Ex-Post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues

Final Report

EUROPEAN COMMISSION

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LIST OF ABBREVIATIONS

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ADM	Administrative waste fee/contribution systems
CR	Cargo Residue
ECJ	European Court of Justice
ECC	European Cruise Council
ECSA	European Community Ship-owner Association
EGCS	Exhaust gas cleaning systems
EMSA	European Maritime Safety Agency
EQ	Evaluation question
ESPO	European Sea Ports Organisation
EU	European Union
GES	good environmental status
GISIS	Global Integrated Shipping Information System
IMO	International Maritime Organization
IR	Interim Report
ISO	International Organization for Standardization
MARPOL	MARPOL Convention
MEPC	Marine Environment Protection Committee
MOU	Memorandum of Understanding
MSFD	Marine Strategy Framework Directive
NSF	No special fee systems
PRF	Port reception facilities
PSC	Port State Control
SECAs	Sulphur Emission Control Areas
SGW	Ship-generated Waste
TBD	To be determined
ToR	Terms of Reference
WFD	Waste Framework Directive
WMP	Waste management plan
WRH	Waste reception and handling plan

EXECUTIVE SUMMARY

This Report presents the results of the ex-post evaluation of *Directive 2000/59/EC on Port Reception Facilities for Ship-generated Waste and Cargo Residues* (PRF Directive). The evaluation was commissioned by Directorate-General for Mobility and Transport (DG MOVE) and was undertaken by a consortium of Panteia and PWC. The ex-post evaluation presents a critical judgement of the five evaluation criteria addressed by the evaluation, i.e. relevance, effectiveness, efficiency, EU added value and coherence.

Background

Directive 2000/59/EC on Port Reception Facilities for Ship-generated Waste and Cargo Residues, hereafter referred to as the 'PRF Directive', aligns EU law with the obligations of the International Convention for the Prevention of Pollution from Ships (MARPOL) to ensure effective implementation and enforcement. MARPOL requires its Contracting Parties to provide for port reception facilities for ship-generated waste and cargo residues that are not allowed to be discharged into the sea. Those facilities must be adequate to meet the needs of ships using the port, without causing undue delay.

In addition, the PRF Directive imposes more specific obligations on relevant stakeholders by introducing the following key elements and requirements:

- Waste reception and handling plans in ports;
- Waste notification by ships before entry into port;
- Mandatory delivery of ship-generated waste;
- Payment of fees by ships for the reception of their ship-generated waste;
- An exemption system for ships engaged in scheduled traffic with frequent and regular port calls;
- Inspections to verify that ships comply with the delivery requirements;
- Development of an information and monitoring system.

These key elements seek to ensure that EU ports provide for adequate port reception facilities, as established by the waste reception and handling (WRH) plans, and to ensure that all ships deliver their ship-generated waste and cargo residues in the reception facilities in the ports, through mandatory delivery and an appropriate cost recovery system. The reporting of information on (intended) waste delivery from the ship to the ports is a key element for ensuring effective operations and planning. For this, the PRF Directive requires the use of a notification form, identifying the ship-generated waste and cargo residues to be delivered and/or remaining on board. To further safeguard the smooth operation of maritime transport and avoid undue burden on ships that are engaged in scheduled traffic with regular port calls, these ships may be exempted from the requirements under certain conditions. The PRF Directive also provides for a monitoring and enforcement system, largely based on inspections. The establishment of an information and monitoring system should contribute to the identification of ships, which have not delivered their ship-generated waste and cargo residues.

Evaluation objectives and methods

The general objective of the study is to provide the European Commission with an evaluation of the PRF Directive, covering its implementation and the effectiveness of its mechanisms. The evaluation should point out problem areas with respect to meeting the objectives of the PRF Directive, which could be addressed in a possible review of the PRF Directive.

The evaluation approach is based on a thorough review of existing studies, evaluations and other documents and a stakeholder consultation process, which consisted of an online survey to stakeholder groups and additional targeted interviews. The evaluation of

the findings obtained through these various sources is carried out based on the principle of triangulation.

Results of the evaluation: Relevance of the PRF Directive

The PRF Directive introduces relevant policy measures in relation to its objectives. It requires Member States to provide adequate port reception facilities, which is a prerequisite for reducing discharges at sea. The principle of mandatory delivery requires that all ships deliver all their waste in port reception facilities, unless a ship has sufficient space to store it until the next port of call. The combination of hard measures (enforcement) and soft measures (providing incentives) contained in the PRF Directive is relevant to impact the behaviour of port users in favour of the environmental objectives set by the EU.

The maritime transport sector contributes substantially to the presence of oily waste, sewage and garbage in the marine environment. In view of their harmful effects on the marine environment, the mandatory delivery principle is relevant for these types of waste. This contributes to meeting the objectives of improving the protection of the marine environment and reducing the number of discharges at sea.

Through the principle of mandatory delivery, the PRF Directive aims to ensure that ships leaving European ports have only minimal volumes of waste on-board for disposal in the port of delivery. To subsequently minimise the risk that ships discharge at sea *before* calling at their next port, the PRF Directive requires the provision of adequate port reception facilities. As such, these requirements strengthen each other in contributing to the shared objectives of reducing discharges at sea and improving the protection of the marine environment.

Results of the evaluation: Effectiveness of the PRF Directive

The PRF Directive has contributed to higher volumes of garbage (MARPOL Annex V) delivered to EU ports since the implementation of the PRF Directive. Volumes of sewage delivery (MARPOL Annex IV) to port reception facilities have been relatively stable, and overall a negative trend was found for oily waste (MARPOL Annex I) delivered to ports. At the same time the estimated discharges of oily waste at sea have gone down considerably. The increased volumes of garbage delivered to ports indicate a positive effect of the PRF Directive on its objective to reduce discharges at sea. For the other waste types (oily waste and sewage) such a conclusion cannot be drawn based on the delivered volumes to ports.

The collected data shows that variations in waste delivery are partly influenced by the cost recovery systems put in place by ports. Most ports introduced a cost recovery system in line with the requirements of the PRF Directive, but these systems have not introduced comparable incentives in the various ports/regions. Higher volumes of waste are delivered in certain types of indirect fee systems, as compared to direct fee systems. This finding is in line with the philosophy of the PRF Directive, which does not allow ports to charge waste fees fully related to the volumes delivered (direct fee), as this gives port users an incentive to discharge their waste at sea. Also within indirect fee systems substantial variation in waste delivery trends was found. It is noted that the large variety of cost recovery systems found across the various Member States complicates transparency for port users. Due to different ways in calculating the fee for waste disposal, port users often do not know in advance the price they will pay. This has contributed to the overall idea among port users that port reception facilities are too expensive.

The large variety of cost recovery systems found across the EU is also illustrative for the differences in interpretation of the PRF Directive by individual Member States, which is not only the case for cost recovery systems, but also for other provisions of the PRF Directive. This to some extent limits the effectiveness of the PRF Directive.

This evaluation shows that in general the adequacy of port reception facilities has improved, waste management practices in ports have improved due the introduction of regularly updated WRH plans, and effective operations and planning are in place under the provisions of the PRF Directive. Whereas all these aspects contribute to the policy objectives of the PRF Directive at EU level, there are substantial differences between ports and regions, particularly with regard to implementation of the various cost recovery systems, exemption regimes and application of the mandatory delivery principle. These differences created limitations to the overall effectiveness of the PRF Directive in view of its objectives. It is therefore concluded that the PRF Directive has been partially effective in achieving its policy objectives.

Results of the evaluation: Efficiency of the PRF Directive

Although the benefits of the PRF Directive are clear, all waste that is not discharged at sea can be considered a direct benefit to society, quantification of the benefit is a challenge. We have estimated the annual benefits of 'not discharging garbage waste at sea' at 297.0 million EURO. Including other waste types (i.e. sewage and oily waste) would substantially increase this benefit. Comparing these benefits to the estimated annual costs related to the PRF Directive of 226.0 million EURO shows that the benefits largely outweigh the costs. Included in these costs is an estimated administrative burden of 85.7 million EURO, which consists in particular of the substantial administrative burden on port users to fill in advance notification forms.

Even though the costs associated with the PRF Directive are clearly outweighed by the benefits, these costs are not always efficiently achieved. The collection of necessary information to report to the next port the estimate volumes of waste delivery is a substantial burden on port users. Despite its potential use, ports and inspection authorities make insufficient use of the information contained in the advance notification forms, which raises legitimate questions on the proportionality of this measure. The upcoming implementation (June 2015) of mandatory reporting through the National Single Window has the potential to reduce this administrative burden, while also improving the possibilities for using and exchanging the information between competent authorities. Another cost that was mentioned by stakeholders is the requirement to develop WRH plans. This continues to be perceived as an issue by particularly smaller ports.

Results of the evaluation: EU Added Value of the PRF Directive

The theoretical EU added value of the PRF Directive is apparent. It offers the possibility to enforce the requirements of MARPOL at the EU level, while further developing the ambitions of reducing discharges at sea. Whereas the restrictions on discharges at sea would also be in place without the PRF Directive (under MARPOL), the PRF Directive creates added value in creating common provisions to ports and their Member States in response to the MARPOL requirements. These provisions have the ambition not only of banning illegal discharges at sea, but also of reducing operational discharges at sea. This is done through implementing and enforcing the common provisions put forward in the PRF Directive, and through the regular exchange of good practices.

In practice, however, Member States have interpreted various elements proposed by the framework of the PRF Directive in different ways. The principle of mandatory delivery, the requirements on cost recovery systems and the provisions for inspections have not been developed in a harmonised way. This does not only limit the overall effectiveness of the PRF Directive as already established above, but also restricts the EU added value that could have been reached with a common approach. Overall, it is therefore concluded that the PRF Directive offers EU added value, but has not been able to develop this to its full potential.

Results of the evaluation: Coherence of the PRF Directive

Overall, the PRF Directive complements the provisions of the Directive on ship-source pollution (Directive 2005/35/EC), despite some differences in overall scope. The PRF Directive is roughly coherent with the objectives set by environmental legislation, such as the Marine Strategy Framework Directive (MSFD - Directive 2008/56/EC) and the Waste Framework Directive (WFD - Directive 2008/98/EC). Though coherent with their wider objectives, a number of incoherencies exist with the more specific provisions of these Directives. The PRF Directive specifically states that the treatment, recovery or disposal of waste should be in line with the (legal predecessors of the) WFD. Under the WFD however, Member States have considerable discretion to organise the waste collection on their territory as deemed appropriate. As a result, the rules for receiving and handling ship-generated waste and cargo residues vary per municipality or region, including provisions for recycling of waste. In view of recent developments towards more environmentally sustainable practices on-board, this multitude of approaches have caused inefficiencies in the collection, handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues in port reception facilities. Inconsistencies were also found for waste categorisations between on-board and land-based waste. The background of the PRF Directive as part of the EU transport acquis, and its link to the MARPOL Convention are the reasons that the PRF Directive builds on a different set of key terms and definitions than the WFD, but also than the MSFD, which are partially incoherent and overlapping with terms used for types of waste. These differences in definitions, however, do not prevent the PRF Directive to provide a coherent overall contribution to the objectives of the various Directives.

A more specific coherence issue that was found is the relation with the Directive on Sulphur content of marine fuels. This Directive assigns the PRF Directive a role in ensuring that adequate facilities exist that are capable to meet the waste discharge needs of ships using exhaust gas cleaning systems. As of yet, however, the PRF Directive does not include this specific waste type (MARPOL Annex VI) and therefore cannot perform this supportive function.

As required by the Reporting Formalities Directive (Directive 2010/65/EC), mandatory reporting into SafeSeaNet through the National Single Window is being implemented and should be operational by June 2015. This rationalisation of reporting formalities for port users into the National Single Window has been the driving force to consolidate the various forms used for advance notification, based on different definitions into one waste message. This ensures on the short-term coherency between these Directives. However, the existing inconsistency between the PRF Directive and the revised waste type definitions of the MARPOL annexes are insufficient to ensure adequate reporting on the longer term however.

Despite the fact that the PRF Directive contributes to the same objectives as the Directives above, due to incoherencies in terms of specific provisions, and for instance the conflicting use of key definitions, which affect the practical implementation of the PRF Directive, it is concluded that the PRF Directive is only partially coherent with EU legislation.

Conclusions

The evaluation of the PRF Directive concludes that the approach of the PRF Directive has been relevant to its objective and has been partially effective, efficient and coherent. It also has clear EU added value but does not reach its full potential in this respect. To conclude the main findings of the evaluation, issues were identified that could be addressed in a possible review of the PRF Directive. These 'problems and challenges' have been identified for each of the PRF Directive's key elements and are summarised below:

- The **adequacy of port reception facilities** has been improved with the introduction of the PRF Directive. These are a prerequisite for increasing the delivery of waste onshore and reducing discharges at sea. However, adequate facilities alone are not sufficient to achieve a zero-waste objective in maritime transport.
- Not all port authorities keep track of the **volumes of waste delivered** to their port over time. Ports that collect this information do so on the basis of their own data needs, using their own units of measurement, which complicates monitoring progress to the objectives of the PRF Directive.
- Port users are insufficiently consulted in the **development of waste reception and handling plans**, which is a key reason for ongoing inadequacies in port reception facilities, particularly where the lack of segregation procedures in the collection of solid waste is mentioned.
- Waste reception and handling plans developed by ports and approved by the relevant (local) authorities do not always sufficiently take into account **the waste hierarchy** presented by the Waste Framework Directive, which leads to inefficiencies at the ship-port interface.
- A large variety of **cost recovery systems** has been implemented to charge port users for the delivery of waste to port reception facilities, which has not contributed to transparency in waste fees charged to port users.
- Due to the fact that the prescribed **advance notification form** is not in line with the IMO Guidelines and Circulars, different notification forms are in use in ports across the EU.
- Different procedures are employed to evaluate **exemption requests** across the EU, which may increase the administrative burden on port users, while limiting the potential for relevant authorities in different Member States to cooperate.
- The costs for stakeholders to comply with the PRF Directive (including administrative burden) are outweighed by the benefits. However, the **non-transparent nature of fees** charged to port users reduces support and commitment from this crucial stakeholder group.
- The limited use of the information from the **advance notification forms for enforcement purposes** renders its administrative burden on port users inefficient and disproportionate.
- A low number of **PRF inspections** have been conducted, mainly due to legal uncertainty created by contradictions between the minimum requirements in the PSC and PRF Directives.
- Despite reducing some of the differences in approaches of Member States with ports in the various sea basins, there are still **substantial differences between the various ports and Member States** in **interpretation and implementation of key elements of the PRF Directive**; particularly for the mandatory delivery principle, elements in cost recovery systems and enforcement provisions. These different applications have limited the EU added value of the PRF Directive in practice.
- The increased use of scrubbers to reduce air pollution in line with the Sulphur Directive necessitates adequate discharge of this waste to port reception facilities. However, **MARPOL Annex VI waste** is currently not covered by the PRF Directive.
- The differences in implementation of the PRF Directive in terms of **waste handling** show that the EU waste requirement 'to efficiently collect, handle, re-use, recycle and sustainable dispose' ship-generated waste and cargo residues are not always followed.
- The information that will be exchanged with relevant authorities through SafeSeaNet does not include the **most relevant information for enforcement**, as the data is based on rough estimates, rather than actual waste deliveries.

PART I – INTRODUCTION, CONTEXT AND METHODOLOGY

1. INTRODUCTION

1.1. Background

This Final Report is part of the study mandated by the European Commission on the *ex-post evaluation of Directive 2000/59/EC on Port Reception Facilities for Ship-generated Waste and Cargo Residues*[1].

The general objective of this study is to provide the Commission with an evaluation of the PRF Directive, covering its implementation and the effectiveness of its mechanisms. The evaluation identifies problem areas with respect to achieving the objectives of the PRF Directive, which could be addressed in a possible review of the PRF Directive.

1.2. Objective of this report

The objective of this report is to present findings from the project. This includes a critical judgement of the five evaluation criteria addressed by the evaluation, i.e. relevance, effectiveness, efficiency, EU added value and coherence. For these five evaluation criteria, a total of 17 evaluation questions were defined. Evaluation criteria and questions are presented in Section 3.2. This Final Report also provides a description of the methodology followed by an assessment of the limitations of the approach taken and the data used.

1.3. Contents of this report

This report contains three parts, namely introduction, context and methodology section (Part I); analysis (Part II); and conclusions and recommendations (Part III). Part I contains the following chapters: Introduction (Chapter 1); Context (Chapter 2) and Methodology (Chapter 3). Part II represents the backbone of this report and contains the responses to the evaluation questions posed. The research has been grouped per evaluation criterion: Relevance (Chapter 4); Effectiveness (Chapter 5); Efficiency (Chapter 6); EU added value (Chapter 7); and Coherence (Chapter 8). Part III presents the Conclusions (Chapter 9) and Recommendations (Chapter 10).

Further background information is presented in the annexes.

[1] Directive 2000/59/EC on Port Reception Facilities for Ship-generated Waste and Cargo Residues will hereafter be referred to as the PRF Directive.

2. CONTEXT

This chapter provides the contextual background to the PRF Directive. It provides information relevant to this evaluation and contributes to better understanding of the analysis and results of the evaluation.

Information is provided on the MARPOL Convention (Section 2.2) because MARPOL presents the basis for the PRF Directive. This is followed by an explanation of the relationship between the PRF Directive and the MARPOL Convention (Section 2.3). The link between the PRF Directive and other relevant EU legislation, including environmental legislation, is explored in Section 2.4. Finally, Regional Agreements for cooperation on the protection of the marine environment are presented (Section 2.5).

2.1. The International Convention for the Prevention of Pollution from Ships - MARPOL 73/78

The MARPOL Convention, as established by the International Maritime Organisation (IMO), imposes numerous operational and technical requirements on ships to prevent pollution of the sea. For operational pollution resulting from the ship operations (routine operations), the MARPOL Convention prohibits discharges into the sea except under very strict conditions (when the impact on the environment will be negligible). Therefore, ship-generated waste resulting from normal ship operations that cannot be discharged into the sea is kept on board and discharged in adequate port reception facilities.

The control and/or prohibition of discharges into the sea of oil, noxious and liquid substances in bulk, harmful substances carried in packaged forms, sewage, garbage, ozone-depleting substances, and exhaust gas cleaning residues are regulated under the following six annexes:

- Annex I: oil (oil from machinery spaces, oily residues from cargo areas)
- Annex II: noxious liquid substances in bulk
- Annex III: harmful substances carried in packaged form
- Annex IV : sewage
- Annex V: garbage
- Annex VI: ozone depleting substances and exhaust gas cleaning residues

Except for Annex III waste, all other waste types require adequate port reception facilities that meet the needs of the ships using ports to discharge ship-generated waste and cargo residues. Parties to MARPOL as port states are required to take measures to ensure the provision of adequate port reception facilities. They are required to take actions to ensure that ships calling at their ports comply with MARPOL requirements. Annex VI is currently not covered under the PRF Directive and no specific reference is made in the PRF Directive to Annex II waste. However, insofar as Annex II waste can be classified as cargo residues, it is covered under the PRF Directive. The definition of cargo residues in Article 2(d) and Article 10 of the PRF Directive is interpreted by Member States as cargo residues under Annex I and Annex II.

To protect vulnerable marine environments against the effects of discharges at sea, MARPOL Annexes I, IV, V and VI have established special areas where more stringent discharge requirements apply. Under Annex I, all European seas have been marked as a special area. Due to the different environmental status of each sea, for the other MARPOL annexes some seas are a special area, whereas others are not. Only the Baltic Sea has been assigned the status of special area in all presented MARPOL annexes. Table 1 presents these special areas, which border EU Member States, in relation to the waste types defined by MARPOL annexes.

