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Guidance Document Regarding the use of Cost Recovery Systems for the Delivery of Waste from Ships

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This report is one of the knowledge products contributing to GloLitter Outcome 1: Global awareness of Sea Based sources of Marine Plastic Litter (SBMPL) expanded.

This report is based on work conducted by Mr. Peter van den Dries, under the technical supervision and coordination of the GloLitter Partnerships Project Coordination Unit.

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Abstract

Marine plastic litter is widely recognized as a threat to ocean health. Although it is generally assumed that most of the plastic waste entering the world's oceans comes from land-based sources, marine plastic litter (MPL) also results from sea-based activities such as fishing and shipping.

Therefore, the MARPOL Convention and its technical annexes contain provisions to regulate which types of waste from ships can (and cannot) be legally discharged into the sea. Although MARPOL does not contain an explicit requirement for ships to deliver the waste carried on board to a reception facility before leaving the port, due to these strict discharge requirements ship operators are implicitly forced to deliver, as a minimum, the waste that cannot be legally discharged at sea to a reception facility in port. MARPOL also requires party States to ensure the provision of adequate port reception facilities (PRFs). However, a substantial amount of waste from ships is still being discharged illegally at sea.

To encourage ships to deliver their onboard generated waste to a reception facility, ports often apply schemes with financial incentives for ships not to discharge their waste at sea. In general, these financial schemes apply the "polluter pays"* principle and aim to ensure that the costs of PRFs for the collection of garbage from ships are (fully or partially) covered by a fee paid by all ships calling at the port. The funds collected through these charging systems can then be used to maintain and operate the facilities, support waste management infrastructure, and encourage responsible waste disposal practices.

Although these cost recovery systems may involve fees or charges levied on ships using PRFs based on the amount and type of waste delivered, cost recovery systems often include an indirect element, where the ship pays a waste fee irrespective of the actual delivery of waste, which gives the ship a right of delivery for its garbage. This eliminates any financial incentive for ships to discharge their waste such as plastic and old fishing gear at sea. To take account of the differences between ships in terms of size, type of ship, on-board waste reduction, and the type of traffic the ship is engaged in, ports can differentiate the waste fee.

This Guidance Document describes the types of cost recovery systems for waste from ships that are currently applied in ports, and how they can consider the characteristics of merchant and cruise/passenger ports, fishing ports and recreational ports. This Guidance Document also provides an overview of the policy and regulatory framework regarding cost recovery systems, and the elements determining the cost of a PRF.

* The "polluter pays" principle means polluters pay for measures to prevent, control and remedy pollution and for the cost to society of pollution.

Abbreviations and acronyms

ALDFG	Abandoned, Lost, or otherwise Discarded Fishing Gear
EMSA	European Maritime Safety Agency
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GloLitter	GloLitter Partnerships
HME	Harmful to the Marine Environment
IMO	International Maritime Organization
ISO	International Organization for Standardization
MARPOL	International Convention for the Prevention of Pollution from Ships
MPL	Marine plastic litter
ODS	Ozone Depleting Substances
PRF	Port reception facilities
RAP	Regional Action Plan
REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea
SBMPL	Sea Based sources of Marine Plastic Litter
SSS	Short Sea Shipping
WRHP	Waste reception and handling plan

1 Introduction

1.1 GloLitter Partnerships Project

The GloLitter Partnerships Project (GloLitter, https://glolitter.imo.org) is funded by an initial contribution from the Government of Norway and implemented by the International Maritime Organization (IMO) in partnership with the Food and Agricultural Organization of the United Nations (FAO) and aims to reduce and prevent MPL originating from the shipping and fisheries sectors. This global project supports 30 developing countries in five regions (Africa, Asia, the Caribbean, Latin America and the Pacific) in identifying opportunities for the prevention and reduction of marine litter.

GloLitter achieves its objectives by focusing on several areas identified in the IMO *Action Plan to address marine plastic Litter from ships* (refer to resolution MEPC.310(73), and the FAO *Voluntary Guidelines on the Marking of Fishing Gear*. The project expands government and port management capacities, instigates legal, policy and institutional reforms at the national level in the GloLitter participating countries. It develops mechanisms for sustainability and enhances regional cooperation to support transition of maritime transport and fisheries sectors towards a low-plastics future.

This project spurs global efforts to demonstrate and test best practices to deal with MPL and enhances global knowledge management and information-sharing to support the objectives. The partnership is three-tiered involving global, regional and country-level partners, representing government, industry and non-governmental organizations.

1.2 Scope of this activity

The overall goal of GloLitter is to enable developing countries to effectively implement and enforce international regulatory frameworks as well as best practices for prevention, reduction and control of MPL, and in particular Sea Based Marine Plastic Litter (SBMPL) through capacity-building, policymaking, action planning, practical steps in reducing the dumping of fishing gear and legislative developments; all aimed at supporting international efforts in dealing with MPL.

The development of this Guidance Document regarding the use of cost recovery systems for the delivery of waste from ships followed a recommendation in the gap analysis developed within the context of GloLitter output 1.3 and fits within the framework of GloLitter outcome 1:

- knowledge products and capacity-building tools developed in support of wider capacity-building on the subject; and
- disseminated to expand global awareness and stakeholders' support in dealing with SBMPL.

This Guidance Document provides an overview of the relevant legal frameworks linked to the use of cost recovery systems, outlines the key elements of cost recovery systems, and provides recommendations for good practices in different types of ports and for different types of waste (including waste fishing gear).

1.3 Waste from ships as a source of marine litter

Even though it is generally assumed that most of the waste entering the world's oceans comes from land-based sources, there are clear indications that marine litter also results from sea-based activities, although this has not been specifically quantified on any scale, and its contribution to the global burden of plastic debris in the world's oceans is poorly understood.

According to the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) Working Group 43 on Sea-based sources of marine litter (GESAMP, 2021),[*] sea-based activities and industries contribute to the global burden of marine litter, and this warrants concern largely because synthetic materials

[*] http://www.gesamp.org/publications/sea-based-sources-of-marine-litter.

comprise significant portions and components of litter entering the world's oceans from sea-based and other maritime activities and sources.

Ships generate solid waste daily that may end up as marine litter, often containing cargo waste, operational wastes (from cargo stowage and handling), sewage, galley waste, domestic waste from crews and maintenance waste.

The shipping industry is also a source of microplastics, after routine cleaning of ship hulls, mishandling of cargo made of plastic items or accidental spills of industrial resin pellets. Microplastics are also generated from marine paints and antifouling coatings, from wastewater management and discharge systems (greywater, sewage), and transported through ballast waters (GESAMP, 2021).

Most traditional impacts of marine litter like entanglement and ingestion must be considered mainly as a consequence of general waste discarded overboard from ships, without specific impact in relation to their shipping origin.

Quantification of waste discharged at sea is difficult in the absence of directly available global data. However, a 2018 Impact Assessment* accompanying the proposal for the amendment of European Union (EU) Directive 2000/59/EC on PRFs for ship-generated waste and cargo residues estimated the amount of waste that is (potentially) discharged at sea by ships: although garbage delivered in EU ports has increased since the introduction of the EU PRF Directive, a significant delivery gap in waste remains, estimated between 60,000 tons and 300,000 tons, i.e. 7% to 34% of the total to be delivered annually.

While few detailed studies are available that quantify the amounts and types of plastic litter from shipping, 0.001% to 2% of cargo loads are lost annually. As well, 0.01 m^3 to 0.1 m^3 of operational waste and 0.003 m^3 to 0.015 m^3 of plastic and domestic wastes are generated per person per day (GESAMP, 2021).

1.4 Introduction to cost recovery systems

MARPOL contains provisions in order to regulate which types of waste from ships can (and as a consequence also which cannot) be legally discharged into the sea. Especially for garbage (MARPOL Annex V) these discharge criteria are very strict, and only a few types of garbage can, under specific conditions, be legally discharged at sea: food waste, certain types of cargo residues and cleaning agents, and animal carcasses.

Although MARPOL does not contain an explicit requirement for ships to deliver the waste carried on board to a reception facility before leaving the port, due to these strict discharge requirements ship operators are implicitly forced to deliver, as a minimum, the waste that cannot be legally discharged at sea to a reception facility in port. MARPOL also requires party States to ensure the provision of adequate PRFs.

However, as indicated in section 1.3 of this Guidance Document, a substantial amount of waste from ships is still being discharged illegally at sea.

In order to encourage ships to deliver their onboard generated waste to a reception facility, more and more ports apply schemes with financial incentives for ships not to discharge their waste at sea. In general, these financial schemes apply the "polluter pays"† principle and aim to ensure that the costs of PRFs for the collection of garbage from ships are (fully or partially) covered by a fee paid by all ships calling at the port. The funds collected through these charging systems can then be used to maintain and operate the facilities, support waste management infrastructure, and encourage responsible waste disposal practices.

Although these cost recovery systems may involve fees or charges levied on ships using PRFs based on the amount and type of waste delivered, cost recovery systems often include an indirect element, where the ship pays a waste fee irrespective of the actual delivery of waste and giving the ship a right of delivery for its garbage. This eliminates any financial incentive for ships to discharge their waste such as plastic and old fishing

* Impact Assessment, accompanying the Proposal for a Directive on port reception facilities for the delivery of waste from ships, (Ecorys/COWI), SWD(2018) 21 final.

† The "polluter pays" principle means polluters pay for measures to prevent, control and remedy pollution and for the cost to society of pollution.

gear at sea. To take account of the differences between ships in terms of size, type of ship, on-board waste reduction, and the type of traffic the ship is engaged in, ports can differentiate the waste fee.

While MARPOL does not explicitly mandate charging systems for waste collection, many countries and ports have implemented such systems as part of their efforts to ensure proper waste management and to cover the costs associated with waste reception, handling and disposal.

Due to the entry into force in 2002 of a specific Directive[*] on PRFs, ports in the EU have since then been required to implement a cost recovery system for the collection and treatment of waste from ships. A 2015 ex-post analysis[†] indicated that, although comparable statistical data was not always available and the delivery of waste is influenced by a multitude of factors, a general trend could be observed of increased volumes of waste delivered to ports with fee systems in line with the requirements of the PRF Directive.

In this Guidance Document regarding the use of cost recovery systems for the delivery of waste from ships the terminology "cost recovery system" and "fee system" are used interchangeably throughout the text. They both mean the same.

[*] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on PRF for ship-generated waste and cargo residues.

[†] *Ex-Post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (Panteia and PwC, 2015).

