MEDITERRANEAN ACTION PLAN (MAP)
REGIONAL MARINE POLLUTION EMERGENCY RESPONSE CENTRE FOR THE MEDITERRANEAN SEA (REMPEC)

Third Meeting of the Mediterranean Network of Law Enforcement Officials relating to MARPOL within the framework of the Barcelona Convention (MENELAS)

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Agenda Item 5

STUDY BASED ON A LITERATURE REVIEW ON EXISTING BEST PRACTICES IN THE MEDITERRANEAN AS WELL AS OTHER EUROPEAN REGIONAL SEAS FOR THE APPLICATION OF CHARGES AT REASONABLE COSTS AND OF THE NO-SPECIAL-FEE SYSTEM FOR THE USE OF PORT RECEPTION FACILITIES

Note by the Secretariat

SUMMARY

Executive Summary: This document presents the study based on a literature review on existing best practices in the Mediterranean as well as other European regional seas for the application of charges at reasonable costs and of the No-Special-Fee system for the use of port reception facilities.

Action to be taken: Paragraph 3

Related documents: UNEP(DEPI)/MED IG.21/9

Background

1. Within the framework of the European Union (EU)-funded "Marine Litter-MED" Project that is aimed at supporting the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean ("the Barcelona Convention") from Southern Mediterranean / European Neighbourhood to implement the Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities to the Barcelona Convention[1], the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) prepared a study based on a literature review on existing best practices in the Mediterranean as well as other European regional seas for the application of charges at reasonable costs and of the No-Special-Fee system for the use of port reception facilities, hereinafter referred to as "the Study".

2. The Study is presented in the **Appendix** to the present document.

Action requested by the Meeting

3. **The Meeting is invited to take note** of the information provided in the present document.

[1] UNEP(DEPI)/MED IG.21/9, Decision IG.21/7.

APPENDIX

Study based on a literature review on existing best practices in the Mediterranean as well as other European regional seas for the application of charges at reasonable costs and of the No-Special-Fee system for the use of port reception facilities

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List of Abbreviations/Acronyms

EU	European Union
IMO	International Maritime Organization
MAP	Mediterranean Action Plan
MARPOL	International Convention for the Prevention of Pollution from Ships
PoW	Programme of Work
REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
UN	United Nations

1 BACKGROUND

1. The Eighteenth Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean ("the Barcelona Convention") and its Protocols, which was held in Istanbul, Turkey from 3 to 6 December 2013, adopted Decision IG.21/7 related to the Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities (LBS Protocol) to the Barcelona Convention, hereinafter referred to as the Marine Litter Regional Plan (UNEP(DEPI)/MED IG.21/9).

2. According to Article 9(5) of the Marine Litter Regional Plan, in conformity with the objectives and principles thereof, the Contracting Parties to the Barcelona Convention shall, in accordance with Article 14 of the Protocol concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea ("the 2002 Prevention and Emergency Protocol") to the Barcelona Convention, explore and implement to the extent possible by 2017, ways and means to charge reasonable cost for the use of Port Reception Facilities (PRF) or when applicable, apply No-Special-Fee System.

3. Moreover, according to Article 10(f) of the Marine Litter Regional Plan, the Contracting Parties to the Barcelona Convention undertake to explore and implement to the extent possible the following measures by the year 2019, […], (f) Charge reasonable costs for the use of port reception facilities or, when applicable apply No-Special-Fee system, in consultation with competent international and regional organisations, when using port reception facilities for implementing the measures provided for in Article 10.

4. Furthermore, according to Article 14 of the Marine Litter Regional Plan, the MAP-Barcelona Convention Secretariat in cooperation with relevant international and regional organisations, shall prepare specific guidelines taking into account where appropriate existing guidelines, to support and facilitate the implementation of measures provided for in articles 9 and 10 thereof. Subject to availability of external funds these guidelines shall be published in different Mediterranean region languages.

5. The Nineteenth Ordinary Meeting of the Contracting Parties to the Barcelona Convention and its Protocols, which was convened in Athens, Greece from 9 to 12 February 2016, adopted Decision IG.22/4 related to the Regional Strategy for Prevention of and Response to Marine Pollution from Ships (2016-2021), hereinafter referred to as the Regional Strategy (2016-2021) (UNEP(DEPI)/MED IG.22/28).

6. The Regional Strategy (2016-2021), which aims at assisting the Contracting Parties to the Barcelona Convention to implement the 2002 Prevention and Emergency Protocol, addresses the issue of marine litter in Specific Objectives 5 (Provision of reception facilities in ports), 6 (Delivery of ship-generated wastes) and 9 (To reduce the pollution generated by pleasure craft activities). It also addresses the related issue of illicit ship pollution discharges in Specific Objectives 7 (Improved follow-up of pollution events as well as monitoring and surveillance of illicit discharges) and 8 (To improve the level of enforcement and the prosecution of discharge offenders). Therefore, reducing (illegal) discharges of ship generated waste features among the priority areas of work of the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) established within the framework of the Mediterranean Action Plan (MAP) of the United Nations Environment Programme (UNEP), also referred to as UNEP/MAP, with a view to coordinating the activities of the Mediterranean coastal States related to the implementation of the 2002 Prevention and Emergency Protocol..

7. The UNEP/MAP Programme of Work (PoW) 2018-2019 adopted by the Twentieth Ordinary Meeting of the Contracting Parties to the Barcelona Convention and its Protocols, which was held in Tirana, Albania, from 17 to 20 December 2017, includes several activities addressing marine litter, including the implementation of the EU-funded "Marine Litter-MED" Project that is aimed at supporting the Contracting Parties to the Barcelona Convention from Southern Mediterranean / European Neighbourhood to implement the Marine Litter Regional Plan.

8. The EU-funded “Marine Litter-MED” Project has specific outputs on the development of a set of technical guidelines within the framework of Article 14 of the Marine Litter Regional Plan and one of its components, which is coordinated by REMPEC, focuses on measures related to the better management of marine litter from sea-based sources in ports and marinas in the Mediterranean, in particular the application of charges at reasonable costs for the use of port reception facilities or, when applicable, application of No-Special-Fee System, as well as the provision of reception facilities and the delivery of ship-generated wastes in ports and marinas in the Mediterranean.

9. In this context, REMPEC prepared the present document entitled “Study based on a literature review on existing best practices in the Mediterranean as well as other European Regional Seas for the application of charges at reasonable costs and of the No-Special-Fee system for the use of port reception facilities, hereinafter referred to as “the Study”.

2 INTRODUCTION

2.1 General approach and outline of the Study

10. The Study provides an overview of types of cost recovery systems and best practices regarding the application of these systems in the Mediterranean and other European Regional Seas, based upon a literature and internet review. For each system, the elements determining the “incentive” for ships to use the PRF are being looked at.

11. Although examples are used of best practices applied all over Europe, also best practices in non-EU ports of the Mediterranean – when available – are considered.

12. Although the main focus, as a whole, is on marine litter/garbage, cost recovery systems for all ship-generated wastes (MARPOL Annex I, II, IV, V and VI) are included. As the delivery behaviour of ships differs depending on the type of waste (e.g. oily waste can be kept longer on board than garbage), its impact on cost recovery systems is mentioned.

13. Another important aspect influencing the application of cost recovery systems is the differences between the types of ports (such as commercial, cruise/passenger, fishing, recreational), so this aspect is also reflected in the Study. Information on availability of PRF could be found in the IMO Global Integrated Shipping Information System (GISIS).

2.2 Scope

14. The Study looks at practices related to cost recovery systems for all types of MARPOL wastes/residues, for the following types of ports:

- merchant seaports
- cruise/passenger ports
- fishing ports
- marinas

15. It can be noted that also other wastes and residues from ships, such as ballast water sediments and residues from anti-fouling systems, can be relevant when assessing the need for PRF. However, as these types of wastes do not fall within the scope of MARPOL and are in general not covered by indirect cost recovery systems, wastes and residues regulated by the Ballast Water Management Convention, the Anti-Fouling Systems Convention and the London Protocol/London Convention are not covered in the Study.

3 REGULATORY FRAMEWORK RELATED TO PORT RECEPTION FACILITIES

3.1 International regulatory framework

3.1.1 MARPOL

16. The International Convention for the Prevention of Pollution from Ships (1973 as modified by the 1978 and 1997 Protocols), MARPOL, is one of the most important international conventions regulating the marine environment. It was developed by the International Maritime Organization (IMO) aiming to preserve the marine environment by fully eliminating pollution by operational discharges of oil and other harmful substances from ships, and to minimize accidental spillage of such substances.

17. Together with its six annexes covering pollution by oil, chemicals, harmful substances in packaged form, sewage, garbage and airborne emissions, MARPOL works as a whole: the articles mainly deal with jurisdiction, powers of enforcement and inspection, while more detailed anti-pollution regulations are contained in the annexes.

18. In that respect it is also necessary to refer to the so called “Special Areas”, with specific and more stringent discharge criteria on operational discharges, which are included in most of the MARPOL Annexes. An up-to-date list of the IMO Special Areas can be found at: http://www.imo.org (click on Marine Environment, then Special Areas). In the context of the present document it is important to note that the Mediterranean Sea is a Special area for MARPOL Annex I (oil) and V (garbage).

19. In general MARPOL contains provisions in order to regulate the availability of adequate Port Reception Facilities (PRF), which types of wastes/residues can (and as a consequence also which cannot) be legally discharged into the sea, onboard waste management, and enforcement and inspections. The MARPOL requirements regarding the availability of adequate PRF are contained in the following regulations:

- Regulation 38 of Annex I
- Regulation 18 of Annex II
- Regulation 12 and 13 (passenger ships in special areas) of Annex IV
- Regulation 8 of Annex V
- Regulation 17 of Annex VI

20. In addition to the MARPOL Convention (including its Annexes), the IMO has also adopted several guidelines related to the management of ship’s waste/residues, providing additional tools to all stakeholders (private and public) in order to provide good practices. These practices can also be used by governments when establishing stricter national or regional requirements.
Guidelines related to the management of MARPOL Annex V are:

- 2017 Guidelines for the implementation of MARPOL Annex V (Resolution MEPC.295(71))
- 2018 Consolidated guidance for port reception facility providers and users (MEPC.1/Circ.834/Rev.1)
- 2012 Guidelines for the development of Garbage Management Plans (Resolution MEPC.220(63))
- 2012 Guidelines for the development of a regional reception facilities plan (Resolution MEPC.221(63))
- 2000 Guidelines for ensuring the adequacy of port waste reception facilities (Resolution MEPC.83(44)
- 2016 IMO Manual “Port Reception Facilities – How To Do It”

21. MARPOL does not contain any explicit requirements to install cost recovery systems. Only in section 6.3 of the 2017 guidelines for the implementation of MARPOL Annex V (Resolution MEPC.295(71)) reference is made to the use of compliance incentive systems, and governments are encouraged to evaluate means to ensure that garbage delivered to port is actually received and disposed of properly at reasonable cost or without charging special fees to individual ships (see also section 4.1 of the present document).

3.1.2 Discharge at sea: impact of Special Areas

22. The possibility to legally discharge waste at sea is another element that can influence the delivery of ship's waste to PRF. Although MARPOL regulations have become stricter over the years, it is still allowed to – under specific conditions – discharge certain waste types at sea. These discharge criteria are included in the following regulations:

- MARPOL Annex I: Regulations 15 and 34
- MARPOL Annex II: Regulation 13
- MARPOL Annex IV: Regulation 11
- MARPOL Annex V: Regulations 4 and 6

23. As indicated by the EMSA study on "the management of ship-generated waste types on-board ships[1]" ships can opt to treat waste on board and – when complying with the criteria – legally discharge the effluent at sea. Common examples are:

- the treatment of bilge water in an OWS and the subsequent discharge of the separated oil to a PRF and the water to the sea;
- sewage is treated in different ways and if well treated can be disposed at sea;
- food waste can comminute, shredded or passed through a grinder and afterwards disposed at sea or being collected in bins and delivered to PRF;
- wash water containing certain types of cargo residues are often discharged at sea

24. Due to specific oceanographic, ecological and traffic characteristics of some sea areas, MARPOL defines certain sea areas as "special areas[2]", in which the adoption of special mandatory methods for the protection of sea pollution is required. Under MARPOL, these special areas are provided with a higher level of protection than other areas of the sea. It should be noted that the Mediterranean Sea is designated as a special area under MARPOL Annexes I and V.

25. As the discharge criteria for oil or oily mixtures, noxious liquid substances carried in bulk, sewage and garbage is are stricter in special areas, ships sailing in those areas might not meet these criteria and therefore be required to deliver their wastes and residues to a PRF. States should therefore take into consideration the relative importance of compliance in these special areas. The special area requirements will only take effect upon receipt of sufficient notification on the existence of adequate PRF from all Parties whose coastlines border the relevant special area.

26. The discharge of wash water and cargo residues contained therein is primarily controlled through MARPOL Annex V, where it is classed as garbage and therefore subject to the controls specified within Regulations 4 and 6. In essence the discharge of cargo residues contained in wash water is governed by the following criteria:

- No discharge of cargo residues should occur less than 12 nautical miles from the nearest land, or the nearest ice shelf.
- No discharge of cargo residues should occur within the six MARPOL defined "Special Areas" (the Mediterranean, the "Gulfs" area, the wider Caribbean including the Gulf of Mexico, the Baltic Sea, the North Sea and the Antarctic). The discharge of cargo residues contained in wash water is only permitted if both the destination and departure ports are within the Special Area and the ship will not transit outside the Special Area between these ports, and only provided that no adequate PRF exist. In such instances discharge of non-recoverable, non-HME (harmful to the marine environment) cargo residues in hold wash water should take place as far out to sea as is practicable and, in any event, no less than 12 nautical miles from the nearest land or the nearest ice shelf.
- No discharge of any cargo residues specified as HME. Hold wash water should be discharged to a suitable reception facility.

[1] The management of ship-generated waste types on-board ships, 2017, CE Delft & CHEW, EMSA/OP/02/2016
[2] For the latest status of the special areas, it is advised to consult the IMO website (www.imo.org)

Table 1: Summary of restrictions to the discharge of garbage into the sea under regulation 4, 5, and 6 of MARPOL Annex V and chapter 5 of part II-A of the Polar Code (source: IMO)

<table>
<tr><th rowspan="2">Garbage type[1]</th><th colspan="2">All ships except platforms[4]</th><th rowspan="2">Regulation 5
Offshore platforms located more than 12 nm from nearest land and ships when alongside or within 500 metres of such platforms[4]</th></tr>
<tr><th>Regulation 4
Outside special areas
(Distances are from the nearest land)</th><th>Regulation 6
Within special areas
(Distances are from nearest land or nearest ice-shelf)</th></tr>
<tr><td>Food waste comminuted or ground[2]</td><td>≥3 nm, en route and as far as practicable</td><td>≥12 nm, en route and as far as practicable[3]</td><td>Discharge permitted</td></tr>
<tr><td>Food waste not comminuted or ground</td><td>≥12 nm, en route and as far as practicable</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues[5, 6] not contained in wash water</td><td rowspan="2">≥ 12 nm, en route and as far as practicable</td><td>Discharge prohibited</td><td rowspan="2">Discharge prohibited</td></tr>
<tr><td>Cargo residues[5, 6] contained in wash water</td><td>≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2 and paragraph 5.2.1.5 of part II-A of the Polar Code)</td></tr>
<tr><td>Cleaning agents and additives[6] contained in cargo hold wash water</td><td rowspan="2">Discharge permitted</td><td>≥ 12 nm, en route and as far as practicable (subject to conditions in regulation 6.1.2 and paragraph 5.2.1.5 of part II-A of the Polar Code)</td><td rowspan="2">Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives[6] in deck and external surfaces wash water</td><td>Discharge permitted</td></tr>
<tr><td>Animal Carcasses (should be split or otherwise treated to ensure the carcasses will sink immediately)</td><td>Must be en route and as far from the nearest land as possible. Should be >100 nm and maximum water depth</td><td rowspan="2">Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>All other garbage including plastics, synthetic ropes, fishing gear, plastic garbage bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
</table>

[1] When garbage is mixed with or contaminated by other harmful substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall

apply.

[2] Comminuted or ground food wastes must be able to pass through a screen with mesh no larger than 25 mm.

[3] The discharge of introduced avian products in the Antarctic area is not permitted unless incinerated, autoclaved or otherwise treated to be made sterile.

[4] Offshore platforms located 12 nm from nearest land and associated ships include all fixed or floating platforms engaged in exploration or exploitation or associated processing of seabed mineral resources, and all ships alongside or within 500 m of such platforms.

[5] Cargo residues means only those cargo residues that cannot be recovered using commonly available methods for unloading.

[6] These substances must not be harmful to the marine environment.

3.1.3 IMO's Global Integrated Shipping Information System (GISIS):

27. In order to facilitate the dissemination of information and promote public access to sets of data collection by the IMO Secretariat, the IMO has developed an internet-based database on information for shipping: the Global Integrated Shipping Information System[3] (GISIS). This database contains both information open to the general public and a member's area section with more specific information only accessible to registered IMO users.

28. The Port Reception Facility Database (PRFD) provides data on facilities for the reception of all categories of ship-generated waste (incl. MARPOL Annex V). While the public is allowed free access (following a simple initial registration) to all the information on a view-only basis, only the respective party States can update data for reception facilities via a login password. The database aims at improving the rate of reporting alleged inadequacies of reception facilities so that the problem can be tackled more effectively.

29. Parties to MARPOL are also required to communicate the information on available PRF's in their ports into the PRFD. Although the PRFD does not contain specific information on cost recovery systems, it provides a list of contact points in each country. Information regarding cost recovery systems might be available on request there.

3.2 Regional regulatory framework: the EU Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues

30. In 2000 the European Union adopted a specific regulatory tool addressing the issue of preventing pollution of the marine environment by waste from ships. The purpose of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues is to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the European Union, 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. Although the purpose of this PRF Directive is similar to the main goal of MARPOL, there are some differences regarding their key requirements (see table 2).