Table 1 Special areas and related PFR annexes

Special areas	Annex I	Annex IV	Annex V	Annex VI
Baltic Sea	X	X[2]	X	X
North West European Waters	X			
North Sea	X		X	X
Mediterranean Sea	X		X	
Black Sea	X		X	

To reduce and eliminate pollution from ships, the provision of adequate port reception facilities is a prerequisite. MARPOL does not set prescriptive standards for port reception facilities other than requiring that these be 'adequate'. However, through the Marine Environment Protection Committee (MEPC), IMO has adopted a number of guidance documents (resolutions, circulars, guidelines, codes, manuals). These guidance documents assist parties to MARPOL in fulfilling their obligations and in implementing the convention's requirements on the provision of adequate port reception facilities.

Since 2000, extensive regulatory and technical developments have taken place in the IMO. All MARPOL annexes were revised taking into account the lessons learned and recent technological developments. Thus the annexes reflect changes in the general approach on preventing pollution of the marine environment and atmosphere from shipping. Numerous guidelines have been adopted to assist countries in implementing the newly revised annexes.

2.2. Directive 2000/59/EC – the PRF Directive

The European Parliament and the Council emphasise that pollution of the seas can be reduced through compliance with international conventions, codes, and resolutions. Nevertheless, the European Parliament and the Council have expressed concern about implementation and enforcement of the MARPOL Convention. Furthermore, the Parliament and the Council consider that protection of the marine environment could be enhanced by reducing discharges of ship-generated waste and cargo residues into the sea. This could be achieved by improving the availability and use of port reception facilities and by improving the enforcement regimes in place.

Consequently, action at EU level was considered to be the most effective way of ensuring common environmental standards for ships and ports throughout the EU, because all Member States are parties to MARPOL. Thus, the PRF Directive was introduced as the legal instrument. This reaffirmed the Member States' obligations under MARPOL and formulated the explicit objective to reduce the discharges of ship-generated waste and cargo residues into the sea. The PRF Directive also provided a framework for the Member States' uniform and compulsory application of environmental standards (in line with IMO recommendations included in MEPC resolutions, codes and manuals), while leaving each Member State the right to decide on the specific implementation tools.

[2] The special area status of the Baltic Sea under Annex IV is not in force yet pending the decision of the MEPC on an effective date following the receipt of sufficient information from the Baltic States.

The PRF Directive imposed compulsory measures on Member States that go beyond the scope of the MARPOL Convention. These compulsory measures apply to all ships and all EU ports, and relate to:

- Development of **waste reception and handling plans** (Article 5). A waste reception and handling plan shall be developed and implemented for each port following consultations with relevant parties. Detailed requirements are set out in Annex I to the PRF Directive.
- **Compulsory prior notification** (Article 6). At least 24 hours prior to arrival, the master of a ship must complete the form, as presented in Annex II of the PRF Directive.
- **Mandatory delivery of all ship-generated waste** (Article 7), which extends to MARPOL Annexes I (oil from machinery spaces), IV (sewage) and V (garbage), including exceptions and exemptions.
- Principle of **fees for ship-generated waste** (Article 8).
  - The costs of port reception facilities for ship-generated waste, including waste treatment and disposal, shall be covered through the collection of fees from ships.
  - The fees shall not provide incentives for ships to discharge waste into the sea.
  - The fees shall be fair, transparent, non-discriminatory, and reflect the costs of the facilities and services made available.
- **Exemption system** for ships engaged in scheduled traffic with frequent and regular port calls, which enables these ships to be exempted from the obligations under Article 6, 7(1) and 8.
- Provisions for **inspections**, to verify that ships comply with the delivery requirements (Article 11).
- Development of an **information and monitoring** system (Article 12(3)), which should improve the identification of ships that do not deliver ship-generated waste or cargo residues in line with the PRF Directive, and to monitor reduction of discharges at sea.

In addition, the PRF Directive contains provisions for its implementation and enforcement, including inspection of ships and penalties for infringements. To this extent, the PRF Directive allows use of the inspection regime introduced under the EU Directive on Port State Control (PSC). This makes the PRF Directive a key component in the overall regulatory regime for preventing and controlling pollution of the seas from ship-generated waste and cargo residues. The PRF Directive is an impetus to EU Member States to fulfil their obligations under the MARPOL Convention, by harmonising implementation of measures to be taken. With the possibility to use the enforcement option under the Port State Control regime, the PRF Directive also enables action against illegal discharges and non-compliance with MARPOL requirements, further strengthening the framework for regional cooperation.

2.3. Relationship between the PRF Directive and other EU legislation

The PRF Directive is an integral part of the EU maritime transport policy and seeks to protect the marine environment. The PRF Directive is related directly or indirectly to a wider body of European maritime and environmental legislation.

Specific references are made in the PRF Directive to:

- The polluter pays principle, requesting that the cost of port reception facilities be covered by ships;
- The Directive on Port State Control in the framework of which the inspection of ships may be undertaken and which refers to the PRF Directive on exchange of information and cooperation;

- The Waste Framework Directive (2008/98/EC). The PRF Directive states that the reception, collection, storage, treatment and disposal of ship-generated waste and cargo residues shall be carried out in accordance with the Waste Directives.

In addition to these Directives the PRF Directive also contributes to achieving the objectives of a wider body of EU legislation. The EU legislation listed below specifically refers to the PRF Directive as a possible instrument to contribute to their objectives:

- The Reporting Formalities Directive (2010/65/EC) aims to rationalise the reporting formalities of ships, including the PRF Directive's requirements, into a National Single Window. By bundling the various reporting formalities for ships calling at EU ports, it seeks to prevent double data collection and to reduce the administrative burden on port users. It includes the PRF Directive's advance notification requirements and the introduction of reporting through a National Single Window by ultimately 1 June 2015.
- Directive 2005/35/EC on penalties for ship-source pollution focuses on intentional pollution and introduces penalties for illegal discharges. This directive covers 'polluting substances', a term which is defined as substances regulated by Annex I (oil) and Annex II (noxious liquid substances in bulk) of MARPOL[3]. It shares with the PRF Directive the coverage of waste types, as defined under MARPOL Annex I. The Directive on ship-source pollution is directly in line with the PRF Directive's requirement to provide adequate facilities and makes the illegal discharge at sea of MARPOL Annex I and II waste a criminal offence.
- Directive 2012/33/EU on the sulphur content of marine fuels underlines the need for port reception facilities for exhaust gas cleaning residues. This directive's main goal is to reduce air pollution in the maritime transport sector by regulating sulphur emissions from vessels into the air[4]. Whereas the long-term goal of this directive is to encourage the use of more environmental friendly marine fuels without a direct link to port reception facilities, the use of exhaust gas cleaning systems (EGCS), or 'scrubbers' on ships is suggested as a short-term solution to meet the requirements. The use of scrubbers requires waste disposal (Annex VI waste). Due to the new and expected rapid expansion in the use of scrubbers, port users will need to discharge this new waste type in an environmental friendly way.
- Directive 2008/56/EC on marine strategy framework (MSFD) and the EU policy on the reduction of marine litter recognise the contribution of the PRF Directive to reduction of discharge at sea of marine litter by ships. It proposes to protect the marine environment and requires Member States to achieve and maintain a 'good environmental status' (GES) for their marine waters by 2020. The MSFD covers all human activities that have an impact on the marine environment and adopts an approach that enables sustainable use of marine goods and services while achieving a good environmental status.

2.4. Regional Agreements for cooperation on the protection of the marine environment

The PRF Directive states that it should be consistent with existing Regional Agreements. Below relevant Regional Agreements are presented.

HELCOM

HELCOM (Baltic Marine Environment Protection Commission - Helsinki Commission) is the governing body of the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (adopted in 1974 and subsequently revised). HELCOM is the

[3] Directive 2005/35/EC of the European Parliament and of the Council on ship-source pollution and on the introduction of penalties for infringements, Article 2(2).

[4] Refer to Directive 1999/32/EC, as amended by Directive 2005/33/EC and subsequently by Directive 2012/33/EU.

intergovernmental organisation of the nine Baltic Sea countries and the European Union, working to protect the marine environment of the Baltic Sea from all sources of pollution and to ensure safety of navigation in the region.

A maritime group has been established to identify and promote actions to limit sea-based pollution and ways for safer navigation in the Baltic Sea. It also works to ensure enforcement and harmonised implementation of the IMO's international shipping regulations in accordance with the 1992 Helsinki Convention. The maritime group constitutes the main framework for regional cooperation on port reception facilities.

One of the major subjects that the maritime group is currently dealing with is sewage from ships in the Baltic area. The IMO decision to designate the Baltic Sea as a MARPOL Annex IV 'special area' in 2011 was based on a proposal by Baltic Sea countries submitted in 2010. In anticipation of the 2011 IMO decision, the 2010 HELCOM Ministerial Meeting set up a Baltic Sea Cooperation Platform on sewage port reception facilities. By 2013, the work of this Cooperation Platform had resulted in the document 'HELCOM Interim Guidance on technical and operational aspects of sewage delivery to port reception facilities'.

HELCOM has recently released[5] a second edition of the HELCOM Overview on Baltic Sea Sewage Port Reception Facilities 2014. The report provides information on port reception facilities for sewage, as well as for their use by international cruise ships in the Baltic Sea area. Following the March HELCOM meeting, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, and Sweden have submitted a joint notification to IMO MEPC 68 (May 2015), stating that their ports in the Baltic region have adequate facilities for sewage reception and requesting the Committee to set a date on which the special area requirements under MARPOL Annex IV will be effective.

The maritime group is also active in regional cooperation to combat illegal discharges. Regional exercises are periodically organised and HELCOM has adopted recommendations on 'Airborne surveillance with remote sensing equipment in the Baltic Sea area'.

OSPAR

The OSPAR Convention is the current legal instrument guiding international cooperation on the protection of the marine environment in the North-East Atlantic. Work under the Convention is managed by the OSPAR Commission, made up of representatives of the governments of 15 Contracting Parties and the European Commission, representing the European Union.

The work undertaken by the OSPAR Commission relates to monitoring and assessment of the status of the marine environment. The results are used to follow up on the implementation of the strategies and on the resulting benefits to the marine environment.

According to Annex V of the OSPAR Convention, programmes and measures cannot be adopted under the Convention on issues relating to shipping. This will be dealt with by the IMO. However, the OSPAR work programme includes ships as a source of pollution by marine litter.

The Bonn Agreement, which is linked to OSPAR through its secretariat, is the mechanism by which the North Sea States and the European Union (the Contracting Parties) work together in combating accidental and illegal pollution from shipping, offshore oil and gas operations, and other maritime activities in the North Sea Area. In addition, parties cooperate in surveillance to detect and combat pollution at sea.

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[5] HELCOM (2015), Baltic Sea Sewage Port Reception Facilities, 6 March 2015

In order to prevent illegal and accidental pollution, most Bonn Agreement Contracting Parties undertake aerial surveillance to enforce maritime pollution regulations and standards.

Mediterranean Action Plan and REMPEC

The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) is the regional centre established to contribute to preventing and reducing pollution from ships and combating pollution in emergency situations. REMPEC also assists the Contracting Parties in mobilising regional and international assistance in an emergency[6].

Especially relevant is the project on 'Port reception facilities for collecting ship-generated garbage, bilge water and oily waste', financed under the MEDA financial mechanism and implemented between 2002 and 2004. One of the project goals was to promote and implement the PRF Directive.

The Convention on the Protection of the Black Sea against Pollution

The Convention on the Protection of the Black Sea Against Pollution was signed in 1992 in Bucharest by all countries with a shore on the Black Sea, and is dedicated to the prevention of the marine environment of the Black Sea. In order to implement the actions and policies agreed upon and to strengthen the regional mechanisms for cooperation by Black Sea States, the Black Sea Commission (or Istanbul Commission) and its subsidiary bodies, including its Secretariat, were established.

A dedicated Advisory Group on the Environmental Safety Aspects of Shipping, coordinated by the Activity Centre in Varna, Bulgaria was also created. The group will coordinate the regional approach for:

- ensuring that the reception facilities in the ports of the Black sea have the capacity to meet the needs of the ships and comply with MARPOL Special Area requirements. Use of these facilities will be compulsory. A study to promote the PRF directive approach has been financed by the EU;
- implementing a harmonised system of port state control through the regional MOU on port State control;
- implementing a harmonised system of enforcement, including fines. The primary aim is to serve as a deterrent to illegal discharges and, where necessary, to exercise enforcement action against illegal discharge.

The four Regional Agreements, through the established implementing bodies, cooperate closely with the European Commission. Other international bodies cooperate with the Commission, such as the United Nations Environment Programme (UNEP) and its Global Program of Action for the Protection of the Marine Environment from Land-Based Activities (GPA), as well as other Regional Seas Programmes (RSP) to assess and monitor the status of the marine environment, including marine litter.

[6] See REMPEC website: http://www.rempec.org/rempec.asp?pgeVisit=New&theID=6

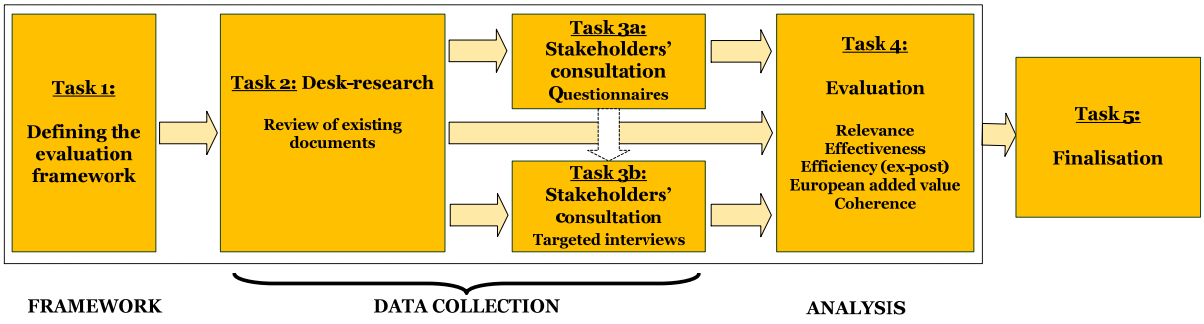
3. METHODOLOGICAL ASPECTS

This chapter presents the methodological aspects of the evaluation of the PRF Directive. The methodological approach is presented in Section 3.1, highlighting the tasks carried out to deliver the project objectives. Section 3.2 presents the scope of the evaluation by listing the five evaluation criteria and the 17 evaluation questions formulated for these criteria. These criteria and questions form the basis for the evaluation framework, which is outlined in Section 3.3 and presented in further detail in Annex 2. Specific attention is given to the ports dataset that is used as a basis for calculations in Section 3.4. Limitations of the evaluation are presented in Section 3.5.

3.1. Methodological approach

The project's methodological approach is illustrated in Figure 1, presenting the five tasks that are described in the subsequent sections.

Figure 1 Methodological approach



Source: Panteia

Task 1 – Evaluation Framework

An evaluation framework was developed at the beginning of the project to facilitate the evaluation. The evaluation framework is described in Section 3.3 and presented in more detail in Annex 2.

Task 2 – Desk research

The purpose of this task is to gather and synthesise data from relevant reports and documents. Desk research was carried out to respond to the information needs identified in the evaluation framework. An overview of the literature reviewed is presented in the bibliography in Annex 1.

Task 3 – Stakeholder consultation

A stakeholder consultation was carried out to complement the data collected from the desk research. The stakeholder consultation consisted of a questionnaire survey and targeted interviews with relevant stakeholders.

Task 3a – Questionnaires – targeted survey

A survey was conducted in the period November–December 2014, addressing the following five stakeholder categories:

- **Ports**: Port Authorities and Harbour Masters;
- **Port users**: Users of Port Reception Facilities, Shipping Companies, Fishing Operators, Recreational Vessel Operators;

- **PRF operators**: Providers of Port Reception Facilities, Waste Operators and Terminal Operators;
- **Member States**: Member States, National and Regional Authorities;
- **Other organisations**: Non-Governmental Organisations, Fisheries Commissions, Advisory Councils, Other types of commissions and environmental protection organisations, Other types of stakeholders not grouped elsewhere.

Each category of stakeholders received a specifically tailored questionnaire. Questions on general information and opinions were replicated in all questionnaires. In addition, each questionnaire included questions to collect specific information depending on the activity in which the respondent was active.

The survey was launched on 6 November 2014 and was closed on 5 December 2014. Different categories of stakeholders were approached directly by email, indirectly with the support of industry associations and as result of word of mouth by stakeholders. In total, 129 stakeholders responded to the survey. More details on the stakeholders consulted are presented in Annex 3 and the questionnaire is presented in Annex 4.

Task 3b – Targeted interviews

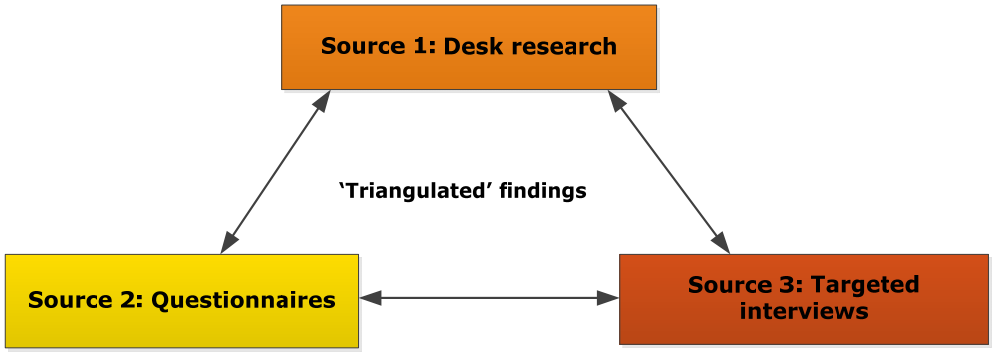
Targeted interviews were used as a data source to fill information gaps in the evaluation framework and to crosscheck information gathered through other sources. In total, 14 targeted interviews were conducted. A list of the stakeholders interviewed is presented in Annex 3.

Task 4 – Analysis

In this task, the data collected in Tasks 2.3 were analysed in order to respond to the evaluation questions. The results of this analysis are presented in Part II of this report, structured according to the five evaluation criteria.

Figure 2 illustrates how the principle of triangulation was applied for the analysis in this study.

Figure 2 The principle of triangulation in the Evaluation Framework



Source: Panteia

Task 5 – Finalisation

Task 5 is designed to finalise the project by providing the Final Report, which has been adjusted based on the comments from the Commission and on the feedback from stakeholders. An additional element of this task has been the presentation of evaluation findings at various events, including the European Sustainable Shipping Forum (ESSF) and the Pan European Cruise Dialogue.

3.2. Evaluation criteria and questions

The evaluation of the PRF Directive is structured according to five evaluation criteria and 17 evaluation questions.

The five evaluation criteria are defined as follows[7]:

- **Relevance**: To what extent do the original objectives still correspond to the current needs within the EU.
- **Effectiveness**: To what extent did the intervention cause the observed changes/effects. To what extent can these changes/effects be credited to the intervention. To what extent do the observed effects correspond to the objectives.
- **Efficiency**: To what extent were the costs involved justified, given the changes/effects, which have been achieved. What factors influenced the achievements observed.
- **EU Added Value**: What is the additional value resulting from the EU interventions, compared to what could be achieved by Member States at national and/or regional levels.
- **Coherence**: To what extent is this intervention coherent with other interventions, which have similar objectives. To what extent is the intervention coherent internally.