2 Cost recovery systems for waste from ships: international policy and legal frameworks

2.1 The IMO policy framework

2.1.1 *The MARPOL Convention*

The International Convention for the Prevention of Pollution from Ships (MARPOL), 1973, as modified by the 1978 and 1997 Protocols, is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. It was developed by IMO aimed at preserving 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.

Together with its six annexes covering pollution by oil (Annex I), chemicals (Annex II), harmful substances in packaged form (Annex III), sewage (Annex IV), garbage (Annex V) and air pollution (Annex VI), 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. In that respect it is also necessary to refer to the so-called "Special Areas"[*] where specific and more stringent discharge criteria on operational discharges apply.

MARPOL contains provisions to regulate the availability of adequate PRFs, 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 PRFs 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; and
- Regulation 17 of Annex VI.

In addition to the MARPOL Convention (including its Annexes), IMO has also adopted several guidelines related to the management of ship waste/residues, to provide additional tools and information to all stakeholders (private and public) and give overviews of good practices which could be used by governments when establishing 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); and
- 2016 IMO Manual *Port Reception Facilities* – How to do it.

[*] 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).

MARPOL does not contain any explicit requirements to the application of cost recovery systems for waste from ships. It should, however, be noted that several MARPOL-related guidelines and guidance documents developed and/or adopted by IMO refer to the application of financial schemes in order to incentivize the use of reception facilities and to avoid unreasonably high costs (see sections 2.1.2 to 2.1.4 of this Guidance Document).

2.1.2 *Relevant IMO guidelines*

The following IMO guidelines contain references to the possible impact of a cost element on PRFs:

Table 1: *IMO guidelines containing references to impact of cost elements on PRFs*

Guideline	IMO reference	Date	Relevant references
Guidelines for ensuring the adequacy of PRFs	Resolution MEPC.83(44)	13 March 2000	**5.2:** The mere provision of facilities, which are then not fully utilized, does not necessarily mean they are adequate. Poor location, complicated procedures, restricted availability and unreasonably high costs for the service provided, are all factors which may deter the use of reception facilities **5.9.5:** During the process of consultation, the port should consider some common elements. In summary, these might include ensuring that facilities do not cost so much to use as to present a disincentive to users **12.1:** Although no specific or generic system for charging is recommended, IMO has recently revised its Comprehensive Manual on Port Reception Facilities (chapter 11).* This contains several options which ports may wish to consider as a means of recovering the cost of providing adequate facilities. However, the cost should not discourage use of the facilities **13.2:** States Parties, by reaching consensus on a regional framework may bring about significant improvements to the region's marine environment. Such arrangements may also provide States with a basis for cooperation on enforcement and charging principles and the exchange of technical information
Guidelines for the implementation of MARPOL Annex V	Resolution MEPC.295(71)	7 July 2017	**6.1:** Recognizing that direct enforcement of MARPOL Annex V regulations, particularly at sea, is difficult to accomplish, governments are encouraged to consider not only restrictive and punitive measures consistent with international law, but also the removal of any disincentives, the creation of positive incentives and initiatives to facilitate more effective compliance, and the development of voluntary measures within the regulated community when developing programmes and domestic legislation to ensure compliance with the Annex **6.3.1:** The augmentation of PRFs 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 (…) tax incentives

* This Comprehensive Manual on Port Reception Facilities was updated in 2016, and the title was changed to Port Reception Facilities – How to do it. Also see section 2.1.4 of this Guidance Document.

Guideline	IMO reference	Date	Relevant references
Consolidated guidance for port reception facility providers and users	Circular MEPC.1/ Circ.834/Rev.1	1 March 2018	**53:** Although the port structure in a State Party may or may not accommodate cost/pricing schemes and/or other incentives for MARPOL wastes/residues delivery ashore, reception facility services should be provided at a reasonable cost. The *Guidelines for ensuring the adequacy of port waste reception facilities* (Resolution MEPC.83(44)) (section 3.2) define "adequate" facilities as those which "do not provide mariners with a disincentive to use them", and further stress that unreasonably high costs may deter use of PRFs (section 5.2).

In these guidelines several references are made to the application of charging systems, with the view to provide positive incentives for ships to make use of PRFs. Although "tax incentives" as mentioned in section 6.3 of the *guidelines for the implementation of MARPOL Annex V* 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 investments that may be necessary to establish reception facilities and the encouragement for port and terminal operators to evaluate means to lessen this impact in order to ensure that the garbage is disposed of properly at "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 PRFs over all ships calling the port, e.g. by applying a no-special-fee system.

It should be noted that the references to "reasonable" or "unreasonable" costs in several of the above guidelines can be interpreted in different ways. More context is given in section 3.3 of this Guidance Document.

2.1.3 *The IMO Strategy and Action Plan to Address Marine Plastic Litter from Ships*

On 26 November 2021, IMO adopted its *Strategy to address marine plastic litter from ships* (resolution MEPC.341(77)). The objective of this Strategy is to guide the implementation of the IMO *Action Plan to address marine plastic litter from ships* (resolution MEPC.310(73)), which was previously adopted on 26 October 2018, and to best achieve the outcomes of the IMO Action Plan by the establishment of a timeline and identification of appropriate modalities.

The main objective of the Action Plan is to contribute to the global solution for preventing MPL entering the oceans through ship-based activities, by providing IMO with a mechanism to identify specific outcomes, and actions to achieve these outcomes in a way that is meaningful and measurable. The Action Plan builds on existing policy and regulatory frameworks and identifies opportunities to enhance these frameworks and introduces new supporting measures to address the issue of MPL from ships.

The Action Plan also provides a list of priority actions. In the section on "Improvement of the effectiveness of port reception facilities and treatment in reducing marine plastic litter", measure 16 of the Action Plan includes:

> "Consider the development of tools to support the implementation of cost frameworks associated with port reception facilities, taking into account the need to not create disincentives for the use of port reception facilities, the potential benefits of cost incentives that provide no additional fees based on volume and identifying waste types that can be reduced, reused or recycled through schemes that identify waste revenue."

Although not legally binding, this measure in the Action Plan explicitly supports the development of cost recovery systems to incentivize the use of PRFs.

* Implying that the costs for the collection and treatment of the ship's waste should be borne by the port users, as opposed to any other stakeholder (e.g. society).

2.1.4 *Port Reception Facilities – How to do it*

This IMO manual provides practical information to governments and competent (port) authorities, in particular, those in developing countries, as well as the shipping industry, agencies and waste contractors seeking guidance when implementing MARPOL. It also provides guidance on how to deal with possible inadequacies, as, in order to comply fully with MARPOL, a party State should ensure the provision of adequate PRFs meeting the needs of ships using their ports, without causing undue delay to the ships.

Chapter 11 of this manual addresses the issue of funding mechanisms for the establishment and operations of PRFs and provides guidance regarding the selection of a fee system which is best suited to the port's conditions and traffic. According to the manual, such a system can be based on two principles:

- the "polluter pays" principle; and
- the "shared cost" system.

The polluter pays is a principle which implies that waste generators should pay for the collection, treatment, recycling and environmentally sound disposal of the waste they generate. Application of the polluter pays principle may require the implementation of a monitoring and control system to track the production, handling (including transport) and disposal of wastes and ensure compliance with the law.

According to the manual, a shared costs principle entails that all costs are shared by society, usually by allocation from governmental tax revenues. From a business economical point of view, this system is not a real cost recovery system. Also, specifically regarding the subject of wastes generated by ships, it can be questioned whether the use of taxpayers' money for the management of wastes generated by other stakeholders is an approach worth considering. Low-interest loans or tax credits to waste generators and PRFs could be used as an incentive to improve operations and stimulate waste minimization. However, it should be noted that this approach requires a monitoring and control system to ensure compliance.

In practice, a system which embodies the polluter pays principle will aim for 100% cost recovery. A combination of the two principles will result in a system with partial cost recovery as the costs are partially covered by the port and/or the government, either at the local or national level. A system which embodies the shared costs principle is actually a non-cost recovery system, but nonetheless, still a system to cover (some of) the costs of a PRF.

The IMO manual further addresses the following types of financial schemes:

- the direct fee system;
- the contract system;
- costs of disposal included in port dues;
- the fixed fee system;
- the combined system; and
- the free-of-charge system.

The first five systems are options for cost recovery; the last system is considered a non-cost recovery system.

2.2 Other policy and regulatory frameworks

2.2.1 *Directive (EU) 2019/883 on port reception facilities for the delivery of waste from ships*

2.2.1.1 *Introduction*

In 2000, the EU 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 PRFs 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 EU, 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.

However, Directive 2000/59/EC left substantial room for interpretation by the individual EU Member States: as a Directive is a legal act of the EU which requires EU Member States to achieve a particular result without dictating the means of achieving that result,* Directives leave EU Member States often with a certain amount of leeway as to the exact rules to be adopted. This was also the case for some of the key elements of Directive 2000/59/EC, including elements† that are related to the cost recovery systems. Therefore, a new Directive (EU) 2019/883 was adopted on 17 April 2019, which repeals Directive 2000/59/EC, and puts in place important regulatory changes.

Key requirements of Directive (EU) 2019/883 include:

- An obligation for EU Member States to ensure the availability of PRFs adequate to meet the needs of ships normally visiting the port, without causing undue delay.
- Ports must develop and implement a waste reception and handling plan (WRHP), 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.
- The master of a ship should complete a waste 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.
- Upon delivery, the PRF operator or the port authority is to issue a waste delivery receipt, the information of which needs to be electronically reported by the master of the ship.
- A mandatory delivery for all ship-generated waste. However, there is 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 EU Member States ensure that any ship may be subject to inspection. A risk-based approach is to be applied for inspections, based on information from the advance waste notification and waste receipt which are electronically reported and exchanged.

2.2.1.2 *Cost recovery systems in the EU Port Reception Facilities Directive*

In order to address the ambiguity of Directive 2000/59/EC towards some of the key elements related to cost recovery systems, and to achieve a higher level of harmonization, Directive (EU) 2019/883 provides additional clarification regarding cost recovery systems, such as:

- fishing vessels and recreational craft are no longer being exempt from the indirect fee system;
- elements that determine the "cost" of a PRF, such as the operational and administrative costs but also the net revenues from EPR‡ schemes and national/regional funding;
- more transparency in relation between the indirect fee and costs;
- more harmonized calculation method of significant contribution;
- indirect fee element to apply also to sewage (MARPOL Annex IV) and oily waste (MARPOL Annex I, other than cargo residues);
- mandatory application of the 100% indirect fee for garbage, including fishing gear and passively fished waste;

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

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

‡ Extended Producer Responsibility: these are policy tools that extend the producer's financial and/or operational responsibility for a product to include the management of the post-consumer stage, in order to help meet national recycling and recovery targets.