31. The Directive applies to all ships, including fishing vessels and recreational craft, irrespective of their flag, calling at, or operating within, a port of a Member State, with the exception of any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service; and to all ports of the Member States normally visited by these ships. Key requirements of the PRF Directive include:

- An obligation for the Member States to ensure the availability of PRF adequate to meet the needs of ships normally visiting the port, without causing undue delay;
- Ports have to develop and implement a waste reception and handling plan, following consultation with all relevant parties, in particular the port users. These plans shall be evaluated and approved by the competent authority in the Member State;

[3] https://gisis.imo.org/Public/Default.aspx

- The master of a ship has to complete a notification form and forward it in due time (at least 24 hours prior to arrival), informing the port of call about the ship's intentions regarding the delivery of ship-generated waste and cargo residues;
- A mandatory delivery for all ship-generated waste, however taking into account a possibility for the vessel not to deliver waste if it has sufficient dedicated waste storage capacity till the next port of delivery;
- **The implementation of a cost recovery system applying the "polluter pays" principle through the application of a waste fee, providing an incentive to ships not to discharge ship-generated waste at sea;**
- The establishment of an enforcement scheme, by which Member States ensure that any ship may be subject to inspection.

32. The PRF Directive also provides guidance on what is to be considered an "adequate" port reception facility:

> "To achieve adequacy, the reception facilities shall be capable of receiving the types and quantities of ship-generated waste and cargo residues from ships normally using that port, taking into account the operational needs of the users of the port, the size and the geographical location of the port, the type of ships calling at that port and the exemptions provided for under Article 9."

33. The Directive 2000/59/EC also contains two annexes:
- Annex 1 provides an overview of elements to be addressed in the port's Waste Reception and Handling Plan;
- Annex 2 provides a standardized format for the advance waste notification on the amounts of waste to be delivered to the PRF.

34. In addition, the European Commission has developed guidelines for the interpretation of Directive 2000/59/EC (Commission Notice 2016/C 115/05 of 01.04.2016). This Commission Notice is presented to explain the Commission's views on how certain provisions should be implemented, such as:
- The issue of "adequacy";
- Certain key elements related to the waste reception and handling plans (mandatory elements, scope, consultation with relevant parties, evaluation/approval/monitoring, reporting of inadequacies;
- Principles of mandatory delivery;
- Sufficient storage capacity;
- Intended port of delivery;
- Monitoring and enforcement;
- Exemptions.

Table 2: Overview of the main differences regarding PRF requirements between MARPOL and EU Directive 2000/59/EC (source: Secretariat of the Basel Convention[4])

	MARPOL	**EU Directive 2000/59/EC**
Definitions:	Although both MARPOL and the EU PRF Directive contain several definitions of wastes and residues there are no[5] commonly used definitions, which sometimes leads towards different understanding. Also, the current version of the PRF Directive uses some references to MARPOL that are outdated due to updates of MARPOL or its guidelines (e.g. "cargo-associated waste" which in MARPOL has been redefined as "operational wastes")	
Provision of adequate PRF:	Required by MARPOL	Required by PRF Directive
Downstream processing and treatment:	No requirements in MARPOL	Treatment, recycling, energy recovery or disposal to be carried out in accordance with EU waste legislation
Port waste plans:	Not required by MARPOL	To be developed and implemented for each port. Required content of the plan is set out in Annex I of the EU Directive
Mandatory delivery of ship's waste:	Not required by MARPOL, except for certain types of cargo residues and washing waters (MARPOL Annex II)	Mandatory delivery of all ship-generated waste, except in case of sufficient dedicated storage capacity and except for certain types of cargo residues and washing waters (MARPOL Annex II)
Advance waste notification:	Not required by MARPOL, although encouraged by IMO guidelines[6]	Required by PRF Directive, incl. the use of standardised format (Annex 2)
Cost recovery systems:	Not required by MARPOL, although encouraged by IMO guidelines[7]	Required by PRF Directive: cost for PRF, incl. collection and treatment, has to be paid by a fee from ships. Cost recovery system is to provide incentive not to discharge at sea

[4] Guidance manual on how to improve the sea-land interface to ensure that wastes falling within the scope of MARPOL, once offloaded from a ship, are managed in an environmentally sound manner, 2017

[5] It can be noted that the EU Directive contains a definition of "ship-generated waste" being wastes and residues which are generated during the service of a ship and that fall under the scope of the MARPOL Annexes I, IV and V.

[6] Consolidated guidance for PRF providers and users (MEPC.1/Circ.834/Rev.1).

[7] 2017 guidelines for the implementation of MARPOL Annex V (MEPC.295(71)).

4 REGULATORY FRAMEWORK RELATED TO COST RECOVERY SYSTEMS

4.1 MARPOL

35. As already mentioned in section 3.1.1 of the present document, MARPOL does not contain any explicit requirements to install cost recovery systems. However, section 6.3 of the 2017 guidelines for the implementation of MARPOL Annex V (Resolution MEPC.295(71)) provides references to the use of compliance incentive systems:

> "The augmentation of port reception facilities to serve ship traffic without undue delay or inconvenience may call for capital investment from port and terminal operators as well as the garbage management companies serving those ports. Governments are encouraged to evaluate means within their authority to lessen this impact, thereby helping to ensure that garbage delivered to port is actually received and disposed of properly at reasonable cost or without charging special fees to individual ships. Such means could include, but are not limited to:
>
> .1 tax incentives
> .2 loan guarantees;
> .3 public ship business preference;
> .4 special funds to assist in problem situations such as remote ports with no land-based garbage management system in which to deliver ships' garbage;
> .5 Government subsidies; and
> .6 special funds to help defray the cost of a bounty programme for lost, abandoned or discarded fishing gear or other persistent garbage. The programme would make appropriate payments to persons who retrieve such fishing gear, or other persistent garbage other than their own, from marine waters under the jurisdiction of Government."

36. Although the "tax incentives" as mentioned in section 6.3 of the guidelines are not explicitly implicating the use of cost recovery systems implementing the "polluter pays" principle, the section does encourage governments to explore the use of systems helping to ensure that garbage delivered to port is actually received and disposed of properly. In addition, the reference to the "reasonable cost or without charging special fees to individual ships" could be interpreted as an encouragement to distribute the cost for the provision and/or the use of PRF over all ships calling the port, e.g. by applying a no-special fee system. Still, the current text leaves substantial room for interpretation.

4.2 Regional regulatory framework

4.2.1 Regional Plan for the Marine Litter Management in the Mediterranean

37. In 2013 the Regional Plan for the Marine Litter Management in the Mediterranean was adopted. The main objectives of the Regional Plan are to:

(a) Prevent and reduce to the minimum marine litter pollution in the Mediterranean and its impact on ecosystem services, habitats, species in particular the endangered species public health and safety;
(b) Remove to the extent possible already existent marine litter;
(c) Enhance knowledge on marine litter; and
(d) Achieve that the management of marine litter in the Mediterranean is performed in accordance with accepted international standards and approaches as well as those of relevant regional organizations and as appropriate in harmony with programmes and measures applied in other seas.

38. Several measures were included to address marine litter from sea-based sources, including marine litter from sea-based sources.

39. In its Article 9.5 the plan refers to the fact that the Contracting Parties shall, in conformity with the objectives and principles of the Regional Plan:

> "*In accordance with Article 14 of the Prevention and Emergency Protocol explore and implement to the extent possible by 2017, ways and means to charge reasonable cost for the use of port reception facilities or when applicable, apply No-Special-Fee system. The Contracting Parties shall also take the necessary steps to provide ships using their ports with*

updated information relevant to the obligation arising from Annex V of MARPOL Convention5 and from their legislation applicable in the field."

40. Also in its Article 10.(f) the Contracting Parties agreed to assess the possibility to:
"*charge reasonable costs for the use of port reception facilities or, when applicable apply No-Special-Fee system, in consultation with competent international and regional organizations, when using port reception facilities for implementing the measures provided for in Article 10.*"

4.2.2 EU Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues

4.2.2.1 Cost recovery systems in the PRF Directive

41. A way to promote the use of PRF and achieve a maximal delivery of wastes from ship to shore could be through the application of the "polluter pays[8]" principle. In addition to ensuring the availability of adequate PRF, applying the "polluter pays" principle to ship's waste can be facilitated by requiring ships to contribute significantly to the costs for the reception and management of ship's waste. This contribution can be collected by installing a specific cost recovery system using a fee from the ships calling the port, irrespective whether they make use of the reception facilities or not. This fee should cover the costs for the collection, transport and disposal of the ship's wastes.

42. The PRF Directive requires the provision of such a cost recovery system through its Article 8:

1. *Member States shall ensure that the costs of port reception facilities for ship-generated waste, including the treatment and disposal of the waste, shall be covered through the collection of a fee from ships.*
2. *The cost recovery systems for using port reception facilities shall provide no incentive for ships to discharge their waste into the sea. To this end the following principles shall apply to ships other than fishing vessels and recreational craft authorized to carry no more than 12 passengers:*
   (a) *All ships calling at a port of a Member State shall contribute significantly to the costs referred to in paragraph 1, irrespective of actual use of the facilities. Arrangements to this effect may include incorporation of the fee in the port dues or a separate standard waste fee. The fees may be differentiated with respect to, inter alia, the category, type and size of the ship;*
   (b) *The part of the costs which is not covered by the fee referred to in subparagraph (a), if any, shall be covered on the basis of the types and quantities of ship-generated waste actually delivered by the ship;*
   (c) *Fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.*
3. *In order to ensure that the fees are fair, transparent, non-discriminatory and reflect the costs of the facilities and services made available and, where appropriate, used, the amount of the fees and the basis on which they have been calculated should be made clear for the port users.*
4. *The Commission shall, within three years of the date referred to in Article 16(1), submit a report to the European Parliament and to the Council, evaluating the impact of the variety of cost recovery systems adopted in accordance with paragraph 2 on the marine environment and waste flow patterns. This report shall be drawn up in liaison with the competent authorities of the Member States and representatives of ports.*
5. *The Commission shall, if necessary in the light of this evaluation, submit a proposal to amend this Directive by the introduction of a system involving the payment of an appropriate percentage, of no less than one third, of the costs referred to in paragraph 1 by all ships calling*

[8] The "polluter pays" principle is enacted to make the party responsible for producing pollution responsible for paying for the damage done to the natural environment.

at a port of a Member State irrespective of actual use of the facilities, or an alternative system with equivalent effects.

43. In a separate statement, the European Commission indicated that they interpret the word "significantly" as a figure of the order of at least 30 % of the costs referred to in Article 8(1).

44. It should be noted that, due to the definition of “ship-generated waste[9]” in the PRF Directive, cost recovery systems are not required to cover the collection and treatment of cargo residues. Furthermore, according to Article 10 of the PRF Directive, any fee for delivery of cargo residues shall be paid by the user of the reception facility.

45. In addition, due to the adoption of the revised MARPOL Annex V[10] in 2011 there no longer is a reference to “cargo-associated waste” (waste generated through the stowage and handling of cargo are covered by the definition of “operational waste” in the revised MARPOL Annex V).

46. As the PRF Directive applies to ports within the EU only, today all EU ports have cost recovery systems for ship’s wastes in place. However, also several ports outside the EU have established such cost recovery systems.

4.2.2.2 Recent developments

47. Currently the EU PRF Directive is being revised. After finalization of the Impact Assessment[11] the European Commission drafted a legislative proposal for a new PRF Directive, that after entry into force will repeal the current PRF Directive. The proposal was made public early 2018 and has been extensively discussed within the Maritime Transport meetings of the EU Council, followed by approval by the EU Transport Council on 7th June 2018.

48. Within its Transport Committee also the European Parliament is currently discussing the Commission’s proposal, and an amended draft from the Parliament is to be expected early October 2018. If the negotiations between the institutions on the legislative proposal between Parliament, the Council and the Commission ('trilogues') will not take too long, it is expected that the agreed new PRF Directive can be adopted by the end of 2018. Entry into force will then follow soon, after which the EU Member States will have 2-3 years (depending on the agreed transposition period) to adopt and publish the laws, regulations and administrative measures to comply with the Directive.

49. Within the framework of the present document it is important to note that the revised PRF Directive most likely will have new specific requirements regarding the application of cost recovery systems for ship’s waste: although the European Parliament is currently still reviewing the legislative proposal, the text which has already been adopted by the EU Transport Council for some issues significantly differs from the current PRF Directive.

50. Some of the relevant proposals are:

- the indirect fee to be paid by ships, irrespective of delivery of waste to a PRF, shall cover the indirect administrative costs as well as a significant part of the direct operational costs. The significant part of the direct operational costs shall represent at least 30 % of the total direct costs for actual delivery of the waste during the previous year;
- 100% indirect cost recovery system for MARPOL Annex V other than cargo residues, as the cost recovery systems shall not allow any direct charges. This 100% indirect fee will ensure a right of delivery without any additional charges based on volume of waste delivered, except

[9] “Ship-generated waste” shall mean all waste, including sewage, and residues other tan cargo residues, which are generated during the service of a ship and fall under the scope of Annexes I, IV and V to Marpol 73/78 and cargo-associated waste as defined in the Guidelines for the implementation of Annex V to Marpol 73/78

[10] Amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships (Resolution MEPC.201(62)), adopted on 15 July 2011

[11] Impact Assessment accompanying the Proposal for a Directive of the European Parliament and of the Council on port reception facilities for the delivery of waste from ships, repealing Directive 2000/59/EC and amending Directive 2009/16/EC and Directive 2010/65/EU (Ecorys/COWI), SWD(2018) 21 final

when this volume of waste delivered exceeds the maximum dedicated storage capacity as mentioned in the form set out in Annex 2[12] to the Directive;

- passively fished waste (defined as waste that is collected in nets during fishing operations) is included in several provisions of the proposal:
    - Member States will have to ensure availability of adequate PRF for the collection of passively fished waste;
    - ships will in principle also be required to deliver all its waste carried on board (for fishing vessels including passively fished waste) to a PRF before leaving the port;
    - passively fished waste is to be included in the cost recovery system, with that respect that, in order to avoid that the costs of collection and treatment of passively fished waste are borne exclusively by port users, Member States may decide to cover these costs from the revenues generated by alternative financing systems, including waste management schemes and national or regional funding available.

51. Although these proposals have not yet been finally adopted, they give a good indication of trends to be expected in the future – either on a mandatory or voluntary basis.

4.3 Types and features of cost recovery systems

52. As an EU Directive is a legal act of the European Union which requires Member States to achieve a particular result without dictating the means of achieving that result[13], Directives leave Member States with a certain amount of leeway as to the exact rules to be adopted. Also, the PRF Directive leaves room for interpretation by the individual Member States of some of the key elements of the Directive, including elements[14] that are related the cost recovery systems, such as:

- definition of ‘adequate’ facilities;
- definition of “meeting the needs of users”;
- definition of meeting the needs of the “environment”;
- provision for various authorities to which notification can be submitted, plus lack of definition of ‘relevant authority’ to which all notifications must be communicated;
- cost recovery systems to provide “no incentive” to discharge waste at sea. This could mean ‘no incentive at all’ or ‘not enough incentive to make discharge at sea worthwhile’. If the former, this would suggest that no proportion of direct charge would be permissible (for the ship generated waste to which it applies);
- option to include indirect fees in port dues or separate payment;
- indirect fees to cover ‘30% of the costs of the facilities’ – the option is open as to whether it must be true for each type of ship generated waste or as a whole. Cargo residues are not covered by this requirement;
- “30% of the costs of the facilities” – some Member States do not view this as legally binding because the statement was issued separately to the Directive[15];
- “fair” and “non-discriminatory” charges;
- “sufficient” number of inspections;
- “proportionate” and “dissuasive” level of penalties;
- criteria and method for assessing whether ships produce a reduced quantity of waste and hence may be treated more favourably by cost recovery systems.

53. It is therefore fair to state that, due to the lack of strict prescriptive regulations in both MARPOL and the PRF Directive, varying interpretations regarding cost recovery systems resulted in a large variety of cost recovery systems in place in EU ports.

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12 Standard format of the advance notification form for waste delivery to port reception facilities

13 Differing from Regulations, which are self-executing and do not require any implementing measures

14 Study to support the development of measures to combat a range of marine litter sources, Eunomia report for European Commission (DG ENV), 2016

15 UK Maritime Coastguard Agency (2003), The Informal Guidance on the Mandatory Charge Element of the Port Waste Facilities Regulations 2003 issued on November 2003 by Shipping Policy 2 Division, DfT/ Maritime and Coastguard Agency November 2003. Cited in Panteia (2015) Evaluation of PRF Directive -Interim Report, Annex 2

54. Several studies and analyses have looked at the issue of cost recovery systems for waste from ships. A first analysis was done for the European Maritime Safety Agency (EMSA)[16] in 2005[17], indicating that several systems are in use in EU ports.

55. In 2010 EMSA performed a Horizontal Assessment on PRF in EU ports. The assessment was based upon the reports of visits to 22 EU Member States made by EMSA in the period 2007 – 2010, to gauge the implementation of the PRF Directive, including the availability of cost recovery systems. The assessment indicated that there was a difference in implementation and application of cost recovery systems between (and sometimes within) Member States. The systems could be categorised in three major groups:

- **No special fee systems (NSF)**: these charge ships a waste handling fee, irrespective of their use of facilities.
- **Administrative waste fee/contribution systems (ADM)**: these charge ships a fee, which is partly based on the amount of waste, delivered, and an additional fixed fee, which is refundable on delivery of waste.
- **Direct fee only systems**: charge port users based on the volumes of waste discharged, without an additional standard fee.

56. Within these three categories there is a wide variety of specific models used by individual ports and/or Member States. To add to the complexity, on top of the variety of cost recovery systems, ports and/or Member States sometimes have different cost recovery systems in place for different types of waste.