The following 17 evaluation questions are presented below, grouped per evaluation criterion:

Relevance

1. To what extent is the mandatory delivery of ship-generated waste in the EU relevant to the overall objectives of zero waste in maritime transport and the protection of the marine environment?

2. To what extent does the obligation on the Member States to provide adequate port reception facilities correspond to generating fewer discharges of ship-generated waste and cargo residues at sea?

Effectiveness

3. Has the PRF Directive facilitated and improved the delivery of ship-generated waste in EU ports, and resulted in fewer discharges at sea?

4. Has the PRF Directive improved the adequacy of port reception facilities to receive ship-generated waste and cargo residues?

5. Has the PRF Directive caused ships and ports to improve their waste management practices, in line with EU waste legislation, in particular as regards the separation of solid waste at the ship-port interface?

6. Have the various cost recovery systems (CRS) set up under the PRF Directive ensured that all ships contribute to the costs of PRF in a fair and transparent way, and provided sufficient and comparable incentives for ships to deliver their waste?

7. Has the Directive helped ensure effective operation and planning, upholding the MARPOL requirement to avoid undue delay to ships?

[7] Public consultation on Commission Guidelines for Evaluation (2014).

Efficiency

8. To what extent has the PRF Directive generated benefits and costs for different stakeholders (e.g., national administrations, port/competent authorities, the maritime transport industry and the waste handling/disposal industry)?

9. What is the administrative burden generated by the PRF Directive for different stakeholders? Has enforcement been effective and proportionate? Are there areas of excessive costs that could be avoided?

10. Have the provisions of the PRF Directive been equally fit for the ports of different size, type and geographical location?

EU Added Value

11. What is the EU added value of the PRF Directive's obligations that go beyond the requirements in Marpol 73/78 and in particular development of a waste exception and handling plan, notification, mandatory delivery, fees and inspection? Has the coexistence of EU and international law in this domain created inefficiencies, overlaps or legal uncertainties?

12. Would it have been possible to obtain the same results in terms of waste delivery and reduction of discharges without EU intervention, i.e. the PRF Directive?

13. Has there been a recognised exchange of good practices at national or regional level (such as, cost recovery systems) and how has this contributed to the EU added value?

Coherence

14. How well does the PRF Directive interact/contribute to the objectives of relevant EU environmental legislation, in particular: the Marine Strategy Framework Directive (Directive 2008/56/EC), the Directive on the sulphur content of marine fuels (Directive 2012/33/EU), the Waste Framework Directive (Directive 2008/98/EC) and other relevant EU waste legislation, as well as the recent Commission initiative on marine litter (SWD(2012) 365 final)?

15. To what extent has the PRF Directive contributed to the efficient collection, handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues, as defined in the EU waste legislation?

16. Is the current framework of the PRF Directive adequate in the long run to ensure the exchange of information, as well as reporting in line with requirements under the Directive on reporting formalities for ships arriving in and/or departing from ports (Directive 2010/65/EC)?

17. How well does the PRF Directive complement Directive 2005/35/EC (as amended) as the key instruments to prevent ship-source pollution?

3.3. Evaluation framework

For the purpose of evaluating the PRF Directive, an evaluation framework was developed. This evaluation framework was designed to provide a structured approach for answering the evaluation questions, as listed above, while detailing data requirements. The evaluation framework, which is presented in Annex 2, was developed at the beginning of the project and has been fine-tuned on the basis of comments from the Commission.

The evaluation framework consists of the following parts:

1. **What do we measure**: this part starts with the evaluation questions. Where useful, these evaluation questions are broken down in sub-questions. Based on this, it is defined what should be measured.

2. **How do we measure**: this part defines how we measure the information required to respond to the evaluation questions. This starts by defining the indicators per evaluation question. In addition to the indicator, additional inputs were included. Additional inputs came from literature, legal documents, questionnaires, stakeholder consultation, interview minutes and workshops. These additional inputs were used to complement the results of the indicators and provide an alternative basis for assessment if the indicators provided insufficient or no information.

3. **Methodological approach**: how to respond to the evaluation questions. This part explains how the indicators and additional information provided the basis for responding to the evaluation question. The limitations of the indicators and additional inputs were also noted.

3.4. Ports dataset: basis for calculations

To support the assessment of the waste discharged at EU ports, as presented in Section 5 (effectiveness) and the calculation of costs presented in Section 6 (efficiency), we created a dataset of 50 ports. This dataset contains 40 large commercial ports, as included in an EMSA report[8] and is complemented by 10 additional ports, for which information was obtained in our stakeholder survey. By combining information from the EMSA study and our survey, we developed a time series on waste deliveries for the period 2004-2013. The 50 ports in our dataset represent 26-30% of total gross tonnage (GT) of all EU ports[9]. We used the annual GT share, i.e. our dataset GT versus total EU GT, to arrive at total EU waste volumes discharged. We added information on other aspects to our dataset, for example on type of costs recovery system in place for each specific type of waste.

When we provide information on waste volumes discharged at ports or costs for ports, we refer to total volumes or costs for all EU ports, unless specifically mentioned otherwise.

3.5. Limitations of the evaluation

Limitations of approach taken

An important challenge in analysis was the high level of aggregation required. For instance, the evaluation question on the adequacy of port reception facilities is something very specific to a single port and to perception of its users. It is difficult to provide overall conclusions on aspects that are so diverse and differently perceived by users. As a result, the evaluation team focused on broader trends and specific elements mentioned by stakeholders.

The data collection process, strongly relied on results of desk research (Task 2) and the survey of stakeholders (Task 3a). After completing the desk research and the surveys and before moving on to the analytical work, we assessed the extent to which we were able to respond to the evaluation questions or needed additional interviews to fill an information gap. In this process, we considered three options per evaluation question:

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[8] Study on the delivery of ship-generated waste and cargo residues (Ramboll, 2012).

[9] Annual gross tonnage for all EU ports is based on EUOSTAT figures. Details are presented in Annex 5.

- Sufficient information to respond to evaluation question.
- Information gap that can be possibly filled from targeted interviews.
- Information gap combined with expected structural limitations of data availability.

Most evaluation questions could be analysed based on results of desk research and surveys, with the additional option of targeted interviews. However, some limitations on data availability affected the ability to respond to some of the evaluation questions, as presented below.

Limitations of data availability

Table 2 summarises the additional information needs after desk research and the stakeholder survey, and presents results of the interviews and the extent to which the information gap was filled. The stakeholders interviewed are presented in Annex 2.

Table 2 Additional information obtained in interviews

Additional information needs (EQ)	Result
EQ3: The data collected on discharges at sea needed to be further complemented by additional interviews. To this end we have been in touch with a contractor that is working for DG ENV[10] to get more information on discharges at sea.	The interviews did not result in additional data on discharges at sea.
EQ7: Inspection authorities in Member States were approached to fill the information gap on exemptions, notably on exemptions granted, and to what extent port users make use of this.	Qualitative information was obtained and used to strengthen the evaluation findings.
EQ8: Additional information was collected from ports and Member States on costs and administrative burden, notably: • For ports, on time spent on handling notification and WRH plans. • For Member States, on inspection of a typical WRH plan and ship inspection. • For waste operators, on costs of operating port reception facilities. • For shipping companies, on costs of using port reception facilities, estimated time required for notification of ship, average time spent hosting a typical ship inspection.	This information was collected in additional interviews. Whereas it resulted primarily in qualitative data, the findings were also used to strengthen our approach to calculate cost and benefits.
EQ9: An effort was made to collect more qualitative information on administrative burden from shipping companies, European ports, and Member State authorities.	Data on administrative burden were collected and used to support our analysis, for example on time spent on advance notification by port users.
EQ 16: In order to fully report on possible issues with regard to the implementation of a single reporting window, also including the reporting requirements under the PRF Directive, the research team has liaised with EMSA to discuss the progress and issues of SafeSeaNet.	Information on the progress of implementation of SafeSeaNet was obtained and used in the report.

After data collection in the desk research, the stakeholder survey and the targeted interviews, the following problems related to data availability remained:

- Structural problems exist in collecting volumes of waste discharged at sea. Inevitably this is always an estimate, based on other data that is available. For most types of waste, a comparable indicator was found, for example, beach litter and plastic in bird stomachs for garbage (Annex V waste) and oil spills based on aerial surveillance for oil (Annex I waste). However, these comparable indicators have their limitations, for example in determining the contribution of discharges of waste from ships versus land-based pollution of beaches. We were unable to find comparable indicators for sewage (Annex IV waste).

[10] We have been in contact with Eunomia Research & Consulting Ltd to discuss availability of data on discharges at sea, particularly on the extent of discharges at sea, an area in which we found little information.

- The evaluation team acknowledges that the data on some types of waste are not available. The approach to extrapolate the waste delivery volumes of our dataset to total EU level, as presented in Section 3.4, has limitations related to robustness of the waste delivery volumes at EU level. These aggregated waste volumes were used to estimate waste collection costs.
- It was not possible to collect the number of exemptions granted by Member States in the EU. EMSA reported that this information has not been collated for the reports completed for the European Commission. Lack of insight in number of exemptions is a limitation with regard to conclusions on exemptions.
- A structural limitation exists in obtaining data on the level of costs of using port reception facilities. These costs contain market-sensitive information and are often not disclosed. Ports are generally not willing to share information on the cost of waste reception and handling, or do not know how private waste operators do this. Thus, there are limitations on assessing the largest cost factor, the cost of waste delivery, reception and handling.
- Given the problems in collecting volumes of waste discharged at sea, there are also limitations related to estimating the benefits of the PRF Directive. The main expected benefit of the PRF Directive is a reduction of waste discharges sea. As there are no data available on volumes discharged, it is not possible to accurately calculate the benefits. As presented in Section 6.2, we have calculated a proxy for benefits, by estimating increased waste volumes collected in the period 2004-2012 and to value these surplus volumes at the cost of cleaning polluted beaches. This type of calculation indicates that benefits are likely to be substantial, but no hard evidence on quantified benefits is available.

PART II – ANALYSIS

4. RELEVANCE

Relevance is defined as the extent to which the provisions of the PRF Directive are pertinent to the needs, problems and issues to be addressed[11]. For this evaluation criterion, two evaluation questions are defined and dealt with in Sections 4.1 and 4.2 respectively. Section 4.1 assesses the extent to which the mandatory delivery principle is relevant to meeting the overall objectives. Subsequently, Section 4.1 assesses to what extent the requirement to provide adequate port reception facilities is relevant to achieve fewer discharges at sea. Based on these two elements, conclusions are drawn on the relevance of these key provisions of the PRF Directive in reaching the wider set of objectives identified.

4.1. EQ 1: Mandatory delivery of ship-generated waste and Commission priorities

4.1.1. The evaluation question

EQ1: To what extent is the mandatory delivery of ship-generated waste in the EU relevant to the overall objectives of zero waste of maritime transport and the protection of the marine environment?

In order to answer this evaluation question, we need to review the extent to which the types of waste included under the mandatory delivery principles have a detrimental effect on the marine environment when discharged at sea. Only then, the principle of mandatory delivery of these types of ship-generated waste would be relevant to the overall EU objectives. Subsequently, the relevance of the PRF Directive in view of the discharge restrictions under the MARPOL Convention is evaluated. To assess the relevance of the scope of the PRF Directive, the analysis of this evaluation question outlines the overall EU objectives, after which the relevance of each type of waste under the mandatory delivery principle can be assessed.

4.1.2. Contribution to EU objectives

The European Commission set an ambitious long-term objective of zero-waste and zero-emission maritime transport[12]. A first step to achieving this is to reach 'good environmental status' of marine waters in the EU, as defined under the Marine Strategy Framework Directive (MSFD). In a recent communication on the '[a] zero waste programme for Europe',[13] the European Commission set an aspirational target for reducing marine litter by 13% by 2020 and by 27% by 2030. The PRF Directive is given a key contributory role to reaching these goals of the MSFD, by seeking to reduce illegal discharges at sea. The underlying rationale is that through providing adequate port reception facilities and enforcing the delivery of waste in European ports, the reduction goals could be better achieved.

Whereas the PRF Directive has been assigned a key contributory role in the EU objectives, as set out above, it should be underlined that the PRF Directive does not regulate discharges at sea. As outlined in Chapter 2, to protect the marine environment from the effects of discharges at sea, the MARPOL Annexes prohibit the discharge of waste into the sea, except under very strict conditions. As a result, ships are required by MARPOL to dispose of their waste in port reception facilities. The role of the PRF Directive in this legislative framework is to contribute to the EU objectives of reducing discharges at sea and improving the quality of the marine environment, by improving the availability

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[11] Evaluating EU Activities, a Practical Guide for the Commission Services (2004).
[12] COM (2009)8.
[13] COM(2014) 398 final.

and use of waste reception facilities in ports. For this, the mandatory delivery principle is an important element that reduces the risk that ships leave the port if they pose a threat to the marine environment by discharging ship-generated waste at sea. This element is further assessed below, and subsequently compared with the views of stakeholders.

The principle of mandatory delivery is introduced in Article 7(1), which sets out that all vessels shall discharge all their ship-generated waste before departure, unless they can prove they have sufficient space to store the waste accumulated during the intended voyage of the ship until the port of call, as set out in Article 7(2). Through the mandatory delivery principle, the PRF Directive introduces a measure for ports and relevant authorities to prevent ships leaving port with waste on-board, if there are good reasons to believe that this may be discharged at sea, possibly in violation of MARPOL discharge regulations.

The principle of mandatory delivery is relevant in reducing *illegal and legal* discharges. It prevents ships leaving port with insufficient storage for all waste that will accumulate during the voyage, which may necessitate discharge before arrival at the port of waste delivery. In combination with cost recovery systems that do not offer an incentive to discharge at sea (but also the availability of adequate facilities, see Section 4.2), the principle of mandatory delivery contributes to reducing discharges at sea, and is relevant to the overall objectives of improving protection of the marine environment.

In the stakeholder consultation, some port users indicated that the restrictions on discharges under MARPOL already contribute to the objectives of zero-waste and protection of the marine environment, and that mandatory delivery principle is an irrelevant additional criterion. However, this view contrasts with other stakeholders (primarily from non-governmental environmental organisations), who indicated that only formulating restrictions on discharges by MARPOL is insufficient. These respondents perceived an enforcement gap, as even though MARPOL requires ships to discharge their waste in port reception facilities, it does not specify in which port and under which conditions it has to be done. Only if a ship poses an unreasonable threat to the marine environment, MARPOL requires a port state to ensure that the ship is not authorised to proceed to sea until the situation has been rectified. The principle of mandatory delivery is, therefore, evaluated to be a relevant addition to the legal framework.

4.1.3. Mandatory delivery of different types of waste

The mandatory delivery principle applies to all ship-generated waste, defined in Article 2 as 'all waste, including sewage, and residues other than cargo residues, which are generated during the service of a ship and fall under the scope of Annexes I, IV, V to MARPOL 73/78'. These annexes of MARPOL set out in detail the discharge restrictions of each waste type at sea. In view of the variety of these types of waste, and different effects on the marine environment of discharge at sea, different discharge restrictions have been set. In view of these, the relevance of mandatory delivery is assessed for each type of waste below.

Oil pollution comes in various forms, with different impacts on the environment. Light refined oil products (such as, gasoline and diesel) disperse easily and dissipate naturally. Whereas these oil types seem to disappear, these oil types tend to be relatively toxic and when present in sufficient quantities can result in mortalities of marine plants and animals. Heavier crude oil is more persistent in the marine environment, and damages by smothering flora and fauna, yet is generally less toxic.[14] In 2007, a group of experts estimated that worldwide operational discharges of ships make up 45% of the estimated annual 457,000 tonnes of oil flowing into the marine environment. Smaller contributors

[14] ITOPF (2011), The fate of oil spills, Technical information paper.

are, for instance, accidental oil spills and the offshore industry, as well as land-based economic activities[15].

Under strict conditions, MARPOL Annex I allows operational discharges of oily mixtures from machinery space processed through approved oily filter equipment which shall not exceed an oil content of 15 parts per million[16]. In view of the negative effects of oil pollution on the marine environment, and the substantial contribution of operational discharges by maritime transport, it is relevant to include oily waste under a mandatory delivery regime. Oily rags warrant special attention because under the new MARPOL Annex V, these are classified as MARPOL Annex V waste[17].

Sewage ('black water'), as defined under Annex IV of MARPOL, can cause harm to eco-systems if discharged near land and can pose a public health threat because it can carry harmful nutrients, bacteria, pathogens, diseases, viruses and parasites[18]. Furthermore, 'grey water', which is not covered by the Annexes of MARPOL or the PRF Directive, includes wastewater from kitchens and laundries, and can pose a threat to the marine environment, because this also contains organic matter, thus carrying the risk of algal growth and eutrophication. When discharged at sea, untreated sewage requires excessive amounts of oxygen to be broken down by bacteria, hence potentially reducing the requisite amount of oxygen needed by fishes and marine plants[19].

Sewage produced on-board is particularly relevant as a waste type for passenger transport. It is estimated that 40-50 litres of 'black water' (sewage) and an additional 120-300 litres of 'grey water' are produced per passenger per day. To deal with these quantities, most modern ships are equipped with advanced sewage treatment plants and/or with special sewage tanks[20]. These treatment plants or sewage comminuting and disinfecting systems can prepare black water for discharge[21]. After treatment of the sewage waste by such approved on-board treatments plants, discharge is permitted under MARPOL Annex IV. If the sewage is only comminuted and disinfected to the standards set by the IMO (primary treatment), then the treated sewage can be discharged by a ship over 400 gross tonnage (GT), or certified to carry more than 15 passengers, three nautical miles from the nearest land. Finally, MARPOL Annex IV restricts the discharge of untreated sewage to at least 12 nautical miles from the nearest land and outside special areas[22], as the oceans are considered to be capable of assimilating sewage through natural bacterial action[23]. When inside this limit, the ship has to treat the sewage before disposal or store the sewage in on-board sewage holding tanks for disposal in the port reception facility. The ECC (European Cruise Council) requires its members not to discharge untreated black water at sea even at a distance more than 12 nautical miles from the nearest land.

In view of the negative effects on the marine environment of untreated sewage discharges near land and the ongoing practice of discharging at sea (particularly where permitted under MARPOL), it is relevant to include untreated sewage under the

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15 GESAMP. 2007. Report n° 75: Estimates of Oil Entering the Marine Environment from Sea-Based Activities, IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection. (http://gesamp.imo.org/).

16 Consult IMO MARPOL 73/78, Annex I

17 IMO (2012), 2012 Guidelines for the implementation of MARPOL Annex V. Resolution MEPC.219(63).

18 EMSA (2012), Addressing illegal discharges in the marine environment, page 38.

19 Hatenboer et al. (2012), *Report "Sewage Treatment plants"*, Dutch Ministry of Infrastructure and the Environment, available at: http://www.ilent.nl/Images/Report%20'Sewage%20treatment%20plants'_tcm334-358106.pdf

20 Butt, N. 2007. The impact of cruise ship-generated waste on home ports and ports of call: A study of Southampton, Marine Policy 31.

21 Comminuting refers to the process of reducing the size of sewage solids, and is part of the primary treatment process. See for instance HELCOM (2015), Baltic Sea Sewage Port Reception Facilities: HELCOM Overview 2014, Revised Second Edition.

