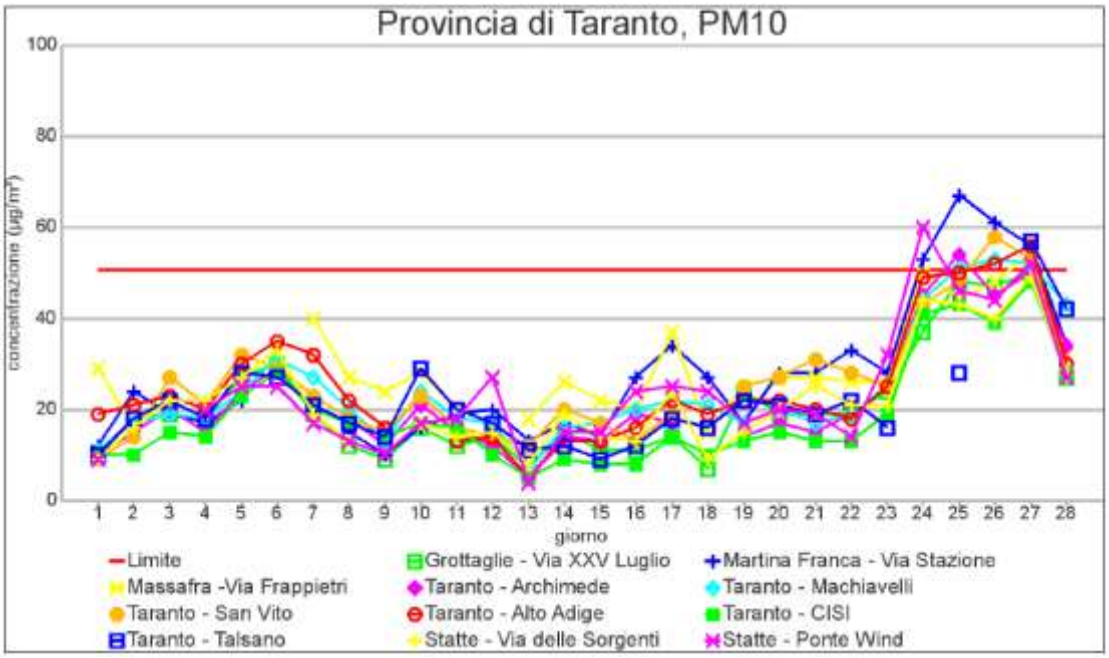


Figure 3 – Average daily concentrations of parameters, Taranto, Feb.2021(1)

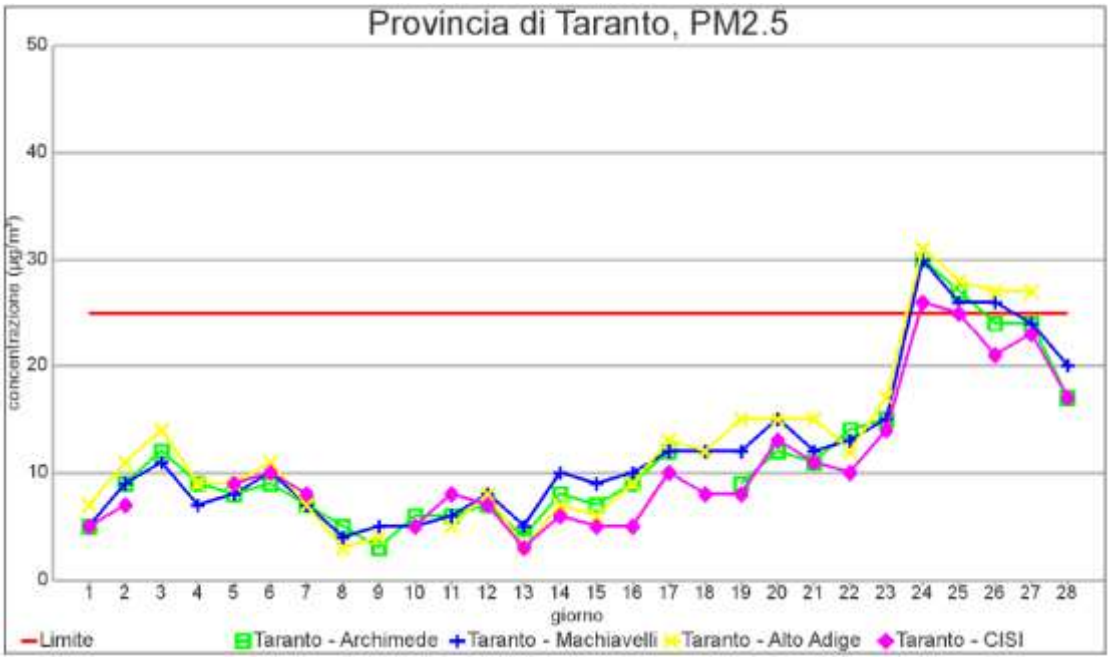


Figure 4 – Average daily concentrations of parameters, Taranto, Feb.2021(2)

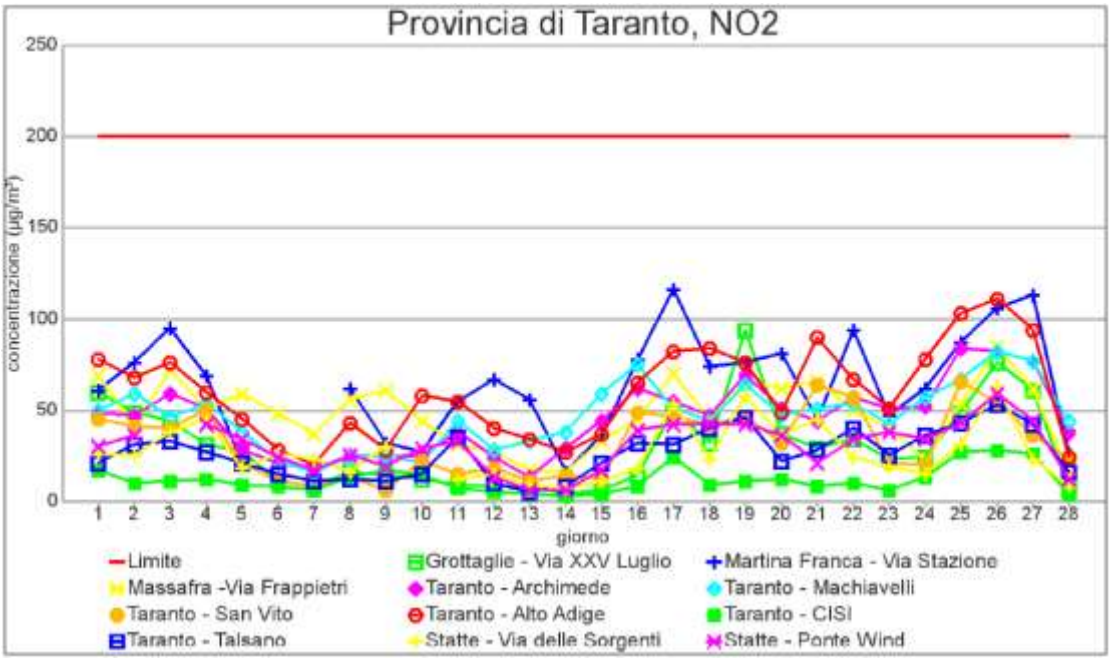


Figure 5 – Average daily concentrations of parameters, Taranto, Feb.2021(3)

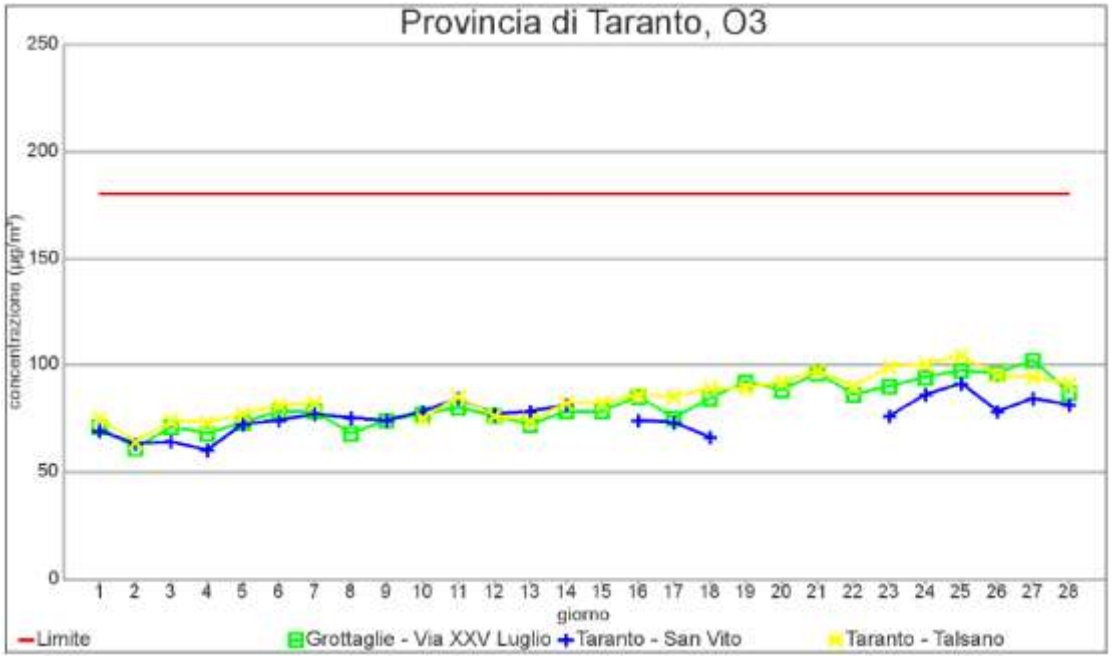


Figure 6 – Average daily concentrations of parameters, Taranto, Feb.2021(4)

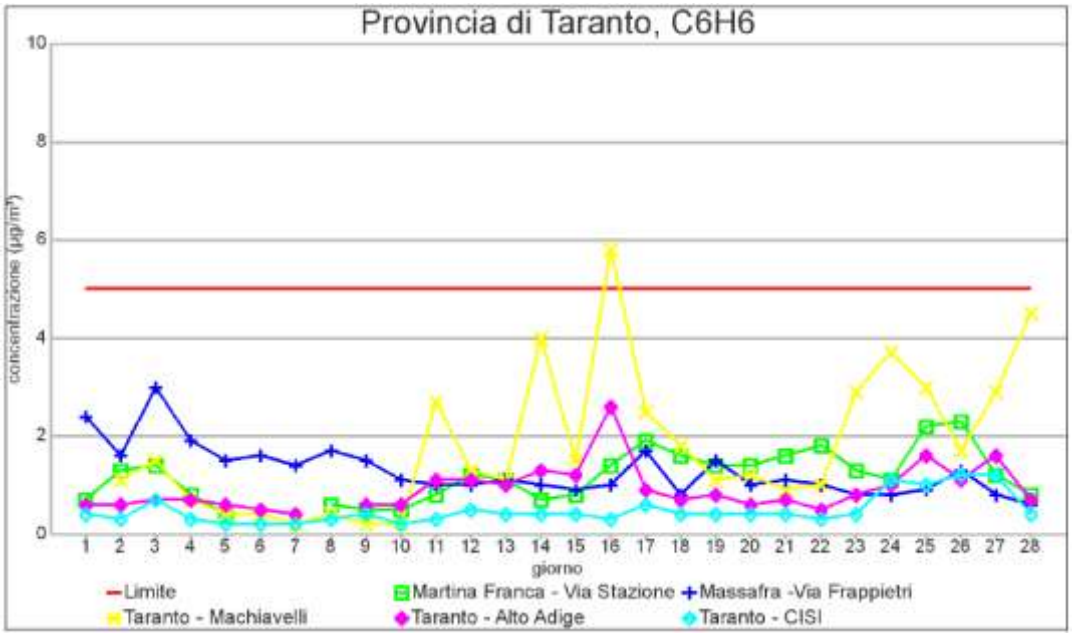


Figure 7 – Average daily concentrations of parameters, Taranto, Feb.2021(5)

With the aim of creating a **permanent monitoring system** for the entire port area, aimed at controlling and monitoring this area with homogeneously distributed measurement points, the Port System Authority of the Ionian Sea intends to implement the Integrated Monitoring Plan in its programming. of the port area of Taranto drawn up in collaboration with DICATECh (Department of Civil, Environmental, Land, Construction and Chemistry Engineering). This Plan provides a description of the techniques, instruments and materials to be used for the construction of the stations and separate monitoring actions for environmental matrices.

In order to control the impacts resulting from the execution of works / interventions (in-ante-in-post operam) in progress / planned on the port areas, the Port System Authority of the Ionian Sea defines specific, timely monitoring activities.

The Port System Authority of the Ionian Sea adopted in December 2019 the **Environmental Energy Planning Document (DEASP)** drawn up in collaboration with the DIPAR (Environment and Reuse Production District - Puglia Region). The Document assessed greenhouse gas emissions due to port activity for the year 2018 and established a reduction of 15% in 10 years in relation to traffic volumes, through the implementation of:

- Energy efficiency of buildings;
- Electric mobility;
- Cold ironing;
- LNG fueling systems;

Transformation of the port area into a Landscape and Ecologically Equipped Production Area (APPEA).

Central Adriatic Ports Authority

This paragraph provides a description of the current environmental status of the Port of Ancona, also following the survey carried out on the quality of the coastal marine waters, bathing waters and sediments in the Port of Ancona and in the areas most next, represented in **deliverable T1.1.1**.

In particular, the analysis of the monitoring methodologies applied by ARPAM for coastal marine waters (in the three-year period 2015-2017) and for bathing waters (for the 2020 season) was reported, in addition to the description of the environmental monitoring plan. of the filled basin of the Port of Ancona drawn up by AdSP MAC.

The quality of water bodies and bathing waters was investigated on the basis of the European Community Directive 2000/60/EC "Water Framework Directive" which established a reference framework for community action on water protection. In addition to Directive 2000/60/EC, implemented in Italy by Legislative Decree 152/2006, the investigations also referred to the following implementing decrees of Legislative Decree 152/2006:

- Ministerial Decree 131/2008 containing the technical criteria for the characterization of water bodies;

- Ministerial Decree 260/2010 which established new technical criteria for the monitoring and classification of surface water bodies.

In the tables below it is therefore possible to report a general picture of the ecological and chemical status of the waters within the basin under investigation and the consequent classification, as required by Legislative Decree 152/06, following the monitoring conducted by ARPAM for the three-year period 2015-2017.

WATER BODY CODE	NAME	CLOROFILLLA A CLASS	MACRO INVERTEBRATE CLASS	TRIX CLASS	STATE PARAMETERS CHEMICALS IN SUPPORT	ECOLOGICAL STATE
IT11.R_COSTA_UF03_12.C	Senigallia-Ancona	HIGH	HIGH	MODERATE	MODERATE	MODERATE
IT11.R_COSTA_UF13_13.A	Ancona - Numana	HIGH	HIGH	GOOD	GOOD	GOOD

WATER BODY CODE	SWB NAME	CHEMICAL STATUS	Parameter exceeded
IT11.R_COSTA_UF03_12.C	Senigallia - Ancona	GOOD	Lead (SQA -MA water); Cadmium (SQA -MA water);
IT11.R_COSTA_UF13_13.A	Ancona - Numana	GOOD	Lead (SQA -MA water); Cadmium (SQA -MA water);

Figure 8 – Ecological & Chemical Status of waters 2015-2017, ARPAM

With regard to bathing water, as reported in the "Annual report on the quality of bathing water relating to the bathing season 2020", published by ARPAM in October of the same year, in 2020 there was a widespread improvement in the quality classes of bathing waters in the Marche region, in fact 31 of the 254 waters have improved their quality and only in one case has there been a deterioration.

In the 2020 season, the Marche bathing waters were awarded the Excellent class in 219 cases (200 in 2019) and the Good class in 21 cases (31 in 2019), confirming the excellent

performance of the coast in 94% of the points monitored. Only 6 waters were found to be sufficient and only 4 scarce.

In order to fully represent the environmental status of the port area or adjacent to it, it is worth mentioning the studies carried out on the possible pollution caused by the management of ballast water and fecal indicator bacteria.

From the first study it emerged that as regards the disinfection by-products investigated, trihalomethanes (**THMs**) (consisting mainly of bromoform) and, to a lesser extent, other brominated compounds were found as main components in the marine waters studied. Negligible concentrations or absence of other volatile chlorinated compounds and haloacetic acids (**HAA**) were also found in the investigated waters.

As for sediments, haloacetic acids were found in concentrations above the limits of detection (**LOQ**), while the results for the more volatile compounds confirmed that the concentration of these compounds is low or absent in marine sediments which therefore cannot be considered matrix of accumulation of these contaminants.

In mussels, few data show bioaccumulation levels above the LOQ for THMs, mainly related to chloroform. Bromoform, despite the relatively high concentration found in seawater, was not found to be bioaccumulated in the mussel tissue. On the other hand, HAA, consisting mainly of monochloroacetic acid (**MCAA**) and monobromoacetic acid (**DCAA**), have been found in sediments and mussels, but not in seawater. These results can be explained by the low persistence of these compounds, due to the biodegradation that occurs in marine waters. One of the objectives of this study was to assess the suitability of the mussel observation methodology for monitoring DBPs in the marine environment. The aforementioned study shows the need to find a suitable tool for monitoring DBPs released into the marine environment, focusing in particular on the marine matrices that are currently the most affected as regards THMs.

The study conducted on the state of pollution generated by fecal indicator bacteria has provided the largest set of data produced to date for port areas. It shows that a large number of faecal bacteria are found in ports and that their abundance is characterized by marked spatial-temporal variability. The study provides the necessary data regarding the range, abundance and variability of faecal indicators in port water and sediments, thus providing a solid basic understanding of faecal contamination in large commercial ports. It can help plan and manage port activities such as sediment dredging and mineral water exchange, which have the potential to spread microbial pathogens from the port to the nearby coastal sea and to transmit waterborne diseases to humans through the exposure to port sea water polluted by pathogens or sediment.

In addition to the water matrix, the AdSP MAC is involved in the **Atmospheric Pollution Project (PIA)** aimed at the prevention and control of respiratory allergies, the monitoring of air pollution related to the city of Ancona.

The study, funded by the NEWBRAIN[4] cooperation project as part of the ADRION program, represents the contribution of the AdSP MAC to the issue of environmental monitoring, with particular reference to the port area.

Figure 9 - Logo of the Atmospheric Pollution Project (PIA)

The initiative is promoted by the Marche Region starting from the objectives of the Aerobiological Pollution and PM_{10} ($PM_{2,5}$) study in the City of Ancona in order to improve knowledge on the exposure of the population to allergenic pollens and their potential interaction with atmospheric pollutants. The project sees a large partnership involved and finds two implementing bodies: the Central Adriatic Port Authority and the Municipality of Ancona, project leader.

The strategic objectives that the firm aims to achieve can be summarized as follows:

1) improve the management of pollen allergy in the population, both urban and non-urban, through the use of Aerobiological Information systems and suspended Particulates (PM_{10} - $PM_{2,5}$) with the aim of obtaining a better quality of life and direct and indirect reduction of the costs of the Regional Health Service;

2) to evaluate the exposure of the population to pollen and their potential interaction with PM_{10} - $PM_{2,5}$ pollution;

[4] The Central Adriatic Port Authority is the lead partner of the NEWBRAIN project "Enhancing capacity for integrated transport and mobility services and multimodality in the Adriatic-Ionian area", funded under the European territorial cooperation program ADRION.

3) increase the awareness of local institutions, local health services, legislators, consumers on the importance of integrated information for improving health among people suffering from pollen allergies and chronic cardio-pulmonary diseases;

4) raise awareness of possible life changes and preventive measures among those suffering from pollen allergies or cardio-pulmonary diseases through the use of aerobiological information systems and chemical-physical composition of the air and supporting educational initiatives aimed at reducing the risk for the most sensitive populations (children and the elderly) ".

2.2.2 Greece – Igoumenitsa Port Authority S.A.

Igoumenitsa Port Authority is well concerned about the activities that take place under its responsibility or inside its area of authority and have direct impact on the environment. Aiming to address and eliminate the environmental problems that derive from the Port's operation, IPA S.A has taken serious action by applying protocols and initiatives for being environmentally sustainable (presented in Chapter 4) and constantly monitors and assesses its activities. Based on the aforementioned assessments, the most significant environmental issues which have been documented in the port area of Igoumenitsa are related to waste management, water consumption, energy and resources consumption, air pollution/ emissions and noise.

Specifically, results reported for the years of 2016, 2017 and 2018 have shown that IPA's water consumption has increased (Figure 10), even though reducing water consumption has been characterized as a top priority for the Organisation. The recorded increased consumption is mainly attributed to the growing number of passengers, ships and the technical projects that are implemented in the port area.

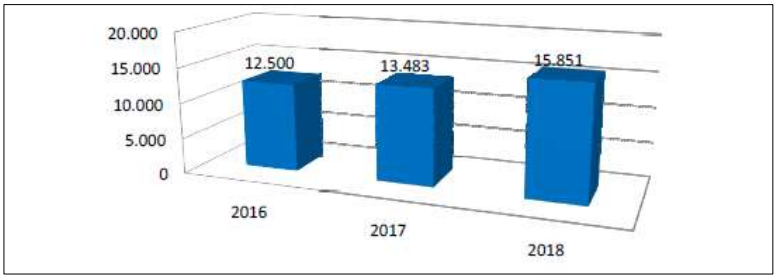


Figure 10 – Water Consumption (m^3)
Source: (Igoumenitsa Port Authority S.A., 2019)

Furthermore, IPA S.A has documented an increased amount of ship solid hazardous waste (Figure 11). Although IPA assures that solid and liquid waste is collected by approved waste management contractors and disposed of in the designated reception facilities, the increasing amount of (hazardous) waste generated from ships in the port area raises a sustainability concern.

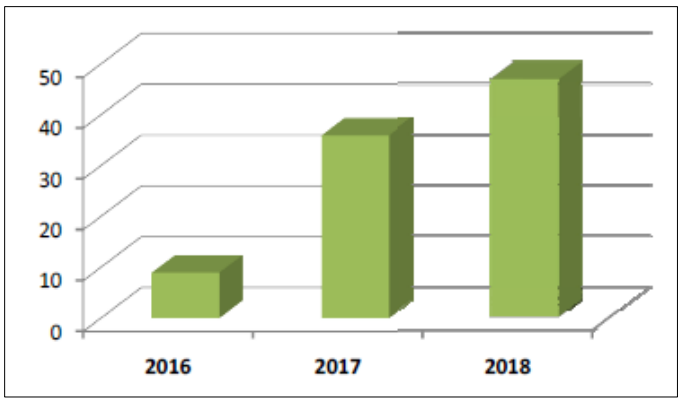


Figure 11 – Ship solid hazardous waste (tn)
Source: (Igoumenitsa Port Authority S.A., 2019)

Similarly, the amount of liquid hazardous waste which includes oil residues, lubricant oil and waste mixtures from oil separators, has increased significantly over the past years (Figure 12).

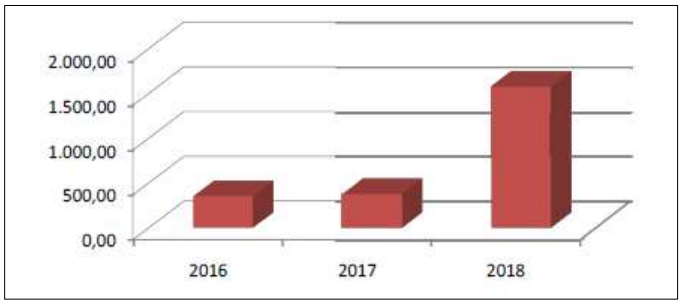


Figure 12 – Ship liquid hazardous waste (m^3)
Source: (Igoumenitsa Port Authority S.A., 2019)

Furthermore, there has been a recorded increase of ship solid non-hazardous waste (Figure 13). Although there was a smaller amount of waste generated in 2017 compared to the previous year, the overall trend is upwards.

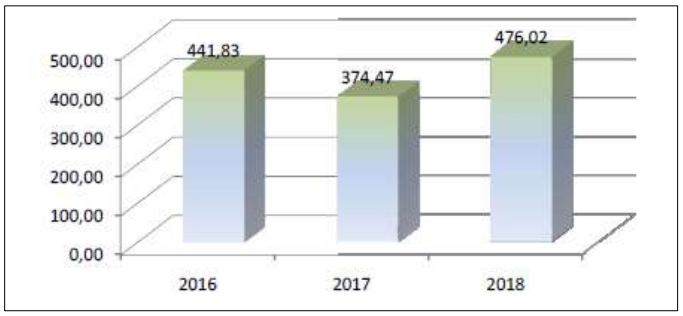


Figure 13 – Ship solid non-hazardous waste (tn)
Source: (Igoumenitsa Port Authority S.A., 2019)

Likewise, the amount of solid hazardous waste (batteries) generated over the indicated 3-year period has increased more than fiftyfold (Figure 14).

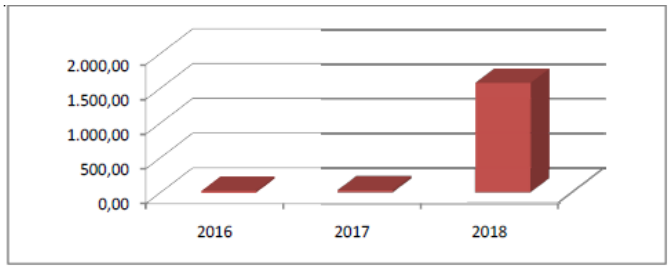


Figure 14 – Solid hazardous waste (batteries) (kg)
Source: (Igoumenitsa Port Authority S.A., 2019)

Concluding, the available data indicate that the amount of produced waste (solid and liquid) has an overall increasing trend. This is mainly attributed to the increased activities (commercial, passenger) taking place in the Port in the last few years.

2.2.3 Croatia – Zadar County Rural Development Agency

Subject to the pilot activity of the project ECOWAVES is the New Port of Gazenica as a modern port partially opened in 2015 for all traffic with a temporary terminal building in order to disburden, relocate and provide additional capacities for ferry and cruise ships 3,5 km south from the city centre.

Figure 15 – Port of Gazenica Facilities

In 2018, a new terminal building was completed which resulted in a fascinating 24 000 m2 of fully equipped facility. The new ferry and cruise Port of Gazenica was constructed by developing an area on land and adequate draft depth in the maritime zone by filling up the waterfront, construction of waterfront structures and piers, construction of access roads and parking lots. Gazenica enabled an increase in the traffic by providing extra berths which can now accept larger ferries, cruise and RO-RO ships. The new port has 12 berths for domestic and international traffic (ferries connecting Zadar with the islands, international vessels and cruise ships).

Purpose of berths in Gazenica under the jurisdiction of the Port of Zadar Authority is:

- Berths, 1, 2, 3, 4, 5, 6 and 7 are used for passenger ships on regular domestic lines
- Berths 8, 9, 10, 11, 12 are used for passenger ships in on international lines, where berths 8 and 9 are used for liner international shipping
- Loading and unloading of fishing boats located on the northern part of the port area (length 210m)
- Gas station – passenger port Gazenica for refueling of vehicles and vessels

Different transport and traffic needs have determined the following functions of the new Terminal:

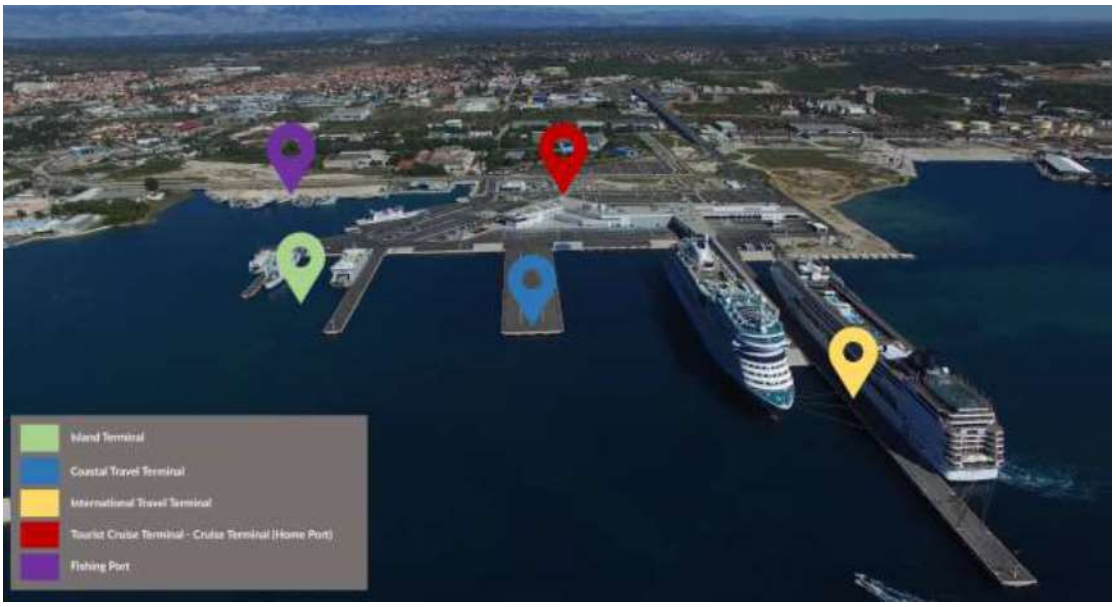


Figure 16 – New Terminal

- Island Terminal
- Coastal Travel Terminal
- International Travel Terminal
- A Permanent border crossing for international passenger and freight traffic in maritime transport
- Tourist Cruise Terminal – Cruise Terminal (Home Port)
- Fishing Port

In order to determine the importance of the New Port of Gazenica in the overall traffic of the port of Zadar, provided below are the tables and graphs explaining the share of the passenger and vehicle traffic from ferries in the New Port of Gazenica. Also, cruise statistics is explained by comparing the share of passenger traffic and calls in the New Port of Gazenica and the City Port Zadar. Ferries on both domestic and international lines are arriving to the New Port of Gazenica while high-speed shipping lines are directed to the City Port Zadar. Therefore, table under shows the number of passengers in the New Port of Gazenica in relation to the total number of passengers on both locations including the City.

Port Zadar in order to determine the share of passenger traffic in the New Port of Gazenica which is the focus of the ECOWAVES project.

It can be concluded that the total number of passengers is in constant increase since 2016. In 2019, 64% of all passenger traffic from ferries and high-speed ships (excluding cruisers) goes to the New Port of Gazenica together with 100% of all vehicle traffic which highlights the significance of the New Port of Gazenica in terms of passenger and RO-RO traffic.

Table 6 - Turnover on domestic lines 2015 - 2019

Year	2015	2016	2017	2018	2019
Passengers	2.156.480	2.238.312	2.348.950	2.354.127	**2.390.575**
Vehicles	360.474	397.618	429.321	457.117	**484.690**

Table 7 - Turnover on international lines 2015 - 2019

Year	2015	2016	2017	2018	2019
Passengers	33.215	30.637	38.532	38.632	**38.335**
Vehicles	5.580	5.496	8.116	8.218	**7.263**

Table 8 - Turnover on cruise lines 2015 - 2019

Year	2015	2016	2017	2018	2019
Port of call	96	114	110	120	**130**
Passengers	70.366	136.462	137.667	166.528	**182.682**

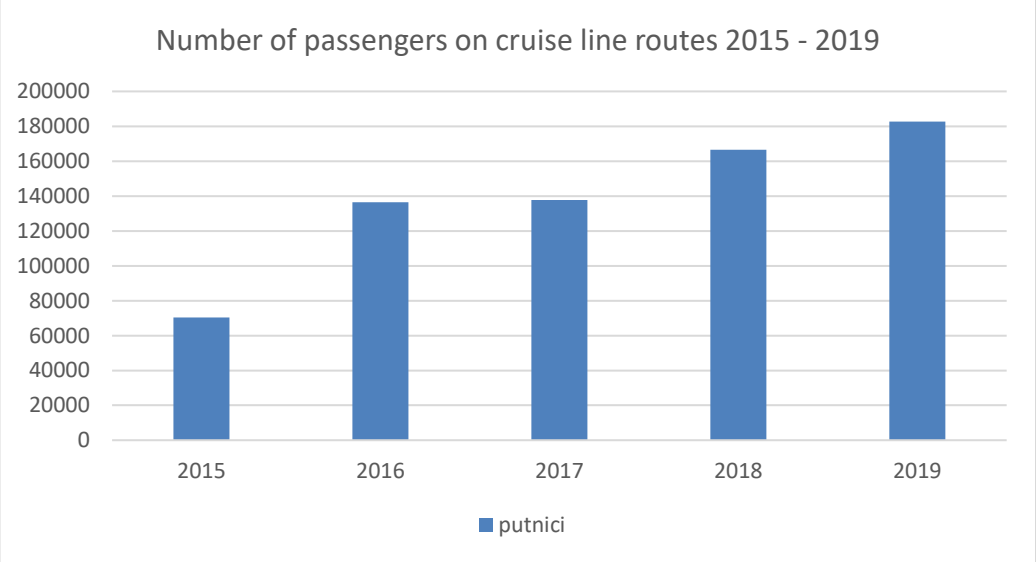


Figure 17 – No of passengers on cruise line routes 2015-2019 (Port of Zadar)

Table 9 - Realized passenger and vehicle traffic - TOTAL 2015 - 2019

Year	2015	2016	2017	2018	2019
Passengers	2.260.061	2.405.411	2.525.149	2.559.287	**2.611.592**
Vehicles	366.054	403.114	437.437	465.335	**491.953**

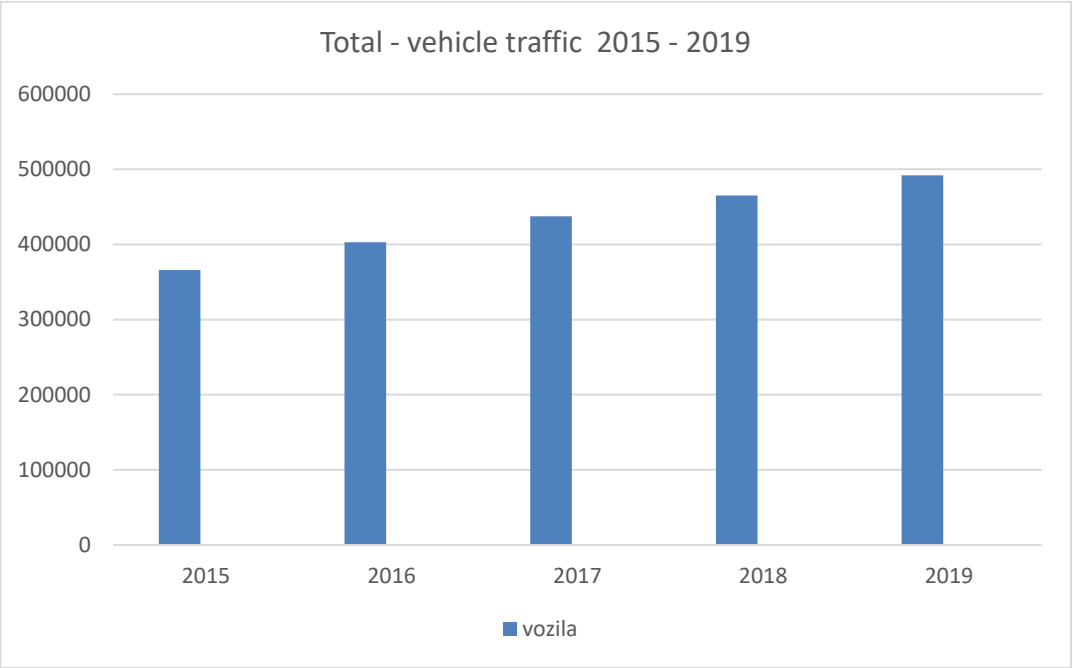


Figure 18 – Vehicle Traffic (in total) 2015-2019 (Port of Zadar)

The following is a table comparing the Old City Port and the new Port of Gaženica, which shows the relationship between the port of call and the cruiser passengers between the two port basins.

Table 10 - Cruise ships – relation between Old City Port – new Port of Gaženica 2015/2019

2016	**Port of call**	**Passengers**
Old City Port	47	10.945
New Port of Gaženica	67	125.517
Total	114	136.462
2017	**Port of call**	**Passengers**
Old City Port	43	13.489
New Port of Gaženica	67	124.178
Total	110	137.667
2018	**Ticanja**	**Putnici**
Old City Port	47	12.819
New Port of Gaženica	73	153.709
Total	120	166.528
2019	**Ticanja**	**Putnici**
Old City Port	49+1(sidro)	16.088
New Port of Gaženica	80	166.594
Total	130	182.682

Carbon footprint analyses – Port of Zadar, Gazenica – Overall GHG emissions

Overall GHG emissions in the Port of Zadar for year 2019 were 4351.6 tonne CO_2 equivalent which is minor when compared to the EU statistic. The carbon footprint calculation in the

Section 3 of the TNA has proved that the New Port of Gazenica is indeed a very modern port with very low GHG emissions and satisfactory energy-efficient and sustainability performance.

Table 11 - Overall GHG emissions

Summary of contributions to the production of greenhouse gases in the maritime sector, in the port of Zadar, in 2019		
Category	**t CO2eq**	**%**
Electric energy	139.9	3.2
Heating	28	0.6
Service vehicles	0	0.0
Operational port vehicles	0	0.0
Heavy vehicles **and road vehicles**	161	3.7
Naval port service (e.g. pilot/tug)	0	0.0
Railway tractors	0	0.0
Anchored ships	0	0.0
Ships maneuvering	223.6	5.1
Moored ships	3799.1	87.3
TOTAL	**4351.6**	**100**

GHG emissions in the Port of Zadar are very specific and there are no significant terrestrial GHG emissions. Shore-side emissions are produced indirectly by electrical energy consumption or directly from road vehicle traffic inside the port area and from the natural gas boilers used for heating. Terrestrial emissions make only 7.6% of overall GHG emissions in Port of Zadar, maritime emissions account up to 92.4%. Largest terrestrial GHG producer is road transport, partially due to the relatively long ferry approach inside the port area of almost 1 km, however expected emission from this category will undoubtedly decrease in the coming years due to the increasing share of electric vehicles. This trend will be heavily influenced by development of EV infrastructure on nearby islands.

Largest part of the emissions is attributed to the large cruise ships, which is very important considering their small numbers. Enormous 85.6% of all emissions are caused only by cruisers mooring, making them an ideal candidate for any measures towards reduction of GHG emissions.

Different activities can be taken to decrease these emissions, among which shore-to-ship power supply could provide most benefit. Such systems could be installed only for cruise ship arrivals, as ferries produce relatively small mooring emissions. Considering expected raise in ETS pricing towards 65 €/t in 2030, ship operators could find further incentives for welcoming such systems.

CO2 emission is the main greenhouse gas produced by ships and the focus, but nitrogen oxides (NOx), and sulphur oxides (SOx) are also very important pollutants. CO_2 contributes to global warming by trapping heat in the atmosphere, and negatively affects marine ecosystems by increasing the acidity of seawater. Currently, CO2 emissions from international shipping

amount to around 800 million tons of CO2 per year, making the shipping sector a substantial contributor to climate change. These CO2 emissions represent approximately 2-3% of total global CO2 emissions and around 97% of all GHG emissions coming from international shipping.

This Study indicates that New Port of Gazenica is not problematic in terms of emissions at the moment of this analysis. This is especially important when observing environmental impact on the surrounding areas especially the city of Zadar and its inhabitants. Given the fact that one of the main objectives when constructing New Port of Gazenica was relocation of traffic from the center of the city of Zadar, it is significant to emphasize the environmental importance of this project.

Therefore, we can generally conclude that New Port of Gazenica hasn't got any serious CO_2 emissions, but the Port of Zadar Authority needs to be ready for e-mobility and ensure enough electric capacity in the port area. Figure below gives an overview of calculated emissions in the New Port of Gazenica for each berth.

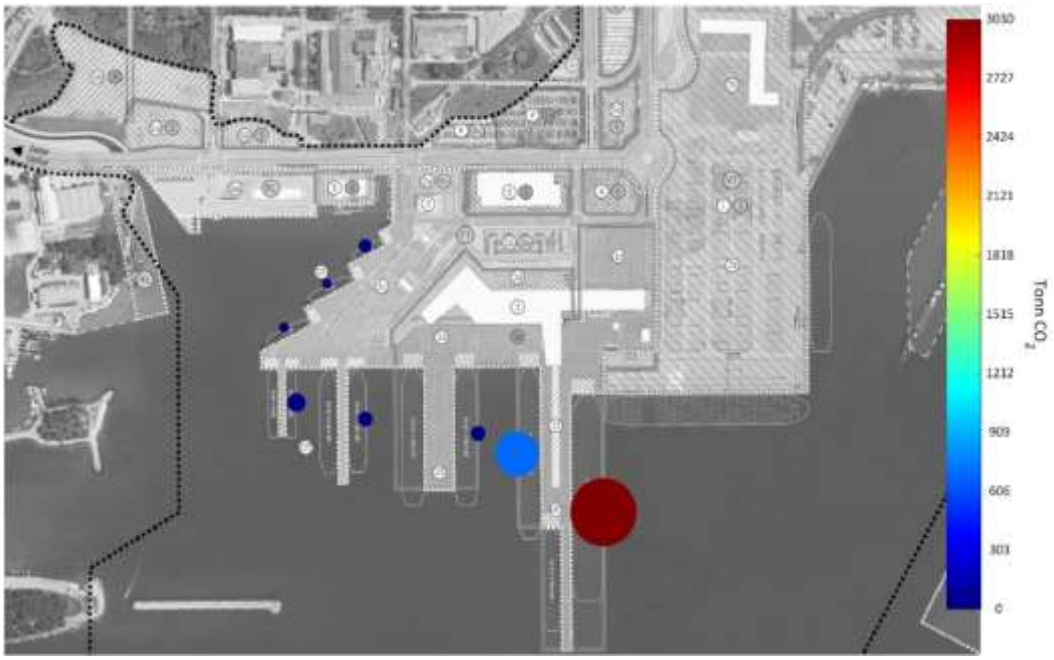


Figure 19 – Mapped emissions for all berths

2.2.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Luka Koper states in its Annual report (Anon., 2021a) that as a company is committed to sustainable development, which among other, guarantees that its development is undertaken in a way that respects the natural environment. However, notwithstanding all the environmental obligations that the Port of Koper has, the activities related to port operations have a significant impact on the environment.

In the Slovenian Sea, the environmental status is assessed following two European Directives: Water Framework Directive (WFD, 2000/60/EC) and Marine Strategy Framework Directive (MSFD, 2008/56/EC). The ecological status of Slovenian coastal waters, which was assessed through the WFD monitoring, is good and it seems to be stable (ARSO, 2020). This means that no specific measures are necessary to improve the status, at least what concerns the quality elements followed in the WFD monitoring.

On the contrary, all water bodies of the coastal and territorial sea have poor chemical status following WFD (ARSO, 2017). The reason for the poor chemical status is the exceedance of the environmental quality standard for tributyltin compounds (TBT), which were used as biocides in coatings to protect ships from hull fouling. Another poor status resulted from the content of mercury in marine organisms (mussels in this case), for which the environmental standard was exceeded at two monitoring sites, and at two monitoring sites the readings were only slightly below the environmental quality standard. For comparison, in inland waters, the Hg content in organisms was exceeded at all but one monitoring site. Mercury is transported over long distances by atmospheric deposition and is widely present in organisms in surface waters across Europe, at concentrations exceeding the quality standards for organisms.

Port of Koper is entirely located it the water body SI5VT3 which is a heavily modified water body (HMWB) according to the WFD nomenclature. This status of the HMWB was assigned due to substantial hydro-morphological alterations of the natural state because of the uses such as maritime traffic and presence of the Port of Koper. In HMWBs the assessment of the ecological status is necessary, but with the use of special methodology of assessment, taking into account the physical changes caused by specific uses. The good status of the HMWBs at which the WFD is aiming to be achieved is called good ecological potential. Since the methodology for assessing the good ecological potential in the Slovenian sea is not yet developed, the status is assessed equally to that in natural water bodies. Therefore, caution is needed with the interpretation of the results for the WB SI5VT3 as concerns biological quality elements. Results of the WFD monitoring in the area of the Port of Koper are presented in Table 12.

Table 12 - Ecological and chemical status of the water body SI5VT3 where the Port of Koper is located.

<table>
<tr><th>SI5VT3</th><th colspan="2">Element</th><th>Status</th><th>Level of confidence</th><th>Overall status</th></tr>
<tr><td rowspan="8">Ecological status</td><td rowspan="3">Biological quality elements</td><td>Phytoplankton</td><td>HIGH</td><td rowspan="8">medium</td><td rowspan="8">GOOD</td></tr>
<tr><td>Macroalgae</td><td>#</td></tr>
<tr><td>Benthic invertebrates</td><td>GOOD</td></tr>
<tr><td rowspan="4">Chemical and physico-chemical elements</td><td>Nitrate</td><td>GOOD</td></tr>
<tr><td>Orthophosphate</td><td>HIGH</td></tr>
<tr><td>Total phosphorus</td><td>HIGH</td></tr>
<tr><td>Specific pollutants</td><td>GOOD</td></tr>
<tr><td rowspan="2">Chemical status</td><td>Sea water</td><td>Tributyltin compounds</td><td>POOR</td><td>high</td><td rowspan="2">POOR</td></tr>
<tr><td>Biota</td><td>Mercury</td><td>POOR</td><td>low</td></tr>
</table>

- monitoring of macroalgae was done, but the status is not given, since the bottom of the WB is mostly sedimentary

The bad chemical status of the Slovenian Sea due to high concentration of TBT substances is certainly a problem connected to maritime traffic. In the last decade, the presence of organic tin compounds (TBT) used to coat ships against fouling has been detected in the sea. Research has shown that TBT can be toxic for the marine biota even at very low concentrations and this evidence has been used to set a very stringent environmental quality standard. However, recent analyses in 2017 show a marked improvement in the situation. Concentrations have

decreased after several years of poor status, resulting in a good chemical status of the Slovenian Sea according to the latest data (ARSO, 2017). In 2003, the European Union banned the use of TBT in antifouling products. As these substances are difficult to degrade and persistent, especially in sediments and living organisms, they still pose a threat to the marine environment.

The elements used for the environmental assessment according to the WFD (Table 1) do not respond to the whole range of pressures that affect the habitats of Slovenian Sea. Other issues that are worth of further research and monitoring are covered by 11 MSFD descriptors, against which the environmental status of Slovenian marine waters is monitored. However, most of the methodologies for the assessments are still under development. MSFD descriptors that are of special interest to this work are: Eutrophication (descriptor D5) and Chemical pollution (Descriptors D8 and D9), which are overlapping with WFD monitoring, Non-indigenous species (descriptor D2), Marine litter (descriptor D10), Energy incl. underwater noise (descriptor D10) and Seafloor integrity (D6). The monitoring for the elements for these descriptors was not yet established during the first assessment cycle, so the status was assessed based on some pilot monitoring, project results and research data (MOP, 2019).

As regards the D10 Marine litter, the environmental status of Slovenian marine waters is poor for criterion D10C1 – marine litter excluding microlitter. The proximity of the Port of Koper together with highly urbanized areas of the city of Koper and the discharge of litter by rivers were identified as possible explanations of very high density of floating marine litter. According to the results for the microlitter, the environmental status of Slovenian marine waters is poor also for criterion D10C2 – microlitter. Therefore, the status of the marine waters is poor also regarding the whole descriptor D10.

The relevant pressures affecting the seabed condition according to descriptor D6 Sea-floor integrity are physical loss (due to continual change in seabed substrate and morphology or seabed substrate removal) and physical disturbance (temporary or reversible). The Slovenian coast has been in recent subjected to fragmentation and degradation or even loss of habitat types and changes in the structure of biological communities due to human activities. It has been shown that even small and minute interventions can have serious consequences for the marine environment. For example, anchoring a ship in a seagrass meadow can cause severe devastation to the seabed, and beach (re)constructions can lead to the complete disappearance of a large number of habitat types (Lipej et al., 2018).

Significant physical pressure on the Slovenian seabed is represented by the following activities: land acquisition, coastal and flood protection, excavation and disposal of materials, fisheries, mariculture and its infrastructure, maritime transport and related infrastructure, waste management and disposal, and tourism and recreation infrastructure (Lipej et al., 2018). At least some of these activities are connected with maritime traffic, Port of Koper and recreational marinas. The area of physical loss in the Slovenian Sea is 5.59 km2 or 2.61%. Most of the seabed losses are due to land acquisition (2.92 km2), in particular due to the construction and expansion of the Port of Koper (Lipej et al., 2018). The area of physical disturbance of the seabed in the Slovenian Sea is 204 km2 or 95.5%. Maritime traffic affects 45.3% and anchoring off the Port of Koper affects 11% of the seabed. Figure 2 shows how much

the circalittoral area of the Slovenian Sea is affected by these different activities. Darker colors represent more intensive activities.

It is obvious that very extensive changes and losses have occurred in the area of the Port of Koper, where regular deepening of the seabed in the sedimentary infralittoral and circalittoral is required due to the traffic of large ships. The major dredging of the seabed takes place in the area of the Port of Koper, where, because of the shallow bottom, harbour basins and navigable channels are deepened at the entrances. The area of the deepening area is estimated to be 1.03 km2 (Lipej et al., 2018). The dredged material is disposed in designated port cassettes onshore. However, it is planned to obtain a permit for disposal at sea for the material recovered from the maintenance channels, which would mean an additional impact on the seabed.