- the costs for the collection and treatment of passively fished waste shall be covered, where appropriate, by revenues generated by alternative financing systems, including waste management schemes and EU, national or regional funding; and
- the criteria regarding the "green ship" concept are to be further defined through an implementing act.

Directive (EU) 2019/883 requires the provision of a cost recovery system through its Article 8:

1 *Member States shall ensure that the costs of operating port reception facilities for the reception and treatment of waste from ships, other than cargo residues, are covered through the collection of a fee from ships. Those costs include the elements listed in Annex 4.*

2 *The cost recovery systems shall provide no incentive for ships to discharge their waste at sea. To this end, the Member States shall apply all of the following principles in the design and operation of the cost recovery systems:*

a) ships shall pay an indirect fee, irrespective of delivery of waste to a port reception facility;

b) the indirect fee shall cover:

i) the indirect administrative costs;

ii) a significant part of the direct operational costs, as determined in Annex 4, which shall represent at least 30 % of the total direct costs for actual delivery of the waste during the previous year, with the possibility of also taking into account costs related to the traffic volume expected for the coming year;

c) in order to provide for a maximum incentive for the delivery of MARPOL Annex V waste other than cargo residues, no direct fee shall be charged for such waste, in order to ensure a right of delivery without any additional charges based on the volume of waste delivered, except where the volume of waste delivered exceeds the maximum dedicated storage capacity mentioned in the form set out in Annex 2 to this Directive; passively fished waste shall be covered by this regime, including the right of delivery;

d) in order to avoid that the costs of collection and treatment of passively fished waste are borne exclusively by port users, Member States shall cover, where appropriate, those costs from the revenues generated by alternative financing systems, including by waste management schemes and by Union, national or regional funding available;

e) in order to encourage the delivery of residues from tank washing containing high-viscosity persistent floating substances, Member States may provide for appropriate financial incentives for their delivery;

f) the indirect fee shall not include the waste from exhaust gas cleaning systems, the costs of which shall be covered on the basis of the types and quantities of waste delivered.

3 *The part of the costs which is not covered by the indirect fee, if any, shall be covered on the basis of the types and quantities of waste actually delivered by the ship.*

4 *The fees may be differentiated on the following basis:*

a) the category, type and size of the ship;

b) the provision of services to ships outside normal operating hours in the port; or

c) the hazardous nature of the waste.

5 *The fees shall be reduced on the following basis:*

a) the type of trade the ship is engaged in, in particular when a ship is engaged in short sea shipping trade;

b) the ship's design, equipment and operation demonstrate that the ship produces reduced quantities of waste and manages its waste in a sustainable and environmentally sound manner.

By 28 June 2020, the Commission shall adopt implementing acts to define the criteria for determining that a ship meets the requirements stated in point (b) of the first subparagraph in relation to the ship's on-board waste management. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 20(2).

6 *In order to ensure that the fees are fair, transparent, easily identifiable, non-discriminatory, and that they 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 shall be made available in an official language of the Member State where the port is located and, where relevant, in a language that is internationally used to the port users in the waste reception and handling plan.*

7 *Member States shall ensure that monitoring data on the volume and quantity of passively fished waste are collected and shall report such monitoring data to the Commission.*

The Commission shall, on the basis of those monitoring data, publish a report by 31 December 2022 and every two years thereafter. The Commission shall adopt implementing acts to define monitoring data methodologies and the format for reporting. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 20(2).

Directive (EU) 2019/883 does not make a distinction between the types of ships, and fully incorporates requirements regarding cost recovery systems for merchant ships, passenger/cruise ships, fishing vessels as well as recreational craft.

Another important element is that for ship's garbage (MARPOL Annex V – waste, other than cargo residues) a 100% indirect fee system is required. In order to provide for a maximum incentive for the delivery of garbage, no direct fee shall be charged for such waste, in order to ensure a right of delivery without any additional charges based on the volume of waste delivered. The only exception is when the volume of waste delivered exceeds the maximum dedicated storage capacity, which is mentioned in the advance notification form: in that case, an additional direct fee can be charged in order to ensure that the costs related to receiving this exceptional amount of waste do not cause a disproportionate burden on a port's cost recovery system.

It can also be noted that cost recovery systems are not required to cover the collection and treatment of cargo residues. According to Article 8.1 of Directive (EU) 2019/883, which excludes cargo residues from the requirements of cost recovery systems, the cost for delivery of cargo residues is to be paid directly by the user of the reception facility. Also, for waste from exhaust gas cleaning systems (MARPOL Annex VI) a direct fee is to be applied.

2.2.2 *Regional Sea Conventions*

The Regional Sea Conventions engage neighbouring countries for the conservation of their common marine environment. Their work areas cover maritime activities, pressures resulting from them, as well as biodiversity and ecosystems protection. The Regional Sea Conventions implement coordinated monitoring programmes in the regional sea basins and perform joint assessments of the state of the environment.

Many regional seas commissions and/or their contracting parties have also developed various strategic documents addressing marine litter, with clear objectives and targets for their regions. Several of these marine litter action plans include measures, recommendations and/or references to the use of cost recovery systems for the collection and treatment of waste from ships.

Some examples:

Table 2: *Examples of fee systems in regional seas*

Area	Organization	Agreement	Measure
Baltic Sea	HELCOM Commission	Guidelines for the establishment of a "no-special-fee" system for the discharge of ship-generated oily wastes originating from machinery spaces to port reception facilities (1998)	Contracting Parties are recommended to apply the no-special-fee system, which is defined as a charging system where the cost of reception, handling and disposal of ship-generated wastes, originating from the normal operation of the ship, is included in the harbour fee or otherwise charged to the ship irrespective of whether wastes are delivered or not
Black Sea	Black Sea Commission	Black Sea Marine Litter Regional Action Plan (2018)	Contracting Parties undertake to explore and implement to the extent possible: charge reasonable costs for the use of port reception facilities or, when applicable apply the no-special-fee system, in consultation with competent international and regional organizations, when using PRFs
Mediterranean Sea	Barcelona Convention	Regional Plan on Marine Litter Management in the Mediterranean (2014)	Contracting Parties undertake to explore and implement to the extent possible the following measures by the year 2019: charge reasonable costs for the use of PRF or, when applicable, apply the no-special-fee system, in consultation with competent international and regional organisations, when using PRFs
North-East Atlantic	OSPAR	Second OSPAR Regional Action Plan on Marine Litter (2022–2030)	Harmonize practices related to the provision and use of PRFs, including the implementation of fee systems
Southeast Asia	ASEAN	ASEAN Regional Action Plan for Combating marine debris (2021–2025)	Support Member States with the proper implementation and adoption of the principles expressed in MARPOL Annex V with the preparation of best practices manual for reducing, separate collection and treatment of fisheries marine plastic, including description of direct and indirect fees charged by ports for waste management from ships

2.2.3 *The Basel Convention*

The 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (the Basel Convention) is an international treaty designed to reduce the movements of hazardous waste between nations, and specifically to prevent the transfer of hazardous waste from developed to less developed countries. The Convention is also intended to minimize the rate and toxicity of waste generated, to ensure environmentally sound management as close as possible to the source of generation, and to assist developing countries in environmentally sound management of hazardous and other waste generated.

In 2017, the Conference of the Parties to the Basel Convention adopted a 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. This guidance manual builds on the existing relevant technical guidelines and guidance documents developed under the Basel Convention and IMO.

The manual also contains a section on fee systems for ship-generated waste, where it is mentioned that in the interest of protecting the marine environment, cost recovery systems should encourage ships to deliver their waste to ports instead of discharging them into the sea. This can be facilitated by requiring ships to contribute significantly to the costs for the reception and management of ship-generated waste, irrespective of their use of the facilities.

2.2.4 *The G20 Action Plan on Marine Litter*

The Group of 20 (G20), is an intergovernmental forum comprising 19 sovereign countries,* the EU, and the African Union. It works to address major issues related to the global economy, such as international financial stability, climate change mitigation and sustainable development. During its summit in Hamburg in 2017, the G20 agreed on a "G20 Action Plan on Marine Litter". With this action plan, the G20 recognizes the urgent need for action to prevent and reduce marine litter in order to preserve human health and marine and coastal ecosystems and mitigate the economic costs and impacts of marine litter.

The G20 Action Plan identifies areas of prior concern and potential policy measures, such as the promotion of sustainable waste management:

a) Support integrated sustainable waste management including infrastructure (for collection and treatment).

b) Promote access to regular waste collection services and facilitate investments in waste management infrastructure in order to prevent waste leakage into the sea.

c) Where needed, integrate informal waste workers into modernized waste management systems in order to improve their working conditions and livelihoods.

d) Support international cooperation among the G20 and with other partners, for capacity development and infrastructure investments for improved waste management systems in coastal, urban and rural areas.

e) Establish adequate port reception facilities at ports and terminals in line with MARPOL requirements, in particular Annex V. Encourage port reception facilities to apply a reasonable cost or when applicable no-special-fee system for waste of sea-based sources.

f) Promote regulatory frameworks on environmentally sound management of waste in order to facilitate its implementation at local levels.

g) Secure cross-financing of waste management operational activities (e.g. through economic incentives, fees, charges, deposit funds or taxes).

h) Surmount barriers to financing waste management, e.g. by de-risking private waste management infrastructure investment in G20 Countries (cf. APEC model).

It can be noted that this G20 Action Plan emphasises that PRFs should apply a "reasonable cost" and encourages the use of a no-special-fee system for waste from sea-based sources. It also explicitly refers to the use of economic incentives, fees and charges in the context of waste management operational activities.

2.2.5 *The ISO Standard on arrangement and management of port waste reception facilities*

The International Organization for Standardization (ISO) is an independent, non-governmental international organization with a membership of 169 national standards bodies. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market-relevant international standards that support innovation and provide solutions to global challenges.

ISO has also developed a document (ISO Standard 16304) that provides a method for addressing ship-generated waste and cargo residues from when they are offloaded from the ship, to how they are managed ashore. The provision, operation and use of PRFs are inherently linked, so this document addresses the design of PRFs,

* Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, the United Kingdom and the United States.

and their operation and management. This document is designed to be used by ports and terminals with existing PRFs which aim to refine their systems; it can also be used by new ports and terminals that are developing PRFs.