22 In the EU only the Baltic Sea has been assigned as an Annex IV special area, see Chapter 2.

23 See IMO (2014), Prevention of Pollution by Sewage from Ships, http://www.imo.org/OurWork/Environment/PollutionPrevention/Sewage/Pages/Default.aspx

mandatory delivery principle. However, it is not relevant to apply the principle of mandatory delivery to ships with on-board sewage treatment facilities, as these ships do not have the untreated 'black water' on-board. For vessels without these facilities, the mandatory delivery of untreated sewage can be a relevant contribution to reducing the discharges of this type of waste at sea.

Despite its relevance in reducing discharges at sea, the correct application of this principle by ports cannot prevent port users discharging their untreated sewage at sea in line with MARPOL Annex IV restrictions before entering port. For this reason, it is essential to consider the relevance of the mandatory delivery principle in line with the other elements of the PRF Directive, such as the provision of adequate port reception facilities and cost recovery systems that do not give an incentive to discharge waste at sea.

Garbage, the ship-generated waste included under MARPOL Annex V, includes various types of waste. With few exceptions, discharge at sea of garbage is not permitted, and has been further restricted under the revised Annex V, which entered into force on 1 January 2013[24]. Despite this restrictive discharge regime in MARPOL Annex V, which completely forbids the discharge of plastics at sea, marine debris found in various seas is dominated by plastics, both from land-based and ship-based sources[25]. The share of plastics is estimated to be on average 60-80% of total marine debris, while in some regions, plastic materials constitute as much as 90-95% of the total amount of marine debris.[26] Plastics float for years and have substantial negative environmental impacts, for instance by ensnaring or being ingested by animals. Unlike the other waste types discussed above, marine litter is also highly visible, as it floats on sea or washes up on beaches with possible impacts on tourism and recreation[27]. Whereas most plastics enter the marine environment from land-based sources, a widely accepted estimate is that on average up to 20% of garbage in the marine environment is of ship-based origin[28,29]. However, the percentage arising from shipping depends on the level of activities at sea and is substantially higher along busy shipping routes[30]. For example, up to half of the marine litter found in the North Sea and specifically the English Channel can be related to marine transport[31], while the share of marine litter of ship-source origin is estimated to be as high as 90% along scarcely populated beaches on the Dutch coast[32].

In the EU, a recent study[33] analysed the contribution of sea-based sources to marine litter found on various beaches, as presented in Table 3. This study also indicated large regional differences of the share of sea-based sources of marine litter, which confirms the relation to proximity to shipping routes. This provides evidence that the mandatory delivery of garbage under the PRF Directive is relevant in view of the EU policy objectives of zero waste of maritime transport and the protection of the marine environment.

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[24] IMO (2011), Resolution MEPC.201(62).

[25] See for instance Jambeck, J.R. et al (2015), 'Plastic waste inputs from land into the ocean', *Science 347*, no. 6223, pp. 768-771.

[26] See for instance Jambeck, J.R. et al (2015), 'Plastic waste inputs from land into the ocean', *Science 347*, no. 6223, pp. 768-771.

[27] EMSA (2012), Addressing illegal discharges in the marine environment
Plastic Debris, Rivers to Sea Project: www.plasticdebris.org

[28] See website European Commission DG ENV: http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm

[29] GESAMP (2010, IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection); Bowmer, T. and Kershaw, P.J., 2010 (Eds.), Proceedings of the GESAMP International Workshop on plastic particles as a vector in transporting persistent, bio-accumulating and toxic substances in the oceans. GESAMP Rep. Stud. No. 82, 68pp.
OSPAR (2009). Marine litter in the North-East Atlantic Region: Assessment and priorities for response.

[30] See for instance M. Gross (2015), 'Ocean of plastic waste', *Current biology* 25 (3): pp. 93-96.

[31] UNEP (2005) Marine Litter: An analytical overview

[32] Van Franeker, J.A., S. Kühn, E. L. Bravo Rebolledo & A. Meijboom (2014) Fulmar Litter EcoQO monitoring in the Netherlands - Update 2012 and 2013. IMARES Report C122/14. IMARES, Texel: page 9.

[33] M. van Acoleyn et al. (2014), Marine Litter study to support the establishment of an initial quantitative headline reduction target- SFRA0025, for European Commission DG ENV

Table 3 Estimated share of marine litter from sea-based sources

Regional sea	Estimated % marine litter from sea-based sources
Baltic Sea	29%
Mediterranean Sea	14%
Black Sea	Insufficient reliable data
North Sea / Atlantic Ocean	43%

Source: M. van Acoleyn et al. (2014), Marine Litter study to support the establishment of an initial quantitative headline reduction target- SFRA0025, for European Commission DG ENV.

4.1.4. Conclusions

In view of the ambitious EU objectives to reduce overall discharges at sea and improve the protection of the marine environment, it is necessary to take additional action. The mandatory delivery principle, articulated by Article 7 of the PRF Directive, seeks to prevent ships leaving ports without sufficient storage for waste that will accumulate during the voyage. Unless ship operators can prove that they have sufficient storage, ships are required to discharge their waste in port reception facilities. Even though this principle cannot prevent discharges, the mandatory delivery principle minimises the risk of ships discharging at sea and posing a threat to the marine environment. In combination with other elements of the PRF Directive, this contributes to reducing discharges at sea.

Particularly in view of the substantial negative impacts on the marine environment from discharges at sea of MARPOL Annex I, IV and V waste types, the mandatory delivery of these waste types is relevant to the main objective of protection of the marine environment. It is concluded that the principle of mandatory delivery is relevant to the EU objectives to reduce discharges at sea and the protection of the marine environment.

4.2. EQ 2: Provision of adequate port reception facilities and fewer discharges of ship-generated waste and cargo residues

4.2.1. The evaluation question

EQ2: To what extent does the obligation for Member States to provide for adequate port reception facilities correspond to generating fewer discharges of ship-generated waste and cargo residues at sea?

The obligation on Member States to provide adequate port reception facilities is a prerequisite to reaching the PRF Directive's objective to reduce discharges of ship-generated waste and cargo residues at sea. To assess its relevance against other potential aspects related to the number of discharges at sea, these other aspects are also assessed.

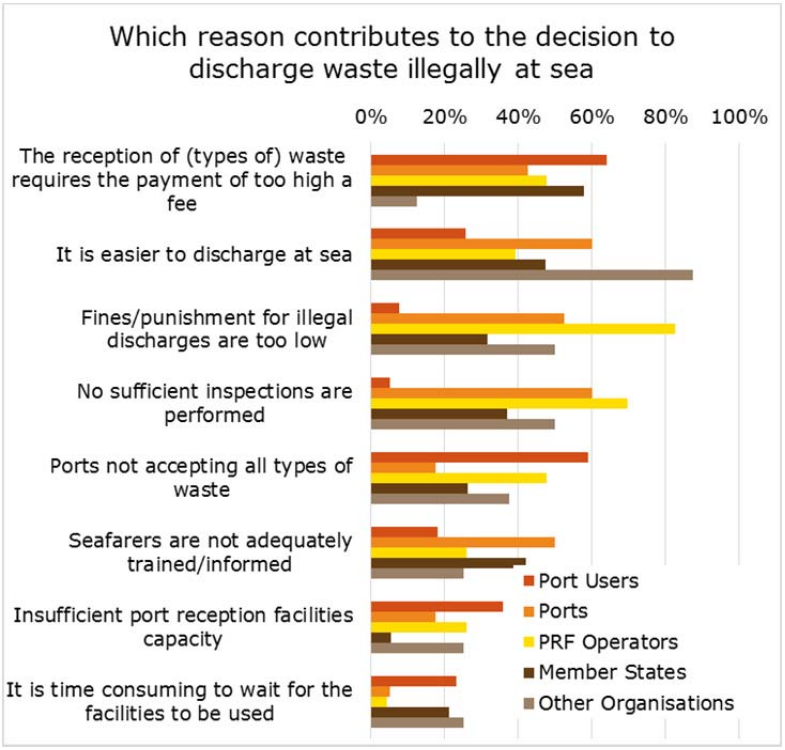
4.2.2. Linking adequacy of PRF to discharges at sea

The core approach of the PRF Directive rests on the logic that adequate facilities are a prerequisite for reducing discharges of ship-generated waste and cargo residues at sea. Recital 4 of the PRF Directive underlines that 'reducing discharges of ship waste into the sea […] can be achieved by improving the availability and use of reception facilities and by improving the enforcement regime'. By requiring Member States to provide adequate port reception facilities, the PRF Directive seeks to ensure that port users, when calling at a port, will find and use these facilities, and as such contribute to fewer discharges of ship-generated waste and cargo residues at sea.

This theoretical logic was compared with the views of stakeholders on the key reason to discharge waste at sea. Particular attention was paid to port users because they would conduct the discharge. Based on the results, as shown in Figure 3, port users considered financial incentives more important than the adequacy of port reception facilities in the decision to discharge waste at sea. This confirms the relevance of Article 8 in the PRF

Directive (requiring positive financial incentives to encourage use of port reception facilities), but does not immediately confirm the relevance of adequate facilities. This relevance is established in the following reasons to discharge waste illegally at sea reported by port users; the non-acceptance of waste in port reception facilities, and the inadequate capacity of port reception facilities to discharge waste. This shows that the relevance of providing adequate facilities (both in terms of the types of waste accepted, and the capacity of the facilities) to reduce illegal discharges at sea is clear to port users.

Figure 3 Reasons for illegal discharges at sea



Source: stakeholder consultation

Other stakeholders (non-port users) gave slightly different reasons for illegal discharges at sea. Ports, PRF operators, and other organisations pointed mainly to problems in enforcement (related to fines and inspections) as a reason for vessels to discharge at sea, whereas the answers of the Member States were more spread across potential reasons. The notable difference between these replies is that a substantial number of ports (50%) and Member States (42%) indicated that limited training of shipping crew is an important aspect that could contribute to the decision to discharge waste illegally at sea. This issue was not often mentioned by other respondents. These answers show the variety of factors that can contribute to the illegal discharge of waste, among which the adequacy of facilities is almost as important for port users as the costs of the facilities.

In addition to the conditions that influence vessels in discharging their waste illegally, other factors impacting discharges at sea are also relevant. In light of the Commission's zero-waste objective in maritime transport, the PRF Directive also aims to reduce the number of legal operational discharges at sea. If the reasons above are valid for illegal discharges, they apply even more strongly to legal operational discharges. However, for legal discharges other factors are also relevant, such as technological developments in vessel construction, equipment and management. Technological innovations, such as on-board waste treatment plants, oil filters or waste incinerators, can substantially reduce the amount of on-board waste produced, and reduce the quantity and the impact on the

marine environment of the waste that can be discharged in port reception facilities, or within the legal restrictions of MARPOL[34].

Finally, it is anticipated that, in the near future, innovative technological developments with regard to the construction, equipment and the operation of ships may contribute to a reduction of waste production by ships, as well as discharges of ship-generated waste and cargo residues at sea, thus impacting the volume of waste delivered. For instance, over the last few years, the maritime transport sector has moved from the use of heavy fuel oil towards fuel oil based on distillate products and cleaner ship diesel engines. These are more fuel-efficient, can result in substantial emission reductions and produce considerably less waste oil. In addition, the continuous adjustment by IMO of its regulatory regime to cope with the technical development, as seen in the recent revision of the various MARPOL annexes, including the designation of Special Areas, continue to require more rigorous discharge requirements for ship-generated waste and cargo residues. The introduction of the Directive on Ship-source Pollution, with criminal sanctions to illegal discharges of polluting substances at sea (see Section 8.4) is likely to affect ship's behaviour. Over time, these developments can substantially alter demand on port reception facilities.

4.2.3. Conclusions

The discussion above indicates that the approach chosen by the PRF Directive is relevant to meeting the objective of fewer discharges at sea. It also shows that other factors, unrelated to the requirements of the PRF Directive, such as developments in international law, and technological developments, have an influence on the discharges of waste at sea. However, the overall approach taken by the PRF Directive is relevant for reducing the number of discharges of ship-generated waste and cargo residues at sea, as it goes beyond the obligations for Member States to provide for adequate port reception facilities. Although this obligation on Member States is relevant, and the provision of adequate port reception facilities is *necessary* for ships to discharge their waste properly, the adequacy of these facilities alone does not guarantee reduced discharges at sea.

Stakeholders indicated that the costs of waste disposal in ports is a relevant factor in deciding whether ships discharge at sea or in port reception facilities, while proper enforcement of the requirement was also often mentioned as an influencing factor. These factors are addressed in the current PRF Directive, which recognises the need for combining adequate facilities and better enforcement to reach its objective (recital 4). The relevance for appropriate financial incentives is also recognised. Recital 14 lists that the fee system in place should encourage the delivery of ship-generated waste in ports instead of discharging waste at sea. The obligation for Member States to provide adequate port reception facilities, in combination with other measures, leads to fewer discharges of ship-generated waste and cargo residues at sea.

[34] See for instance European Marine Equipment Council (2010), Green Ship Technology Book

5. EFFECTIVENESS

The evaluation questions in this section focus on effectiveness, which is the extent to which the objectives of the PRF Directive have been achieved[35]. Firstly, Section 5.1 evaluates the extent the PRF the Directive has improved the delivery of ship-generated waste in EU ports, while resulting in fewer discharges at sea. Section 5.2 evaluates the extent to which the PRF Directive has improved the adequacy of port reception facilities in the EU. The extent to which the PRF Directive has contributed to improved waste management practices is evaluated in Section 5.3. Section 5.4 evaluates the extent to which the various cost recovery systems introduced in the EU are in line with the requirements of the PRF Directive. Finally, Section 5.5 evaluates the extent to which the Directive met its objectives in terms of effective operations and planning. Based on these five key elements, the overall effectiveness of the PRF Directive was evaluated.

5.1. EQ 3: Delivery of ship-generated waste to EU ports

5.1.1. The evaluation question

EQ3: Has the PRF Directive facilitated and improved the delivery of ship-generated waste in EU ports, and resulted in fewer discharges at sea?

To respond to this evaluation question, the longitudinal data on volumes of delivered ship-generated waste in a number of European ports was collated. These trend data were assessed against various sources that estimate the volumes of waste discharged at sea. A direct link between the PRF Directive and reduced discharges at sea cannot be proven with data. However, broader estimations of various operational discharges in European seas can give insight into the potential impact of the PRF Directive.

This chapter identifies a number of proxies that are employed to indicate the broader trend of discharges at sea. For different types of discharges, different proxies are employed, as further presented below. This includes the discharges of oil and garbage. Despite the potential negative effects of unprocessed sewage on the marine environment (see section 4.1.3), little data exists on the discharges of this type at sea. An elaborate set of the environmental monitoring indicators developed by HELCOM in the Baltic Sea comes closest, and is discussed below.

5.1.2. The delivery of ship-generated waste in EU ports

The core element of the PRF Directive is to reduce and eliminate waste discharge at sea. If the PRF Directive effectively contributes to this objective, it would be expected to coincide with an increase of waste deliveries in EU ports. Therefore, the amount of waste delivered after the entry into force of the PRF Directive has been analysed.

Various EMSA studies indicate a rising trend in the early years of the PRF Directive[36]. A Dutch study conducted in 2005 showed the effects of implementation of the PRF Directive on the amounts of waste delivered to the ports of Hamburg, Rotterdam and Antwerp. It showed that at the time when the PRF Directive was implemented in the ports of Hamburg and Antwerp, but not yet in Rotterdam, the amount of waste received at the port of Rotterdam was significantly lower than that received at the other two ports. After

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[35] Evaluating EU Activities, a Practical Guide for the Commission Services (2004).

[36] EMSA, *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.*
EMSA (2005), A study on the availability and use of port reception facilities for ship-generated waste (CarlBro)

implementation of a cost recovery system in line with the PRF Directive, the amounts of Annex I and Annex V waste delivered increased significantly[37].

To complement these findings with more recent data, additional data on the volumes of waste delivered to EU ports were collected from the stakeholder consultation and EMSA reports[38]. These data were pooled, and subsequently analysed, as outlined in Annex 5. To prevent attributing changes in the waste volumes delivered due to a changing number of ships, or the variation in types of vessels calling at EU ports, estimates of discharged waste in EU ports, and a comparison with the 2004 value are presented. In the latter case, the gross tonnage (GT) of vessels calling annually at EU ports was kept constant[39]. This allows for assessment of the extent to which the *same* number of vessels delivered *more* waste in EU ports.

The estimates of discharged volumes were grouped by waste type, which are analysed below. The first few years of the PRF Directive show an increasing trend in the amount of the various waste types delivered at EU ports. This is in line with the findings of other studies that aimed at identifying the amount of waste delivered to EU ports. As discussed in more detail below, the volumes of oily waste from machinery space and sewage were found to decrease in most EU seaports.

5.1.3. Estimating port deliveries of oily waste

Despite the fact that relatively stable volumes of oily waste from machinery space (MARPOL Annex I waste) were reported for the first few years of the PRF Directive, an overall downward trend can be observed after 2008, even when corrected for the decrease in maritime transport in these years (the blue line in the graph). When split by sea basin, relative waste deliveries to ports on the North Sea and Atlantic Ocean are upward or relatively stable until 2011. After 2011, the volumes of this type of delivered waste show a negative relative trend, again unrelated to trends in the number of port calls or the size of vessels calling in ports. The delivery of this type of waste has decreased in most other sea areas, and particularly in the Mediterranean Sea. Section 5.1.4 shows that the discharges at sea of this type of waste have also reduced structurally, ruling out the conclusion that ships have discharged more at sea. Explanations for this finding are for instance discussed in section 5.4, which explores the effect of different cost recovery systems and argues that differences in trends are not only related to regional differences, but also to the different applications of the provisions of the PRF Directive.

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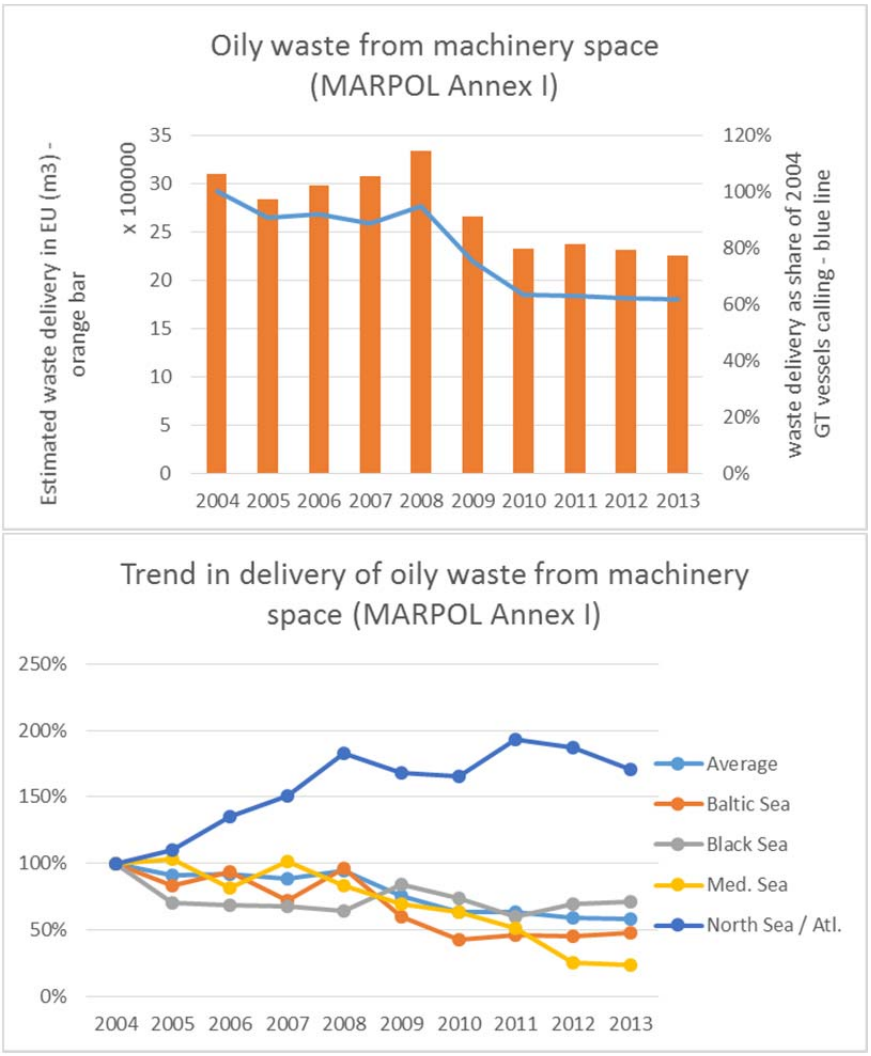
[37] M.H. Nijdam & P.W. de Langen; Haven Ontvangst Installaties, Indirecte financiering en gevolgen voor de concurrentiepositie van Nederlandse Zeehavens; Eindrapport juni 2005

[38] EMSA (2012), Study on the delivery of ship-generated waste and cargo residues (Ramboll).
EMSA (2005), A study on the availability and use of port reception facilities for ship-generated waste (CarlBro)

[39] See Annex 5 for more details.