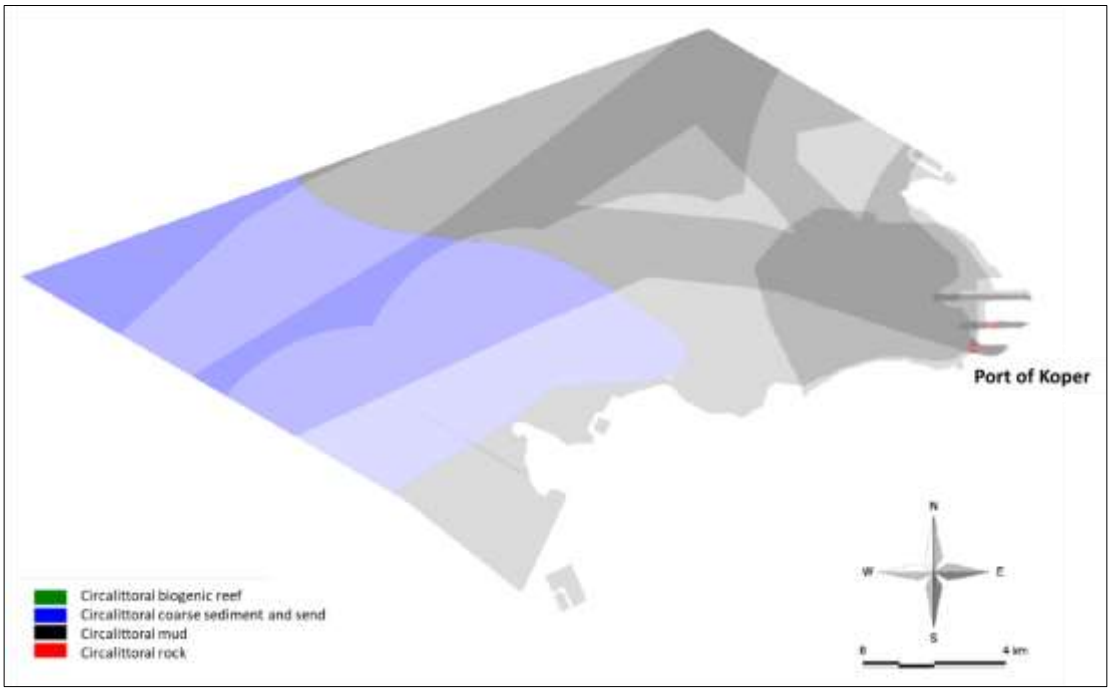


Figure 20 – Circalittoral bottom of the Slovenian Sea coloured according to the number of activities taking place in a given area. The darker the colour intensity, the more activities take place in that area. Different colours represent different habitat types. (Source: Lipej et al., 2018)

The economic traffic of ships calling at the port of Koper or other major ports, as well as ships navigating to ports in Italy and transiting the Slovenian Sea, has also a major impact on the marine environment (Caserman et al., 2020). In assessing the situation, the experts analysed the following traffic parameters that represent pressures on benthic habitats: maritime traffic density, anchoring, the official area of the Port of Koper and larger marinas and ports along the Slovenian coast (Figure 12). Such activities cause physical disturbance to the seabed and associated habitats and communities. In the case of the Port of Koper, the problem is also the physical loss of primary benthic habitats and communities.

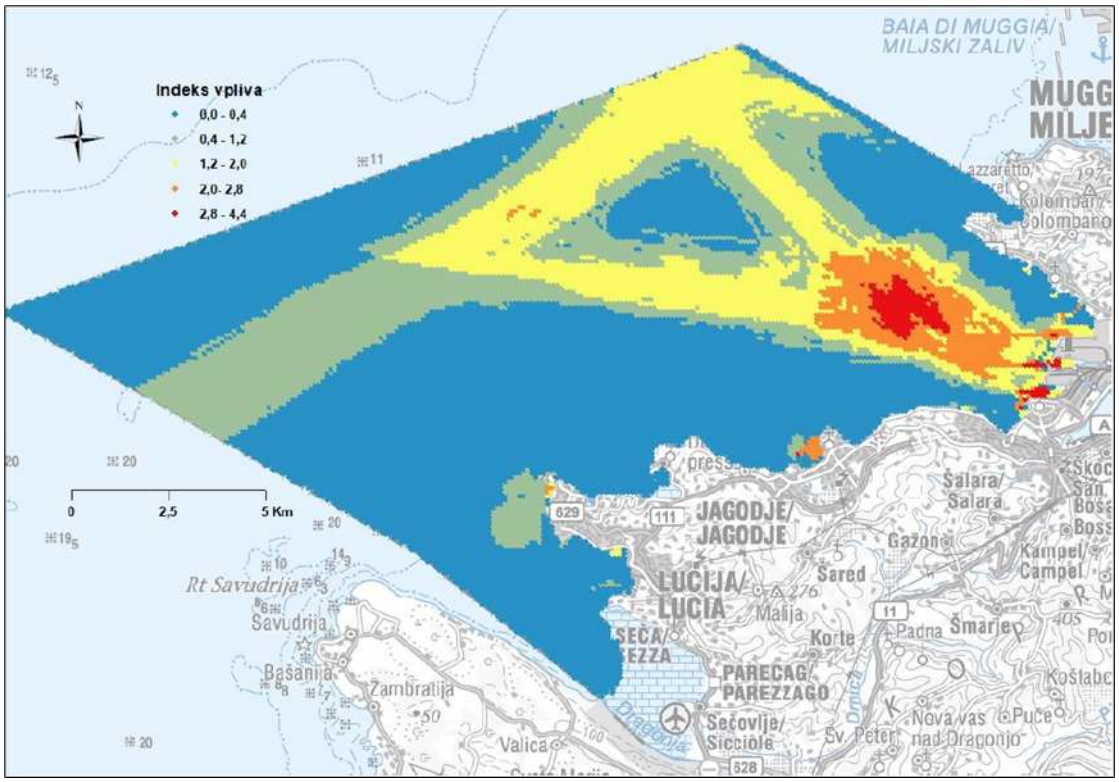


Figure 21 – Locations and pressure intensities due to maritime traffic and their effects on benthic habitat types. A higher value of the impact index means a greater impact of the pressures on benthic habitat types (source: Caserman et al., 2020).

Maritime traffic connected to the port activities significantly contribute to the underwater noise (descriptor D10). Anthropogenic sounds may be of short duration (i.e. impulsive) or be long lasting (i.e. continuous); impulsive sounds may however be repeated at intervals (duty cycle) and such repetition may become diffuse with distance and reverberation and become indistinguishable from continuous noise (Dekeling et al., 2014).

The status of Slovenian marine waters in terms of impulsive noise input cannot yet be determined due to the limited amount of data and indeterminate thresholds. The one-time impulsive noise measurements show that the measured impulsive noise levels due to pile driving in the port of Koper are mostly higher than the sound level in which marine animals communicate.

At the beginning of 2015, a stationary measuring station for continuous underwater noise was set up near the port of Koper, about 300 meters from the coast. The monitoring station complies with the guidelines for conducting Type A monitoring (Dekeling et al., 2014). In a short measurement period (2015-2017), a slightly decreasing trend of 125 Hz noise and a slightly increasing trend of 63 Hz noise was estimated, but the reliability of the trend assessment is low. It was not possible to assess the status of Slovenian marine waters in relation to the introduction of continuous underwater noise based on an unreliable assessment of the trend. However, the average continuous noise levels at the central frequencies of 63 Hz and 125 Hz were lower than the sound level at which the bottlenose dolphin (Tursiops truncatus) communicates.

Maritime transport is an important transmission route for the introduction of non-indigenous

species (NIS, descriptor D2) into the new environment. The main vectors of transmission are ship ballast water and hull fouling. The analysis of the sources of ballast water discharged into the port of Koper has shown that the vast majority of water originates from the ports of the northern Adriatic Sea, but discharges from almost all oceans have been detected in the port of Koper. However, it is important to note that a single release can be sufficient for the successful transfer of NIS and that the spread of NIS also occurs through so-called intermediate stations, e.g. nearby ports. The introduction of NIS into the Slovenian Sea with ballast water is therefore very likely. From the point of view of ballast water discharges and possible NIS, the loaded cargo (export) is particularly important, as the amounts of ballast water discharged are proportional to the amounts of loaded cargo. According to the projection that the loaded cargo in the port of Koper will increase in the near future, the possibility of entering NIS will also increase.

The number of NIS in the Slovenian Sea, as elsewhere in the Mediterranean, is growing and this trend is expected to continue. The first reason is related to the general trend of bioinvasion, the second reason to the greater research effort. In 2021, the cumulative number of NIS and cryptogenic species was 57, of which about half are massively abundant and some are identified as invasive (Mavrič, et al., 2021). The vast majority of species (82%) entered the Slovenian Sea through maritime transport, either through ballast water or as hull fouling. These include the ctenophore Mnemiopsis leidyi and the blue crab Calinectes sapidus. Given the number of NIS, the environmental status is assessed as "not good" as the number of NIS tends to increase. However, for the time being NIS does not cause any visible ecological and economic consequences, so the situation is good from this point of view. However, there is still great uncertainty about the actual harmful effects of NIS on the environment.

2.2.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

The results of the monitoring conducted in the period from 2012 to 2016 are presented below, which are also the last processed and publicly available data.

Monitoring covered 43% of water bodies, of which:

- 2% have good status
- 21% moderate
- 14% weak and
- 6% bad.

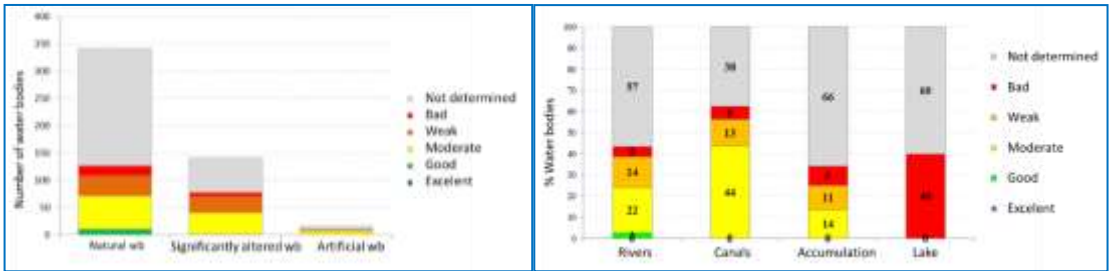


Figure 22 - Ecological status of waterbodies 2012-2016

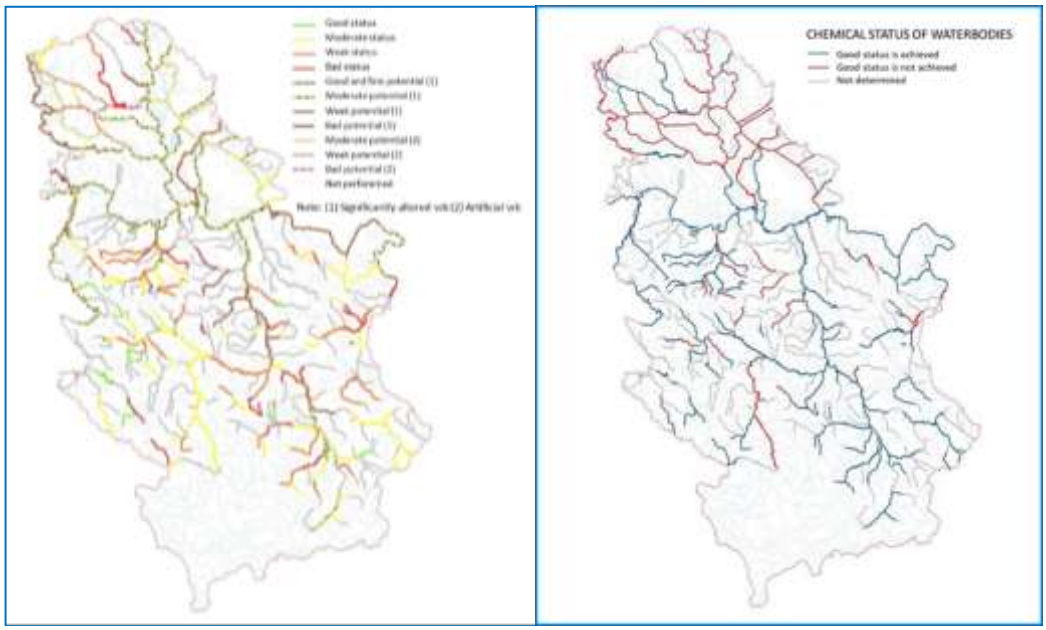


Figure 23 - Ecological status/potential of water bodies in Serbia (2012-2016) and Chemical status of water bodies (2012-2016)

The chemical status of water bodies was determined on 42% of water bodies, with 32% achieving good status, while 10% did not.

Status Analysis and Conclusions

The ports in the Republic of Serbia are located on the rivers Danube, Sava and Tisza, and below is an overview of all measuring stations on these rivers and the status is determined. Moderate ecological status was determined at the largest number of measuring stations and good chemical status was achieved.

Based on the available data, it is not possible to determine whether ports contribute to this status of water bodies.

Table 13 - Ecological status/potential and chemical status of Danube, Sava and Tisa

No	Profile	Waterbody	Ecological status/ potential	Chemical status	Reason for not achieving good chemical status
1.	Bezdan	Danube			Ni dissolved
2.	Bogojevo				Ni dissolved
3.	Novi Sad				
4.	Slankamen				Ni dissolved
5.	Zemun				
6.	Smederevo				
7.	Banatska Palanka				
8.	Tekija				
9.	Brza Palanka				

No	Profile	Waterbody	Ecological status/ potential	Chemical status	Reason for not achieving good chemical status
10.	Radujevac				
11.	Martonos	Tisa			Endpsulfan Ni dissolved
12.	Novi Becej				Ni dissolved
13.	Titel				Ni dissolved
14.	Jamena	Sava			
15.	Sabac				
16.	Ostruznica				

Legend:

Ecological status/potential	
	Bad
	Weak
	Modetate
Chemical status:	
	Good status is not achieved
	Good status is achieved

2.2.6 Albania - Port of Vlora

The Vlora Bay has high values in terms of biodiversity associated with the presence of Posidonia meadows, coralligenous communities and other vulnerable marine habitats, fish species, geological formations, endangered and protected species (including charismatic species), and landscape and also it has socio-economic values including: artisanal fisheries, tourism, and beaches.

Mediterranean physiognomyis characterized by the abundance of Mediterraneo-Atlantic species. Posidonia oceanica meadows host a relatively high biodiversity of benthic macrofauna including sponges, cnidarians, bryozoans, molluscs, annelids, crustaceans, echinoderms and ascidians (Beqiraj et al., 2008). Coralligenous algae, a biogenic formation building a rim, which can extend locally to more than 1 m in width, are present at the mediolittoral stage along the western coasts of Karaburuni peninsula, Sazani island and Rreza e Kanalit area. Three globally endangered marine turtles, with high threatening status (IUCN Red List of Threatened Species, 2014 9) are present in Albanian waters: loggerhead turtles (Caretta caretta), green turtles (Chelonia mydas) and much more rarely leatherback turtle (Dermochelys coriacea). The area is also a potential monk seal habitat (monk seals were reported in Karaburuni in 1982 and Sazani in 1991). Five species of cetaceans are reported in Albanian waters among which the short-beaked common dolphin (Delphinus delphis), the common bottlenose dolphin (Tursiops truncatus) and the sperm whale (Physeter macrocephalus) which have been identified by ACCOBAMS as being in the greatest danger of disappearing from the Mediterranean. According to Birdlife International (2014), the area of Vlora bay, Karaburuni peninsula and Cika mountain is listed as an Important Bird and

Figure 24 – National Marine Park Sazan – Karaburun Zoning Map

Biodiversity Area (IBA) for Albania (IBA assessment was done in 2000)10. About 70 species of water birds have been recorded among which the Dalmatian pelican (Pelecanus crispus) and the pygmy cormorant (Phalacrocorax pygmaeus). The area is also important for fisheries. Artisanal fishing exists along the coasts of Rreza e Kanalit-Karaburuni and Sazani. Professional fishermen use mainly lines and trawling. The fish fauna of commercial interest is made of several demersal species and groups, small and big fishes, crustacean and molluscs. Historical and archaeological values of the sites are unique and would attract national and international tourism. Several archaeological and historical remains are present in the area in Orikumi lagoon, Vlora bay, Karaburuni, e.g. Grama bay and some caves. The establishment of NMP Karaburun-Sazan requires the development of a management plan including the definition of the role and functions of the management unit, of the detailed regulations for each zone and for each activity allowed in the area, the recruitment and training of staff, the definition and installation of necessary infrastructures and the preparation of research, monitoring and communication plans. The plan will have to remain adaptive to change in local and regional conditions and responsive to new challenges and opportunities.

Threats that were identified, because of the presence of touristic boats and personal boats are the following: Degradation of Posidonia meadows, Degradation of coralligenous communities, Decreased fish stocks; Degradation of geological formations, Intensive aquaculture, Pollution, and Degradation of archaeological and historical sites.

2.2.7 Montenegro – Ministry of Capital Investments

In the case of water and marine environment, the EU Water Framework Directive 2000/60/EC has been the main driver for the evolution of the legal framework in Montenegro regarding water resources management and water services and provided the foundations for the relevant national legislation. The main legislative instrument in place is the Law on Water (OG 27/07) of

2007 with its amendments of 2011 as consolidated in 2018. The legislative act prescribes the main goals for sustainable water protection and management, as well as the terms and conditions for implementation of water management activities, following the directions of the Water Framework Directive.

The main principles guiding the Law on Water are presented below:

- the prevention of deterioration of aquatic ecosystems;
- ensuring the good status of waters;
- progressive reduction of pollution of groundwater;
- sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use;
- public participation in decision-making related to waters; and
- mitigation of the effects of floods and droughts.

The Law on Water focuses on the integrated management based on river basin approach while regulating ownership on water, water management planning, water regulation and use, water infrastructure, water monitoring, protection against floods and erosion.

Despite amendments, implementation of the regulated framework remains a work in progress. Legislation transposition is monitored by a table of concordance of national with EU legislation. The financing of water resources in Montenegro is carried out in accordance with the 2008 Law on Water Management Financing (OG 65/08) which regulates, among other matters, various water fees.

According to the most recent EU report on Montenegrin environmental performance, and in particular with regards to the waste and water condition, the overall notion is that while Montenegro remains partially aligned with the EU acquis, the progress of implementation has been slow or inadequate. According to the report" On the subject of waste details of the country's waste management model and the modalities of its implementation remain to be clarified. There is an urgent need to remedy illegal waste disposal and the use of temporary waste disposal in all municipalities", while regarding water quality recent development include a network of hydrological surface stations for monitoring the quantity of surface waters and the establishment of a network of stations for groundwater monitoring. It is noted that largest source of pollution of surface and groundwater is untreated wastewater.

Following the introduction of the new monitoring system, a monitoring program related to the quality of surface waters in Montenegro in 2019 was implemented during the period of June-December, through 4 lots of measurements for basic physical and chemical parameters and covering three different seasons, as well as the period of low water level (when pollution and use are at their highest) and 2 lots of biological measurements, both representing characteristic biological cycle on the coast and in water.

The results of the 2019 assessment regarding surface waters are presented in the following table:

Table 14 - Montenegrin 2019 Water State assessment

Water Body Name	Surface water (SW)	SW Type	Site Name	Ecological status of the water quality				
				general physic - chemical parameters	Fitoplankton	Fitobentos	Makrozoobentos	ecological status
Bojana	Bojana1	R9	Fraskanjel	g	g	m	b	b
	Bojana1	R9	Reč	m	vl	m	b	b
Morača	Morača 5	R8	Ispod Sportskog centra	m	g	p	b	b
	Morača (ZPVT)	R8	Ispod ušća Cijevne	m	-	p	b	b
	Morača7	R8	Iznad ušća-lijevi rukavac	m	d	m	-	m
Cijevna	Cijevna 1	R6	Dinoša	g	-	m	p	p
Zeta	Zeta4	R8	Vranjske njive	g	d	u	b	b
Gračanica	Gračanica 2 (ZPVT)	R2	Ispod glavnog skladišta	m	-	-	-	m
Lim	Lim 3	R7	Ispod industrijske zone	m	-	p	p	p
	Lim 3	R7	Dobrakovo	m	m	p	m	p
Ljubovića	Ljubovića 1	R2	Lekovina	m	-	m	p	p
Lješnica	Lješnica 1	R2	Iznad ušća u Lim	g	-	m	b	b
Ibar	Ibar 2	R4	Bać	m	-	p	m	p
Ćehotina	Ćehotina 5	R5	Ispod kolektora	m	b	m	b	b
	Ćehotina 6	R5	Gradac	m	-	g	m	m
Šasko j.	Kod restorana	L4	Kod restorana	m	p	m	-	p
Skadarsko j.	Vučko blato WB1	L4	Kamenik	g	m	-	-	m
	Sjever WB 2	L5	Moračnik	g	g	-	-	p
	Jugozapad W3	L5	Podhum	g	g	-	-	g
	Pelag zona W4	L6	Centar	g	h	-	-	g
Crno jezero	Kod splava	L1	Kod splava	g	g	p	-	p
Slano j.	VVT	N/A	Ispod Broćanca	g	g	m	-	m
Krupačko j.	VVT	N/A	Zatvaračnica	g	g	p	-	p
Liverovića j.	JMVT	R2	Iznad brane	m	g	m	-	m
Bilećko j.	VVT	N/A	Ispod sela Miruše	g	g	p	-	p
Otilovića j.	JMVT	R5	Kod mosta	m	g	m	-	m
HercegnovskiZ.	TW 4	T3	Ušće Sutorine	m	-	-	-	m
Risanski Z.	TW 2	T1	Ušće Risanske rijeke	m	-	-	-	m
Kotorski Z.	TW 1	T1	Ušće Škudre	m	-	-	-	m

Tivatski Z.	TW 3	T2	Ušće potoka kod Opatova	g	-	-	-	g
Rijeka Bojana	TW 5	T4	Ušće Bojane desni rukavac	m	-	-	-	m

Source: Informacija o stanju životne sredine 2019, Agencija za zaštitu prirode iživotne sredine, Maj, 2020.

3. Presentation of applied protocols and initiatives for being environmentally sustainable and socially desirable

3.1 Initiatives and protocols applied for the Corporate Social Responsibility of the institution

3.1.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The Port System Authority of the Ionian Sea - Port of Taranto - to continue its awareness-raising and collaboration activities for the protection of the natural environment of its territory, the health and safety of citizens, users and operators of the port, adopted the "Environmental Policy" Document on 11/04/2018 as part of the Environmental Management System, through which it undertakes:

- continuous improvement and environmental prevention including pollution prevention;
- to ensure compliance with mandatory environmental regulations and other signed environmental requirements;
- to anticipate, as far as possible, the application of environmental laws;
- to work towards the activities and companies operating in the port areas so that their action is in line with the Environmental Policy adopted by the Administration;
- to communicate to the outside the actions implemented in order to create attention in the community on environmental issues.

This commitment is realized through:

- the analysis and systematic evaluation of the activities carried out in the port area that may interfere with the adequate maintenance of the quality of the environment;
- the knowledge and awareness of users and operators, thus fostering that common spirit of sharing, cooperation and guidance on environmental issues in order to pursue the objectives aimed at improving environmental conditions for the benefit of the entire local community;
- the use of the best technologies relating to the activities of the Port System Authority, favoring their dissemination among the realities present in the port area of reference;
- the digitization of administrative and port processes in order to simplify access to users and optimize the flows of incoming and outgoing goods;
- participation in European projects with a view to promoting - within the port cluster or in general on the territory - the principles of the circular economy and its applications in logistics/port activities and services.

In order to facilitate the harmonization of environmental interventions in the port sector by the various companies concerned and to give an authoritative reference point on the state of the environment in the port environment, the Port System Authority undertakes to periodically draw up environmental documents to be disseminated on the territory.

This policy, kept active through the process of continuous improvement promoted by the environmental management system, is adopted by all the staff of the Port System Authority and is made public so that:

- All directorates participate, by role and competence in the realization and pursuit of the environmental objectives of the Authority;
- All workers are trained, informed and sensitized to carry out their tasks in line with the objectives set;
- The predisposition and the will to continuous improvement and protection of the environment is constant.

Central Adriatic Ports Authority

Below is a list, with related description, of the initiatives planned by the AdSP MAC which testify to its commitment in terms of Corporate Social Responsibility:

- **APP Welcome to Ancona**, to transform the passenger into a tourist. First year of testing in 2015, preparation is underway to improve information and services in 2016 in collaboration with the Municipality of Ancona and the Chamber of Commerce;
- **Reopening of the Porto** Antico **to the city**: Reorganization of the ancient port carried out in 7 months, in strong synergy with local institutions and bodies (Region, Chamber of Commerce, Municipality, Superintendency, Prefecture, Harbor Master's Office, Guardia di Finanza, Customs), through:
    - Removal of abandoned cranes for over 10 years;
    - Removal of fencing nets;
    - Asphalting;
    - Implementation of street furniture and creation of "tattoos" on the ground.
    - Enhancement of spaces no longer useful for commercial traffic but with a high tourist and cultural potential;
    - Creation of new opportunities for economic development in the hospitality and tourist reception sector.

Among the objectives of the reopening of the Porto Antico to the city are:

Therefore, the opening path of the port to the city launched in 2015 to enhance the historical-monumental area of the Porto Antico confirmed the achievement of the expected objectives: recovery of the tourist-recreational and cultural use of the historic port area characterized by emergencies historical-architectural present (Arco di Traiano, Arco Clementino, base of the Lantern, historical walls, ruins of the Roman port, etc.); improvement of the urban usability of the area, consistent with the priority expressed by the city of having free access to the sea in an area with a high symbolic value and identification of the local community; privileged access to the city for the benefit of cruise passengers, overlooking the monumental and archaeological area.

In the three-year period 2020-2022, the implementation of the **ITI (Integrated Territorial Investment)** urban redevelopment project presented by the Municipality of Ancona, by the Central Adriatic Port Authority and by a broader institutional partnership, aimed at mending the urban fabric between Porto, will be completed. Ancient and historical center of the city of Ancona. The scope of intervention is located in the waterfront part of the Ancient Port that revolves around the “Palazzo degli Anziani” and the surrounding archaeological monumental system;

- **Targeted actions to support employment and businesses**: Strong commitment of the AdSP in support of luxury yachting yards in order to guarantee and strengthen the historic strategic asset of the port, essential for both direct employment and to avoid dispersion of an induced business made up of professionalism and manufacturing skills;

- **New Regulation governing port work**, which has the dual objective of improving the regulation of dock work and, at the same time, ensuring flexibility, transparency and clarity in relations between companies;

- **LISY PORT COMMUNITY SYSTEM**: Activated by the Central Adriatic Ports Authority- Port of Ancona with community funding (MEDNET project). It allows telematic dialogue with the Customs Agency and between operators. Allows dialogue with ISTAT (the only case in Italy) for statistical obligations relating to goods and passengers;

- **WI-FI**: the port has been equipped with a free wi-fi network accessible to all, upon registration. Funded with a European project.

In order to pursue the set objectives regarding environmental sustainability, the AdSP MAC has launched awareness-raising and collaboration activities for the protection of the natural environment of its territory, the health and safety of citizens, users and operators of the port. This commitment is realized through:

- Dissemination of information on the risks of pollution at sea with which the aim is to preserve the sea from pollution caused by the illegal abandonment of waste produced by ships;

- Definition of a sustainable development strategy, based on 3 interconnected pillars (people, planet, profit);

Figure 25 - The 3 pillars of sustainable development

- The drafting of the Energy and Environmental Planning Document (DEASP) of the Central Adriatic Ports Authority and consequent planning of actions in line with the following objectives:

- reduction of current energy needs through energy efficiency measures;

- monitoring of energy needs to improve future energy planning;
- construction of low energy impact infrastructures;
- use of systems and technologies with a lower environmental impact to meet current energy needs;
- production of energy from renewable sources;
- cooperation between public and private operators;
- mitigation actions of the impact on air quality.

3.1.2 Greece – Igoumenitsa Port Authority S.A.

Igoumenitsa Port Authority is an integral part of the local community, and thus it makes every effort to support and meet its needs. Specifically, under the umbrella of IPA's Corporate Social Responsibility, a series of initiatives and actions are implemented every year, aiming to promote culture, social welfare, education; to support socially vulnerable groups and institutions which serve citizens' needs.

The main areas of intervention and actions included in IPA's Corporate Social Responsibility are presented below.

Subsidies and Donations

Subsidies, donations, sponsorships are provided by IPA S.A to:

- Institutions/ bodies which operate within the port area and enhance or complement the port's operation,
- healthcare units, institutions and services related to medical care,
- clubs and institutions supporting vulnerable groups,
- social grocery stores,
- schools and educational institutions,
- conferences promoting scientific issues and work,
- Municipalities of the Thesprotia Prefecture for the Organisation of cultural events and activities promoting/ strengthening culture,
- activities promoting/ strengthening sports.

Internships

Additionally, IPA S.A runs an internship program, giving the opportunity to post-secondary and higher education students to acquire work experience before completion of their studies and acquisition of their degree.

Educational Activity "Knowing the Port of my City"

Moreover, Igoumenitsa Port Authority, in cooperation with the Local Directorate of Education, implements the educational activity "Knowing the Port of my city". The activity is addressed to students of Primary and Secondary Education of Thesprotia. Its aim is to familiarize the students with the port's facilities and functions through experiential learning.

The training program is divided in two phases and is accompanied by an informational leaflet titled "Knowing the Port", which is provided to students free of charge. At the first phase,

children visit port areas such as the passenger station, mooring sites, and general facilities. At the second phase, children are invited to the Central Passenger Hall, where a short presentation of the harbor's history and port uses is made.

3.1.3 Croatia – Zadar County Rural Development Agency

N/A

3.1.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

The Slovenian coast is a relatively small area where large activities take place. One of the most important is certainly the legal transport activity, which co-created the image of Koper and strongly influenced the quality of life of its inhabitants. In its more than 60 years of life, the port of Koper has experienced extraordinary development and international recognition.

However, the development of the port has triggered a number of discussions, issues and initiatives in recent years. Different opinions are recorded, especially in the plans for the construction of the third pier. We also noticed a poor knowledge of port work and familiarity with how we exercise our responsibility to the environment in the port.

In order to better inform the public about the activities related to the port, we have established a portal for the sustainable development of the Port of Koper - www.zivetispristaniscem.si

Today's population is facing the first signs of a planetary environmental crisis compared to previous generations. This means that from now on, social security and a higher quality of life will have to be achieved without deteriorating the living conditions of future generations. Consistent with the aspects of social sustainable development means the development of the philosophical and value basis of the environment, ethics for the modern global economy and the way of life of the population. The social aspect of sustainable development thus raises the question of planetarily based social and generational environmental justice, equality, solidarity and intergenerational responsibility. One of the basic goals of the social aspect of sustainable development is certainly to reduce the development of a predominantly consumer society and focus on more intrinsic goals, spending time in more sustainable activities and environments, family, friends, community and helping the vulnerable groups.

Social responsibility is a broader concept than sustainable development and includes four key areas:

- attitude towards employees (level of salaries, principle of equal pay for equal work, family-friendly company),
- attitude towards the environment (respect for and exceeding environmental standards), attitudes towards the community (sponsorships, donations, corporate volunteering), and
- market attitude towards customers and suppliers (quality assurance, payment within reasonable deadlines).

Most often, corporate social responsibility at EU level is defined as a concept within which companies on a voluntary level include caring for society and the environment in their day-to-day operations and in their relationships with stakeholders. According to the ISO 26000 social responsibility standard, it is the organization's responsibility for the impact of its decisions and

activities on society and the environment that, through transparent ethical conduct:

- contributes to sustainable development,
- takes into account the expectations of stakeholders, complies with applicable legislation and international standards, and
- is integrated into the whole organization and implements it in its relations.

Sustainability in the maritime industry means ensuring the safe, efficient and reliable transport of goods while reducing environmental impacts and increasing resource efficiency. Sustainable ports are those ports that, in accordance with their sustainable strategic orientations and activities, meet the current and future needs of ports and their stakeholders, while protecting and conserving human and natural resources.

The Port of Koper is the only cargo port in Slovenia. It has a concession to perform port activities in the entire port area. Its core business is the handling and storage of all types of goods and a range of ancillary services on goods and other services, which provides customers with comprehensive logistical support. The concession area covers 280 ha. The Port of Koper operates at 12 specialized terminals.

The Port of Koper also performs certain economic public services, namely: 1. the economic public service of port infrastructure maintenance; 2. public utility service for the maintenance of marine aquatic and coastal lands (services related to the prevention and elimination of the consequences of marine pollution); 3. economic public service of waste collection from vessels in the area of the Koper cargo port. In addition to the parent company Luka Koper, d. d. subsidiaries and associates. The current composition is published on the website https://luka-kp.si/slo/.

The scope of Luka Koper's operations is continuously growing. The growth trend is expected in the future as well.

The company carries out its basic port transhipment activity mainly for its hinterland markets. The Slovenian market accounts for less than a third of total throughput. Transit traffic is increasing from year to year, especially in the traditional and most important hinterland markets of Austria, Hungary, Slovakia, the Czech Republic, Italy, as well as Croatia, Serbia and Romania.

The port of Koper has a strategic location for cargo on the route Asia - Europe, as the route is much shorter compared to northern European ports, which means that the transfer has a much smaller carbon footprint.

The Port of Koper intends to maintain its primacy as the largest container port in the northern Adriatic and wants to become the largest car port in the Mediterranean.

Luka Koper - green port

The Port of Koper manages the port, which is surrounded on two sides by the population, in the hinterland with a natural environment of special value (Natura 2000), and on the outside it is surrounded by a sensitive marine ecosystem. Due to this position, it has been taking care of improving the quality of life in the entire area in which the port is located for many years. In operations and development issues, it takes into account the principles of sustainable

development and responsible environmental management, with sustainable development being one of the key strategic directions of the Luka Koper Group.

Support policies

Social responsibility strategy of the Port of Koper, d. d. is the umbrella document for the management of social responsibility and sustainable development. It connects strategic orientations and sectoral policies, namely:

- Business strategy of the company and the Luka Koper Group
- Human Resources Management Strategy
- Corporate integrity strategy of the companies of the Luka Koper Group
- Code of Ethics for Luka Koper Group companies
- Rules on accepting gifts in the companies of the Luka Koper Group
- Rules of Procedure on the work of the Corporate Integrity Commissioner and the commission for dealing with reports of violations of corporate integrity in the Luka Koper Group
- Statement of risk appetite
- Strategic orientations of development in the environmental field
- Energy policy
- Company management policy
- Business continuity policy
- Security policy
- IT strategy for the period 2020 - 2025
- Strategy in the field of sponsorships and donations

Overall quality of management

The Port of Koper also demonstrates its sustainable orientation by achieving comprehensive management quality.

The Port of Koper has applied the requirements of different systems into a management system:

- quality management system in accordance with ISO 9001: 2015,
- environmental management system in accordance with ISO 14001: 2015 and the EMAS scheme,
- ensuring food safety according to the Haccp system and in accordance with ISO 22000: 2005,
- occupational safety and health management system in accordance with ISO 45001: 2018,
- energy management system in accordance with ISO 50001: 2018
- NON GMO system for separate transhipment and storage of non-genetically modified soybeans, system for ensuring safe feed in accordance with GMP + B3,
- business excellence model,
- reporting on sustainable development according to GRI standards.

Environmental strategy of Port of Koper untill 2030 – plans fort he future:

Land and water use:

- construction of a garage house
- renovation of the water supply system
- modernization of treatment plants with built-in waste water reuse systems

Climate factors and air quality:

- modernization of machinery and equipment
- use of alternative fuels (LPG, LNG, electricity)
- use of alternative sources for space heating and cooling (eg transition to heat pumps)

Seabed deepening and sea sediment management:

- alternative use of excavated sea sediment for construction purposes
- use of state-of-the-art deepening techniques
- additional analysis of sea sediment quality

Noise reduction:

- gradual electrification of machinery
- gradual replacement of floor machinery drives with more modern engines
- replacement of all audible warning devices with devices on t.i. white sound (instead of tone they use noise), which significantly reduces sound pollution
- reduction of noise sources caused by construction works

Energy efficiency:

- increased use of renewable energy sources (solar power plants)
- obtaining certification for the ISO 50001 standard - Energy management system
- renovation of buildings into almost zero-energy buildings
- optimization of the use of transhipment machinery

Waste management:

- waste prevention
- reuse of generated waste (eg use of paper sludge to reduce dust)
- recycling (eg use of wood waste for heating)

Light pollution:

- replacement of lights with more energy efficient ones (eg LED lights)
- transition to an automatic lighting on / off system according to the conditions in the port

Sea quality:

- installation of additional protective floating curtains
- upgrade of the video surveillance system
- implementation of activities to reduce accidents at sea and pollution from ships
- construction of ballast water treatment capacities from ships
- education and training of employees for effective implementation of interventions

Luka Koper, d. d., is also a signatory to the Slovenian guidelines on corporate integrity.

Achieving national and global sustainability goals by 2030

Through its activities, the Port of Koper contributes to the implementation of the United Nations goals for sustainable development and the strategic orientations defined by the Republic of Slovenia in the Development Strategy of Slovenia 2030.

Table 15 - Achieving national and global sustainability goals by 2030 (Port of Koper)

Development guidelines of Republic of Slovenia 2030	**United Nations Sustainable Development Goals 2030**	**Sustainable guideliness of Port of Koper Group**
An inclusive, healthy, safe and responsible society	• Health and well-being (3) • Gender equality (5) • Decent work and economic growth (8) • Reducing inequalities (10)	• Protection of dignity and equal treatment regardless of gender, age, racial, religious, national, social, political affiliation, marital status, financial status, sexual orientation and other personal circumstances. • Respect for human rights • Healthy and safe working environment • Decent pay for work • Healthy and active life of employees and the wider community • Doing business in accordance with the law and high ethical standards
A competitive economy that creates added value for all	• Decent work and economic growth (8) • Industry, innovation and infrastructure (9) • Responsible consumption and production (12)	• Promoting knowledge and skills for quality work • Rational use of resources • Achieving beneficial effects on the economy
Learning for and throughout life	• Quality education (4)	• Education and training of employees • Support for the education and employability of young people (scholarships, work placements) and people with disabilities and the provision of quality jobs • Promoting lifelong learning for the general public
Preserved healthy natural environment	• Clean water and sanitation (6) • Affordable and clean energy (7) • Sustainable cities and communities (11) • Climate action (13) • Life in the water (14) • Life on land (15)	• Care for the natural environment • Sustainable management of natural resources • Employee health promotion • Low carbon circular economy • Sustainable development of the wider community •
High level of cooperation, competence and management efficiency	• Reducing inequalities (10) • Sustainable cities and communities n (11) • Peace, justice and strong institutions (16) • Partnership to achieve objectives (17)	• Multi-stakeholder dialogues and cooperation • Socially responsible projects and partnerships • Transparency and efficency of operations

3.1.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

None of initiatives and protocols are applied for the Corporate Social Responsibility.

3.1.6 Albania - Port of Vlora

The only very effective management in the Bay of Vlora are the cases of waste spills in the maritime space near the port facilities which require a clear action plan for taking precautionary and quick measures during such situations, as in cases of spills of petroleum products and various oils.

Emergencies, such as spills of fuel or hazardous and toxic substances into the sea, require prompt, decisive and well-informed action. A control and management system is as primary as the knowledge and expertise required to implement this system. These are used especially during operations of stage 3.

The national structure for managing response operations to a major marine pollution incident (level 3) in Albania is described as follows:

- The response to a major incident of contamination by fuel or hazardous and toxic substances in Albania shall be coordinated by IOMC. The representative of the *Inter-Institutional Maritime Operational Center (IACC)* accepts the role of National Coordinator and will notify the Ministry of Interior, the General Directorate of Civil Emergencies, the minister responsible for the hydrocarbon sector, the ministry responsible for the environment.
- The National Coordinator will be assisted by the Incident Management Team and will be supported by a Technical Committee. A team of consultants will assist the National Coordinator in some specific areas such as legal advice, media relations, security, etc. In the event of a major incident of marine pollution, for important economic and political decisions, the Council of Ministers on the proposal of the Administrative Director of IOCC may decide to establish an Inter-Ministerial Committee for Emergency Management.
- *In order to carry out an effective response to marine pollution incidents and to undertake various tasks as* effectively as possible, four functional groups will be established, hereinafter referred to as response groups, which will be established in Level 3; planning group, operational group, logistics group, as well as finance and administrative group, which have precisely defined responsibilities.
- The same response groups may also be established as a responsible need for the management of Level 2 and Level 1 incidents.
- In Level 3, and if necessary, Level 2 of marine pollution incidents, IOMC plays a leading role and provides a platform for cooperation between institutions that have their interests at sea, in line with its planning mission, organizing and directing naval operations in the Albanian maritime territory. In addition to the duties and responsibilities described in the decision of the Council of Ministers no. 954, dated 30.9.2009 (see annex 4) in case of an incident of marine pollution, IOMC under the direction of the National Coordinator will guarantee:

- coordination of search and rescue operations;
- integrated use of national reserves;
- coordination with institutions and services participating in the Center, which are:
  - Ministry of Interior (Border Police, Department for Border and Migration);
  - Ministry of Defense (Navy and Navy);
  - Ministry of Finance (Customs);
  - Ministry of Tourism and Environment
  - Ministry of Public Works and Transport;
  - Ministry of Agriculture, Food and Consumer Protection;
  - Ministry of Tourism, Culture, Youth and Sports;
  - coordination with the General Maritime Directorate;
  - Ministry of Economy, Trade and Energy (ministry responsible for the sector
  - hydrocarbon energy);
- effective institutional cooperation;
- exchange of information;
- gathering information;
- use of the integrated maritime space surveillance system (SIVHD) for continuous monitoring of areas affected by pollution.

- In particular, IOMC focuses on communications related to the incident, to ensure cooperation and coordination of actions of all institutions and services participating in the Center and operating in the field of maritime affairs, and acts as an Operations Center for the National Coordinator General. , The National Field Coordinator and the incident management team.
- In cases of marine pollution that require a response at the national level, IOMC establishes an incident management team. If deemed necessary, the National Coordinator will call in the incident management team, which can act in support of response levels 1 and 2.

REACTION TO MARINE POLLUTION CAUSED BY OIL

The reaction to a major spill will be carried out according to the decision of the National General Coordinator. In undertaking this decision the National Coordinator General should consider the following ways of reacting:

- monitoring;
- elimination of the source of pollution;
- offshore response operations, including control and collection of fuel molding and its chemical distribution;
- shore response operations – shoreline cleaning;
- dumping of collected oily material.

Together with the decision on the response to a pollution incident, the National Coordinator shall also take action, or request other competent authorities take measures in order to:

- provide areas contaminated by unauthorized actions and entrances;
- guarantee the collection of seawater samples and, if necessary, air quality monitoring;
- stop fishing activities in polluted areas, if necessary;

- stop navigating and flying over the polluted area, as needed.

The reaction to the source of pollution (elimination of the source of pollution) contains the following:

- ship stabilization;
- stopping and reducing the discharge of pollutants;
- the transfer of pollutants on board the ship and / or the transfer of the substance to any other vessel (vessel relief);
- chemical decomposition of the pollutant;
- control of pollutants with limiting strips;
- collection of pollutants using separators / pumps and disposal on board.

The offshore response includes the following:

- chemical decomposition of the pollutant;
- control of pollutants with limiting strips;
- collection of pollutant using separator / pump and its disposal
- temporary on board;
- use of sorbents (absorbent solutions), collection using fishing boats (nets);
- temporary storage of waste on board.

The response near the coastline includes the following:

- protection of sensitive areas on the shore using boundary strips;
- deflection of the fuel stain in the direction of areas with low sensitivity;
- control and collection of pollutants;
- careful handling of pollutants from the limited distribution of decomposers under the control of environmental experts.

3.1.7 Montenegro – Ministry of Capital Investments

Back in 2013, the Government of Montenegro, namely Ministry of Tourism andSustainable Development, prepared document “Policy for Social Responsibility in Montenegro” which gives a review on the Un Global Compact and its principles related to CSR (Corporate Social Responsibility) in the area of environment protection. This includes requirements form the companies to adopt, promote and apply essential values presented as follows:

- To support precautionary approach toward challenges in the environment area;
- To initiate and launch promotional activities for higher environmental responsibility and
- To encourage further development of environmental technologies.

In practice, this mean that success of the business should not be measured with profitonly, but also with the achieved balance between economic, social and environmentalgoals, in a way which is beneficial to citizens, to local community and society at whole.In the same period, Union of Employers of Montenegro also established annual awards for corporate social responsibility within several categories, while one of them is “Environmental Care and Protection”.

The Port of Bar is recognized as a socially responsible company which operates fully inline with this principles and attitudes and beside the business difficulties in previous years, has continued to support individual, public institutions and environment protection.

Participation of the Port of Bar in various international projects shows commitment ofthis authority to promote and enhance its role in corporate social responsibility in thearea of environmental protection.

Such an example was a project ECOPORT8, whose mission was to guarantee healthy and eco-competition among SEE ports, by avoiding environmental damage by applying common regulations, common protective and control objectives, as well as the creation of an eco-port network.

The aims of the project were:

- to provide port authorities in the SEE zone with appropriate tools for in managing environment protection and monitoring;
- to define common, transnational and sustainable protocol in order to establish common standards for the control and monitoring of major environmental parameters in ports;
- to obtain environmental certificates for PAN-EU corridors and port networks, which is quite complex;
- to establish permanent PAN-EU network in order to develop, strengthen and transfer of coordinated cooperation initiatives for eco-management of PAN- EU ports on the corridor;
- to identify joint innovative studies, methods and tools (preventive approach), in order to define environmental and social risk conditions and to reduce environmental impact and to support its development in partner port zones;
- to encourage, in terms of networking and institutional partnership principles, development of cooperation and efficient relations between local authorities, citizens and business within the SEE, with the aim to stimulate growth, employment and environmental protection;
- to train new professionals in environmental design and environmental management in port areas;
- to stimulate continuous improvement of ecological performance in identified port areas.

The principal outputs and results of the project can be classified into three categories:

- improving knowledge and linking environmental quality with operative procedures;
- defining procedures and instrumentation able to verify environmental quality;
- disseminating good practice among Authorities, port workers and end users.

3.2 Strategic relations and collaborations of your institution with stakeholders and key actors/bodies

3.2.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The guiding principle in the environmental field for the Ionian Sea Port System Authority is the continuous improvement of its performance; in this direction, the Port System Authority of the Ionian Sea is an environmentally responsible organization, committed to guaranteeing existing and potential users of the port services under conditions of economic efficiency and competitiveness, with the minimum impact on the natural environment and social.

The bodies of the Port System Authority of the Ionian Sea are:

1) the President;
2) the Management Committee;
3) the Board of Auditors.

Furthermore, Law no. 84/1994 and subsequent amendments, provides:

4) the General Secretariat, composed of the General Secretary and the Technical-Operational Secretariat, which includes the employees of the Entity, pursuant to art. 10;
5) the Partnership Body of the sea resource, as an ascending and descending partnership comparison body with consultative functions of economic and social partnership, pursuant to art. 11 bis;
6) the Advisory Commission, as a body with advisory functions on certain matters, pursuant to art. 15.

The human resources available to the Ionian Sea Port System Authority currently consist of 44 employees, divided into 3 executive level units and 41 non-executive level units.

The subjects involved in the activities carried out within the Port of Taranto, the so-called "stakeholders", can be grouped as specified below: users, suppliers, contractors, concessionaires, institutions, environment, community (external stakeholders), human resources (stakeholders interior).

The Port System Authority of the Ionian Sea proceeds to outsource services through a procedure defined according to the characteristics of the service to be entrusted. The details of the companies entrusted with the service are shown on the institutional website of the Body in the transparency section. During the planning phase, the Authority established the level of control or influence it can exert on environmental aspects, taking into consideration the entire life cycle of the product/service. Based on the company policy and the expected results of the Environmental Management System (for example the improvement and enhancement of the environmental performance of products/services along the entire life cycle), the Authority

identifies the actions to increase the control capacity/influence along the supply chain (replacement of suppliers/distributors, review of existing contracts, partnerships, incentives, information/awareness campaigns).

The Port System Authority proceeds with the assignment of services to the outside with particular sensitivity and attention to the environment.

In the tenders awarded with the criterion of the most economically advantageous offer, the Contracting Authority provides reward scores for operators in possession of ISO 14001 environmental certification, as well as additional certifications such as, for example, ISO 9001.

As also specified in paragraph 6.1 of this document, with regard to the waste collection and management service in the port area and the pollution prevention and protection service and emergency intervention for the remediation of water bodies and port areas from hydrocarbons, between the actors and subjects interested in these activities can be listed as follows:

- Nigromare S.r.l .;
- RTI Morfini S.p.A./Hidrochemical S.p.A .;
- Teorema S.p.A .;
- South Ecological Company;
- Ecotaras S.p.A. company

The basic strategy, which informs the action of the Port System Authority of the Ionian Sea (as sanctioned in the application procedures of the Environmental Management System EMS implemented), establishes criteria firmly oriented towards environmental sustainability for the selection of entrepreneurial subjects who must render services in the port area.

In particular, for specific contracts such as the cleaning of port areas, the Contracting Authority has established criteria for evaluating the technical offer relating to the environmental characteristics of the service, aimed at the use of certified products and recycled plastic bins (certified), as well as a management aimed at containing the waste produced through an awareness campaign of the offices and port users.

Additional award scores were awarded for the use of low environmental impact vehicles (Euro 6, LPG or methane).

The required equipment followed specific indications provided in the “Port of Taranto waste collection and management plan.
Compatibly with the current provisions of the Procurement Code, the Administration undertakes to increase - by identifying specific requirements for registration in the register of suppliers and participation in tender procedures - the participation of companies with environmental certifications.

In order to pursue the planned objectives of environmental sustainability, the Port System Authority of the Ionian Sea has for some time started a fruitful collaboration relationship with the Production District for the Environment and Reuse (DIPAR) and with the Department of

Civil, Environmental, Land, Construction and Chemical Engineering (DICATECh) of the Polytechnic of Bari.

Central Adriatic Ports Authority

In its activity, the Port Authority normally relates to the local port community, made up of all public entities that have competence in the port area (Port Authority, Customs Agency, Guardia di Finanza, Polmare, Maritime Health, Chemist of the Port etc), and private individuals operating in the port area (port facility managers, shipping agencies, shippers, landing and boarding companies, terminal operators etc.) through periodic meetings and meetings to address specific issues.