57. Other studies further built on this categorization of cost recovery systems:

- the 2012 EMSA study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports, Ramboll (EMSA/OP/06/2011);
- the 2015 “Ex-post evaluation of Directive 2000/59/EC on PRF” developed by Panteia/PwC for the European Commission (DG MOVE), within the framework of the EC’s Regulatory Fitness and Performance programme (REFIT) for the revision of the Directive 2000/59/EC;
- the 2017 Impact Assessment, accompanying the Proposal for a Directive of the European Parliament and of the Council on port reception facilities for the delivery of waste from ships, repealing Directive 2000/59/EC and amending Directive 2009/16/EC and Directive 2010/65/EU (Ecorys/COWI), SWD(2018) 21 final.

58. Therefore, also in the present document the three categories of cost recovery systems mentioned in the EMSA Horizontal Assessment will be maintained.

59. It should be noted that also the 2016 “study to support the development of measures to combat a range of marine litter sources” (Eunomia, report for the European Commission DG ENV) in principle used these same categories, but added a few more varieties:

- direct fees
- indirect fees (and reverse fee systems)
- partial indirect fees
- deposit refund systems
- penalties
- voucher systems

60. The three main categories are presented below and explained more in detail, based on the analysis done in the ex-post evaluation of the PRF Directive (Panteia/PwC, 2015).

[16] EMSA is the EU Agency that provides technical assistance and support to the European Commission and EU Member States in the development and implementation of EU legislation on maritime safety, pollution by ships and maritime security (www.emsa.europa.eu).

[17] A Study on the Availability and Use of Port Reception Facilities for Ship-Generated Waste, Carl Bro a/s, 2005

4.3.1 No special fee systems (NSF)

61. Among cost recovery systems without special fees (no-special fee) in place in European ports, several do not provide limits to the amounts of waste landed (referred to as 100% NSF or unlimited NSF). In this system, no fee is charged in addition to the common waste handling fee, which the port authority charges to all ships. This handling fee does not depend on the quantity of the delivered waste and is also charged if a vessel does not use the port reception facilities at all. The fee is normally based on ship size and sometimes also on ship type, and the waste handling fee can be included in the port dues or charged separately.

62. There are ports applying a variety of this no special fee system, where they accept waste up to a certain (reasonable) amount (referred to as NSF with reasonable amounts), meaning that a specified amount of waste is covered by the common waste handling fee charged to all ships. All quantities of waste that are considered “excessive” are charged separately and may be charged by either the port authority or by waste operating companies. The amounts covered by the common waste fee are defined by the port authority. Any additional waste is charged separately, based on the volume of delivered quantities.

63. Many EU ports have implemented a variation of the NSF system. In most cases, this system can apply to both MARPOL Annex I (oil) and Annex V (garbage). In a few cases sewage is included as well. Some ports have implemented a cost recovery system in which a no special fee is only charged for garbage (referred to as the “garbage-only” NSF system). In these cases, the indirect fee covers all garbage reception costs, while all other costs are charged based on the volumes of waste delivered.

4.3.2 Administrative waste fee/contribution systems (ADM)

64. Administrative waste contribution systems generally consist of two separate parts, being the common administrative fee and a fee that is directly related to the volumes of waste delivered.

65. One variation of this system is an administrative waste fee deposit (referred to as ADM/deposit system). An important difference in how the ADM/deposit system can be found in Member State ports is whether or not ships get a refund of their deposit after discharging waste at a port reception facility. In some ports, a non-refundable administrative waste fee is charged to ships. However, in several cases, ships receive a full or partial refund if they discharge waste. In this system, all ships pay a waste fee to the port authority. All waste reception costs are directly charged by waste operators and are based on the volumes of waste discharged. Subsequently, a refund can be reclaimed from the port authority when evidence can be submitted of the waste handling transaction in the port.

66. Another cost recovery system type including an administrative fee that is applied in EU ports is the ADM/opposite fee system. In this case, all ships are charged a penalty fee unless they can submit proof of having discharged waste in that or another EU port.

4.3.3 Direct fee only systems

67. In addition to NSF and ADM cost recovery systems, one additional model was found. This system covers all waste reception costs with a fee that is directly related to the amounts of waste landed only, so there are no charges if the user delivers no waste. By only charging vessels that deliver waste, fully based on the volume of waste delivered, these systems do not provide incentives to discharge waste in ports, and therefore are not in line with Article 8(2) of the PRF Directive, which requires that such incentives are in place.

68. Direct fee systems are mainly applied for cargo residues, washing waters and scrubber wastes (MARPOL Annex VI).

5 APPLICATION OF COST RECOVERY SYSTEMS IN PORTS

5.1 Overview of the application of cost recovery systems in EU ports

69. In the 2015 ex-post evaluation by Panteia/PwC an analysis has been made regarding the application of the type of cost recovery systems in the EU, also considering that ports often use different cost recovery systems for different types of waste. To that respect a sample of 50 major ports has been analysed (see figure 1).

70. Overall the evaluation indicated that most ports either apply an NSF or an ADM system, with the NSF system being more commonly used than ADM systems. Within the ports using the NSF system, most of them are inclined to set maximum limits to the amount of waste covered by the fixed fee and use a “reasonable amount” more often than the 100% system (unlimited use). Especially for garbage ports often use indirect systems, either through NSF or some form of ADM system. For oily waste (MARPOL Annex I) and particularly sewage (MARPOL Annex IV), more often a direct fee is charged related to the amount of waste delivered.

71. When divided by geographical region, it becomes clear that especially Member States in the Baltic Sea area have adopted NSF systems. The ADM system is mostly found in continental North Sea ports, while fees in direct relation to volumes of waste discharged are found in the Mediterranean region and the Atlantic Ocean region for some types of waste (including the North Sea particularly for sewage).

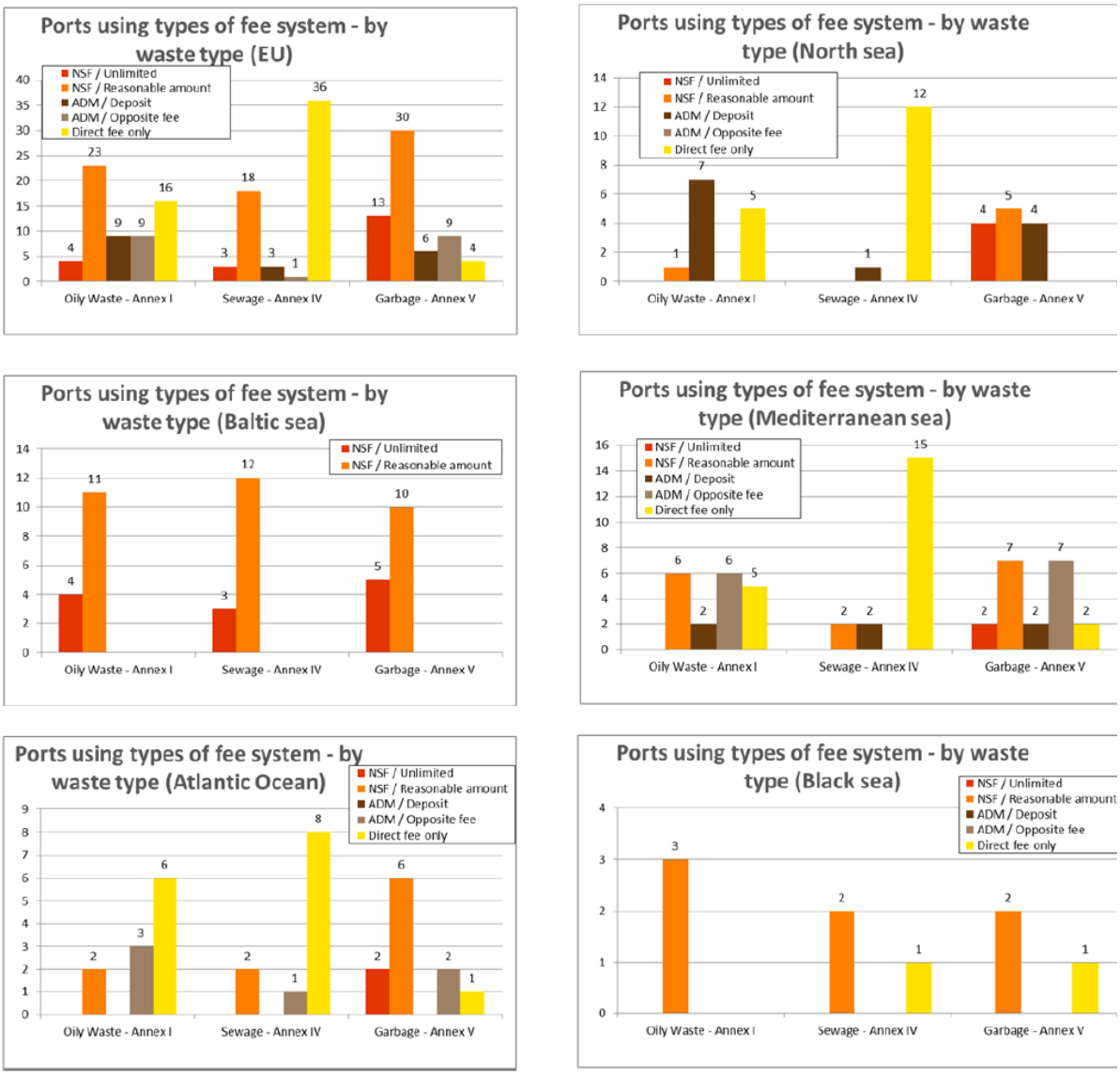


Figure 1: application of cost recovery systems in EU ports (source: Panteia/PwC)

72. To address the issue of pollution of the marine environment by ship-generated waste, some regions have developed specific strategies, including binding measures. An example of such a regional approach is the Helsinki Commission for the Baltic Sea (HELCOM), which approved the Strategy for Port Reception Facilities for Ship-generated Wastes and Associated Issues, also known as the Baltic Strategy. This strategy comprises a set of measures and regulations aiming to ensure ships' compliance with global and regional discharge regulations, and to eliminate illegal discharges into the sea of all wastes from all ships. In 2007 HELCOM approved its Recommendation 28/1 on the “Application of the no-special-fee system to ship-generated wastes in the Baltic Sea”. As a result, all ports in the Baltic apply the NSF.

73. Figure 2 provides a geographical overview of calculation of cost recovery systems, according to the 2015 “Analytical Note on port reception facilities for ship-generated waste and cargo residues” that was prepared by the EU Committee of the Regions Secretariat[18].

[18] Note was drafted to assist the Rapporteur and the relevant Commission in preparation of the opinion or for the internal needs of the Committee of the Regions

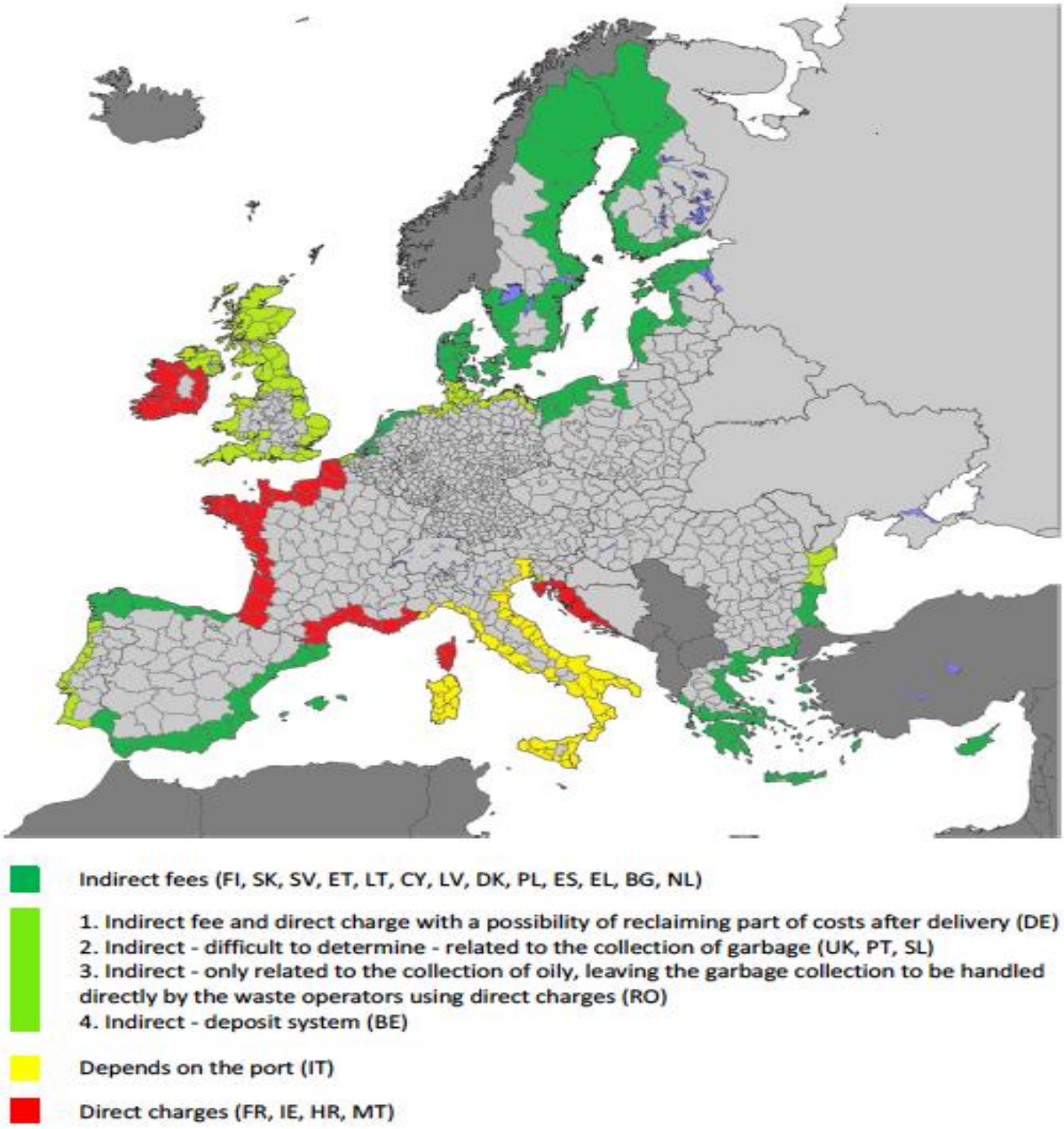


Figure 2: Geographical overview of calculation of cost recovery systems in EU ports (source: EU Committee of the Regions)

5.2 Examples of cost recovery systems used in ports

74. The delivery of ship's waste and cargo residues to PRF is influenced by many external factors, such as traffic in the port, type and size of the ships calling the port, price and service level of waste collecting operations, etc. In this section several practice examples are given of the application of cost recovery systems in ports.

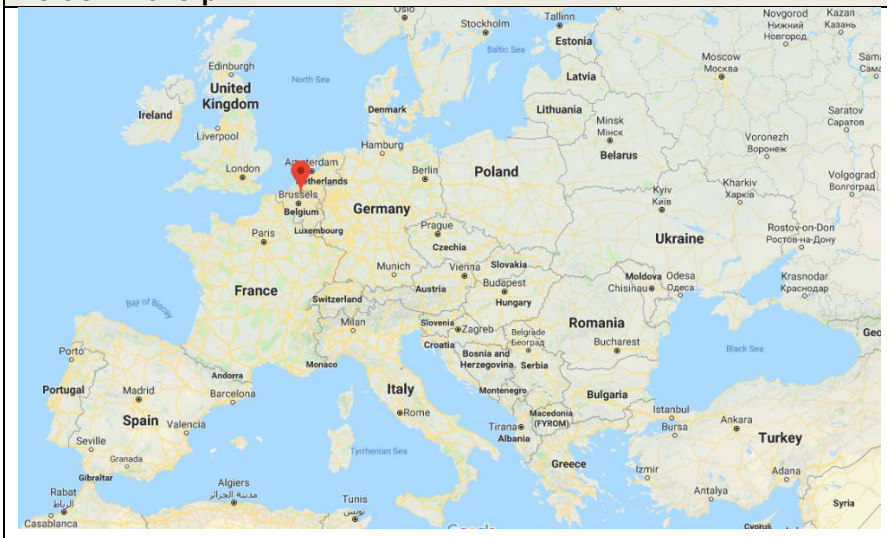
75. In order to fully take into account, the above mentioned port characteristics, a distinction has been made between practices in merchant seaports, cruise/passenger ports, fishing ports and marinas. During the internet survey focus has been on the Mediterranean ports, but practice examples have not always been found. Therefore, also practices in other seas have been reflected.