Figure 4 Trend in delivery of oily waste from machinery space to EU ports



Source: Panteia / PWC (2015)

5.1.4. Estimating discharges of oily waste at sea

To investigate the link between waste delivered in port reception facilities and the state of the marine environment, the observed trends in discharges of oily waste at sea were assessed. If less oily waste is delivered to port reception facilities, it is crucial to investigate whether this ends up in the marine environment, or whether other factors should be considered.

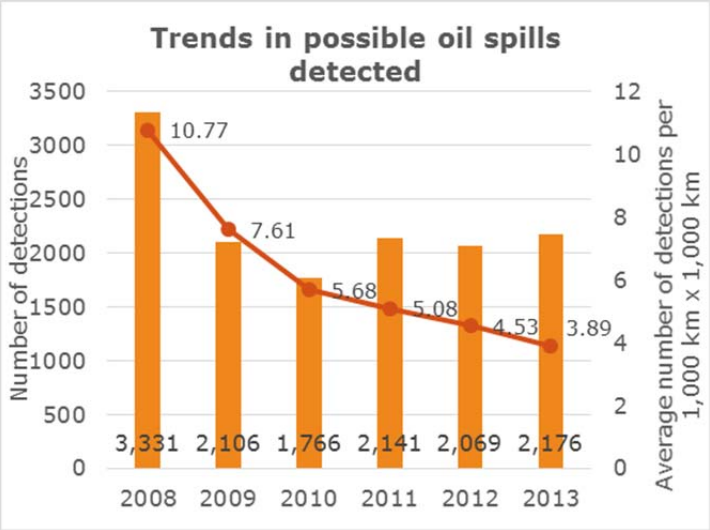
There are several methods to estimate the trend in oil volumes that enter the marine environment. Levels of oil entering in the marine environment can be monitored by assessing oiled seabird populations. Even small quantities of oil on the sea surface can be dangerous to sea birds, and its effects are relatively long term and may impair the water-repellent properties of bird feathers or cause sea birds to stop feeding.[40] A long-term study conducted for the North Sea found a steady and significant reduction in the number of oiled birds since the 1980s. This study also showed that the number of oiled birds was considerably higher along important shipping lanes, indicating the relevance of policy measures to reduce illegal operational discharges in order to reduce oil spills in the environment[41]. Other studies have measured the occurrence of 'tar balls', which are

[40] EMSA (2012), Addressing illegal discharges in the marine environment, page 32.
[41] See C.J. Camphuysen et al. (2009), Oil Pollution and Seabirds: Quality Status Report 2009 (Common Wadden Sea Secretariat (CWSS)).

persistent patches of oil containing primarily the heavier components of oil emulsified in seawater. These 'tar balls' occasionally wash up on shores and damage sensitive coastal zones[42].

Whereas the evidence from beached bird and 'tar ball' surveys indicates that levels of oil entering the marine environment may have dropped in recent decades, the levels found are still greater than may be expected, given the strict discharge requirements for oily waste in international legislation. In the EU, additional instruments are employed to monitor compliance with the discharge restrictions for oily wastes. Aerial and satellite surveillance play a crucial role in monitoring, which also provides considerable insights into more recent developments. In the last five years, reduced volumes of illegal discharges in Europe have been reported. Based on satellite data collected in CleanSeaNet, EMSA reports possible oil spills to the Member States for further investigation, which are presented by the bars in Figure 5. However, as not all dark areas on images are necessarily oil, CleanSeaNet does not detect 'oil spills' but 'possible oil spills'. Other substances with a similar appearance include fish or vegetable oil, ice, algae, or other look-alikes.[43] These reported 'possible oil spills' need further investigation, and are forwarded to relevant authorities to check whether they concerns oily waste. The average number of possible oil spills detected per 1,000 km^2 monitored by CleanSeaNet annually has reduced from an average of 10.77 spill detections per 1,000 km^2 monitored in 2008 to an average of 3.89 spill detections 2013[44].

Figure 5 Trends in oil spills detected



Source: EMSA (2014), Pollution Preparedness and Response Activities

This finding was confirmed by aerial surveillance data collected in the framework of the Bonn Agreement between Member States around the North Sea. Figure 6, based on the annual report on aerial surveillance[45]. shows an overall decreasing trend in the number of identified oil spills compared to relatively similar levels of monitoring flight hours since 2000. The larger time series than in Figure 5 suggests that entry into force of the PRF Directive in 2002, and subsequent measures taken by national Member States, coincided with considerable reduction of the number of oil spills in the North Sea.

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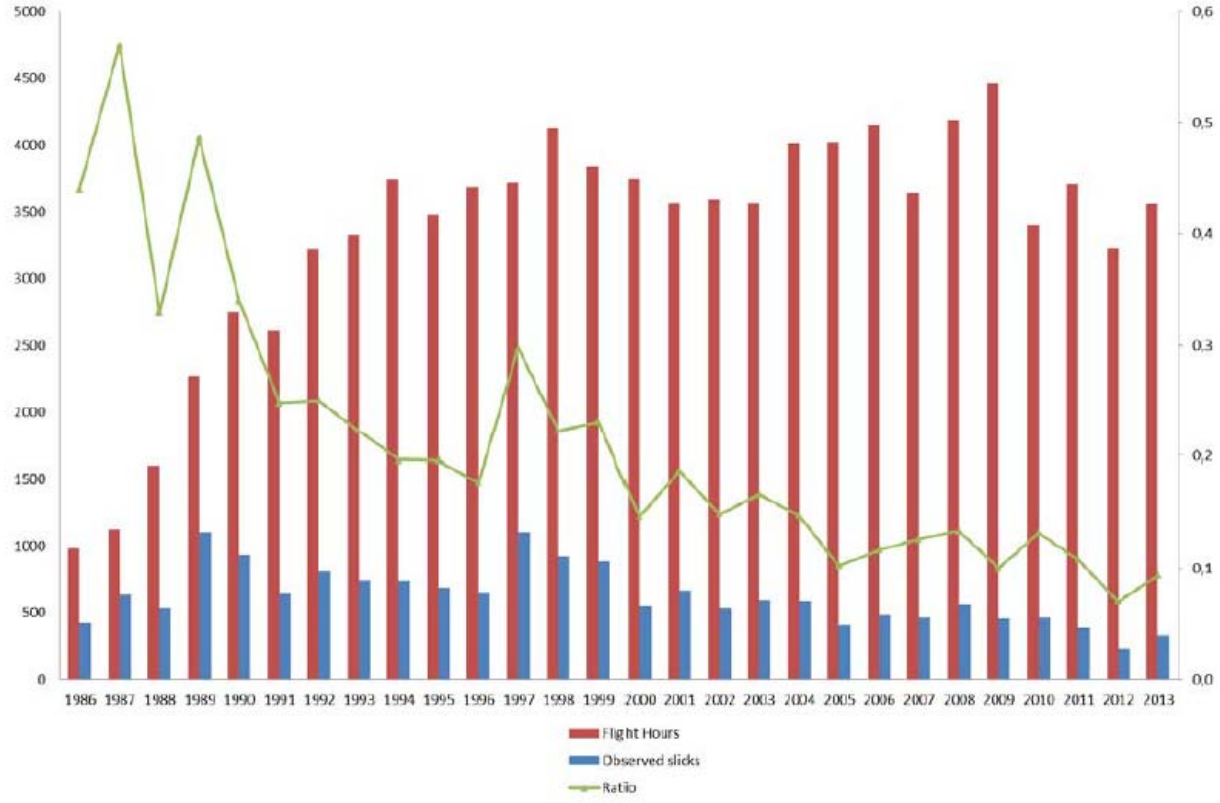
[42] GESAMP. 2007. Report n° 75: Estimates of Oil Entering the Marine Environment from Sea-Based Activities, IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection. (http://gesamp.imo.org/).

[43] EMSA (2014), Pollution Preparedness and Response Activities: January 2014: page 44.

[44] See http://www.emsa.europa.eu/faq-pollution/305-detection-of-oil-pollution-at-sea-by-satellites/2220-how-many-oil-spills-does-cleanseanet-detect-per-year.html

[45] Bonn Agreement (2012), Annual report on aerial surveillance for 2012

Figure 6 Number of identified oil spills in contrast to levels of monitoring flight hours



Source: Bonn Agreement (2012), Annual report on aerial surveillance for 2013.

A more detailed study of surveillance data under the Bonn Agreement in the Belgian North Sea showed a statistical relationship between the observed reduction of operational discharges at sea and implementation of the PRF Directive in combination with the entry into force of the status of special area of the North Sea under MARPOL Annex I[46]. The findings of this study are compelling because the number of observed oil spills was reviewed on the basis of characteristics, such as size, estimated volume and colour. This effectively excluded oil spills that are not the result of operational discharges, such as spills resulting from accidents and offshore activities. This finding is in line with the findings of other studies conducted outside Belgian waters[47].

A similar trend was observed in monitoring oil spills in the Baltic Sea with aerial surveillance by HELCOM[48]. As for the North Sea, the hours of flying have increased, but the overall number of spills found has reduced considerably (see Figure 7). Such detailed surveillance data are only available for the North Sea and the Baltic Sea. In the other seas within the EU, air surveillance is sometimes used to follow-up possible oil spills, but no similar time series are available to monitor the number of oil spills over time[49]. However, given the high intensity of maritime transport particularly in the North Sea, the available data provide an important indication that discharges of oily waste in EU seas have reduced over the last decade. Moreover, the data provided by EMSA in Figure 5 cover the entire EU, and confirm the trends.

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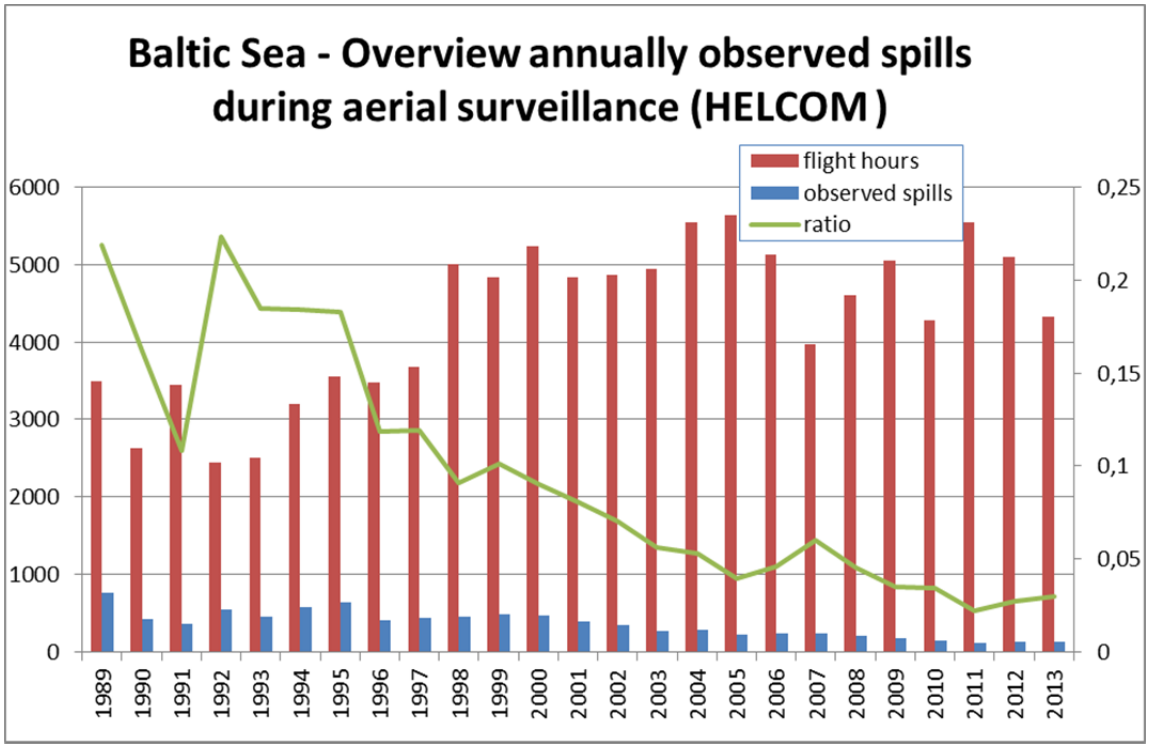
[46] Lagring R., *et al.* (2012), 'Twenty year of Belgian North Sea aerial surveillance: A quantitative analysis of results confirms effectiveness of international oil pollution legislation', Marine Pollution Bulletin 64: 644-652.

[47] Carpenter, A., 2007. The Bonn Agreement Aerial Surveillance programme: trends in North Sea oil pollution 1986–2004. Mar. Pollut. Bull. 54 (2), 149–163

[48] Baltic Marine Environment Protection Commission (2013), Annual report on Baltic Marine Environment Protection Commission Illegal discharges observed during aerial surveillance 2013.

[49] Consider for instance in the Mediterranean Sea projects like AESOP in 2005, and REMPEC in 2007.

Figure 7 Overview annually observed spills



Source: Panteia (2015), based on HELCOM: Annual report on Baltic Marine Environment Protection Commission Illegal discharges observed during aerial surveillance 2013.

5.1.5. Estimating port deliveries of sewage

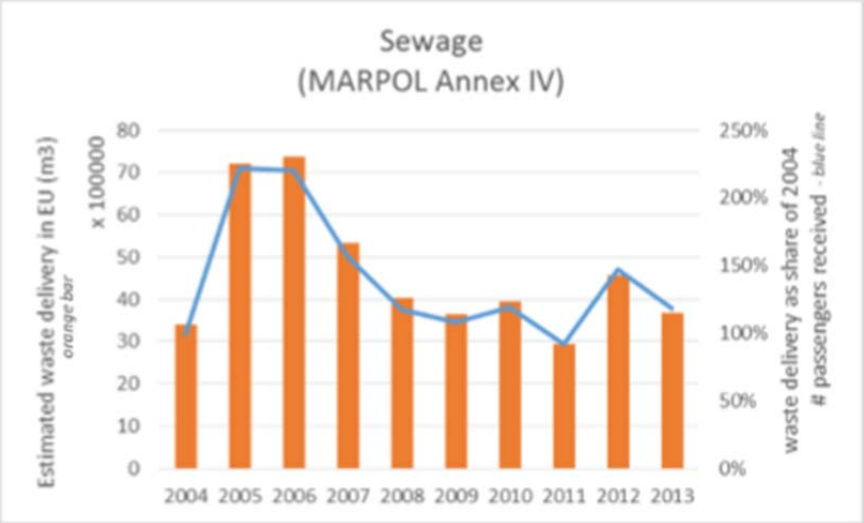
The evaluation also collected data on sewage delivery to European ports, which is presented in a similar way as for oily waste. One key difference is that the volumes delivered were not analysed per ship size but by the number of passengers. As sewage is primarily considered a waste type from passenger transport (particularly the cruise sector), the delivery of this type of waste has been compared with the number of passengers received by ports.

Figure 8 shows in the bar chart (left axis) the discharge estimates for the EU based on the number of passengers. The line chart (right axis) shows the relative increase in sewage volumes delivered per 1,000 passengers. An increase can be observed in the period 2004-2006, which coincides with the initial implementation years of the PRF Directive for sewage (12 months after the entry into force in September 2003 of the MARPOL Annex IV), and also with the entry into force in August 2005 of the revised MARPOL Annex IV, which introduced more stringent discharge requirements for sewage at sea.

However, after 2006, sewage volumes delivered to EU ports dropped sharply to the level of 2004. After 2008, the volumes remain relatively stable, except for a sudden decline in 2011, when less sewage was delivered per 1,000 passengers in EU ports than in 2004.

It is difficult to differentiate these results by regions, given the limited data received for sewage deliveries outside the Baltic Sea. Less than half of the ports in the stakeholder consultation provided information on the delivered sewage volumes in their ports. Ports around the Baltic Sea generally provided these data and levels were relatively stable when the varying numbers of passengers in ports are taken into account. This is mostly related to the type of cost recovery system in place (see Section 5.4). The trend in Figure 8 is mainly related to a number of ports outside the Baltic Sea area, where sewage delivery increased in the early years of implementation of the PRF Directive and MARPOL Annex IV. However, continuous levels of sewage discharges were not sustained from 2007 onwards.

Figure 8 Trend in delivery of sewage to EU ports



Source: Panteia / PWC (2015)

The increase in sewage deliveries in the early years in these ports indicates that there is a potential to receive and handle sewage provided the right incentives and adequate facilities are offered. The overall trend suggests that at EU level, the PRF Directive has not been effective in increasing sewage delivered to EU ports. An explanation is that MARPOL Annex IV allows raw sewage to be discharged at sea if a vessel is at least 12 nautical miles from the shore. Moreover, ships with advanced on-board sewage treatment plants may not need to discharge sewage waste in port reception facilities as they can discharge the treated sewage into the sea in line with MARPOL Annex IV (again under a number of specified conditions). Furthermore, Annex II to the Directive specifically refers to regulation 11 of MARPOL Annex IV and specifies that the corresponding boxes on the advance notification form do not need to be completed if it is the intention to make an authorised discharge at sea. This is also reflected in statistics collected for the Baltic Sea, where the use of port reception facilities for discharging sewage is the highest in Europe. A recent HELCOM report shows that in 2014, only 30% of all cruise ships indicated to have used available port reception facilities to discharge on-board sewage in the port[50].

If ships discharge their on-board sewage before they call at a port, as allowed under special conditions by MARPOL, the strict application of mandatory delivery by relevant authorities would not contribute to higher collected volumes of sewage at ports. In this case, ships would ensure to empty their storage before calling at the port, particularly if costs are involved in discharging waste (see Section 4.1). The stakeholder consultation provided support that for this reason generally Member States have not insisted on 'mandatory delivery' of sewage on leaving the port, in spite of Article 7 of the PRF Directive, which also includes sewage. The amendment of Annex II of the PRF Directive introduced by Directive 2007/71/EC explicitly refers to the 'authorised discharges under MARPOL' and is cited as a reason for not following up on mandatory delivery for sewage under Article 7. Some regional differences on its application can be justified, particularly after the 'special area' status of the Baltic Sea comes into force. In this case, the principle would prevent the departure of ships without approved on-board sewage treatment plants that do not have sufficient storage available.