The standard contains a section on cost recovery systems, providing specific information on the development and application of fee systems for the collection and treatment of waste from ships. According to this standard, the waste fee should be based on the following principles:

- the waste generator should pay for the provision and use of the PRF;
- the "not for profit" principle with respect to the service the port or terminal provides (i.e. costs for the disposal and the provision of the PRF should not be inflated by the port or terminal for profit);
- the fee should be fair, non-discriminatory and reflect the costs of the facilities and services provided;
- excessive fees will be a disincentive to use the PRF; and
- it should be transparent so that generators of the waste are aware of, and understand all, the components and methods for calculating fees.

The standard also provides an overview of types of fee systems, refers to the importance of transparency and making the information regarding the fee system available for the port users, and emphasizes the possible cost advantages of reuse, recovery and recycling.

3 Elements determining the cost of port reception facilities

3.1 The "cost" of adequate port reception facilities

A PRF can be defined as "any facility which is fixed, floating or mobile and capable of providing the service of receiving waste from ships".[*] In order to be adequate, the PRF should regard the operational needs of the users should be able to manage the types and quantities of wastes from ships normally visiting the port.[†] The adequacy relates to operational conditions on the one side, i.e. to meet the needs of ships normally visiting the ports and not to create obstacles to ships using the PRF, as well as the environmental management of the PRF. Inevitably, this comes with a cost. The total cost of providing and operating an adequate PRF is not only determined by the costs for the collection and treatment of the waste from the ship. Also, many other elements influence the total cost, such as the cost for personnel, administration, ICT, etc.

Ports organize and provide PRF services in several ways. Some ports provide all PRF services for ship-generated waste under their own control (when ports own the PRF infrastructure, but often waste contractors selected through a public tender procedure), while other ports provide full PRF services through waste contractors in an open market system. It is clear that the cost elements depend on the manner in which the PRF is operated and the degree of the port authorities' involvement (e.g. in some small ports, not all indirect administrative costs will be included in the cost recovery system). Furthermore, the costs are not the same in all ports, as direct costs in one port may be considered as indirect in other ports (temporary storage, loading/unloading, etc.).

When developing a cost recovery system for the collection and treatment of waste from ships, in general, the following types of costs are taken into account:

a) Direct costs, which are the operational costs arising from the actual delivery (collection, treatment and final disposal) of the ship-generated waste, including infrastructural costs (investments). These direct costs can originate from the waste operators or the port authority, depending on the local PRF arrangements.

b) Indirect costs, which relate to the administrative costs of the port arising from the management of information such as the advance waste notification, the development of the WRHP (including consultation, communication, licensing waste contractors, tendering procedures, etc.) and the cost recovery system itself (invoicing, reimbursements for waste operators, financial follow-up).

In addition, the costs of PRFs can also be influenced by possible revenues from selling the treated ship-generated waste, and/or recycling or reuse. Identifying these different cost elements facilitates clarifying the cost recovery system and will make them more transparent for port users.

The following sections provide an overview based on the different cost elements which have been identified in Annex 4 of Directive (EU) 2019/883. The combination of the direct and indirect cost elements together with the net revenues will result in the net total cost for the collection, storage, treatment and final disposal of the wastes from ships. It should be noted that the term "indirect cost" should not be confused with the term "indirect fee" which is also often used (as in sections 4 and 5 of this Guidance Document).

3.1.1 *Direct costs*

Direct costs are operational costs that arise from the actual delivery of waste from ships, including:

- the provision of PRF infrastructure, including skips, containers, tanks, processing tools, barges, trucks, waste reception, treatment installations;
- concessions due to site leasing, if applicable, or for leasing the equipment necessary for the operation of PRF;

[*] Article 2.6 of Directive (EU) 2019/883 on PRF for the delivery of waste from ships.

[†] IMO resolution MEPC.83(44) – *Guidelines for ensuring the adequacy of port waste reception facilities*.

- the actual operation of the PRF: collection of the wastes from the ship, transport of waste from the PRF for final treatment, maintenance and cleaning of PRF, costs for staff, including overtime, provision of electricity, waste analysis and insurance;
- pre-treatment of the ship-generated waste: preparing for re-use, recycling or disposal of the waste, including separate collection and/or additional segregation of the waste; and
- costs for administration: invoicing, issuing of waste receipts to the ship, reporting, etc.

Direct costs can be influenced by the availability of existing waste treatment infrastructure: ports that are in the vicinity of large industrial clusters may have better access to land-based waste treatment facilities (e.g. incineration plants and/or landfill sites), which may entail lower costs for the treatment of ship-generated waste because of larger volumes can be handled, and reduced transport costs.

3.1.2 *Indirect costs*

Indirect costs are administrative costs that arise from the management of the collection system for ship-generated waste in the port, including:

- development and approval of the port's waste management plan, including all (financial) audits of the plan and its implementation;
- updating the port's waste management plan, including labour costs and consultancy fees, where applicable;
- organizing the consultation procedures for the (re-)evaluation of the port's waste management plan;
- management of the advance waste notification and cost recovery systems, including the application of reduced fees for "green ships",* the provision of ICT systems at port level, statistical analysis and associated labour costs;
- organization of public procurement procedures for the provision of PRF, as well as the issuing of the necessary authorizations for the provision of PRF;
- communication of information to port users through the distribution of flyers, putting up signs and posters in the port, or publication of the information on the port's website, and electronic reporting of the information;
- management of waste management schemes, such as extended producer responsibility (EPR) schemes, recycling and application for and implementing of national/regional funds; and
- other administrative costs, such as monitoring exemptions (e.g. for ferries and other frequent callers) and electronic reporting of this information.

3.2 Revenues

Revenues are net proceeds from waste management schemes and national/regional funding available, including the following revenue elements:

- net financial benefits provided by EPR schemes;
- other net revenues from waste management such as recycling schemes; and
- other funding or subsidies available to ports for waste management and fisheries.

Net revenues not only depend on the availability of a market for the use of recycled waste or secondary materials (which can be stimulated and supported by a regulatory framework facilitating the circular economy), but also on the application of EPR schemes and national/international funding.

* Can be defined as ships where its design, equipment and operation demonstrate that the ship produces reduced quantities of waste, and manages its waste in a sustainable and environmentally sound manner.

3.3 The "reasonable cost" aspect

As mentioned in section 2.1.1 in this Guidance Document, MARPOL does not explicitly require the application of a cost recovery system. However, several IMO guidelines that facilitate the implementation of MARPOL refer to elements that improve delivery waste from ships to port reception facilities:

- *Guidelines for ensuring the adequacy of port reception facilities* (resolution MEPC.83(44)):
  - "unreasonably high costs for the service provided, are all factors which may deter the use of reception facilities" (section 5.2);
  - "ensure that facilities do not cost so much to use as to present a disincentive to user" (section 5.9.5);
  - "ports may wish to consider as a means of recovering the cost of providing adequate facilities" (section 12.1); and
  - "provide States with a basis for co-operation on enforcement and charging principles" (section 13.2).
- *Guidelines for the implementation of MARPOL Annex V* (resolution MEPC.295(71)):
  - "Governments are encouraged to evaluate means (…) 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 (…) tax incentives" (section 6.3.1).
- *Consolidated guidance for port reception facility providers and users* (Circular MEPC.1/Circ.834/Rev.1):
  - "reception facility services should be provided at a reasonable cost" (section 53).

What constitutes "reasonable" and "unreasonable" costs is an issue that is also mentioned in several of the Regional Seas Conventions' Action Plans on Marine Litter and is also included in the G20 Action Plan on Marine Litter. However, neither of these policy documents provide further guidance on what is to be understood under this "reasonable cost".

"Reasonable/unreasonable costs" as such, is a very subjective term, as there are many angles to it, for example:

a) It depends on the point of view: a cost that can be perceived as very "reasonable" for a port authority or a PRF, may be experienced as "unreasonable" for the ship owner, the ship operator or the agent.

b) Differing practices in the waste management industry may have an impact: e.g. implementation of higher standards for the recycling or treatment of certain types of waste can lead to higher costs, which in turn may change the perception of what is "reasonable" or not. In some countries, higher waste management standards may be the rule, leading to higher costs for the delivery of ship-generated waste in port. This may be perceived as "unreasonable" compared with lower standards in other ports/countries.

c) The number of ships calling and consequently also the amount of waste delivered can have an impact on the perception of "reasonable cost", even within the same port: in some countries, port terminals are also required to perform as a PRF for the ships calling the terminal. A terminal/PRF with a limited number of ships calling (that as a consequence deliver less waste) may have the same indirect (and partly also direct) costs as a terminal/PRF with many ships delivering. If a similar cost for the collection and treatment of ship-generated waste is to be covered by a waste fee from a limited number of ships, this waste fee will be higher which can be perceived as unreasonable.

As a consequence, it is impossible to put an absolute figure to "reasonable cost", not in monetary terms nor in terms of X% of the total cost for a ship to call a port.

There are, however, a few important elements for further consideration:

a) The cost for the delivery of the ship-generated waste to a PRF, in general, is only a fraction of the total cost for a ship calling the port (including pilots, tugboats, loading/unloading, port dues, etc.). Therefore, a division of the cost for PRFs over all the ships calling at the port/terminal, irrespective of whether they use the PRF or not (i.e. application of a fee system with an indirect fee, irrespective of delivery of waste to a PRF), will only have a minor impact on the total cost for the individual ship. Dividing the total cost for a PRF in a port over all the port users will reduce the cost for the individual ship and therefore will reduce the perception of "unreasonable".

b) In order to avoid discussions and misunderstandings on what is perceived as a "reasonable" cost or not, a key element is transparency. There are cases where the ship operator or agent does not have a good understanding of what is included in the payment of the waste fee: they are required to pay the fee, but then have no information regarding the consequences, e.g. they are not aware that payment of the fee gives them the right to deliver a certain amount of ship-generated waste without extra charges (no-special-fee system), or they do not know that there is a full or partial reimbursement for the cost when they deliver their waste to a PRF. Also, if there are other (direct) charges, this should be made transparent and well-communicated. It can be noted that Article 8.6 of Directive (EU) 2019/883 explicitly refers to the transparency issue, and that the fees and the basis on which they have been calculated are to be made available to the port users.

c) Maximum transparency regarding how the collected waste is treated is important: a better treatment level (e.g. reuse or recycling) may lead to a higher cost but this may be fully acceptable by the shipowner or operator and might therefore not necessarily be perceived as "unreasonable".

d) The collection and treatment of certain types of waste, e.g. hazardous waste, can entail higher costs, and can therefore lead to higher waste fees. This should also be properly communicated to the port users.

e) For specific types of traffic, such as Short Sea Shipping (SSS) or cruise vessels, a differentiated fee can be taken into consideration, where the specificities of the traffic can be fully addressed:

- In case of SSS, the ship makes relatively shorter voyages with frequent port calls, so in principle, there should be plenty of opportunities to deliver the ship's waste to a PRF. Also, when the voyage is shorter there is not much time to generate large amounts of waste, it is therefore acceptable that the ship carries small amounts of waste, and as a consequence is not requested to pay a "full" waste fee.
- Cruise vessels generate large amounts of garbage leading to higher costs for collection and treatment, which can be reflected in the waste fee.

f) In the case of "green ships" (where the ships' design, equipment and operation demonstrate that the ship produces reduced quantities of waste and manages its waste in a sustainable and environmentally sound manner) ports can install a rebate scheme.