Specifically, for the implementation of the Port waste collection and management plan, the main bodies and organizations involved are listed below:

- Port Authority of Ancona: The Corps is the recipient of functions mainly linked to the regulation of civil and productive uses of the sea, ports and coasts, as well as maritime transport in general. The attributions of a strictly military nature cover a substantially residual component linked to the concurrence activities in coastal defense and in supporting the action of the naval units of the Italian Navy. The staff of the Corps is vested with the qualification of officers and agents of the judicial police, for the violations provided for by the navigation code (article 1235) and other special laws (fishing, maritime state property, pleasure boating, environment, etc.);
- Marche Region - waste sector;
- Provincial Administration of Ancona - Environment Sector;
- Municipality of Ancona;
- ARPAM Marche: The main functions attributed to ARPAs can be summarized as follows:
  - control of sources and factors of air, water, soil, acoustic and electromagnetic pollution;
  - monitoring of the various environmental components: climate, air quality, water quality, soil characterization, environmental sound level;
  - control and supervision of compliance with current legislation and the provisions of the provisions issued by the competent environmental authorities;
  - technical-scientific, instrumental and analytical support to the owners with planning and active administration functions in the environmental field (Regions, Provinces and Municipalities);
  - development of an environmental information system to support institutional bodies and available to interested social organizations;
- Port chemist: is a professional figure provided for by the Navigation Code (Article 46 and following). The chemist of the port possesses an adequate knowledge of many professional topics, of the rules and regulations in force regarding naval and port safety, prevention of pollution at sea, degassing and remediation of tanks used for the transport of petroleum or chemical products, both in liquid and gaseous state, refrigerants and under pressure, etc. The port chemical consultants, for example, have the task of ascertaining the dangerous conditions of ships as regards the presence of explosive, flammable, poisonous, corrosive or otherwise harmful and dangerous vapors or gases, carrying out the checks with all technical means jointly to possible chemical processes.

- Ancona Maritime Health Office.
- Association of shipping agents recommended by the Ancona Maritime Department (representing ship owners);
- ANSEP UNITAM (National Association of Port Ecological Services) (representing the managers of the port facilities).

3.2.2 Greece – Igoumenitsa Port Authority S.A.

IPA S.A has developed significant strategic relations and collaborations with various Greek and International stakeholders, being a Project or Associated Partner in several EU projects and initiatives.

Table 18 presents a detailed list of the projects in which IPA S.A has actively participated as well as the partnerships in which IPA S.A has been involved.

Table 16 - EU Projects in which IPA S.A has participated.

S/N	EU Projects	EU Programme	Role to the Project	Partnership
1	ADRI-UP – Adriatic MoS Upgraded Services	Connecting Europe Facility	Lead Partner	▪ Ancona Port Authority, ▪ Trieste Port Authority, ▪ Region of Epirus, ▪ Biotexniko Parko Thesprotias S.A, Interport di Trieste SpA, ▪ Ministero dell Infrastructure e dei Trasporti – Rete Autostrade Mediterranee
2	POSEIDON MED II - LNG BUNKERING PROJECT	Connecting Europe Facility	Project Partner	▪ DEPA Commercial S.A ▪ DESFA – Hellenic Gas Transmission System Operator S.A ▪ Hellenic Lloyd's Register ▪ Ocean Finance Ltd. ▪ Environmental Protection Engineering S.A ▪ NAP Engineering P.C ▪ Rogan Associates S.A ▪ Piraeus Port Authority S.A ▪ Haraklion Port Authority S.A ▪ Patras Port Authority S.A ▪ Cyprus Ports Authority ▪ North Adriatic Sea Port Authority ▪ Rimorchiatori Riunti Panfido & C.SRL ▪ Minoan Lines Shipping S.A ▪ Blue Star Ferries Maritime S.A ▪ Attica Ferries Maritime Company ▪ Shipping Company of Crete S.A ▪ Neptune Lines Shipping & Managing Enterprises S.A ▪ Hellenic Seaways Maritime S.A ▪ Arista Shipping Co. Ltd. ▪ Lavar Shipping S.A ▪ Bunkernet Ltd. ▪ Hellenic Shortsea Shipowners Association ▪ Association of Passengers Shipping Companies -SEEN ▪ Centre for Research and Technology

S/N	EU Projects	EU Programme	Role to the Project	Partnership
				Hellas (CERTH)
3	DOCK BI	INTERREG V-A Cooperation Programme Greece – Italy 2014-2020	Project Partner	▪ LB1 Consortium of industrial development area of Brindisi ▪ Port Authority of Brindisi ▪ Municipality of Brindisi ▪ Municipality of Igoumenitsa
4	NEW BRAIN – Nodes Enhancing Waterway BRidging Adriatic-Ionian Network	Adriatic-Ionian Programme INTERREG V-B Transnational 2014-2020 (ADRION)	Project Partner	▪ Central Adriatic Ports Authority ▪ Institute for Transport and Logistics Foundation ▪ Bari Port Authority ▪ KIP- Inrermodal Transport Cluster ▪ Port of Bar Holding Company ▪ Interport Padova ▪ Venice Port Authority ▪ Piraeus Chamber of Small and Medium Size Industries
5	ECOWAVES	Adriatic-Ionian Programme INTERREG V-B ADRION 2014-2020	Project Partner	▪ Port Network Authority of the Ionian SEA- Port of Taranto ▪ Central Adriatic Ports Authority ▪ Zadar County Rural Development Agency ▪ Regional Development Agency of Northern Primorska Ltd. Nova Gorica ▪ Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja ▪ Port of Vlora ▪ Ministry of Transport and Maritime Affairs
6	ADRION SUPPLY CHAIN – Adrion (Adriatic – Ionian) Supply Chain		Project Partner	▪ Port Authority of Alexandroupolis S.A. ▪ Port Authority of Volos S.A. ▪ Port Authority of Patras S.A. ▪ Port Authority of Thessaloniki S.A. ▪ Central Adriatic Ports Authority (Ancona Port) ▪ East Adriatic Sea Ports Authority (Trieste Port) ▪ South Adriatic Sea Ports Authority (Bari Port) ▪ Ravenna Port Authority ▪ Rete Autostrade Mediterranee (RAM) ▪ Port of Burgas
7	ADRIPASS – Integrating multimodal connections in the Adriatic-Ionian region	Adriatic-Ionian Programme INTERREG V-B Transnational 2014-2020 (ADRION)	Associated Partner	▪ Aristotle University of Thessaloniki-Special Account For Research Funds ▪ Chamber of Commerce and Industry of Serbia ▪ Durres Port Authority ▪ Foreign Trade Chamber of Bosnia and Herzegovina ▪ GECT EUREGIO SENZA CONFINI r.l./ EVTZ EUREGIO OHNE GRENZEN mbH ▪ Institute for Transport and Logistics Foundation ▪ Luka Koper, port and logistic system, public limited company ▪ Ploče Port Authority ▪ Port of Bar Holding company ▪ Regional Unit of Thesprotia/Region of Epirus

S/N	EU Projects	EU Programme	Role to the Project	Partnership
8	SUMPORT – Sustainable Urban Mobility in MEDPORT cities	INTERREG MED 2014-2020	Associated Partner	▪ Central European Initiative (CEI) ▪ Institute for Transport and Logistics (ITL) ▪ Durrës Municipality ▪ City of Kotor ▪ Fundación ValenciaPort ▪ Las Naves - Ajuntament de Valencia ▪ Municipality of Koper ▪ Aristotle University of Thessaloniki ▪ Region of Epirus – Regional Unity of Thesprotia ▪ Limassol Municipality
9	PoWER – Ports as driving Wheels of Entrepreneurial Realm	Adriatic-Ionian Programme INTERREG V-B Transnational 2014-2020 (ADRION)	Associated Partner	▪ Chamber of Thesprotia ▪ Centre for Research & Technology Hellas (CERTH) ▪ Bashkia Durrës ▪ ISTITUTO PER LE TECNOLOGIE DELLA COSTRUZIONE ▪ CNA RAVENNA ▪ RIJECKA RAZVOJNA AGEMCIJA PORIN ▪ CETEOR Sarajevo ▪ European Affairs Fund of Autonomous Province of Vojvodina ▪ Cooperation & Development Institute

POSEIDON MED II and NEWBRAIN included in the aforementioned list are projects with a strong environmental focus, which have actively supported IPA's efforts towards effective management of impacts on the port, community, and the environment.

Specifically, under the POSEIDON MED II project, IPA S.A has responded to the international environmental requirements and the instigating demand of Liquid Natural Gas (LNG) as the new marine fuel. As part of the Project, IPA S.A has collaborated with the Center for Research and Technology Hellas (CERTH) in order to measure gaseous pollutants in the port of Igoumenitsa. Two reports have been drafted presenting the atmospheric pollutant measurement charts and making comparisons of the values with legislation limits.

As part of the NEWBRAIN project and the aim to concretely push forward the implementation of the TEN-T network in the Adriatic-Ionian Macro-region in line with environment-friendly and low-carbon requirements of the EU policies, IPA S.A has collaborated with External Experts (LIVING PROSPECTS Ltd.) to draft two environmental assessment studies:

- Environmental Assessment of two high priority projects:
    - BluePort - LNG and CNG Supply Chains Upgrading Adriatic/Ionian Ports.
    - Construction of the Freight Village (FV) in Thesprotia and a Railway network.
- Estimation of the Energy Footprint of Transport & Logistic Node of IPA S.A.

Port Reception Facilities & Monitoring Processes

Additionally, IPA S.A has developed strategic collaborations with companies from the private sector in order to:

- provide adequate reception facilities for ship-generated waste and cargo residues (ANTIPOLLUTION S.A: contractor responsible for the collection and disposal of solid waste; HELLENIC ENVIRONMENTAL ECNTER – HEC S.A: contractor responsible for the

disposal of ship generated liquid waste),

- conduct seawater quality measurements (BIOLAB).

Certifications

Finally, IPA S.A has developed close co-operation with the institutional bodies (EUROCERT, Lloyd's Register, Ministry of the Environment and Energy) that have issued environmental management certificates for IPA S.A.

A detailed reference of these certifications is presented in Section 3.3.

3.2.3 Croatia – Zadar County Rural Development Agency

In Table, stakeholders are listed according to their importance in relation to their power of influence on the project and its results and based on their interest in the project and pilot activity of the Port of Zadar Authority.

Table 17 - Stakeholder mapping

		LOW	*POWER OF INFLUENCE* *HIGH*
IN TE R ES T	H I G H	Marginal Stakeholders Importance = Low ● Local and national media ● General Public (tourists, visitors)	Relevant Stakeholders (e.g. Institutions we would like to involve) Importance = Medium/High ● City of Zadar ● Zadar County ● Zadar County Development Agency (ZADRA NOVA) ● University of Zadar ● Faculty of Maritime Studies in Rijeka ● Ministry of economy and sustainable development ● Zadar branch of the Croatian Chamber of Economy ● Ministry of Agriculture/ Environmental Protection
	L O W	Operative Stakeholders (stakeholders we must involve) Importance = Medium/High ● Maritime police ● Harbormaster`s office ● Custom office ● Luka Zadar d.d. - Cargo port concessionaire	Key Stakeholders (Essential to project outcomes) Importance = High ● Ministry of the Sea, Transport and Infrastructure **<u>Liner Shipping companies</u>** ● Jadrolinija – liner shipping company ● Mia Tours - liner shipping company ● G&V Line - liner shipping company ● Cruise companies ● ZIPO d.o.o. Terminal building concessionaire of passenger port **<u>Concessionaires – waste removal</u>** ● Čistoća d.o.o. Zadar

		• Cian d.o.o. Split • IND-EKO d.o.o. Rijeka • Dezinsekcija d.o.o. Rijeka • Ciklon d.o.o. Zadar • Sordes d.o.o. Zadar • Odlagalište sirovina d.o.o. Zadar

3.2.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Through its activities, the Port of Koper influences various groups of people, who also influence the operation of the port. Stakeholders of Port of Koper are defined and identified in the Corporate Governance Policy of Luka Koper, d. d., and within individual business processes of the company.

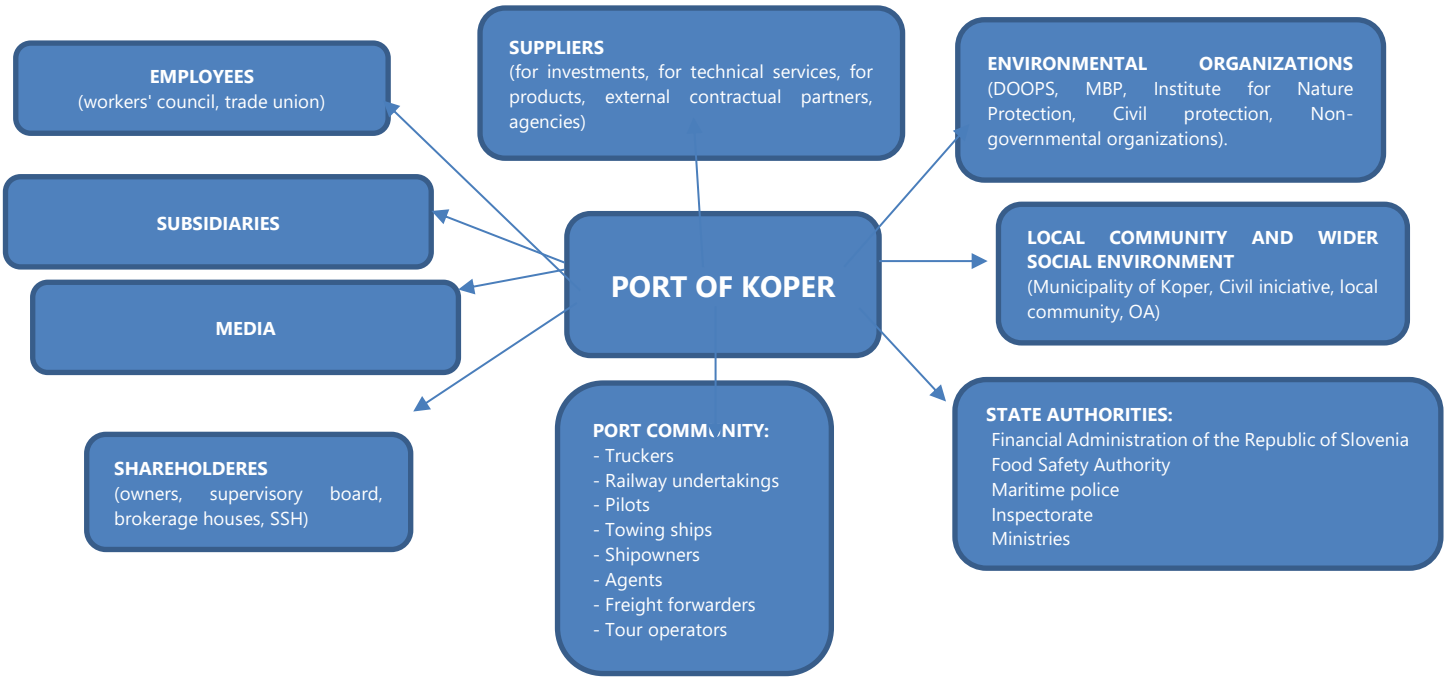


Figure 26 – Stakeholders and key actors – Port of Koper

Shareholders realize their management rights at the General Meeting of Shareholders. The powers of the General Meeting and other matters directly related to the General Meeting are set out in the Companies Act, the Company's Articles of Association and the Rules of Procedure of the General Meeting. For communication with shareholders, the joint stock company uses the following forms of communication: - regular general meetings of shareholders, - information system of the Ljubljana Stock Exchange SEOnet, - Luka Koper website with a special section 'for investors', - participation of company representatives in investment conferences at home and abroad, - monthly the newspaper Luški glasnik and its version, which is adapted for the external public, - the annual publication of the brochure Luški delničar for all shareholders, - press conferences on the company's operations, - meetings at the company's headquarters.

Stakeholder identification: Stakeholders of Port of Koper, which are defined and identified in the Management Policy of Luka Koper, d. d . are:

Shareholders: realize their management rights at the General Meeting of Shareholders. The powers of the General Meeting and other matters directly related to the General Meeting are set out in the Companies Act, the Company's Articles of Association and the Rules of Procedure of the General Meeting.

Customers dictate constant adjustment and introduction of changes and improvements in the company's operations. Customer satisfaction is the basic guideline of all employees. From the first contacts with customers, then the provision of services for them all the way to resolving possible complaints, it is necessary to be aware that customer satisfaction gives meaning to work and is the foundation of realizing the vision and mission of Port of Koper. Customer satisfaction is regularly monitored by Port of Koper. It provides customers with top quality services, quick response to their demand and effective information and all other necessary support. The existing port management model is the basis for equal treatment of all customers.

The port community is involved in changes in the functioning of the port system as a whole. The port community is an informal association of all stakeholders whose business activity is directly related to the provision of port services. These are clients of services - freight forwarders, agents and carriers, united in professional organizations - as well as representatives of control houses and inspection bodies and state institutions, who all together form expectations for the Port of Koper with the aim of coordinated operation at the entry or exit point. It is physically represented by the port area throughout the logistics chain. Port of Koper responds to these requests by coordinating them and communicating with interested stakeholders. The company's business success and the reputation of the Port of Koper are also related to the work of suppliers, so in achieving business goals, the efforts of all business partners who are involved in the operation of the port system as suppliers of necessary products or services are respected and highly valued.

Employees are encouraged to do a great job and the successful are rewarded. The culture of partnership with employees is built on the affiliation, cooperation, creativity, respect and responsibility of each individual. Much attention is paid to internal communication, as it is the foundation of a comprehensive communication web. Employees are acquainted with news, internal acts and other information through notifications via e-mail and notice boards, the monthly internal newsletter »Luški glasnik«(Port Newspaper) and the intranet. Employees who do not have access to a computer access the published information through information provided in the operative. Special emphasis is also placed on direct communication between employees in the form of working and operational meetings, quality teams, coordination, annual managerial interviews with colleagues, conferences and other forms of teamwork. Employees are encouraged to undergo continuous training. Through development plans, the career development and critical competencies of an individual employee are defined in accordance with the company's long-term development needs.

Commitment to sustainable development is one of the fundamental strategic directions. The focus is on establishing and maintaining partnerships with the **local community and the wider social environment.** This simultaneously ensures the successful development of employees and strong support for the social environment, and upgrades the care for the natural environment. Sponsorships and donations support education, sports, culture and humanitarian projects. Once a year, the 'port door opens wide' and the organization of the Port Day enables visitors from both the local and wider environment to see the port, piers, lifts, devices and transhipment and other activities.

State authorities: The state is aware that the Port of Koper, as the only Slovenian port, is extremely important for the entire economy. In 2008, the joint stock company was granted a concession for the performance of port activities, management, development and regular maintenance of port infrastructure in the area of the Port of Koper.

The essential elements of the concession contract are:

- the duration of the concession contract,
- determination of the method of calculating the concession fee,
- agreement between the contracting parties on how to invest in port infrastructure,
- rules for the management, administration and operation of the port,
- ensuring the openness of the port,
- rights and obligations of the parties upon termination or termination of the concession relationship.

The duration of the concession is 35 years, as stipulated by the Maritime Legislation Act. The agreed concession fee amounts to 3.5 percent of the company's operating revenues, less fees charged. By paying the concession fee, the joint-stock company, as the concessionaire, also pays the rent and the building right, and is exempted from paying the port use fee. The concession fee includes water rights, water fees and other fees related to the use of the sea. Investments in port infrastructure are made by the concessionaire in agreement with the Republic of Slovenia and on the basis of the valid five-year port development program. The management, operation and operation of the port were divided between the grantor and the concessionaire and agreed on the methods of coordinated action to achieve the objectives of the concession in the interest of both.

Ensuring the openness of the port is the obligation and goal of both parties. It is an obligation to provide services to anyone who is interested and fulfills the conditions in accordance with the principles of the acquis. The company's goal is to make the port of Koper the primary and best port for the countries of Eastern and Central Europe.

Media: The company is open to the general public. It answers media questions on an ongoing basis and keeps them informed about business operations and innovations in the company. It also publishes information on the company's website www.luka-kp.si and on the company's sustainable portal www.zivetispristaniscem.si. The company prepares press releases for the media, organizes press conferences and invites them to important business events and visits.

Table 18 - Involvement of stakeholders and key actors (their expectations and needs), Slovenia

Stakeholders and Key Actors	Communication Tools	Expectation and needs of stakeholders and Key Actors	Frequency of cooperation
SHAREHOLDERS	Web page SEOnet Meetings General Meeting of Shareholders Annual Report Investor conferences »Luški glasnik« (Port's newsletter) »Luški delničar« (Port's newsletter for shareholders) Press conferences	Information on the company's operations Financial performance Business strategy and plans Dividend policy Concern for the environment Access to information Business performance Strategy Prevention of corruption Informing about competition Information on key markets Connecting with the local community	When publishing business reports and, if necessary, at meetings with the investors
CUSTOMERS	Web page Notifications and other service messages Phone contacts Personal contacts Fairs and conferences Organization of target business events Customer satisfaction survey Port's newsletter LinkedIn »Port days« Meetings	Quality and timely services based on customer orders Appropriate handling of complaints Systematic notification of regular and extraordinary activities related to customers Ability to adapt to customer requirements Business stability Providing adequate capacities and equipment Business informatization Compliance with safety and technical standards Competitiveness of conditions Marketing and sales Strategy Customer relations Investments	Daily communication via networks, if necessary personal contacts, survey every two years, once a year port days, conferences, fairs, target business events
STATE AUTHORITIES	web portals reports	Operations in accordance with the concession agreement Operations in accordance with laws and regulations Strategic and spatial plans of the company Appropriate communication (reports, responses, etc.) Concern for the environment Sustainable Development Strategy	regulary
SUBSIDIARIES	'Best Supplier' Event Personal contacts Telephone contacts	Reliability of payments Long term cooperation Recognition for successful cooperation Correct cooperation and communication Business performance Concern for the environment Caring for employees Strategy Prevention of corruption, discrimination, ethics and integrity, human rights Competition information	daily
SUPPLIERS	»Best supplier event« Portal ZPP	Reliability of payments Long term cooperation Recognition for successful cooperation Correct cooperation and communication Timely acquaintance with possible changes in society Concern for the environment	daily

Stakeholders and Key Actors	Communication Tools	Expectation and needs of stakeholders and Key Actors	Frequency of cooperation
		Access to information Business performance Prevention of corruption Business compliance Supplier relations Investments Strategy	
EMPLOYEES	Employee satisfaction survey Port newsletter Quality teams Chat room Intranet Meetings Assessment of leaders Annual interviews Evaluation of mutual cooperation between units	Regular training and education Appropriate communication with employees Career development and competencies Security and health at work Salary system Employee relations Business performance Access to information Strategy Marketing and sales Risks Prevention of corruption, discrimination, ethics and integrity, human rights Sustainable Development Social environment Connecting with the local community	daily
LOCAL COMMUNITY AND WIDER SOCIAL ENVIRONMENT	»Port day« event Portal "Living with the port" Meetings with representatives of local communities Facebook Port newsletter	Compliance with environmental regulations Co-financing of cultural, sports and humanitarian organizations Employment Contribution to the development of the economic environment Spatial plans of the port Transparent communication with the public Prevention of corruption Sustainable Development Concern for the environment Protection of the sea	occasionally – as needed
ENVIRONMENTAL ORGANIZATIONS	Portal »Living with the port« Environmental reports Expert councils	Risks The impact of the Port of Koper on the wider social environment Sustainable development Concern for the environment	occasionally
MEDIA	Press conferences Press releases Answer the press Web page	Up-to-date information on events, operations and changes in the company Business performance Concern for the environment Caring for employees Strategy Prevention of corruption, discrimination, ethics and integrity, human rights Security and health at work	continuously

From the set of numerous stakeholders with whom Port of Koper cooperates and develops sustainable relations, which are defined in the Management Policy of Port of Koper, and within the individual business processes of the company, on the basis of strategic orientations, key stakeholders were identified and their expectations and ways of involvement in the operation of the Port of Koper Group were defined.

Matrix of importance

Open relationships with stakeholders are extremely important for connecting the goals of sustainable development with social responsibility. Because the interests and goals of individual stakeholders are different, it is important to obtain feedback from stakeholders regarding their expectations of each company or group. Therefore, the Port of Koper Group defined the essential topics of sustainable development and assessed them from the point of view of importance for the Luka Koper Group and from the point of view of importance for key stakeholders. Based on both aspects, a matrix of essential contents for the company Luka Koper was prepared below (2020).

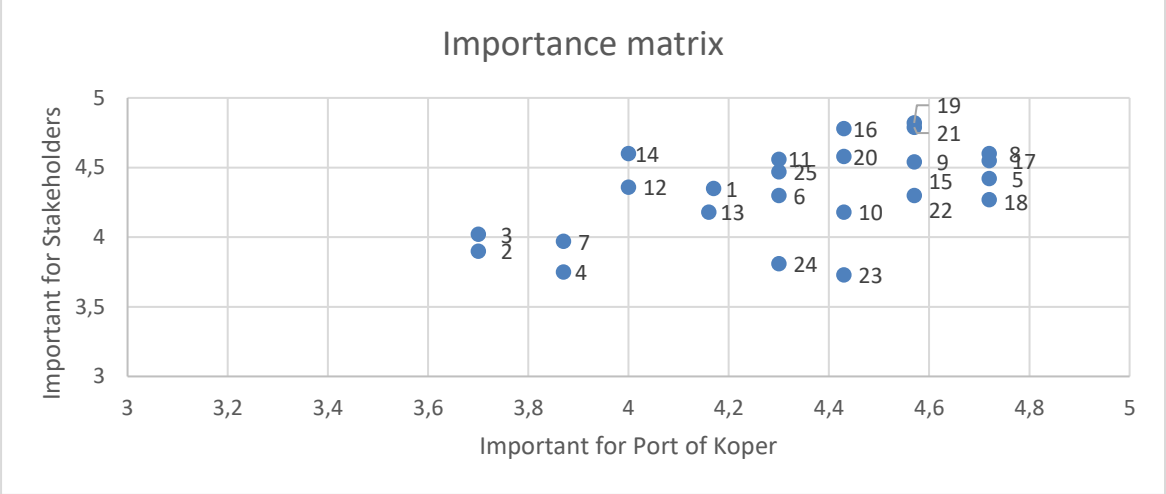


Figure 27 – Importance Matrix of Stakeholders, Slovenia

1	Financial results (business analysis, business indicators)
2	Investments in non - financial assets
3	Accounts
4	Information on shares, shareholders
5	Marketing and sales (transhipment, commodity groups)
6	Current information on the company's operations, events, activities
7	General information about the company (history, identity card, activities, organization, ..)
8	Strategy
9	Economic impacts of the Port of Koper on the wider environment
10	Company management and governance system
11	Risks
12	Ethics and corporate integrity, human rights
13	Discrimination, diversity and equal opportunities
14	Prevention of corruption
15	Security and health at work
16	Sustainable Development
17	Compliance of business with laws and rules
18	Employment and care for employees (education, career development of employees, social security, ..)
19	Concern for the environment (air quality, emissions, carbon footprint, noise, light pollution, wastewater, waste, ..)
20	Energy management (energy efficiency, energy consumption)
21	Marine protection (marine quality, marine pollution, biodiversity)
22	Social environment (sponsorships and donations, local community involvement)
23	Supplier relations
24	Customer relations
25	Involvement of stakeholders in the activities of the Port of Koper

Stakeholders rated content with scores ranging from 1 (lowest, least important) to 5 (highest, most important). All content was highly rated by both stakeholders and the company (score above 3.7). Both stakeholders and the company identified as the most important topics: strategy, care for the environment and marine protection, the economic impact of the Port of Koper on the wider environment and compliance with business laws and regulations. Luka Koper, d. d., highlighted or rated the highest content (score 4.7) of the following contents: marketing and sales, strategy, compliance with business laws and regulations, and employment and care for employees. On the other hand, stakeholders emphasized the most (score 4.8): care for the environment, protection of the sea and sustainable development. The matrix of essential contents was renewed in 2020.

3.2.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

N/A

3.2.6 Albania - Port of Vlora

Both governmental and non-governmental stakeholders were identified and subsequently analysed.

Table 19 - List of stakeholders, Albania

STAKEHOLDERS	***RELATION BETWEEN STAKEHOLDERS AND NMP***	***LEVEL OF ENGAGEMENT***
Ministries/National authorities		
Ministry of transport and energy	Responsible fo the management of ports and their services	High power and responsibility
Ministry of Environment	Responsible for legal framework for PA management.	Kept satisfied / engage closely – high power and responsibility related to PAs
Ministry of Urban Development and Tourism	Responsible for setup, implementation and monitoring of the National Tourism Strategy; legal framework for tourism development, related planning and development process; support for regional ports and tourism organization at national, Regional and local level	Kept satisfied – high power; Moderate interest
Ministry of Defence	Military base located at Karaburun peninsula and Sazani island	Keep satisfied–highpower, low interest

STAKEHOLDERS	*RELATION BETWEEN STAKEHOLDERS AND NMP*	*LEVEL OF ENGAGEMENT*
National Spatial Planning Agency	Develop planning standards and supervise implementation of spatial planning instruments	Keep informed
National Coastal Agency	Coastal protection,promotionandmonitorin gofprojectsforthedevelopmentofth ecoastalzone	Kept satisfied / engage closely – role and quite high power in promoting and protecting the coastal areas
National Urban Planning Inspectorate	Law enforcement related to spatial planning and constructions	Keep informed
National Tourism Agency –NTA	Carry on the functions related to promotion and marketing in tourism, e.g. production and distribution of promotional publications, official tourism portals, familiarization tours, PR, Tourism trade fairs, etc.	Engaged closely / keep informed – importance intaking and evaluating touristic data and developing touristic strategies and information packages
State organisations		
Stakeholders	Relation betweenstakeholdersandNMP	Level of engagement
Regional Environment Inspectorate	Law enforcement, control lingi llegal activities;	Monitor / keep informed – moderate power, low interest
Regional Environment Agency– ARM	Presenting each Prefecture; implementing procedures related to environmental licenses; collecting environmental data	Just monitor– low power and competencies not so relevant
InterInstitutional Marine Operations Centre	Aninter-sectoralinstitutionresponsibleformon itoringthemarineareaofAlbaniaand Planning and coordinating sea related activities	Engaged closely
Fisheries Inspectorate Vlora	Responsibility for surveillance Of fisheries activities, including the NMP	Monitor
Border Police and Immigration	Responsibility in NMP as well (controlling access to the area)	Monitor
Local/Regional administration		
Vlora Prefecture	Supervises legal framework implementation and controls local government authorities	high power over some issues, moderate interest
Vlora County Council	Develops and implements regional policies and coordinates with	high power over some issues, moderate interest

STAKEHOLDERS	RELATION BETWEEN STAKEHOLDERS AND NMP	LEVEL OF ENGAGEMENT
	central and local government authorities	
Vlora Municipality	Decides over local development (businesses); NMP visitors are mostly Staying in Vlora	high power over some issues, moderate interest
User associations		
Chamber of Commerce and Industry, Vlora	Association of private Businesses in Vlora,potential for promotion	Monitor
Fisheries Management Organisation –OMP		Interested and some power
Tourismservices		
Organisation of Touristic Operators	Tourism agencies	Engage closely – important for tourism development ; directly engaged with the NMP

3.2.7 Montenegro – Ministry of Capital Investments

In April 2021, the State Audit Institution published Final Report on revision of efficiencyof "Management of interventions in the case of sudden pollution in the Adriatic Sea" which brings findings on:

- Success in achieving business goals or individual financial transactions goals, programme, projects and use of human, financial and other resources and
- Effects of achieved goals and results in relation to planning.

Given that the creation of a safe living environment and its protection is od the utmost importance for the health of citizens and economic development of the country, State Audit Institution is obliged to ensure appropriate assistance to the Government in its preservation, as well is in responding to hazards and has conducted an audit with the overall goal to define if all relevant authorities, in charge for the protection of the Adriatic Sea from pollution, are adequately prepared for an effective response

Protection from sudden pollution in ports

International conventions require the provision of acceptable capacities in Montenegrin ports. In line with them, Montenegro has to provide port facilities for receiving different kind of contents, otherwise, it could be observed as a violation of international obligations and further on, unscrupulous ship operators can illegally release banned substances into the sea.

Article 51 of the Law on the Protection of the Sea from the Vessels Pollution stipulates that the port operator is obliged to equip the port with reception devices and management of waste, in accordance with international standards and domestic regulations dealing with prevention of environmental pollution from ships, protection of marines and coastal areas and civil liability for damage caused by pollution.

Supervision over the implementation of the law is performed by Ministry of Capital Investments (former Ministry of Transport and Maritime Affairs), while the inspection activities is an obligation of the inspectors (Article 60 of the Law on Inspection, Article 61 of the Law on the Protection of the Sea from the Vessels Pollution and Article 30 of the Law on Ports).

3.3 Initiatives and protocols applied/adopted for Environmental Protection and Management and Environmental Sustainability

3.3.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The Ionian Sea Port System Authority, within the Waste Collection and Management Plan, has provided the companies that manage the service and those who use it with a detailed description of the procedures for collecting waste produced by ships and caries residues and those produced in common use areas. As already widely described in *previous deliverables,* in particular at T1.2.1, the procedures indicate how, equipment and timing with which collection services are carried out, both by sea and by land.

A comprehensive assessment of existing port waste collection and management facilities was also carried out in *deliverable* T1.2.2. In effect, the port of Taranto is equipped with different collection systems functional to the type of waste. For waste treatment there are two plants, one for the treatment in self-clavation of food waste produced by ships/boats from non-EU countries, and one (outside the port of Taranto) for the management of bilge water.

The following are specific information on waste managers and port reception, treatment and disposal facilities:

- **Nigromare S.r.l. Company**: merchant ship-generated waste collection generated by vessels docked in the port of Taranto, offshore, beyond roadsteads/within roadsteads in Mar Grande.
- **RTI Morfini S.p.A./Hidrochemical S.p.A. Company**: collection and transport of bilge waters, slops, sludge having a flashpoint higher than 60°c and the merchant ship ballast water.
- **Ecologica Sud Company by Vito D'Angiulli**: used oils collection, unloaded by fishing and recreational vessels and ships, as well as used filters and exhausted lead batteries are collected in two reception facilities, located in the port domain and is managed by the **company Teorema S.p.A.**.

In addition, in the Port of Taranto there is a pollution prevention and protection service and emergency intervention for the remediation of hydrocarbon stretches of water and port areas given in concession by the local Harbor Master's Office to the **Company Ecotaras S.p.A.**. The number of daily interventions is on average equal to about 2/3, of which at least one near the areas under concession to the refinery in the Port of Taranto.

The Port System Authority of the Ionian Sea, as part of the activities to improve its environmental performance and consequently those of the Port, also uses a **management system certified** by RINA Services S.p.A. according to **ISO 14001: 2015**.

It is also positive to consider that the achievement of environmental certification according to the UNI EN ISO 14001 standards demonstrates the achievement, by the Entity, of sustainable behavior and an adequate level of attention to environmental problems in the port area.

This occurs, as required by the aforementioned regulations, through the control (provided for in specific procedures) of the environmental impacts associated with its activities, products and services provided in the port area and falling within its sphere of competence.

The Port System Authority of the Ionian Sea through the implementation of the aforementioned system, with a view to continuous improvement, has drawn up an environmental policy which includes the commitments that the Authority has set itself.

The Authority has carried out awareness campaigns towards port users and plans to raise awareness towards them in order to encourage separate waste collection.

Separate collection and waste recovery have also been given great importance in the management of waste management tenders. Participants were asked among the qualifying elements of the proposed service organization also those aimed at improving the environmental sustainability of the service in accordance with the environmental management system, certified in accordance with ISO 14001:2015, adopted by the Authority. The companies that have been awarded the service have recognized the importance of this aspect, aiming to increase separate collection for solid waste and recovery for liquid waste with awareness-raising and involvement of port users as well as their commitment.

Central Adriatic Ports Authority

Actions to improve environmental sustainability and mitigate the impacts generated by the port systemhave been implemented as part of the strategy for the development of the port system, taking into account the importance and delicacy of the issue and the need to address it at an integrated level between all stakeholders. Naturally, the energy policy choices made at national and international level are fundamental, with the awareness that sustainability itself is a factor on which the competitive capacity of an international port such as Ancona also depends.

By way of example, among the actions of commitment to sustainability there are controls in port on the fuels used by ships. As per legislation, these checks are effectively carried out, on a random basis, by the Harbor Master's Office. On the use of fuels in ports and their characteristics, which are subject to international regulation and pending the introduction of new and more restrictive rules, the Port Authority and the Harbour office of Ancona are preparing a series of proposals to share with shipowners to introduce improvements that may anticipate the application of the legal provisions that entered into force from 1 January

2020[5]. The AdSP MAC has worked to ensure that the voluntary agreement between the parties is materialized by the end of 2019. The effort to achieve these objectives has been noted and recognized also at the national level.

With reference to the environmental sustainability initiatives undertaken by the AdSP MAC within the port of Ancona, it is appropriate to highlight the drafting of the **Energy and Environmental Planning Document relating to the Central Adriatic Port Authority**, whose main functional contents for the energy planning of the system port, are aimed at defining:

- the reference framework relating to maritime traffic and the current and foreseeable energy consumption of the Authority in relation to the implementation of new technologies and services, which modify the same consumption, also considering the activities of concessionaires and operators;
- the evolution of the regulatory framework concerning the use of renewable energy sources or in cogeneration or trigeneration, for the production of energy in the case of the Central Adriatic Port Authority;
- energy planning scenarios with a view to reducing emissions, through a plurality of lines of action, such as the efficiency of existing structures, the development of production and consumption systems, integrated energy management systems, electrification of docks, electrification of final consumption in new sectors, such as transport and heating, agreements with stakeholders regarding the use of fuels with a lower environmental impact, etc.
- a mobility plan, in agreement with the municipal administrations, to reduce the environmental impact of traffic to and from the port areas and within them.

Furthermore, the Central Adriatic Port Authority, within the **Plan for the collection and management of waste produced by ships and cargo residues**, has provided a detailed description to the companies that manage the service and to those who use it. the procedures for the collection of waste produced by ships and cargo residues, those generated by pleasure craft, fishing boats and small ships, waste accidentally found at sea as well as those deriving from the cleaning of water bodies and de-pollution activities. As already widely described in the previous deliverables, in particular at T1.2.1, the procedures indicate the methods, equipment and timing with which the collection services are carried out, both by sea and by land.

In deliverable T1.2.2, an extensive assessment of the existing port waste collection and management facilities was also conducted. In fact, the port of Ancona is equipped with various collection systems functional to the type of waste.

In particular, in the South Pier area, a suitable area is identified for the temporary storage (Article 4 paragraph 4 of Legislative Decree 182/2003) of waste delivered by ships, pending subsequent transport for recovery/disposal. The area in question also houses a sterilization plant authorized by the Province of Ancona for the treatment of food waste produced by ships/boats from non-EU countries.

[5] Directive 2012/33 / EU, codified by directive 2016/802 / EU.

In the aforementioned South Pier area, identified by the Central Adriatic Ports Authority, there is also an area intended for the temporary parking of the roll-off containers used for the collection of waste and for the parking and handling of vehicles used for the collection and transport of said waste.

The concessionaire also has two other areas for the separate collection of hazardous and non-hazardous waste from the port of Ancona, authorized pursuant to art. 208 of Legislative Decree 152/2006.

In detail, the following are identified:

- N.1 fenced and manned port reception facility located in the “former Morini slipway” area authorized by the Province of Ancona with Authorization n. 16/2018 of 10/04/2018 intended for the reserve (R13) and preliminary storage (D15) of hazardous and non-hazardous waste with a maximum storage capacity of 25 tons (authorization expires 10/4/2028).

- N.1 port reception facility “ex Tubimar area” authorized as reserve center R13 with provincial authorization n. 17/2010 of 14/10/2010 and intended for the storage of special non-hazardous waste from ships and from the production activities of the port of Ancona, with a maximum storage capacity of 130 tons (authorization expires 10/3/2030).

The concessionaire also has a concession for the mooring of nautical vehicles used for the collection of waste from ships parked in the Port of Ancona and/or roadstead, and/or oil terminals.

The aforementioned reception areas and the sterilization system present in the port perimeter are managed by the concessionaire **Gruppo Garbage Service S.r.l.**
In addition, the Central Adriatic Ports Authority has issued an environmental regulation that provides for **measures to contain and mitigate the pollution resulting from the traffic for the movement of goods**, including:

1. The use of airtight buckets to avoid accidental dispersion into the sea;

2. The obligation to suspend operations in the event of strong wind;

3. For heavy vehicles: stop with the engines off and in special areas of the ferries intended for boarding, with shortened routes within the port;

4. Imposition of the use of particulate filters on lifting vehicles that circulate in the port with a displacement of about 6.000 cm_3.

With reference to the issue of air quality in the port area, the voluntary "**Ancona blue agreement**" was promoted by the Central Adriatic Port Authority and the Harbour office of Ancona. With the signing of the voluntary agreement, valid until 31 December 2019, the shipowners and ferry companies, in collaboration with the shipping agencies, have undertaken to operate the main and auxiliary engines of the ships with marine fuel with a sulfur content not exceeding 0,1% from the completion of the mooring maneuver in port and up to the departure and exit from the port, compared to the 1,5% required by the current law.

The agreement was signed on 30 November 2018 by representatives of four companies of the major shipping companies (Adria Ferries, Jadrolinija, Superfast Ferries-Blue Star Ferries, Snav). The "Ancona blue agreement" thus anticipated, improving it, the European 2020 directive which provides that all ships, from 1 January 2020, will be required to use, when sailing in the open sea, in maneuvering and inside ports, fuels with a sulfur content of less than 0,5%. If the stop in the port, according to the times previously disclosed to the public, should exceed two hours, once the mooring maneuvers have been completed, they must use fuels with a sulfur content not exceeding 0,1%.

3.3.2 Greece – Igoumenitsa Port Authority S.A.

Igoumenitsa Port Authority is constantly striving to improve the quality of the services provided for mooring of ships and boats, the transport of passengers, vehicles, and cargo on domestic and international routes and on cruise ships in a way that contributes to sustainable development and environmental protection.

Aiming to develop a modern Environmental Management System according to ESPO/ PERS and ISO 14001 standards, IPA S.A has applied and currently holds and maintains the corresponding certificates.

ISO 14001 "Environmental management systems - Requirements with guidance for use"

Specifically, IPA S.A was certified by EUROCERT with the International Standard ISO 14001 "Environmental management systems - Requirements with guidance for use" on 27/06/2014, 21/11/2026 and 20/09/2019. The Certificate is valid till 19/09/2022.

ISO 14001 is recognized internationally as providing a generic standard for environmental management systems. It is designed to assist organisations to minimize their impacts on the environment, achieve compliance with environmental legal and other requirements, and to continually improve their environmental performance. These objectives are facilitated by a "plan, do, check, review" process requiring organisations to identify and manage their significant environmental aspects. The Standard applies to the environmental aspects that the organisation identifies as those which it can control and those which it can influence. The Standard does not itself state specific environmental performance criteria.

EcoPorts - Port Environmental Review System (PERS)

IPA S.A was also certified by EcoPorts' Port Environmental Review System (PERS), on 28/03/2013, after approval by the Lloyd's Register Assessor.

PERS is the only port-sector specific environmental management standard. It stems from work carried out by the ports themselves and it is specifically designed to assist port authorities with the functional organisation necessary to deliver the goals of sustainable development. Even though, there is plenty of advice available on general environmental topics, the highly specialised nature of the environmental challenges in the port area that port authorities face, means that a custom-made approach is absolutely vital. While incorporating the main generic requirements of recognised environmental management standards (e.g. ISO 14001), PERS is adapted to deliver effective port environmental management. Its implementation can be

independently certified by Lloyd's Register. As mentioned earlier, this has been the case for IPA S.A.

Eco-Management and Audit Scheme (EMAS)

Moreover, the Port of Igoumenitsa is one of the few ports in Europe registered in the Eco-Management and Audit Scheme (EMAS). The registration of Igoumenitsa Port Authority was approved with the Decision No. 141/3 / 2-1-2017 of the Ministry of the Environment and Energy (ID No: 73346658-BF0), under the registration number EL-000112.

EMAS is a management tool for companies and other organisations to evaluate, report and improve their environmental performance by reducing the environmental impact of the operation in their sites. The scheme has been available for participation by companies since 1995 and was originally restricted to companies in industrial sectors. Since 2001 EMAS has been open to all economic sectors including public and private services. In 2009 the EMAS Regulation was revised and modified for the second time. Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) was published on 22 December 2009 and entered into force on 11 January 2010.

When an Organisation (or a specific Organisation's activity area) has been verified by EMAS it means that the Organisation (or the relevant activity area) has identified the significant environmental impacts of its operation, has been audited to comply with environmental legislation and has put in place a program of continuous reduction of its environmental impact and saving of natural resources.

The Greek EMAS Register includes all Organisations (private enterprises, foundations, or public bodies) in Greece that are registered in the Community EMAS system. The registration of an Organisation verified by an accredited verification body shall be carried out by decision of the Minister of Industry of the United States on the recommendation of the EMAS Committee.

Moreover, in the effort for a sustainable and efficient waste management system, IPA has participated in several initiatives, producing technical reports and studies aiming to further enhance its environmental performance.

Environmental Policy

Specifically, IPA S.A. drafts an Environmental Policy and implements an Environmental Management System in accordance with **ISO 14001: 2015**, **Regulation (EU) 2017/1505 (EMAS)** and **PERS (Port Environmental Review System)** with the aim of preventing environmental pollution, limiting the impact climate change, aiming at the sustainable use of resources and the protection of the biodiversity and ecosystems of the region in which it operates. In this effort, the management of the Organisation is committed to:

- fully comply with current international, European, and Greek environmental legislation and all relevant generally accepted best practices for the management of Ports,
- implement European Sea Port Organisation (ESPO) policy and guidance documents,

- inform, educate, and encourage all staff and users of the Port for their involvement in environmental protection activities of competence,
- systematically identify, evaluate, and control all environmental aspects and impacts arising from its activities and services,
- minimize and safe disposal of waste generated by the activities of the Organisation,
- establish, document, and review environmental objectives by applying stable procedures or environmental programs such as avoiding soil, sea, and air pollution from hazardous and non-hazardous waste from ships and boats, and from port operations, promoting packaging recycling, minimizing electricity, fuel and water consumption, improving aesthetic area, informing stakeholders, disseminating environmental policy and reducing carbon footprint,
- inform suppliers and contractors who cooperate with the company for the Environmental Policy that is being implemented and to ensure that they comply with relevant environmental management principles,
- aim at creating and maintaining an open and creative relationship of trust with the local community and the general public,
- strive for the continuous improvement of the Organisation's environmental performance,
- publish an annual environmental report available to the public.

The Organisation's Environmental Policy is communicated to all employees, is available to the public and those working on behalf of the company and is reviewed and amended periodically by the top management of the Organisation.

Environmental Management

As already mentioned, IPA S.A. has great concern about the activities that take place under its responsibility or inside its area of authority and have direct impact on the environment. Specifically:

- According to the directions of the European communities and the Greek legislation, IPA S.A provides services for the facilitation of receiving waste and ship residues, through external contractors.
- IPA S.A has purchased proper equipment to manage pollution emergencies in the marine environment.
- IPA S.A has composed a Port Contingency Plan.
- IPA S.A has drafted an Environmental Declaration defining all direct and indirect environmental elements with positive or negative impact on the environment, with qualitative and quantitative assessments, and has produced a catalogue of all environmental factors considered important.
- IPA S.A has drafted Environmental Sustainability Reports presenting its performance on major environmental aspects and data outlining the footprint of the Port’s operation concerning environmental issues.

- IPA S.A has scheduled and performs monitoring of air emissions and noise, as well as water consumption.

IPA S.A, has taken all the required measures to control the reported environmental issues and improve its environmental performance. Specifically, it has set specific environmental objectives and related environmental management programs (Table 20). Aiming to achieve sustainable development and environmental protection, IPA S.A has also identified performance indicators (Table 20) to monitor and assure its progress in achieving compliance with legislation and improving environmental quality through the actions on its environmental aspect. Progress on the performance indicators is monitored and reviewed each year to ensure that environmental performance is in the desirable levels.

Table 20 - IPA's environmental objectives, programs, and indicators

S/N	Environmental Objective	Environmental Program	Environmental Indicator
1	Reduction of water consumption	Monitoring and control of water consumption	E.P.I. 0501 TOTAL WATER CONSUMPTION
2	Environmental Policy communication and improvement of environmental performance	Reduction of complaints related to environmental issues	
3	Sea and soil pollution prevention caused by solid and liquid ships waste/ Compliance with environmental legislation	Monitoring and management of ships solid and liquid waste	E.P.I 01 WASTE QUANTITY (DANGEROUS) FROM SHIPS AND VESSELS
4	Soil pollution prevention caused by hazardous waste	Monitoring and management of organisation's hazardous waste	E.P.I 01 WASTE QUANTITY (NON-DANGEROUS) FROM SHIPS AND VESSELS E.P.I. 02 QUANTITY OF LIQUID WASTE (DANGEROUS) FROM SHIPS AND VESSELS E.P.I 03 QUANTITY OF RECYCLED BATTERIES E.P.I QUANTITY OF LAMPS DELIVERED
5	Reduction of electrical energy consumption	Monitoring and control of electrical energy consumption	E.P.I. 04 TOTAL ELECTRICITY CONSUMPTION
6	Awareness, training and encouragement of involved personnel and contractors and bodies	Environmental training of involved personnel, contractors and bodies	

Specifically, aiming to reduce water consumption and improve flow control and network status monitoring, Port of Igoumenitsa has installed a water monitoring system.

Energy saving is considered a major concern for Port of Igoumenitsa and actions of installing equipment of lower consumption are scheduled and taken. Energy consumption is monitored and controlled.

Port of Igoumenitsa assures that solid and liquid waste is collected by approved waste management contractors and provides all required reception facilities. Liquid hazardous waste from ships includes oil residues, lubricant oil and waste mixtures from oil separators.