76. The following examples of application of cost recovery systems have been found on the internet:

Type of port	Example
Merchant seaports	Antwerp (Belgium)
	Lisbon (Portugal)
	Gdansk (Poland)
	Patras (Greece)
	Marseille (France)
Cruise/passenger ports	Stockholm (Sweden)
	Kusadasi (Turkey)
	Barcelona (Spain)
	Dubrovnik (Croatia)
	Skagen (Denmark)
Fishing ports	Den Helder (Netherlands)
	Gamla Höfnin – Reykjavik (Iceland)
	Zeebrugge (Belgium)
	Peterhead (Scotland – UK)
Marinas	Porto Cervo (Italy)
	Gothenburg (Sweden)
	Rhodes (Greece)
	Koper (Slovenia)
	Port Ghalib (Egypt)

5.2.1 Merchant seaports

5.2.1.1 Port of Antwerp (Belgium)

Port of Antwerp	
	
Brief description of the port	<u>In 2017:</u> - 14.223 arrivals of seagoing vessels - average GT: 28.599 - 30% container vessels, 29% tankers, 19% general cargo - total maritime cargo turnover: 223,65 million tonnes
Type of cost recovery system	ADM
Brief description of the cost recovery system	<u>Waste fee:</u> ○ for each call a waste fee has to be paid to the port authority, irrespective of the use of a PRF

	○ consists of fixed and variable part: ▪ fixed part: 75 EUR (for ships up to 3000 GT) or 110 EUR (for ships over 3000 GT) ▪ variable part: 0,005 EUR to be multiplied by the ship's GT ▪ maximum waste fee is 480 EUR ○ examples: ▪ waste fee for 9000 GT vessel: 155 EUR ▪ waste fee for 25.000 GT vessel: 235 EUR ▪ waste fee for 65.000 GT vessel: 435 EUR <u>Waste delivery:</u> - direct charges to the PRF in case of waste delivery - financial compensation by port authority in case of waste delivery to PRF: ○ consists of fixed and variable part: ▪ fixed compensation (per call): • 300 EUR for MARPOL Annex I • 200 EUR for MARPOL Annex V ▪ variable compensation depending on volumes delivered • 25 EUR/m^3 for MARPOL Annex I • 25 EUR/m^3 for MARPOL Annex V - possibility of: ○ reduced waste fee for environmentally friendly ships ○ exemption of waste fee for frequent calling ships (min. 1 call every 14 days) - limitation of financial compensation when: ○ the collected amount of MARPOL Annex I waste exceeds the maximum dedicated storage capacity listed in the ship's IOPP Certificate ○ the ship stays longer than 20 calendar days ○ no compensation when ship is forced by PSC to deliver waste (e.g. when ship has insufficient storage capacity to sail to the next port) ○ no compensation for cargo residues and cargo associated wastes (e.g. dunnage)
Overview of tariffs	https://www.portofantwerp.com/en/tariff-regulations-sea-going-vessels-2018-0

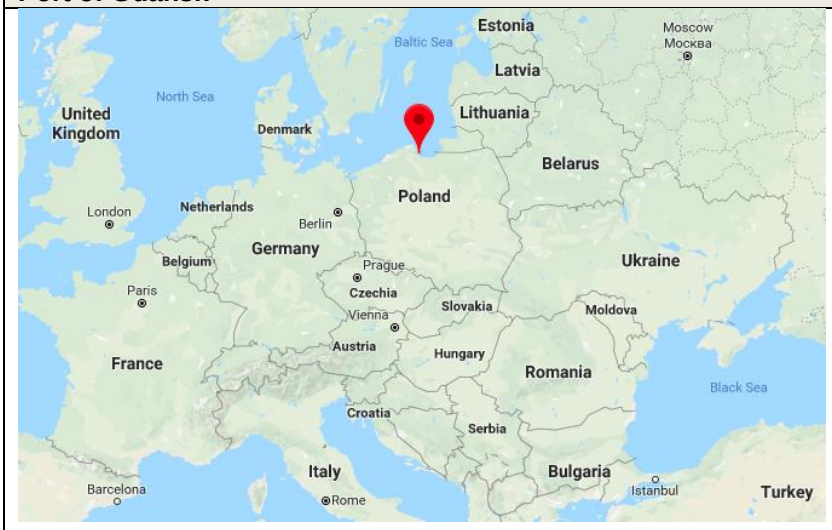
5.2.1.2 Port of Lisbon (Portugal)

Port of Lisbon	
	
Brief description of the port	<u>In 2017:</u> - total cargo turnover: 12,2 million tonnes - in 2010: 3097 incoming ship calls (no data found for 2017)
Type of cost recovery system	ADM

Brief description of the cost recovery system	- waste fee:
	  ○ for each call a waste fee has to be paid to the port authority, irrespective of the use of a PRF
	  ○ depends on ship's GT, corresponding to 0,0081 EUR/GT up to a maximum of 500 EUR
	- in case of delivery of solid waste to PRF: variable fee
	  ○ collection onshore:
	  ▪ depending on container size (m^3): 47 to 137 EUR
	  ▪ staff beyond collection service: 6 EUR/man/hour
	  ▪ cost for manipulating containers:
	  • containers up to 10 m^3: 45 EUR/container
	  • containers 20 to 40 m^3: 65 EUR/container
	  ○ collection offshore: extra charge of 374 EUR
	  ○ collection of international catering waste (category 1): extra charge of 200 EUR
	- possibility of:
	  ○ additional charges in case of late services request or cancellations
	  ○ additional charges in case of containers placed with delay (when it is the ship's responsibility)
	  ○ reductions in case of efficient waste delivery or delays (when it is the port authority's responsibility)

Overview of tariffs	http://www.portodelisboa.pt

5.2.1.3 Port of Gdansk (Poland)

<table>
<tr><th colspan="2">Port of Gdansk</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td>Brief description of the port</td><td><u>In 2017:</u>
- 2500 ship calls
- average 18.000 GT/call
- 40,61 million tonnes cargo turnover (44% general cargo)</td></tr>
<tr><td>Type of cost recovery system</td><td>NSF for reasonable amounts</td></tr>
<tr><td>Brief description of the cost recovery system</td><td><u>Port dues (incl. waste fee) is based on GT and type of ship:</u>
<table>
<tr><th>Ship size and type</th><th>Fee (EUR/1 GT)</th></tr>
<tr><td>Car carrier</td><td>0,14</td></tr>
<tr><td>General cargo vessel</td><td>0,45</td></tr>
<tr><td>Reefer carrier</td><td>0,52</td></tr>
<tr><td>Container vessel</td><td>0,22</td></tr>
<tr><td>Ro-ro ship</td><td>0,20</td></tr>
<tr><td>Bulk carrier</td><td>0,51</td></tr>
<tr><td>Passenger ship</td><td>0,13</td></tr>
<tr><td>Ferry</td><td>0,09</td></tr>
<tr><td>Passenger-cargo ship</td><td>0,09</td></tr>
<tr><td>Tanker up to 38.000 GT</td><td>0,57</td></tr>
<tr><td>Tanker over 38.000 GT</td><td>0,64</td></tr>
<tr><td>Towing and pushing vessels</td><td>0,48</td></tr>
<tr><td>Other seagoing ships</td><td>0,45</td></tr>
</table>
- reduction possible depending on the frequency the ship calls the port:
o for liner vessels and ferries:
▪ at least 8 times a week amount to 40%
▪ at least 6 times a week amount to 45%
▪ at least 4 times a week amount to 50%
▪ 3 times a week amount to 60%
▪ 2 times a week amount to 65%
▪ 1 once a week amount to 70%
▪ less than once a week but no less than once a month amount to 75%
of the fee above</td></tr>
</table>

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<td>

for passenger ships tonnage dues have been introduced depending on the number of calls in a calendar year:

for 2-3 calls, the dues amount to 80%,
for 4-5 calls, the dues amount to 60%,
for more than 6 calls, the dues amount to 50%

<u>Waste delivery:</u>

after payment of port fees the ship is entitled to deliver the following amounts of waste, depending on the location of the last port of call:

<table>
<tr><th rowspan="2">Waste type</th><th colspan="3">Location of last port of call</th></tr>
<tr><th>Baltic Sea</th><th>North Sea</th><th>Other waters</th></tr>
<tr><td>Waste oils and mixtures (incl. oily rags and fuel filters)</td><td>3,0 m^3</td><td>7,0 m^3</td><td>12,0 m^3</td></tr>
<tr><td>Solid waste</td><td>0,5 m^3</td><td>0,6 m^3</td><td>0,7 m^3</td></tr>
<tr><td>Sewage</td><td>3,0 m^3</td><td>6,0 m^3</td><td>7,0 m^3</td></tr>
</table>
<u>Conditions for waste delivery:</u>

Delivery joint used for disposing bilge water shall comply with the requirements stipulated in MARPOL Annex I
Delivery joint used for disposing sewage shall comply with the requirements stipulated in MARPOL Annex IV
Onboard pump delivery shall not be less than 7.5 m^3/hour
Bilge water pH shall be within the range of 6.5 - 9
Waste oils must be heated to the temperature level required for efficient reception, but not higher than 60°C
Solid waste oils shall be packed in marked bags or non-returnable containers
Solid waste must be segregated into the categories specified by MARPOL Annex V and placed in labelled bags or disposable containers
Reception of sewage shall be effected by means of marked waste removal vehicles provided alongside the vessel
Waste delivery should be notified in advance

</td>
</tr>
<tr>
<td>Overview of tariffs</td>
<td>https://www.portgdansk.pl/m-shipping/types-of-waste</td>
</tr>
</table>

5.2.1.4 Port of Patras (Greece)

<table>
<tr><th colspan="2">Port of Patras</th></tr>
<tr><td colspan="2"> 
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<tr><td>Brief description of the port</td><td><u>In 2017:</u>
- 500.099 passengers
- 117.038 trucks
- 70.780 trailers
- 104.725 vehicles</td></tr>
<tr><td>Type of cost recovery system</td><td>Solid waste: no information was found.
Liquid waste:
- ships in scheduled routes: NSF for reasonable amounts, supplemented with extra charges for additional waste delivered
- ships in unscheduled routes: ADM deposit scheme</td></tr>
<tr><td>Brief description of the cost recovery system</td><td><u>Waste fee for ships engaged in scheduled routes:</u>
- these ships pay a fixed reciprocatively fee on a daily basis during the period that they are engaged in the voyages
- depending on category and type of ship
o ferries: 4,75 EUR/day
o passenger ferries: depends on the quantity of liquid waste produced in relation with the ship’s storage capacity
▪ subcategory A: 9,50 EUR/day
▪ subcategory B: 19,00 EUR/day
o hydrofoil-catamaran passenger ships: 4,43 EUR/day
o cruise ships: 19,00 EUR/day
o tugboats and tankers: 4,43 EUR/day
o cargo ships (< 1000 GT) with regular calls (min. 2/month): 5,06 EUR/day
o barges: 57,00 EUR/month
o pleasure cruise vessels carrying more than 12 passengers: 57 EUR/month
- exemption from waste fee for fishing boats and pleasure vessels carrying less than 12 passengers
- paying the waste fee entitles the following waste deliveries:
o ferries: 8 m^3 of liquid waste per 3 months
o passenger ferries:
▪ subcategory A: 20 m^3 of liquid waste per 2 months
▪ subcategory B: 20 m^3 of liquid waste per month</td></tr>
</table>

	○ hydrofoil-catamaran passenger ships: 5 m^3 of liquid waste per 3 months ○ cruise ships: 20 m^3 of liquid waste per month ○ tugboats and tankers: 5 m^3 of liquid waste per 3 months ○ cargo ships (< 1000 GT) with regular calls (min. 2/month): 10 m^3 of liquid waste per 3 months - extra charges in case of delivery of more waste than the allocated maximum volume <u>Waste fee for ships in unscheduled routes:</u> - each ship pays a waste fee when it calls the port - the fee is calculated on the basis of the size of the ship, upon arrival of the ship at the port: ○ waste fee = 200 x factor based on ship's GT (1 to 10) ○ from 200 EUR to 2000 EUR - in case a ship delivers its waste to the PRF and after producing all relevant documentation for the settlement of the invoices relevant to the realized deliveries, provided that the ship has sailed away from the port area under the jurisdiction of Patras Port Authority, this fee will be returned to the ship after deducting: ○ 15% of the fee for the cost of operating the waste reception facilities; and ○ 5% of the fee for the cost of developing, operating and maintenance of the data processing application ○ the return of the remaining amount of the advance fees will be made after the representative of the ship produces all relevant documentation for the delivery of wastes and settlement of the invoices relevant to the realized deliveries - in case the ship does not deliver any waste, the waste fee will be kept in full
Overview of tariffs	http://www.patrasport.gr/cms/?page_id=2324&lang=en

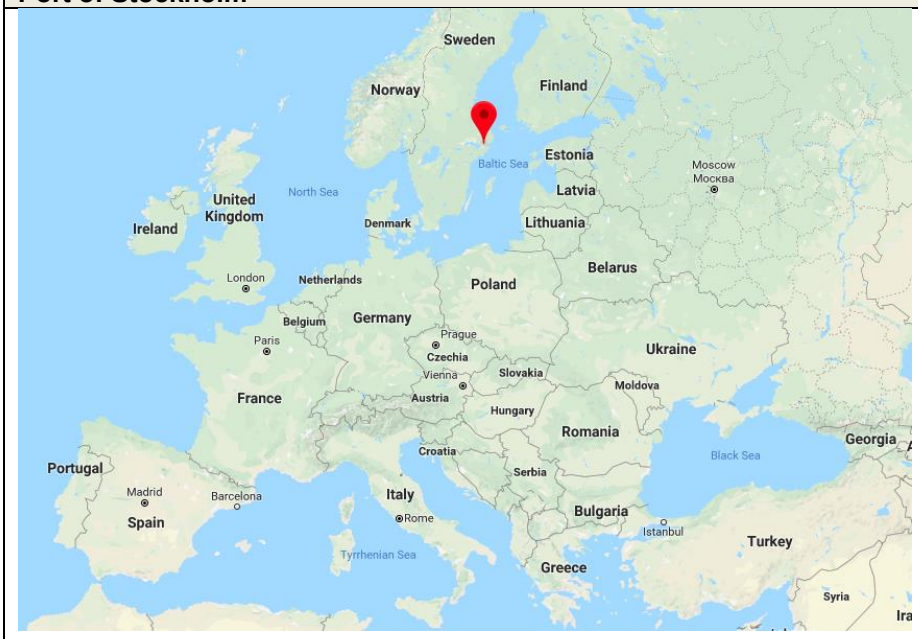
5.2.1.5 Port of Marseille Fos (France)

Port of Marseille Fos	
	
Brief description of the port	<u>In 2016:</u> - 7469 ship calls - 81 million tonnes cargo turnover - 2,7 million passengers

Type of cost recovery system	ADM opposite fee system (only ships that do not deliver pay waste fee)
Brief description of the cost recovery system	- Any ship that does not arrange for the collection of its waste by PRF approved by the port authority has to pay a fee, consisting of a port duty amounting to 30% of the cost estimated by the Marseille Fos Port Authority for the collection and treatment of ship-generated waste - This waste fee consists of the sum of two taxes: o a "solids" tax applies to operating waste subject to MARPOL V: flat fee set to 185 EUR; o a "liquids" tax applies to operating waste subject to MARPOL I by applying a coefficient of 0.0099 EUR/m³ to the vessel's taxable volume - The liquids tax amount is limited by a minimum amount set to 64 EUR and cannot exceed a cap of 675 EUR - Exemptions: o due to waste deposited: vessels having their operating waste collected by waste removal companies approved by the Marseille Fos Port Authority, on presentation of the disposal certificate provided by the service provider are: ▪ exempted from the solids tax amount, if solids were deposited; ▪ exempted from the liquids tax amount, if liquids were deposited; ▪ fully exempted from the fee if solids and liquids were deposited o due to disposal facilities: - vessels carrying out frequent and regular port calls, according to an itinerary and schedule set in advance, that can justify having disposal certificates for their operating waste in an EU port located on the vessel's effective itinerary, benefit from the tax exemption in the following conditions: ▪ the disposal certificates must be issued or validated by the Port Authority of the deposit port; ▪ the validity of the disposal certificate cannot exceed 14 days after the issue date; ▪ a solids disposal certificate exonerates from the payment of the solids tax; ▪ a liquids disposal certificate exonerates from the payment of the liquids tax; ▪ a solids and liquids disposal certificate exonerate from the payment of the solids and liquids taxes - Vessels having disposal certificates in a European port, with an issue date not exceeding 14 days, can request to be exonerated from the tax. o due to disposal contracts: vessels carrying out frequent and regular port calls, according to an itinerary and schedule set in advance, that can justify having operating waste disposal contracts along with the payment of the corresponding fee, signed in an EU port located on the vessel's effective itinerary and validated by the Port Authority of the port concerned, are exempt from paying the waste fee. This contract must be valid on the day of the port call and cover all the waste likely to be produced onboard (solids and liquids).
Overview of tariffs	http://www.marseille-port.fr/en/Page/10004

5.2.2 Cruise/passenger ports

5.2.2.1 Port of Stockholm (Sweden)

Port of Stockholm	
	
Brief description of the port	In 2016: - 223 cruise ship calls - 8300 total ship calls - 11,7 million passengers - 9 million tonnes cargo turnover
Type of cost recovery system	NSF Direct charge for scrubber waste
Brief description of the cost recovery system	- waste fee (no distinction between waste types, except for MARPOL Annex VI scrubber waste): based on the ship's GT o 0,55 SEK/GT (± 0,0523 EUR/GT) o maximum of 11.000 SEK/call (± 1046 EUR) o additional charges can apply in situations when the port incurs additional costs beyond what is normal when a vessel is depositing waste, such as: ▪ no advance waste notification; ▪ when the port has not been notified of the inclusion of unknown substances, solvents or detergents in sludge or drums and packages containing oil residue or hazardous waste are not correctly packed and labelled with the contents or when depositing and placement is not carried out at assigned areas; ▪ when delivery is not done at the agreed time; ▪ when the vessel does not provide personnel for the delivery of sludge; ▪ when the pump capacity for sludge is less than 5 m^3 per hour. - ships wishing to deliver scrubber waste: o notice 5 working days before arrival o price available on request
Overview of tariffs	http://www.portsofstockholm.com/about-us/prices-for-servicestariffs/

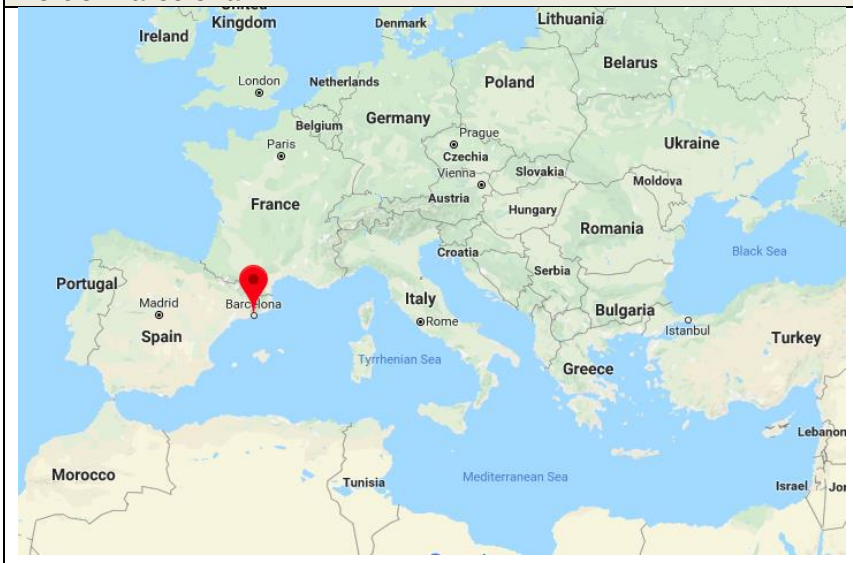
5.2.2.2 Port of Kusadasi (Turkey)