[50] HELCOM (2015), Baltic Sea Sewage Port Reception Facilities, HELCOM Overview 2014; revised second edition.

5.1.6. Estimating discharges of sewage at sea

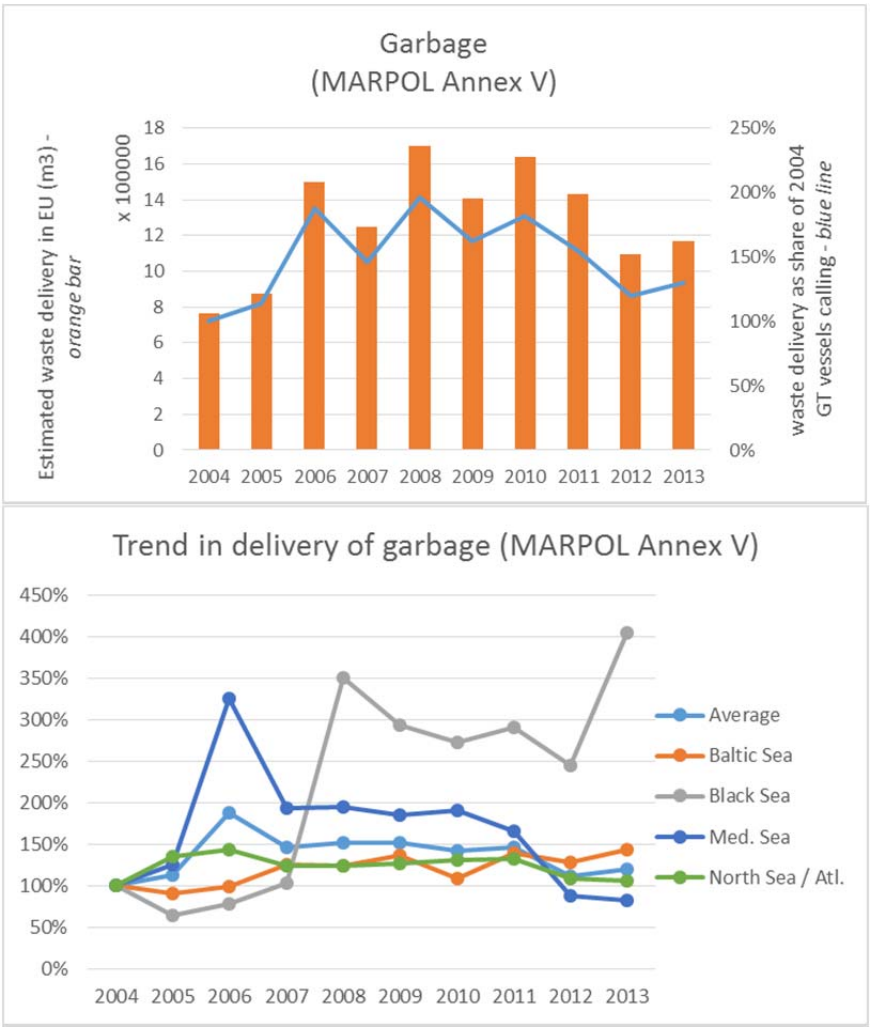
No data could be collected on estimated discharges of sewage at sea. In spite of the fact that sewage discharge at sea cannot be measured as straightforwardly as oil or garbage, various steps have been taken to reduce discharges at sea. HELCOM, for instance, actively monitors a defined set of environmental indicators, measuring the degree of eutrophication of the Baltic Sea. These indicators show that the levels of eutrophication in the Baltic Sea continue to be high. Despite relevance of discharge restrictions on sewage to improve the situation, this does not allow conclusions on the amounts of sewage discharged[51].

5.1.7. Estimating port deliveries of garbage

Figure 9 presents the volumes for garbage delivery. Port users delivered higher volumes of garbage to port reception facilities throughout the period under evaluation, compared to the base year 2004. After a relatively small increase in 2005, the levels of solid waste (MARPOL annex V waste) were substantially higher than the 2004 level. In view of continuous efforts to reduce amounts of waste generated by ships and tightening of international standards, it is unlikely that similar-sized vessels are producing more waste. Instead, the higher volumes of waste delivered to EU ports correspond to lower discharges at sea. However, considerable differences were found per sea basin. Whereas ports around the Mediterranean Sea experienced a peak in garbage deliveries in 2006, deliveries of garbage at these ports have declined gradually even to levels below 2004 volumes, for instance in 2012 and 2013. For ports in the Black Sea, our data show a considerable increase of garbage deliveries since 2007, which coincides with the accession of Romania and Bulgaria to the EU. The North Sea / Atlantic ports have had relatively stable volumes delivered to port reception facilities over the years. Despite these regional differences, generally the amounts of garbage delivered to EU ports are considerably higher than 2004, as illustrated in Figure 9.

[51] HELCOM (2014), Eutrophication status of the Baltic Sea 2007-2011 - A concise thematic assessment.

Figure 9 Trend in delivery of garbage to EU ports



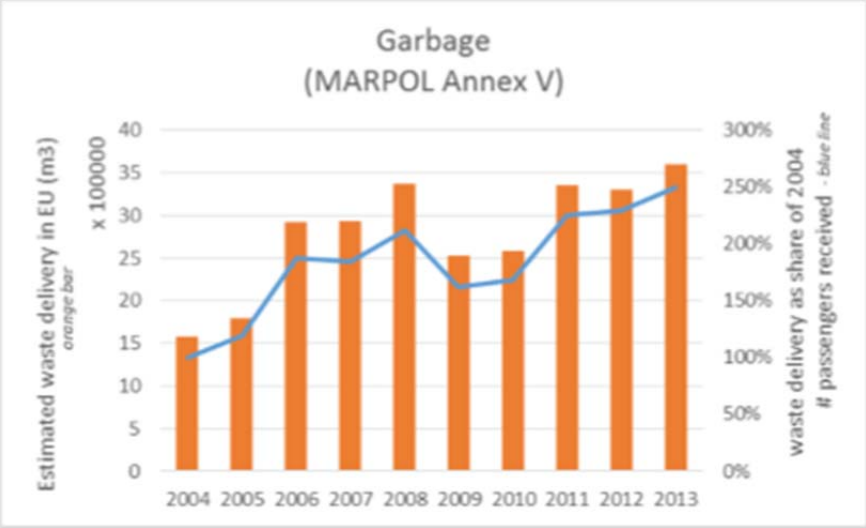
Source: Panteia / PWC (2015)

The analysis of waste deliveries for garbage should not only control for the size and number of vessels (measured in GT calling in the port), as argued for oily waste. A vessel carrying a large number of passengers produces substantially more garbage than a freight transport vessel[52], and therefore waste deliveries are also related to the number of passengers transported (as for sewage above). A separate analysis was conducted. In Figure 10, the deliveries of garbage are shown in relation to the number of passengers in each port. The trend in garbage deliveries as given in Figure 10 was calculated based on the number of passengers transported (bars represent absolute estimates) compared to the average waste delivery per 1,000 passengers against base year 2004 (line graph). The graph confirms the rising trend of waste delivery found in Figure 9[53]. When the data were compared to the number of passengers transported, the delivery levels of MARPOL Annex V waste since 2006 are consistently more than double that in 2004. This indicates that vessels are discharging more than double the amount of garbage per passenger compared to 2004.

[52] EMSA (2012), Addressing illegal discharges in the marine environment

[53] To ensure reliable results, ports with less than 100.000 passengers were excluded from the analysis. As a result, the figure is based on the data from fewer ports (29) than the total of 50 ports included.

Figure 10 Garbage delivered – as share of number of passengers



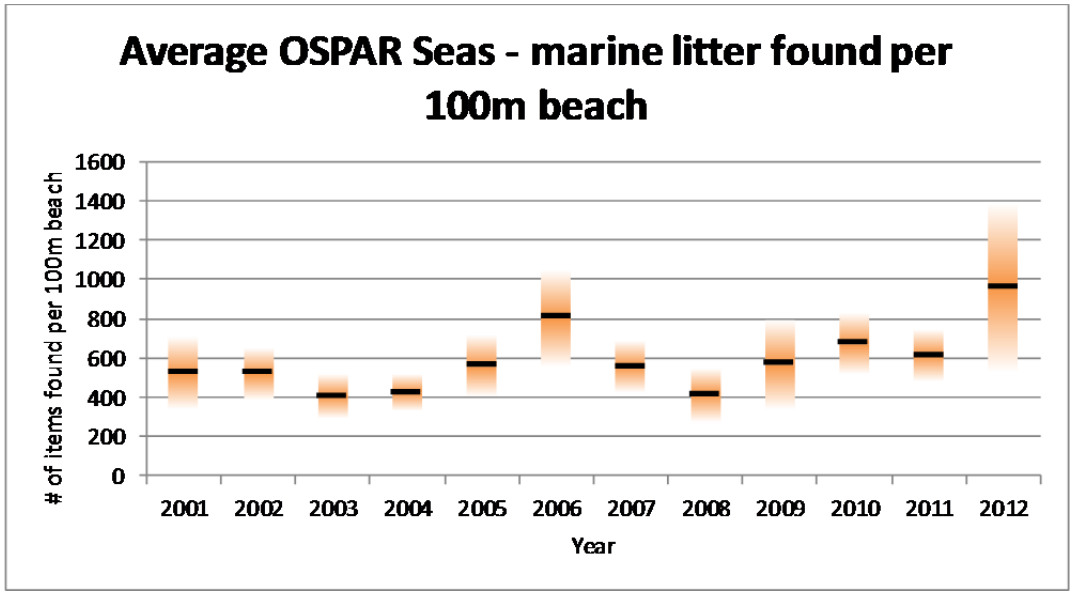
5.1.8. Estimating discharges of garbage at sea

A number of methodologies have been employed in studies to measure the development of garbage discharges in European seas. The findings of beach surveys are presented first, and contribute to estimating the number of discharges of garbage. Moreover, given the predominance of plastics in garbage discharge at sea (the share of plastics is estimated to be up to 90%, see Section 4.1.3), results of international studies on the extent to which plastic is found in stomachs of dead fulmars found on various beaches are also presented.

In the framework of the OSPAR project on Marine Litter Beach Monitoring, a large amount of data has been collected since 2000 on marine litter on beaches. Based on this data collected by the OSPAR Commission, this evaluation mapped the development of marine litter in European seas[54]. The marine litter found on various beaches has been systematically counted and categorised to use as indication for the state of marine litter in the OSPAR area. The results relate to the 100 metres of beach surveyed, generally on the high-tide line. As these data are used to assess the volumes of ship-generated waste, categories that clearly have a land-based origin, particularly individual cigarette butts and sanitary items were excluded from the analysis. For many elements of garbage, it was more difficult to determine the origin but these elements were included in the beach survey. As a result, the survey cannot be considered 100% ship-source garbage. Figure 11 presents the average annual waste counted. In order to take seasonal effects into account, data were collected for four seasons and summed in the overview below. Each average is presented with respective 95% confidence intervals.

[54] Please note that the focus of this evaluation lies on volumes of ship-generated waste. Therefore, categories that clearly have a land-based source, such as various sanitary items, are excluded from the figures. As such, the results may slightly deviate from the data presented by OSPAR.

Figure 11 Marine litter found per 100 metre beach



Source: Panteia 2015, based on marine litter data OSPAR

Figure 11 presents a slightly increasing trend in marine litter on beaches bordering OSPAR seas, but this is primarily due to the last measurement in 2012. Without this last measurement, a relatively stable trend can be observed. Moreover, it is unclear to what extent beaches were cleaned during a count, which may also contribute to increasing numbers[55]. Most of the variations between the years are not statistically significant, as these do not fall outside the confidence intervals of the other measurement. There are substantial geographical differences in beaches located at the OSPAR seas, with relatively large amounts of waste found in the Greater North Sea Region (with 600-1,400 items per 100 metre on average in the Northern North Sea, and 200-600 items per 100 metre in the Southern North Sea). Lower levels were observed on beaches in the Bay of Biscay and the Iberian Coast (approximately 100-300 items per 100 metre). In a similar project conducted on beaches around the Baltic Sea, relatively small amounts of garbage were found compared to OSPAR beaches. Due to differences in methodology, these findings cannot be easily compared for determining the contribution of ship-source garbage.

Monitoring of the amount of plastics found in the stomach of beached seabirds provided another insight in the development of waste discharged at sea. Various publications suggest an important impact of shipping (including fisheries) in marine litter, which can be responsible for around 40% of litter in busy shipping routes[56]. Even though these data are limited to the North Sea, they concern a sea with high traffic intensity, and more importantly, data were collected in the same way from as early as 1979. These studies found relatively stable amounts of plastic, which, after a peak in the 1990s, are currently comparable to the level in the 1980s. The detail of the findings has inspired the OSPAR

[55] See for a discussion on methodology of the Beach survey for instance OSPAR Commission (2007), *Monitoring of marine litter on beaches in the OSPAR region.*

[56] Fleet, D.M 2003. Untersuchung der Verschmutzung der Spülsäume durch Schiffsmüll and der deutschen Nordseeküste. (UFOPLAN) FAZ 202 96 183, im Auftrag des Umweltbundesamtes, Hochschule Bremen. 194pp.
Van Franeker, J.A. 2005. Schoon strand Texel 2005: onderzoeksresultaten van de schoonmaakactie van het Texelse strand op 20 april 2005. Alterra speciale uitgave 2005/09. Alterra, Texel. 23pp.
Stichting De Noordzee 2003. Coastwatch Onderzoek 2002. Stichting de Noordzee, Utrecht. 17pp + addenda.
Guse, N., Fleet, D., van Franeker, J. & Garthe, S. 2005. Der Eissturmvogel (Fulmarus glacialis)- Mülleimer der Nordsee? Seevögel 26(2): 3-12.

Commission to set policy targets based on the amount of plastics found in the stomachs of fulmars[57].

5.1.9. Conclusions

This chapter established the lack of comparable data on actual waste deliveries in ports in the EU. For this reason, this chapter estimated waste volumes delivered to EU ports in the period 2004 to 2013, based on the answers received on a targeted stakeholder consultation. Based on data collected in this evaluation, deliveries of ship-generated waste on average increased or remained the same in the early years of the implementation of the PRF Directive.

Considerable variations in sea basins were observed, with, for instance, a positive trend in delivery of Annex I waste in ports around the North Sea and the Atlantic Ocean contrary to the overall trend of decreasing volumes. These variations provide valuable trends and contribute to the understanding of developments in delivered waste volumes, and add to the assessment of incentives of the various price levels and cost recovery systems throughout the EU. Whereas the PRF Directive has contributed to higher volumes of garbage delivered in EU ports, it has had a more limited impact on the delivery of sewage.

It is puzzling to find overall lower deliveries of oily waste delivered to port reception facilities while the number of possible discharges at sea also has gone down substantially. However, it is noted that the data series on discharges of oil at sea, complemented by other academic studies, finds reductions in observed oil discharges at sea roughly coincided with the implementation years of the PRF Directive, which provides a clear indication of an impact of the PRF Directive. It also shows that the reduced volumes of oily waste delivered to ports are apparently not discharged at sea. The new requirements on fuel oil for combustion purposes combined with newer engines, result in lower amounts of oily waste produced. In addition, more advanced oil filters substantially reduce the volumes of oily waste produced. These factors combined result in less oily waste discharged at port reception facilities. We have not been able to assess the size of the impact of the new requirements and technological developments on reduced oily waste production.

With respect to the delivery of sewage, the data show different trends in different regions, which indicates that the PRF Directive is not implemented in the same way with respect to mandatory delivery. In general, the evidence suggests that relevant authorities do not require ships to fully discharge their waste in port reception facilities, as MARPOL Annex IV allows discharges at sea of raw sewage 12 nautical miles from the coast. However, substantial differences exist across member states. Compare, for instance, the stable volumes delivered to Baltic Sea ports with the sudden high level in 2011 of delivery in North Sea ports. Overall, the data do not suggest that the implementation of the PRF Directive has contributed substantially to higher sewage delivery in ports. The positive trend in the delivery of sewage waste in the early years of the PRF Directive overlapped with the early years of the implementation of MARPOL Annex IV. Moreover, the stable levels delivered at Baltic Sea ports can be attributed to policy cooperation in HELCOM (for instance, on the structure of their fee systems), and its designation as a special area under Annex IV. In spite of this initial rise in sewage delivery in the early years, deliveries in 2013 were at the same level as in 2004. This further contributes to the conclusion that the PRF Directive has not contributed substantially to higher sewage delivery to EU ports.

For garbage, the introduction of the PRF Directive coincided with a substantial increase in volumes of waste delivered to EU ports. Whereas geographical differences persist, the relatively stable increasing levels after the PRF Directive implementation years, and the sudden rise of garbage collected in EU ports in the Black Sea on accession of Bulgaria

[57] See for instance OSPAR Commission (2013), "Policy Issue: Litter in the marine environment".

and Romania to the EU, provide evidence of a facilitative role of the PRF Directive that contributed to the delivery of this waste to port reception facilities. Despite this impact, studies do not indicate an apparent reductions in the levels of marine litter found, either from land-based sources or from ship-based sources, as our data show. The consistent higher levels of garbage collected in port reception facilities is indicative for the positive contribution to the delivery of waste to EU ports, and clearly contributes to the EU zero-waste programme.

5.2. EQ 4: Adequacy of port reception facilities

5.2.1. The evaluation question

EQ4: Has the PRF Directive improved the adequacy of port reception facilities to receive ship-generated waste and cargo residues?

One of the main objectives of the PRF Directive is to ensure that Member States provide adequate port reception facilities in their ports to meet the needs of the ships normally using that port[58]. This section evaluates to what extent the PRF Directive has improved the adequacy of port reception facilities to receive ship-generated waste and cargo residues. This was achieved by defining the adequacy of port reception facilities at an aggregated EU level, and assessing developments in the provision of port reception facilities for ship-generated waste and cargo residues.

5.2.2. The requirement to provide adequate port reception facilities

The scope of the requirement to provide adequate port reception facilities is vast and embodies almost all ports in the EU, handling different types of cargo, of different sizes, and with different geographical realities. Only military ports are excluded. As a result, different needs have to be taken into account in different ports when defining adequacy. The PRF Directive has been designed to allow a variety of approaches to receiving and handling ship-generated waste and cargo residues. The PRF Directive defines the 'adequacy' of port reception facilities as: 'capable of receiving the types and quantities of ship-generated waste and cargo residues from ships normally using that port, taking into account the operational needs of the users of the ports, the size and the geographical location of the port, the type of ships calling at the port and the exemptions provided for under Article 9'[59].

5.2.3. Improvements of adequacy

In order to establish whether the PRF Directive *improved* the availability of adequate port reception facilities, the situation before the PRF Directive was assessed. A number of studies show that in various ports in different regions port reception facilities were available before implementation of the PRF Directive, but that additional facilities were developed with the implementation of the Directive[60]. As indicated in Figure 12, a large majority of stakeholders in all categories concluded that the PRF Directive has at least to some extent improved the ability of port reception facilities to receive ship-generated waste.