4 Types and impact of cost recovery systems

4.1 The "polluter pays" principle

In 1972, the Organization for Economic Cooperation and Development introduced the polluter pays principle as a concept where the polluter is kept responsible for the pollution. The polluter pays principle imposes a liability on a person who pollutes the environment and is to compensate for the damage caused to human health or the environment. This principle is one of the main principles of environmental policy that guides sustainable development worldwide. Additionally, governments often use policy-based financial instruments built on this principle, such as an environmental tax.

Translated to waste management policy, the polluter pays principle can be referred to as a requirement that the costs of disposing of waste must be borne by the holder of waste, by previous holders or by the producers of the product from which the waste came. In other words: to make those who produce waste responsible for its recycling and disposal, including for the cost related to it. It seems fair that a polluter should pay for the environmental damage caused.

Application of the polluter pays principle to the issue of marine litter and waste generated by ships would mean that the cost for providing and using these facilities is recovered from ships through mechanisms such as port fees, waste disposal charges and service tariffs.

In the interest of protecting the environment, the fee system should encourage the delivery of ship-generated waste to ports instead of discharge into the sea. This can be facilitated by providing that all ships contribute to the costs for the reception and handling of waste from ships, so as to reduce the economic incentives to discharge into the sea.

If costs linked to the provision of adequate PRFs are limited to the direct cost for collection and treatment of the waste only, it would make sense that such a waste fee would also be based on the amount and type of waste offloaded at the port. In that case, a direct waste fee paid by the ships using the reception facility would be sufficient to cover the costs.

However, MARPOL requires party States to ensure the provision of adequate reception facilities in their ports meets the needs of the ships using these facilities. But it is not always possible to accurately assess the possible needs of the ships calling at ports: according to a European Maritime Safety Agency (EMSA)[*] study on the management of ship-generated waste onboard ships,[†] there are a variety of waste flows and onboard treatment methods for almost every type of ship-generated waste. The empirical evidence gathered in the study shows that ships use different onboard treatment methods and often treat only a part of a waste stream. This results in a difference between the amount of waste that is generated by the ship and the amount delivered to a PRF. Sometimes a ship does not even land any waste at all, e.g. when it has sufficient onboard storage capacity for the waste and decides to deliver the waste to the next port of call.

Still, MARPOL holds a requirement to provide adequate PRFs for the collection of waste from ships, even when it is not sure whether the ships calling at the port will actually use these facilities. As indicated in section 3.1 of this Guidance Document, this comes with a cost. Therefore, this overall cost for the provision of adequate reception facilities can be divided among all the port users, even among the ones that decide not to make use of the waste reception services, by implementing an indirect contribution that is to be paid by the ship irrespective of actual use of the facilities.

[*] 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 (https://www.emsa.europa.eu).

[†] The Management of Ship-Generated Waste On-board Ships, EMSA/OP/02/2016, CE Delft, 2017.

The incorporation of the polluter pays principle in cost recovery systems for ship waste collection, handling and treatment, is a crucial step toward achieving sustainable maritime practices. By aligning financial responsibility with environmental impact, this approach promotes accountability and encourages pollution prevention.

4.2 Scope of cost recovery systems

When developing a cost recovery system, it is important to ensure that it is as clear and transparent as possible, in order to avoid discussions afterwards. Therefore, one of the key elements of a cost recovery system is its scope. This can be defined in two ways:

- depending on the waste types; and
- depending on the ship type.

The application of a cost recovery system for waste from ships may also require the implementation of a monitoring and control system to track the information regarding the delivery and collection, handling (including transport) and downstream treatment of the wastes, and thus ensure compliance with the requirements to ensure their environmentally sound treatment.

4.2.1 *Waste types*

In general, cost recovery systems make a distinction between waste types that are generated by most types of vessels during their normal operations (e.g. garbage), and more specific waste types that are not commonly produced (e.g. cargo residues).

Two possible reasons for that are:

- For wastes that are commonly generated during the normal operations of a ship, the expected volumes are somewhat more straightforward to estimate (depending on the duration of the voyage, the number of crew/passengers, fuel consumption, etc.), which makes the planning of the necessary reception capacity less complex.
- As most vessels calling at a port are expected to have generated similar types of wastes (being the ones that are commonly generated during the normal operations of a ship), the expected volumes of waste eligible for delivery to a port reception facility will be bigger. As a result:
  - private contractors may see a business opportunity and be more interested to invest in waste reception and handling infrastructure, with higher standards and better service levels; and
  - adequacy of port reception facilities may be ensured more efficiently.

Examples of waste types that are in general included in cost recovery systems are:

Table 3*: Examples of waste types included in cost recovery systems*

MARPOL Annex I	– oily bilge water – oily residues (sludge) – used engine oil
MARPOL Annex V (garbage)	– plastics (category A) – food waste (category B) – domestic waste (paper, rags, glass bottles, metals, crockery, etc.) (category C) – cooking oil (category D) – incinerator ashes (category E) – operational waste (metal, steel, car tires, wood, expired pyrotechnics, oily rags, paint, glue, cans, batteries, ink cartridges, fire extinguishers, solvents, oily drums, coolants, propeller shaft grease, etc.) (category F) – E-waste (washing machines, electric stoves, laptops, printers, cameras, electric tools, etc.) (category I)

Although MARPOL Annex IV waste (sewage, including black and grey water) are commonly generated by each type of vessel, they are not always included in cost recovery systems: according to MARPOL, they can be legally discharged at sea, sewage is in general not always delivered to a PRF. Only in specific cases where the discharge criteria for sewage is strict (e.g. MARPOL Annex IV Special Areas, local discharge requirements for cruise ships), this type of waste is more generally delivered to PRFs thus can be included within the scope of the cost recovery system.

Examples of waste types that are in general outside the scope of cost recovery systems are:

Table 4*: Examples of waste types not included in cost recovery systems*

MARPOL Annex I	– oily tank washings (slops) – dirty ballast water – tanks scale and sludge from tank cleaning – other waste oils (e.g. off-spec fuels)
MARPOL Annex II	– cargo residues or washing waters containing all types of noxious liquid substances
MARPOL Annex IV	– sewage (except in case of specific discharge criteria)
MARPOL Annex V	– waste/residues from fumigation – washing waters/cargo residues (Harmful to the Marine Environment (HME) and non-HME)
MARPOL Annex VI	– ozone depleting substances (ODS) – exhaust gas cleaning residues

It should be noted that other wastes and residues from ships, such as ballast water sediments and residues from anti-fouling systems, can also be relevant when assessing the application of cost recovery systems for the use of PRFs. However, in general, these types of wastes are left outside the scope.

4.2.2 *Ship types*

In some cases, restrictions to which types of waste are covered by the cost recovery system can also be linked to specific types of ships: for example, the waste that is generated by fishing vessels differs both in amount and composition from the waste that is generated by a large cruise vessel. Therefore, cost recovery schemes are often tailor-made to apply only to ships normally calling at ports, and the key elements (indirect/direct fee, amount of the fee, timing for payment) may differ between merchant seaports, cruise/passenger ports, fishing ports and recreational ports. In cases where one port is called by commercial vessels, cruise/passenger ships, fishing vessels as well as recreational craft, the port authority can still decide to apply a different waste fee system depending on the type of vessel.

4.3 Types of cost recovery systems

Due to the extensive EU mandatory regulatory framework regarding the application of cost recovery systems for waste from ships, ports in the EU have been developing and implementing fee systems since the early 2000s. As a result, it will not come as a surprise that the majority of information, statistics and analysis on cost recovery systems comes from EU ports and institutions.

In 2010, EMSA performed a Horizontal Assessment on PRFs in EU ports. This assessment was based on the outcome of visits to 22 EU Member States made by EMSA in the period 2007–2010, to gauge the implementation of the PRF Directive 2000/59/EC, 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 even within) EU Member States. Notwithstanding the fact that many different variations of cost recovery systems were in place at the time, the systems could be categorized in three major groups:

– 100% indirect fee systems or no-special-fee systems (NSF): these charge ships a waste handling fee, irrespective of whether these ships make use of the facilities;

- administrative waste fee systems: 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; and
- direct fee-only systems: PRF users are charged based on the type and volume of waste delivered, without an additional standard/indirect fee.

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

A few other studies (all within the EU context) further build 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 port reception facilities for ship-generated waste and cargo residues* that was 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 PRF Directive 2000/59/EC; and
- the 2018 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.

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) analysed the different types of cost recovery systems implemented in EU ports and, slightly differing from the initial EMSA categorization in 2010, concluded that they can be categorized in three main groups:

- Indirect fee component: vessels pay a standard fee that is not directly related to the quantity of waste deposited. When this is the only element of the cost recovery system it is also known as the "no-special-fee" system.
- Direct fee component: the vessel is charged based on the quantity of waste received.
- Deposit refund or penalty component: where the vessel incurs an extra cost if it chooses not to dispose of any waste at the PRF. This is also known as the "administrative waste fee system".

In practice, these are combined to various extents to make up the actual cost recovery system used in the port, and a few more systems were described:

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

4.3.1 *Indirect cost recovery systems*

The main principle of an indirect cost recovery system is that a substantial part of the waste fee is indirect, meaning that this part of the waste fee is charged to each ship calling the port, irrespective of actual use of the port reception facilities.

* *Ex-post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues*, (Panteia/PwC, 2015).

If this indirect fee covers the full cost of the collection, handling, and treatment of all of the ship's waste, without limits to the amounts of waste landed, this is called a 100% indirect or no-special-fee system. In this system, no additional fee is charged in addition to the common waste fee, which the port authority charges to all ships. This waste fee then does not depend on the quantity of the delivered waste and is also charged if a vessel does not use the PRF 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.