Port of Kusadasi	
	
Brief description of the port	<u>In 2017[19]:</u> - 126 cruise ship calls - 119.884 passengers
Type of cost recovery system	NSF for reasonable amounts (supplemented with direct charges for additional volumes delivered)
Brief description of the cost recovery system	In Turkey cost recovery systems for waste from ships are set according to a national regulation. <u>Fixed waste fee:</u> - to be paid by each ship (exemptions for certain types of vessels such as government owned ships in non-commercial operation, recreational boats with a maximum of 12 passengers, ferries, ships returning to port within 48 hours, etc.) - irrespective use of PRF - depends on GT of the ship (in 9 categories): from 80 EUR to 720 EUR - after payment of fixed fee ships can deliver specific volumes of: o MARPOL Annex I (bilge water, waste oil and sludge): 1 to 13 m^3 o MARPOL Annex IV: 2 to 15 m^3 o MARPOL Annex V: 1 to 5 m^3 <u>Variable waste fee:</u> - to be paid when ship wants to deliver more waste to PRF than max volume set in fixed fee - irrespective of GT of the ship: o MARPOL Annex I (slops, dirty ballast): 1,5 EUR/m^3 o MARPOL Annex I (bilge water, waste oil and sludge): 35 EUR/m^3 o MARPOL Annex IV: 15 EUR/m^3 o MARPOL Annex V: 25 EUR/m^3 - reduced fee for: o tankers (< 150 GT) and other vessels (< 400 GT) in cabotage: 25% reduction

[19] Based on MedCruise Statistics

	○ government owned vessels in non-commercial operation, recreational boats with a maximum of 12 passengers, ferries: 50% reduction - when waste is collected offshore: ○ 30% increase for waste other than slops and dirty ballast ○ 5 EUR/m^3 for slops and dirty ballast - working times are between Monday/Saturday between 08:00 and 17:00 - outside these hours: increase of charges with 25%
Overview of tariffs	http://www.mesbas.com.tr/Tariff--for-Port-Services&52.html

5.2.2.3 Port of Barcelona (Spain)

Port of Barcelona	
	
Brief description of the port	<u>In 2017[20]:</u> - 778 cruise vessels - 2,7 million passengers
Type of cost recovery system	100% NSF (no volume limitations) for MARPOL Annex I and V Other types of waste (sewage, operational wastes): direct charges
Brief description of the cost recovery system	In Spain cost recovery systems for waste from ships are set according to a national regulation. <u>Fixed waste fee:</u> - to be paid by each ship (exemptions for certain types of vessels, such as frequent and regular callers on a scheduled route) - irrespective use of PRF - fee is to cover collection and treatment - depends on GT of the ship and number of people onboard (for passenger ships): ○ tariff = 80 EUR x coefficient (C) ○ for ships between 0 and 2500 GT: C = 1,5 ○ for ships between 2501 and 25.000 GT: C = 0,0006 x GT

[20] Based on MedCruise Statistics

	○ for ships between 25.001 and 100.000 GT: C = (1,2 x 0,0001 x GT) + 12 ○ for ships > 100.000 GT: C= 24 ○ to be added with a fee depending on the number of people onboard: 0,25 EUR/person - port authorities may introduce a corrective factor (not lower than 1,0 and not higher than 1,3) in order to achieve a balance between the costs for PRF and income from fees - reduced fee possible: ○ for ships generating reduced amounts of waste ("green ships"): 20% on the fixed part of the waste fee (not related to number of persons) ○ for ships that can prove that they have delivered MARPOL Annex I waste at the previous port: 50% on the fixed part of the waste fee (not related to number of persons) <u>Waste delivery:</u> - after payment of fixed fee ships can deliver all MARPOL Annex I and V waste (no volume restrictions) - the ship's waste is to be delivered during the first 7 days of the stopover - in case of mobile collection (barge): 25% increase
Overview of tariffs	http://www.portdebarcelona.cat/en/web/port-dels-negocis/tarifes2;jsessionid=84CE57FC00504C7029DFA0676556557D

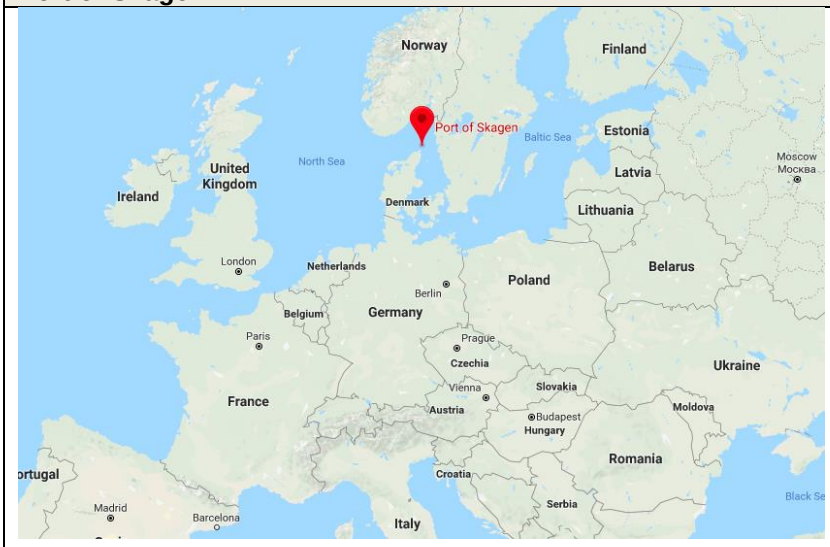
5.2.2.4 Port of Dubrovnik (Croatia)

Port of Dubrovnik	
	
Brief description of the port	<u>In 2017[21]:</u> - 539 cruise vessels - 748.918 passengers
Type of cost recovery system	NSF for garbage Other wastes: direct charges depending on volumes of waste delivered
Brief description of the cost recovery system	<u>NSF for garbage:</u> - for ships up to 500 GT: fee is based on size of vessel ○ length up to 25 m: 30 EUR ○ length between 25-50 m: 45 EUR

[21] Based on MedCruise Statistics

	○ length over 50 m: 60 EUR - for ships over 500 GT: fee is based on volume of garbage delivered ○ up to 3 m^3: 195 EUR ○ over 3 m3 segregated waste: 65 EUR/m^3 ○ over 3 m3 non-segregated waste: 85 EUR/m^3 ○ over 3 m3 non-segregated baled waste: 130 EUR/m^3 - fee for disposal of animal by products not intended for human consumption: based on volume of garbage delivered: 200 EUR/m^3 <u>Direct charge for delivery of fluid wastes:</u> - fluid waste that does not need special disposal[22]: direct fee based on volume delivered ○ tank truck (8 tonnes) in 1 tour: 100 EUR - fluid waste that needs special disposal: will be charged according the price determined by a specialized and authorized company for special fluid waste disposal increased with 5% of handling costs <u>Direct charge for disposal of oil waste and other waste at Pier Gruž[23]:</u> - disposal of oil waste: direct fee at a rate of 2,00 EUR/litre - disposal of other waste (oil filters, rags): direct fee at a rate of 2,00 EUR/kg - in case this waste collection is required a special demand is necessary (24 hours in advance)
Overview of tariffs	http://www.portdubrovnik.hr/index.php?act=1&lnk=193&lan=en#193

5.2.2.5 Port of Skagen (Denmark)

Port of Skagen	
	
Brief description of the port	<u>In 2018:</u> - 44 cruise vessels - 69.000 passengers
Type of cost recovery system	NSF + direct charge for specific types of waste (sewage, scrubber waste) or excessive volumes

[22] Wording used in "2018 Tariff Schedule of port services and charges of Dubrovnik Port Authority"
[23] Pier in port of Dubrovnik that is specifically used for cruise vessels

Brief description of the cost recovery system	<u>2018 rates for Port of Skagen:</u> - berthing: DKK 2.35 /GT (0,3151 EUR/GT) - discount rates for the fourth call or more: DKK 1.50 /GT (0,2012 EUR/GT) - passenger fee: DKK 2 per passenger/call (0,2682 EUR per passenger/call) <u>Garbage delivery:</u> - mobile collection (barge): extra charge - waste container size: 20 m^3 - cruise vessels up to 80.000 GT: delivery of 10m^3 of general waste free of charge - cruise vessels above 80.000 GT: delivery of 20m^3 of general waste free of charge <u>Sludge delivery:</u> - engine slops: limited quantities can be received free of charge <u>Sewage (black and grey water) delivery:</u> - PRF has 8 shore connections with direct discharge to the municipal sewage system via an 800 m^3 tank - pumping capacity: approx. 200 m^3/hour - maximum delivery per cruise call: 800 m^3 - sewage is to be pumped ashore by means of the ship's own pumps - charge: DKK 50/m^3 (6,70 EUR/m^3) - connection fee: DKK 600 (80,44 EUR) - standard dimensions and technical characteristics of flanges for discharge connections are available <u>Scrubber wastewater:</u> - Wastewater from exhaust gas scrubber systems (EGCS) is received - charges depend on the quantity of scrubber wastewater: o 1 - 8 m^3: DKK 1.400 per ton (187,70 EUR/ton) o 8 - 15 m^3: DKK 1.250 per ton (167,64 EUR/ton) o above 15 m^3: DKK 1.100 per ton (147,52 EUR/ton) - administration fee: DKK 600 (80,45 EUR) Notice about discharge of garbage, waste oil, sewage and scrubber water must be given minimum 24 hours prior to arrival.
Overview of tariffs	http://www.skagenhavn.dk/en/cruise/port-info

<u>5.2.3 Fishing ports</u>

77. For EU ports it should be noted that fishing vessels are exempt from the principles set out in article 8(2) of the EU PRF Directive. In effect this means that there is no obligation to charge these vessels a separate standard waste fee, and contribution to the cost of PRF can be fully incorporated in the port dues.

78. During the survey preparing the present document, it was found that for fishing ports only limited information regarding cost recovery systems was available on the internet. A reason for this could be that, differing from the collection of waste from merchant ships and other vessels operating internationally, in many cases fishing vessels have a "home port" (or at least a limited number of ports they visit in order to market the fish) to which they return to after their fishing activities.

79. As a consequence, this allows a more direct communication (in the native language) regarding regulations and waste collection schemes in the home port, and there might not be a real need for port authorities and fishing communities to make waste fees and tariffs publicly available on their website.

5.2.3.1 Port of Den Helder (Netherlands)

Port of Den Helder	
	
Brief description of the port	<u>In 2014:</u> - 1999 fishing vessels calls - 2763 offshore support vessels calls - volumes of waste collected: o MARPOL Annex I: 2365 m^3 o MARPOL Annex IV: 201 m^3 o MARPOL Annex V: 490 m^3
Type of cost recovery system	- NSF for oily waste and small hazardous wastes: national system managed by NGO - NSF for household waste: managed by port authority - Direct charge for other waste (batteries, wood, fishing gear)
Brief description of the cost recovery system	<u>NSF for oily waste and small hazardous wastes:</u> - harmonized system for all Dutch fishing ports, managed by NGO (called SFAV) - yearly fee depending on vessel engine power (horsepower): o group 1A (0 – 296 hp): 350 EUR o group 1B (0 – 296 hp): 565 EUR o group 1C (0 – 296 hp): 725 EUR o group 2 (296 – 1200 hp): 960 EUR o group 3 (> 1200 hp): 1620 EUR - specific tariff for small vessels for mussels o group 4A (< 250 m^2): 250 EUR o group 4B (> 250 m^2): 350 EUR - waste that can be delivered (yearly total): o group 1A: 1m^3 bilges/oil + 75 kg small hazardous waste o group 1B: 1,25 m^3 bilges/oil + 100 kg small hazardous waste o group 1C: 2 m^3 bilges/oil + 125 kg small hazardous waste o group 2: 4 m^3 bilges/oil + 150 kg small hazardous waste o group 3: 8 m^3 bilges/oil + 300 kg small hazardous waste

	○ group 4A: 0,5 m³ bilges/oil + 50 kg small hazardous waste ○ group 4B: 0,75 m³ bilges/oil + 175 kg small hazardous waste - if ship delivers more: extra charges <u>NSF for household waste:</u> - 7,5 EUR/call <u>For other wastes (e.g. fishing gear, batteries, wooden pallets):</u> - direct charge to be paid to waste collector <u>Passively fished waste:</u> - can be delivered free of charge (cost for collection and treatment is covered by national subsidies)
Overview of tariffs	https://www.portofdenhelder.eu/en/tarieven Website of the national NGO organizing the collection of waste from fishing vessels: https://www.sfav.nl

5.2.3.2 Gamla Höfnin – Port of Reykjavik (Iceland)

Gamla Höfnin – Port of Reykjavik	
	
Brief description of the port	<u>In 2017:</u> - 486 fishing vessels
Type of cost recovery system	NSF
Brief description of the cost recovery system	<u>Waste fee:</u> - ships that call several times per year: ○ depends on the size of the vessel: ▪ 0,78 ISK/GT (0,0063 EUR/GT) ▪ min fee is 5566 ISK (44,65 EUR) ▪ max fee is 50.020 ISK (401,26 EUR) ○ reduced fee for “green ships”: ▪ 0,36 ISK/GT (0,0028 EUR) ▪ min fee is 5566 ISK (44,65 EUR) ▪ max fee is 25010 (200,63 EUR)

	○ ships < 60 m that have a home port in Reykjavik pay a fixed monthly fee of 5566 ISK/month (44,65 EUR) - other vessels: pay minimum waste fee of 11.173 ISK/m^3 (89,63 EUR) - frequent callers: can be exempt from waste fee <u>Waste delivery:</u> - 5 m^3 of waste[24]
Additional information	https://www.faxafloahafnir.is/en/schedules-of-rates-and-dues/

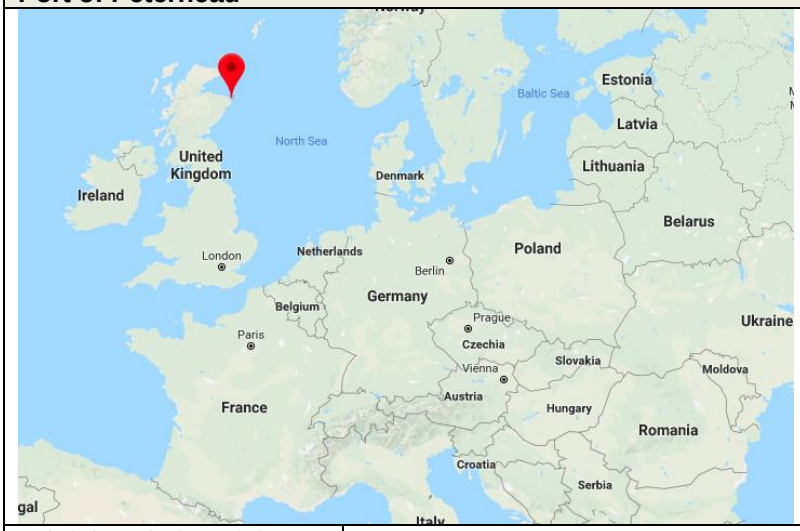
5.2.3.3 Port of Zeebrugge (Belgium)

Port of Zeebrugge	
	
Brief description of the port	<u>In 2016:</u> - 43 members (fishing boats that subscribed to the waste management scheme)
Type of cost recovery system	- MARPOL Annex V waste: 100% NSF (incl. fishing gear and small hazardous wastes): national system managed by NGO - MARPOL Annex I: direct charges
Brief description of the cost recovery system	<u>NSF for MARPOL Annex V wastes, incl. fishing gear and small hazardous wastes:</u> - harmonized voluntary system in all Belgian fishing ports, managed by NGO (called VVC) - irrespective of flag - yearly fee depending on vessel engine power: ○ small vessels (< 221 kW): 900 EUR ○ larger vessels (> 221 kW): 1800 EUR - payment of this yearly fee results in unlimited delivery of all MARPOL Annex V wastes, incl. fishing gear and small hazardous wastes - fishing boats that have not joined the scheme pay an individual waste fee per port call: ○ small vessels (< 221 kW): 200 EUR/call ○ larger vessels (> 221 kW): 400 EUR/call

[24] Waste type was not specified

	<u>Direct charges for liquid oily wastes:</u> - depending on volume of oily waste delivered - facilitated by national NGO <u>Passively fished waste:</u> - can be delivered free of charge (cost for collection and treatment is covered by national subsidies)
Additional information	https://www.vvcequipment.be/nl/home/1

5.2.3.4 Port of Peterhead (Scotland – UK)

Port of Peterhead	
	
Brief description of the port	- UK's largest whitefish and pelagic port - in 2017: throughput fish valued at over £ 195 million a year
Type of cost recovery system	NSF
Brief description of the cost recovery system	Fishing vessels pay per arrival £26.00 *(this charge is levied on only one occasion per vessel per week)*
Overview of tariffs	http://www.peterheadport.co.uk/downloads.htm

<u>5.2.4 Marinas</u>

80. For EU ports it should be noted that recreational craft[25] are exempt from the principles set out in article 8(2) of the EU PRF Directive. In effect this means that there is no obligation to charge these vessels a separate standard waste fee, and contribution to the cost of PRF can be fully incorporated in the port dues.