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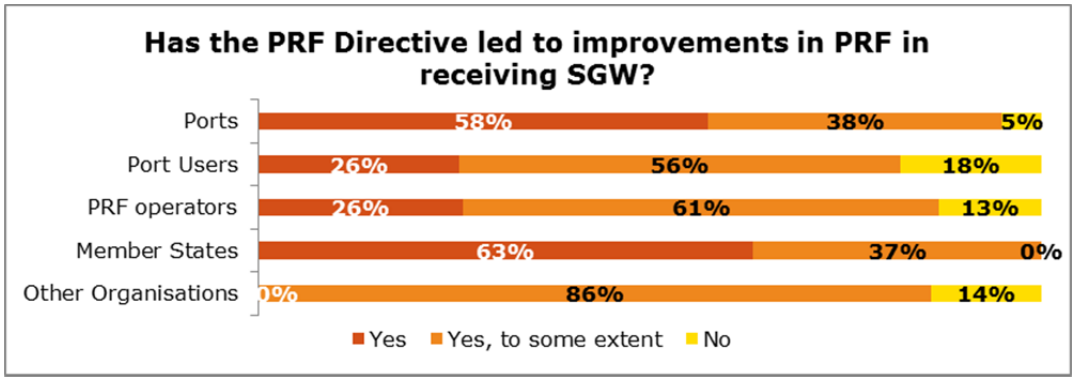
[58] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Article 4(1).

[59] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Article 4(2)

[60] - Ball (1999), Port waste reception facilities in UK ports, Marine Policy 23: 4–5, pages 307-327.
- Carpenter and S. Macgill (2001), Charging for Port Reception Facilities in North Sea Ports: Putting Theory into Practice, Marine Pollution Bulletin 42: 4, Pages 257–266.
- Carpenter and S. Macgill (2003), The EU directive on port reception facilities for ship-generated waste and cargo residues: current availability of facilities in the North Sea, Marine Pollution Bulletin 46: 1, pages 21-32. Carpenter and S. Macgill (2005), The EU Directive on port reception facilities for ship-generated waste and cargo residues: The results of a second survey on the provision and uptake of facilities in North Sea ports, Marine Pollution Bulletin 50: 1541-1547.

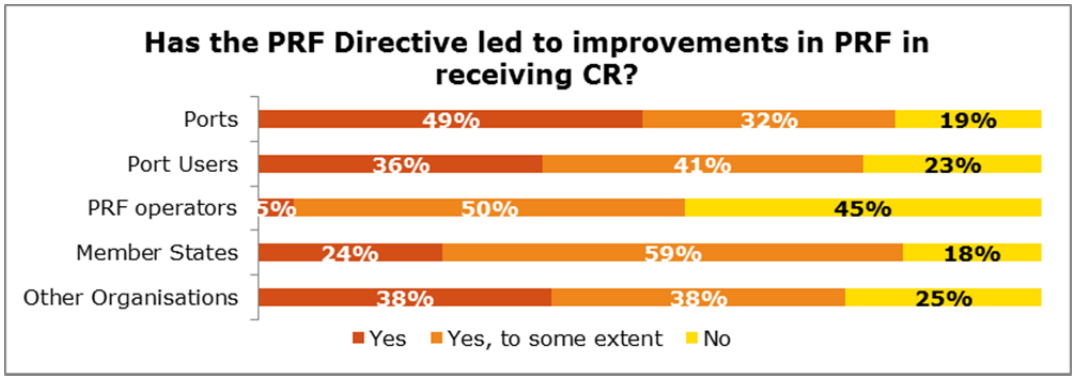
Figure 12 PRF Directive impact on receiving ship-generated waste



Source: stakeholder consultation

For the ability of port reception facilities to receive cargo residues, stakeholders indicated that the PRF Directive led to (at least some) improvements, though not in similar large numbers as for ship-generated waste. As Figure 13 shows, 45% of the waste operators sees no improvements. 23% of the port users sees no improvement as a result of the introduction of the PRF Directive, which is not so different from their perception regarding ship-generated waste. Compared to ship-generated waste, ports (19%) and Member States (18%) were more critical about the improvements since the PRF Directive, even though they are less critical than other stakeholders. The handling of cargo residues is often not under the direct competence of the port authorities, but normally the responsibility of the oil or chemical terminals and the owner of the cargo[61]. The discharge of cargo residues generally requires specialised treatment, and once treated, the cargo residues, unlike ship-generated waste, often represent a commercial value.

Figure 13 PRF Directive impact on receiving cargo residues



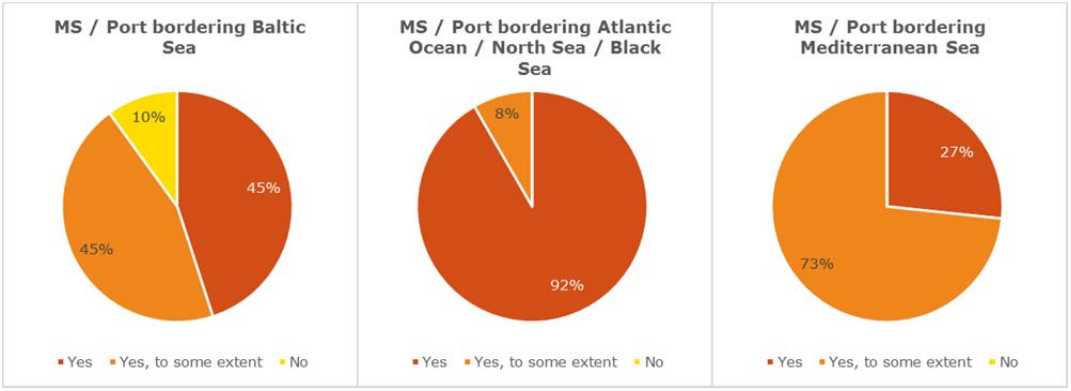
Source: stakeholder consultation

A more in-depth analysis of the views on improvements in port reception facilities to receive ship-generated waste showed substantial regional differences. No significant geographical differences were observed in the results for perceived improvements of facilities handling cargo residues. Figure 14 shows that from all port authorities and Member States (the only groups that could be analysed by geographical location), only some respondents around the Baltic Sea saw no improvements in facilities for ship-generated waste as a result of the PRF Directive (10% of respondents). Stakeholders reported that this should be primarily seen from the perspective that under the HELCOM Convention, the States around the Baltic Sea had adequate port reception facilities in

[61] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 42.

place, as a result of which some stakeholders may not perceive the PRF Directive to provide a direct improvement[62].

Figure 14 Regional differences in perceived impact of the PRF Directive



Source: stakeholder consultation

A large number of respondents from Member States and ports on the Atlantic Ocean, North Sea and Black Sea, saw substantial improvements (92%, leaving only the remaining 8% to see a slight improvement). The high appreciation of the improvements in the Atlantic Ocean and the North Sea indicates substantial improvements in port reception facilities. The recent focus of OSPAR on reducing marine litter may have further contributed to the development of adequate port reception facilities. Recent OSPAR Action Plans also include specific references to the PRF Directive[63].

While a large number of Member States and ports on the Atlantic Ocean and North Sea see 'substantial improvements', Member States and ports in the Mediterranean Sea see only improvement 'to some extent' (73% see 'improvements to some extent', while only 27% see 'substantial improvements'). This indicates potentially less effective implementation of the PRF Directive in these regions, as confirmed by the waste delivery data presented in the previous section. Volumes of oily waste and garbage wastes delivered in the Mediterranean are consistently the lowest in the EU.

From the above, it can be concluded that the PRF Directive has overall contributed to improving port reception facilities for ship-generated waste and cargo residues in the EU, despite some regional differences. These regional differences could be explained by prior developments in providing port reception facilities. A majority of stakeholders also reported that the PRF Directive has improved facilities to receive cargo residues specifically, though in slightly smaller numbers than for ship-generated waste. ,

5.2.4. Adequacy of facilities to meet operational needs of port users

In addition to the observations of general improvements in port reception facilities in receiving ship-generated waste and cargo residues, the extent to which port reception facilities in the EU were considered adequate was evaluated. This took account of the extent to which these facilities can meet the operational needs of port users. For this, a number of specific elements are analysed separately below.

Port users indicated that the PRF Directive has contributed to an improvement of the *types* of waste received (63% of port users), the *capacity* (66% of port users) and the *number* of facilities available (68% of port users). Despite these positive evaluations, a

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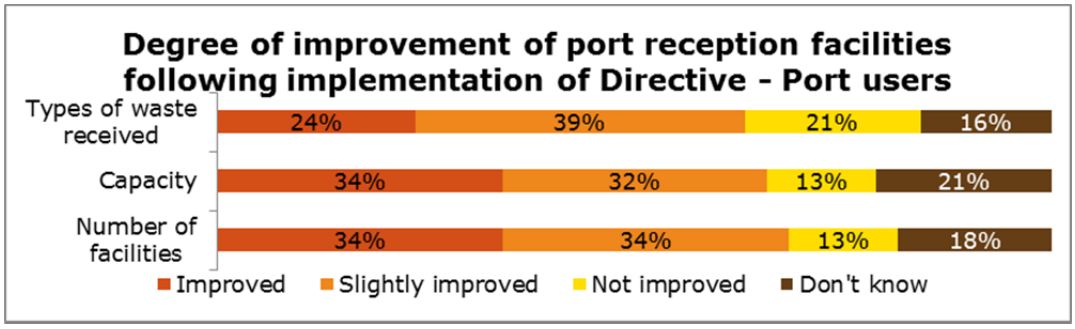
[62] Consider the Helsinki Convention (1974, as amended in 1992): Convention on the protection of the marine environment of the Baltic Sea.

[63] Consider OSPAR (2014) Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic, available at: http://www.ospar.org/documents/dbase/decrecs/agreements/14-01e_rap_marine_litter.doc.

relatively large number of port users also indicated that they were not able to acknowledge the degree of improvement (16%, 21%, and 18% respectively). The analysis of the open comments shows that most port users had trouble answering this question due to large differences in adequacy between different EU ports.

Figure 15 Improvement of port reception facilities through the PRF Directive – port users



Source: stakeholder consultation

These findings are evaluated in more detail below. For port users the most important element in determining adequacy of port reception facilities is whether the relevant waste types are accepted[64]. Given the importance for port users, this evaluation sought to establish whether ports can receive and handle various waste types. These findings were compared with the results of the stakeholder consultation above. Despite relevant differences between ports, particularly in terms of the types of vessels they service and their size, our data showed that EU ports are generally able to receive and handle the waste types prescribed in the PRF Directive. The results of a recent overview of acceptance of waste types in 2012[65] complemented with the findings from our stakeholder consultation in 2014 are presented in Tables 4 and 5.

Table 4 Acceptance of ship-generated waste

Type of ship-generated waste	Accepted in major ports 2012	Accepted in major ports 2014[66]
Oily waste from machinery space (MARPOL Annex I)	All (100%)	100%
Sewage (MARPOL Annex IV)	92%	97% of ports, 89% of waste operators
Garbage (MARPOL Annex V)	All (100%)	100%

[64] Based on a question in our stakeholder consultation, not presented here. Port users were asked to rank various items, based on their respective importance to adequacy of port reception facilities (availability of reception facilities for different waste types, capacity / discharge rate, costs, possibility for waste separation and recycling, timeliness and readiness of PRF services, location of PRF services, efficiency of inspections, location and/or size of the port). The most important element for all port users was the availability of port reception facilities.

[65] EMSA (2012), Study on the delivery of ship-generated waste and cargo residues (Ramboll), page 51.

[66] Based on results stakeholder consultation.

Table 5 Acceptance of cargo residues

Type of cargo residue	Accepted in major ports 2012	Accepted in major ports 2014[67]
Oily cargo residues (MARPOL Annex I)	47%	Not reported
Liquid cargo residues (MARPOL Annex V)	80%	Not reported

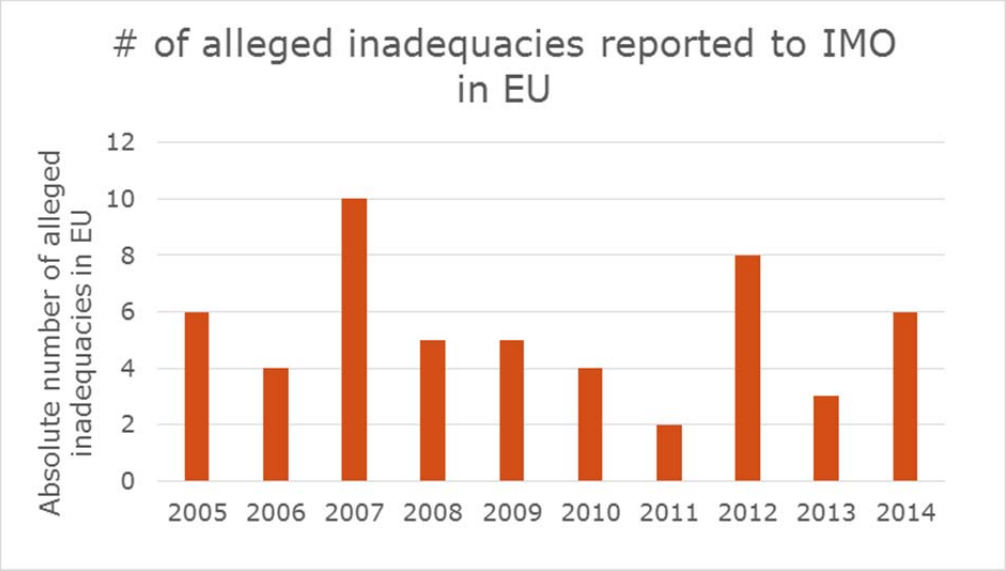
Whereas most waste types are generally accepted, and MARPOL Annex I and MARPOL Annex V waste are accepted in all surveyed major ports, there was lower acceptance of oily cargo residues. This is not necessarily an issue with respect to the PRF Directive's requirement to offer adequate facilities to 'ships normally using the port'. If a port does not receive oil tankers, it does not need to have facilities to handle oily cargo residue. Only one port user (out of 38 port users) in the stakeholder consultation indicated that the acceptance of cargo residues is a problem. This finding is further strengthened by EMSA's inspections in ports, which also did not find specific issues related to the delivery of cargo residues in the EU[68].

However, port users in every port may have oily waste from machinery space, and garbage to be delivered, and therefore each major port should have adequate facilities to receive and handle these waste types. Table 4 and Table 5 show that all ports reportedly accept MARPOL Annex I and MARPOL Annex V waste, and almost all accept Annex IV waste. These findings are in line with the results of an EMSA horizontal study, which showed that almost all Member States have port reception facilities that are adequate and available, especially for ship-generated waste[69].

In addition to assessing the acceptance of different waste types in port reception facilities in the EU, this evaluation took into account the number of alleged inadequacies reported to IMO that can be found under the IMO Global Integrated Shipping Information System (GISIS). This is also a relevant measurement for adequacy, as through this tool IMO gives users of port reception facilities the possibility to report on alleged inadequacies of port reception facilities. As Figure 16 illustrates, every year a small number of reports are filed on EU ports. More in-depth analysis of these reports showed that 79% of the alleged inadequacies concerned the inability to discharge a particular type of waste. 10% of the reports indicated a capacity issue for sewage discharge, and 6% indicated that the fees charged were unreasonable. The remaining 6% concerned complaints regarding the convenience of discharge locations and undue delays due to planning. However, with over 1,500 ports in the EU and roughly two million port calls per year in the main EU ports, the number of reported inadequacies is low and does not show a discernible trend[70].

[67] Based on results stakeholder consultation.
[68] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 42.
[69] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 41.
[70] See https://gisis.imo.org/Public/PRF/InadequateFacilities.aspx, and Eurostat data on port calls.

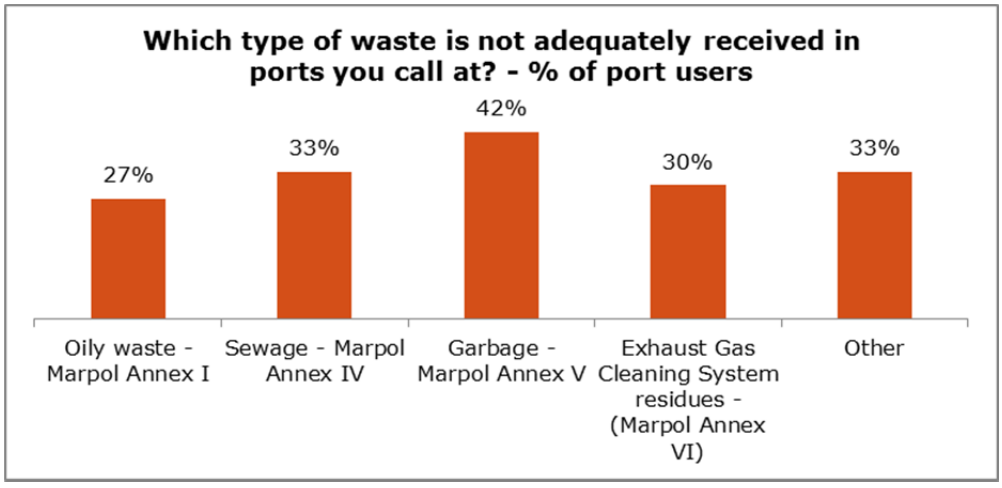
Figure 16 Inadequacies reported to IMO



Source: GISIS Database on alleged inadequacies of port reception facilities

Despite the overall appreciation by stakeholders of improvements in EU ports since the introduction of the PRF Directive, our stakeholder consultation still points to a number of substantial issues related to adequacy. For the various types of ship-generated waste, port users reported delivery problems, particularly for garbage (MARPOL Annex V waste) and sewage (MARPOL Annex IV waste), as presented in Figure 17. Each of these elements will be discussed below in more detail.

Figure 17 Type of ship-generated waste not adequately received



Source: stakeholder consultation

Port users were asked to substantiate their problems and for garbage under MARPOL Annex V almost all respondents indicated the lack in some ports of arrangements for collecting separated solid waste in the port as the most prominent issue of adequacy. This issue is assessed in Section 5.3.2 on waste management practices. The availability of dedicated receptacles for collecting separated waste in the port clearly has an effect on the perceived adequacy of facilities. Moreover, this issue has been on the agenda for

several years. A 2005 study estimated that only about 25% of the North Sea ports have waste separation procedures in place[71].

With regard to sewage (MARPOL Annex IV), 33% of port users indicated that in some ports adequate facilities are not available. Other reports suggest that the capacity (the rate of flow) of port reception facilities to receive MARPOL Annex IV waste is often considered insufficient, even though the facilities are in place[72]. A more in-depth analysis of the stakeholder responses confirmed this. For all port users that reported an adequacy problem with Annex IV waste, the *capacity* of facilities was particularly important[73]. Despite the presence of sewage treatment plants on board, the substantial production of Annex IV waste on board large cruise ships, in combination with their relatively short time in ports, means that these port users are primarily concerned with the capacity (rate of flow) of Annex IV facilities[74]. Although relevant in each port of call for cruise ships, this issue was mentioned particularly by the cruise industry. With the most recent amendments to Annex IV, the Baltic Sea, which is an area frequented by passenger ships and cruise vessels, has been designated as a special area in which the discharge of untreated sewage is prohibited[75]. This special area status has not entered into force yet, awaiting the MEPC to set a date from which the special area requirements under MARPOL shall take effect. Recently, the Baltic Sea coastal states sent a notification to MEPC 68[76], stating that adequate reception facilities for sewage are provided in their ports and terminals[77].

Exhaust gas cleaning system residues (MARPOL Annex VI) were mentioned by 30% of the port users, who indicated that many ports do not yet have the facilities to accept this type of waste. This is particularly due to the fact that there are currently not many vessels with a need to discharge this type of waste. This issue is directly related to MARPOL Annex VI and to the introduction of the new Sulphur Directive (2012/33/EU), which are discussed in Section 8.1.3. In the period under evaluation, the amounts of Annex VI waste were too small to have an impact the effectiveness of the PRF Directive in relation to its broader zero-waste objectives. However, as indicated elsewhere in this report (see coherence with other EU legislation in Section 8.2), this can change in the future. Currently, the main impact lies on the overall perceived adequacy of EU ports by port users. However, Annex VI waste is currently not within the scope of the PRF Directive. As ports do not have to ensure adequate port reception facilities for this waste type under the PRF Directive, it does not affect the effectiveness of the PRF Directive.