Many ports are applying a variety of this indirect fee system, where they accept waste up to a certain (often described as "reasonable") amount, meaning that a specified amount of waste is covered by the common waste 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 the 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 types and volume of delivered quantities.

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 (e.g. in MARPOL Annex IV Special Areas).

Some ports have implemented a cost recovery system in which a 100% indirect fee is only charged for garbage. In these cases, the indirect fee covers all garbage reception costs, while all other costs are charged based on the volume of waste delivered.

In other ports, another distinction between waste types is applied and a separate fee system for different types of waste has been developed. For example, in some ports, the common indirect waste fee covers:

- MARPOL Annex I waste: a significant part of the direct costs for the collection, handling and treatment of certain types of oily waste (e.g. bilges and sludge) up to a certain amount. In case the ship delivers more than this amount, the cost for the extra waste is to be paid directly to the waste contractor.
- MARPOL Annex V waste: full coverage of the costs for the collection, handling and treatment of garbage.

In order to provide for a maximum incentive for the delivery of garbage (MARPOL Annex V, not being cargo residues), it should be noted that according to the PRF Directive (EU) 2019/883 volume limitations are no longer allowed for the delivery of garbage. The only exception allowed is where the volume of the garbage delivered exceeds the maximum dedicated storage capacity mentioned in the advance waste notification form (Annex 2 of Directive (EU) 2019/883).

4.3.2 *Direct cost recovery systems*

This system covers all waste reception costs with a fee that is directly related to the type and amount 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 types and volumes of waste delivered, it can be questioned whether these systems do provide sufficient incentives to deliver their waste in ports (reducing the economic incentive to discharge into the sea) and whether they properly address the "polluter pays" principle, as referred to in section 4.1 of this Guidance Document.

It can be noted that direct-only waste fee systems are not in line with Directive (EU) 2019/883, which requires that such incentives are in place. According to Directive (EU) 2019/883, direct fee systems can only be applied for cargo residues, washing waters and MARPOL Annex VI wastes (ODS and exhaust gas cleaning residues).

4.3.3 *Administrative waste fee systems*

Administrative waste fee systems generally consist of two separate parts, being:

- the common administrative fee or deposit; and
- a fee that is directly related to the types and volumes of waste delivered.

An important variation in how the administrative waste fee system can be found in ports is whether or not ships get a refund of their common administrative fee or deposit after delivering waste at a PRF. 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.

It should be noted that for EU ports Directive (EU) 2019/883 requires that this indirect fee covers the indirect administrative costs plus a significant part of the direct operational costs (30% of total direct costs for the actual delivery of the waste during the previous year).

Another cost recovery system type including an administrative fee that is applied in EU ports is the opposite fee system. In this case, all ships are charged a penalty fee unless they can submit proof of having discharged waste in an EU port. The penalty can be fixed, similar in magnitude and calculation to an indirect fee, or calculated in proportion to the likely waste generation, e.g. the estimated cost (or a certain percentage of that cost) for the amount of waste based on the journey time from the last port.

4.3.4 *Overview of cost recovery systems applied in EU ports*

In 2015, the *Ex-post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (Panteia/PwC) analysed the application of the type of cost recovery systems in EU ports, also considering that ports often use different cost recovery systems for different types of waste.

Overall, the evaluation indicated that most ports either apply a 100% indirect fee system (no-special-fee system) or an administrative fee system, with the indirect fee system being more commonly used than administrative fee systems. Within the ports using the indirect fee 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 (no-special-fee system, including unlimited use). Especially for garbage ports often use indirect systems, either through the no-special-fee system or some form of administrative 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.

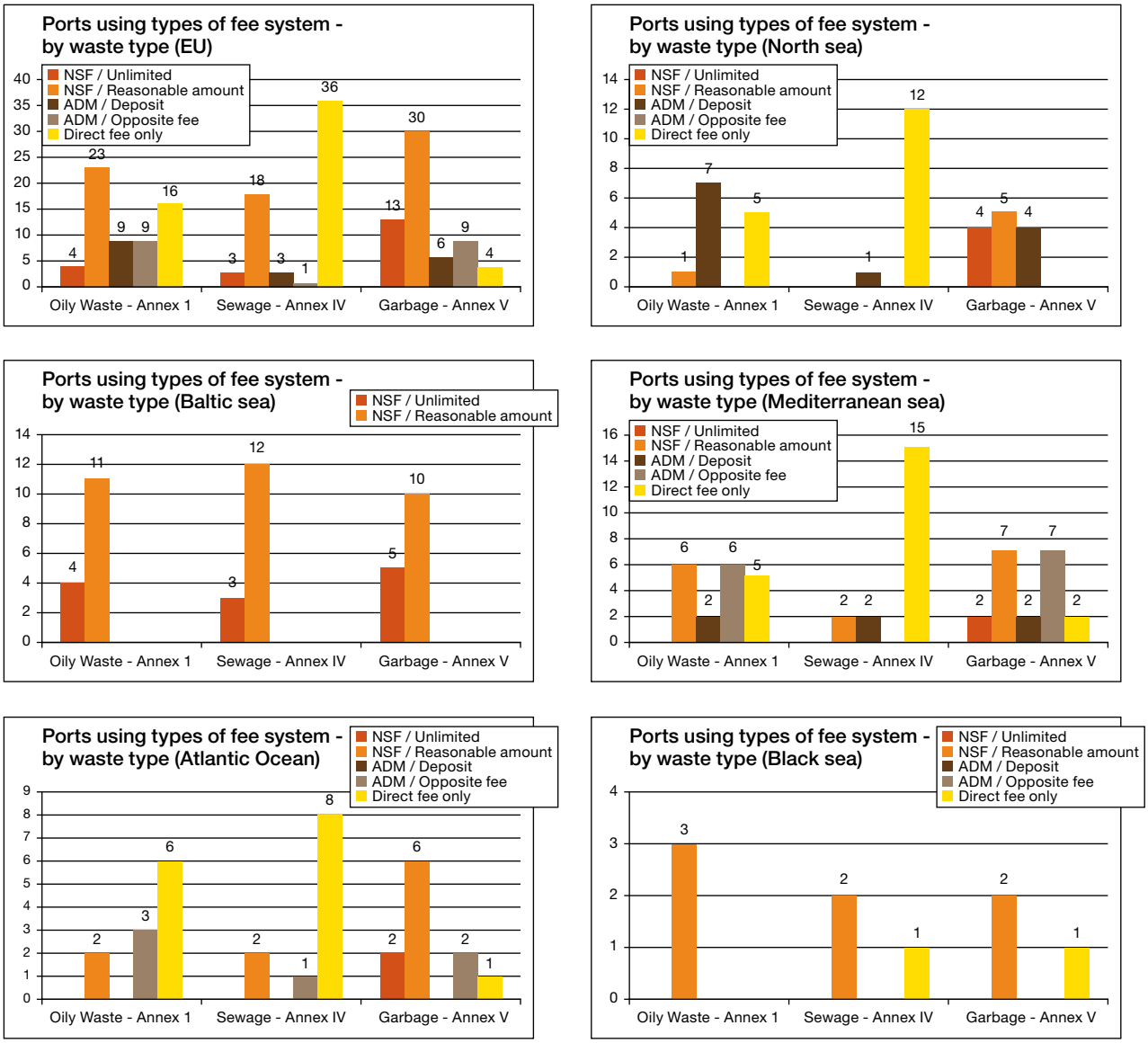

Figure 1: *Application of cost recovery systems in EU ports (source: Panteia/PwC)*

4.3.5 *Impact of cost recovery systems*

4.3.5.1 *Impact of cost recovery systems on the delivery of waste from ships*

The delivery of waste from ships depends on many different parameters, such as the availability and adequacy of reception facilities in ports, their service level, planning constraints, etc. Also, the type of waste can influence the ship's needs: vessels tend to dispose of garbage (MARPOL Annex V) in every port due to limits on storage space and to avoid unpleasant smells caused by storing it on board for too long.[*] For oily waste (MARPOL Annex I), this is somewhat different, as vessels tend to have relatively large storage capacity and therefore prefer to store the waste onboard and deliver a large quantity to a reception facility in one go. Still, it is recognized that cost recovery systems for the delivery of ship's waste to PRFs can influence the behaviour of how vessels handle their waste.[†]

Several studies have looked at waste delivery trends and the possible impact of fee systems on the delivery of ship-generated waste to PRFs:

a) The 2012 EMSA Horizontal Assessment identified a trend that indicated a general increase in delivered ship-generated waste between 2005 and 2008. Whether this increase can be fully or partially attributed to the instalment of fee systems in EU ports is difficult to say.

b) In 2012 the EMSA-commissioned *Study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports*[‡] concluded that for MARPOL Annex I and V wastes delivery trends show an increase up to 2008/09 and then a decrease and stabilization in 2010 (the increase from 2004 to 2008/09 was explained by the implementation of the PRF Directive, while the decrease after 2008/09 was explained by reduced port calls following the global economic crisis). In addition, the study concluded that it is difficult to say whether one fee system is better than the other, and the waste delivery data cannot document that one system should be more effective than another.

c) In 2015 the *Ex-post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues*[§] 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. From the data collected under 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.

Also, the *Study to support the development of measures to combat a range of marine litter sources* (Eunomia, 2016) looked in detail at the performance of cost recovery systems in EU ports. As this study aimed at assessing possible preventative measures regarding marine litter, the focus was on garbage (MARPOL Annex V) as this waste stream contains the greatest quantity of items that become marine debris if disposed of into the sea. Some of the results of this study were:

- A survey was conducted about the opinions from different stakeholder groups on the importance of different factors leading to the discharge of waste at sea: the results show that more port users thought that illegal waste discharge was due to PRF costs being too high than any other reason.
- When asked specifically about different types of cost recovery systems, around half of stakeholders thought that penalty systems and full deposit refund systems did not result in incentives to discharge at sea.

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[*] De Langen, P.W., and Nijdam, M.N. (2007) Charging systems for waste reception facilities in ports and the level playing field: a case from North-West Europe, Coastal Management, Vol. 36, No. 1, pp. 109–124.

[†] *Study to support the development of measures to combat a range of marine litter sources*, Report for the European Commission DG Environment (Eunomia, 2016).

[‡] *Study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports* EMSA/OP/06/2011, study developed by Ramboll, Jens Peter Ohlenschlager.

[§] 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 Directive 2000/59/EC.