81. As a result, the majority of marinas assessed in the internet survey conducted in the context of the present document indicated on their website that "garbage/waste delivery is included" (or similar language). This was the case in the following marinas:

[25] Recreational craft authorized to carry more than 12 passengers

Mediterranean Sea		
Country	Marina	Website
Croatia	Punat (Island Krk)	https://www.marina-punat.hr/UserDocsImages/dokumenti/Cjenik_2018_ENG.pdf
	Tribunj	https://marinatribunj-adriatiq.com/en/price-list/marina
Cyprus	Limassol	http://www.limassolmarina.com/limassol-marina-services
France	Ajaccio	http://www.port-ajaccio.com/tarifs-passage-et-hivernage
	Port de Cassis	http://www.portdecassis.com/details-dechetterie+du+port+departemental+de+cassis-64.html
	Sète	http://www.sete.port.fr/en/marina/presentation-marina-and-its-services/marina-services
Greece	Agios Nikolaos	https://www.marinaofagiosnikolaos.gr/facilities.html
	Mytilini	http://www.mytilinimarina.com/index.php?page=templates-and-stylesheets
Italy	Portofino	https://www.marinadiportofino.com/en/services/ Note: the website also provides “waste collection guidelines” for the port users
	Marina di Ragusa	http://www.portoturisticomarinadiragusa.it/en Note: the “garbage is included” was not mentioned on the website, but was confirmed orally to the consultant during a site visit
Malta	Mgarr Marina (Gozo)	http://www.gozomarina.net/berthing-agreement-rules-and-regulations/
Montenegro	Porto Montenegro	https://www.portomontenegro.com/en/marina/#marina-facilities
Spain	Marina Port de Mallorca	https://www.portdemallorca.com/en/environmental-policy
	Ibiza	http://www.marinaibiza.com/amarres.php?lang=en
	Cartagena	http://www.yachtportcartagena.com/en/facilities/
Turkey	Netsel Marmaris	http://www.netselmarina.com/en/services/technical

Other seas		
Country	Marina	Website
Belgium	Nieuwpoort	https://www.marinareservation.com/marina-vvw-nieuwpoort-1375
Estonia	Tallinn marina	http://www.portoftallinn.com/marina-berthing-fees
France	La Rochelle	http://www.portlarochelle.com/en/berthing-rates/ Note: the port website also provides additional information regarding waste collection http://www.portlarochelle.com/sinformer/environnement/a-chaque-dechet-son-lieu-de-collecte/
Germany	City Sporthafen Hamburg	https://www.citysporthafen.hamburg/en/services/marina-services.html
Ireland	Galway	https://theportofgalway.ie/marina/
UK	Darthaven marina	http://www.darthaven.co.uk/facilities

82. In some marinas it was found that a separate waste fee (other than the overall port dues) is being charged. This was the case in Porto Cervo (Italy), Gothenburg marina (Sweden), Rhodes Marina (Greece), Koper Marina (Slovenia) and Port Ghalib Egypt).

5.2.4.1 Porto Cervo (Italy)

Porto Cervo	
	
Type of cost recovery system	NSF
Brief description of the cost recovery system	- Daily rates - Waste fee depending on size (length/width) of the vessel: o from 2,70 EUR (6,5/2,3 m) up to 100 EUR (55/10 m)
Overview of tariffs	http://www.marinadiportocervo.com

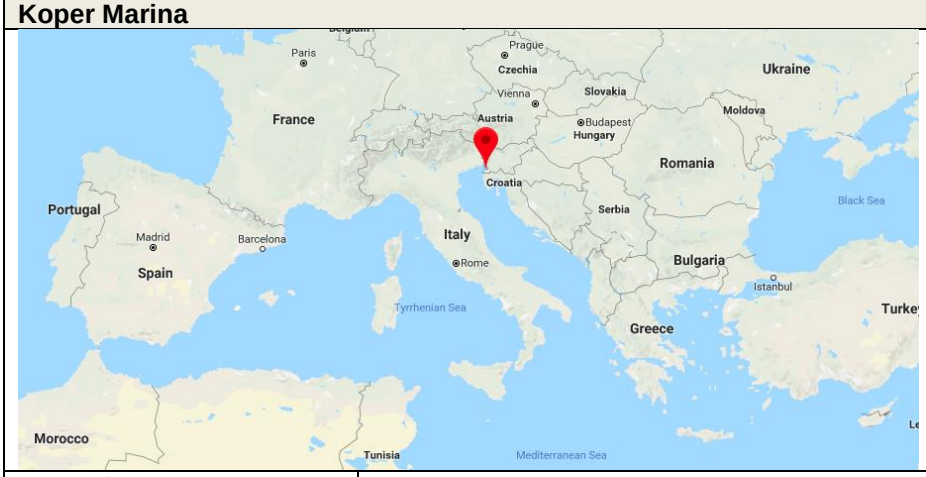
5.2.4.2 Gothenburg Marina (Sweden)

Gothenburg Marina	
	
Type of cost recovery system	NSF + direct charge for sludge and bilge water
Brief description of the cost recovery system	- General port dues depending on length of vessel, which includes the delivery of garbage: o daily rates of 3000 – 5250 SEK (285 – 498 EUR) - Separate waste fee for the delivery of sludge and oily bilge water: 0,23 SEK/GT (0,0219 EUR/GT)
Overview of tariffs	https://www.portofgothenburg.com/maritime/port-tariff/

5.2.4.3 Rhodes Marina (Greece)

Rhodes Marina	
	
Type of cost recovery system	NSF for garbage + direct charge for liquid wastes
Brief description of the cost recovery system	- General port dues depending on length of vessel, which includes the delivery of garbage - Separate waste fee for the delivery of liquid wastes: ○ liquid waste at 5 designated areas: 8 EUR/time up to 100 litres ○ liquid waste at berth with mobile unit: 20 EUR/time up to 100 litres ○ bilge & grey water removal at 2 designated areas: 14 EUR/time up to 50 litres ○ bilge & grey water removal with mobile unit: 25 EUR/time up to 50 litres
Overview of tariffs	http://www.rhodesmarinas.com/main/page/berth_costs

5.2.4.4 Koper Marina (Slovenia)

Koper Marina	
	
Type of cost recovery system	NSF
Brief description of the cost recovery system	Separate waste fee for the delivery of liquid wastes: - for boats up to 10 m: 33 EUR - for boats over 10 M: 43 EUR
Overview of tariffs	https://www.marina-koper.si/en/about

5.2.4.5 Port Ghalib (Egypt)

Port Ghalib (Egypt)	
	
Type of cost recovery system	Direct fee system
Brief description of the cost recovery system	Separate waste fee for the delivery of both solid and liquid wastes. For local registered vessels: - solid waste disposal service: o daily trip: $ 6,00 per vessel o weekly trip: $ 15,00 LE per vessel o 2-week trips: $ 19,00 LE per vessel - supply of solid waste bags: $ 2,00 per package of 10 bags - pumping out: $ 7,00 per service For foreign registered vessels: - solid waste disposal service: $ 1,00 per waste bag - supply of solid waste bags: $ 1,50 per package of 10 bags - pumping out: $ 10,00 per service
Overview of tariffs	http://www.portghalib.com/marina/tariffs

6 PERFORMANCE OF COST RECOVERY SYSTEMS

6.1 Elements influencing the delivery of ship's wastes

6.1.1 Types of ship-generated waste

83. An important element influencing the delivery of waste from ships is the type of waste. The 2017 EMSA study on "the management of ship-generated waste types on-board ships[26]" indicated that for almost every type of ship-generated waste there is a variety of waste flows and on-board treatment methods. The evidence gathered in the study shows that ships use different treatment methods and often only treat a part of a waste stream. This results in a difference between the amounts of waste generated onboard and the amounts landed.

84. The same EMSA study also shows that shipping companies appear to optimize their waste delivery in order to reduce the cost of waste management. According to the Impact Assessment supporting the revision of the PRF Directive (Ecorys/COWI, 2017) information from PRF operators indicates that oily waste, having a commercial value, is typically kept on board to be delivered in a port where market conditions are most favourable (relating to oil prices, demand for oily waste). Such conditions may be found within but possibly also outside the EU.

85. Some ships indicate that waste is separated on a ship but the company that collects the waste does not separate this. In addition, the separation categories of waste can differ among countries.

86. Furthermore, also the onboard storage capacity influences the delivery of ship's waste to PRF. Liquid oily wastes (MARPOL Annex I) such as sludge and oily bilge water can be easily stored onboard in designated holding tanks. As the storage capacity of these tanks can be quite large, ships can sail long distances before the tanks are full and delivery to a PRF is necessary. When the ship is equipped with bilge water separation technology such as an oil-water separator (OWS), which can reduce the quantity of bilge water by 65–85%, the time that delivery to a PRF can even be prolonged. Some companies have indicated that the storage capacity on board can also be expanded by using bags for excess waste.

87. Also, for sewage (MARPOL Annex IV) ships often have holding tanks. The size of these tank should take into account the capacity for the retention of all sewage, the operation of the ship, the number of persons onboard and other relevant factors. Some ships (e.g. cruise vessels) are equipped with type approved sewage treatment plants, where the ship's sewage is being disinfected and treated. In those cases, ships are only required to deliver the generated effluent when the ship is in port, as while it is on the route all can be continuously discharged at sea.

88. It can be noted that due to the impact of seasonal traffic the delivery to PRF of some waste types can be subject to strong variations. In the Baltic strong variations have been observed[27] regarding the delivery of sewage from cruise ships and ferries, where deliveries have decreased every winter (see figure 3), as the cruise ships are mostly operating from April until October, with an annual peak between June and August. As a consequence, it seems logical that for cruise and passenger ships also the delivery of other types of waste to PRF, e.g. garbage, are strongly affected.

[26] The management of ship-generated waste types on-board ships, 2017, CE Delft & CHEW, EMSA/OP/02/2016
[27] HELCOM Overview 2018 on Baltic Sea Sewage Port Reception Facilities

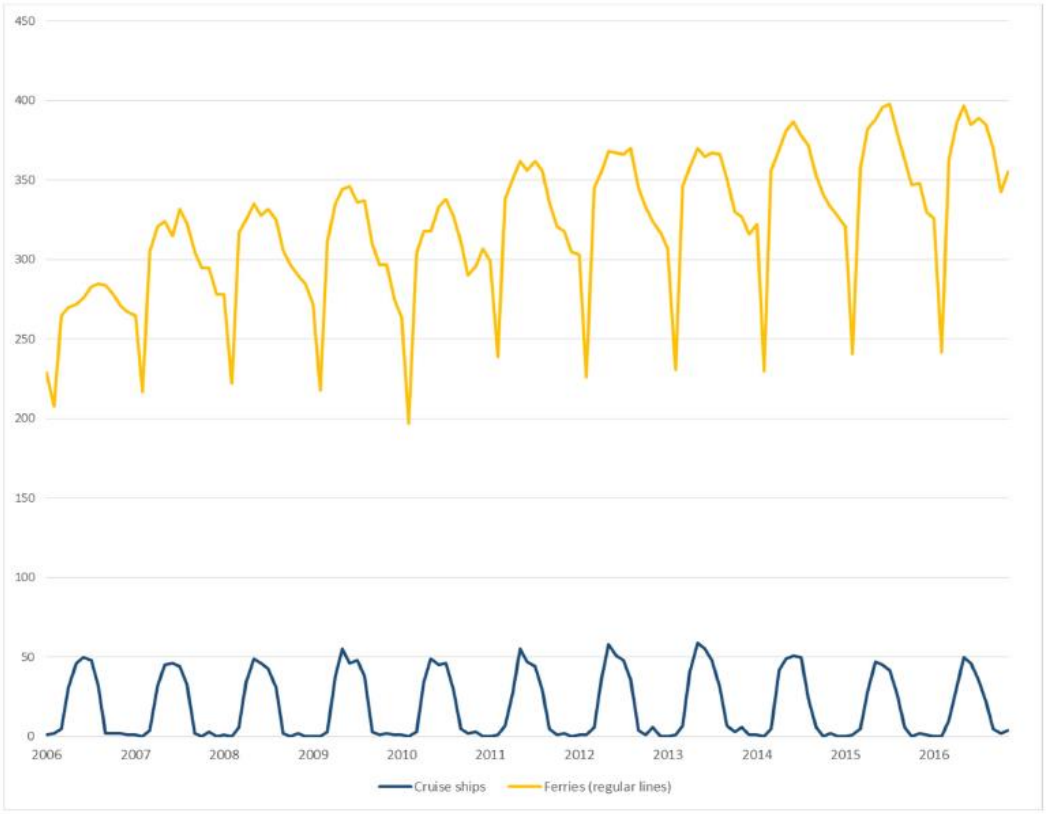


Figure 3: Number of cruise ships and ferries[28] operating in the Baltic Sea (monthly values) based on the HELCOM AIS data (source: HELCOM Baltic Marine Environment Protection Commission)

6.1.2 Characteristics of waste generated onboard ships

89. The EMSA-commissioned study on the management of ship-generated waste on-board ships (CE Delft/CHEW, 2017) provides an empirical overview of the management, drivers, technologies and the quantities of different categories of ship-generated waste. The data presented in the report have been collected from ship audits, interviews, a literature review, an online survey among stakeholders and audits of waste notification forms.

90. For almost every type of ship-generated waste, there is a variety of waste flows and on-board treatment methods. The empirical evidence gathered in this study shows that ships use different treatment methods and often only treat part of a waste stream. This results in a difference between the amounts of waste generated and the amounts landed.

[28] The ship type “ferries” also includes RoPax as well as small passenger ships with a length less than 50 metres

MARPOL Annex *I (source: CE Delft/CHEW)*

Type of waste	Generation rate	Driver	On-board treatment
Oily bilge water	0.01-13 m^3 per day, larger ships generate larger quantities.	Condensation and leakages in the engine room; size of the ship.	The amount can be reduced by 65-85% by using an oil water separator and discharging the water fraction into the sea.
Oily residues (sludge)	0.01 to 0.03 m^3 of sludge per tonne of HFO. 0 and 0.01 m^3 per tonne of MGO.	Type of fuel; fuel consumption.	Evaporation can reduce the amount of sludge by up to 75%. Incineration can reduce the amount of sludge by 99% or more.
Tank washings (slops)	20 to hundreds of m^3	Number of tank cleanings; Size of loading capacity.	After settling, the water fraction may be discharged at sea.

MARPOL Annex *IV (source: CE Delft/CHEW)*

Type of waste	Generation rate	Driver	On-board treatment
Sewage	0.01 to 0.06 m^3 per person per day. Sewage is sometimes mixed with other waste water. The total amount ranges from 0.04 to 0.45 m^3 per day per person.	Number of persons on-board; type of toilets; length of voyage.	Effluent from treatment plants is often discharged at sea where permitted under MARPOL Annex V.

MARPOL Annex V (source: CE Delft/CHEW):

Type of waste	Generation rate	Driver	On-board treatment
Plastics	0.001 to 0.008 m^3 of plastics per person per day.	Number of person on-board.	Often not incinerated. Dirty plastics (plastics that have been in contact with food) are often treated as a separate waste stream.
Food wastes	0.001 to 0.003 m^3 per person per day.	Number of persons on-board; provisions.	Where permitted under MARPOL Annex V, food waste is often discharged at sea.
Domestic wastes	0.001 to 0.02 m^3 per day per person.	Number of persons on-board; type of products used.	
Cooking oil	0.01 to 0.08 litres per person per day.	Number of persons on-board; type of food prepared.	Although not permitted, cooking oil is sometimes still added to the sludge tank.
Incinerator ashes	0.004 and 0.06 m^3 per month.	Use of incinerator; cost of using incinerator.	The incinerator is not used for all types of waste, mostly for paper sometimes for oily sludge.
Operational wastes	0.001 to 0.1 m^3 per person per day.	Size of the ship; type of cargo.	
Cargo residues	0.001-2 % of cargo load.	Type of cargo. Size of ship.	

Fishing gear *(source: Eunomia):*

91. For fishing gear it is reasonable to assume that the quantity of waste produced is directly related to the level of fishing and farming effort. In practice, the generation of fishing gear waste differs per day and location. The waste estimated per tonne of fish farmed or captured in Norway is 1 kg plastic from fishing nets and trawl equipment per tonne of output production and 11 kg plastic waste from aquaculture per tonne of output.

Overview of MARPOL Annex V onboard waste generation per subcategory and ship segment (source: Eunomia*):*

92. The "study to support the development of measures to combat a range of marine litter sources" (Eunomia, 2016) provides the most extensive estimates of waste generation for all MARPOL Annex V waste types on an aggregate level and per waste category (see table 3).

Table 3: MARPOL Annex V onboard waste generation estimates (1000 tonnes) for 2013 by subcategory and ship segment (source: Eunomia)

Sector/waste stream	Shipping	Fishing	Cruise	Passenger	Recreational	Navy	Total	%
Annex V – domestic	74,4	43,5	86,7	123,0	170,9	8,8	507,3	57%
Annex V – solid CR	122,5	-	-	-	-	-	122,5	14%
Annex V – fishing gear	-	218,5	-	-	-	-	218,5	25%
Annex V – other operational	27,1	4,3	-	0,3	-	0,9	32,6	4%
Total	224	266,3	86,7	123,3	170,9	9,7	880,9	
%	25%	30%	10%	14%	19%	1%		

93. These data show that the contribution of the various shipping segments differs between waste categories, where typically passenger ships (cruise, ferries, recreational boating) cover the majority of domestic waste (garbage), while cargo ships are the main responsible for MARPOL Annex V cargo residues and other operational waste. It should be noted that the figures presented only cover cargo residues from dry bulk (MARPOL Annex V). In calculating the figures, Eunomia already corrected for legal discharges of food waste. If an average treatment of 25% is assumed (Ecorys/COWI, 2017), the gross waste generation would be an approximate 1,2 million tonnes for all shipping sectors, and about 0,3 million tonnes for merchant shipping alone. Fishing and recreational vessels together account for about half of the total MARPOL Annex V waste generation.

6.2 Impact of cost recovery systems on waste delivery

94. Apart from the availability of adequate PRF, which is a primary preventative measure that can reduce the likelihood that ship's waste is discharged at sea, also the cost for their use can discourage waste delivery by ships. Therefore, the application of cost recovery systems can take away the economic advantage of discharging into sea: as ships are required to pay a waste fee irrespective whether they use the PRF or not, they might as well deliver the waste.