Regarding port operation waste, Port of Igoumenitsa concerns and gives priority in separation, collection and proper management/ treatment of non-hazardous solid waste and hazardous solid waste, including paints, maintenance, and medical waste. Electrical waste is another flow that Port of Igoumenitsa manages properly and separately. Old lamps and similar equipment are collected and transported to recycling facilities. Furthermore, Port of Igoumenitsa supports recycling of special types of waste such as printing tonners.

Concerning air emissions, regular monitoring of CO and NO_2 takes place since 2013. Last year equipment for continuous measuring and reporting of air emissions (CO, NO_2, O_3 and SO_2) was installed in port's facilities.

The Port will also be equipped with noise measuring device for continuous monitoring of noise in port's areas.

Lastly, regarding quality of sea water, laboratory analyses are carried out on seawater at labeled points.

3.3.3 Croatia – Zadar County Rural Development Agency

Ship Waste Management Plan

The Ship Waste Management Plan prescribes the acceptance and handling of ship accumulated waste and ship cargo residues in the area managed by the Zadar Port Authority (hereinafter: ***the Port Authority area***);

The area of the Port Authority includes the land and sea part as stated in the Decision on the Establishment of the Port of Zadar Authority (Official Gazette No. 19/97, 21/02, 154/03, 132/06, 127/07, 155/13, 83 / 15);

The Waste Management Plan in the subject area of the Zadar Port Authority regulates:

- methods and procedures for the management of ship accumulated waste and ship cargo residues from ships entering the port area of the Port Authority,
- protection of the marine environment from the discharge or dumping of ship-generated waste
- protection against pollution of the land area of the Zadar Port Authority;
- All natural and legal persons using the port are obliged to comply with and comply with the provisions of the Maritime Code of the Republic of Croatia (Official Gazette 181/04, 76/07, 146/08, 61/11, 56/13, 26/15) , 17/19), and the Ordinance on the Order and Conditions of Use of the Port in the port area under the jurisdiction of the Zadar Port Authority;

WASTE MANAGEMENT IN THE PORT AREA UNDER THE JURISDICTION OF THE PORT AUTHORITY OF ZADAR

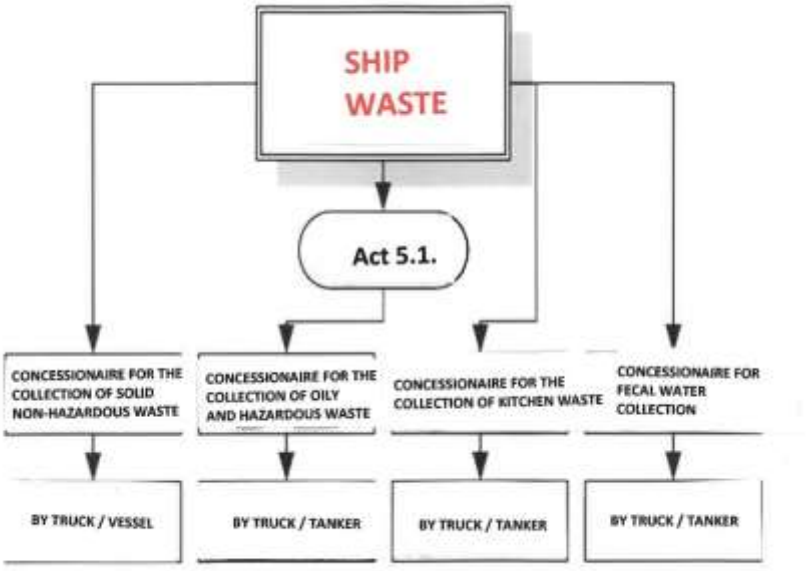


Figure 28 – WASTE MANAGEMENT IN THE PORT AREA UNDER THE JURISDICTION OF THE PORT AUTHORITY OF ZADAR

SHIP WASTE COLLECTION DIAGRAM

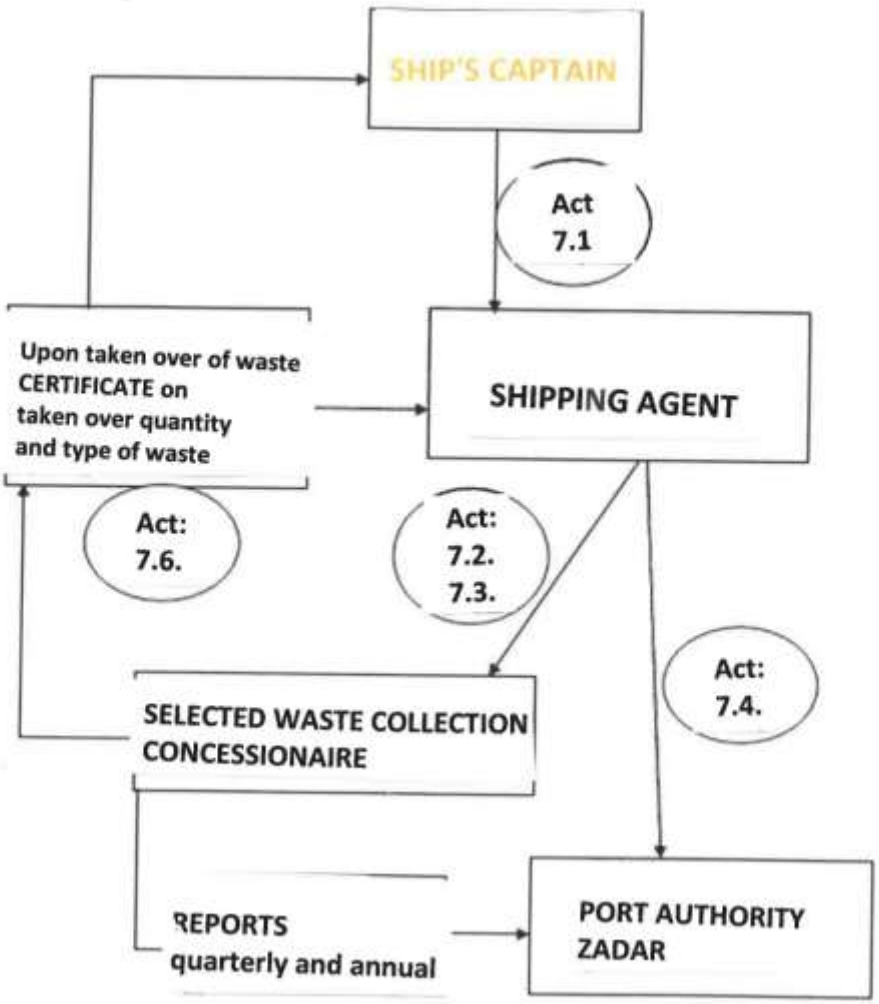


Figure 29 - SHIP WASTE COLLECTION DIAGRAM

TYPES AND MANNER OF WASTE COLLECTION FROM SHIPS

The manner, amount of collection and transport of waste from ships that normally come to the Port Authority area depends on the category of waste, the required dynamics and the location of waste collection.

Of the permanent containers for waste collection in the port area under the jurisdiction of the Zadar Port Authority, there are containers for municipal waste in the City Port of Zadar or passenger Port Gaženica and a container for receiving waste oils, oiled cloths and oil filters in the fishing Port Gaženica

Other types of waste are collected by authorized concessionaires after prior notice.

Oily liquid and solid waste

Acceptance of oily waste from ships shall be carried out by authorized concessionaires with prior notice in accordance with Rule 38 of Annex I of the MARPOL Convention,

Ship's unloading pumps for oily waste must support a transhipment capacity of not less than 6 m3 / h,

When pumping oily waste liquids must be heated to a temperature of not less than 60 ° C,

Solid oily waste must be suitably packed in marked bags or in non-returnable containers,

Oiled wastewater is collected after the chemical-physical analysis in specialized tank trucks,

Fishing vessels in the area of loading / unloading points for fishing boats in the Port of Gaženica, can dispose of small quantities of waste oils (up to 100 liters) in containers for receiving oil and marine municipal waste in containers for receiving municipal waste,

Smaller vessels, and yachts with up to 12 crew members, which dock in the city port can, only with prior notice, dispose of waste oils (up to 100 liters), while marine municipal waste can be disposed of in containers for receiving municipal waste.

Hazardous waste

Disposal of various types of hazardous waste, which is not listed in the Plan, is possible, with the prior consent of the Port Authority, and with the agreement of the selected Concessionaire. Hazardous waste is taken for treatment to authorized processors of this type of waste.

Faecal waters (Annex IV of the MARPOL Convention)

Faecal water is collected by tank trucks by an authorized concessionaire, after which the concessionaires take it to the central city treatment plant.

Ship waste

Plastics (Annex V of the MARPOL Convention - Category A)
Upon arrival of the ship, the acceptance of plastic from the ship by the authorized concessionaires must be performed separately and taken away in specialized plastic containers, and taken away for recycling separately from other categories of waste.
Food residues (Annex V of the MARPOL Convention - Category B)
The ship must not dispose of such waste in municipal waste, but hand it over separately for disposal and harmless disposal to an authorized concessionaire.
Ship-generated municipal waste (Annex V of the MARPOL Convention - Category C)
Acceptance of municipal waste from the ship is performed by the authorized concessionaire with prior notice. This category of waste is transported by specialized metal containers (containers) with a volume of 7m3.

Edible oils (Annex V of the MARPOL Convention - Category D)

This category of waste is collected in the containers of the vehicle of the selected concessionaire and taken to the final treatment of waste.

Incinerator ash (Annex V of the MARPOL Convention - Category E)

This waste category is collected by ADR vehicles for final waste treatment.

Working waste (Annex V of the MARPOL Convention - Category F)

Working waste must be suitably packed in marked bags or in non-returnable containers, and acceptance by the concessionaire is done in specialized containers separately from other waste categories.

By-products of animal origin not for human consumption (Annex V of the MARPOL Convention - Category G). Upon the arrival of the ship in international traffic, the concessionaire usually accepts animal by-products from the ship with specialized tanks. Waste is disposed of in containers with lids marked “for disposal only” and transported from the port to the collection point and stored within the registered facility. Subsequently, the incineration of the same waste is organized.

Fishing equipment (Annex V of the MARPOL Convention - Category H)

This category of waste is collected by concessionaire vehicles for final waste treatment.

Electronic waste (Annex V of the MARPOL Convention - Category I)

This category of waste is collected by concessionaire vehicles for final waste treatment.

Remains of cargo on ships (Annex V of the MARPOL Convention - categories J and K); This category of waste is collected by specialized vehicles for final waste treatment.

Depending on the type and amount of waste, cargo residues are disposed of in a convenient manner by prior agreement with the selected Concessionaire. It is the consignee's responsibility to dispose of cargo residues from ships at his own expense.

The costs of accepting the remains of cargo from the ship shall be reimbursed by the user of the receiving devices.

Exceptionally, the ship may forward to the next port without delivery of cargo residues if it is evident from the submitted data that there is enough space on board to accommodate cargo residues on board to the port where the remaining cargo will be delivered to receiving facilities.

Exceptionally, the Master's Office may order the ship from 5.10. of this Article to unload cargo residues before leaving the port if there is information that the port of destination does not have a suitable receiving device or the port of destination is unknown and there is a risk that the cargo remains could be thrown into the sea.

The Harbor Master's Office shall prohibit the departure of the ship if it does not act in accordance with the order referred to in paragraph 5.11. of this Article.

The waste categories listed in Item 5. of this Plan are collected in the vehicles of the authorized concessionaire only with prior notice by the shipping agent. The concessionaire is obliged to have a valid permit for the collection of a certain type of waste and is obliged to notify the Port Authority of any changes related to the permit.

APPLICATION FOR SHIPMENT OF SHIP WASTE

Requirements for reporting the delivery of ship-generated waste by ships, is used to better plan waste collection operations and avoid unnecessary delays for ships that provide services to authorized concessionaires.

Ship's agent (except for Croatian warships and public ships, fishing boat or sports and leisure vessels authorized to transport no more than 12 passengers) before arriving at the port of Zadar, is obliged to fully and accurately report to the Port Authority and the Port Authority all items of ship waste and cargo residues that are planned to be delivered at the port and to enter all basic data, in accordance with Directive 2000/59 / EC and the MARPOL Convention and the IMO Directive. Ship waste is reported via the CIMIS application system, ie via the "Ship Waste Report" form, in order to approve the acceptance of the ship in the port and plan waste acceptance operations and avoid delays of ships using port waste collection devices.

They are also obliged to submit:

- at least 48 hours before arrival for the area under the management of the Zadar Port Authority,
- after finding out at the port of departure, if the information is available less than 48 hours before arrival in the area under the management of the Port Authority;
- immediately before departure from the previous port, if the duration of the trip is less than 24 hours.

The notification form prescribed by the Plan is an integral part of it and is submitted to the competent institutions through the information system CIMIS - Croatian Integrated Maritime Information System.

THE COURSE OF WASTE COLLECTION FROM SHIPS

- The Master of the ship is obliged to send to his maritime agency the form "Report of Ship Waste,
- The maritime agent is obliged to forward the request for the needs of waste collection to the selected Concessionaire upon the request received by the ship,
- The maritime agent of the ship and the selected Concessionaire agree on the time and manner of taking over the ship's waste or cargo residues,
- The Maritime Agency is obliged to inform the Port Authority about the planned work, the name of the concessionaire who will perform it and the estimated time in which the planned work will be performed;
- The concessionaire may take oily water samples to determine the chemical-physical constituents of the oiled waste;
- After the completion of the work, the Concessionaire is obliged to issue a Waste Delivery Receipt (*Appendix 7, Form 07/18*) to the Master of the ship, and the ship is obliged to forward a copy of it to the shipping agent.
- A copy of the signed and stamped *Waste Delivery Receipt* shall be submitted by the maritime agent to the competent authorities via the CIMIS system.
- All waste from ships must be collected separately in accordance with the Annexes to MARPOL 73/78 of the Convention and the waste categories of MARPOL 73/78 of the Convention.

NOTES FOR INADEQUATE SERVICES

Upon receipt of the remark on the inadequacy of port facilities for receiving waste from ships,

the person responsible for the implementation of this Plan will take the necessary corrective actions to eliminate the inadequate service and obtain the satisfaction of service users. Inadequacy of port reception devices for ship waste with a description of the reasons for the problem, can also be reported to the competent Harbor Master's Office.

DATA COLLECTION AND SUBMISSION REQUIREMENTS

Concessionaires are obliged to submit in writing to the Zadar Port Authority:
Quarterly monthly reports on the total amount and type of waste collected in the area of the Port Authority, 30 days after the end of the quarter.

Annual report on the total amount and type of waste disposed of in the area of the Port Authority, submitted within 30 days after the end of the calendar year.

The reports shall be submitted to the competent department of the Port Authority, in charge of the Implementation of this Plan.

COST COLLECTION SYSTEM

The cost collection system is determined through the maximum amount determined on the day of signing the concession agreement with the Concessionaire.

TEMPORARY WASTE DISPOSAL LOCATIONS

Locations of temporary disposal of waste from port activities are listed in the internal regulations of port concessionaires.
In the port area under the jurisdiction of the Zadar Port Authority, about 120 tons and about 60 m3 of ship waste are disposed of annually.

PERSON RESPONSIBLE FOR IMPLEMENTING THE PLAN

The Department for Operations and Security and Technical Affairs and Maintenance of the Zadar Port Authority is in charge of the implementation of this Plan;

Since it is a very frequent port with a large number of passengers and vehicles, in addition to managing the removal of waste from ships, it is necessary to pay special attention to the maintenance of the mainland in such a way as to ensure quality reception of small municipal waste produced by passengers.

The new passenger port in Gaženica, which is the subject of these analyzes, was put into operation several years ago, while the passenger terminal building has been in use since 2019. The ambitions of the Zadar Port Authority are great and in the next period the beginning of activities on the introduction of procedures and standards is expected, as well as in the largest European ports. Weakness is currently detected in terms of the lack of a long-term waste management plan. In addition, there is a lack of receiving devices with selective waste collection and recycling, and it is necessary to raise communication and public awareness to a higher level. Also, there was a lack of employees in positions dealing with environmental protection, i.e., monitoring and management of waste disposal processes, both at the destination and in the Zadar Port Authority. Given the large port area managed by the Zadar Port Authority on the maritime domain of the passenger port Gaženica, it should be

considered how to attract potential concessionaires engaged in the disposal of various types of waste and possibly plan part of the port area for such activities. The circular economy, not only in the area of Zadar but also in the whole of Croatia, is still not sufficiently developed and it is necessary to think and act in that direction. In the coming period, the Zadar Port Authority plans to join the EcoPorts initiative.

EcoPorts is the main environmental initiative of the European port sector. It was initiated by a number of proactive ports in 1997 and has been fully integrated into the European Sea Ports Organisation (ESPO) since 2011. The overarching principle of EcoPorts is to raise awareness on environmental protection through cooperation and sharing of knowledge between ports and improve environmental management.

Self Diagnosis Method (SDM). SDM is a concise checklist against which port managers can self-assess the environmental management programme of the port in relation to the performance of both the sector and international standards.

Port Environmental Review System (PERS)- Developed by ports themselves, PERS has firmly established its reputation as the only port sector specific environmental management standard.

3.3.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Legislation in the field of environmental protection is defined in great detail and prescribed in the Environmental Protection Act (ZVO-1, Ur.l.RS No. 39/2003). The law regulates the protection of the environment against overload as a fundamental condition for sustainable development. In this context, the cinema prescribes the basic principles of environmental protection, measures for environmental protection, monitoring and information on the state of the environment, economic instruments for environmental protection, public services for environmental protection and other issues related to environmental protection. In addition to the Environmental Protection Act, the legislation also includes a number of special implementing regulations that regulate specific environments where any environmental risks arise. The most important areas are regulations on air and water quality, on waste management, on industrial pollution and accidents, on light pollution and electromagnetic radiation, on noise, and on the protection of soil and nature.

The systematic approach ISO standard 14001 2015 provides organizations with a guide and the necessary up-to-date information for the long-term building of success in the field of environmental protection and thus a contribution to sustainable development by:

- directs organizations to meet legal and other relevant requirements,
- aims to protect the environment by preventing or at least reducing adverse environmental impacts,
- helps to improve the effects of effective management of environmental issues,
- helps to achieve better financial and operational benefits through environmentally friendly processes, which can, inter alia, strengthen the organization's market position,
- assists in communicating with relevant stakeholders.

The economic growth of a society must be limited by the ability to renew natural resources and the ability to clean the environment independently. This raises the question of whether progress or development of a society with a sustainable economy is possible. Definitely yes, but in a different way than we have known it so far. For the sake of its own survival, society must look for alternative visions with which it will be able to survive and at the same time be less exhausted and burden the planetary ecosystem.

Uniform management system of the port of Koper

Luka Koper is a successful company that demonstrates its focus on achieving comprehensive business quality.

Quality means satisfying and anticipating the needs and expectations of our customers: customers, employees, owners and the environment. Our goal is to figure out what customers want and direct our internal processes so that they get it. We use international quality standards and the principles of business excellence, which we have introduced and integrated into a unified management system.

The beginnings of quality in the Port of Koper date back to 1997, when the Port of Koper started introducing standards and obtained the ISO 9002 certificate.

The requirements of different systems and other, special requirements are combined in a single management system:

- quality management in accordance with ISO 9001;
- environmental management in accordance with ISO 14001 and the requirements of the EMAS Regulation;
- occupational health and safety management in accordance with ISO 45001;
- food safety management in accordance with ISO 22000;
- energy management in accordance with ISO 50001;
- GMP + B3 feed safety standard for transhipment and storage - at the Bulk Cargo Terminal;
- non GMO (non genetically modified organism) requirements for separate transhipment and storage of non-genetically modified soybeans - at the Bulk Cargo Terminal;
- requirements of the ECO certificate for organically produced food and feed - at the Refrigerated Cargo Terminal, at the General Cargo Terminal and at the Bulk Cargo Terminal;
- the requirements of the AEO certificate for the status of authorized economic operator performing customs formalities;
- requirements of the ISCC EU certificate for sustainable management of biofuels and biomass - at the Liquid Cargo Terminal;
- the requirements of the SEVESO directive on the management of major-accident hazards involving dangerous substances - at the Container Terminal, the Liquid Cargo Terminal and the Refrigerated Cargo Terminal;

- the requirements of the ISPS (International Ship and Port Facility Security Code), ie the International Ship and Port Facility Security Code;
- GRI (Global Reporting Initiative) Sustainability Reporting Standards.

3.3.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

None of waste disposal/management protocols and/or Waste Management Standards (e.g., Port Environmental Review System (PERS), ISO 9001:2015 and ISO 14001:2015 and / or EMAS) are implemented by any port.

3.3.6 Albania - Port of Vlora

Port Environmental Review System (PERS consists of an introduction describing the scheme and a guide to the implementation of a port environmental management system, according to the same scheme. In particular, the PERS provides a series of commitments for a port authority (such as, for example, the publication of a periodical report on the state of the environment, the monitoring of a series of environmental indicators, etc ...) to operate according to the directions of the European Union, which encourages the adoption of such environmental management instruments for a sustainable development of the European port sector (European Economic and Social Committee 2007 / C 168/12). On a voluntary basis, the port authority may also require certification for its environmental management system according to the PERS scheme, accredited by independent bodies. This instrument is therefore an excellent reference standard for good environmental practices for the ports sector and a good starting point for those ports that intend to fall within the standards of the environmental certification ISO 14001 and / or EMAS. Port Environmental Review System (PERS consists of an introduction describing the scheme and a guide to

the implementation of a port environmental management system, according to the same scheme. In particular, the PERS provides a series of commitments for a port authority (such as, for example, the publication of a periodical report on the state of the environment, the monitoring of a series of environmental indicators, etc ...) to operate according to the directions of the European Union, which encourages the adoption of such environmental management instruments for a sustainable development of the European port sector (European Economic and Social Committee 2007 / C 168/12). On a voluntary basis, the port authority may also require certification for its environmental management system according to the PERS scheme, accredited by independent bodies. This instrument is therefore an excellent reference standard for good environmental practices for the ports sector and a good starting point for those ports that intend to fall within the standards of the environmental certification ISO 14001 and / or EMAS.

Since the port of Vlora has not specialized in monitoring the environmental situation around the Bay of Vlora for years, it has not yet become part of the implementation of these standards. With the creation of the new port, there will be a good management and coordination of work related to environmental monitoring and waste management.

3.3.7 Montenegro – Ministry of Capital Investments

Amongst the stakeholders of the port, it is noted that Port of Adria AD is holder of the following certifications:

- ISO 9001:2015
- ISO 14001:2015
- OHSAS 18001:2007
- ECO Ports Certificate
- ISPS Code Certification for Passenger Ships and Cargo Ships

The Hemosan Ltd Bar as Waste Management Contractor operated under the following certificates:

- ISO 5001:2011
- ISO 9001:2015
- ISO 14001:2015
- OHSAS 18001:2007

4. Identification of protocols/ standards as best practices that can be applied in the Adriatic ports for enhancing the environmental profile and their social responsibility

In order to improve the Adriatic ports' environmental profile and increase social responsibility, the partnership has selected specific **protocols/ standards** as best practices from their internal or outer environment, considered as applicable measures aimed at environmental sustainability and mitigation of the impacts deriving from port activities, applicable in the Adriatic, Ionian and river ports.

Those are presented below per Country, although some of them are related to each other but have different characteristics according to the Port where applied, or provide additional information.

4.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

In order to improve its environmental profile and increase its social responsibility, the Port System Authority of the Ionian Sea has prepared and documented its Environmental Policy and has defined the modalities for the definition, verification, approval and dissemination of Environmental Policy, so that it becomes a reference for all staff and is made available to the public.

Environmental Policy is a guide to implement the Authority's Environmental Management System (SGA), in order to ensure compliance with all regulatory provisions in the field of the environment and to pursue a reasonable and continuous improvement of efficiency.

The High Management (AD), which is entrusted with the task of keeping the organization under control (the President in this case), has finalized its commitment:

- towards the environment, promoting the development of the Environmental Management System, compliant with UNI EN ISO 14001:2015;
- with the signing of the principles and guidelines of reference, through environmental policy.

The AD defines the Environmental Policy document according to the following operational phases:

- definition of commitments for the maintenance of regulatory compliance, for adherence to the philosophy of sustainable development, for the prevention of pollution and for continuous improvement aimed at reducing any potential environmental impact and significant and non-significant risk factors;
- definition of the general objectives, taking into account:
    - environmental aspects;
    - improvement of environmental management.

The Policy document is subject to review as a result of significant internal and/or external changes. The AD approves the Environmental Policy document, before its internal dissemination and/or external communication.

In application of the environmental policy principles adopted, the Ionian Sea Port System Authority has implemented several operational actions among which it is intended to indicate those described in the paragraphs to follow as "**good practices**" applicable in Adriatic, Ionian and river ports.

Good Practice 1: Adoption of the Environmental Energy Planning Document (DEASP)

In December 2019, the Ionian Sea Port System Authority adopted the Environmental Energy Planning Document (DEASP) drawn up in collaboration with DIPAR (Productive District of Environment and Reuse - Puglia Region).

The Document, in compliance with the Guidelines adopted by the Ministry of the Environment, The Protection of the Territory and the Sea, in agreement with the Italian Ministry of Transport, focuses in the first part on a photograph of the fact of the port of Taranto to 2018 (last year of which complete and certified data are available), at the energy, infrastructure and transport level and examines individually the different activities of the port and the components that characterize them.

The data collection took place by actively involving all the subjects operating in the port system both through collective and individual meetings coordinated with the preparation and administration of separate and articulated questionnaires:

- "Basic questionnaire", aimed at collecting energy and environmental data concerning buildings and concession areas in the port;
- "Questionnaire for the definition of future scenarios", concerning any planned activities aimed at reducing energy consumption and CO2 emissions;
- "Carbon Footprint Questionnaire", aimed at acquiring supplementary data on means of transport (land and sea) and on the facilities and equipment used by the bodies involved within the Port System.

The available data allowed the drafting of the Energy Balance sheet and the measurement of the Carbon Footprint of the Ionian Sea Port System.

The second part of the Document defines the objectives of energy-environmental sustainability to be achieved, the strategies and interventions to pursue them, proposing a series of technological solutions that allow, in the next three years, to launch actions and interventions aimed at reducing the use of energy from fossil sources for the same services offered, favoring technologies with less environmental impact.

These solutions identify:

- Interventions, which include works, plants, structures, works as a result of investments made with the aim of improving energy efficiency and producing energy from renewable sources;
- Organizational measures aimed at a more efficient and sustainable environmental energy management in the port environment extendable according to an APPEA model to the promotion of:

- the unitary management of infrastructure and services throughout the port area;
- monitoring of environmental performance;
- the preparation of a program of progressive environmental redevelopment of the Area.

The Document has established a reduction in greenhouse gas emissions of 15% in 10 years in relation to traffic volumes.

Good Practice 2: Integrated Monitoring Plan of the Taranto port area

The Ionian Sea Port System Authority, in collaboration with DICATECh (Department of Civil, Environmental, Territory, Construction and Chemistry Engineering), has drawn up the integrated Monitoring Plan of the Taranto port area (2 November 2015).

The aforementioned paper provides a description of the techniques, instruments and materials to be used for the construction of stations and separate monitoring actions for environmental matrices in order to control the impacts deriving from the execution of the works/interventions (in-ante-in-post operam) in progress/scheduled on the port areas, listed below:

- "Taranto Port Plate – Extension IV Protruding and West Dock";
- "Dredging of 2.3 Mm^3 of sediments in the Polysectoral Pier area and for the construction of a first lot for the functional filled case to the extension of the V Protruding of the Port of Taranto";
- "Taranto Port Plate – Logistics Platform";
- "Taranto port plate – Strada dei Moli";
- "Taranto Port Plate – Filled Tank";
- "Redevelopment of the Multisectoral Pier – Modernisation of the Mooring Quay";
- "Redevelopment of the Polysectoral Pier – New Foranea Dam for the protection of the Port outside the tarstead of Taranto – Stretch of Ponente";
- "Correction, enlargement and structural adjustment of the Levante quay of the San Cataldo pier and consolidation of the calata 1 of the Port of Taranto.

The Integrated Monitoring Plan acts as a guideline and indication, in order to indicate a minimum level of performance of quality, for the supply of fixed and mobile monitoring systems and the materials that will be used for the realization of the planned works.

The aforementioned Plan has identified an "area" monitoring network with the main objective of controlling, through measuring points "homogeneously" distributed over an area that includes all the areas relevant to the individual works and areas at the contour, the overall quality status of the land-sea system.

The long-term objective is to create a permanent monitoring system for the entire port area that, in the current phase, interferes as little as possible with the existing Area Monitoring Plans. The aim of the proposal is, therefore, to set up a well-programmed network of monitoring stations, concerning different matrices, through which to systematically detect a

defined set of parameters: all in accordance with a methodological approach that can lead to a harmonious program both from the point of view of timing and operational methods to be adopted subsequently during the implementation and management of the monitoring project for the area under consideration.

The Plan identifies the monitoring actions with regard to the individual matrices to be investigated:

- Water matrix;
- Sediment matrix;
- Air matrix;
- Noise matrix,
- Soil matrix;
- Flora and fauna matrix;
- Filter organisms matrix;
- Benthos matrix.

In particular, the monitoring network for the **water matrix** is distinguished by seawater column and underground water column, with reference to a network of fixed and mobile stations; the following types of networks are available:

- a general network of fixed stations;
- a general network of mobile stations;
- a general network of piezometers on the ground.

The monitoring activities of the individual works are provided for in the context of the activity of the general networks in accordance with the individual protocols. If the Area Monitoring Plan of the individual work includes columns of water on fixed and mobile stations, the related measures must be included among those scheduled for the general networks: the higher frequency of the measurements, normally required by the individual Area Monitoring Plans, must harmonize with the quarterly frequency of the measures on the general network, without changing the dates and cadence, but only enriching the overall number from the beginning of the construction site of the individual work until the time of its end.

The purpose of the general network is to build a continuously updated basis of the general system. These "general networks" can provide an overview of the environment on which to base the comparison with the data subsequently or simultaneously produced within each Area Monitoring Plan.

The monitoring stations of the "seawater" matrix have been classified according to the works and the type of station, whether fixed or mobile.

With regard to fixed stations, a reduction of the same was carried out, choosing a total of 6, distributed throughout the entire area of interest, and respecting, for these selected stations, the locations reported in the individual Area Monitoring Plans.

For the network of mobile stations, a mesh has been defined, which is shown in the following figure, distributed homogeneously according to four rows of stations at different distances from the coast.

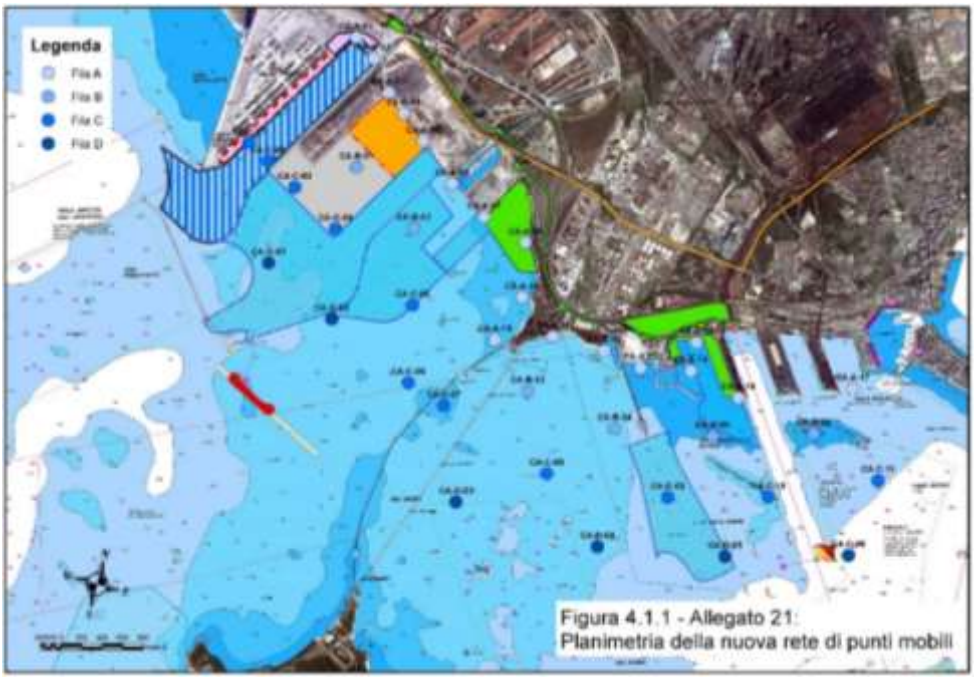


Figure 30 - Floor plan of the new mobile point network of the Integrated Monitoring Plan of the port area - DICATECh (2015)

The position of the measuring points is related to the location of ground piezometers whose original positioning was established before 2011; the entire piezometer network has already been sampled in two previous campaigns (July 2011 and April-May 2013).

The network of piezometers, space-continuous and sufficiently homogeneous, follows the projection of the coastline of the 1950s, occupying only public areas within the SIN6.

Such a location ensures comprehensive monitoring of the quality of water leaving the SIN and bound for the sea.

For the purposes of the general network for "area" monitoring, however, a reduction has been made in the number of piezometers belonging to the pre-existing network, taking into account only 22: these control points are homogeneously distributed along the coast and their position, as already mentioned, is related to the position of the control points at sea.

The abbreviations of the monitoring stations and their location are shown in the following figure.

[6]The sites of national interest (SIN) represent very large contaminated areas classified as dangerous by the Italian State and that need interventions to clean the soil, subsoil and /or surface and groundwater to avoid environmental and health damage.

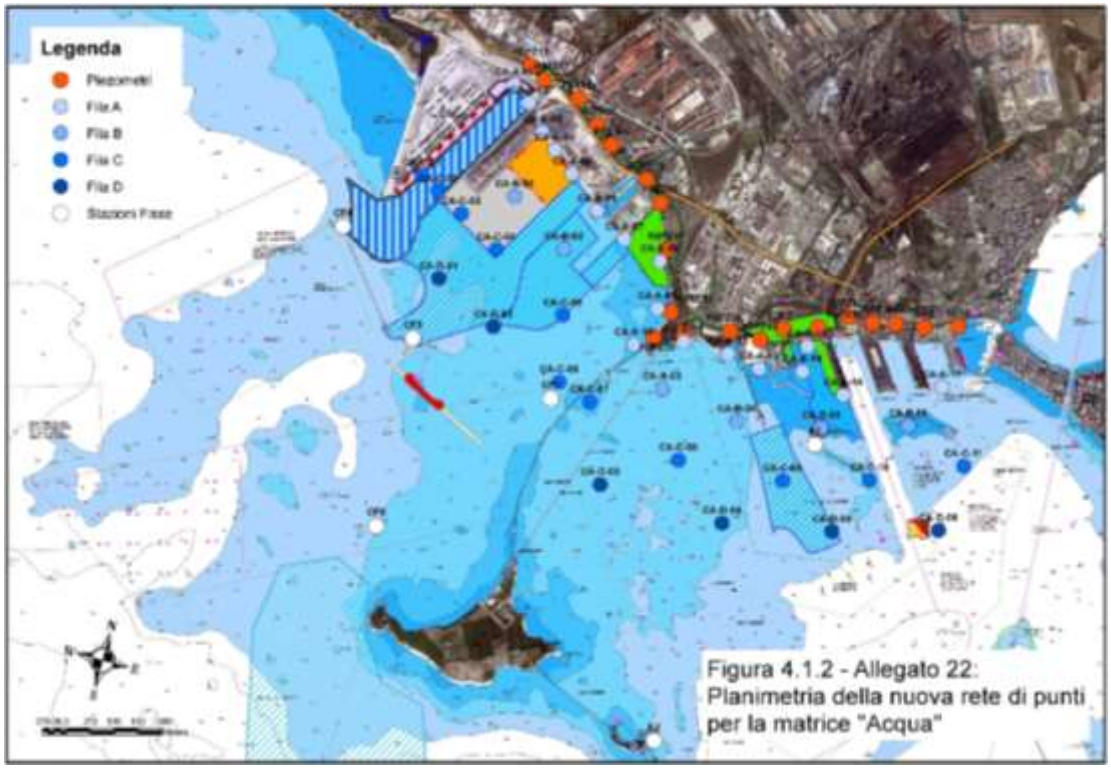


Figure 31 - Floor plan of the new network of points for the "water" matrix of the Integrated Monitoring Plan of the port area - DICATECh (2015)

At mobile stations there are multi-parametric profiles related to conductivity, temperature, pH, pressure, dissolved oxygen and turbidity along the seawater column. The objective of the water columns is to be able, with regard to some predefined quotas within the seawater body, to reconstruct information plans through interpolation of data. To do this it is necessary that the profiles are quoted with respect to the average sea level, taking into account the tidal phases, or, more easily than the bottom which, at least in theory, is stable. These water columns should of course also be envisaged at the fixed stations of the corresponding general network. In particular, on some of these fixed stations it is planned to use correntometers to determine the direction and intensity of currents along the water column. It is obvious that measurements on mobile and fixed measuring points (at sea) should be carried out as far as possible in accordance with the same time horizon, as it is not correct to interpolate and/or interpret non-cohesive data. This clearly poses some technical problems and the simultaneous nature of the measurements, a condition which is unrealistic if not with fully automatic systems, can only reasonably be approximated by an appropriate choice of measurement techniques.

In any case, the indication is to carry out the profiles along the water columns both in moving and fixed points at low tide, so that the aquifer is potentially spilly and there is a more representative picture of the land-based contributes to the marine environment. These profiles should also be conducted along the column of water intercepted by the monitoring wells always with regard to the same time horizon during which the profiles in the water column will be carried out on the sea waters.

As regards the collection of water samples at sea for subsequent laboratory chemical analyses, both for fixed stations and for furniture, in view of the low depth of the seabed under intervention, two sampling depths, "surface" and "bottom", were defined, the latter dependent on the bathymetry of the seabed at the measuring point.

The connection of the mesh of mobile and fixed stations with the ground network, consisting of piezometers, allows to obtain different photographs of the qualitative condition of the waters to the land-sea interface (relations between seawater and groundwater) and to the sediment-water interface with reference to well-defined time horizons.

For the water matrix, for the three general networks, namely:

- the network of mobile stations which aims to monitor the parameters relating to the "water matrix" ("marine waters") throughout the area affected by the construction sites, where this in practice coincides with a large part of the area covered by the TOPT;
- the network of fixed stations;
- the network of piezometers;

the recommended frequency for water column measurements and sampling is quarterly.

This is obviously linked to climatic trends in the places of interest that affect groundwater fluctuations and sea conditions.

In addition, this activity is carried out on local networks of mobile and fixed stations falling within the relevance of each work, the locations of which coincide with those of some of the general mobile and fixed network stations.
On these local networks, the measurements on the water column and the sampling increase in frequency in compliance with the Area Monitoring Plans provided for each work, inserting the measurements in the intervals defined by the quarterly cadences of the general networks (e.g. in the case of the forecast of monthly measures there would be two additional measures among those on a quarterly basis).

The duration of monitoring for local networks is that provided within each Area Monitoring Plan.

The general network therefore continues to operate at all times with its frequencies: the overlapping of the monitoring activities of each work involves an increase in the number of data within the monitoring period of the work itself.

With regards to **marine sediments,** in order to characterize the level and type of pollution of the area of interest, a subdivision of the sediments of the seabed into four quality classes was carried out, a function of the concentration of pollutants present. This subdivision is based both on the Contamination Threshold Concentrations (CTC) defined by Legislative Decree 152/06, column B (industrial sites) of Table 1 of The All. 5. Title V of Part Four, and on the specific intervention limits defined by ICRAM for the port sediments of the Taranto site of national interest:

- "GREEN" - it contains sediments in which there is no exceeding of the intervention values defined by ICRAM;

- "YELLOW" - this class shall include sediments for which at least one of the parameters analyzed has concentrations higher than the intervention values defined by ICRAM, but lower than the limit concentration values indicated in Table 1, Col. B of Legislative Decree 152/06 and subsequent amendments and additions;
- "RED" - the sediments belonging to this class are those in which at least one of the parameters analyzed has concentrations above the limit concentration values indicated in Table 1, Col. B of Legislative Decree 152/06 and subsequent amendments and additions, but below the limit values for the classification of "dangerous" listed in All. D, Part IV - Title I and II, Legislative Decree 152/2006 and subsequent amendments and additions;
- "VIOLET" - this class includes sediments with concentrations above the limit values for the classification of "dangerous".

Sediments in the marine environment become the final receptor body of numerous contaminants that, due to anthropogenic activities, but also natural processes, can accumulate in sediments that therefore become a "trap" of all contaminants poured and present in the column of water above.

In areas with a high level of anthropization such as port basins, often characterized by low hydro-dynamism, contaminants can reach very high concentrations in sediments, up to the establishment of a reverse process of transfer and leaching of "trapped" substances and the subsequent release of them into the water column. In this case, sediments potentially become an active secondary source of pollution: this situation can have a negative impact on the quality of the water column and sometimes lead to profound alterations in the dynamic balances underlying the functioning of the entire port ecosystem.

It should also be noted that the negative effects on the ecosystem may be more or less significant depending on the presence of some "pejorative" conditions related to the climate (winds, currents, tidal regime, thermal stratification of the body of water), the morphology of the area, the chemical-physical conditions of the system (redox, pH, etc.) as well as the very peculiarities of the matrices that make up the marine ecosystem (water, sediment, biota) and the "inland". Thus, the sedimentary compartment can be considered as a recorder and time supplement of what happens in the water column. In fact, a wide variety of polluting compounds, nutrient salts and organic matter, are found in higher concentrations in the sediment than in the water column, and the determination of the quality of the aquatic sector cannot be separated from monitoring through the sampling and periodic analysis of certain environmental parameters in the sediment matrix.

Monitoring stations constitute the area monitoring network for the "sediment" matrix and their planimetric distribution is shown in the following figure.

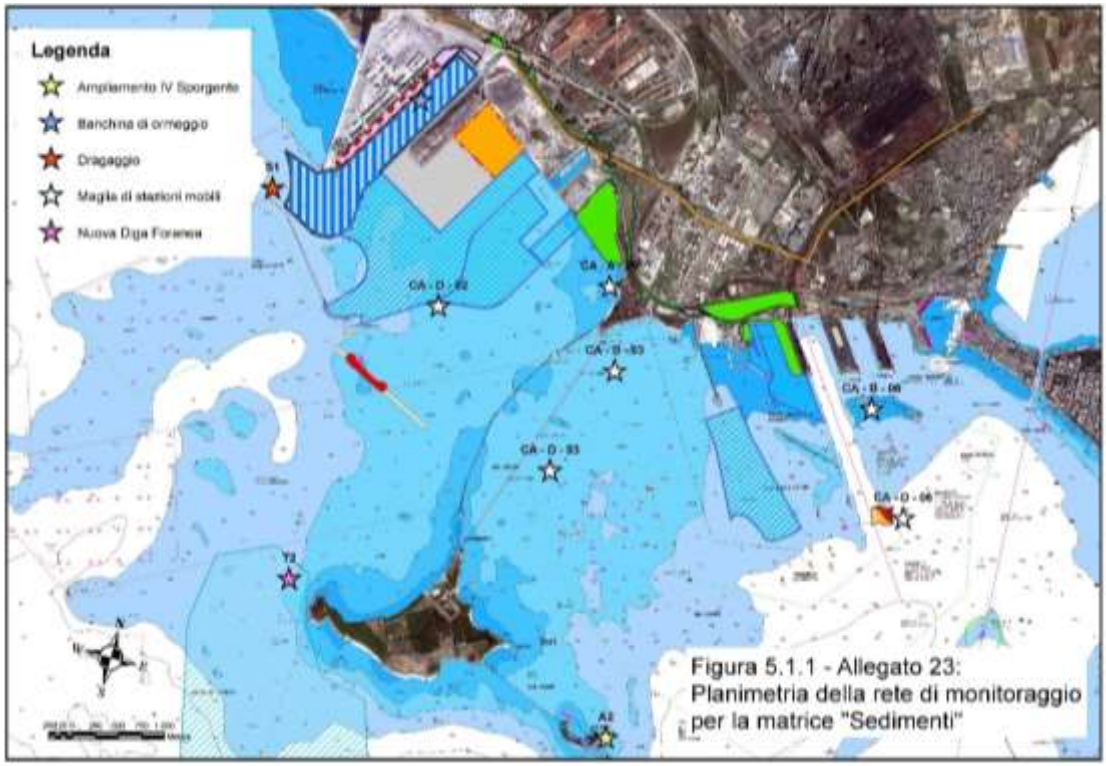


Figure 32 - Floor plan of the new network of points for the "sediment" matrix of the Integrated Monitoring Plan of the port area - DICATECh (2015)

At sediment monitoring stations, surface sediment (0 - 20 cm) is expected to be sampled for chemical-physical analysis, such as:

- particle size distribution;
- metals;
- hydrocarbons C<12 and C>12;
- IPA;
- PCB;
- pesticides;
- organostannic compounds;
- TOC;
- pH;
- potentials redox;
- nutrients (Ntot, Ptot).

For the sampling phase, reference can be made to what is reported in the "Manual for the Handling of Marine Sediments" (Ministry of the Environment and Land and Sea Protection, ICRAM 2007) which suggests for the sampling of submerged surface sediments (up to a thickness of 50 cm), the use of buckets, box corers or underwater operators equipped with liners, with characteristics suitable to take the entire aforementioned thickness or in any case a layer of material not less than the first 20 cm.

Good Practice 3: Waste collection and management plan of the Port of Taranto

The Port System Authority of the Ionian Sea, in compliance with the provisions of art. 5 of Legislative Decree 182/03 has drawn up the "**Waste Collection and Management Plan of the Port of Taranto**" approved by Resolution of the Regional Council n. 1407 of 12 June 2015 and in force since 28 November 2004 and subsequent updates. The most recent update of this Plan was approved with D.G.R. of the Puglia Region n. 1203 of July 31, 2020.

This Plan is updated and approved in accordance with the regional waste planning, in compliance with the aforementioned legislation, at least every three years or in any case in the presence of significant operational changes in the management of the port.

The Authority, with the Waste Collection and Management Plan of the Port of Taranto, is interested in regulating the management of all the different types of waste produced in the port area, not only with regard to waste produced by ships but also with those that are produced and managed throughout the territorial district of competence. Therefore, the plan deals, in its entirety, with the management and treatment of the different types of waste produced and collected in the port area.

Ship waste, which can be classified into special hazardous and non-hazardous waste, which can be delivered and disposed of by accommodation facilities, is distinguished into the following types:

1) produced by the ship;
2) load residues which consist of any material contained in the holds or tanks of the load and which has remained there at the end of the unloading and cleaning operations.

In turn, the waste produced by the ship is divided into:

a) special waste similar to urban waste (kitchen type, other than load residues);
b) waste water;
c) bilge water;
3) associated with the load.

Similarly, cargo waste is classified as:

a) slop (washing water);
b) ballast waters when they come into contact with cargo;
4) surpluses.

Responsibility for the management of waste collected in common use areas and therefore, to be considered "products" in those areas, lies with the Port System Authority of the Ionian Sea. This waste is divided into two types as it is distinguishable between those found by cleaning the common areas and those collected in the "ecological islands".

With regard to waste from the cleaning service of the common areas, it must be further specified that it comes from ground areas and water mirrors. In fact, in the Port of Taranto there is a service for the prevention and protection of pollution and rapid intervention for the reclamation of water mirrors and port areas by hydrocarbons granted by the local Captaincy of Porto to the Ecotaras S.p.A. Company.

The "Ecological Islands" project, on the other hand, was born from the need to provide users of boating, private and professional, fishing and/or recreational, functional structures for the collection of waste such as spent lead batteries and waste oils.

For both ship-generated waste and cargo residues and waste produced in common areas, the Plan reports the assessment of the type and quantity of waste produced, a detailed description of collection procedures and analysis of the presence of collection facilities in the port area.

The Waste Collection and Management Plan of the Port of Taranto also includes the collection procedures (means and equipment) and management of the different types of waste, identifying the various treatment plants, describing their type and capacity.

Other information that can be found in the Analysis Plan is:

- Cost analysis;
- Tariff system;
- Reports;
- Consultations;
- Regulations;
- Responsibility;
- Initiatives;
- Equipment and processes;
- Plants use;
- Disposal;
- The preliminary environmental report for subjection to the Strategic Environmental Assessment (VAS), in turn composed of the analysis in this regard:
    - bulk, miscellaneous goods, passengers and containers in the Port of Taranto;
    - the geographical classification and location of the port of Taranto;
    - the territorial classification of the port of Taranto;
    - the Site of National Interest (SIN);
    - Contents and objectives of the Plan with the assessment of the impacts on the various environmental matrices (air, landscape, water, soil and subsoil, noise, marine environment, vegetation, fauna and ecosystems).

It is also specified that, in **chapter** below, the description of solid waste disposal facilities (inside the port), liquids (near the port) and sediment treatment plants (under authorization) is given.

Central Adriatic Ports Authority

In application of the measures aimed at environmental sustainability and mitigation of the impacts deriving from port activities, the Central Adriatic Ports Authority has implemented or is planning to implement various operational actions, among which we intend to report those described in paragraphs a follow as "good practices" applicable in the Adriatic, Ionian and river ports.

Good Practice 1: Port area monitoring plans

The area of the port of Ancona is the subject of various monitoring campaigns of environmental matrices, including:

1. Coastal marine waters;
2. Bathing waters;
3. Sediments deriving from dredging activities.

In addition to these, in the port of Ancona are applied:

- the environmental monitoring plan of the sediment tank;
- the Atmospheric Pollution Project (P.I.A.).

Quality of coastal marine water bodies

With regard to the monitoring of coastal marine waters, the Regional Agency for Environmental Protection of the Marche Region (ARPAM) published in 2019, the "Report on coastal marine water bodies in the three-year period 2015-2017". The activities carried out led to the classification of water bodies and provided for the assessment of both the ecological status of water bodies, by analyzing the elements of biological, chemical and physico-chemical quality, and the assessment of the chemical status by researching and quantifying dangerous substances. priorities indicated at Community level.

The ecological status of coastal marine waters obtained following the monitoring conducted by ARPAM for the three-year period 2015-2017 is summarized in the following table. The water bodies closest to the area under examination are highlighted in red.