- Opinions about 100% indirect fee systems were similarly favourable amongst stakeholders as a whole, where again around 50% thought that it did not result in incentives to discharge at sea. However, if the 100% indirect fee was applied to garbage alone, the proportion reduced to 30%. If port users alone were taken into account, this dropped further to 16%.
- Although this is a complex issue,[*] an important area to look into when attempting to determine the effect of cost recovery systems on marine litter are the data regarding waste delivery to port reception facilities:
  - One report[†] assembling waste delivery data, based on waste delivery receipts, tentatively concluded that waste delivery has on the whole tended to increase over the last decade or so, both in absolute terms, and when taking into account general trends in gross tonnage. This has been taken as reflecting favourably upon the implementation of the EU PRF Directive 2000/59/EC.
  - Another study[‡] found that irrespective of the type of CRS in place, in most ports where an incentive to discharge waste in the port was introduced "as determined by expert observation", an increased level of waste delivery was observed when compared to the situation prior to the Directive's implementation.

However, studies attempting to find correlations between types of cost recovery systems and delivery statistics have generally found it difficult to arrive at robust conclusions because:

- there are so many configurations of fee systems and a wide variety of these has been implemented in the ports;
- delivery of reliable data is poor;
- the time when ports implemented their fee systems varies and is generally not recorded; and
- the ports implementing certain cost recovery systems may also have other features affecting the types of ships calling and, consequently, also the waste delivery.

Still, removing a financial incentive to dump waste at sea by the implementation of cost recovery systems is an important step to reducing the amount of marine litter, and will lead to some vessels making more use of port reception facilities[§]. However, the financial incentive is not the only reason contributing to the decision to dispose of ship's waste into the sea. There may be many other possible reasons, such as:

- the processes for receiving waste are not always simple and expeditious, which may discourage ships from using the reception facilities;
- port reception facilities are not always adequate: they may not receive all types of waste, have insufficient capacity, and using them may be time-consuming; and
- during port operations, the crew may be too busy with other tasks, and there may be not sufficient staff to deliver the waste to the reception facility.

4.3.5.2 *Cost recovery systems and the ports' competitiveness*

A level playing field is considered of crucial importance for both the shipping sector and port sector. Fair competition requires equal application of regulations across these sectors. In this context, ports sometimes raise concerns regarding substantial differences in waste management practices and standards between ports, and the implementation of a cost recovery system for the collection, handling and treatment of waste from ships will lead to higher costs for their port users, making the port less competitive.

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[*] Taking into account the growth of the maritime sector (both gross tonnage and cargo handled), number of seafarers employed, etc.

[†] EMSA, and Ramboll (2012) *Study on the Delivery of Ship-Generated Waste and Cargo Residues to Port Reception Facilities in EU Ports*, August 2012.

[‡] EMSA (2005), Technical report evaluating the variety of cost recovery systems adopted in accordance with Article 8 of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues.

[§] *Study to support the development of measures to combat a range of marine litter sources* (Eunomia, 2016).

In that context, the following considerations can be made.

It is unlikely that waste fees significantly affect inter-port competition, as the cost for the delivery of the ship-generated waste to a port reception facility, in general, is only a fraction of the total cost for a ship calling the port (including pilots, tugboats, loading/unloading, port dues, etc.). As mentioned in section 3.3 of this Guidance Document, a division of the total cost for port reception facilities over all the ships calling the port/terminal, irrespective of whether they use the reception facility or not, will only have a minor impact on the total cost for an individual ship. Inter-port competition can be created, but only in the case when the cost recovery systems in competing ports contribute to very large differences in port dues, waste fees or other charges or to complex administrative matters for the ship owner.

However, some types of cost recovery systems can, when mandatorily implemented in a specific geographic area, distort the waste market at ports[*] as this can lead to:

- inconvenience for ports for whom this results in disproportionate waste burdens;
- difficulties for ports whose port reception facilities may no longer be economical owing to the lack of waste throughput; and
- impact upon the likelihood of discharge at sea either because of poorer port reception facilities in a certain port, or because ships can decide to keep up to the cheapest port with the risk of filling their maximum storage capacity and therefore may have no choice but to discharge it at sea.

Inter-port competition is also possible in other, more positive and service-oriented ways: ports could e.g. also compete in terms of services rendered or in terms of the environmental provisions like a port reception facility with good, fast service.

A cost recovery system for waste from ships will also provide the port authority with additional financial resources, which can be used to (fully or partially) cover certain costs, e.g. indirect administrative costs such as costs for the development of an IT-based monitoring and information system.

A key element when applying a cost recovery system is transparency regarding the waste fee and the type of costs covered by these fees, so that port users understand what they are paying for as well as the basic cost calculation. This is expected to provide for a better level playing field for both ports and port users, where these actors compete on the basis of equal and fair conditions.[†]

[*] *Study to support the development of measures to combat a range of marine litter sources* (Eunomia, 2016).

[†] Impact Assessment, accompanying the Proposal for a Directive on port reception facilities for the delivery of waste from ships, (Ecorys/COWI), SWD(2018) 21 final.

5 Considerations regarding the use of cost recovery systems in different types of ports

5.1 General considerations

When incentivizing the delivery of waste from ships to a port reception facility many different elements are to be considered, such as:

- availability and accessibility of the port reception facility;
- adequacy of the reception facility, including price and service level;
- size of the port;
- types of traffic, including seasonal traffic;
- volumes of waste normally delivered by the ships; and
- downstream waste management and recycling options.

Still, the implementation of a cost recovery system used in a port for the collection, management and treatment of waste from ships may influence the behaviour of vessels, and potentially reduce the amount of waste dumped at sea, by removing the financial incentive to dump waste at sea created by waste reception fees by decoupling these fees from the quantity of waste received.

The *Study to support the development of measures to combat a range of marine litter sources* (Eunomia, 2016) considered some of the factors that affect the relative attractiveness of cost recovery systems:

- Although it was concluded that according to the polluter pays principle, port users should foot the bill for waste management as opposed to any other stakeholder, rather than payments should be in proportion to the amount of waste disposed of, systems that satisfy this latter interpretation are likely to be viewed as fairer by ports/port users. Systems adhering to the broader interpretation of the polluter pays principle may also be perceived as more attractive because they mean lower fees for users with smaller amounts of waste. Allocating fees according to some vessel criteria related to waste volumes may help to alleviate some of these concerns. However, the volume of waste is likely to depend on various factors such as ship size, operations (fishing, shipping, cruise, etc.), crew numbers, and fuel type, and this will vary for different waste streams.
- Lack of transparency about how port fees are calculated has been cited as a concern for port users.
- High upfront costs may be perceived negatively, even if they make little or no difference to overall costs.
- Some stakeholders find positive incentives for “good” behaviour more acceptable than negative incentives for “bad” behaviour.
- Harmonising systems whether between waste streams or between ports may counterbalance user reservations regarding particular cost recovery systems, because of the time savings due to increased transparency and more standardized administrative processes.
- Environmental outcomes themselves may influence relative attractiveness, and the extent to which they do will be dependent on the particular stakeholder, and some stakeholders may prioritize environmental over economic concerns.

Although several types of cost recovery systems have already been developed and some are even applied regionally on a harmonized basis,* a port can still design a tailor-made cost recovery system that perfectly fits its own characteristics. Also, the type of traffic will largely influence the cost recovery system: a fishing port, with recurrent ship calls by the same fishing vessels, may need a different approach with more financial flexibility within the fee system aiming at other waste types than a large merchant seaport.

Still, when developing a cost recovery system, regardless for which type of port, the following general considerations should be taken into account:

- Polluter pays principle: although there can be specific exceptions (e.g. for passively fished waste), the cost for providing and using port reception facilities is to be recovered from ships through mechanisms such as port fees, waste disposal charges and service tariffs.
- The cost recovery system employed should recognise the preferred delivery frequency for different waste types, and not unfairly disrupt responsible waste management procedures of compliant vessels. For example, incentivising the delivery of oily waste at every port call may not be practical or desirable, and schemes such as deposits and penalties may not be suitable.
- Transparency: each port user should have a good understanding of which services are included in the waste fee. As they are required to pay the fee, port users should be aware of what that payment gives them in return (the right to deliver a certain amount of waste without extra charges, or a full/partial reimbursement for the cost when they deliver their waste to a reception facility, etc.).
- In order not to include a disincentive for ships for using the port reception facilities, charges for using these facilities should be fair and non-discriminatory.
- The proper consultation of the port's stakeholders is one of the key success factors when implementing any scheme for the management of waste from ships. A constructive dialogue between the port authority and its relevant stakeholders is considered to be crucial for a proper functioning of the system, not only for establishing adequate reception facilities but also when developing and implementing a cost recovery scheme.
- Scope: it is important to ensure that this is as clear and transparent as possible, in order to avoid discussions afterwards.
- Providing schemes that reward best practice, such as a "green ships scheme", could help to alleviate concerns around fairness and the polluter pays principle.

The application of a cost recovery system for waste from ships may also require the implementation of a monitoring and control system to track the information regarding the delivery and collection, handling, and downstream treatment of the wastes, and thus ensure compliance with the requirements to ensure their environmentally sound treatment. The cost for developing such a monitoring system may be covered (fully or partially) by an indirect cost recovery scheme.

5.2 Considerations regarding cost recovery systems in merchant seaports

Cost recovery systems in merchant seaports often make a distinction between the type of waste delivered from the ship.

Oily wastes (MARPOL Annex I)

Liquid oily wastes such as sludge and oily bilge water can be stored onboard relatively easily in designated holding tanks. As the storage capacity of these tanks can be quite large, ships can sail long distances before the holding tanks are full and delivery to a port reception facility is necessary. Ships therefore prefer to store the waste on board and deliver this type of waste in a large quantity to a reception facility in one go. When the ship is equipped with bilge water separation technology (e.g. oil-water separator), which can reduce the quantity of bilge water by 65% to 85%, the time for delivery to a reception facility can even be prolonged.

* Especially in EU ports, due to the requirements of the Directive (EU) 2019/883 on PRF.

Delivery of oily wastes requires designated equipment (tanks and piping) and substantial pumping capacity. As the delivery of oily bilge water and/or sludge therefore can take some time, ship operators will not be keen on delivering small amounts in every single port of call, but only:

- when the remaining storage tanks' capacity is limited in order to cover the amount of oily waste that will be generated during the following voyage; or
- when state-of-the-art service levels for collection can be provided by a reception facility in a specific port.

In some areas, oily waste has a commercial value. Therefore, it is typically kept on board in order to deliver it to a reception facility in a port where market conditions are most favourable (relating to oil prices, demand for oily waste, etc.).