95. The main objective of cost recovery systems is that the costs of PRF for ship's waste, including the treatment and disposal of the waste, are covered through the collection of a fee from ships. This is based on the "polluter pays principle", in which the costs are to be fully borne by the port users. Differing from EU ports, where the EU PRF Directive requires that all costs for PRF are to be covered by fees from ships, in non-EU ports cost recovery schemes can also be based on a partial coverage of costs, e.g. in certain fishing ports of marinas where ship's garbage is introduced in the municipal waste management scheme.

96. Still, in order to ensure that the cost recovery systems provide no incentive for ships to discharge their waste into the sea, it is desirable that all ships "contribute significantly" to the costs of the facilities, irrespective of their actual use of the facility (the indirect fee approach). The European Commission specified in a separate declaration annexed to the PRF Directive that the significant contribution should be understood as " a figure of the order of at least 30 % of the costs referred to in article 8(1)"[29]. At the same time, ports have the possibility to differentiate the waste fee based on the category, type and size of the ship, as well as on the basis of the ship's environmental performance and operation.

97. As explained earlier the variety of existing cost recovery systems is a result of a combination of several factors, such as:

- lack of strict prescriptive regulations in both MARPOL and the PRF Directive;
- differences in interpretation of the regulatory framework;
- differences in strategy and administration of ports, in particular whether the port is publicly owned and operated private or privately owned/operated;
- differences in traffic (size and type of ships), leading to differing types and volumes of wastes delivered to PRF.

98. As a consequence, there might also be differences in the level of the incentives to deliver the waste on land (from full incentive to no incentive at all). This has been confirmed[30] by stakeholders in response to the 2017 EU Open Public Consultation: 51 out of 79 respondents (63%) indicated that the lack of alignment leads to insufficient incentives for delivery.

99. Several studies have looked at waste delivery trends and the possible impact of cost recovery systems on the delivery of ship's waste to PRF:

- 2010 EMSA Horizontal Assessment:
  Identified a trend that indicated a general increase of delivered ship-generated waste between 2005 and 2008. Whether this increase can be fully or partially attributed to the instalment of cost recovery systems in EU ports is difficult to say.

- 2012 EMSA "study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports"[31]:
  This study concluded that for MARPOL Annex I and V wastes delivery trends show an increase up to 2008/2009 and then a decrease and stabilization in 2010 (the increase from 2004 to 2008/9 was explained by the implementation of the PRF Directive, while the decrease after 2008/9 was explained by reduced port calls following the economic crises). In addition, the study concluded that it is difficult to say whether one cost recovery system is better than the other, and the waste delivery data cannot document that one system should be more effective than another.

- 2015 the "Ex-post evaluation of Directive 2000/59/EC on PRF[32]":
  This evaluation identified a lack of comparable data on actual waste deliveries in ports in the EU. For this reason, the study estimated waste volumes delivered to EU ports in the period 2004 to 2013, based on the answers received on a targeted stakeholder consultation. Based on data collected in this evaluation, deliveries of ship-generated waste on average increased or remained the same in the early years of the implementation of the PRF Directive. For MARPOL Annex I wastes considerable variations were observed, while the delivery of MARPOL Annex V (garbage) has increased.

[29] Official Journal of the European Union L 332/90, 28.12.2000
[30] Impact Assessment accompanying the proposal for a revised PRF Directive, 2018, SWD(2018) 21 final
[31] EMSA/OP/06/2011, study developed by Ramboll.
[32] Developed by Panteia/PwC for the European Commission (DG MOVE), within the framework of the EC's Regulatory Fitness and Performance programme (REFIT) for the revision of the Directive 2000/59/EC.

- 2017 Impact Assessment[33] accompanying the revision process of the PRF Directive:
  The IA stated that there are no indications that the amount of garbage from ships (marine litter) has decreased in recent years. Time series of marine litter on European shores indicate that the problem has persisted since the implementation of the Directive. Sea-based sources actively contribute to the problem with an estimated EU average of 32% and values up to 50% for some sea basins.

100. Recent studies have also indicated that among the sea-based contributors to the problem of marine litter, the fishing sector features quite dominantly, with the recreational sector also taking a significant share. Although garbage delivered in ports has increased since the introduction of the Directive, a significant delivery gap remains. The illegal discharge of oily waste into the sea has substantially decreased over time, as also evidenced by aerial surveillance data on oil spills detected in surface water. Notwithstanding the apparent progress in delivery, some oily waste that should be delivered in EU ports is not, indicating potential discharges into sea, causing harm to the marine environment. Regarding the sewage that originates from merchant shipping that is to be delivered to port, it is estimated that approximately 10% of the sewage that should be delivered on land is not received by PRF (and thus potentially discharged illegally).

Overview of delivery of ship's wastes in EU ports:

101. It must be noted that for the fisheries and recreational sector no data was available.

MARPOL Annex I:

102. Regarding the delivery of oily waste at PRFs, waste delivery data collected for 29 larger EU ports indicate that volumes of oily waste delivered to port reception facilities have doubled between 2004 and 2008, and have remained stable since, as shown in figure 4.

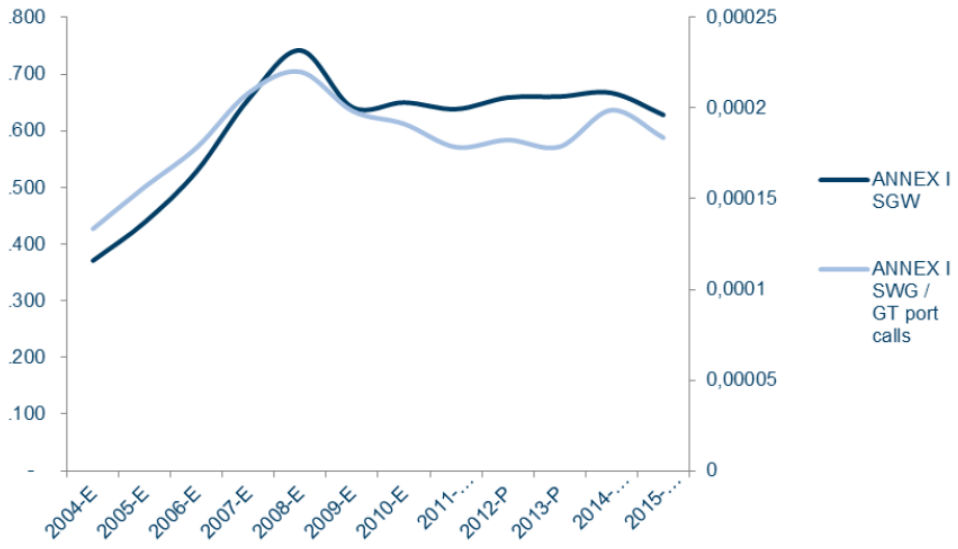


Figure 4: MARPOL Annex I oily waste delivered in 1000 ton (left axis) and per unit of GT calls (right axis) (source: Ecorys)

[33] Impact Assessment, accompanying the document Proposal for a Directive of the European Parliament and of the Council on port reception facilities for the delivery of waste from ships, repealing Directive 2000/59/EC and amending Directive 2009/16/EC and Directive 2010/65/EU, 2017, Ecorys/COWI, SWD(2018) 21 final

103. Based on a number of sources, it can be concluded that the illegal discharge of oily waste into the sea has substantially decreased over time. Sources include the MARWAS[34] analysis, the CE Delft/CHEW study on ship-generated waste (2016), a review of delivery data of 29 larger ports, the ex-post evaluation (Panteia/PwC, 2015) and validation through case studies and interviews. Notwithstanding the apparent progress in delivery, some oily waste that should be delivered in EU ports is not, indicating potential discharges into sea, causing harm to the marine environment. The gap between oily waste generated and treated versus the waste delivered in ports is estimated at 2,5%.

MARPOL Annex IV:

104. The port delivery data for sewage in figure 5 shows a strong increase (75%) in sewage delivered from 2004 to 2005, which coincides with the revision and entry into force of MARPOL Annex IV (entry into force on 1 August 2005). Since then, a decrease of between 2005 to 2008 was observed, with one possible explanation being that existing ships were required to comply with the provisions of the revised Annex IV five years after the date of entry into force of Annex IV, namely since 27 September 2008. Since 2008, a slight increase is observed.

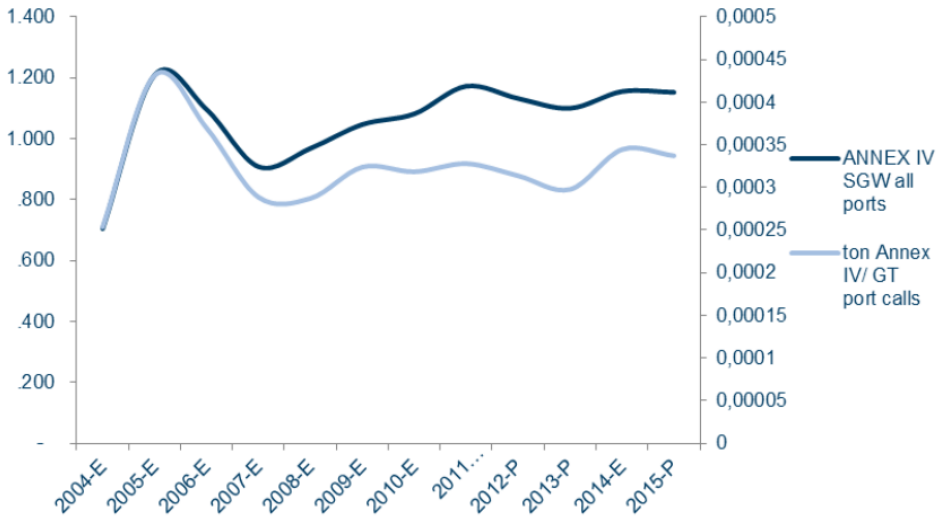


Figure 5: MARPOL Annex IV sewage delivered – in 1000 ton (left axis) and per unit of GT calls (right axis) (source: Ecorys)

105. When comparing the remaining volumes with volumes delivered to 29 ports, a sewage delivery gap of 7-17% is observed, indicating that this part of sewage is not delivered, so potentially discharged illegally.

106. Based on ship-generated waste estimates from CE Delft/CHEW (2016), MARWAS calculations, delivery data from 29 ports (Ecorys/COWI, 2017), HELCOM (2014), case studies and interviews (Ecorys/COWI, 2017), it is concluded that, for merchant shipping, of the sewage that is to be delivered to port, approximately 7-17% is not received by PRF and potentially discharged illegally.

107. For the recreational and fisheries sector, while volumes of sewage generated are similar to those of the merchant sector, no data on delivery are available to assess whether the gap for these sectors is similar or, possibly, higher.

[34] The MARWAS model is built on a data base manager, which processes data from the Lloyds Maritime Intelligence Services (LMIS). Using comprehensive data on the parameters influencing waste generation and the number of voyages and ships in a given period, MARWAS predicts the types and calculates the amounts of waste generated on board the ship during the voyage from the last port of call

MARPOL Annex V:

108. Data on MARPOL Annex V waste delivery to 29 ports (Ecorys/COWI, 2017) show an increase in waste delivery by merchant ships since the implementation of the PRF Directive, as reflected in figure 6, showing volumes higher than the amounts of waste generated as estimated by Eunomia (2016).

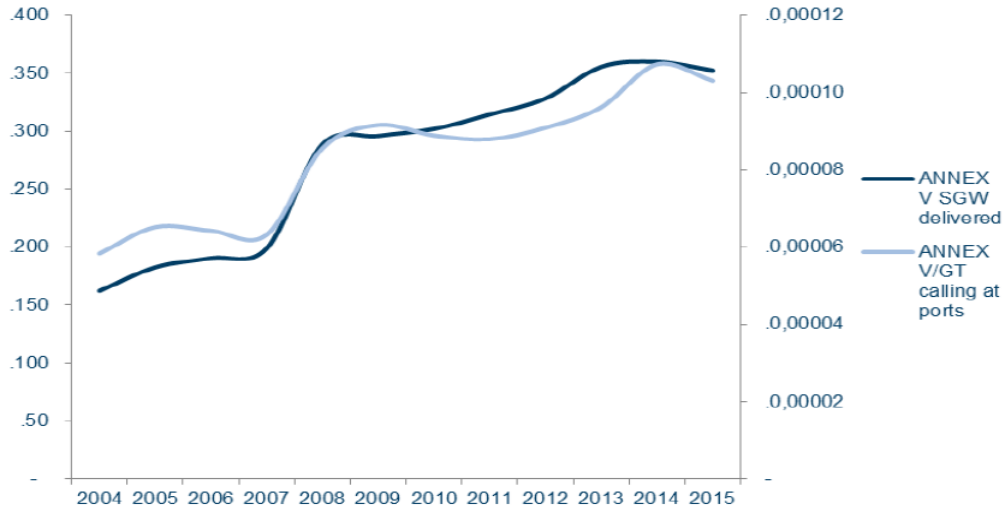


Figure 6: MARPOL Annex V garbage delivered – in 1000 ton (left axis) and per unit of GT calls (right axis) (source: Ecorys)

109. In order to estimate the delivery gap for garbage, a comparison was made between total waste generated with waste delivered, using their delivery estimates from studies done by Panteia/PwC (2015) and Ramboll (2012), indicating a significant gap between generation and delivery of about 33% (order of 900,000 tons generated vs 600,000 tons delivered). At the same time, time series data from marine litter monitoring programmes (OSPAR, 2012) do not indicate a reduction of the amount of marine litter in European seas.

110. It should be noted that given the high share of marine litter from land-based sources, the above developments cannot be directly linked. However, a study by Sá et all (2015) finds evidence that significant higher concentrations of MARPOL Annex V waste float near dense shipping routes (operational waste and packaging material), compared to the areas with little shipping traffic, indicate a significant contribution of the (merchant) shipping sector to waste at sea.

111. For the fisheries sector, more specific estimates exist in relation to fisheries equipment, including so-called abandoned, lost or otherwise discarded fishing gear (ALDFG), ranging up to 220,000 tons per year for the EU as a whole (Ecorys/COWI 2017, calculations based on Eunomia, 2016). Data from fishing for litter programmes initiated over the past decade suggest that the amount of ALDFG is gradually decreasing, but still a lot of “old” ALDFG is in Europe’s seas. ALDFG is to be passively fished and delivered to port, which is supported by fishing for litter programmes or independently.

112. The amount of marine litter found in European seas remains at a rather constant level and time series of marine litter on European shores indicate that the problem has persisted since the implementation of the PRF Directive. Although land-based sources are dominant in generating marine litter, sea-based sources actively contribute to the problem with an estimated EU average 32% and values up to 50% for some sea basins. It is estimated that the fishing and recreational sectors are relatively large sea-based sources contributors, with shares of 30% and 19% respectively according to Eunomia (2016) (the balance provided by merchant shipping), and 65% for fisheries alone according to Arcadis (2012). Although garbage delivered in ports has increased since the introduction of the PRF Directive, a significant delivery gap thus remains.

MARPOL Annex VI:

113. Under MARPOL Annex VI strict requirements regarding emission levels are adopted. A range of waste types are included in MARPOL Annex VI, such as waste from exhaust gas cleaning systems (scrubbers) and ozone depleting substances (ODS). The 2017 IA-analysis (Ecorys/COWI) concentrates on waste from scrubbers, as ODS is mainly handled through repair yards.

114. The use of scrubbers generates so-called scrubber sludge. This type of waste is mainly generated by merchant shipping, as their ship engines run on heavy fuel oil for which abatement measures are required, at least in Sulphur Emission Control Areas (SECA). Fisheries and recreational boating hardly contribute to the generation of MARPOL Annex VI waste.

115. This waste category is currently generated in limited volumes only, due to the fact that the number of ships with on-board scrubbers is still relatively small. According to the data presented (Ecorys/COWI, 2017), approximately 400 scrubbers (both open and closed loop) have been installed on board of vessels. Open loop scrubbers take in sea water, use it for scrubbing, then treat it and discharge it back into sea, whereas closed loop scrubbers use fresh water from a holding tank that, after use and treatment, is used again, while the treatment gives wash water bleed-off and sludge.

116. Studies indicate that closed loop scrubbers would generate 1kg of dry matter per MWh, or 20 kg/MWh sludge in total (assuming 5% dry matter content). For an average ship with a 15MW engine, operating 4,000 hours per year, this would imply 60 tonnes of dry matter or 1,2 million tonnes of sludge (appr. 1,200 m3). Open loop scrubbers are reported not to generate any sludge.

117. Driven by regulatory measures, including SECA zones and announced global sulphur content limits, it is expected that there will be a growth of this type of waste in the future with a growing uptake potential of scrubbers. Any estimate on volume is, however, premature, as it is uncertain how the shipping sector will respond to upcoming legislation (i.e. investing in exhaust gas cleaning systems – EGCS and choosing between open-loop or closed-loop systems or switching to cleaner but more expensive fuels). The CE Delft/CHEW study (2016) also concluded that it has proven difficult to provide estimates of volumes generated on-board ships for this type of waste.