Table 21 - Ecological status of the water bodies of the Marche Region (three-year period 2015 - 2017).

WATER BODY CODE	NAME	CLOROFILLLA A CLASS	MACRO INVERTEBRATE CLASS	TRIX CLASS	STATE PARAMETERS CHEMICALS IN SUPPORT	ECOLOGICAL STATE
IT11.R_COSTA_UF01_01.A	Gabicce	Not monitored, merged with the Emilia-Romagna water body				
IT11.R_COSTA_UF02_02.A	San Bartolo	HIGH	NOT CLASSIFIED	GOOD	GOOD	GOOD
IT11.R_COSTA_UF03_12.A	Pesaro - Fano	HIGH	HIGH	GOOD	MODERATE	MODERATE
IT11.R_COSTA_UF03_12.B	Fano - Senigallia	HIGH	HIGH	GOOD	GOOD	GOOD
IT11.R_COSTA_UF03_12.C	Senigallia-Ancona	HIGH	HIGH	MODERATE	MODERATE	MODERATE
IT11.R_COSTA_UF13_13.A	Ancona - Numana	HIGH	HIGH	GOOD	GOOD	GOOD
IT11.R_COSTA_UF14_22.A	Numana - Porto Recanati	HIGH	HIGH	MODERATE	GOOD	MODERATE
IT11.R_COSTA_UF14_22.B	Porto Recanati - Civitanova	HIGH	HIGH	GOOD	GOOD	MODERATE
IT11.R_COSTA_UF14_22.C	Civitanova - Porto San Giorgio	HIGH	HIGH	GOOD	GOOD	MODERATE
IT11.R_COSTA_UF23_24.A	Porto San Giorgio - Grottammare	HIGH	HIGH	GOOD	GOOD	MODERATE
IT11.R_COSTA_UF25_27.A	Grottammare – San Benedetto(1*)	HIGH	HIGH	GOOD	GOOD	MODERATE
IT11.R_COSTA_UF25_27.B	Porto di San Benedetto del Tronto - Fiume Tronto	HIGH	HIGH	GOOD	GOOD	MODERATE
(1*) Not monitored directly but merged with the water body located to the south (Port of San Benedetto del Tronto - River Tronto)						

The table below shows the chemical status obtained on each water body and the indication of the parameter that has exceeded the standard; exceeding the standard in water does not lead to a downgrading of the chemical status.

Table 22 - Chemical status obtained on each water body. Elaborated by ARPAM

WATER BODY CODE	SWB NAME	CHEMICAL STATUS	Parameter exceeded
IT11.R_COSTA_UF01_01.A	Gabicce	Merged with Emilia-Romagna	
IT11.R_COSTA_UF02_02.A	San Bartolo	GOOD	Lead (SQA-MA water); Cadmium (SQA -CMA water); Mercury (SQA -CMA water)
IT11.R_COSTA_UF03_12.A	Pesaro - Fano	GOOD	Lead (SQA -MA water)
IT11.R_COSTA_UF03_12.B	Fano - Senigallia	GOOD	Lead (SQA -MA e CMA water); Mercury (SQA -CMA water)
IT11.R_COSTA_UF03_12.C	Senigallia - Ancona	GOOD	Lead (SQA -MA water); Cadmium (SQA -MA water);
IT11.R_COSTA_UF13_13.A	Ancona - Numana	GOOD	Lead (SQA -MA water); Cadmium (SQA -MA water);
IT11.R_COSTA_UF14_22.A	Numana - Porto Recanati	GOOD	Lead (SQA -MA water); Mercury (SQA -CMA water)
IT11.R_COSTA_UF14_22.B	Porto Recanati - Civitanova	GOOD	
IT11.R_COSTA_UF14_22.C	Civitanova - Porto San Giorgio	BAD	Mercury (SQA -MA sediments)
IT11.R_COSTA_UF23_24.A	Porto San Giorgio - Grottammare	BAD	Mercury (SQA -MA sediments)
IT11.R_COSTA_UF25_27.A	Grottammare - San Benedetto (1*)	BAD	
IT11.R_COSTA_UF25_27.B	Porto di San Benedetto del Tronto - Fiume Tronto	BAD	Mercury (SQA -CMA water/ SQA -MA sediments)

(1*) Not monitored directly but merged with the water body located to the south (Port of San Benedetto del Tronto - River Tronto)

Bathing water quality

During the 2020 bathing season, as in the previous four (2016-2019), the ARPAM carried out some monitoring activities of the waters intended for bathing in the Marche Region in order to protect and protect the health of bathers and at the same time to improve and protection of the water resource. Following the monitoring carried out during the 2020 bathing season, ARPAM published in October 2020 the "Report on the quality of bathing water", which shows that in 2020 there was a widespread improvement in the quality classes of bathing waters in the Marche region, in fact 31 of the 254 waters have improved their quality and only in one case has there been a deterioration.

The results obtained by the Agency for the last bathing season are summarized in the following graph:

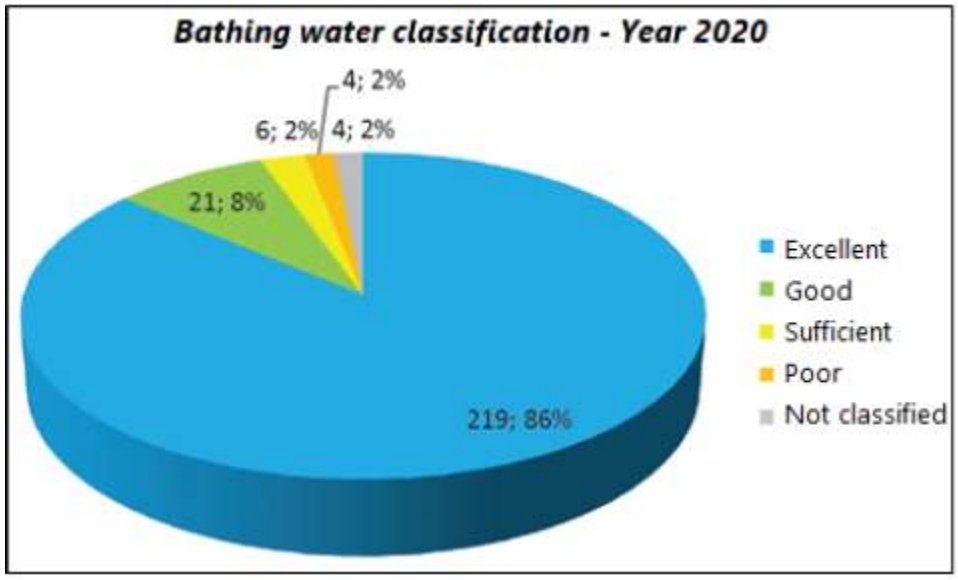


Figure 33 - Bathing water classification - year 2020 - Elaborated by ARPAM.

In the 2020 season, the Marche bathing waters were awarded the **Excellent class in 219 cases** (200 in 2019) and the **Good class in 21 cases** (31 in 2019), confirming the excellent performance of the coast in 94% of the points monitored. Only **6 waters** were found to be **sufficient** and only **4 scarce**.

Characterization of sediments deriving from dredging activities

In the port of Ancona various dredging operations were carried out by the Central Adriatic Port Authority (ADSP MAC) or by the concessionaires with the support of the ADSP from a technical and authorization point of view, various dredging operations, activities already in place in 2017 - 2020 and which continue to represent one of the main challenges of the ports of the Central Adriatic Sea.
In fact, the MAC ADSP for the Port of Ancona in the next three years provides for the start of some works, including:
- Dredging of the stretch of water in front of the quays from n. 19 to n. 25, in accordance with the "2008 Dredging Agreement";

- Dredging of the stretch of water in front of quay 26 of the port of Ancona and maintenance of the seabed of the port;

- Design of the dredging of the stretch of water in front of the new straight quay of the port of Ancona.

The discipline of the methods and technical standards for the authorization of diving into the sea of excavated seabed materials is regulated in Italy by the **Ministerial Decree of 15 July 2016, no. 173**, "Regulation laying down technical procedures and criteria for the authorization of the immersion in the sea of excavated seabed materials", which also indicates the modalities with which to carry out the nourishment and the transfer in conterminated areas in relation to the dredged sediments and/or conferred in areas not included in a Site of National Interest (SIN). The decree distinguishes different management methods: deliberate

immersion in the sea, nourishment interventions, immersion in a confined environment. Hierarchically, immersion in the sea is to be considered as the last option, after nourishment and immersion in a confined environment.

Therefore, with reference to the characterization of the sediments resulting from the dredging activities carried out in the Port of Ancona, the results obtained following the survey campaign carried out in 2020, from the application of the weighted integration criteria implemented by the Ministerial Decree n. 173/2016, the processing of the chemical hazard and the ecotoxicological hazard of sediments, integrated to process the "Quality Class" of the sediments analyzed following the various sampling campaigns performed.

In particular, for the characterization of the sediments deriving from the construction activities of quay 27 of the port of Ancona, an exemplary extract of the classification is reported. Specifically, the following elements were determined for each sediment sample:

- the percentage of pelite,
- the ecotoxicological hazard class,
- the percentage contribution provided to this danger by the elutriate,
- the chemical hazard class,
- the overall Quality Class of the material.

Table 23 - Sediment quality classification of Quay n. 27 - Port of Ancona - Example extract.

Monitoring station	Depht	Ecotoxicological hazard level	% Elutriato	Chemical hazard level	% Pelite	Material quality class	Notes
S01	0-50	MEDIUM	12.0	HQc(L2) <= Low	76.6	C	
	50-100	ABSENT	10.0	HQc(L2) <= Negligible	64.2	A	*1
	100-200	ABSENT	43.0	HQc(L2) <= Negligible	46.5	A	*2
	200-400	ABSENT	100.0	HQc(L2) <= Negligible	45.1	A	
	400-600	ABSENT	90.1	HQc(L2) <= Negligible	37.9	A	
	600-700	ABSENT	100.0	HQc(L2) <= Negligible	30.9	A	
S02	0-50	MEDIUM	68.6	HQc(L2) <= Low	71.7	C	
	50-100	HIGH	42.7	HQc(L2) <= Low	76.9	D	
	100-200	MEDIUM	72.7	HQc(L2) <= Low	39.1	C	
	200-400	ABSENT	62.3	HQc(L2) <= Negligible	33.8	A	*2
	400-600	ABSENT	67.0	HQc(L2) <= Negligible	40.9	A	
	600-800	ABSENT	100.0	HQc(L2) <= Negligible	39.1	A	
	800-1000	ABSENT	100.0	HQc(L2) <= Negligible	36.3	A	
	1000-1150	ABSENT	100.0	HQc(L2) <= Negligible	40.7	A	

*1: Values higher than those indicated for nourishment revealed (Technical Annex, Note 7 Tab. 2.5, Ministerial Decree 173/2016)
*2: Pelite higher than that indicated for nourishment revealed (Technical Annex of Ministerial Decree 173/2016, Figure 7)

Environmental monitoring plan of the sediment tank

Within the Port of Ancona, a sediment tank was built to receive the sediments from the excavation of the seabed of the port itself and other minor ports of the Marche. The tank has a final capacity of 145,000 m_3 (considering the achievement of the altitude equal to approximately +0.7 meters above sea level) and was built by choosing a technical solution that would allow it to accommodate sediments of quality classes B2 and C1, to pursuant to the then current Regional Council Determination 255/09, which represented the highest degree of pollution present in the sediments that can be conferred in a sealed sealed environment, according to the classification provided by the "Manual for the handling of marine sediments" drawn up by ICRAM - APAT ". As established by the successor Legislative Decree 173/2016 "Regulation laying down procedures and technical criteria for the authorization of immersion in the sea of excavated seabed materials", issued pursuant to art. 109 of Legislative Decree 152/2006, the sediment tank can now be used for sediments of quality classes C, D and possibly E, subject to specific risk assessment, as required by point 2.8 "Management options" of the Annex Technician of the aforementioned decree.

In accordance with the provisions of the Disciplinary of the Marche Region of 12/05/2016, the CNR-ISMAR of Ancona has been commissioned by the Ancona Port Authority to draw up and implement a monitoring program aimed at identifying and reducing any impacts caused by the operations of spillage of sediments inside the tank and, above all, from the opening of the gates, with which the tank is equipped, on the surrounding marine environment.

The proposed monitoring program includes an *ante operam* phase, an *in itinere* and a *post operam* phase, with some investigations to be carried out continuously starting from the *ante operam* phase, in order to collect data on hydrodynamics and characteristics physical and chemical of waters, sediments and benthic communities in the stretch of water adjacent to the backfill basin and a series of investigations to be carried out in conjunction with the opening of the gates.

The environmental monitoring plan of the sediment tank of the port of Ancona was drawn up by distinguishing the survey areas and the various environmental matrices examined. In particular, water samples were taken both inside and outside the tank and sediments in the area outside the sediment tank.

Atmospheric Pollution Project (PIA)

As part of the monitoring of pollution in the port area, the Central Adriatic Port Authority is the promoter, collaborator and implementer, in collaboration with the Municipality of Ancona and the Marche Region, for the realization of the Atmospheric Pollution Project (PIA) for the protection of the population from aerobiological pollution and fine dust, approved with Regional Council Resolution no. 621/2018.

The project analyzes and examines in detail the actual impact of emissions and fallout in the territory of the Municipality of Ancona.
The agreement between the Marche Region, the Municipality of Ancona and the Central Adriatic Ports Authority is aimed at improving knowledge on the exposure of the population

to allergenic pollens and their potential interaction with atmospheric pollutants such as fine dust (PM10 - PM2,5).

Having acknowledged that the protection of air quality is a priority in any environmental protection policy, in compliance with Legislative Decree no. 155/2010, "Implementation of Directive 2008/50/EC on ambient air quality and cleaner air in Europe", the Marche Region has been assigned the institutional competence to avoid, prevent or reduce the harmful effects of atmospheric pollution phenomena on the human health and the environment as a whole.

At the basis of the Ancona Pollution Project (P.I.A.), a methodological document scheme was drawn up containing objectives, actions, expected results and a financial plan of the project.

The strategic objectives that the firm aims to achieve can be summarized as follows:

1. improve the management of pollen allergy in the population, urban and non-urban, through the use of Aerobiological Information systems and suspended particulates (PM_{10} - $PM_{2,5}$) with the aim of obtaining a better quality of life and direct and indirect reduction of the costs of the Regional Health Service;
2. evaluate the exposure of the population to pollen and their potential interaction with PM_{10} - $PM_{2,5}$ pollution;
3. increase the awareness of institutions, local communities, local health services, legislators, consumers, on the importance of integrated information for improving health among people suffering from pollen allergies and chronic cardio-pulmonary diseases;
4. raise awareness of possible life changes and preventive measures among those suffering from pollen allergies or cardio-pulmonary diseases through the use of aerobiological information systems and chemical-physical composition of the air and supporting educational initiatives aimed at reducing the risk for the most sensitive populations (children and the elderly).

The above objectives can be achieved through the following actions:

- establishment of an Integrated Information System (IIS) which includes communication of the weekly quantity of the various types of pollen, fungal spores and chemical air pollutants (PM_{10} - $PM_{2,5}$);
- assessment of the state of health of patients suffering from cardiorespiratory and neurological diseases, with particular attention to more sensitive groups (children, elderly);
- development of studies-initiatives concerning the use of potentially less allergenic plants;
- an effective mapping also of rural environments on the allergenic profile and that of chemical pollution by suspended particulate;
- communication and dissemination of the results of the PIA to the scientific community.

These actions will make it possible to achieve the following results:

- the creation of a centralized database with data from the PIA;
- the creation of educational/information campaigns for the promotion of better lifestyles and the prevention of related pollution pathologies;

- the creation of a map of rural and urban environments that facilitate the reduction of pollution and the greenhouse effect and are little or no allergenic; - the increase of knowledge about the effects of the interaction between pollen and suspended particulate in order to guide political decisions towards the best environmental and health choices.

Good Practice 2: Adoption of the Environmental Energy Planning Document (DEASP)

Liquefied Natural Gas (LNG)

Significant reductions in the emission limits for shipping are expected in the coming decades. This request will push towards the adoption of new technologies and fuels with a lower environmental impact. Liquefied Natural Gas is a very promising alternative to current fuels to contain CO_2, SOx, NOx emissions induced by Ro-Ro and passenger maritime traffic.
The study of the LNG Supply and Distribution System in the Port of Ancona, commissioned in 2017, is part of the GAINN4MOS initiative, an action promoted by the European Commission among a number of Member States aimed at developing the use of LNG (Liquefied Natural Gas) on means of transport with high installed power (shipping and heavy road transport), promoting the construction of coastal deposits distributed along the Atlantic and Mediterranean coasts.

The goal is to address the challenges posed by the sulfur directive (2012/33/EU) and the directive on the infrastructure necessary for the use of clean alternative fuels (2014/94/EU). In fact, the European Commission, with the European Directive 2014/94/EU on the development of an infrastructure for alternative fuels (DAFI), has established that the Member States adopt, by 2016, development plans for the various alternative sources for the transport sector. LNG is also placed in this context, for which the Directive provides that, through their respective national strategic frameworks, Member States ensure that, within predetermined terms, an adequate number of refueling points for LNG are created both in seaports. and in the roads belonging to the TEN-T core network (Trans-European Transport Network) and in the main inland waterway ports and are required to favor an adequate distribution system for the distribution of LNG in their respective territory, including loading facilities for LNG tank vehicles.

The aim is to reduce the environmental impact of diesel engines in sea and road transport, as well as to reduce operating costs for users of diesel engines and to develop the use of LNG, which, as an alternative to fuels current, allows the zeroing of SOx and particulate matter, a drastic reduction of NOx and CO and a moderate reduction of CO_2, and therefore contributes to the improvement of environmental qualities, together with the use of renewable energy sources.

In this context, the port of Ancona, characterized by an important activity of marine vehicles and a dynamic and infrastructured hinterland, has been identified as one of the possible “core” ports of the Italian network for the storage and distribution of LNG on the national territory. The goal of the work was to provide a technical-economic framework for a supply and distribution system for liquefied natural gas (LNG) in the port of Ancona. In particular, the study consisted of carrying out the following activities:

- Analysis of the potential and future demand for LNG, considering:
  - the refueling and / or possible conversion of land and sea vehicles;
  - an area of influence that includes the Marche, Umbria, Abruzzo, Molise and a part of Emilia-Romagna;
  - different temporal and development scenarios, referable primarily to the provisions contained in the European directives 2014/94 / EU and 2012/33 / EU and in Annex VI of the MARPOL Convention.
- Rough sizing and choice of storage system technology (storage capacity, type and number of tanks).
- Analysis of possible solutions for the supply and distribution of LNG.
- Production of the block diagram of the terminal.
- Preliminary analysis on the security of the terminal.
- Definition of the layout and requirements required for the installation area (necessary surface, proximity to the docks for docking ships, connections to ordinary roads, etc.).
- Recognition of the regulatory and authorization specificities relating to the development hypotheses identified.
- Synthetic programmatic / temporal and economic framework of the solutions identified.

Cold ironing in the port of Ancona

In recent years, the port has seen a constant increase in traffic and therefore a consequent increase in the emission of pollutants in the area. The phenomenon is due both to the maneuvering movements of the ships and to the stationing of the same on the quay and to the vehicle loading and unloading. The Central Adriatic Port Authority thus began to take an interest in this aspect of the environmental issue as well.

Below is a brief representation of a plant solution for satisfying the energy demand of ships while stationed in port, annexed to the adopted Environmental Energy Planning Document of the Port System which, to overcome the problem of the high cost of electricity in Italy, proposes a trigenerative production system to produce the necessary energy on site. The power plant, powered by natural gas, in addition to energy for ships, produces a thermal residue that is used for the air conditioning of buildings located in the port area. This is made possible by the design of a highly efficient district heating network. In addition, a compressed air storage system is envisaged to still satisfy the maximum power request but with a lower power plant, exploiting the energy accumulated in the moments of lower demand. The technique allows to level the load, which is highly dynamic, as it depends on the presence of ships in port. This has been designed both to allow the system to always operate at its size power and consequently have a maximum yield and to reduce investment costs thanks to the installation of a smaller power plant, even if this second aspect is compensated by the cost of the storage system itself. The lower part of the electrical load is then satisfied by the power plant, the peaks by the energy storage system. If the latter is not sufficient, we resort to withdrawing electricity from the national grid. First, we moved on to identifying the docks to be electrified and the buildings to be air-conditioned with the district heating network.

The proposed electrification of the docks in the port of Ancona concerns the passenger sector, in particular that of ferries. They are characterized by a fairly regular frequency of arrivals and departures, although variable during the seasons of the year. Furthermore, they do not require particularly high powers, as is the case for example in the case of cruise ships. The latter may be the subject of a subsequent study, as works are planned in the port for the construction of a new quay specifically dedicated to this type of ship.

Ancona Blue Agreement

The Ancona Blue Agreement constitutes a voluntary agreement between the Central Adriatic Port Authority and the Harbour Office of Ancona on the one hand, and the shipowners/shipping companies of the participating ferries on the other, in collaboration with the local shipping agencies. The agreement, signed in November 2018, intervenes on the sulfur content of the fuels used, reduced to 0,1% for the main and auxiliary engines from the completion of the mooring maneuver in port and up to the departure and exit of the port, compared to the 1,5% required by law.

The agreement is part of the implementation of interventions aimed at reducing atmospheric emissions from ships, which constitutes a primary commitment for the Administrations and operators in the sector, in particular given the prospect of the Ancona port basin in the urban center of the city. In fact, the ferries that climb the port of Ancona, mooring adjacent to the city center, are found to operate in the vicinity of heavily man-made areas and therefore can contribute, in association with other factors, to affect the general state of the surrounding air quality.

In order to contribute to the containment of atmospheric pollution levels in urban areas, with particular reference to sulfur emissions into the atmosphere, it was also considered appropriate to intervene on the use of fuels for marine use, also given the obligation of current legislation in on the use of fuels by ships (Legislative Decree no.205 of 09 November 2007), or the use of "marine diesel oil with a sulfur content of less than 0,1%" for ships at mooring, starting from 1 January 2010, providing for the introduction of more stringent limits than those established by current Community and national legislation on the sulfur content of marine fuels, which can also be achieved through the adoption of voluntary agreements between the parties, without prejudice to the limits imposed by current legislation.

All this in compliance with the provisions of the International Maritime Organization and the European Union in the international regulatory framework aimed at prohibiting, starting from 1 January 2020, the use of fuels for maritime use with sulfur content higher than 0,5% in all Member States.

The need to mitigate the phenomenon of the emission into the atmosphere of the combustion gases produced by the ships that pass through the port of Ancona, located in the immediate vicinity of the urban agglomerations, has been shared by the shipowners/shipping companies, through the adoption of measures and voluntary technical measures.

Under the agreement, the signatory shipowners/shipping companies undertake to operate the main and auxiliary engines of the ships they operate with marine fuel with a sulfur content not exceeding 0,10% by mass from completion. of the mooring maneuver in the port, for the

entire duration of the stop (regardless of the stop period communicated and made public, even if less than 2 hours), as well as during the unmooring and navigation phases from the quay assigned to the pilot station.

The agreement also provides for good management practices for ship machinery, aimed at further reducing, compared to the provisions of current legislation, the harmful emissions of the exhaust gases produced by them, in order therefore to adopt all technical measures and good practices. for the containment of exhaust gas emissions into the atmosphere, also paying particular attention to engine maintenance with more frequent intervention intervals than the standard set by the plans of the individual companies.

On the other hand, the Harbour Office, responsible for preparing the docking plan, as part of the agreement, undertakes to optimize the order of entry and exit of the ships by communicating it in time to the ships concerned, while the Central Adriatic Port Authority undertakes, in relation to any changes mentioned above, to monitor and consequently to optimize the organization of the processes of embarkation and disembarkation of ships in collaboration with the maritime agencies and institutions responsible for entry and exit controls from the port.

Good Practice 3: Collection and management plan for ship-generated waste and cargo residues

The measures to carry out the activities related to waste management are proposed below as best practice, i.e. the **Plan for the collection and management of waste produced by ships and cargo residues**, which the AdSP MAC has prepared and approved with Resolution of the Regional Council of the Marche Region n. 1513 of 29 October 2012, recently being updated to Revision no. 2 of 24 March 2021, soon to be approved.

The Plan provides a detailed description of the management of some types of waste (the most common), however it is not to be considered exhaustive and does not exclude or preclude the management of other types of waste not mentioned but still manageable with the current plant structure. / management.

In particular, the management of:

- “Garbage” food waste (sterilized and non-sterilized);
- Liquid waste;
- Load residues;
- Filters, oils and exhausted batteries;
- Non-hazardous waste;
- Other hazardous waste;
- Waste produced by pleasure craft, fishing boats and smaller vessels;
- Waste from the cleaning of water bodies;
- Litter accidentally found at sea.

The Plan is updated every three years and, in any case, in the presence of significant changes in the management of the Port. It is structured according to an "open" system which, in the context of defined strategic choices, delegates the definition of technical-regulatory elements subject to rapid updates to other administrative tools, which are subject to rapid updates (e.g. call for tenders and service performance specifications, local regulations, tariff ordinances, etc.).

In addition to the methods of organizing the service, in the aforementioned Plan it is possible to find, among other information:

- The description of the port, with the relative historical data on traffic, the types of waste collected and the services provided;
- The facilities for the disposal and recovery of waste produced by ships, pleasure boats and fishing boats and cargo residues;
- The tariff regime, both for ships and pleasure craft, fishing boats, small vessels and other vessels;
- The estimate of the costs of the port facilities, also in terms of human resources for the performance of the service, the material resources and the framework of management costs and facilities;
- The Integrated Information System, with relative description, information activities for port users and the information process scheme;
- The guidelines for awarding the service (authorizations, concession reports);
- Identification of the person responsible for implementing the plan.

The details of the articulation of the plan can be found in **deliverable T1.2.1**.

4.2 Greece – Igoumenitsa Port Authority S.A.

IPA S.A has already adopted the most well-known protocols and standards relevant to Port activities. However, in this chapter, two more protocols/ standards were identified and are suggested as best practices.

Best practice 1 (ISO 16304: 2018) regards the arrangement and management of port waste reception facilities. Currently IPA S.A has transferred to external companies the reception, management, and final disposal of waste from ships visiting the port, as a contract work. In case IPA S.A decides to develop port reception facilities at its site, it is suggested to take into consideration and apply ISO 16304: 2018.

Best practice 2 (GRI Standards for Sustainability Reporting) regards structured guidelines supporting organisations, including ports, to draft their Sustainability Reports. IPA S.A currently develops Sustainability Reports, thus adoption of the GRI Standards could be a suggestion for IPA S.A in order to enhance its reporting procedures.

Good Practice 1: ISO 16304: 2018 "Ships and marine technology — Marine environment protection — Arrangement and management of port waste reception facilities"

ISO 16304: 2018 provides a method for addressing ship generated waste and cargo residues from when they are offloaded from the ship, to how they are managed ashore. The provision,

operation and use of Port Reception Facilities (PRFs) are inherently linked, so ISO 16304 addresses the design of PRFs, and their operation and management. It is designed to be used by ports and terminals with existing PRFs which aim to refine their systems; it can also be used by new ports and terminals that are developing PRFs.

Parties to International Convention for the Prevention of Pollution from Ships (MARPOL) are obligated as Port States to ensure that PRFs adequate to meet the needs of the ships using them without causing undue delay are provided at their ports and terminals. MARPOL does not seek to regulate the management of ship generated waste and cargo residues at ports and terminals beyond the reception facility requirement. However, ports and terminals may need to consider national, regional and local regulations. While these regulations can exceed the scope of MARPOL, the International Maritime Organisation (IMO) recognises the need to manage ship generated waste and cargo residues at ports and terminals as part of an environmentally sound management approach for avoiding, minimising, and eliminating pollution from ships.

In consideration of above, ISO 16304:2018 applies to the management of ship generated waste and cargo residues regulated by MARPOL that are discharged at ports and terminals. It also covers principles and issues that should be considered in the development of a Port Waste Management Plan (PWMP) its implementation and PRF operations. The operation of any PRF is governed by the principles and procedures included in PWMP. The procedures to operate the PRF and the development of a PWMP are closely linked and therefore are integrated into this Standard.

ISO 16304: 2018 addresses the principles and issues that should be considered in:

- The development of a port waste management strategy;
- The design and operation of PRF;
- PWMP development, implementation and compliance; and
- PRF management and accountability.

The Standard has been designed to be used by ports and terminals of any size. It does not give specifics on the size or location of a PRF in each port, but provides a list of principles to be considered and applied to any size of type of port or terminal (e.g. marina, fishing port, container terminal, oil terminal, roll on/roll off terminal, cruise terminal, ferry terminal, bulk or general cargo terminal, ship repair or recycling facility, and offshore terminal). Inland ports and marinas and those ports that have entered regional arrangements for the provision of a PRF can also use ISO 16304.

ISO 16304 is meant to complement ISO 14001 by adding a component that extends its principles to management of ships' waste in ports. It can be incorporated easily into other plans for achieving ISO 14001 accreditation, as an extension that focuses on PRF. Conversely, the processes put in place during the preparations for ISO 14001 accreditation will assist in meeting the development of a holistic Port Waste Management Plan under ISO 16304.

Good Practice 2: Global Reporting Initiative (GRI) Sustainability Reporting Standards

The Global Reporting Initiative (GRI) Sustainability Reporting Standards are the most widely used standards for sustainability reporting. The GRI Standards are used by different types of organisations throughout the world, including ports, as a global common language in order to communicate their economic, environmental, and social performance.

The GRI Standards help Organisations increase their transparency and communicate both their positive and negative impacts on sustainable development. The GRI Standards enable consistent and high-quality sustainability reporting, which helps organisations meet the needs of their stakeholders for comparable and reliable data. Any organisation, large or small, private, or public, regardless of sector, location, and reporting experience, can use the GRI Standards to report on its impacts in a standardized and comparable way.

Each Organisation reports on topics that reflect the organisation's significant economic, environmental, and social impacts and that are important to its stakeholders. With the GRI Standards, these are the "material topics" that the organisation reports on. The organisation's material topics are determined based on the organisation's activities and business relationships. Some of the aspects that ports deem important to report include promoting transparency in their management and sustainability actions, strengthening their performance, allowing communication with their stakeholders and meeting their expectations and responding to clients and competition, as well as developing a solid corporate image and a valuable reputation over time.

The use of the GRI Standards is self-declarative, meaning that each Organisation must indicate whether the report has been prepared in accordance with the GRI Standards following the criteria stipulated in GRI 101: Foundation. Reporting Organisations are required to comply with the Reporting Principles for defining report quality contained in GRI 101: Foundation on reporting reliable and quality information.

The GRI Standards are aligned with widely recognized international instruments for responsible business behavior. Organisations can also use the Standards to report on their impacts and progress on the SDGs. Since the adoption of the 2030 Agenda for Sustainable Development, GRI has developed guidance for companies to integrate these Goals into reporting practice, with the GRI Standards at the core.

4.3 Croatia – Zadar County Rural Development Agency

Good Practice 1: Respect the City – action plan

Although it is an initiative launched by the City of Dubrovnik, Croatia, and not the Port Authority, this example is an excellent example of cooperation between key actors in environmental management, waste management and promoting the sustainability of the destination.

Respect the City – Respect the City for a sustainable future of Dubrovnik Respect the City (RTC) is a with an action plan. It is comprised of a set of short-term, medium-

term and long-term measures and activities focused on Dubrovnik as the leader in sustainable and responsible tourism in the Mediterranean.

Having recognized the need for both urgent and systematic action based on sustainable models of development of the city and of tourism as its primary economic activity, the City of Dubrovnik has launched the initiative Respect the City. Its aim is to reduce negative effects of overtourism through continued cooperation of stakeholders and a combination of measures and solutions.

The conservation of cultural heritage, the quality of citizens' daily lives and ensuring the best possible experience of Dubrovnik as a destination for its visitors – all those are motives for this shift in destination management. Already during the first year since the launch of the project, Respect the City attracted the attention of international media and the global tourist sector, whereas Dubrovnik is increasingly becoming perceived as a city which has started managing its tourism in a sustainable way.

Figure 34 – Respect the city of Dubrovnik

Good Practice 2: Waste management in the Port of Dover

Waste initiatives have been put in place at the Port of Dover, in order to recognise the value of the waste products generated and increase the sustainability of not only the operations of the harbour authority but those operating within the port estate.

Separate Waste Management Plans are in place for ships waste and port-generated waste. Annual targets are set to reduce waste to landfill and increase recycling for the general waste produced across the port estate. By working with our waste contractors to increase recycling and energy from waste we are on target to achieve a significant 90% landfill avoidance for this general waste stream. Information about changes to the waste service and performance against targets is provided to the main operators within the port community through quarterly meetings and newsletters.

Waste charges have been revised to reflect the value of recyclable waste products and encourage our customers to segregate and recycle and larger receptacles have been designed to reduce transport costs and emissions.

Particular success has also been achieved through the development of a paving framework agreement to cover the paving requirements for all landside infrastructure within the port. Instead of pricing and tendering each paving job separately, the framework takes a long term view of all the paving maintenance requirements within the port. This enables strategic decision making, which improves the efficiency and economies of scale associated with the works. Recycling capabilities and environmental performance were key criteria in selecting the principal contractor. In 2011, 82% of all wastes produced by the framework were recycled into clean aggregate, concrete and road sub base.

Links:

Performance against waste targets and further details of the measures implemented can be found in our annual environmental bulletin available on the Port of Dover website at the following link:

http://www.doverport.co.uk/?page=AnnualReports

The Ships waste Management Plan is also available at:

http://www.doverport.co.uk/_assets/client/images/collateral/Ships%20WMP%20ammended.pdf

Figure 35 – Waste management in the Port of Dover

Good Practice 3: Waste alternative Management System

The Port of Piraeus, Greece (PPA SA) has done a thorough audit within all port area in order to identify the possible sources of recyclable waste. After the identification of the waste streams, a Handbook on alternative waste management was elaborated and an appropriate management system was put in place. The Handbook includes all the procedures and steps that port employees should follow for appropriate waste management and it has been circulated to all the relevant personnel of PPA SA.

Overall, the following procedure has been implemented:

- PPA SA cooperates with the respective recycling companies which have been authorized by the Hellenic Ministry.
- In every field of activity the appropriate number and type of bins and containers for the waste collection have been assigned.
- In each activity sector (e.g. workshop, offices) there has been designated personnel in charge of supervising the waste collection and the implementation of the waste delivery process.
- The recyclable waste is collected and the relevant delivery documents are issued.

The implementation of this system was started in 2005 in a pilot framework, incorporating gradually all possible recyclable waste streams. The system has been further and fully developed in 2009. It is worth noting that certain practices, such as the management of waste toners and cartridges, are not regulated obligations but voluntary initiatives that support the PPA's environmental policy.

The implementation of this waste management system and the relevant record keeping on quantities and types of waste delivered, led to achievements such as the avoidance of bins overflowing and the maintenance of a cleaner port. After the entry into force of the system and its gradual development, the abovementioned waste are managed separately by the

biodegradable and common domestic waste, reducing the waste disposed in landfills, saving energy and natural resources, while ensuring environmental protection and public health. This practice has also enhanced the active participation of port employees to PPA SA waste alternative management and thus their environmental awareness as well.

The system is based on the principle of waste transport routes optimization avoiding unnecessary internal routes for the transport of small quantities to a central collection point, as waste delivery is done at the production sites. Moreover, due to the reuse, recovery and recycling of the specific waste (reduced amounts of waste disposed in landfills), the contribution of port activities in air emissions associated with global warming have been decreased. Furthermore, the implementation of the system allows the assessment of the contribution of each activity in waste production and the identification of corrective actions, where appropriate.

Links:

http://www.olp.gr/en/nature-protection/nature-quality

Good Practice 4: Collection and temporary storage of waste generated by small boats

Port of Setubal and Sesimbra (APSS), Portugal, enables and provides means of collection and temporary storage of waste generated by small boats using the best techniques available. Containers for waste contaminated with hydrocarbons, equipped with sump, and wherein the cover container for used oil and has double wall flag strokes. The volume of containers also allows a high turnover and ease of use, allowing high safety standards. In addition, the users of recreational docks are encouraged to adopt good environmental practices, particularly regarding the management of waste generated by they own. The provision of suitable equipment for waste collection, creates conditions to make the source separation improves the efficiency of waste management, increasing the amount that you can enter in recovery circuits.

Figure 36 – Collection and temporary storage of waste generated by small boats

4.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Good Practice 1: Sustainability Practices in Port Operations

Sustainability strategies achieving long-term viability in the face of economic uncertainty, low environmental and social impacts are critical for sustainable development of maritime operations. Accordingly, integrating the consideration of sustainability into all activities in and around a port is part of an aim to be a sustainable and efficient port. Annual sustainability reports published on port websites suggest guidelines and strategic advice towards port sustainability to address issues related to sustainable port operations and development with economic, social and environmental considerations [25–27]. The suggested issues for "best practices" include: operational efficiency, safety and security in a port, cooperation and communication, monitoring and upgrading port facilities, and environmental management systems. Objectives of these practises embrace: resource, environmental, community and human resource management, continuous growth, and port operators and supply chain management.

During recent years, to address issues related to sustainable port development and operations, as well as to assist decision-making processes oriented towards sustainable development in port industry, a number of international organizations (OECD, IMO, and ESPO) and international ports have devised and proposed guideline and strategic advice towards port sustainability practises. For instance, international association of ports and harbour (IAPH) introduced best practice cases of European ports. The suggested practises in port operations includes reducing financial and environmental risks in ports; upgrading port facilities and equipment to cut operation costs; sustainable building construction in a port/hinterland; enhancing long-term viability of operations; safety and security in a port; resource efficiency; eco-friendly and socially responsible image; improving relationships with key stakeholders; port infrastructure utilization; optimizing the routing of vehicles; vehicle utilization (modal shift); employee productivity improvement; recruitment and retention of employees; social and working environment; expansion of the coastal region facilities; and providing incentives for green practices. In addition, based on thematic analysis, prior study [2] clustered the relevant practices into four sub-dimensions incorporating environmental technologies, continual monitoring and upgrading, internal process improvement, and cooperation and communication.

Table 24 – Sustainable practices

Services	Description	Details
Reducing financial and environmental risks in ports	Banks are concerned about their own legal liabilities, so they are taking a closer look at borrowing companies' eco-efficiency records - More investors are becoming interested in investing in environmentally responsible ports	CO2 emission assessment - Green gas emission assessment - Water quality assessment - Air pollution assessment - FDI (foreign direct investment)

Services	Description	Details
Upgrading port facilities and equipment to cut operation costs	Facilities and equipment improvement - External cost down including pollution, climate change, and other biological damages driving from transport	AMP (Alternative maritime Power) - Tandem spreader - DPF (Diesel particulate filter trap) - e-RTGC (Electric rubber tired gantry crane) - Cold ironing (from inland) - LED street lamp - Solar power cranes
Sustainable building construction in a port/hinterland	- Reducing environmental impacts from construction method - Long-term viability of port facility	- Green building standard (LEED) - Use of noise reduction equipment
Enhancing long-term viability of operations	Using renewable and alternative energy sources for less environmental impacts	Solar energy, wind energy, and tidal energy - Use of CNG (compressed Natural Gas - Use of bio-Diesel, hydrogen fuel - LED (Light Emitting Diode) street lamp - Solar power cranes - Dredging for securing water depth
Safety and security in a port	Reduction of accidents (oil spillage) and noise/light pollution - External cost down including pollution, congestion and accidents	Reduction of accidents from using electronic transport - Public lighting - Auto Monitoring System (AMS)
Resource efficiency	Cutting waste and using natural resources more efficiently can save costs and boost profits	Resource recycling in a port - Sustainable purchasing
Eco-friendly and socially responsible image	Improving 'Green" image, and transparency of port operation	Sustainability report - Incentives to shipping companies and stevedores with eco-friendly equipment
Improving relationships with key stakeholders	Collaboration for minimizing environmental impacts - Environmental groups and businesses are working together more to find solutions	CSR (Cooperate social responsibility) - EMS (Environmental Management System) - Co-operation between stakeholders
Port infrastructure utilization	Improving port infrastructure utilization to minimize congestion in a port - External cost down (congestion, accidents)	Optimum use of space - Efficient gate processing system - Extended gate operating hours
Optimizing the routing of vehicles	Energy/cost efficiency from optimizing the routing of vehicles - External cost down (congestion, accidents and other biological damages driving from transport)	Reduction in road transport - Idling time reduction of ship/truck - AGV (Automatic Vehicle System)

Services	Description	Details
Vehicle utilization (Modal shift)	Employee training/education - The best and brightest young people are more willing to work for environmentally responsible ports	A combination of learning and working activities - Training/education
Recruitment and retention of employees	Job creation - Improving employee's satisfaction	Employee satisfaction - Public infrastructure and architecture for double use
The hinterland social and working environment	Creation of a pleasant life environment	Air quality and climate - Visual impact reduction - Open space and park development
Expansion of the coastal region facilities	Prevention of ocean pollution caused by land activities	Expansion and improve the sewage disposal plants, sewage landfills, waste water disposal plants
Providing incentives for green practices	- Encouraging eco-friendly practices in port activity area	Green ship certification System - Incentives on the new cleaning technology - Green flag incentive program

Some limitations of this present interesting directions for future research. As the theory can be strengthened by utilizing multiple examples, to improve the ability to generalize findings, further studies will be needed to extend the research area, covering the competing global mega container ports. The adoption and implementation of sustainability practice is relevant to attitudes towards responding to the external business environment, such as entrepreneurship and CSR (corporate social responsibility). Therefore, this study recommends that academic attention should be given to the theoretical relationships between attributes such as entrepreneurship and CSR that stimulate the adoption of sustainability practice also required to provide practical implications for port industries.

The »Sustainability Practices in a Port« costs vary according to the individual topic in the proposal, they cannot be estimated - this would require additional studies. The main topics to be estimated are:

- Environmental technologies (new equipment and technology introduction; renewable and alternative energy sources; optimizing the routing of vehicles and ships; vehicle ultičization (modal shift), sustainable building construction)
- Monitoring and upgrading (reducing financial and environemtal risks, improvement of safety and security in a port; upgrading port facilities and equipment, environmental index development)
- Process and quality improvment (joint planning and supply chain integration; port infrastructure utilization; service differentiation; service quality improvement)
- Active participation (training and edcuation; recruitment and retention of employees; waste reduction; providing incentives for green pracitces)
- Communication and cooperation (operational transparecy; exchange of information and knowledge; relationships with key stakeholders).

Good Practice 2: Smart Port

The »Smart Port« includes:

- A smart information system that esures the synchronzation and smooth operation of all traffic and operations at the maritime terminal, through the permanent exchange of data and information., The intelligent information system in an asset to improve the visibility, fluidity, realiability and safety of the marine terminal. It communicates directly with the other sysstems and softwares, namely the radar of the port authority, the cargo community system and also the system of Maritime Business, which allows adapting and improving the level of sevrices. Morever it is accessible from any screen whether it is a computer or tablet.
- A data center: computer data development is forcing the ports to have their own data center to store and analyize all the information of maritime traffic in real time which increases the speed and flexibility of the network and also improves the productivity of the port.
- Cybersecurity: aims to ensure the avaliability, traceability, integrity and confidentiality of information stored and transmitted. This information is threatened by cyberattacks, which can lead to disastrouis consequences such as information theft, remote control of computer systems, sabotage, etc. And sometimes the consequences are at the scale of the country. Then, the risks management of cyberattacks is unvoidable.
- Port automation: automation means the ombination of software,hardware and mechanics. Improving the degree of automation in the port helps to support interaction between different collaborative partners, reduce the number of unnecessary labor, reduce the inactivity rate, ensure speed, reliability, fluidity and traceability, minimize the waste resources and also increase the technical efficency of the port, which is one of the determining factors of productivity.

This suggestion puts the basic pillars of the smart port and it will be relevant to implement the concept in differnet ports to assess quantitatively and qualitatively their benefits. It is essencial to develop new smart port indicators, integrate them into a dynamic performance measurement system and connect the various logistics components in the port area to monitor the evolution of the port. In terms of technological and IT solutions, most solutions are not yet mature to sever the realization of the full vision of the smart port, so further research in this direction would be needed to fill this gap.

The equipment that is needed in this kind of upgrade is as follows:

1. Smart information system (software)

2. Smart ships: equipped with a satelite system, a set of sensors and monitoring equipment, to imporve the system monitoring and control through increasing the quantity ans realiability of exchange data with the port, in real time. In fact the smart ship is connected with the port to collaborate automatically in the planning of the docks, in the preparation of cargo handling operations and work and materials handling and in the organization of truckers to the hour. This improves the management of fleets and minimizes the waiting time of vessels at the dock

and also the time of inactivity. This collaboration between the ship and the port has a considerable marketing impact to make the port smart.

3. Smart container: the container is equiped with a set of sensors that allows collecting data on geolocation, humidity, temperature, vibration, pressure, shock, etc. It communicates remote and directly collected data to the information system, which allows to consult in real time the technical documentation, report damage o reven the plan of maintenacve operations. The smart container gives a constant feedback throughout his trip which gives a gobal vision on the fleed and facilitates the piloting.

4. Automated operations. This concernees the transport, storage and handling of containers inside the terminal. Transportation automation invloves replacing conventional trucks with electronically gudied transport platforms. Then, the storagew operations consist of the use of the rail cranes without operator, thus the operations of storage and extraction of containers are controlled by an automated control system. The dock cranes can be automatic to quickly load and unload ships. The automation of the port terminal internal operations reduces waiting times for ships and trucks and also reduces energy requirements.

Good Practice 3: Circular Economy Network of Ports

Circular economy network of ports, which would provide an innovation ecosystem around the port activity and stimulate circular economy initiatives in ports. All the ports that would join this network would be a part of online platform where there would be information of each port regarding the possibility of which waste is accepted by the port for reuse (metals, plastics, construction materials, biomass, mixed waste, energy, water, etc. and the price-list for the service.

For this reason, some activities would need to be carried out i each port in order for the network to be set up. The basic activities in each port that need to be carried out are as follows:

all ports that would join this network would be published on the online platform, where it would be clear which garbage is being purchased / taken over for new use.

- Mapping of stakeholders including Port Authorities, suppliers and other companies which carry out activities within the port (e.g. start-up incubators). Each partner will seek to bring the regional/national stakeholders from their territory into the network.
- Establishment of links with other related initiatives such as the European Circular Economy Stakeholder Platform. The aim would be to to share experiences and exchange opinions on circular economy solutions in the port sector.
- Definition of the structure, organisation, operating regime, scope and services that will be offered by the network.
- Organisation of internal roundtable discussions on circular economy in each port inviting all the relevant stakeholders. The roundtable discussion would aim at developing a medium and long-term work plan on circular economy within ports.

The consortium would collect needs (e.g. requests for improvements, difficulties) and stakeholder expectations to be considered and compiled in the framework of the various activities and topics foreseen during the project. This interaction with stakeholders would be possible through the organisation of the workshops, enabling:

- Discussion opportunities that arise in the port environment in relation to circular economy as well as the legal, economic, technical and other barriers that prevent or hinder the development of circular economies in the port sector.
- Identify ideas and agreed solutions applicable to specific port problems;
- Facilitate the development of synergies between the different actors in the value chains linked to the port activity.

This network of ports would facilitate the exchange of experiences and good practices, provide policy recommendations and foster the training as well as new business opportunities both in port clusters and other industries related to this environment.
Given that the activity would be common to all ports, a strategy for the implementation of this proposal should be drawn up with the participation and contributions of other ports that decide to accede to this proposal.

As ports play such a crucial role in circular economy, the network of ports will work as a facilitator to find synergies and promote/push all ports to upgrade their current sustainable status in their transitions to a circular economy. By facilitating the connection and communication between stakeholders, it will allow them to easily share their expertise obtained through personal experience in real-life use-cases, allowing the less experienced to familiarise themselves in terms of current best practices related to circular economy and serve as a tool to replicate the practices in their own context/use-cases if possible.

4.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

The Environmental, Health, and Safety (EHS) Guidelines[7] by World Bank Group prescribes the following:

Good Practice 1: EHS Guidelines

Waste Management

The type and amount of solid and liquid wastes associated with port operations may vary significantly depending on the nature of port operations and the types of ships serviced. Wastes originating at the port may include inert solid waste from cargo packaging and from administrative offices, as well as hazardous or potentially hazardous waste associated with vehicle maintenance operations, such as paint, scrap metal, used lubricating oils and engine degreasing solvents. Wastes originating from ships may include oily sludge, inert materials such as food packaging, and food waste. Guidance applicable to port generated wastes, whether hazardous or non-hazardous, is discussed in the General EHS Guidelines. Specific

[7] https://bit.ly/3fiQu9h

pollution prevention, minimization, and control recommendations for ship-generated wastes received by port facilities are outlined below.

General Waste Reception

Port facilities should provide adequate means of receiving and managing effluents and wastes to meet the needs of the port and those of visiting ships that the port is designed to service.

The provision of waste reception facilities should be developed in coordination with the local governments according to their commitments to the MARPOL Conventionas port states. Port waste reception facilities should provideadequate capacity to receive port- and ship-generated wastes, including appropriately sized and located receptacles, and the capacity to deal with seasonal fluctuations.

Ship Wastes

- Information should be available for ship captains to identify solid waste reception facilities and acceptable handling procedures at ports;
- Discharge of solid waste from vessels should be prohibited while in port in accordance with MARPOL and national regulations;
- A collection and disposal system should be developed for ship-generated garbage for ships alongside and at anchor, consistent with the International Maritime Organization (IMO) Comprehensive Manual on Port Reception Facilities. Closable skips should be provided at the berths, and towed or self-propelled barges fitted with skips should be used to collect garbage from ships at anchor; and
- Food waste from ships delivered to the port should be managed according to applicable local regulations intended to protect human and animal health.44 Local requirements may include rendering, incineration, or landfilling of food waste and mixed waste containing food waste.