Therefore, cost recovery systems for oily waste (bilges, sludge) in general are based on an administrative fee system, containing a fixed indirect fee supplemented with a refundable (deposit) part depending on the amount of waste delivered, or a penalty (in case of no delivery).

Cargo residues (MARPOL Annexes I, II and V)

Not every ship generates cargo residues or washing waters containing remnants of cargo: in principle, only bulk (dry and liquid) ships can generate cargo residues or washing water containing cargo residues. Therefore, it does not seem fair to apply an indirect cost recovery system for this type of waste, distributing the cost for collection and treatment over all port users (also the ones that do not generate cargo residues).

Cargo residues also include the remnants of noxious liquid cargo after cleaning operations to which the discharge norms of MARPOL apply, and which under certain conditions, as set out in the MARPOL Annexes, do not need to be delivered in port to avoid unnecessary operational costs for ships and congestion in ports.

The cost for the collection and treatment of cargo residues is in general covered by a direct fee to be paid by the user of the reception facility, depending on the amount and type of waste delivered.

Sewage (MARPOL Annex IV)

Sewage is not always delivered to a reception facility. Most merchant ships have sewage holding tanks, which cover the necessary capacity for the retention of all sewage generated during the operation of the ship, taking into account the number of persons onboard. Depending on the storage capacity of these tanks, it might not always be necessary for the ship to deliver sewage to a port reception facility.

Some ships are equipped with type-approved sewage treatment plants. In those cases, ships are only required to deliver the generated effluent when the ship is in port (where ships are often prohibited to discharge), as while it is on the route all sewage (when it is well treated) can be continuously legally discharged at sea. Therefore, not every ship delivers sewage to a port reception facility, and yearly volumes of sewage delivered in a port can be limited.

Therefore, the delivery of sewage is not often incentivized by the application of a cost recovery system. However, ports located within a MARPOL Annex IV Special Area or in areas with strict discharge criteria may apply an indirect cost recovery system including the delivery of unlimited or reasonable amounts.[*]

Garbage (MARPOL Annex V)

The generation of garbage is directly linked with the amount of people onboard a ship: as every ship has crew and/or passengers on board, every ship generates garbage.

Garbage, especially when contaminated with galley waste and food packaging, can also be quite smelly. As it is not allowed to discharge any garbage at sea (except for food waste, under specific conditions), for hygienic reasons the ship's crew, in general, is not very keen on storing the garbage onboard the ship and are therefore happy to deliver the garbage when calling at a port, especially after long travels.

[*] With "reasonable amounts" it is meant that a specified amount of waste (threshold level) is covered by the common waste handling fee charged to all ships.

Although appendix II to MARPOL Annex V identifies different categories of garbage* to be grouped in the Garbage Record Book, it does not explicitly require the onboard segregation of these waste types. In addition, MARPOL Annex V does not require to separate hazardous garbage from non-hazardous garbage. As a consequence, the cost for collection and treatment of mixed garbage is not only determined by the volume of the garbage delivered, but also by the amount of hazardous wastes (as the cost for handling and treatment of this type of waste can be significantly higher).

Although it is generally perceived that the 100% indirect fee system for garbage, apart from being transparent and relatively simple to manage, has the advantage of providing a significant incentive not to discharge garbage at sea, it is sometimes mentioned that this system does not provide a clear incentive for ships to reduce waste generation on board. This can be addressed by introducing reduced waste fees for ships generating less amounts of waste ("green ships").

In general, ports apply an indirect cost recovery system for garbage (MARPOL Annex V, not being cargo residues), either through a no-special-fee (100% indirect) or some form of administrative system. Some ports tend to set maximum limits to the amount of waste covered by the waste fee and use a "reasonable amount" more often than the 100% system (unlimited use).

Scrubber waste (MARPOL Annex VI)

MARPOL Annex VI covers waste from exhaust gas cleaning systems (scrubber sludge) and ODS. As ODS are mainly handled through repair yards, they are not included in fee systems.

As MARPOL Annex VI does not require the use of scrubbers, not every ship is equipped with them. Also, only exhaust gas cleaning systems that operate in a closed-loop mode generate residues (open-loop scrubbers discharge their residue directly into the sea).

And although it is expected that there will be a growth of this type of waste in the future, scrubber sludge is currently generated in limited volumes only, due to the fact that the number of ships with onboard scrubbers is still relatively small.

Therefore, similar to cargo residues, the cost for the collection and treatment of scrubber residues is in general covered by a direct fee to be paid by the user of the reception facility, depending on the amount of waste delivered.

5.3 Considerations regarding cost recovery systems in cruise/passenger ports

The waste types generated by cruise and passenger vessels in general are similar to the ones generated by merchant vessels. Apart from the fact that cruise and passenger ships do not generate cargo residues, the main differences are:

- Cruise/passenger vessels generate larger amounts of garbage, including substantial amounts of food waste and hazardous wastes. This may impact the cost of collection and treatment.
- Modern cruise vessels are equipped with several onboard waste (pre-)treatment systems, such as glass crushers, compactors, incinerators, etc. These types of vessels will also be able to segregate garbage into different types, facilitating recycling and reuse.
- Most cruise ships are equipped with type-approved sewage treatment systems: as a consequence, these ships are only required to deliver the generated effluent when the ship is in port (where ships are often prohibited to discharge), as while it is on the route all sewage treatment effluent can be continuously legally discharged at sea.
- Cruise and passenger ports are often heavily affected by seasonal traffic (many ships in high season), which will lead to higher volumes of sewage and garbage delivered to the reception facilities.

* Plastics (category A), Food wastes (B), Domestic wastes (C), Cooking oil (D), Incinerator ashes (E), Operational wastes (F), Animal carcasses (G), Fishing gear (H) and E-waste (I).

– In general, both cruise and passenger vessels operate in a scheduled traffic scheme, based on a planned list of times of departures and arrivals between identified ports or recurrent crossings. As a result, most cruise line operators will optimize the delivery of the ship's waste, with delivery of certain types of waste depending on availability and adequacy (also taking into account waste charges and service levels) in designated ports along the ship's route.

In general, cruise and passenger ports also apply an indirect cost recovery system for garbage, either through a no-special-fee (100% indirect) or some form of administrative system. Due to the large amounts of garbage cruise/passenger vessels can generate, some cruise/passenger ports tend to set maximum limits to the amount of waste covered by the waste fee and apply a "reasonable amount" more often than the 100% system (unlimited use).

For oily wastes, the cost recovery systems in passenger/cruise ports in general are based on an administrative fee system, containing a fixed indirect fee supplemented with a refundable (deposit) part depending on the amount of waste delivered.

When cruise ships have arranged the delivery of their waste in designated ports, the other ports along the ship's route (the ones that do not receive any waste) may apply a reduced fee or exemption scheme for these vessels.

5.4 Considerations regarding cost recovery systems in fishing ports

Waste generated from the normal operation of fishing vessels, as well as mismanaged fishing gears themselves, can also contribute towards the problem of marine debris, particularly through Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG), which is understood to have a considerable impact on marine species. Therefore, the focus for cost recovery systems in fishing ports should be on incentivizing the delivery to port reception facilities of waste fishing gear,* and waste that is unintentionally caught during fishing operations (which is often referred to as "passively fished waste").

In general, fishing vessels tend to call at their home port, often linked to the fish auction, on a daily, weekly, or other recurrent structural basis. In these cases of fishing vessels regularly calling at their home port, the cost recovery system can be organized in a more flexible way, with an indirect fee including a right to deliver waste over a longer period (e.g. a subscription system where an indirect waste fee is paid once that includes a right to deliver all waste during a period of a month/six months/one year). However, large fishing vessels can also leave their home port for longer periods and deliver their fish to other ports. In those ports the fee system may be organized in similar fashion to fee systems employed in merchant seaports, which charge vessels an indirect waste fee for garbage, including waste fishing gear, when calling the port.

As fishing vessels in general use gasoil as a fuel, they do not generate sludge. Therefore, the collection of oily waste will be limited to bilges and waste oil, and there may not be a need to include these types of waste in an indirect fee system.

The situation is somewhat different for passively fished waste:†

– Litter retention projects‡ facilitate vessels to store this unintentionally caught litter on board and return it to shore to be properly processed. Projects typically provide fishers with large bags that can be used to store the litter "caught" and recovered during fishing activities onboard before being brought to shore for further handling and treatment.

* Waste fishing gear can include both "end-of-life fishing gear", which includes fishing gear that is at its end of life and will no longer be used, such as damaged or worn out gears and/or gear components, as well as recovered ALDFG.

† Passively fished waste: waste collected in nets during fishing operations (Mannaart and Bentley, 2022).

‡ An example is the "Fishing For Litter" scheme (https://fishingforlitter.org/).

– As the passively fished waste can be comprised of any type of marine litter, there is no direct link with waste generated by fishing vessels (as sources of marine litter are diverse, and often not even sea-based*). By removing marine litter from the sea and bringing it to shoreside facilities, fishers are literally cleaning the seas. Therefore, it seems rather problematic to apply the "polluter pays" principle to passively fished wastes delivered by vessels, and it would be unfair to charge the fishing vessels bringing this passively fished waste to a reception facility with a direct waste fee.

An option to remove the disincentive to deliver passively fished waste created by a direct waste fee is to require the provision of reception facilities (where available) for this waste at no additional cost to the vessel. The port reception facility could then be funded by adding a small fee onto other port costs, such as the fee system for other waste types, or to fund the collection of passively fished waste by governmental agencies. This can also be subsidized on a national or sub-national level.

It should be noted that it can be difficult to distinguish between passively fished waste and end-of-life fishing gear generated by the fishing vessels; therefore, the system may be potentially susceptible to exploitation for free disposal of end-of-life fishing gear.

5.5 Considerations regarding cost recovery systems in recreational ports

In general, the majority of waste delivered in recreational ports is garbage, very much comparable to household waste. As yachts use lighter fuels such as diesel, these types of ships do not generate sludge. Also, bilge water is generated in limited amounts, depending on the size of the ship. Liquid waste such as oily bilge water can be stored onboard in tanks. Delivery to a reception facility will depend on the storage capacity of these tanks. Also, the delivery of residues from the boat's sanitation system, including chemical toilets, will depend on onboard storage capacity.

Therefore, a suitable cost recovery system may be a 100% indirect system (no-special-fee) providing a right to deliver all garbage. For club members, this can be organized on a yearly basis (subscription scheme), while for visitors calling at the marina only for short periods, this can be organized on a daily or weekly basis.

The collection of bilges, oily waste and sanitary waste can be covered by an administrative fee system, supplemented with a direct fee, depending on the type and volume of waste delivered.

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