Overview:

Table 4: Amount of ship-generated waste generated and delivered annually, and the resulting "waste gap" (sources: Ecorys/COWI, MARWAS and Eunomia)

	Annex I - oily waste		Annex IV - sewage		Annex V - garbage		Annex VI -scrubber waste
	Merchant shipping	All, including fishing and recreational craft	Merchant shipping	All, including fishing and recreational craft	Merchant shipping	All, including fishing and recreational craft	All (only applicable for merchant shipping)
Waste to be delivered (after treatment and legal discharge [33])	1,226,000 m^3	1,290,000 m^3 Merchant: 1,226,000 m^3 Fishing vessels: 55,000 m^3 Recreational craft: 9,000 m^3	1,362,000 m^3	2,312,000 m^3 / 2,562,000 m^3 Merchant: 1,362,000m^3 Fishing vessels: 500,000 / 750,000 m^3 Recreational craft: 450,000 m^3	434,000 tonnes[34]	881,000 tonnes Merchant: 434,000 tonnes Fishing vessels: 266,000 tonnes Recreational craft: 171,000 tonnes[35]	24,000m^3 sludge 360,000 m^3 bleed-off (generated by scrubbers operating in closed-loop mode, i.e. 5% of 400)
Actually delivered (4)	1,195,000 m^3	*Unknown, as waste delivery data for fishing ports and marinas are unknown*	1,226,000 m^3	*Unknown, as waste delivery data for fishing ports and marinas are unknown*	Range from 286,000 to 404,000 tonnes[36]	Range from 580,000 to 820,000 tonnes	*Unknown*
Delivery gap (3) – (4)	**31,000 m^3 (2.5%)**	Unknown, but consisting of 31,000 m^3 caused by merchant shipping and a contribution from fishing vessels and recreational craft from 0 to 64,000 m^3	**136,000 m^3 (10%)**	*Unknown*	**Between 30,000-148,000 tonnes (7-34%)**	**Between 60,000-300,000 tonnes (7-34%)**	*Unknown*

6.3 Comparison of cost recovery systems

118. The ex-post evaluation (Panteia/PwC, 2015)[35] of the PRF Directive assessed the incentives created by the different cost recovery systems. Therefore, waste flows at the macro level of different ports with different cost recovery systems were analysed. Given the lack of comparable statistical data and the multitude of factors influencing waste delivery in EU ports, it was concluded in the study that this cannot be done with absolute certainty. However, a general trend could be observed of increased volumes of waste delivered to ports with cost recovery systems in line with the requirements of the PRF Directive (NSF/ADM systems in their varieties).

119. Given the specificities of the different waste types and the fact that in general ports apply different cost recovery system or different waste types, the results are presented by waste types. It should be noted that cargo residues often remain the property of the cargo owner after unloading the cargo to the terminal, and as a result often have an economic value. Therefore, cargo residues in most cases are not included in the cost recovery systems and the application of the indirect fee, and have not been covered by the assessment.

MARPOL Annex I (source: Panteia/PwC):

120. For MARPOL Annex I wastes, the results (figure 7) show substantial variation for each cost recovery system. The vertical axis presents the average amounts (m^3) of waste delivered per 1,000 GT. Consistently increasing levels of oily waste are delivered to ADM/deposit systems. This indicated that in ports with these systems, a similar number of vessels deliver on average more MARPOL Annex I waste than before. Other cost recovery systems do not show a rising trend.

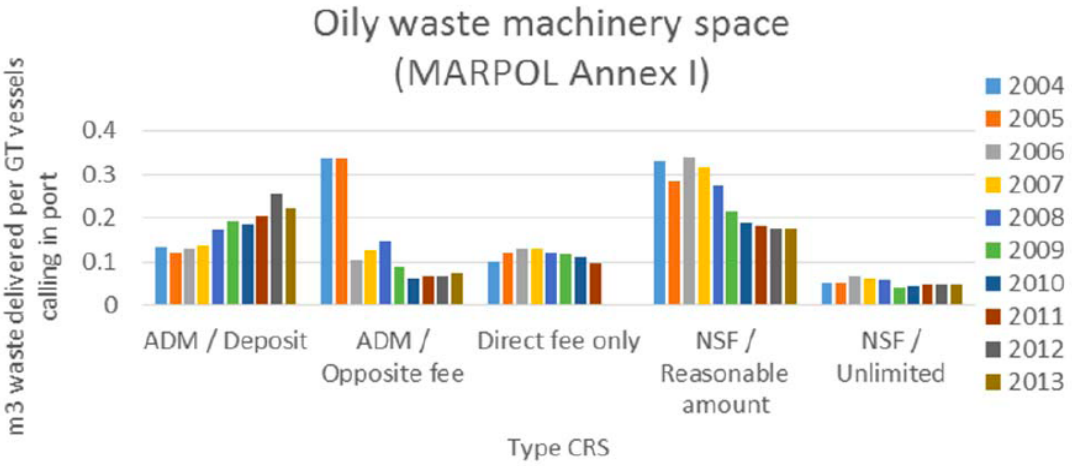


Figure 7: Trends in waste delivery for MARPOL Annex I (source : Panteia, 2015)

MARPOL Annex IV (source : Panteia/PwC):

121. For sewage, ports with a NSF/unlimited system receive comparatively higher amounts of waste than ports with other cost recovery systems.

[35] Ex-post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, 2015, Panteia/PwC, p. 53-60

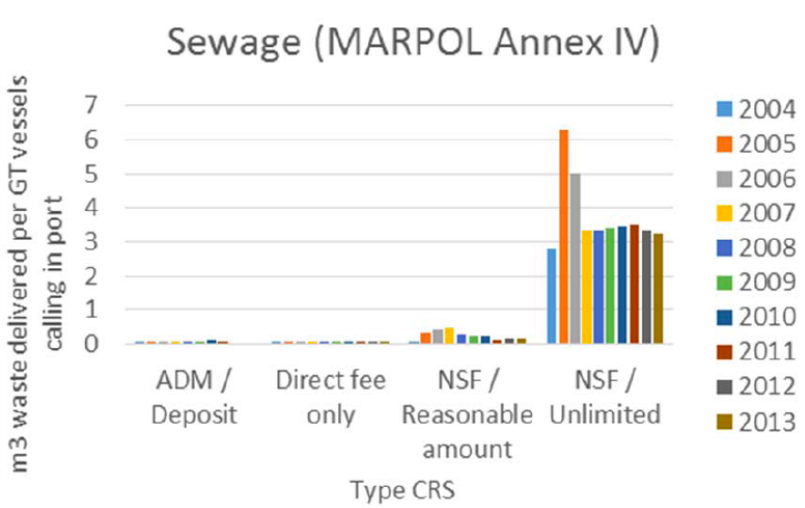


Figure 8: Trends in waste delivery for MARPOL Annex IV (source: Panteia, 2015)

122. Comparison was then made with the trends in percentages, but no clear trends can be observed. The volumes of deliveries are relatively stable in ports with NSF/unlimited systems, whereas delivery of sewage in NSF/reasonable amounts is reducing, possibly related to lower "reasonable limits" set. In ports with ADM/deposit and direct fee systems, a positive trend in sewage deliveries can also be observed. However, measured in absolute volumes, these trends are minimal and suggest that ships deliver their sewage in ports with NSF systems.

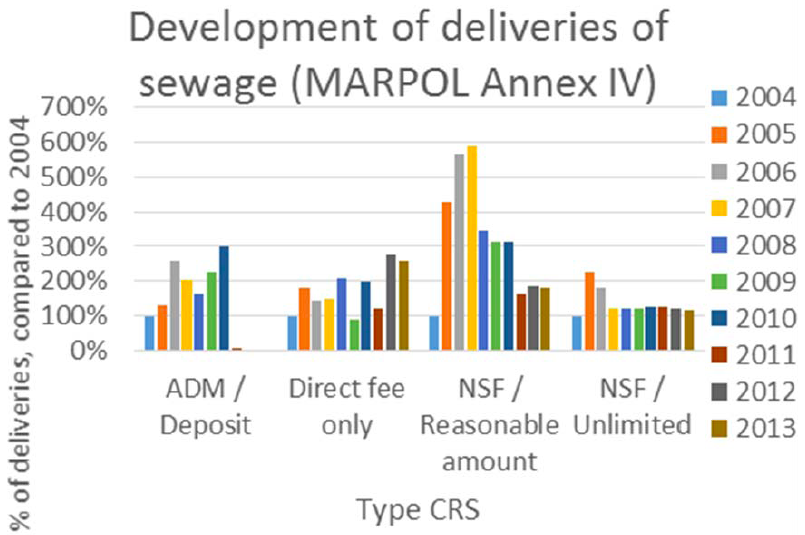


Figure 9: Trends in waste delivery (% of deliveries compared to 2004) for MARPOL Annex IV (source: Panteia, 2015)

123. It was therefore concluded that the type of cost recovery system is not the key factor influencing the level of delivery, and that this is related more to the regional circumstances. This can be explained by the efforts of HELCOM[36] to assign the Baltic Sea as a special area under Annex IV, which would prohibit the discharge of untreated sewage waste in this sea. Ports around this sea

[36] HELCOM (Baltic Marine Environment Protection Commission - Helsinki Commission) is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, known as the Helsinki Convention. The Contracting Parties are Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden

have been developing PRF to adequately handle the higher demand for disposal of sewage wastes on shore.

MARPOL Annex V (source: Panteia/PwC):

124. The volumes of MARPOL Annex V waste deliveries as shown in figure 10 show, except for the NSF systems, relatively similar trends. Because ports generally do not have the same cost recovery systems for both MARPOL Annex I and Annex V waste, similar trends are an indication that variation is more related to the type of cost recovery system than, for instance, geographical location of the port.

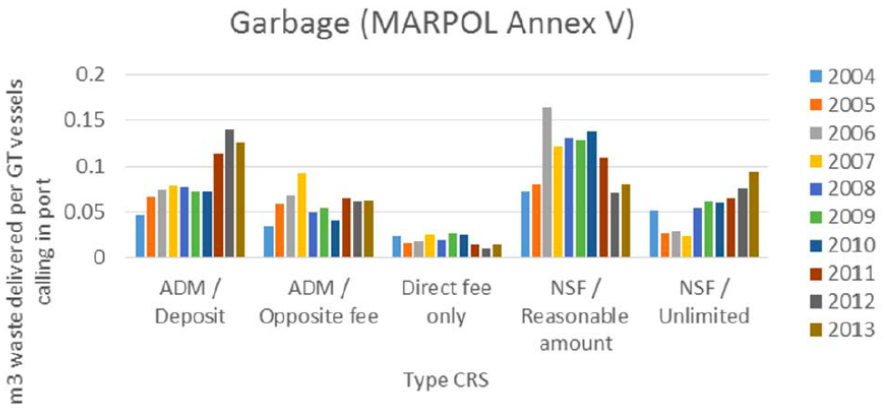


Figure 10: Garbage (MARPOL Annex V) collected for types of cost recovery systems (source: Panteia, 2015)

125. The deliveries of Annex V waste in ports with NSF/reasonable amount systems do not show a clear trend. A clear difference with MARPOL Annex I waste is the rising trend of increased Annex V waste deliveries in ports with NSF/unlimited systems. Whereas these levels were relatively low until 2008, a clear rising trend has been observed in these ports in recent years. This finding is in line with how a NSF/unlimited cost recovery system provides incentives to deliver in the port.

Conclusions (source: Panteia/PwC):

126. The findings of the ex-post evaluation of the EU PRF Directive (Panteia/PwC, 2015) show increased deliveries in ports with an ADM deposit system. The variation in delivery trends for the various cost recovery systems applied to the different types of waste indicates that cost recovery systems affect incentives to port users to discharge waste. However, these are not the only elements affecting waste discharge: other factors, such as the amounts of waste allowed under NSF, and the level of compensation for waste delivery are also relevant. Moreover, other factors not directly related to the type of cost recovery system also have an effect, such as differences in enforcement standards by ports, other incentives in port dues, type of traffic/ships calling at the port, efficiency on waste operations, and the type of port operations. Among these factors, the higher environmental standards and incentives of other port dues in ports on the Baltic Sea can partly explain the relatively low volumes of MARPOL Annex I waste deliveries in Baltic Sea ports, despite the “no special fee” systems in place.

127. The ex-post evaluation (Panteia/PwC, 2015) finds different waste delivery trends in ports with different cost recovery systems, also when controlling for the number and size of vessels calling at each port. Even though various other factors also impact the delivery patterns of waste to PRF, this shows that the **type of cost recovery system has an impact on waste delivery behaviour of port users**. In view of the different trends found across the EU, it is also concluded that the variety of systems in place does not provide sufficient and comparable incentives to ensure that port users deliver their waste in port reception facilities.

128. It was also found that **lower amounts of waste are delivered to ports that charge in relation to the volumes of waste delivered, than in ports with indirect fee systems in place**, which suggests that the latter are indeed more in line with the objectives of the PRF Directive.

6.4 Element of "incentive" for delivery in different cost recovery systems

129. In the ex-post evaluation of the PRF Directive (Panteia/PwC, 2015) an assessment has been done regarding the element of "incentive for the delivery" within the different cost recovery systems. This assessment was done based on stakeholder responses, where several questions have been sent out to different port users and stakeholders.

130. Responding to the question related to the "incentive not to discharge at sea", the majority of respondents (see figure 11) considered that the ADM/opposite fee systems and NSF unlimited systems do not provide incentives to discharge at sea.

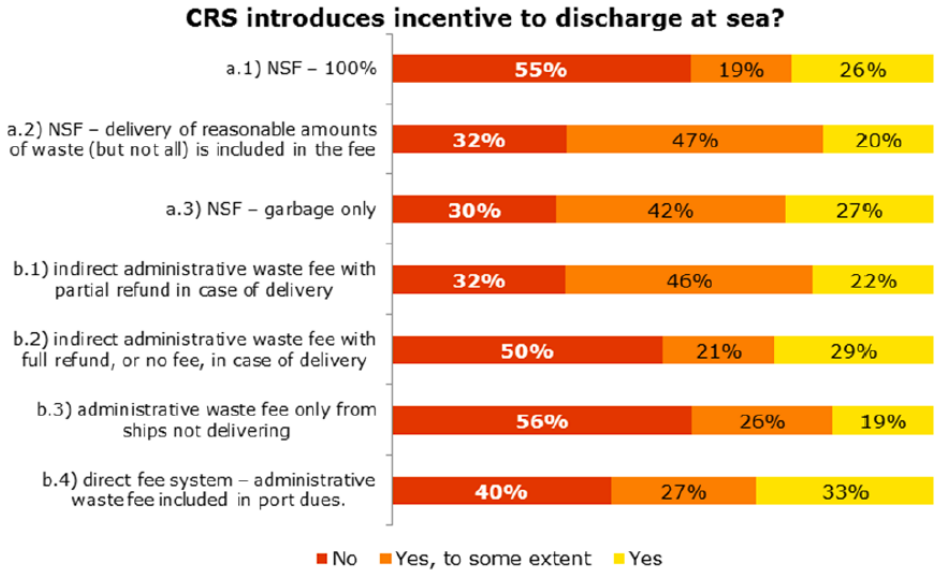


Figure 11: Incentives to discharge waste at sea by cost recovery system (source: Panteia/PwC)

131. To better understand these differences, stakeholder responses were further analysed. The results above were split up where relevant differences between stakeholders were found. A particular difference was found between ports and other stakeholders for the NSF-garbage only systems, as presented in figure 12. Whereas a majority of ports expected that this does not create an incentive to discharge waste at sea, only 16% of port users considered this to be the case. Unfortunately, insufficient data have been collected on NSF/garbage only systems to substantiate this finding with waste delivery data.

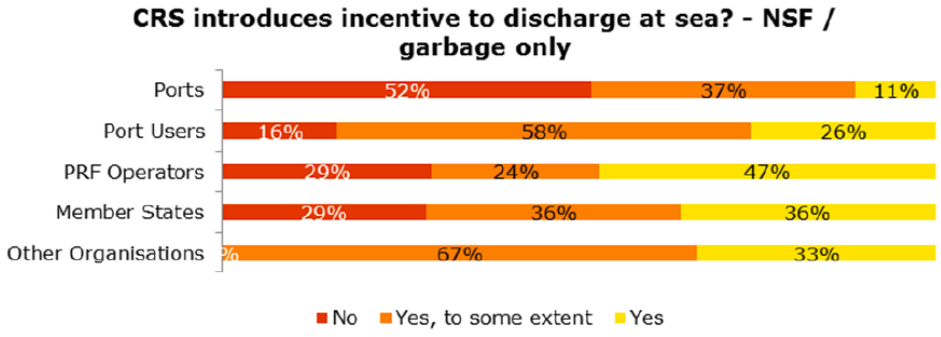


Figure 12: Incentives to discharge waste at sea in NSF for garbage only (source: Panteia/PwC)

132. Port users considered that incentives provided by an ADM system that only charges a fee for ships that do not deliver waste offers the least incentives to discharge at sea (see figure 13). This could be explained from the perspective of administrative burden. Instead of applying for a refund or a deposit after delivery of waste, the system would only target ships that do not deliver waste.

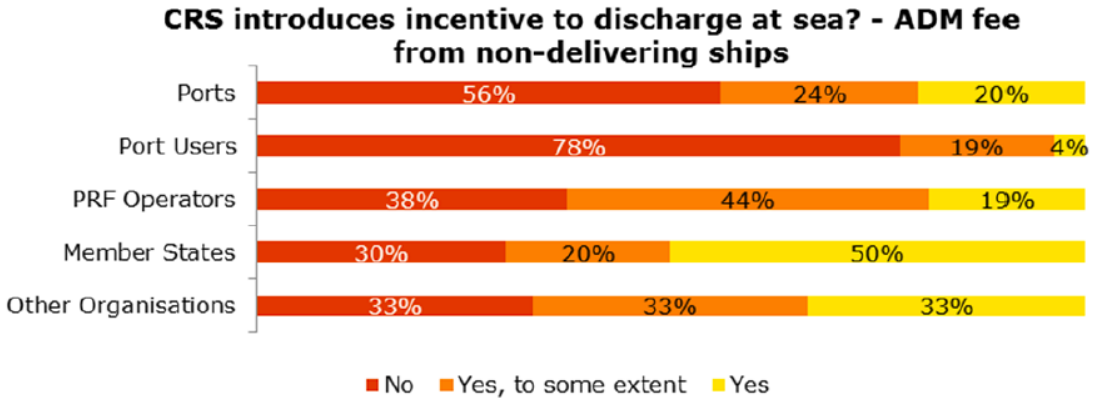


Figure 13: Incentives to discharge at sea in ADM system for non-delivering ships (source : Panteia/PwC)

Conclusion (source: Panteia/PwC):

- The collected data shows that **variations in waste delivery are influenced by the cost recovery systems** put in place by ports. Most ports introduced a cost recovery system in line with the requirements of the PRF Directive, but these have not introduced comparable incentives in the various ports/regions.

- **Higher volumes of waste are delivered in certain types of indirect fee systems, as compared to direct fee systems**. Also **within indirect fee systems substantial variation** in waste delivery trends was found. This shows the potential for using cost recovery systems to influence port users' incentives to deliver waste in port reception facilities.

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