Hazardous Materials and Oil Management

Hazardous materials at ports typically include large volumes of hazardous cargo, as well as oil, fuels, solvents, lubricants and other hazardous substances used in port activities including vessel, vehicle, equipment and grounds maintenance. Spills may occur due to accidents (e.g., collisions, groundings, fires), equipment failure (e.g., pipelines, hoses, flanges), or improper operating procedures during cargo transfer or fueling, and involve crude oils, refined products or residual fuels, liquid substances, and substances in packaged form. General hazardous materials management is addressed in the General EHS Guidelines. Additional recommended prevention, minimization, and control techniques specific to ports are listed below.

Spill Prevention

Oil and chemical-handling facilities in ports should be located with consideration of natural drainage systems and the presence of environmentally-sensitive areas/receptors (e.g., mangroves, corals, aquaculture projects, and beaches, etc.). Siting of these facilities should include provisions for physical separation/distance to avoid and minimize adverse impacts.

Hazardous materials storage and handling facilities should be constructed away from traffic zones and should include protective mechanisms (e.g., reinforced posts, concrete barriers, etc.) to protect storage areas from vehicle accidents. Covered and ventilated temporary storage areas should be designed to facilitate collection of potentially hazardous leaks and spills, including the use of sloped surfaces to direct spill flows, and the use of catch basins with valve systems to allow spills and releases to enter a dead-end sump from which spilled materials can be pumped/recovered. Where hydraulic equipment is used over or adjacent to water or other sensitive receptors, biodegradable hydraulic oils should be used.

Ports should include secondary containment for above ground liquid storage tanks and tanker truck loading and unloading areas.

Fueling areas should be equipped with containment basins in areas with a high risk of accidental releases of oil or hazardous materials (e.g., fueling or fuel transfer locations). Fuel dispensing equipment should be equipped with "breakaway" hose connections that provide emergency shutdown of flow should the fueling connection be broken by movement. Fueling equipment should be inspected prior to fueling activities to ensure all components are in satisfactory condition.

Spill Control Planning

Port operators should prepare a spill prevention, control, and countermeasure plan consistent with the IMO Manual on Oil Pollution Section II—Contingency Planning, which:

- Identifies areas within the port zone and nearby vicinity that are sensitive to spills and releases of hazardous materials and locations of any water intakes (e.g., cooling water for shore-based industries);
- Outlines responsibilities for managing spills, releases, and other pollution incidents, including reporting and alerting mechanisms to ensure any spillage is reported promptly to the Port Authorities;
- Includes provision of specialized oil spill response equipment (e.g., containment booms, recovery devices, and oil recovery or dispersant application vessels, etc.); and
- Includes regular training schedules and simulated spill incident and response exercises for response personnel in spill alert and reporting procedures, the deployment of spill control equipment, and the emergency care/treatment of people and animals impacted by the spill.

4.6 Albania - Port of Vlora

Good Practice 1: Ship-generated Waste Management Plan

PPA SA has elaborated and implements a *Ship-generated Waste Management Plan*, in line with the European Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, as embodied in Greek Legislation, as well as according to the International Convention Marpol 73/78 for the Prevention of Pollution from Ships.

Through the implementation of this Plan, PPA SA aims at the reduction of discharges into the sea and especially the illegal discharges of ship-generated waste and cargo residues from ships

calling at European ports, by improving the availability and use of port reception facilities, thereby enhancing the protection of the marine environment.

According to this Plan, PPA SA provides port reception facilities, adequate to meet the needs of all kind of ships that normally call at PPA SA port area, without causing them undue delay.

PPA SA, while designing its port reception facilities, takes into consideration the type of ships that normally call at its port area, their operating needs and estimates both the type and amount of waste and cargo residues they generate, in order to ensure the adequacy of the PPA SA port reception facilities.

In the PPA SA Ship-generated Waste Management Plan, waste and cargo residues are categorized according to the International Convention Marpol 73/78, as following:

- Annex I: Oily waste
- Annex II: Noxious liquid substances carried in bulk
- Annex III: Harmful substances carried in packaged form
- Annex IV: Sewage
- Annex V: Garbage
- Annex VI: Ozone-depleting substances

PPA SA provides port reception facilities for all the above-mentioned types of waste and cargo residues, according to the PPA SA Ship-generated Waste Management Plan. According to this Plan, the ship-generated waste management is divided in:

- Liquid waste management
- Solid waste management

An innovative technology on the sewage reception services is applied in the Cruise area. More specific, a permanent sewage network is operated in this area and the cruise ships calling at PPA SA Cruise Terminal may discharge their sewage by connecting to this permanent network, which connects to the urban sewage network with final recipient the Wastewater Treatment Plant of Athens in Psittallia. This permanent port sewage reception network was constructed to meet the increased needs of visiting cruise ships during the Olympic Games ''Athens 2004'' and since then many cruise ships have benefitted due to saving of discharge time. Saving of energy and fuel, reduction of air emissions and traffic congestion avoidance are also achieved, in comparison with delivering cruise ship-generated sewage on tanker trucks.

Good Practice 2: WASCOL system

Responding to the requirements of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, many EU ports have installed reception facilities, implemented waste management plans and developed fee systems. Although in general most of these different practices provide good results, some systems seem to be more effective than others. For several years now the port of Antwerp applies a strong incentive-based fee system, leaving room for an open market for PRF (free choice for ship-owner/agent), combined with astate-of-the-art monitoring and information system. The volumes of ship-generated waste that are being delivered in Antwerp are not only significantly high but are increasing every year. The system is being monitored through a state-of-the-art information

system on ship-generated waste (WASCOL), reducing bureaucracy for the users and increasing transparency. As EMSA considers the WASCOL - system as one of the best practices in EU ports, Antwerp has been invited to present the monitoring and information tool to other EU Member States (SafeSeaNet expert group). The fee system includes a strong incentive towards maximum delivery of ship-generated waste, without limits in terms of maximum volumes. Practices related to ship-generated waste were installed after extensive consultation with all the relevant parties (representatives of PRF, ship agents, Port State Control, environmental administration, etc.) and a forum has been established, were all issues relating to ship-generated waste are being discussed (every 3-4 months). As Port State Control has direct access to the information and monitoring system, the data on ship-generated waste are being used when targeting vessels for inspection.

Plastics have a place at the port, but that place is not in nature. Port of Antwerp is taking various actions aimed at preventing pollution and cleaning up waste and plastics in order to protect fauna, flora and ourselves. Port of Antwerp was the first European port to sign the Operation Clean Sweep charter at the end of 2017. The main objective is to avoid litter in seawater. To this end, they launched the 'Zero Pellet Loss' platform and brought together fifteen port companies from the entire chain of transport, industry and logistics. In 2019, the 'Zero Pellet Loss' platform launched an action plan with numerous measures for preventing the loss of plastic pellets, whether during production, transport, storage or processing. At the Doel Dock, 'Patje Plastic' is fishing out floating waste and plastics so that they do not spread further along the waterways. The design from the Dutch company Allseas is made from 75% recycled materials. The plastic catcher is completely mechanical and uses only wind, water and gravity to keep the dock water clean.

4.7 Montenegro – Ministry of Capital Investments

Best Practice 1: "No Special Fee" (NSF) System

The respective literature reveals that Best Practices can be discerned in more localized environments. One of the increasingly common practices is the "No Special Fee" (NSF)-System, or in some cases its next step the positive incentive approach. This specific approach has been adopted Baltic Marine Environment Protection Commission (HELCOM) in its legislative convention (Helsinki convention). It is noted that HELCOM involves 9 participating countries (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden) as well as the EU. According to HELCOM NSF- system this is ""a charging system where the cost of reception, handling and disposal of ship generated wastes, originating from the normal operation of the ship, as well as of marine litter caught in fishing nets, is included in the harbor fee or otherwise charged to the ship irrespective of whether wastes are delivered or not". Since waste, and in many cases litter, is a direct result of the ship's normal operation thus leading to its creation on boards, the NSF approach was the charging of payment for reception, handling and disposal of oil residues, sewage and garbage at any calling port, regardless of the use of service or not.

This creates an incentive for the vessels to actively participate, while the fee involved covers waste collection, handling and processing, including infrastructure, and is usually counted on the basis of a ship's gross tonnage. In addition, the fee only covers investments in reception facilities, the operation of reception facilities, repair and maintenance costs of such facilities and the costs of handling, treatment and final disposal of received wastes, preventing its use as a competition tool between the regional ports.

The regional ports have their own waste management charges, calculated per gross tonnage. Any recyclable wastes (included in the chart under the overarching category of domestic waste) are collected / received without any extra cost and include paper/cardboard, glass and metal. The cruise and other ships calling at any of the four presented ports pay any other charges, in addition to this tariff, including vessel charges, mooring and unmooring, water supplies and quay charges. Within this unified scheme the practices of four ports (Copenhagen, Tallinn, Helsinki, Stockholm) are compared with regards to the criteria in the following table.

Table 25 - Baltic Area Waste Fee System

Type of Waste / Charge	Copenhagen	Tallinn	Helsinki	Stockholm
Oily washes	No special fee in general, except for oily tank washing water	No special fee	No special fee, with a cap of 20 m^3	No special fee
Wastewater	No fee for Black water with a cap of 130l per day. Charge for collection of Grey Water.	Free up to 7 m^3. Charge for exceeding amounts	No special fee	No special fee
Domestic waste	No special fee	No special fee	No special fee	No special fee
International food waste	No special fee	No special fee	No special fee, with a cap of 7 m^3 / 6 tons	No special fee
Hazardous waste	No special fee	No special fee	On the basis of occurred costs	No special fee
Electronics	No special fee	No special fee	On the basis of occurred costs	No special fee
Scrubber waste	On the basis of occurred costs	No special fee	On the basis of occurred costs	On the basis of occurred costs

Reductions in waste collection	After 7th port call	Delivery of sorted waste	None	Delivery of sorted waste On the basis of ship type and port calls
Restrictions	Waste fee includes only black water	Waste fee includes only 7 m^3 of wastewater	4h Loading / Collection time limit	None

As noted in the literature, many of the limitations placed are linked to infrastructure restrictions, while in most cases cruise ships are expected to communicate their waste type and quantity to ensure availability of transport means. In addition, all port declare that a major part of ship and cruise ship waste are recycled.

Best Practice 2: Holistic Approach of Port of Dover

Port of Dover, UK, is a port strongly represented in the port literature on good practices. As a multifunctional port including ferry, cargo, cruise and marina facilities and thus the respective multifaceted maritime traffic, it is a good example of approaches that need the contribution of multiple stakeholders.

This is especially true in the case of the environmental approach and its links to the Port's social responsibility. In the environmental sector, the port has adopted a holistic approach involving the traditional and contemporary environmental aspects such as:

- Environmental Monitoring using baseline and indicator parameters according to EU and national legislation;
- Measurement and reducing of Carbon Footprint (reducing it at 59% of base values in 2020) of port operation with regard to its own activities and processes;
- Active pollution prevention via pollution prevention training, to increase staff awareness and the reporting of environmental occurrences. A high level of preparation is maintained in order to cope with any incident in the Port liable to cause environmental harm;
- Establishment of an occurrence reporting system in order to do this, which allows trends to be examined and ensures that training and equipment are appropriate;
- Advanced Waste management on improving its waste management process with most of its waste streams being sent for recycling or reuse. Innovative ideas for future application include continuous improvements in the management of the general waste stream produced from port operations, increasing landfill avoidance through the expansion of recycling initiatives and achieving energy production from waste through incineration;
- Control of Water Quality and Marine Litter prevention;
- Control of Light and Air noise as part of reduction of impact of Port activities.

In addition, the adoption of pro-actively managing and delivering a sustainable port operation, via a certified Environmental Management System (EMS) and the adoption ISO recognized ISO14001 standard which requires demonstration of continual improvement in environmental performance, supports the commitment to the said approaches.

The port's CSR Plan is based on the constant update with the participation of all interested parties and stakeholders such as Port Board, management, employees, customers, suppliers and the community around shared values. The port's CSR Plan is based on the constant update with the participation of all interested parties and stakeholders such as Port Board, management, employees, customers, suppliers and the community around shared values. The overarching criteria for the Port of Dover's CSR activity are:

- Fit to the strategic intent and Port as a business
- Fit to the CSR policy
- Opportunity to create long-term and real value
- Potential for long-term and sustainable partnership (especially with the local community)

All the above-mentioned lead to a CRS plan focused on the local community, but with direct reference links to the Port's environmental policy. It is obvious that this creates the need for regular updates as well as for adaptable strategy, policy and implementation / regulatory texts, that can be adapted on the business level rather than the more inflexible central national authority level.

Best Practice 3: Linking of Port environmental policies to the United Nations Sustainable Development Goals

The best practice identified in the overall literature refers to the linking of Port environmental policies to the United Nations Sustainable Development Goals (SDGs). A set example is, according to UN reporting the Belgian Port of Antwerp, that aims to to work towards becoming a sustainable port reconciling economic, social and ecological interests, by incorporating the 17 SDGs in the port's mission and business plan with a roadmap for 2030.

The incorporation of the environmental aspect of the SDGs might be the general case, as climate change, water, biodiversity and marine environment have been in the target of contemporary approaches for the best part of the last two decades, however the innovative aspect of political, economic and social mixture in the SDGs creates new challenges and opportunities.

Provided that the appropriate tools are available, SDGs are a most suitable platform not only for promoting internal and national sustainable development goals but also for the promotion of regional and international cooperation.

In addition, the SDGs content is most suitable for complementary viewpoints to the established CSR content. In the case of Antwerp, SDGs also formed an assessment framework to encourage a more holistic viewpoint in the organization's decision making,

i.e. climate, well-being, decent work, safety, air quality, mobility, responsible consumption. Examples set, were the integration of SDGs into procurement and concession policies and the

port's daily operations while the recorded success of certain projects with in the port, deliver, according to the ports officials "proof that the port can be a lever for a sustainable future for others, a test zone for new ideas or technologies" and lead

Furthermore, SDGs and their adoption provide the common ground for similarly thinking organizations for the development of cooperation and establishment of networks such as the Getting to Zero Coalition and the World Ports Climate Action Program (WPCAP), an initiative aimed at reducing CO2 emissions from shipping and ports and improving air quality.

5. Identification of Key actors involved - Possible synergies

5.1 Key actors – Stakeholders

5.1.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The Port System Authority of the Ionian Sea, in compliance with the provisions of art. 5 of Legislative Decree 182/03 has drawn up the "**Waste Collection and Management Plan of the Port of Taranto**" approved by Resolution of the Regional Council n. 1407 of 12 June 2015 and in force since 28 November 2004 and subsequent updates. The most recent update of this Plan was approved with D.G.R. of the Puglia Region n. 1203 of July 31, 2020.

The following are specific information on **stakeholders** managing waste and port reception, treatment and disposal facilities:

- **Nigromare S.r.l. Company**: merchant ship-generated waste collection generated by vessels docked in the port of Taranto, offshore, beyond roadsteads/within roadsteads in Mar Grande.
- **RTI Morfini S.p.A./Hidrochemical S.p.A. Company**: collection and transport of bilge waters, slops, sludge having a flashpoint higher than 60°c and the merchant ship ballast water.
- **Ecologica Sud Company by Vito D'Angiulli**: used oils collection, unloaded by fishing and recreational vessels and ships, as well as used filters and exhausted lead batteries are collected in two reception facilities, located in the port domain and is managed by the **company Teorema S.p.A.**.

In addition, in the Port of Taranto there is a pollution prevention and protection service and emergency intervention for the remediation of hydrocarbon stretches of water and port areas given in concession by the local Harbor Master's Office to the **Company Ecotaras S.p.A.**. The number of daily interventions is on average equal to about 2/3, of which at least one near the areas under concession to the refinery in the Port of Taranto.

The Port System Authority of the Ionian Sea, in order to increase efficiency in waste management and improve the environmental status of the Port of Taranto, has issued the **Regulation for the regulation of the collection service of waste from board ships parked in the port and in the dock,** in accordance with the main legislation in force on the subject.

The Regulation regulates the services of collection, transport, treatment and disposal and/or recovery of:

- waste (special waste, waste similar to municipal solids, black water, waste consisting of food products and their residues landed from ships from non-EU countries, coming from the activity of embarkation and disembarkation of goods, etc.) from board merchant ships stopped in the port of Taranto;
- bilge water, washing water, flammability-point bilge waters of more than 60°c and ballast water and ship cargo residues.

In particular, the organization of the service provides that the masters of ships arriving in the port of Taranto fill in in all its part a form in accordance with Annex III referred to in Legislative Decree 182/03 and, also through the Maritime Agencies, forward it to similarities to the provisions of art. 1-2 of Order No 234/2016 of the Port Authority on the "Port Management Information System – PMIS". The Port Authority transmits the information to the service dealers.

In addition to the Maritime Agencies, port authority and concessionaires of the aforementioned waste management activities, a category of stakeholders of significant importance are certainly the users who use the services offered by the Ionian Sea Port System Authority and, more generally, the dealers managing industrial settlements. For these, several and numerous awareness-raising actions are carried out on the issues of waste management and environmental protection (also through the distribution of brochures and the affixing of appropriate signs).

Among the main stakeholders, the role of:

- ARPA Puglia that suggests the general guidelines of the Monitoring and Control Plan and the punctual methods for the analysis of environmental matrices;
- Companies and professionals included in the Register of Suppliers of the Ionian Sea Port System Authority;
- Shipping companies with which to interface for the development of green energy supplies (cold ironing and LNG);
- DIPAR as technical consultant through its Scientific Technical Committee in defining the operating methods of the Monitoring Plan, in the preparation of the technical elaborates of the DEASP, etc.

Central Adriatic Ports Authority

Below is a non-exhaustive list of the main stakeholders typically involved in the implementation of the rules and protocols on port waste management.

In the first place, it is certainly necessary to mention the users of the port, port operators and concessionaires, fishermen and boaters. Their contribution in the correct implementation of the protocols is fundamental for the effective and efficient management of waste.

As already reported in paragraph 5.3 of this document, within the Port of Ancona, the waste collection service from ships moored in the Port of Ancona and from ships anchored in the roadsteads and at the Falconara Marittima oil terminal has been entrusted to the Association Temporary Company (ATI) made up of the companies **Gruppo Garbage Service Srl** (parent company), **Fulmar Ecological Maritime Services S.r.l.** and **Carbonafta & Carbometalli S.r.l.**

The concessionary ATI therefore provides for the performance of the following services within the Port of Ancona, with guaranteed operation 365 days a year, with 24-hour service:

- Collected, transport, treatment, recovery and disposal of the denials of ships of each gender and type;
- Anti-pollution and de-pollution at sea from:
    - o oil tankers (drafting of breakdowns, patrols, etc.);

o spillage of hydrocarbons (with suitable boats);

o solid waste;

- Cleaning of waters and state-owned areas;
- Management of emergencies from spills into the sea;
- Environmental remediation.

The ATI uses nautical and land vehicles for the collection of waste produced in the port area.

Again, among the key players in port waste management we find:

- The Harbour Office: The Corps is the recipient of functions mainly related to the regulation of civil and productive uses of the sea, ports and coasts, as well as maritime transport in general. The attributions of a strictly military nature cover a substantially residual component linked to the concurrence activities in coastal defense and in supporting the action of the naval units of the Italian Navy. The staff of the Corps is vested with the qualification of officers and agents of the judicial police, for the violations provided for by the navigation code (article 1235) and other special laws (fishing, maritime state property, pleasure boating, environment, etc.).

Briefly, the activities carried out can be summarized as follows:

- search and rescue at sea (SAR);
- navigation safety;
- supervision of the operation of the port;
- marine environment protection;
- national control center for sea fishing;
- training of maritime personnel;
- registration of merchant, fishing and pleasure vessels;
- litigation for maritime administrative violations;
- maritime technical-administrative police including: the regulation of maritime activities (power of ordinance), control of maritime traffic, maneuvering of ships, inquiries into maritime accidents, management of ports not seat of a Port Authority;
- testing and inspections of coastal deposits;
- surveillance and maritime state police;
- recruitment of Navy military personnel;
- underwater archeology;
- contribution to the fight against illegal immigration by sea;
- civil protection services;
- traffic police services in port areas (article 12, paragraph 3 letter f of the highway code);
- anti-terrorism and security services, both in port areas and on board national and foreign ships, in compliance with current national and international legislation.

- Port chemist: is a professional figure provided for by the Navigation Code (Article 46 and following). The chemist of the port has an adequate knowledge of many professional topics, of the rules and regulations in force regarding naval and port safety, prevention of pollution at sea, degassing and remediation of tanks used for the transport of petroleum or chemical products, both in liquid and gaseous state, refrigerants and under pressure, etc. The port chemical consultants, for example, have the task of ascertaining the dangerous conditions of ships as regards the presence of explosive, flammable, poisonous, corrosive or otherwise harmful and dangerous vapors or gases, carrying out the checks with all technical means jointly to possible chemical processes.

- Ministry of Health (maritime health offices): The Maritime, Air and Border Health Offices are present at the main international entry points (ports and airports) and carry out the tasks of international prophylaxis and cross-border health; these Offices guarantee the health defense of the national territory from the risk of importing infectious diseases through the international movement of people, means of transport and their cargo.

- Marche Region: which has the legislative power in matters of regional territorial planning and internal mobility, infrastructural endowment, planning and organization of health and social services, promotion of local economic development and organization of services within the region to businesses; on the subject of discipline, as far as regional interest is concerned, of cultural activities, of the enhancement of environmental, cultural and landscape assets, of regional enhancement and organization of tourism, of regulation, on the basis of specific agreements concluded at the regional level, of the financial relations between the territorial bodies of the Region for the respect of the regional and local programmatic objectives of public finance, as well as in any matter not expressly reserved to the exclusive competence of the State.

- Municipality of Ancona: local autonomous body that represents the community of the city itself and of the neighboring countries included in the municipality itself, taking care of the development and interests of the belonging fractions.

5.1.2 Greece – Igoumenitsa Port Authority S.A.

The port community in Igoumenitsa is mainly consisted of the Port Management Authority (Igoumenitsa Port Authority S.A), the ships, and the Igoumenitsa Coast Guard. The above actors/ stakeholders are responsible for the control/ implementation of the Waste Collection and Waste Management Plan for the Port of Igoumenitsa. Besides them, other actors are also involved in the implementation of the Waste Collection and Management Plan as well as in the implementation of protocols and standards, environmental measurements and assessments taking place in the Port of Igoumenitsa to ensure its environmental sustainability.

Specifically, aiming to ensure the successful implementation of the Waste Collection and Waste Management Plan, a dedicated office has been set up in the Port area. The office is run by IPA's contractors - who are responsible for the provision of waste reception facilities, and its operation is supervised by IPA S.A (Directorate of Port Services).

According to the Regulation of Internal Organisation and Operation of IPA S.A, the Directorate of Port Services is responsible for:

- The coordination and operation of the service delivery system for the ship-generated waste and cargo waste facilities.
- The supervision and control of the contracts of IPA S.A with the contractors.
- The monitoring and certification of the provisions of the contract's rights in favor of IPA S.A; as well as for sending the relevant statements to the Department of Finance for the invoicing and collection of related revenues.
- Monitoring compliance with environmental conditions regarding collection, treatment, and final disposal of waste and residues.

The ships arriving/ operating at the port are the waste producers. These are responsible for providing adequate information to the authorities and to the operators responsible for waste reception facilities about their waste and their storage capacity. In addition, the ships are obliged to implement the Plan and dispose their waste in organised port waste reception facilities.

Igoumenitsa Coast Guard is responsible for the conformity control of the ships approaching the port area as well as for the control of the waste management procedures followed by the ships. The Coast Guard is also obliged to manage the information it receives from ships and to utilize the data for a variety of purposes.

The following, sub-sections present some key-actors and stakeholders that the IPA is in collaboration or can create synergies and collaborations in the future enhancing the Environmental and social profile of the port and improving the existing waste management and monitoring system.

Table 26 presents in detail the key stakeholders and their contributions in enhancing the Port's environmental status.

Table 26 - Key stakeholders and their contributions in enhancing the Port's environmental status

Key Actors/ Stakeholders	Responsibilities/ Contributions
Ships	Waste Producer
	Responsible for providing adequate information to the authorities and operators of waste reception facilities about their waste and their storage capacity.
	Responsible to implement the waste management plan.
	Responsible for delivering their waste to organised port reception facilities.
Igoumenitsa Coast Guard	Responsible for the conformity control of the ships approaching the port area.
	Responsible for the control of the waste management procedures followed by the ships.
	Responsible to manage the information received from ships and to utilize the data for a variety of purposes.

Key Actors/ Stakeholders	Responsibilities/ Contributions
External Technical Expert [HELLENIC ENVIRONMENTAL CENTER (HEC) S.A.]	Contractor responsible for the disposal of ship generated liquid waste.
External Technical Expert [ANTIPOLLUTION]	Contractor responsible for the collection and disposal of solid waste.
External Technical Expert [BIOLAB]	Contractor responsible for conducting seawater quality measurements.
Institutional Body [EUROCERT]	Responsible for IPA's Certification with ISO 14001
Institutional Body [Lloyd's Register]	Responsible for IPA's Approval to be certified with PERS
Institutional Body [Ministry of the Environment and Energy]	Responsible for IPA's Approval to be registered in EMAS

5.1.3 Croatia – Zadar County Rural Development Agency

In Table 27, the stakeholders are listed according to their involvement in the project and pilot activity of the Port of Zadar Authority and based on their role, importance, contribution to the project, benefits and support they are providing to the project. Also actions to improve their support are indicated in order to increase their level of current support.

Table 27 - Stakeholders involvement strategy

Stakeholder	Role	Importance	Contribution to the project	Benefits	Conflicts	Current support	Strategies to improve support
Croatian Ministry of the Sea, Transport and Infrastructure	Observer, will be included in dissemination activities	HIGH	Croatian Ministry is informed about activities to be performed within the project and has expressed high interest in the results.	Ministry supports activities to be performed within the pilot action in the port of Gazenica.	None	Informal support	Inform the Ministry about implemented activities. Include them in dissemination activities.
ZIPO d.o.o.	Observer; Concessionaire for the provision of passenger services with the use and maintenance of port facilities (infrastructure and superstructure) in the area of the port Gaženica and is obliged to take measures and activities to protect and preserve the marine environment	HIGH	ZIPO d.o.o. is not directly involved in implementation of project activities but as the main concessionaire has high interest in the project activities	ZIPO d.o.o. will benefit from project activities and is highly interested	None	Informal support	Improve contact, inform about implemented activities. Include them in dissemination activities.

Stakeholder	Role	Importance	Contribution to the project	Benefits	Conflicts	Current support	Strategies to improve support
	and prevent its pollution.						
Luka Zadar d.d.	Commercial cargo port concessionaire	HIGH	No contribution.	Although they are located in the cargo port which is not a subject to the project activities, know-how and best practice examples from the ECOWAVES project can be used for the future environmental plans.	None	No support	Will be informed about project activities and invited to participate to dissemination activities.
City of Zadar	Observer, will be included in dissemination activities	MEDIUM/HIGH	No contribution.	Best practice examples from the ECOWAVES project can be used for the future environmental plans.	None	Informal Support	Contact and inform the City of Zadar about activities within the port. Include them in dissemination activities.
Zadar County	Observer, will be included in dissemination activities	MEDIUM/HIGH	No contribution.	Best practice examples from the ECOWAVES project can be used for the future environmental plans.	None	Informal Support	Contact and inform the Zadar County about activities within the port. Include them in dissemination activities.
Zadar County Development Agency (ZADRA NOVA)	Observer, will be included in dissemination activities	MEDIUM/HIGH	No contribution.	Best practice examples from the ECOWAVES project can be used for the future environmental plans.	None	Informal Support	Contact and inform ZADRA NOVA about activities within the port. Include them in dissemination activities.
University of Zadar	Interested in project activities, will be included in dissemination activities	MEDIUM/HIGH	No contribution, possible engagement for further analysis	University of Zadar, Maritime Department is highly interested in project activities and results with special emphasis on activities of the Zadar Port Authority.	None	Informal support	Contact and inform the University about activities within the port. Include them in dissemination activities and potential further analysis during or after the project duration.

Stakeholder	Role	Importance	Contribution to the project	Benefits	Conflicts	Current support	Strategies to improve support
Faculty of Maritime Studies in Rijeka	Observer, interested in project activities, will be included in dissemination activities	MEDIUM/HIGH	No contribution, possible engagement for further analysis	Highly interested in project activities and results for their future activities	None	Informal support	Contact and inform the Faculty about activities within the port. Include them in dissemination activities and potential further analysis during or after the project duration.
Ministry of economy and sustainable development	Observer, interested in the sustainable development activities, will be included in dissemination activities	MEDIUM/HIGH	No contribution	Know-how and best practice to be used in future projects and activities.	None	No support	Contact and inform them about project activities. Include them in dissemination activities.
Zadar branch of the Croatian Chamber of Economy	Interested in project activities, will be included in dissemination activities	MEDIUM/HIGH	No contribution	Know-how and best practice to be used in future projects and activities.	None	Informal support	Contact and inform them about project activities. Include them in dissemination activities.
Harbormaster`s office	Located in the port terminal building	MARGINAL/LOW	No contribution	Since they are located in the port terminal building, they will have indirect benefits from the project activities.	None	Informal support	Contact and inform them about project activities. Include them in dissemination activities.
Police (border and maritime)	Located in the port terminal building	MARGINAL/LOW	No contribution	Since they are located in the port terminal building, they will have indirect benefits from the project activities.	None	No support	Contact and inform them about project activities. Include them in dissemination activities.
Custom office	Located in the port terminal building	MARGINAL/LOW	No contribution	Since they are located in the port terminal building, they will have indirect benefits from the project activities.	None	No support	Contact and inform them about project activities. Include them in dissemination activities.
Jadrolinija G&V Line Miatours	Liner shipping companies, located in the port	MEDIUM/HIGH	No contribution	Since they are located in the port, they will have direct benefits from	None	Informal support	Contact and inform them about project activities. Include them in

Stakeholder	Role	Importance	Contribution to the project	Benefits	Conflicts	Current support	Strategies to improve support
				the project activities.			dissemination activities.
Cruise companies as – Scenic Cruises, Grand Circle, Aida Cruises,…	Cruise companies – using the Port of Zadar for transit and turnaround activities	MEDIUM/HIGH	No contribution	Since they using port facilities, they will have direct benefits from the project activities.	None	Informal support	Contact and inform them about project activities. Include them in dissemination activities.
Čistoća d.o.o. Zadar Cian d.o.o. Split IND-EKO d.o.o. Rijeka Dezinsekcija d.o.o. Rijeka Ciklon d.o.o. Zadar Sordes d.o.o. Zadar Odlagalište sirovina d.o.o. Zadar	Concessionaires – waste removal	MEDIUM/HIGH	No contribution	Since they collecting port waste - know-how and best practice to be used in future projects and activities.	None	Informal support	Contact and inform them about project activities. Include them in dissemination activities.
General Public	Visitors, Tourists	MARGINAL/LOW	No contribution.	Rising awareness about sustainable solutions and their importance. Direct benefit – better devices for waste disposal	None	No support	Will be informed about the project activities and included in dissemination activities.
Local and National Media	Dissemination activities.	MARGINAL/LOW	Contribution in terms of communication and dissemination activities.	Rising awareness about sustainable solutions and their importance.	None	No support	Will be informed about the project and included in dissemination activities.

5.1.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Shareholders realize their management rights at the General Meeting of Shareholders. The powers of the General Meeting and other matters directly related to the General Meeting are set out in the Companies Act, the Company's Articles of Association and the Rules of Procedure of the General Meeting. For communication with shareholders, the joint stock company uses the following forms of communication: - regular general meetings of

shareholders, - information system of the Ljubljana Stock Exchange SEOnet, - Luka Koper website with a special section 'for investors', - participation of company representatives in investment conferences at home and abroad, - monthly the newspaper Luški glasnik and its version, which is adapted for the external public, - the annual publication of the brochure Luški delničar for all shareholders, - press conferences on the company's operations, - meetings at the company's headquarters.

Stakeholder identification: Stakeholders of Port of Koper, which are defined and identified in the Management Policy of Luka Koper, d. d . are:

Shareholders: realize their management rights at the General Meeting of Shareholders. The powers of the General Meeting and other matters directly related to the General Meeting are set out in the Companies Act, the Company's Articles of Association and the Rules of Procedure of the General Meeting.

Customers dictate constant adjustment and introduction of changes and improvements in the company's operations. Customer satisfaction is the basic guideline of all employees. From the first contacts with customers, then the provision of services for them all the way to resolving possible complaints, it is necessary to be aware that customer satisfaction gives meaning to work and is the foundation of realizing the vision and mission of Port of Koper. Customer satisfaction is regularly monitored by Port of Koper. It provides customers with top quality services, quick response to their demand and effective information and all other necessary support. The existing port management model is the basis for equal treatment of all customers.

The port community is involved in changes in the functioning of the port system as a whole. The port community is an informal association of all stakeholders whose business activity is directly related to the provision of port services. These are clients of services - freight forwarders, agents and carriers, united in professional organizations - as well as representatives of control houses and inspection bodies and state institutions, who all together form expectations for the Port of Koper with the aim of coordinated operation at the entry or exit point. It is physically represented by the port area throughout the logistics chain. Port of Koper responds to these requests by coordinating them and communicating with interested stakeholders. The company's business success and the reputation of the Port of Koper are also related to the work of suppliers, so in achieving business goals, the efforts of all business partners who are involved in the operation of the port system as suppliers of necessary products or services are respected and highly valued.

Employees are encouraged to do a great job and the successful are rewarded. The culture of partnership with employees is built on the affiliation, cooperation, creativity, respect and responsibility of each individual. Much attention is paid to internal communication, as it is the foundation of a comprehensive communication web. Employees are acquainted with news, internal acts and other information through notifications via e-mail and notice boards, the monthly internal newsletter »Luški glasnik«(Port Newspaper) and the intranet. Employees who do not have access to a computer access the published information through information provided in the operative. Special emphasis is also placed on direct communication between

employees in the form of working and operational meetings, quality teams, coordination, annual managerial interviews with colleagues, conferences and other forms of teamwork. Employees are encouraged to undergo continuous training. Through development plans, the career development and critical competencies of an individual employee are defined in accordance with the company's long-term development needs.

Commitment to sustainable development is one of the fundamental strategic directions. The focus is on establishing and maintaining partnerships with the **local community and the wider social environment.** This simultaneously ensures the successful development of employees and strong support for the social environment, and upgrades the care for the natural environment. Sponsorships and donations support education, sports, culture and humanitarian projects. Once a year, the 'port door opens wide' and the organization of the Port Day enables visitors from both the local and wider environment to see the port, piers, lifts, devices and transhipment and other activities.

State authorities: The state is aware that the Port of Koper, as the only Slovenian port, is extremely important for the entire economy. In 2008, the joint stock company was granted a concession for the performance of port activities, management, development and regular maintenance of port infrastructure in the area of the Port of Koper.

The essential elements of the concession contract are:

- the duration of the concession contract,
- determination of the method of calculating the concession fee,
- agreement between the contracting parties on how to invest in port infrastructure,
- rules for the management, administration and operation of the port,
- ensuring the openness of the port,
- rights and obligations of the parties upon termination or termination of the concession relationship.

The duration of the concession is 35 years, as stipulated by the Maritime Legislation Act. The agreed concession fee amounts to 3.5 percent of the company's operating revenues, less fees charged. By paying the concession fee, the joint-stock company, as the concessionaire, also pays the rent and the building right, and is exempted from paying the port use fee. The concession fee includes water rights, water fees and other fees related to the use of the sea. Investments in port infrastructure are made by the concessionaire in agreement with the Republic of Slovenia and on the basis of the valid five-year port development program. The management, operation and operation of the port were divided between the grantor and the concessionaire and agreed on the methods of coordinated action to achieve the objectives of the concession in the interest of both.

Ensuring the openness of the port is the obligation and goal of both parties. It is an obligation to provide services to anyone who is interested and fulfills the conditions in accordance with the principles of the acquis. The company's goal is to make the port of Koper the primary and best port for the countries of Eastern and Central Europe.

Media: The company is open to the general public. It answers media questions on an ongoing basis and keeps them informed about business operations and innovations in the company. It

also publishes information on the company's website www.luka-kp.si and on the company's sustainable portal www.zivetispristaniscem.si. The company prepares press releases for the media, organizes press conferences and invites them to important business events and visits.

5.1.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

Based on the Law on Navigation and Ports on Inland Waters ("Official Gazette of RS", no. 73/2010, 121/2012, 18/2015, 96/2015 - other law, 92/2016, 104/2016 - other. law, 113/2017 - other law, 41/2018, 95/2018 - other law, 37/2019 - other law and 9/2020) **The Port Management Agency** is responsible for activities related to the acceptance of waste, garbage , sanitary waste and bilge water from vessels (Article 208, paragraph 2). This law also regulates the procedures for issuing permits for performing port activities in ports, ports, international passenger ports, ports for own needs and temporary transhipment points.

Pursuant to the Law on Navigation and Ports on Inland Waters, certain issues are regulated in more detail by the following regulations:

- Decree on conditions for navigation and rules of navigation on inland waters ("Official Gazette of RS", No. 96/2014) regulates, inter alia, the prohibition of discharge, spillage or discharge into the waterway of any objects or substances that may cause interference or danger for navigation or for other users of the waterway, including any form of oil waste or a mixture of such waste with water, as well as obligations in case of accidental discharge of objects or substances (Article 17);
- The Decree on the conditions that must be met by ports, ports and temporary transhipment points ("Official Gazette of RS", No. 33/2015 and 88/2016) determines, among other things, the obligation of ports of international importance to provide ship collection services, ie to be equipped with receiving stations for taking over the waste generated during the operation of the ship, as well as vessels for receiving waste oil, waste water, waste lubricant and municipal waste (Articles 3 and 13). This is in direct contradiction with the Law on Waste Management, since Article 71 prohibits the import of hazardous waste, and there is a problem of acceptance of hazardous waste (waste oils, etc.) from foreign ships, because the acceptance procedure is treated as import of hazardous waste. Given that adequate amounts of waste are necessary for the sustainable operation of the terminal, it will be necessary to consider possible solutions that will create a basis for receiving waste from foreign vessels, and on the other hand, will provide services to foreign vessels in accordance with relevant EU regulations.

After providing the necessary equipment for waste collection, the Port Agency is obliged to hire an operator who has a waste management permit, issued by the Ministry of Environmental Protection (hazardous waste), or local government units (non-hazardous waste). The list of operators is available on the website of the Serbian Environmental Protection Agency. Also, any movement of hazardous waste must be announced to the Environmental Protection Agency by filling in the Document on the movement of hazardous waste. The Port Management Agency is obliged to keep daily and annual records on waste

generation and to report once a year, ie by March 31 of the current year, to the Environmental Protection Agency on the annual amount of generated, delivered and stored waste from the previous year.

5.1.6 Albania - Port of Vlora

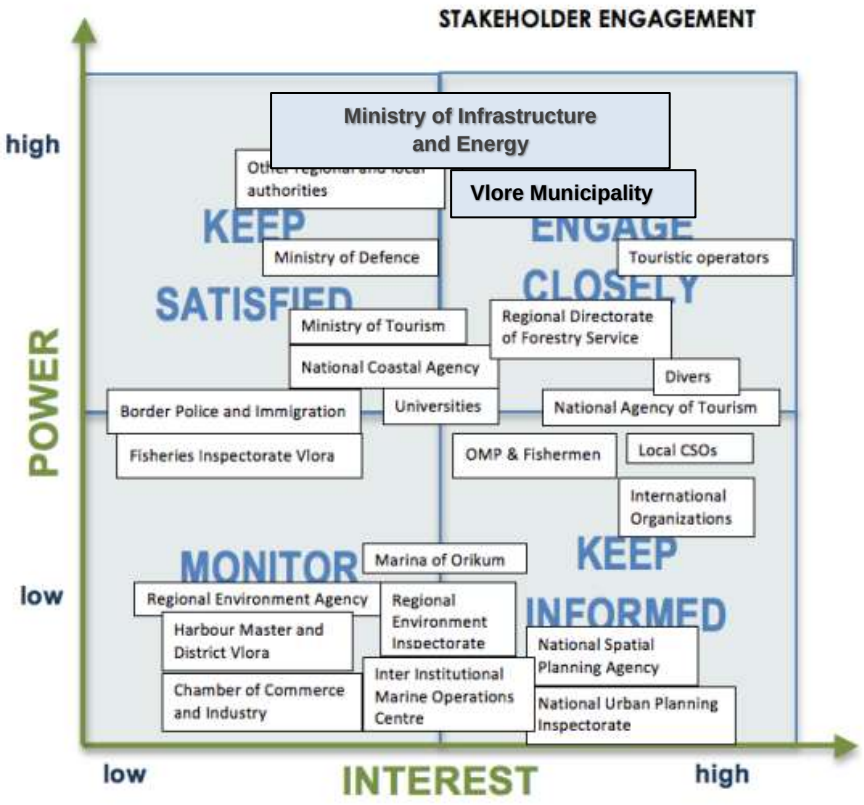


Figure 37 - Stakeholder engagement

A large number of institutions are responsible for waste management and the environmental situation in the port and in the Bay of Vlora, given that we have the presence of the Karaburun-Sazan Marine Protected Area and this makes us have a cooperation and integration of responsible institutions not only for the port and maritime traffic, but also the institutions responsible for protected areas.

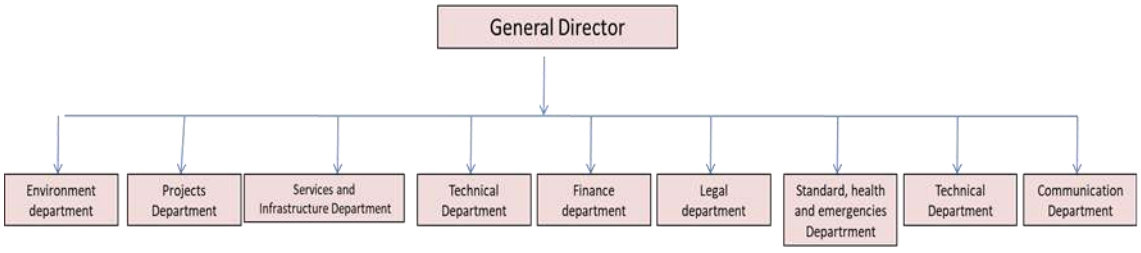


Figure 38 - Main departments of Vlora Port

Regarding the port authority personnel, the main department that is included in the implementation of waste management and environmental status is the environmental department and Standart, health and emergencies department in case of oil spills. The role of the environmental sector with only just one environmental specialist is to manage the waste inside the harbour of Vlora, in the land part.

To manage all the solid waste that are inside the port of Vlora is contracted only one private company which is responsible for waste management throughout the city of Vlora. The role of this company is the collection of solid waste collected in the respective bins found in the port of Vlora, 2 times a week.

Figure 39 - Vlora Port harbour

5.1.7 Montenegro – Ministry of Capital Investments

The Port of Bar is located on the western area of the city of Bar. Its ownership status is Landlord port (public ownership and contracted private operations regarding service providing). The Port is a multipurpose port featuring quay length of 1,440 m with dedicated terminals for container ships, general cargo ships, RO RO and cruise ships, and covers the total area of 518.790 m2 with nine berths and annual handling capacity of 750,000 TEU and 6.0 million tons of general cargoes.

The entire area of the port of Bar, with the exception of PIER V (Passenger Terminal), operates under a free zone regime. The free zone is mostly operated by Port of Adria (approx. 90% of the Zone).

The main operators of the Port are “Luka Bar" AD and “Port of Adria" AD.

“Luka Bar” AD, is a joint stock company whose main activity is handling and storage of goods, organized in accordance to the Law on Business Organization of Montenegro as a single corporative, logistic, technically and technologically completed unit. “Luka Bar” AD was restructured according to the restructuring program of the Government of Montenegro, and

following the Shareholders' General Assembly decision of the 04.09.2009 meeting, new joint stock company the "Container terminal and general cargo" was created and incorporated. This company was privatized and under the new name “Port of Adria” AD was acquired in 2013 by Global Ports holding the operating rights. GPH owns 62.09% shares in Port of Adria.

As a result, the facilities of “Port of Adria" AD is located next to the „Luka Bar" AD. It has a container terminal with 330 m of operational shore and depth of 12 m, as well as a state-of-art container lift (40t) and open storage area of the capacity of 2500 TEU and 180 refrigerated containers. It also has two quays for general cargo equipped with port lifts and closed storage area of 7.6 ha and open storage are of 5.86 ha.

Figure 40 - Port of Bar Satellite Picture

The third critical operator in the Port of Bar is the contracted waste operator for it (in accordance with the respective Waste Management Plan), Hemosan” Ltd. Bar. The company’s activity cover not only Bar but also, the majority of the country’s major port and marinas.

According to the company’s public information and documentation, the applied ISO standards are the following:

- ISO 5001:2011
- ISO 9001:2015
- ISO 14001:2015

- OHSAS 18001:2007

The presentation of infrastructure and equipment regarding the waste management for the country's ports and marinas is based on the provided information by the contracted waste operator, Hemosan Ltd. Bar.

The company owns two Eco centers, one of which is in the Port of Bar and the other one in the Adriatic shipyard Bijela. The Eco center in the Port of Bar includes a recycling center for the acceptance, disposal and treatment of oily and wastewater (slop, bilge water, sludge) collected from the vessels.

The most important equipment contains of one vacuum truck (10 m3) and cistern (32 m^3). The garbage from ships is collected on daily basis, and the average number of wastewater intakes on monthly basis is 5-10 times. All waste waters are subject of mechanical-chemical treatment in Hemosan's facility in Port of Bar.

5.2 Possible synergies

5.2.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

With a view to continuous improvement and attention to the environmental impact deriving from port activities, the following proposals for synergies with the main actors / stakeholders are considered to be improving:

1) Evaluation and sharing with interested operators of incentive measures in favor of those who reduce the quantities of waste produced and who adopt good operating practices;
2) Involvement of stakeholders in the implementation phase of the activities planned by the Port System Authority of the Ionian Sea aimed at an efficient and sustainable management of the port system in terms of environmental energy, as reported in the "Planning of interventions and coordination with the infrastructural planning of the Port System "of the Environmental Energy Planning Document (DEASP) of the Port of Taranto drawn up on behalf of the Port System Authority of the Ionian Sea, in collaboration with DIPAR (Production District for the Environment and Reuse - Puglia Region):
    a. Technical-economic feasibility study for the development of electricity production from renewable sources in the port area;
    b. Technical-economic feasibility study for the electrification of the quays;
    c. Technical-economic feasibility study for energy and environmental upgrading of the institution's facilities in the port area;
    d. Launch of the procedure for the expression of interest for the construction of LNG fueling systems;
    e. Publication of the tender for the identification of the Single Manager of APPEA services;
    f. Technical-economic feasibility study for the construction of a plant for the energy exploitation of wave motion;

g. Technical-economic feasibility study for the diffusion of electric mobility in the port area.

The interventions identified, concerning both the structures and the port infrastructures, will pursue various objectives, aimed at the economic and environmental improvement of energy consumption and supplies, allowing important results in the reduction of greenhouse gas emissions and promoting the eco-sustainability of the port system.

These strategies therefore concern not only the reduction of consumption, resulting from energy efficiency, but also the incentive for the use of new energy carriers.

On the other hand, the pursuit of a more general objective of rationalizing energy and environmental services is envisaged, coordinated in an integrated management logic of port services according to the APPEA model.

3) Evaluation in agreement with DIPAR and with the involvement of the most important suppliers of goods and services in the Register of suppliers, the possibility of including in the procedures for the award of environmental services indications referable to the "Minimum Environmental Criteria" referred to in the National Action Plan for Green Purchases adopted with the Interministerial Decree of 11 April 2008 - updated with DM April 10, 2013 and in particular to evaluate the possibility of using the tool of excellence in the field of Green Public Procurement (GPP): LCA (Life Cycle Assessment).

Central Adriatic Ports Authority

With a view to continuous improvement and attention to the environmental impact deriving from port activities, the following proposals for synergies with the main actors / stakeholders are considered to be improving:

1) Evaluation and sharing with interested operators of incentive measures in favor of those who reduce the quantities of waste produced and who adopt good operating practices;

2) Involvement of stakeholders in the implementation phase of the activities planned by the Central Adriatic Port Authority aimed at an efficient and sustainable management of the port system in terms of environmental energy, as reported in the Environmental Energy Planning Document (DEASP) of the Port of Ancona.

5.2.2 Greece – Igoumenitsa Port Authority S.A.

Aiming to enhance the port's environmental status, IPA S.A could create new synergies with some of the existing stakeholders as well as with key actors which are not currently actively involved in the port's environmental efforts.

Synergy 1: Develop collaboration with GRI

Specifically, in case IPA S.A decides to apply the GRI Standards in its sustainability reporting processes, it could possibly develop a collaboration with GRI and specifically with GRI's global Secretariat in Amsterdam.

GRI is a non-profit, independent, international Organisation, founded in the United States in 1997 by the Coalition for Environmentally Responsible Economies (CERES), the United Nations Environment Programme (UNEP) and the Tellus Institute. GRI supports different types of organisations (businesses and governments) throughout the world in promoting sustainability reporting, based on standards or a framework of principles and indicators that represent the best practices worldwide that Organisations can use to measure and communicate their economic, environmental, and social performance.

It is important to note that even though GRI does not verify or certify the content of a report; it does offer services to review a report's alignment with the GRI Standards and with frameworks such as the SDGs.

Synergy 2: Expand its collaboration with EUROCERT

Moreover, in case IPA S.A decides to develop Port Reception Facilities at its site, it could possibly expand its current collaboration with EUROCERT in order to be certified with the ISO 16034: 2018, which as presented above regards certification about arrangement and management of port waste reception facilities.

Synergy 3: Enhance its collaboration with EU projects which are under the umbrella of Adrion Programme and have similar scope with ECOWAVES

Lastly, IPA S.A could enhance its collaboration with other EU projects which are under the umbrella of Adrion Programme and have similar scope with ECOWAVES. Such an example is the project SEAVIEWS, with which IPA S.A could create additional links and develop closer co-operation.

SEAVIEWS, "SEctor Adaptive Virtual Early Warning System for Marine Pollution" is a project aiming at promoting and enhancing the capacity of transnational collaborations tackling environmental vulnerability, fragmentation and safeguarding ecosystem services in the wider Adriatic area. The SEAVIEWS project brings together stakeholders from 6 partner states: Greece, Albania, Croatia, Montenegro, Italy and Slovenia. Project partners (namely National Technical University of Athens – Greece, Chambers Group for the Development of Greek Isles – Greece, E-institute – Slovenia, Ministry of Transport and Maritime Affairs – Montenegro, National Interuniversity Consortium for Marine Sciences – Italy, University of Tirana – Albania, University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture – Croatia), could be potential stakeholders with which IPA S.A could collaborate in order to exchange knowledge, disseminate results, best practices etc.

5.2.3 Croatia – Zadar County Rural Development Agency

N/A

5.2.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Environmental sustainability rising awareness - stakeholder numbers can easily help to raise awareness of the environmental situation, each in its own way and each in its own way. It includes all stakeholders, as each of them has its own target group. Given that stakeholders are listed in the pyramid scheme, awareness-raising campaigns would reach a larger number

of target groups, which of course should take place constantly, not just as a campaign with a fixed duration. Although raising awareness does not seem to have major effects, in the long run this usually proves to be the best investment.

National funding for environmental sustainability: in collaboration with stakeholders in cooperation with various stakeholders, the intention to improve environmental sustainability would also be upgraded through the funds received to create better conditions for environmental sustainability in cooperation with stakeholders, it is necessary to prepare concrete projects that would significantly improve the current status, and at the same time would be the start-up capital for subsequent own investments of the Port of Koper.

EU funding for environmental sustainability - In cooperation with the stakeholders of the Port of Koper, content suitable for upgrading the existing situation regarding environmental sustainability could be applied for in EU calls for proposals together with other ports in the EU (such as the ECOWAVES project). This is extremely important for environmental sustainability, as projects shared by several partners also have more impact and larger upgrades can be prepared than would otherwise be done by one partner (one port) alone.

5.2.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

All competencies and connections of different key authorities are prescribed by laws.

5.2.6 Albania - Port of Vlora

Institutions at the local level which have in their competencies the monitoring and management of waste as well as the monitoring of the environmental situation are: Port and Captaincy Vlora; Vlora Regional Administration of Protected Areas; National Environment Agency and National Coastal Agency.

The synergy can be realized between the Port of Vlora and the National Environment Agency which develops the monitoring of the environmental situation at the national level, including the respective stations in the area of Vlora. The State of the Environment Report, presents the assessment of the state of the environment based on relevant data for the main components of the environment such as forests, biodiversity, water resources, air, waste management, soil, noise, etc.

This report is a document that informs and recognizes the public on the state of environmental indicators, the impact on environmental health and their trend over the years. It also helps policymakers take action to protect and manage the environment. The main purpose of assessing the state of the environment is to understand the consequences or impacts on the environment coming from different sectors and to identify ways to minimize negative impacts.

The data that the National Environment Agency receives at the port of Vlora regarding the quality of water and species of natural importance every 6 months to 1 year, can be used to complete the database in the absence of the port of Vlora.

Another synergy of institutions can be established with the Regional Administration of Protected Areas which conducts a series of monitoring for the Karaburun-Sazan Marine

Protected Area on the quality of water within the Bay of Vlora; waste management in Karaburun-Sazan BCP as well as the surrounding areas that bring impact to the protected area and the possibility of placing bins in the port of Vlora (through the project "Cognito" for the island of Szan and management of waste coming from tourist ships also supported by the Conservatoire du littoral, 5 baskets were placed in the port of Vlora). Through joint monitoring and the implementation of a waste management plan, the assessment of the environmental situation and the implementation of the waste management protocol at the local level can be improved.

Figure 41 - Placement of bins for different waste

5.2.7 Montenegro – Ministry of Transport and Maritime Affairs

The Port of Bar as an organization does not have specialized equipment for the management of waste, and especially in the case of vessel related waste and pollution and records a lack of specialized Personnel on Waste Management. In addition, the simultaneous operation of two port operators, can lead to a lack of coordination in environment protection activities.

The lack of both implemented training activities for Port of Bar Personnel and the concentration of all waste relating activities to a single external contractor can lead in high-risk condition, in the extraordinary situation that external assistance is not available.

The development of a common training theme under the auspices of the respective National authority should enforce both the internal and the local external capacity on the subject, and improve Overall improvement of Waste Management in Montenegro (increase of recycling rates, reduction of waste quantity headed in landfills).

6. Tailored transnational Guidelines for enhancing actual environmental status of the ports and their social profile

After the thorough study of all the aspects presented in the previous chapters, as well as the rest of the T1 activities of the ECOWAVES project, the partnership has formed specific Guidelines that can enhance the actual environmental status of the ports, as well as their social profile.

Those guidelines, that are considered applicable on EU ports, are hereby presented on project level.

Guideline 1: Unitary management of environmental and energy services according to the APEA model

Title	APEA- Landscaped and Ecologically Equipped Production Areas
Short description	The APEAs constitute an inclusive evolution of landscape themes, building quality and themes of energy production, of traditional APEA (Ecologically Equipped Production Areas, Art. 26 of Legislative Decree 112 of 1998 cd. 'Bassanini Decree'). The decree, in art. 26, indicates: "The regions and autonomous provinces of Trento and Bolzano regulate, with their own laws, industrial areas and ecologically equipped areas, equipped with the infrastructures and systems necessary to guarantee the protection of health, safety and environment. The same laws also govern the forms of unitary management of the infrastructures and services of the ecologically equipped areas by public or private entities (omissis) as well as the methods of acquiring land included in the industrial areas (omissis). The production plants located in the ecologically equipped areas are exempt from the acquisition of authorizations concerning the use of the services present therein. The regions and the autonomous provinces identify the areas (omitted) by choosing them as a priority among the already existing areas, zones or nuclei, even if totally or partially abandoned. The local authorities involved participate in the identification process ". Therefore, the national legislation refers to the individual Regions[8] the task of regulating the matter; however, putting some basic reference elements: 1) the ecologically equipped areas are equipped with the infrastructures and systems necessary to guarantee the protection of health, safety and the environment; 2) the ecologically equipped areas are characterized by forms of unitary management of infrastructures and services;

[8] For the Marche Region: L.R. n. 16/05 "Discipline of urban redevelopment interventions and guidelines for ecologically equipped production areas", and DGR n. 157 of 07/02/2005 "Guidelines for ecologically equipped production areas (APEA) of the Marche Region"

	3) the production plants located in the ecologically equipped areas are exempt from the acquisition of authorizations concerning the use of the services present therein. The Ecologically Equipped Production Areas (APEA) propose the so-called "cluster approach", since they are characterized by the application of principles related to industrial ecology or the adoption of environmental management systems for the area. The APEAs aim at "closing the cycles" of matter, water and energy, at the pooling of the main environmental services (water, energy, waste) and at optimizing the organization of activities that generate impacts on the environment. The cooperative approach basically takes the form of two basic aspects: • the adoption of collective facilities and infrastructures within the industrial area (e.g., consortium purifier, centralized area for waste storage, industrial aqueducts, energy production plants serving the area); • the identification of a unitary manager who deals with common services within the production area (e.g., collective management of waste, energy, safety). The Sole Manager is the entity responsible for the management and administration of the APEA and configures an innovative management model, which allows to obtain efficient collective services (innovative environmental and management services, waste management, water management, energy management, mobility management, logistics services, training, administrative support, technical support, research-innovation, brokerage, marketing, workplace security and management of infrastructure and environmental equipment , etc.). This unitary management also foreshadows objectives of coordinated improvement of the environmental quality of production sites, as well as the achievement of economies of scale, the promotion of Industrial Symbiosis processes, the implementation of a site-specific model of sustainable management. The optimization of production processes, through the focus on "core" processes and the outsourcing of "no core" processes in a landscaped and ecologically equipped Production Area therefore support the competitiveness of companies and promote production efficiency with environmental and energy sustainability objectives. On the basis of the reconnaissance carried out, relating to energy needs within the perimeter of the Ionian Sea Port System Authority, as well as the reconnaissance of the services requested in the same area in relation to: • Waste management; • Waste management and rainwater;

- Transport and mobility;
- Authorization procedures;
- Safety ex D. Lgs. 81/08;
- Production and distribution of energy from renewable sources.

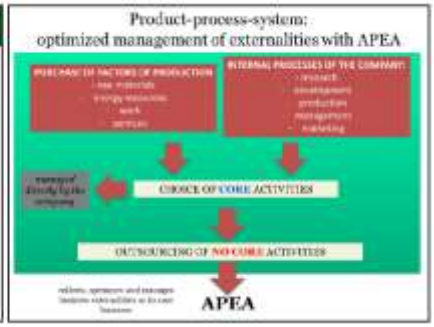
The Port System Authority of the Ionian Sea, within the DEASP (Environmental Energy Planning Document) has planned to evaluate, through a specific Feasibility Study, the implementation within the port area of a unitary management of these services according to the APPEA model, which sees the Port System Authority of the Ionian Sea, or its concessionaire, as the Sole Manager of the above services.

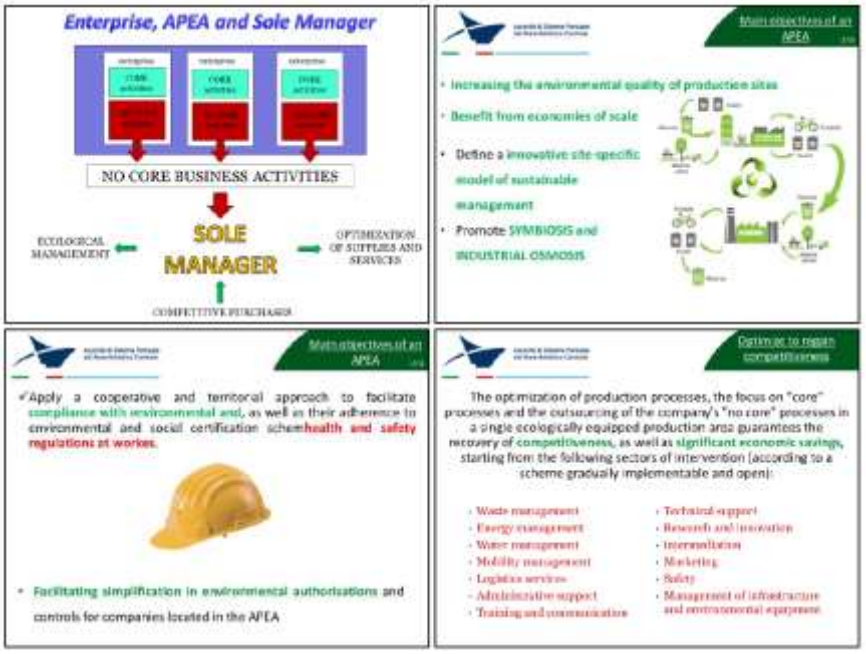
The actions can in fact be both structural and managerial.

Wanting to summarize some representative elements of the APEA common to all the Italian regions that have regulated the matter, we can mention:

- unitary management of collective services;
- area environmental program;
- economic development based on environmental sustainability.

Below is a brief explanatory presentation of the APEA model:



	 Figure 42 – APEA Model explanatory presentation
Problem addressed / Benefits	The implementation of this organizational model involves the design and redevelopment of the landscaped and ecologically equipped production areas that will have to be under different phases such as: 1. Environmental analysis: with the main purpose of framing the area being converted and/or designed at the environmental level; 2. Assessment of critical issues with consequent hierarchies of the same in order to establish later the priority actions to be developed; 3. Definition of the environmental programme through the identification of priorities and improvement objectives to be implemented; 4. Identification of the actions to be divided into specific projects that will be the real response to the critical issues that emerged during the environmental analysis phase; 5. Identification of the Single Manager through public evidence procedures.
Transferability issues	No problem of transferability of good practice. The Port System Authority of the Ionian Sea, within the DEASP (Environmental Energy Planning Document) has planned to evaluate, through a specific Feasibility Study, the implementation within the port area of a unitary management of these services according to the APPEA model, which sees the Port System Authority of the Ionian Sea, or its concessionaire, as the Sole Manager of the above services.
Cost	Unavailable

<table>
<tr><td>Equipment / infrastructures or personnel required</td><td>To be evaluated for each port. In general, by way of example, provision should be made for:
- The installation of new or adaptation of existing infrastructure and services in the production area;
- Increasing the quality and efficiency of common infrastructure;
- The control of environmental performance and impact reduction;
- Definition of a programme for the progressive redevelopment and conversion of existing parts towards a uniform and ecologically equipped management of the entire area.</td></tr>
<tr><td>Time-plan</td><td>
<table>
<tr><td></td><td>1st year</td><td>2nd year</td><td>3rd year</td></tr>
<tr><td>Technical and economic feasibility study for the transformation of the port area into APPEA</td><td></td><td></td><td></td></tr>
<tr><td>Publication of the call for proposals for the identification of the Single Manager of APPEA services</td><td></td><td></td><td></td></tr>
<tr><td>Implementing the APPEA Model</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Synergies & collaborations with key actors / stakeholders</td><td>The key players that, together with the relevant Port Authority, could foster possible collaborations and create possible synergies for the implementation of this guideline are:
• Port concessionaires, dealers and port operators;
• The Regional Environmental Protection Agency (ARPA);
• DIPAR (Productive District of Environment and Reuse - Puglia Region) or other Production Districts for the Environment, where existing.</td></tr>
</table>

Guideline 2: Cold ironing

Title	Cold ironing
Short description	Cold ironing is the set of technological solutions designed to supply electricity to ships on the quayside, so that they can switch off their generation equipment, reducing fuel consumption and therefore emissions into the atmosphere. All ships are equipped with two types of engines, the main ones and the auxiliary ones. The former are necessary for navigation, while the latter for the generation of electricity. In order to obtain this energy, generators are usually used consisting of a generator coupled to either a diesel engine or a gas or steam turbine. The choice depends on economic considerations and the type of boat.

The electricity produced is used on board for the so-called hoteling activities, such as lighting and air conditioning of the premises, refrigeration, the production of hot water for passengers and crew, and in some types of ships also for loading and unloading goods (eg container ships).

These activities must be guaranteed continuously even while the ships are stationed in port, and this means that only the main engines can be switched off during this period, forcing the auxiliary ones to be left on. This leads to the problem of pollution in port areas.

The cold ironing technology intervenes in this sense, that is, allowing ships to turn off the auxiliary engines and supply them with electricity from the ground, taking it from the local network and distributing it through a system on the quay.

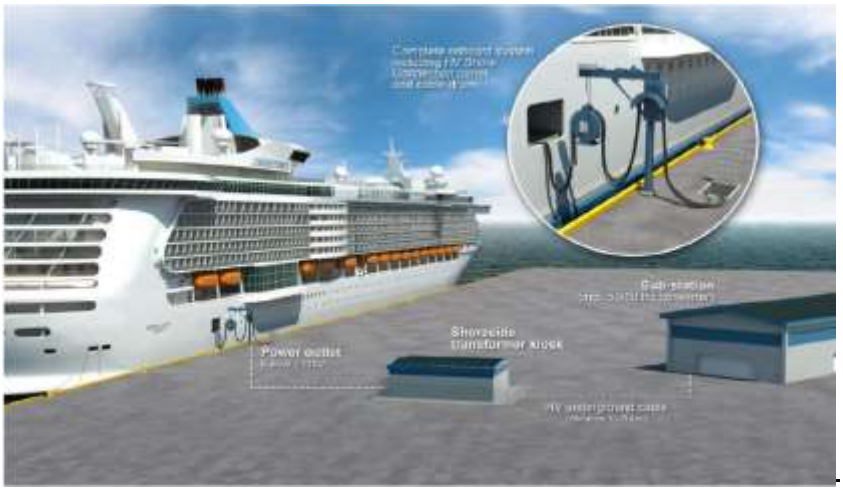
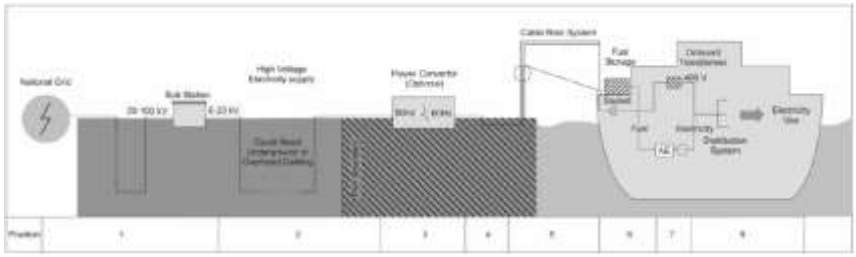


Figure 43 - Port-ship connection system

The term cold ironing was coined in Anglo-Saxon jargon from the comparison between a ship stationary in port and an iron, "iron", and since it is stationary with the engines off it is defined cold, "cold". Alternatively it can also be found under the name of "High Voltage Shore Connection" (HVSC) or "Alternative Maritime Power" (AMP) or "On Shore Power Supply" (OPS).

In 2012 the International Maritime Organization (IMO) defined the cold ironing technique as a "measure to improve air quality in ports and port cities, to reduce emissions of atmospheric pollutants and noise and, to a lesser extent, to reduce the carbon dioxide emitted by moored ships, generated by auxiliary diesel engines ".

Article 4 of the European Directive "on the construction of an infrastructure for alternative fuels" –DAFI 2014/94/EU– provides, in point 5, for the installation by 2025 of electricity supplies along the coasts, giving priority to ports in the TEN-T network.

	A 2005 Entec UK Limited study estimated reductions in emissions from ships' use of ground-based power supply by comparing emission values for pollutants from ships stationed on the quayside (auxiliary engines using fuels with a sulphur content of 0.1%), with emission values for pollutants from electricity generation. The reference technical regulations for the construction of Cold Ironing plants is the IEC8005-1: "Design Standard for Shore to Ship Power". The following figure, taken from the European report "Service contract on ship emissions: assignment, abatement and market-based instruments – Task 2a: Shore-Side Electricity", shows schematically the architecture necessary for the feeding of ships. The elements that make up the system (with reference to the numbers in the figure below) are: 1. Connection cabin to the national grid in medium voltage or transformation substation connected to the high voltage network; 2. Medium voltage cable distribution within the port area; 3. Conversion cabin 50 Hz -> 60 Hz; 4. Distribution at ship connection points; 5. Ship connection system; 6. Connection and on-board interface panel; 7. MT/BT transformer on board[9]; 8. Ship distribution network. Key elements of the infrastructure are the ship dock connection system (5) and the 50 Hz -> 60 Hz conversion system (3). A typical quay electrification system is presented as in the following diagram.  Figure 44 - Schematic architecture necessary for the feeding of ships From an electrical point of view below is the IEC Scheme 80005 – 1:

[9] MT/BT: Medium voltage/low voltage

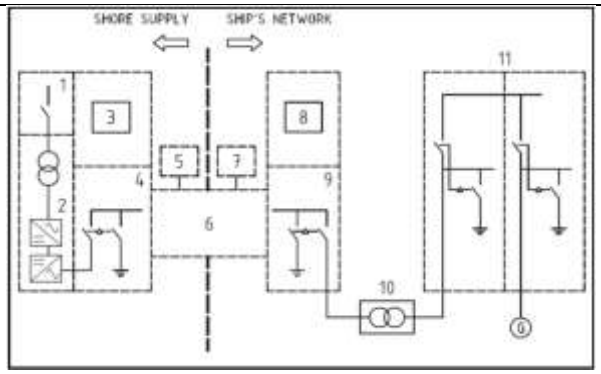


Figure 45 - Scheme IEC 80005 – 1

1. The general switch of the plant, at AT or MT level;
2. power conditioning devices (transformers and frequency converters);
3. protective equipment;
4. breakage and grounding devices;
5. ground-side control apparatus;
6. link component and interface;
7. control equipment on board the ship;
8. protective equipment;
9. transformer on board the ship (if any);
10. main electrical panel on board.

The elements constituting the interface between the ship's electrical system and the ground system are mainly composed of flexible, winding elements, which allow the interface panel to be connected on board the ship and are equipped with auxiliary power systems for winding the cable or handling parts.

Therefore, following the provisions of the technical regulations, the IEC8005-1 electrification of the quays provides for the following interventions on the ground:

a) the construction of a primary power transformation cabin from 150 kV to 20 kV;
b) the installation of static converters (properly flooded, possibly in the primary cabin) to adapt the national network frequency (50 Hz) to that of electrical systems on board certain ships (60 Hz);
c) the realization of the connection between the electricity transmission network and the primary cabin;
d) the installation of a cabin in which integrated protection and control systems and any transformer can be installed to adapt the distribution voltage to the supply voltage required by the ships;
e) the construction of underground cables for the transmission and distribution of electricity;

f) the creation of connection boxes to make the connection between the quay and the ship, complete, if necessary, with devices for the handling of connection cables.

The frequencies most commonly used on ships are 50 Hz or 60 Hz in relation to several aspects, among which the type of shipbuilding and the country of production stand out.

Ship-to-dock connections can be obtained by various modes depending on the vessels, the space available on the quay in relation to loading and unloading activities:

- Motor barge type power system
- Mobile power system
- Fixed power system

The motor barge type feeding system is made by adjusting a motor barge on which to house the connection system and in case the transformer system for adjustment between voltage levels.

Figure 46 - Motor barge type power system

The mobile power system consists of a trolley equipped with a drum wrapped with the power cord with a connector for the docked connection box at one terminal and a connector for the ship at the other.

Figure 47 - Mobile power systems

The fixed power system consists of fixed cable carrier cranes made near the connection boxes.

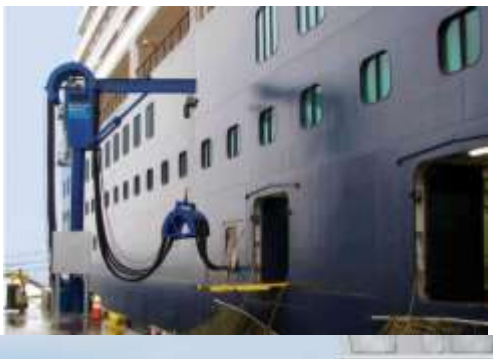


Figure 48 – Connection example

In the case of the port of Taranto, a "Feasibility Study related to the electrification of the commercial and industrial docks of the port of Taranto" drawn up in 2013 as part of the "Plan of first intervention measures for air recovery in the Tamburi district for pollutants B(a)P and PM10" and commissioned by the Port Authority of Taranto to DIPAR (Productive District of the Environment and Reuse) is available. , which

	has availed it of the advice of a group of professionals and professors of the Polytechnic of Bari and the "Aldo Moro" University of Bari.
Problem addressed / Benefits	One of the advantages of the implementation of cold ironing is certainly the reduction of fuel consumption and consequently emissions into the atmosphere thanks to the shutdown by ships on the quayside of their generation equipment. This also makes it possible to achieve the sustainability objectives set by the environmental policy of each port. For example, in Europe, the European Commission has set a target of reducing transport-related emissions by 90% by 2050 and as part of the Green Deal measures promotes the development of sustainable alternatives to fossil fuels. In this regard, EU Directive 2014/94 promotes the construction of infrastructures to increase the use of alternative fuels (DAFI Directive - Directive on Alternative Fuels Infrastructure); the provision identifies the contribution of cold ironing to environmental impact mitigation and calls for infrastructure to be built in EU ports by 2025. Cold ironing also mitigates another port problem: noise10. The port activities, which continue over the 24 hours, in fact generate a considerable disturbance to the residential neighborhoods surrounding the port, impacting on the lives of thousands of people on a daily basis. The acoustic impact of ports is the result of the overlapping noise generated by ships, cranes, loading and unloading operations, shipyards, trucks and trains that generate and combine noise throughout the day and night. The rumble generated by the engines of ships during the hospitalization phase at the docks is a large part of the problem. On-board generators are mostly made up of large internal combustion engines that drag synchronous generators. Even if housed in the heart of the ship, the noise and vibrations produced during operation propagate outside. This is mostly low-frequency noise (<100 Hz) that propagates over long distances and is little shielded by walls and windows. Reducing or shielding noisy emissions from ships by acting on noise sources would require structural intervention on the ship and would still have limited benefits.
Transferability issues	No transferability problems of the good practice. The Central Adriatic Ports Authority, as part of the DEASP (Environmental Energy Planning Document), has prepared a study on a plant solution for satisfying the energy demand of ships while stationed in port, proposing a system of trigenerative production to produce the necessary energy on site. The

[10] Source: Enel X, Legambiente, "*Green Ports: the route to sustainable development*", February 2021

<table>
<tr><td></td><td>power plant, powered by natural gas, in addition to energy for ships, produces a thermal residue that is used for the air conditioning of buildings located in the port area.</td></tr>
<tr><td>Cost</td><td>Not available. In general, the adoption of cold ironing is characterized by very high costs and it is therefore important that its programming is supported by an in-depth and complete cost-benefit analysis, related to the possible alternatives that can be adopted to reduce emissions associated with the power supply of ships in parking. The cost therefore varies according to the characteristics of the existing infrastructures and the extension of the quays.</td></tr>
<tr><td>Equipment / infrastructures or personnel required</td><td>To be evaluated for each port. In general, the elements that make up the system (with reference to the numbers in the figure below) are:
Connection cabin to the national grid in medium voltage or transformation substation connected to the high voltage network;
Medium voltage cable distribution within the port area;
Conversion booth 50 Hz -> 60 Hz;
Distribution at ship connection points;
Ship connection system;
Connection and on-board interface panel;
MT/BT transformer on board;11
Ship distribution network.</td></tr>
<tr><td>Time-plan</td><td><table>
<tr><th></th><th>1st year</th><th>2nd year</th><th>3rd year</th></tr>
<tr><td>Technical and economic feasibility study for the electrification of quays</td><td></td><td></td><td></td></tr>
<tr><td>Design of interventions and procedure with public evidence for the selection of the subject executing the works</td><td></td><td></td><td></td></tr>
<tr><td>Implementation of the system</td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Synergies & collaborations with key actors / stakeholders</td><td>The key players that, together with the Port Authority, could foster possible collaborations and create possible synergies for the implementation of this guideline are:
Ministry of Infrastructure and Transport;
Captaincy of Port;
Port concessionaires, dealers and port operators;
Equipment suppliers.</td></tr>
</table>

[11] MT/BT: Medium voltage/low voltage

Guideline 3: Environmental monitoring

Title	Environmental monitoring
Short description	The Integrated Monitoring Plan acts as a guideline and indication, in order to indicate a minimum level of performance of quality, for the supply of fixed and mobile monitoring systems and the materials that will be used for the realization of the planned works. The aforementioned Plan has identified an "area" monitoring network with the main objective of controlling, through measuring points "homogeneously" distributed over an area that includes all the areas relevant to the individual works and areas at the contour, the overall quality status of the land-sea system. The long-term objective is to create a permanent monitoring system for the entire port area that, in the current phase, interferes as little as possible with the existing Area Monitoring Plans. The aim of the proposal is, therefore, to set up a well-programmed network of monitoring stations, concerning different matrices, through which to systematically detect a defined set of parameters: all in accordance with a methodological approach that can lead to a harmonious program both from the point of view of timing and operational methods to be adopted subsequently during the implementation and management of the monitoring project for the area under consideration. The Plan identifies the monitoring actions regarding the individual matrices to be investigated: - Water matrix; - Sediment matrix; - Air matrix; - Noise matrix, - Soil matrix; - Flora and fauna matrix; - Filter organisms matrix; - Benthos matrix. a general network of fixed stations; For example, the monitoring network for the **water matrix** is divided into sea water column and underground water column, with reference to a network of fixed and mobile stations; the provision of the following types of networks is envisaged: o a general network of mobile stations; o a general network of ground piezometers. o a general network of ground piezometers.

	The purpose of the general network is to build a continuously updated base of the general system. These "general networks" can provide a framework of the environment on which to base the comparison with the data subsequently or simultaneously produced as part of each Area Monitoring Plan. At the mobile stations, multi-parametric profiles are provided for conductivity, temperature, pH, pressure, dissolved oxygen and turbidity along the seawater column. The objective of the water columns is to be able to reconstruct information plans by interpolating the data in relation to some predefined altitudes within the body of sea water. To do this, the profiles must be quoted with respect to the average sea level, taking into account the tidal phases, or, more easily, with respect to the seabed which, at least in theory, is stable. These water columns will obviously also be envisaged in correspondence with the fixed stations of the corresponding general network. In particular, on some of these fixed stations the use of current meters is foreseen to determine the direction and intensity of the currents along the water column. For the water matrix, for the three general networks, that is: - the network of mobile stations which aims to monitor the parameters relating to the "water matrix" ("marine waters"); - the network of fixed stations; - the network of piezometers; the recommended frequency for water column measurements and sampling is quarterly. With regard to **marine sediments**, in order to characterize the level and type of pollution in the area of interest, a subdivision of the seabed sediments into four quality classes must be set, depending on the concentration of pollutants present. This subdivision can be based both on the Contamination Threshold Concentrations (CSC) defined by Legislative Decree 152/06, column B (industrial sites) of Tab. 1 of Annex 5 to Title V of Part Four, and, possibly, on the specific intervention limits defined by ICRAM for port sediments in sites of national interest: ➢ "**GREEN**" - in it fall the sediments in which the intervention values defined by ICRAM are not exceeded; ➢ "**YELLOW**" - this class includes sediments for which at least one of the analyzed parameters has concentrations higher than the intervention values defined by ICRAM, but lower than the limit concentration values indicated in Tab. 1, Col. B of Legislative Decree 152/06 and subsequent amendments; ➢ "**RED**" - the sediments belonging to this class are those in which at least one of the analyzed parameters has concentrations higher than

	the limit concentration values indicated in Tab. 1, Col. B of Legislative Decree 152/06 and subsequent amendments. ii., but lower than the limit values for the classification of "dangerous" reported in Annex D, Part IV - Title I and II, of Legislative Decree 152/2006 and subsequent amendments; ➢ "**PURPLE**" - this class includes sediments with concentrations above the limit values for the classification of "dangerous". Sediments in the marine environment become the final receptor body of numerous contaminants which, due to anthropic activities, but also natural processes, can accumulate in the sediments which therefore become a "trap" for all the contaminants spilled and present in the column. overlying water. In areas with a high level of anthropization such as port basins, often characterized by low hydro-dynamism, the contaminants can reach very high concentrations in the sediments, leading to the establishment of an inverse process of transfer and leaching of the "trapped" and the subsequent release of the same in the water column. In this case the sediments potentially become a secondary active source of pollution: this situation can have a negative impact on the quality of the water column and sometimes lead to profound alterations in the dynamic balances underlying the functioning of the entire port ecosystem. It should also be emphasized that the negative effects on the ecosystem can be more or less significant depending on the presence of some "pejorative" conditions related to the climate (winds, currents, tidal regime, thermal stratification of the water body), to the morphology of the the area, the chemical-physical conditions of the system (redox, pH, etc.) as well as the peculiarities of the matrices constituting the marine ecosystem (water, sediment, biota) and the "inland" ecosystem. Therefore, the sedimentary compartment can be considered as a recorder and temporal integrator of what happens in the water column. In fact, a great variety of polluting compounds, nutrient salts and organic matter, are found in higher concentrations in the sediment than in the water column and the determination of the quality of the aquatic compartment cannot be separated from monitoring through sampling and analysis. periodic of certain environmental parameters in the sediment matrix. In correspondence with the sediment monitoring stations it must provide for the sampling of superficial sediment (0 - 20 cm) for the execution of chemical-physical analyzes, such as: ✓ particle size distribution; ✓ metals; ✓ C <12 and C> 12 hydrocarbons;

	✓ IPA; ✓ PCB; ✓ pesticides; ✓ organotin compounds; ✓ TOC; ✓ pH; ✓ redox potential; ✓ nutrients (Ntot, Ptot). The monitoring of the air matrix allows the characterization of the air quality and meteorological conditions within the area of interest and in the adjacent areas in order to assess the potential impacts on the atmosphere component resulting from port activities and, for example, to realization of projects (diffusion and lifting of dust related to the handling of aggregates, transit of work vehicles, etc.). Therefore, the monitoring activities should be prepared mainly for the ante-operam phases, with the aim of providing an environmental reference framework that allows comparison with the data collected in the subsequent time phases and for the course of work in order to verify the increase, with respect to the ante-operam, in the level of concentration of dust and pollutants induced by the execution of the activities and / or works. For the aforementioned purposes, the monitoring for the "air" matrix should include at least one monitoring network consisting of mobile stations located in correspondence with points that are affected, independently of the works, by pollution in the atmospheric component. In particular, the stations should also be located in points where it is possible to evaluate the impact produced on the atmosphere by ship and road traffic: for this purpose a seasonal monitoring frequency is suggested, for a duration of 30 days. Given the purpose of area monitoring, it would be advisable to verify the opportunity of adopting in the network a fixed station for the control of the "air" matrix and of the meteo-climatic variables that works permanently (continuously, or with frequencies and on predetermined periods, also for the control of emergency conditions): this should have a central position with respect to the whole port area. At the mobile monitoring stations, at least the following parameters should be measured: - PTS[12], PM_{10} and $PM_{2,5}$; - CO, NOx, S02;

[12] Total Suspended Particulate

	- VOC (benzene, toluene); - IPA, metals; - meteoclimatic parameters. On the other hand, at least the following devices should be present for the evaluation of the meteoclimatic parameters at the meteorological station: ▪ anemometer for measuring and representing wind speed and direction; ▪ thermo hygrometer; ▪ rain gauge and radiometer; ▪ barometer; ▪ datalogger; ▪ anti-radiant screen. Air quality monitoring by means of mobile laboratories also requires the allocation of: - automatic analyzers for the evaluation of airborne pollutants (CO, NOx, S02); - automatic sampler with modular sampling head, which allows you to choose the fraction of the particulate material (PM_{10}, $PM_{2,5}$, PTS), metals and IPA. For the monitoring of VOCs (benzene, toluene), it is possible to resort to sampling with canister and subsequent analytical determination in the laboratory. The monitoring of the **noise matrix** makes it possible to verify the effects induced on the acoustic climate by port activities in order to certify compliance with regulatory limits and to arrange any mitigation measures. In the area of interest, interference on the acoustic climate is mainly linked to the movement of vehicles entering and leaving the port (both by sea and by land) and to the work carried out within the construction sites which sometimes have a significant impact on the acoustic climate. The monitoring technique generally consists in the continuous measurement of the noise through the positioning of a sound level meter which continuously records the acoustic pressure level. Given these premises, the monitoring of the "noise" matrix can be broken down into the three time phases: ➢ in the *ante operam* phase, it allows to define the background noise existing in the area of interest, constituting the initial framework with which to compare the data collected in the subsequent phases;

	➢ during the construction phase, measures the emissions attributable to port activities, verifying compliance with the limits imposed by the legislation and the effectiveness of any mitigation measures; ➢ in the *post operam* phase, as it is possible to provide for a check in order to compare the data collected in the *post operam* with the two previous phases. The choices of the monitoring stations must take into account the points that may impact the acoustic climate, regardless of the areas in which the activities take place or in those where new works are set up. The number of stations must be consistent with the extent of the area to be monitored and the function of the receptors to be investigated. The stations should be chosen in order to evaluate the impact produced by ship and road traffic and by routine operations within the port area: for this purpose, a seasonal monitoring frequency with a duration of 30 days is conceivable. It is also possible to foresee a thickening during the construction phase in relation to each activity / site, except for a check on any overlapping of the monitoring stations. For the other matrices (soil, flora and fauna, filter-feeding organisms and benthos), site-specific operational indications will have to be developed.
Problem addressed / Benefits	The Integrated Monitoring Plan acts as a guideline and indication, in order to indicate a minimum performance level of quality, for the supply of fixed and mobile monitoring systems and the materials that will be used for carrying out the planned works. The long-term goal is to create a permanent monitoring system for the entire port area which, in the current phase, interferes as little as possible with the existing Area Monitoring Plans. The purpose of the proposal is, therefore, to set up a well-programmed network of monitoring stations, concerning different matrices, through which to systematically detect a defined set of parameters: all in accordance with a methodological approach that can lead to a program harmonious both from the point of view of timing and of the operating procedures to be adopted later in the implementation and management phase of the monitoring project for the area in question.
Transferability issues	No transferability issues.
Cost	10 MILLION € (three-year monitoring), variable depending on the extension of the area to be monitored, the frequencies and the analytical sets defined.
Equipment / infrastructure	To be evaluated for each port. By way of example and not limited to, the following are the elements that constitute a hypothetical monitoring network, in relation to the monitoring of:

<table>
<tr><td>s or personnel required</td><td>

Water quality:

Network of homogeneously distributed fixed stations and piezometers;
Network of mobile stations;
CTD probe (Electrical conductivity (C), temperature (T) and water depth (D) and/or multiparametric probe;
Current meter;
Samplers and sterile containers for sampling;

Acoustic environment:

Weather station for anemometric regimen determination;
Biennially calibrated phonometer;
Technician competent in acoustics entered on the ENTECA national list managed by ISPRA;

Air quality:

Fixed and mobile monitoring station networks;
Any automatic analyzers for the evaluation of airborne pollutants;
Any automatic samplers;
Canister sampler for VOC monitoring;
Samplers and sterile containers for sampling;

Sediment characterization:

Fixed and mobile sediment matrix monitoring station networks;
Samplers and sterile containers for sampling;
Bucket e/o box corer;
Technical divers equipped with liners;

The soil matrix:

Samplers and sterile containers for sampling;
Any mechanical means;
Analysis of morphological profiles for landscape insertion.

</td></tr>
<tr><td>Time-plan</td><td>To be evaluated for each port and according to the monitoring plan considered. By way of non-exhaustive example, a hypothetical schedule of activities is reported:
<table>
<tr><td></td><td colspan="2">1st year</td><td>2nd year</td><td>3rd year</td><td>4th year</td></tr>
<tr><td>Drafting of the Monitoring Plan</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Public procedure for the assignment of the service</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>First monitoring period</td><td></td><td></td><td></td><td></td><td></td></tr>
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Synergies & collaborations with key actors / stakeholders	The key players that, together with the Port Authority, could foster possible collaborations and create possible synergies for the implementation of this guideline are: • Region; • The Regional Environmental Protection Agency (ARPA); • University system and research bodies; • Analysis laboratories and firms specializing in monitoring systems.

Guideline 4: Adoption of GRI Standards in Sustainability Reporting

Title	**Adoption of GRI Standards in Sustainability Reporting**
Short description	The proposed measure regards the adoption of GRI Standards in Sustainability Reporting by IPA S.A. The GRI Standards, (also described in Section 4.2) are a structured methodology that is highly valued by the ports that have implemented them for sustainability reporting, setting forth a set of principles that guides the ports in how to present a report as well as provide a framework for its content. According to GRI Standards, the principles for defining report content are: • Stakeholder inclusiveness: The port shall identify its stakeholders and explain how it has responded to their reasonable expectations and interest. • Sustainability context: The report must present the reporting Organisation's performance in the broadest context of sustainability, meaning aspects and actions of the port that contribute, or aim to contribute in the future, to the improvement, or cause the deterioration, of the economic, environmental, and social conditions at the local, regional, or global level. • Materiality: Ports can face a wide range of topics or matters on which to report. Relevant subjects or topics to be included in the report, are those that can reasonably be considered important for reflecting the Organisation's economic, environmental, and social impacts, or influencing the decisions of stakeholders. • Completeness: The report shall include coverage of material topics and their boundaries, sufficient to reflect significant economic, environmental, and social impacts, and to enable stakeholders to assess the reporting Organisation's performance over the reporting period. According to GRI Standards, the principles for defining report quality are:

	• Accuracy: • The reported information shall be sufficiently accurate and detailed for stakeholders to assess the reporting Organisations performance. • Balance: The reported information shall reflect positive and negative aspects of the reporting Organisation's performance to enable a reasoned assessment of overall performance. • Clarity: The reporting Organisation shall make information available in a manner that is understandable and accessible to stakeholders using that information. • Comparability: The reporting Organisation shall select, compile, and report information consistently. The reported information shall be presented in a manner that enables stakeholders to analyze changes in the Organisation's performance over time, and that could support analysis relative to other Organisations. • Reliability: The reporting Organisation shall gather, record, compile, analyze, and report information and processes used in the preparation of the report in a way that they can be subject to examination, and that establishes the quality and materiality of the information. • Timeliness: The reporting Organisation shall report on a regular schedule so that information is available in time for stakeholders to make informed decisions.
Problem addressed/ Benefits	Reporting on sustainability information is increasingly becoming a legal requirement and less of a voluntary practice. Governments, stock exchanges, market regulators, investors, civil society and other stakeholders are demanding more and better information on organisations' sustainability impacts. Thus, measuring and reporting according to internationally recognized standards such as the GRI Sustainability Reporting Standards becomes imperative. IPA S.A already develops Sustainability Reports aiming to present its actual performance on major environmental aspects. Adoption of GRI Standards in Sustainability Reporting could support IPA S.A to take a step further and develop a common language enabling comparison of quality of information about its impacts.

	Additionally, GRI Standards could help the port to evaluate and recognize best practices for its business, align sustainability criteria, identify risks and opportunities, generate awareness among employees and upper management about issues linked to sustainable development, engage with all stakeholders and set goas for improvement. Specifically, the commercial, social, and environmental benefits and advantages that IPA S.A could gain by implementing the GRI Sustainability Standards include: • enhanced risk management, • operational continuity, • increased profitability, • improved reputation and social impact, • greater transparency, • asset appreciation.
Transferability issues	GRI Standards could be easily adopted by IPA S.A, without significant obstacles hindering its application. GRI Standards can be used in combination with other reporting frameworks. GRI continually works together with other reporting frameworks to avoid duplication of disclosure effort.
Cost	The GRI Standards are available as a free public good.
Equipment / infrastructures or personnel required	The use of external assurance for sustainability reports is advised in addition to any internal resources, but it is not required in order to make a claim that a report has been prepared in accordance with the GRI Standards. If the report has been externally assured, the assurance report must be included, stating the information that has been assured, as stipulated in GRI 102-56
Time-plan	n/a
Synergies & collaborations with key actors / stakeholders	Organisations report on their sustainability impacts in response to stakeholder information requirements. Thus, engagement with all relevant stakeholders would be strongly appreciated.

Guideline 5: Application of ISO 16304: 2018

Title	**Application of ISO 16304: 2018**
Short description	The proposed measure regards the application of ISO 16304: 2018, in the case that IPA S.A. decides to develop Port Reception Facilities at its site. As presented in Chapter 4, ISO 16304 provides guidance and sets best practice for the following areas of arrangement and management of

	port waste reception facilities. Specifically, the Standard applies to the management of ship-generated waste regulated by MARPOL that is discharged at ports and terminals. It also covers principles and issues that should be considered in the development of a port waste management plan, its implementation and port reception facilities operations. The procedures to operate the port reception facilities and the development of a port waste management plan are closely linked and therefore are integrated into ISO 16304. Specifically, the Standard addresses the principles and issues that should be considered in: ▪ The development of a port waste management strategy; ▪ The design and operation of PRF; ▪ PWMP development, implementation and compliance; and ▪ PRF management and accountability.
Problem addressed/ Benefits	The development of adequate port reception facilities (PRFs) for ship generated waste and cargo residues is a major factor in the management of each of the shipboard waste streams covered by the International Convention for the Prevention of Pollution from Ships (MARPOL) Annexes I to VI, as amended, excluding Annex III (packaged dangerous goods). MARPOL requires that Party States ensure the provision of adequate reception facilities in ports to receive these wastes. Parties to MARPOL should have developed implementing legislation to provide for PRFs. Regional and intergovernmental legislation has also been developed. However, due to operational, ownership, geographic, and legislative differences in ports, there is a large disparity in how operations are conducted. To overcome some of the major issues, the International Maritime Organization (IMO), through its implementation of IMO Instruments (III) Subcommittee (formerly the subcommittee on Flag State Implementation) developed an action programme to tackle the inadequacy of PRFs. To obtain the most efficient management of waste and to reduce the time and resource burden in segregating and handling waste in the ports, the concept of waste minimisation has been integrated into ISO 16304: 2018, by incorporating the following principles: - For waste generate aboard a ship: "Prevention before recycling before energy recovery before disposal" - Once the waste is offloaded ashore: "Avoidance before reduction, before reuse, before recycling, incineration with energy recovery, before disposal"

	Ship owners and operators, cargo owners, and port and terminal owners and operators, along with governments are aware of the importance of well-organised and managed waste collection, especially with respect to health and safety on board ships and at ports and terminals. It has been acknowledged at the IMO that standardized methodologies for waste management both on board ships and shore at PRFs would harmonize practices and ensure a smooth delivery of ship generated waste and cargo residues to shore-side facilities. The main driver for the Port of Igoumenitsa achieving accreditation in the standard would be to demonstrate to stakeholders the commitment to improving environmental standard of ship activities. This may help win an advantage over competitors, providing the Port with a lead in the market. Additionally, one of the benefits of the ISO standards is the requirement for monitoring, as well as internal and external auditing. This ensures credibility and is an alternative approach to ensuring compliance where enforcement mechanisms fall short.
Transferability issues	No issues identified. ISO 16304 is meant to complement ISO 14001 by adding a component that extends its principles to management of ships' waste in ports. It can be incorporated easily into other plans for achieving ISO 14001 accreditation, as an extension that focuses on port reception facilities.
Cost	n/a
Equipment / infrastructures or personnel required	-
Time-plan	
Synergies & collaborations with key actors / stakeholders	Collaboration with EUROCERT could be further enhanced in order to obtain 16304 accreditations.

Guideline 6: Adoption of an incentive-based fee system for waste delivery by ships and a state-of-the-art monitoring and information system

Title	**Adoption of an incentive-based fee system for waste delivery by ships and a state-of-the-art monitoring and information system**
Short description	The proposed measure regards a strong incentive-based fee system for waste delivery by ships, combined with a state-of-the-art monitoring and information system, known as "WASCOL" System. The measure has been applied for several years by the Port of Antwerp, which

	receives significantly high volumes of ship-generated waste - constantly increasing every year. EMSA considers the WASCOL system as one of the best practices in EU ports. *Fees for ship-generated waste* The proposed fee system includes a strong incentive towards maximum delivery of ship-generated waste, without limits in terms of maximum volumes. Specifically, according to the measure, all vessels calling at the port have to send an advance waste notification through EDIFACT – message directly into port information system (WASDIS), at least 24 hours prior to arrival. For each call a substantial waste fee must be paid to the Port Authority irrespective of the use of a port reception facility. As an incentive to deliver the ship's waste at port reception facilities, the disposal of the waste is partly covered through the collection of these fees. Thus, there is a financial compensation by the Port Authority per m^3 of delivered waste. *Waste information and monitoring system (WASCOL)* "WASCOL" is a web-based information and monitoring system of ship-generated waste and cargo residues applied by the Port Authority. The application manages all information related to the waste delivery of each individual ship in the port, by combining the information from the ship's notification with the data reported by the PRF. Specifically, WASCOL is used by PRF: • to register delivered amounts of waste (reporting requirement). It is used by the Port Authority: • to monitor and verify fees and reimbursements, • to monitor waste flows (comparison with ship's notification), • to register PRF's, • to register IOPP certificates (dedicated storage capacity). It is used by Coast Guard: • to target vessels for inspection.
Problem addressed/ Benefits	Discharges of waste and cargo residues into the sea are a serious threat to the marine environment. As presented in Section 3.2, Igoumenitsa Port Authority has documented an increased amount of ship-generated waste over the recent years, attributed to the growing number of passengers, ships and the technical projects implemented in the area. The proposed initiative could support IPA S.A to reduce and ultimately eliminate the intentional pollution of the marine

	environment by ships, providing ships with incentives to deliver their waste to organised reception facilities. According to Deliverable 1.3.1, the main reason preventing ships from delivering their waste to port reception facilities is high reception costs. Since the likelihood of a ship being 'caught' when discharging such cargoes at sea is low, ship operators prefer to avoid the cost of delivering their waste and take this action. If these costs were included in the berthing costs/fees, ships would not turn to the option of dumping at sea. The proposed measure aims to address this problem, and specifically, to: • reduce direct costs of waste delivery, • reduce bureaucracy for the users, • increase transparency, • facilitate control and inspection procedures Additionally, the system provides: • accurate and detailed data on delivery of ship generated waste, • the full picture of waste flows from ships to PRFs, • reliable statistics and thus better monitoring of the procedures.
Transferability issues	WASCOL is an internet application which could be used internationally to facilitate the monitoring of ship´s waste streams and exchange information. The measure could be easily adopted by Igoumenitsa Port, without significant obstacles hindering its application.
Cost	n/a
Equipment / infrastructures or personnel required	Web-based IT System Trained personnel for operating the System
Time-plan	n/a
Synergies & collaborations with key actors / stakeholders	Extensive consultation with all the relevant parties (representatives of PRF, ship agents, Port Authority, Coast Guard) could take place prior to the measure's implementation and a forum involving the aforementioned stakeholders could possibly be established discussing all issues relating to ship-generated waste (every 3-4 months). Additionally, since Coast Guard has direct access to the information and monitoring system, the data on ship-generated waste could be used when targeting vessels for inspection.

	Finally, collaborations with other ports applying the measure (i.e. Antwerp) could occur to exchange data and experiences.

Guideline 7: Usage of a Mobile Technological Handling Station (MTHS)

Title	Usage of a Mobile Technological Handling Station (MTHS)
Short description	The proposed measure regards the usage of a Mobile Technological Handling Station (MTHS) - an innovative technological solution for optimum handling of liquid/ pumped oil-containing waste from ships and/or polluted sea water, which recycles hazardous waste into a 100% recoverable REACH certified oil product. MTHS provides to the ports the operational ability to fight against sea pollution through the practical ability to pump large amounts of contaminated sea water from vessels into reservoirs. It is an extremely flexible, automatically operated handling system which is controlled from one location by one operator using a touch screen, laptop or remotely online, allowing waste in various proportions (oil/water/sediment) to be treated without the need for manual recalibration of the equipment and minimising the loss of usable output components. The integrated residual heat recovery system of the MTHS allows major savings on electricity and thermal energy through preheating the waste before treatment. The treatment process yields a 100% recoverable REACH certified oil component that is of stable quality, has a market and a product price that can be standardised. The waste generated in the process does not end up in landfills. Practically all waste generated in the process is recovered. The solids separated by centrifuge and decanting are used. The proposed technology consumes 1.58 kWh less energy to process 1 m^3 of oil waste than the old process and produces 7% less hazardous waste by mass. MTHS has been developed by the Port of Tallinn and its daughter company Green Marine and is in operation since 2011, aiming to implement the company's social responsibility policy more effectively.
Problem addressed/ Benefits	Discharges of liquid waste into the sea constitutes a serious threat to the marine environment. As presented in Section 3.2, Igoumenitsa Port Authority has documented an increased amount of liquid hazardous waste over the recent years, attributed to the growing number of passengers, ships and the technical projects implemented in the area. The proposed measure could support IPA S.A to implement its environmental policy more effectively, by improving its water management processes.

	The proposed solution brings benefits to many different parties like shipping companies, IPA S.A, the Coast Guard and also to local communities who wish to live by a clean sea. Specifically, the benefits arising from the adoption of the proposed solution are: • Less energy is spent on handling oil waste compared to similar available processes (the energy is recovered), • The amount of hazardous waste is significantly diminished in result of handling, and • The process is environmentally sustainable and economical. • The MTHS process ensures that the amount of airborne emissions is significantly less than with other existing technologies.
Transferability issues	No issues recorded.
Cost	n/a
Equipment / infrastructures or personnel required	The Mobile Technological Handling Station (MTHS) of liquid oil-containing waste is based on a technological set and energy saving solutions for optimum handling of oil-containing waste (incl. bilge, slops, sludge etc) and is built in 10 standard 20-feet sea containers installed in two levels. Technical specifications: ▪ Maximum capacity/output: 15.000l/t or 120.000 m^3/year; ▪ Feed input: 10–90% oil /water mixture, up to 15% v/v sediments; ▪ Viscosity of input waste: <25 cSt on separation temperature; ▪ Density: light fraction differs only by 5% from the heavy fraction; ▪ Water content in oil component output: <0.1% (actual production indicators, Tallinn); ▪ Sediments in oil component output: <0.1% w/w (actual production indicators, Tallinn); ▪ Heating source: hot water, steam or thermal oil (according to the parameters of the boiler system); ▪ Automation: fully automated; Material: for parts in contact with waste as well as for assemblies, high-quality materials are used, incl. chrome metals, stainless steel, Viton and Teflon. Trained personnel for operating the MTHS
Time-plan	n/a

Synergies & collaborations with key actors / stakeholders	Collaboration between public sector authorities and private parties will be needed for the implementation of the proposed measure.

Guideline 8: "Respect the City"

Title	**"Respect the City"**
Short description	Related to the lack of concrete destination cooperation and initiatives such as the initiative launched by the City of Dubrovnik "Respect the City" which through all stakeholders and through periodic action plans proposes measures that affect the further sustainability of the destination and awareness of both residents and visitors / tourists..
Problem addressed / Benefits	Although this is an initiative launched by the City of Dubrovnik and not the Port Authority, this example is an excellent example of cooperation between key actors in environmental management, waste management and promoting the sustainability of the destination.
Transferability issues	RELATED TO OBSTACLES - Given the many stakeholders involved, there is a possibility that the coordination of activities among the partners involved will be very demanding. For example, in the case of the proposed measure of educational eco trips for cruise passengers - one of the major challenges is how to address cruise passengers given the specifics of cruise companies and their business (these are large corporations with tens of thousands of employees)
Cost	n/a
Equipment / infrastructures or personnel required	Furthermore, a small manual can be made with recommendations and instructions on behavior in the port and proper handling of waste that would be placed in visible places in the port, on the websites of the City, County, Port Authority. Leaflet or brochure of recyclable materials can be distributed to all port users - from domestic population, foreign passengers, concessionaires, … It is necessary to create a manual in electronic form. Currently, it is difficult to estimate the costs given that it is necessary to decide exactly what activities and measures are planned to be taken within the initiative, however, this flexibility can allow each port to create measures according to its own budget and needs. The measure would be educational and could cover a whole range of target groups to which each port addresses.
Time-plan	Depending on the measures that will be launched within the initiative, the duration of the implementation of measures depends as well as due to the current pandemic of the COVID19 virus - from 3 to 9 months should be enough for any of the proposed measures.

Synergies & collaborations with key actors / stakeholders	Given that there are several target groups to which this initiative would address, it is possible to take more measures within the initiative in question. In this particular case (Zadar), an educational and ecological trip can be designed and offered for cruise passengers as a target group, and they can be offered the engagement of an expert guide who would take them on tours.

Guideline 9: Setting up an Eco Island in the Port

Title	**Setting up an Eco Island in the Port**
Short description	Setting up an Eco Island in the Port in terms of developing awareness of the importance of the circular economy. This measure is also very flexible and each port can, according to its needs and taking into account its own specifics, determine the optimal position and size of the tank. In light of this, it is very important to establish whether the problem lies in ship-generated waste or whether the waste was generated on the mainland part of the port area due to the impact of passengers / vehicles.
Problem addressed / Benefits	The assumption is that by setting up eco-islands in ports, waste would be generated in controlled positions and would be separated by species at the outset, which facilitates further handling.
Transferability issues	Regarding obstacles - it is important to organize the subsequent regular emptying of the subject equipment / waste containers so that the subject eco-islands would not communicate exactly the opposite story of the desired effect.
Cost	Costs are also difficult to estimate, but each port can, depending on its budget and needs, create its own Eco Island.
Equipment / infrastructures or personnel required	Apart from the supply of equipment and minor works, no greater involvement of staff is required, except for the organization of waste collection. Cooperation is needed with the concessionaires in charge of disposing of the types of waste in question, and it is also possible to educate all port users to use the islands in question as efficiently, correctly and often as possible.
Time-plan	It would take six months to create the terms of reference, equipment specification, organization and implementation of the tender for the procurement of equipment and possible conclusion of a contract / supplement to the contract for disposal with the company / concessionaire.

Synergies & collaborations with key actors / stakeholders	In the case of the passenger port in Gaženica - Zadar, which is the subject of this research, it has been shown that it is necessary to solve the problem of waste generated by passengers and vehicles using the port (paper containers, plastic, old batteries,…). the amount of waste is generated precisely in the waiting areas and other places where there is a large fluctuation of passengers / tourists.

Guideline 10: Development of a long-term Environmental Policy Plan

Title	**Development of a long-term Environmental Policy Plan**
Short description	Development of a long-term Environmental Policy Plan that contains a short-term, medium-term and long-term plan of activities related to the reception, manipulation and disposal of waste. In the specific case, it is about the just completed entire port infrastructure and superstructure in Gaženica, i.e., in the area where the new passenger port is expressed. Given that the port was fully launched less than two years ago, now is the right time to develop a detailed and long-term methodologically harmonized "Environmental Policy Plan" with the prescribed short, medium and long-term activities that need to be done to make the port more efficient in terms of receiving and disposing of ship and other waste.
Problem addressed / Benefits	It can be applied to all ports that do not yet have an adequate methodological approach in environmental issues.
Transferability issues	Obstacles in the development, and especially the subsequent implementation of these plans may have smaller ports with a modest number of skilled workers, given that a good methodological approach is required and subsequent regular monitoring of activities and implementation of measures prescribed by the plan.
Cost	It is still difficult to determine how much the development of the plan in question would cost, given that it depends on the scope and specifics of each port.
Equipment / infrastructures or personnel required	In addition, it would be desirable to involve professionals and universities in this process. For the broader picture - as part of this activity, it would be good for port authorities to join (if they have not already) existing environmental initiatives in ports, which can enable them to regularly monitor European Directives.
Time-plan	For the realization of this activity, taking into account the specification of the content and the duration of the procedure of procurement of services for the development of the plan in question, as well as the

	development of the plan itself, it is estimated that it takes between six and nine months.
Synergies & collaborations with key actors / stakeholders	All companies / concessionaires dealing with the reception and disposal of waste in the port should be included in the development of the plan. A warm recommendation is to designate a person within the port to deal with the implementation of the plan in the port area.

Guideline 11: Circular Economy Center

Title	**Circular Economy Center**
Short description	Circular Economy Center: this would be part of the Port of Koper - a subsidiary where waste suitable for reuse would be accepted. It is necessary to determine what types of waste could be taken. In addition, it would be necessary to set up an online platform, which would show which waste is accepted in this center and daily update information on how much can be accepted that day/week. All logistics would be based on cooperation with a number of stakeholders, including recycling centers, to which certain waste would be taken for recycling. First of all, it is necessary to prepare a plan, obtain all the necessary ship data on waste (how waste is separated on a particular ship, how it is stored, what is the capacity in relation to the waterway, etc.). Based on this, it would be necessary to develop a detailed waste management circular economy plan, and prepare all the necessary logistical arrangements.
Problem addressed / Benefits	Such a service, which would take care of renewable waste, would greatly relieve the existing waste management service, which would consequently mean that the waste currently collected in the port would be processed faster and thus less of a burden on the environment.
Transferability issues	Given that ships from different parts of the world come to port, the problem with this kind of waste would be that not all ships have the same waste separation protocol (there are certain nuances), which would consequently mean that waste that is suitable for further use, found as general waste.
Cost	n/a
Equipment / infrastructures or personnel required	For this type of activity, it would be necessary to set up a new company, with new employees and equipment.
Time-plan	This kind of project can be realized withing 1-2 years.

Synergies & collaborations with key actors / stakeholders	Local authority, state authority and other stakeholders would certainly be interested in this type of activity, as on the one hand it is also the aspiration of the state and local authorities, and on the other hand it is also an opportunity to generate new profits in economic terms.

Guideline 12: Smart waste management system

Title	**Smart waste management system**
Short description	It is an online system or application that every ship that lands should fill in along with all the other documents it submits on landing. This would be an online application where each ship would have to predict the amount and type of garbage it will deliver in port. The application would also have a price list that would vary according to the type of waste (separate waste, general waste, hazardous waste, ..), but the notification of this waste would be mandatory before landing. Thus, the waste management center could also organize logistics in a timely manner for a certain type of waste expected on the coast. This would reduce subsequent logistics in the center itself or help speed up the flow of stored waste.
Problem addressed / Benefits	Such an upgrade of waste management would, at low cost, help to improve the operation of the center, reduce the accumulation and storage of waste and, consequently, contribute to environmental sustainability.
Transferability issues	Such a mandatory waste disposal forecasting system would most likely need some legal basis for the port to require this from incoming ships. Otherwise, this could be given as an option in any case and in this case the cost to the ships would be lower.
Cost	n/a
Equipment / infrastructures or personnel required	online application system monitoring staff
Time-plan	1-2 years
Synergies & collaborations with key actors / stakeholders	Several stakeholders would support this guidelines, as we achieve high benefits with low costs.

Guideline 13: Electrification of means of transport within the port

Title	**Electrification of means of transport within the port**

Short description	All vehicles and machinery used inside the port should be electrically powered, including company vehicles used outside the port. This would mean that all working machines and all other vehicles and means of transport powered by conventional fuels are replaced over time. This is also one of the more important aspects of environmental sustainability in the port, as all possible mechanization should be replaced by more modern versions that contribute to a clean environment.
Problem addressed / Benefits	It is certainly one of the important steps and aspects of environmental sustainability and should be one of the main goals in the next few years. If we want to keep up with the times in terms of environmental sustainability, then this step is inevitable in the future.
Transferability issues	This type of intervention entails an exceptionally high cost. The replacement of all vehicles, means of transport and other machinery should be done gradually.
Cost	n/a
Equipment / infrastructures or personnel required	n/a
Time-plan	Till year 2030
Synergies & collaborations with key actors / stakeholders	Most stakeholders would support such a project - each to the best of their ability. In any case, certain grants from the state or the EU would be welcome here.

Guideline 14: Facility at the terminal on the coast

Title	**Facility at the terminal on the coast**
Short description	The following guideline can be used in the ports with poor waste management system which lack of proper equipment. Those projects need to be implemented in Serbian ports in order to achieve sustainable environmental protection and fulfilling obligation arising from legislation. Waste materials generated on tourist or cargo vessels, both in the process of operation of the vessel, in the process of its maintenance, and in the process of providing catering services, are divided into hazardous and non-hazardous waste, which can be solid and liquid, and wastewater (gray and black) and oily bilge water. The generation, collection and temporary storage of waste materials on ships and cruisers can be very differently organized, so the floating

	dock platform and the onshore terminal must be ready and able to accept: – wastewater (gray and black) – oily bilge water – packaging, non-hazardous waste, which can already be separated by type, and can also be mixed; – mixed municipal waste, which has no use value (a higher percentage is biodegradable waste); – waste motor oils; oiled cloths, filters, etc .; – worn-out fluorescent tubes; waste batteries; – waste edible oils; – other types of waste in smaller quantities. The technical-technological solution includes: – Terminal on the coast, – Floating dock for own needs with wastewater treatment plants (gray and black and oily / bilge), – Service ship with its own ship crane ("interceptor" - self-propelled motor vessel). Collection of waste from cargo ships is done with the help of a specialized ship, "interceptor" for receiving waste materials, about 30 m long, specially equipped for that purpose, with its own ship crane. This ship docks with a vessel at berth or anchorage and picks up waste materials from it: wastewater (gray and black), oily / bilge water, waste oil, solid waste (separated and mixed) and oiled and other hazardous waste. Waste materials that are in the liquid phase can be taken directly from the tank by means of pipe connections and pumps or a special own ship crane (crane), located on the deck of the ship, "interceptors" for receiving waste materials, if they are in tanks / containers. Solid waste, which is in containers, is also transferred by crane. The service ship with its own ship crane ("interceptor" - self-propelled motor vessel) has the task to safely pick up all waste (solid or liquid) from a passenger or cargo ship and take it to a floating pier located along the coast. Waste transportation is technically, but also ecologically, the most sensitive part of the system, and therefore the crane operator and service ship driver must be fully skilled in this type of work, and must undergo education and training in countries that already have experience in such jobs.

	When the ship "interceptor" for reception reaches the platform, hazardous (solid and liquid) and non-hazardous waste, which can be in containers, barrels, tanks, buckets, etc., is transferred from it to the floating pier, from the pier over the approach bridge by forklift to the shore, and from there on to the terminal located on the shore. At the entrance to the Terminal, there is a porter's lodge, from where the employee opens the sliding gate, identifies the type of waste, picks up and fills in the necessary documents that accompany the waste and directs the forklift to a digital platform floor scale where the amount of waste is identified. Depending on the type of waste, the forklift, identified and measured waste, is transported to a plateau for non-hazardous or hazardous waste, for storage, or treatment (selection and baling), until it is picked up by an authorized operator. After the surrender, ie. storage of waste, the forklift goes for a new amount of waste from the platform, or, if the job is done, parked under the canopy on the plateau for non-hazardous waste. The authorized operator, when he comes to pick up the waste, enters the terminal through the gate (which is remotely opened by the clerk in the porter's lodge), picks up a certain, measured, type of waste, fills in the necessary, accompanying documentation and leaves the terminal through. Wastewater is pumped and treated in a gray, black and oily / bilge wastewater treatment plant. The terminal is designed to be ready and able to receive all these types of waste in an adequate and environmentally friendly way. In addition, the Terminal must be functional and have the necessary facilities, equipment, installations and roads, all in the function of providing the necessary and quality services and environmental protection. For these reasons, the available space is divided into three parts: 1. Administrative-manipulative-service plateau; 2. Plateau for non-hazardous waste; 3. Plateau for hazardous waste; ***1. Administrative-manipulative-service plateau consists of:*** – Fences 2m high around the whole complex – Sliding entrance / exit gates 1 and 2 – Administrative buildings – Parking for passenger cars and forklifts – Porters – Platform - floor scales

<table>
<tr><td></td><td>
– Internal roads with two entrances / exits.

2. The plateau for non-hazardous waste consists of:
– Canopies
– Conveyor belts for waste separation with hopper
– Three wire containers for receiving separated raw materials
– Two-chamber balers
– Warehouses of secondary raw materials
– Three containers for already developed secondary raw materials - PET, metal and glass
– Press container for mixed municipal waste.

3. The plateau for hazardous waste consists of:
- Tank with tank for waste machine oils
- Containers for oily hazardous waste
- Containers for fluorescent tubes
- Container for waste batteries
- Container for waste edible oils.

On the Administrative-manipulative-service plateau there is a porter's lodge, a floor scale, an administrative building, parking lots and a grease and oil separator.
</td></tr>
<tr><td>Problem addressed / Benefits</td><td>Part of waste management system in ports, providing the necessary and quality services and environmental protection.</td></tr>
<tr><td>Transferability issues</td><td>This could be implemented in many ports.</td></tr>
<tr><td>Cost</td><td>Not available</td></tr>
<tr><td>Equipment / infrastructures or personnel required</td><td>
<table>
<tr><td>1</td><td>Administrative building:
- office,
- wardrobes for employees,
- toilets.</td></tr>
<tr><td>2</td><td>Landscaping, and facilities on site:
- - fence around the plant to the main gate,
- - portiernica,
- - internal roads,
- - trails around buildings, etc.</td></tr>
<tr><td>3</td><td>Office equipment of the administrative building and porters - furniture, sanitary equipment, thermotechnical equipment</td></tr>
<tr><td>4</td><td>Substation</td></tr>
<tr><td>5</td><td>Computer system with SCADA monitoring station</td></tr>
<tr><td>6</td><td>Video surveillance equipment</td></tr>
<tr><td>7</td><td>PP equipment</td></tr>
<tr><td>8</td><td>Outdoor lighting</td></tr>
<tr><td>9</td><td>Digital platform scale
-Max. measuring weight = 10 t
-Min. measuring weight = 5 kg</td></tr>
<tr><td>10</td><td>Forklift, electric</td></tr>
</table>
</td></tr>
</table>

		- load capacity = 2 t
		Plateau for non-hazardous waste
	1	Belt feeder with hopper Belt width: 1000 mm
	2	Belt sorting conveyor Belt width: 1000 mm Conveyor length: 5000 mm
	3	Two-chamber vertical baling press 150 kN Bale weight: up to 200 kg
	4	Containers, closed, for separated waste (PET, Metal, Glass)
	5	Screw press container, for mixed municipal waste, 10 m^3
	6	Container for separated materials
	7	Storage of spare parts and chemicals, under the canopy
		Plateau for hazardous waste
	1	Container for oily hazardous waste (cloths, filters, etc.), 1000 l
	2	Containers for waste batteries of 1000 l
	3	Container for fluorescent tubes with a maximum length of 1600 mm
	4	Container for waste edible oils of 500 l
	5	Tank with tank for waste motor oils of 5 m^3Tank for receiving up to 1/3 of liquid
Time-plan	Not available	
Synergies & collaborations with key actors / stakeholders	Synergies between port management, operators and responsible authorities	

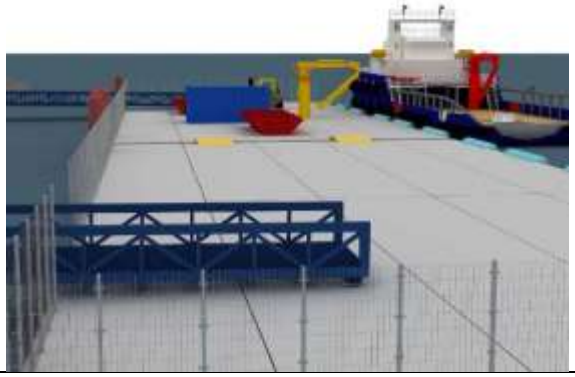
Guideline 15: Specialized ship for receiving waste materials from vessels

Title	**Specialized ship for receiving waste materials from vessels**
Short description	Specialized ship for receiving waste materials from cargo and passenger ships, with its own ship crane (ALB-OWTV-1). Shipbuilding as well as installation of equipment must be appropriate and reliable. The ship is made of mild steel, NS steel - class A. At the stern is the engine room and space for the steering gear. All cargo handling operations are performed from the pump station and from the main deck. Cargo pumps are controlled from the CCS cargo control station on the main deck. A 15 t deck crane will be placed at the stern of the ship on the left side of the cargo area. The ship is equipped with all necessary rescue equipment, fire protection and medical equipment. During inactivity (outside working hours and when there is no call from the vessel to pick up waste materials), the service ship for receiving waste materials will be moored at the floating pier. Basic characteristics: - Load capacity approx. 650 t - Length 40 m - Width 8 m

	- • Deck height 3.5 m.
Problem addressed / Benefits	Part of waste management system in ports, providing the necessary and quality services and environmental protection.
Transferability issues	This could be implemented in many ports.
Cost	Not available
Equipment / infrastructures or personnel required	Boat with equipment
Time-plan	Not available
Synergies & collaborations with key actors / stakeholders	Synergies between port management, operators and responsible authorities.

Guideline 16: Floating dock

Title	**Floating dock**
Short description	A floating dock for its own needs is a reception platform without its own drive. The floating dock for its own needs should provide unobstructed access and stay at the dock of the projected number of people and equipment, as well as a safe berth of a specialized ship for receiving waste materials. as well as equipment for waste treatment, with the associated steel structure in the form of equipment foundations, access paths and enclosures. The facility is built of concrete pontoons interconnected completely in the required dimensions, which ensures that the upgraded platform, equipment and pier do not suffer loads from the movement of the pontoons themselves. The facility is designed so that there are physically separate platforms for solid waste handling and a platform for storing wastewater treatment plants. Equipment located on a floating pier includes: - Gray and black water treatment plant

	- Oily / bilge water treatment plant - Receiving tank for oily / bilge water - Receiving tank for gray and black water - Waste oil tank - Containers for sludge after treatment, one for sludge created by treatment of gray and black waters and for sludge created by treatment of oily / bilge water Deck crane for receiving waste from a specialized ship at the pier. 
Problem addressed / Benefits	Part of waste management system in ports, providing the necessary and quality services and environmental protection.
Transferability issues	This could be implemented in many ports.
Cost	Not available
Equipment / infrastructures or personnel required	- Floating dock for own needs - Deck crane on the pier - Bridge for access to the pier - Receiving tank for gray and black water - Receiving tank for oily / bilge water - Container device for purification of gray and black waters - Container device for purification of oily / bilge water - Sludge container after wastewater treatment - Waste oil tank - Pumping pump

	- Internal pipe network - Skimmer pump in case of an accident
Time-plan	Not available
Synergies & collaborations with key actors / stakeholders	Synergies between port management, operators and responsible authorities

Guideline 17: Operational Guidelines on the Provision of Reception Facilities in Ports and the Delivery of Ship-Generated Wastes in the Mediterranean

Title	**Operational Guidelines on the Provision of Reception Facilities in Ports and the Delivery of Ship-Generated Wastes in the Mediterranean**
Short description	An alternative for the mobile collection of ship-generated waste is to have one or more centrally located fixed shore-based waste reception facilities, or fixed collection points with containers or skips. For smaller ports this might be a suitable option, especially when the collection is organized on a strategic place in the port (e.g. a lock providing the main access to the port). A specific advantage of a fixed PRF is that its operations can be extended and combined with waste (pre-) treatment. For large ports the main disadvantage of a fixed reception facility is that in order to deliver wastes and residues, a ship might have to shift berths if the reception of the ship generated waste is located at a fixed place somewhere else in the port. Shifting berths is a very time consuming and expensive operation, which may lead to undue delay or ships not being keen to use the If PRF are located in a less suitable place, delays, congestion and an increased risk of accidents and collisions will result. Appropriate sites for fixed garbage receptacles therefore include wharves adjacent to moorages, access points to docks, fuel stations and boat launching ramps.
Problem addressed / Benefits	The primary ocean-based sources of marine litter are merchant shipping, ferries and cruise liners, fishing vessels, particularly with respect to lost or abandoned fishing gear, military fleets and research vessels, pleasure craft, offshore oil and gas platforms, and aquaculture farms. 14. It is frequently cited that globally 80% of marine debris originates from land-based sources, and 20% from ocean-based sources, however the origins of this ratio are unclear (NOAA, 2009). Besides, the importance of these sources in terms of their contribution to the marine litter problem varies significantly regionally and locally depending on the scale of these activities in the area, as well as the policies regulating them. This means that there is significant variation in the amounts and types of debris arising from these sources

	regionally and locally. The assessment of the trends in marine litter levels and its sources is crucial for identifying and adopting targeted measures for the different sources. In this respect, the monitoring actions in regional sea conventions, such as the OSPAR Convention, the Helsinki Convention and the Barcelona Convention, are very valuable. Monitoring is applied on uniform marine litter indicators and methods (like beach monitoring and fulmar and/or turtle stomach monitoring), which provide information on the trends in marine litter accumulation and effectiveness of measures. Furthermore, proper source identification is a key element in the monitoring programmes.
Transferability issues	- *increased traffic* - *Expansion of the port: new terminals in operation*
Cost	-
Equipment / infrastructures or personnel required	- Provision of adequate port reception facilities, in order to meet the port users' needs and facilitate a smooth delivery from the ship without causing undue delay; - Introduce modern technology to be implemented by the waste management industry in order to minimize the impact of waste management towards the environment, avoiding emissions to land, water and air;
Time-plan	
Synergies & collaborations with key actors / stakeholders	- *RAPA Vlorw* - *Municipality of Vlore* - *Increased cooperation between Vlora Port and Durres Port might also be a valuable and economically viable option*

Guideline 18: Toward excellence in port environmental management and sustainability- Green guide

Title	**Toward excellence in port environmental management and sustainability- Green guide**
Short description	The main aim of the Green Guide is to trigger port authorities to be proactive and to commit to sustainable development and the continuous improvement of their environmental performance. With this focus, the Guide demonstrates options and approaches, without losing sight of the fact that port authorities find themselves with different challenges to face, have different financial and regulatory powers or capacities to act upon those challenges and finally, have a different track record and history of environmental management and performance. In other words, the Guide recognises that each port is unique. While respecting the differences between ports, the Guide: - defines a common vision of the port sector on environmental sustainability, - promotes the efforts of European port authorities in the field of environmental management,

	- demonstrates evidence of the progress achieved by the sector over time, - provides guidance to ports in establishing and developing further their environmental management programmes, - highlights the main environmental challenges that ports face and demonstrates response options, - develops a common approach towards responsible action, while respecting the diversity of ports, their competences and their abilities
Problem addressed / Benefits	Air quality Energy conservation and climate change Noise management Waste management
Transferability issues	- Port vision - Spatial planning and infrastructure management - Port dues
Cost	-
Equipment / infrastructures or personnel required	-
Synergies & collaborations with key actors / stakeholders	RAPA Vlore National Coastal Agency Vlora Municipality

Guideline 19: Improvement of Infrastructure and reception procedures of black and grey water

Title	**Improvement of Infrastructure and reception procedures of black and grey water**
Short description	The development/upgrade of infrastructure to be able to acceptblack and grey wastewater (sewage, shower and galley wastewater) at some of all of the quays. Vessels can offload sewage free-of-charge and also have the possibility to offload their black and grey wastewater to tanker trucks, pontoons or boats. This type of infrastructure allows the Application of the “No Special Fee” (NSF)-System, simplifying the procedures linked to the delivery of waste and creative motives for the improvement of environmental conduct in the port’s area. The practice conforms with IMO regulation and EU legislation and the approach of the Baltic Marine Environment Protection Commission (HELCOM) in its legislative convention (Helsinki convention). According to HELCOM NSF-system this is ““a charging system where the cost of reception, handling and disposal of ship generated wastes, originating

	from the normal operation of the ship, as well as of marine litter caught in fishingnets, is included in the harbor fee or otherwise charged to the ship irrespective of whether wastes are delivered or not". Since waste, and in many cases litter, is a direct result of the ship's normal operation thus leading to its creation on boards, the NSF approach was the charging of payment for reception, handling and disposal of oil residues, sewage and garbage at any calling port, regardless of the use of service or not.

Guideline 20: Contract Charging System

Title	Contract Charging System
Short description	The contract system is applicable which is the more beneficial in the ports where there are regular visits of the ships as is the case in the P.I. Under this system, a contract is negotiated between the owner of the ship which have registered the P.I as home port use and the operators of reception facilities in the port where the ships regularly visits. There are various contractual terms including volume and type of waste, frequency of use of facilities and fee payment. Enables the vessels owners to budget disposal costs over a fixed period, while port is guaranteed a certain yearly income over the same period The practice conforms with IMO regulation and EU legislation. It can be expected that the increased preparedness level, as the port authorities know in advance the needs of the contracted vessels, improves the normal time required for the waste disposal activities, thus improving the "attractiveness" of the port.
Problems addressed/ Benefits	As ships have contractual agree to dispose of waste in the specific port, and agreed costs in advance, administration is minimized, as is the need for monitoring of that particular ship. Illegal dumping is minimized as payment for delivery of waste is fixed, whether facilities are used or not, removing the so there is no financial incentive to dump waste.
Transferability issues	Simple Knowhow and Capacity Exchange
Cost	No additional costs beyond the regular maintenance activities.

Equipment / infrastructures or personnel required	Requires standard facilities and equipment.
Time-plan	Short – Mid Term procedure Adjustment
Synergies & collaborationswi th keyactors /stakeholders	Luka Bar AD Port of Adria AD Waste Management Contractor: Hemosan Ltd

Guideline 21: Ship-Generated Waste Recycling Theme

Title	**Ship-Generated Waste Recycling Theme**
Short description	The scope of the approach is the increase of ship-generated waste recycling rates, with the purpose of reducing the overall amount of waste landfilled. The Port of Tallinn has been actively pursuing the strategy of recycling very high percentages of ship-generated waste received from cruise ships, with efforts being placed in ensuring that recyclable waste is recycled or reused and diverted away from landfill to be reused, recovered or recycled. The practice conforms with IMO regulation and EU legislation. The increase of recycling rates is considered a major indicator for sustainability and “greening” of waste relating procedures, improving the respective performance of waste collection and the “attractiveness” of the port.
Problems addressed/ Benefits	Minimizing Landfill Waste and Increasing Recycled Material
Transferability issues	Depending on overall infrastructure in the country / region
Cost	Depending on overall infrastructure in the country / region
Equipment / infrastructures or personnel required	Separate Collection Points for Recyclable Material
Time-plan	Depending on overall infrastructure in the country / region

Synergies & collaborationswith keyactors /stakeholders	Luka Bar AD Port of Adria AD Waste Management Contractor: Hemosan Ltd National Authorities

7. Conclusions

7.1 Italy - Port Network Authority of the Ionian Sea & Central Adriatic Ports Authority

Port Network Authority of the Ionian Sea

The quality of the **water** and the characteristics of the marine **sediments**, referred to in **deliverable T1.1.1**, as resulting from the monitoring carried out and in progress, testify to the impact mainly attributable to the important industrial settlements attributable to the integrated cycle steel center and to the product refinery petroleum. The industrial wastewater deriving from these activities, although brought back to the legal limits by means of due treatments, has been discharged into the waters facing the Mar Grande of Taranto for several decades. Paragraph 3.2 of this paper provides a summary of the assessment of the ecological and chemical status of the Apulian surface waters and marine sediments and the results of the chemical, microbiological and ecotoxicological investigations carried out on the sediments of the Port of Taranto.

Waste management in the port of Taranto is virtuous thanks to the availability of detailed procedures for the collection of port waste, the presence of existing collection and management facilities as well as the planning of interventions and actions, in the short and long term, aimed at identifying and start remediation solutions regarding port services to be brought to the attention of the appropriate institutional work tables aimed at increasing the competitiveness of the Port of Taranto. The report of these activities is reported in **deliverables T1.2.1** and **T1.2.2.**

In addition, in December 2019, the Ionian Sea Port System Authority adopted the Environmental Energy Planning Document (DEASP) drawn up in collaboration with the DIPAR (Environment and Reuse Production District - Puglia Region). The Document assessed greenhouse gas emissions due to port activity for the year 2018 and established a reduction of 15% in 10 years in relation to traffic volumes, through the planning and implementation of a series of interventions.

Therefore, the Port System Authority of the Ionian Sea has proposed, in **deliverable T1.3.1**, its organizational structure as a possible model to be pursued for a correct and effective management of port waste. The model also integrates the construction of a soil washing plant for dredged port sediments, currently the subject of a concession procedure (in progress).
From the examination through the SWOT analysis tool of the programming tools used by the Port System Authority of the Ionian Sea, for what concerns the management of waste in the port area (Regulation for the performance of port operations and services in the port of Taranto and the waste collection and management plan of the Port of Taranto), the following emerged, as reported in **deliverable T1.4.1**; in detail:

1) The programmatic and operational tools analyzed are in compliance with the mandatory sector regulations;
2) The application of plans and regulations makes port waste management efficient and ensures the necessary traceability of waste. In particular, during the period analyzed,

the Authority did not receive any reports of any services or discontent from users using the waste collection service or censorship by the supervisory bodies;

3) The development of an articulated environmental monitoring program on the matrices (water, air, flora and fauna, acoustic climate, soil, vegetation, sediments, benthos) developed by DICATECh (Department of Civil Engineering ,Environmental, Territory, Construction and Chemistry) of the Polytechnic of Bari.

Finally, the application of the SWOT analysis has led to the following:

1) Evaluate the possibility of improving the service of collection and collection of waste from board ships arriving in the Port of Taranto;
2) Evaluate the implementation of plant structures for better waste management;
3) Evaluate incentive measures for those who reduce the amount of waste produced and who adopt good operating practices;
4) Setting targets for the reduction of waste produced by the Port Authority;
5) Set goals to increase recycling and reuse of materials;
6) Evaluate the possibility of including in the procedures for entrusting environmental services indications referring to the "Minimum Environmental Criteria" referred to in the National Action Plan for Green Purchases adopted with the Interministerial Decree of April 11, 2008 – updated with D.M. 10 April 2013 introducing the possibility of using the instrument of excellence in the GPP field: LCA (Life Cycle Assessment);
7) Evaluate the transformation of the port area into a Landscape and Ecologically Equipped Production Area (APPEA). This instrument of unitary governance of environmental problems appears as an effective means of monitoring the state of the port ecosystem in all its matrices, to face and overcome contingent and/or structural obstacles more easily in the application of the certified Environmental Management System, to monitor the correct application of procedures and timely compliance with environmental protection regulations by all operators within the Port.

All this leads to suggest some aspects of the organizational model of the Port of Taranto as a common orientation for port authorities in order to improve the role of ports towards the external community.

In order to continue its awareness-raising and collaboration activities for the protection of the natural environment of its territory, the health and safety of citizens, users and operators of the port, the Port System Authority of the Ionian Sea has adopted on 11/04/2018 the "Environmental Policy" Document as part of the Environmental Management System certified by RINA Services SpA according to the ISO 14001: 2015 standard, with which it aims to pursue various environmental sustainability objectives.

Lastly, the collaboration that the Port System Authority of the Ionian Sea has undertaken with the main stakeholders involved both in the management of port waste and in environmental protection and sustainability proved to be assiduous and fruitful.

Central Adriatic Ports Authority

This chapter reports the conclusions about the evaluations carried out in the context of the technical activities carried out in the **work package T.1** of the **ECOWAVES Project**, ADRION

Program, on the basis of which it was possible to identify some best practices applied in the port of Ancona and suggest guidelines. aimed at improving the environmental status of the partnership's ports.

In particular, as can be seen from **deliverable T1.2.1**, we proceeded with the analysis of the current state of ship traffic flows and the related waste production during the period 2016 - 2020 in order to obtain a general view of the collection and management system within the Port of Ancona.

In particular, both waste produced on board ships, those generated by pleasure craft, fishing boats and small ships, waste accidentally found at sea as well as waste resulting from the cleaning of water bodies and de-pollution activities were taken into consideration.

It was found that maritime traffic has undergone a significant decrease in the last two years of analysis compared to the trend of previous years. This decrease is certainly attributable to the reduction in traffic that occurred in 2020 due to the pandemic emergency due to the spread of Covid-19. In particular, as can be seen from the traffic data in the Port of Ancona for the years 2019-2020, the decrease in traffic involved:

- Liquid bulk (-22,3%);
- The solid bulk (-34,8%);
- Various goods in packages (-13,3%).

In addition, the number of touches in 2020 compared to 2019 decreased by 21,2%, that of ferry passengers a reduction of 65,5% and that of cruise passengers was canceled, attesting to a reduction of 100% compared to 2019. Therefore, the amount of waste withdrawn from ships has undergone a significant decrease in the last two years of analysis compared to the trend of previous years.

In **deliverable T1.2.2** an overview was made regarding waste management in the Port of Ancona, with particular reference to waste management systems produced by ships, those generated by pleasure craft, fishing boats and small ships, waste accidentally found at sea, as well as those deriving from the cleaning of the water bodies and from the de-pollution activities.

Following what has been described so far, the AdSP MAC believes that there are no significant gaps in the port of Ancona in terms of structural and infrastructural equipment for the management of waste produced on board ships and cargo residues.

However, we highlight the opportunity to improve the methods of separate waste collection on board ships and the possibility of providing for the presence of spaces to be dedicated in the port area to the installation of systems for the treatment of ballast water and bilge water, which today are managed - if the need arises - in extra-port areas.

Finally, in the light of recent experiences, the adoption of an institutional coordination protocol between all the competent bodies for the coordinated and shared management of waste from health emergencies (e.g., Covid-19) proves to be very appropriate.

In **chapter 3** of this paper, a presentation of the state of the art of waste management is shown as well as the current environmental state.
With regard to the management of waste carried out within the perimeter of the port of Ancona, a summary is provided of the Plan for the collection and management of waste produced by ships and cargo residues as a guideline for waste management. port, as well as a summary of the studies carried out on any pollution caused by the management of ballast water and fecal indicator bacteria.

The quality of the **coastal and bathing sea waters** and the characteristics of the marine **sediments**, referred to in **deliverable T1.1.1**, as resulting from the monitoring carried out and in progress, testify to a non-significant impact of the port activities on the environmental context of the Port of Ancona. Indeed:

- the chemical and ecological status of the water bodies belonging to coastal marine waters was good for the surveys carried out in the 2015-2020 three-year period;

- in 2020 there was a widespread improvement in the quality classes of Marche's bathing waters.

To complete the picture regarding the current environmental state of the port, in the same aforementioned paragraph, the environmental commitment of the AdSP MAC involved in the **Atmospheric Pollution Project (PIA)** aimed at the prevention and control of respiratory allergies, the monitoring of air pollution related to the city of Ancona.

Chapter 3 of this report presents the protocols and initiatives that the AdSP MAC has implemented regarding environmental sustainability and social responsibility. Therefore, this section lists the numerous initiatives that the Port System Authority has undertaken with various partners aimed at the social responsibility of the Entity.
It also reports the important actions implemented by the AdSP MAC for the protection and management of the environment; between these:

- the adoption of the Environmental Energy Planning Document of the Port System;
- the drafting and recent updating (forthcoming approval) of the plan for the collection and management of waste produced by ships and cargo residues;
- the signing of the voluntary Ancona Blue Agreement regarding the use of clean fuels in the Port of Ancona.

Some of the aforementioned protocols, plans and regulations have been proposed, in **chapter 4**, as best practices applied in the port of Ancona; between these:

- the implementation of different monitoring plans for the different environmental matrices;
- the adoption of the Environmental Energy Planning Document of the Port System through which it was possible to identify actions aimed at environmental sustainability and energy efficiency (for example, the implementation of cold ironing and the use of LNG).

In **Chapter 5**, it was possible to identify numerous key players involved in the implementation of rules and protocols for waste management and the possible synergies between the main players to improve the environmental status of the port of Ancona.

Net of the evaluations carried out during the activities of the work package T.1 and whose summaries have been reported in the various previous chapters of this paper, the AdSP MAC has suggested, as a transnational orientation, some guidelines to improve the environmental state the ports of the partnership. In particular, the following guidelines are suggested:

- the implementation of monitoring plans on the various environmental matrices for constant monitoring of the environmental status of the port and the areas adjacent to it, as well as for the assessment of any impacts that port activities may have on the urban context;

- the implementation of systems aimed at saving and energy efficiency such as the proposed trigeneration system to produce the energy necessary for port activities on site;

- the adoption of a unitary management model of environmental and energy services as proposed in the model of Ecologically Equipped Production Areas (APEA).

7.2 Greece – Igoumenitsa Port Authority S.A.

To sum up, Igoumenitsa Port implements a Waste Collection and Waste Management Plan aiming to reduce the discharges of ship-generated waste and cargo residues into the sea and to comply with European and Greek legislation. Specifically, a revised and updated version of IPA's Waste Collection and Waste Management Plan was submitted for approval in 2017. Even though the Plan is in accordance with Directive 2000/59/EC and Directive 2007/71/EC and fulfils the legal requirements set by the Ministerial Decision 8111.1/41/2009, it does not take into consideration the most recent EU Directive 2019/883/EC (which has not been incorporated in the Greek legal framework until today).

Besides the Waste Collection and Waste Management Plan, IPA S.A has taken additional measures in order to address and eliminate environmental problems deriving from the Port's operation. Despite this, recent environmental assessments (2016 -2018) at the port area have shown an increase of liquid and solid waste, attributed to the growing number of passengers, ships and the technical projects implemented in the area.

The efforts of Igoumenitsa Port Authority to be environmentally sustainable and socially desirable could be summarised in the protocols and initiatives which applies as well as in the strategic collaborations which has developed with other stakeholders for the aforementioned purpose.

Specifically, under the umbrella of IPA's Corporate Social Responsibility, a series of initiatives and actions are implemented every year, aiming to promote culture, social welfare, education; to support socially vulnerable groups and institutions which serve citizens' needs. Specifically, subsidies, donations and sponsorships are provided by IPA S.A to various actors, while internship programs and educational activities are also implemented.

In the same framework, IPA S.A has developed strategic relations and collaborations with significant Greek and International stakeholders, being an active project partner to various EU projects with an environmental focus. Additionally, IPA S.A has built strong collaborations with companies from the private sector for the provision of port reception facilities or for monitoring and quality assessments; and has closely cooperated with institutional bodies which have issued environmental management certificates for IPA S.A.

IPA S.A has applied and currently holds and maintains ISO 14001: 2015 Standard. Additionally, Port of Igoumenitsa is certified by Port Environmental Review System (PERS) and is one of the few ports in Europe registered in the Eco-Management and Audit Scheme (EMAS). Based on all the above, IPA S.A has developed its Environmental Policy, which is currently updated. Additionally, IPA S.A has purchased proper equipment to manage pollution emergencies in the marine environment, has composed a Port Contingency Plan, has drafted an Environmental Declaration defining all direct and indirect environmental elements with positive or negative impact on the environment, has drafted Environmental Sustainability Reports and constantly implements various environmental programs.

Having set the context regarding the environmental status of the Port of Igoumenitsa, the report proposes two standards as best practices that could be possibly applied in the Port of Igoumenitsa. Additionally, it suggests synergies that could potentially enhance the port's environmental performance and provides guidance proposing specific measures/ interventions to be implemented.

Specifically, the standards identified by this report are the *ISO 16304: 2018 "Ships and marine technology — Marine environment protection — Arrangement and management of port waste reception facilities"* and the *Global Reporting Initiative (GRI) Sustainability Reporting Standards.*

Application of these two standards comprised two of the four measures proposed for IPA S.A. Specifically, in case IPA S.A decides to develop port reception facilities at its site, it is strongly recommended to use the guidelines provided by ISO 16304: 2018 and seek relevant accreditation. Additionally, given that IPA S.A already develops Sustainability Reports, adoption of the GRI Standards was proposed. The two other measures suggested by the report regard the adoption of an incentive-based fee system for waste delivery by ships and a state-of-the-art monitoring and information system as well as the usage of a Mobile Technological Handling Station (MTHS).

Finally, the possible synergies proposed by this report include collaboration with GRI, enhancement of collaboration with EUROCERT and enhancement of collaboration with other EU projects.

7.3 Croatia – Zadar County Rural Development Agency

The Transport Development Strategy of the Republic of Croatia defines the need to relieve the Passenger Port of Zadar and move ferry traffic from the city center (peninsula) to the new Passenger Port of Gaženica. The strategy envisages the construction of a new ferry terminal as a priority investment. The advantages of the Port of Gaženica are the short distance from the city center (3.5 kilometers), the proximity of the airport (10 kilometers), the railway and the quality traffic connection with the A1 Motorway and the network of other EU motorways.

The Port of Gaženica meets multiple traffic requirements - island, coastal, international ferry traffic, passenger traffic on mega cruisers and cruisers and RO-RO traffic, with all the necessary infrastructure and accompanying upgrades. The Port of Gaženica was put into operation with a temporary terminal building in April 2015 for all types of domestic ferry

transport and cruise ships, and at the beginning of July 2015 for ferry vessels in international traffic. The passenger terminal building was inaugurated on March 24, 2019.

The relocation of the ferry port from the old town to a new location in Gaženica has long-term ensured the sustainability of the destination and better connections with the islands in the archipelago. Furthermore, the impact of car and truck emissions as well as emissions caused by ferries in the city center has been reduced, which has ensured better air quality for the city's residents and protected the city's cultural heritage from the harmful effects of such pollution. Practically in the first year of the port's operation, the entire ferry traffic was relocated from the city center, which caused 500,000 vehicles and about 1,700,000 fewer passengers in the city, as well as an enormous reduction in congestion at the destination. It was the dispersion of passengers that contributed the most to the excellent results in the analysis of CO2 (Carboon Footprint) at the destination, and the conclusion is that Zadar is ahead of other destinations in the Mediterranean and beyond.

However, this research shows that there is much room for improvement - primarily with waste management in the port, but also at the destination. Perhaps the biggest threat lies in the fact that the destination is not yet ready for a more serious and sustainable reception of waste from ships, but these issues go beyond the competence of the entities in the ECOWAVES project and are the subject of a wider discussion.

Furthermore, the Port has all the necessary documents and procedures for waste disposal, however, and the understaffing of staff within the Port of Zadar and other key entities causes poorer monitoring of these processes. One of the observed shortcomings is the absence of a long-term waste management plan in the port as a significant part of the future environmental protection plan of the Port of Zadar.

Since it is a very frequent port with a large number of passengers and vehicles, in addition to managing the removal of waste from ships, it is necessary to pay special attention to maintaining the mainland in such a way as to ensure quality and separate reception of small municipal waste produced by passengers. Waste recycling and the postulates of the circular economy currently exist only in traces and are outside the port area. The circular economy is a system built on reduction, reuse and recycling because waste is considered a valuable resource. Used and defective products can be repaired and reused, some products can be reused directly, and everything else can be recycled. In the light of these conclusions, the installation of ¨ECO ISLANDS¨ on the mainland part of the port area intended for all port users should be considered.

Finally, let us mention the lack of concrete destination cooperation and initiatives such as the initiative launched by the City of Dubrovnik "Respect the City" which through all stakeholders and through periodic action plans proposes measures that affect the further sustainability of the destination and awareness of both residents and visitors / tourists. Although this is an initiative launched by the City of Dubrovnik and not the Port Authority, this example is an excellent example of cooperation between key actors in environmental management, waste management and promoting the sustainability of the destination.

In any case, we can conclude that in terms of sustainable development Zadar as a destination and the Zadar Port Authority has made huge positive strides in the previous period and thus solved much of the problem in sustainable destination management. It is time to eliminate minor shortcomings and long-term strategic thinking in the direction of developing activities and procedures in waste management.

7.4 Slovenia – Regional Development Agency of Northern Primorska Ltd. Nova Gorica

Given that the port of Koper already has good references regarding environmental sustainability, the intention is to develop the port in this direction in the future. Any improvements from the environmental sustainability report and from other areas are more than welcome. We strive to continue to improve our business in the future and strive to pursue the most advanced ports in terms of progress. As the Port of Koper is a relatively small port (globally speaking), our advantage is flexibility, as we can adopt changes faster. In any case, our goal is to follow the guidelines, educate the staff and remain flexible in all areas. We will continue to strive to improve our business and participation in such projects, the motto is Ecowaves, as this is an opportunity to exchange views, good practices and gain new knowledge that is more than necessary nowadays.

7.5 Serbia – Business association for sport, recreation, rehabilitation and business Eco zone Ada Huja

In this guideline is given basic example of waste management in ports which, regardless the provisions of legislation, is not establish (partly or fully) in many serbian ports.

7.6 Albania - Port of Vlora

By collecting, combining and aggregating (individual) data, a specific environmental policy can be developed and implemented at the port area scale. Global data can also facilitate the detection of potential port development restrictions and assist in the prioritising and setting of environmental actions.

Spatial planning and infrastructure management in line with the port vision, zoning plans and policies can be tools to address environmental issues in our ports. Tools such as traffic management, low emission areas and environmental zoning could indeed become part of a broad sustainable development policy. Often this discussion is closely linked to the relationship between ports and cities.

3 are the main key issues that our port area should be well defined and aligned with other international guidelines and protocols:

- *Port Waste Management Plan* - The lack of this plan is seen as an obstacle to sustainable development and waste management at ports.
- *Monitoring of water and air quality in the Bay of* Vlora - A synergy should be ensured between different institutions for data provision

Human and *infrastructural capacity building* in the environmental sector in the Port of Vlora.

7.7 Montenegro – Ministry of Capital Investments

The Montenegrin approach on environmental issues and themes (with emphasis on waste and water) has over the last decade largely been aligned with the EU acquis, at least in legislative and institutional levels, however, in general the implementation of these requires significant update.

In addition, more recent developments and approaches in the EU level such as the adoption of the SDGs as a holistic sustainability platform, the introduction of "Blue" concepts in maritime affairs and the "greening" of port and the their operation, require quick adaptive procedures in a decentralized level, which is not the usual case in the Montenegrin approach, and eventually significant improvement in infrastructure.

That said, the recording of good practices both in the present and in the previous deliverables, show that in a good number of cases the improvement in performance can also originate from the adoption of improved operations management and decision systems, the mainstreaming of activities towards regional coordination, the standardization of approach towards waste and environmental friendly practices and finally by kickstarting the overall changes on local and national levels regarding the treatment of waste and the reuse mentality.

The simplifying of operating systems, the improvement of internal capacity in the official stakeholders and the clarification of roles remains a challenge for Montenegro, however, the application of basic improvements in operation will lead in the simultaneous improvement of the performance in the examined themes.

To conclude, taking into account the proper capabilities and chances, each port could benefit from the pool of the Transnational Guidelines provided hereby, to be further tailored and applied in the ADRION ports, in order to enhance their environmental status.

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