Some 27% of the stakeholders reported inadequacies with regard to oily waste from machinery space (Annex I waste). Stakeholders indicate that disposal of this waste is generally a routine procedure, for which ports are generally equipped. However, no substantial comments or examples of such inadequacies were received. Combined with the fact that this type of waste is mentioned the least often as problematic, it is concluded that generally the facilities for Annex I waste are adequate.

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71 Carpenter and S. Macgill (2005), The EU Directive on port reception facilities for ship-generated waste and cargo residues: The results of a second survey on the provision and uptake of facilities in North Sea ports, Marine Pollution Bulletin 50: 1546.

72 Carpenter and S. Macgill (2005), The EU Directive on port reception facilities for ship-generated waste and cargo residues: The results of a second survey on the provision and uptake of facilities in North Sea ports, Marine Pollution Bulletin 50: 1541-1547.

73 Port users were asked to rank various items, based on their respective importance to adequacy of port reception facilities (see footnote 64). Port users were asked to rank various items, based on their respective importance to adequacy of port reception facilities (availability of reception facilities for different waste types, capacity / discharge rate, costs, possibility for waste separation and recycling, timeliness and readiness of PRF services, location of PRF services, efficiency of inspections, location and/or size of the port). Port users that reported adequacy issues with annex IV waste on average assigned 'capacity' a second position, while the entire population in general selected costs and timeliness in favour of capacity.

74 Confirmed by the answers in our stakeholder consultation, but see also N. Butt (2007), 'The impact of cruise ship-generated waste on home ports and ports of call: A study of Southampton', *Marine Policy* 31, 591-598.

75 IMO (2011), Resolution MEPC.200 (62).

76 The MEPC 68 took place from 11-15 May 2015.

77 MEPC 68/10/2 (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden)

Finally, 30% of the port users in the consultation indicated that the acceptance of a number of various other types of waste is inadequate. Respondents in the stakeholder consultation indicated some problems with the acceptance of hazardous waste, such as pyrotechnics, batteries, and expired medicines, which port users cannot discharge in many ports they regularly call at.

5.2.5. Conclusions

The sections above present evidence of improvements in terms of the adequacy of port reception facilities to receive ship-generated waste in the EU. EMSA inspection reports, studies and the various types of stakeholders consulted agreed that EU ports have improved the availability of adequate facilities to receive ship-generated waste. In addition, stakeholders indicated that overall, the adequacy to receive cargo residues has also improved, even though the collection of cargo residues often takes place separately at terminals.

The evaluation also presents evidence that the types of ship-generated waste under the PRF Directive are generally accepted in all major European ports. This conclusion is the most important element for port users to determine adequacy by port users. Nevertheless, acceptance of some more specific types of hazardous waste, such as pyrotechnics, batteries, and expired medicines is substantially lower and warrants further attention, despite that the stakeholder consultation overall showed that this issue was not a major problem.

Despite the general improvements of port reception facilities, port users indicated some issues that are problematic in terms of adequacy. Most pertinent were inadequate delivery of garbage (and the issue of separation of solid waste, discussed in Section 5.3.6); capacity issues with regard to sewage; and the reception of MARPOL Annex VI waste, which is currently not within the scope of the PRF Directive. These elements are assessed in more detail elsewhere in this report.

5.3. EQ 5: Improving waste management practices

5.3.1. The evaluation question

EQ5: Has the PRF Directive caused ships and ports to improve their waste management practices, in line with EU waste legislation, in particular as regards the separation of solid waste at the ship-port interface?

To answer this evaluation question, the waste management practices on ships and in ports were reviewed. This section focuses on the development, content and implementation of Waste Reception and Handling (WRH) plans, in order to assess potential improvements of waste management practices that can be linked to the introduction of the PRF Directive. In this assessment, a link was made to EU waste legislation and particular attention given to separation of solid waste at the ship-port interface.

5.3.2. The PRF Directive on waste management practices

The PRF Directive does not directly introduce specific provisions for *ships* to improve their waste management practices. However, through the reporting requirements under the PRF Directive (see Section 5.5.2), and in accordance with waste management requirements under international legislation, vessels need to be fully aware of their waste volumes on-board and record these accordingly. MARPOL Annex V requires that all vessels of 100 GT or more carry a waste management plan, in which procedures on minimisation, collection, storage, processing, and disposal of waste are outlined. In addition, the equipment used and the designation of the responsible persons in charge of waste management must be stipulated[78]. These detailed requirements under IMO guidelines give specific guidance for on-board waste management practices. In parallel,

[78] IMO (2012), MEPC.220(63): 2012 Guidelines for the development of garbage management plans.

the International Organization for Standardization (ISO) developed requirements for ISO 21070/11 (on the management and handling of shipboard garbage) which made the segregation of solid waste a precondition for ISO certification[79].

With regard to waste management practices in *ports*, the PRF Directive introduces various requirements for the port authorities. For instance, it requires the mandatory development of a WRH plan by each port. Through these plans, ports are required to identify the needs of users and adopt procedures to address those needs. The development and regular update of these WRH plans, and the subsequent approval by the relevant authorities are key provisions in the PRF Directive to improve waste management practices in ports. Ports are required to develop these WRH plans in view of specific needs of the port and relevant national and local legislation, which applies to the transport, treatment (including waste separation, re-use and recycling) and waste disposal. This legislation also follows the requirements of EU waste legislation, particularly the Waste Framework Directive[80]. More specifically, the PRF Directive requires in Article 12(g) that the treatment, recovery or disposal of ship-generated and cargo residues shall be carried out in accordance with the relevant EU waste legislation.

In this section, the influence of the PRF Directive in developing WRH plans and its contribution to waste management practices in ports is assessed, with a particular focus on the separation of solid waste at the ship-port interface and on the involvement of local authorities responsible for waste management.

5.3.3. Development of WRH plans

Under the PRF Directive, each EU port is required to assess the need for port reception facilities, adequate to ships normally visiting the port. This requires establishing waste reception and handling procedures, and to develop detailed WRH plans. There is an explicit possibility to develop plans in a regional context, as long as such plans reflect the needs of the individual port. EMSA inspections show that European ports generally have such plans in place and follow up on the procedures contained therein[81]. WRH plans were drawn up by ports, or existing waste management plans were revised to comply with the requirements of the PRF Directive. In some cases, WRH plans were lacking, and the European Commission took legal action to ensure compliance with these requirements. Five infringement cases where ports had not developed WRH plans were brought before the European Court of Justice, which ruled in favour of the European Commission in all cases[82].

The Horizontal Assessment Report covering the EMSA Member State inspection visits in 2005-2009 concludes that larger commercial ports have WRH plans in place, as requested[83]. This was confirmed by our stakeholder consultation, where *all* ports and *all* port users visiting larger ports indicated that such plans were in place. EMSA studies show that whereas such plans were being developed in all Member States, there were still ports (in 55% of the Member States) that have not developed or implemented WRH plans[84]. This was particularly the case in fishing and recreational ports, and in a small number of small commercial ports. In these cases, the designated authorities did not require the port to develop a WRH plan and did not check whether the port had developed a WRH plan. This was especially the case for ports used by recreational craft with less than 12 persons[85]. This issue was confirmed by Member States who argued that the current requirement does not allow sufficient variation for the needs of different port

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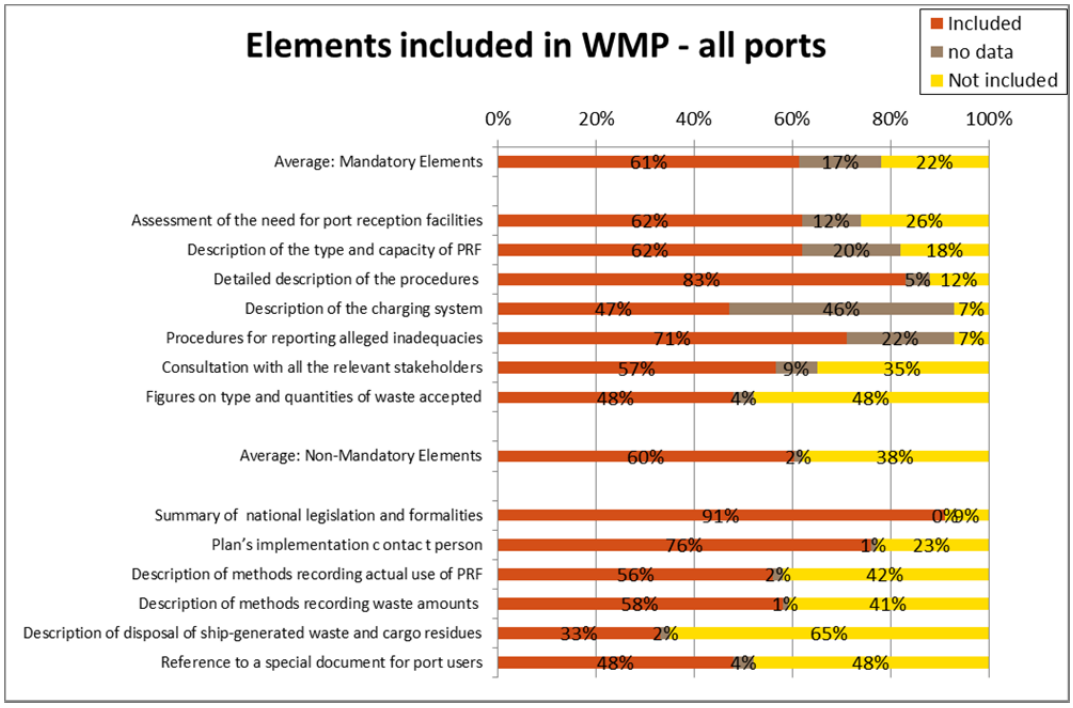
79 http://www.iso.org/iso/catalogue_detail.htm?csnumber=51003
80 Directive/2008/38/EC.
81 EMSA (2006), Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC.
82 ECJ Cases c-81/07, c-106/07, c-368/07, c-480/07, c-26/08.
83 EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 11.
84 EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 11.
85 EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 11.

sizes[86]. More specifically, Member States have indicated at various times that the detailed requirements of the WRH plans should be reduced for smaller ports in a harmonised way, paying specific attention to the lack of resources of smaller ports to draw up these WRH plans, and difficulties encountered with privately owned small ports[87].

5.3.4. Implementation of WRH plans

Annex I of the PRF Directive sets out a number of mandatory elements for WRH plans, followed by a number of additional non-mandatory elements. The competence to determine how these elements are described in WRH plans lies with Member States, who should approve the WRH plans. For each element, Figure 18 presents the result of EMSA inspections on the extent to which these were implemented in the WRH plans. Less than half of the ports (47%) included explicit references to the types and levels of waste fees charged. This issue is also reported in Section 5.4.6, which shows that a large number of port users indicated that they are not adequately informed about the fees charged for waste delivery. In the stakeholder consultation, port users report this issue more often for ports in the North Sea and Baltic Sea than in other regions.

Figure 18 Elements included in WRH plans[88]



Source: EMSA (2006) Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC.

Although Figure 18 presents a summary of all ports surveyed, there are relevant differences between different types of ports. Among the WRH plans developed by fishing ports, for instance, only 48% included an assessment on the need for port reception facilities. For recreational ports, the descriptions of the types and quantities of waste accepted are only present in 37% of the WRH plans. This can be explained because these ports are mostly concerned with only garbage.

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[86] EMSA Workshop report (2011): EMSA workshop on Port Reception Facilities for ship-generated waste and cargo – Lisbon 13 & 14 April 2011: page 5.

[87] EMSA Workshop report (2011): EMSA workshop on Port Reception Facilities for ship-generated waste and cargo – Lisbon 13 & 14 April 2011: page 5.

[88] Please note that where the figure reports 'no data', the analysed plan does not contain this information, whereas 'not included' signifies that upon inspection this element is indeed not found.

Ports of different types and sizes experienced difficulties in implementing the requirements of Annex I. Problems with implementation were mentioned particularly when ports already had WRH plans in place, or in contexts with large numbers of smaller ports[89]. To assist in the subsequent implementation of the PRF Directive requirements, a number of workshops were organised by the EMSA. This was done to address Member States needs for additional guidance on the level of detail required for the WRH plans of recreational ports, which may not have the resources to draft such WRH plans. This issue was also brought forward in our stakeholder consultation, where in some cases Member States reported using differentiated requirements for different types of ports, whereas others use a similar methodology to approve WRH plans. As mentioned earlier, the PRF Directive offers ports the possibility under Article 5(2) to develop regional WRH plans. As a result, separate WRH plans are not needed for each small port. There is no conclusive evidence on the extent to which smaller EU ports are making use of this option.

5.3.5. Including port users in the development of WRH plans

It is necessary to establish to what extent the WRH plans meet the requirements of Article 5(1), i.e. for the WRH plan to be developed 'following consultations with the relevant parties, in particular port users or their representatives'. Through this consultation, the contents of WRH plans can take the demands and waste management practices of relevant port users into account, while respecting the requirements of the local authorities. The EMSA visits to the Member States show that the WRH plans were mostly developed in collaboration with port users, often in the form of meetings or sometimes more formal consultation procedures. Still, in one-third of the Member States no documentary evidence could be provided of such stakeholder consultations. However, there is the possibility that such consultations have taken place informally, as part of normal daily contacts without a reporting routine[90].

These findings were confirmed in our stakeholder consultation. The major commercial ports generally reported in large numbers (89%) that they had contacted the primary port users, and in slightly lower numbers (81%) that they continued to consult their port users to update the WRH plan[91]. However, as Figure 19 shows, port users also indicated that they were not sufficiently consulted on the contents of these plans; 67% indicated they were not consulted on the initial drafting, and 71% reported they were not consulted during the implementation phase and/or during possible revisions. Port users reported that the consultation by ports of their users occurred less often in ports in the Mediterranean region than in other regions. As a large number of WRH plans were developed before 2006, it may be too long ago for port users to be aware of the consultation procedures for the initial drafting. However, this does not hold up for the high percentage that was not consulted on revisions of the WRH plan. Under Article 5(3) of the PRF Directive, the WRH plans should be revised every three years, but port users reported that outdated WRH plans of more than five years old are still sometimes used by ports. In combination with the finding that a number of ports do not consult their users on the development and updating of WRH plans, this indicates an implementation problem.

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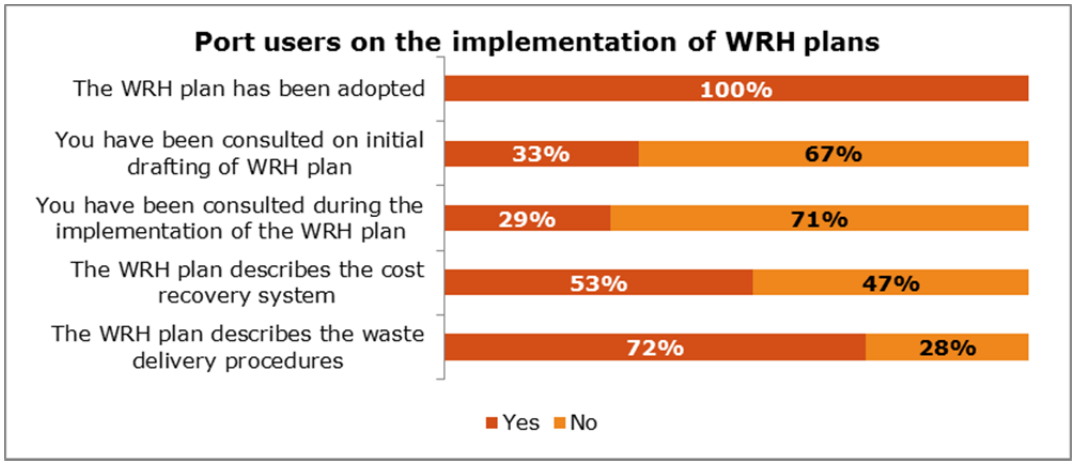
[89] Interview with Lorraine Weller, MCA Senior Environmental Policy Adviser –Maritime and Coastguard Agency-Department of Transport.

[90] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC).

[91] Consult annex, not presented here.

Figure 19 WRH plans implementation aspects

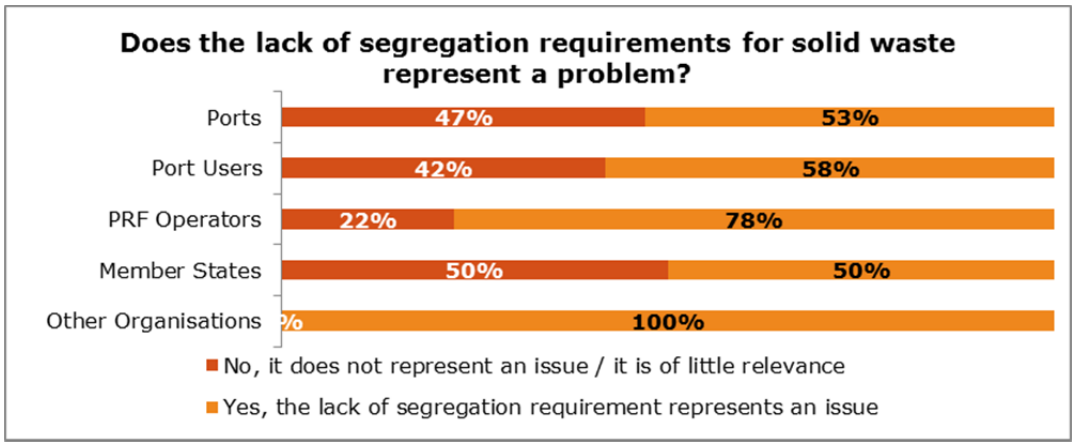


Source: stakeholder consultation

5.3.6. Pertinent needs of port users

The need to consult port users when developing and updating WRH plans becomes most pertinent with regard to separation of solid waste at the ship-port interface. As port users generally apply MARPOL regulations and follow IMO guidelines and ISO Standards for on-board waste management, many have procedures to separate garbage on-board. Separated garbage as a requirement for ISO certification 21070 (management and handling of shipboard garbage), contributes to making this a common practice by port users. However, earlier studies and reports, supplemented by our stakeholder consultation, indicate that many ports do not have specific arrangements for separated garbage collection, and collect all garbage at one location[92].

Figure 20 Segregation of solid waste



Source: stakeholder consultation

PRF operators (78%) as well as other organisations (100%) stated that the lack of segregation requirement constitutes an issue, as presented in Figure 20. The lack of segregation requirements for waste landed in ports under the EU waste legislation was perceived as an issue by one out two respondents in the Baltic and Scandinavian regions, whereas up to two out of three stakeholders in the rest of Europe were of the same opinion[93]. Among port users, the data suggest that the topic is an issue particularly for

[92] European Commission (2012) Impact Assessment for the review of the 2000/59/EC Directive (Europe Economics, May 2012), page 128.

[93] This difference is not statistically significant.

the cruise, the container and the dry bulk sector.[94] When asked to further substantiate their opinion, stakeholders pointed to the demoralising effects of delivering on-board separated waste into a single bin in the port reception facility.

5.3.7. Conclusions

The PRF Directive has contributed to improved waste management practices in a large number of ports by developing planning and describing waste management procedures in the port. The PRF Directive requires that ports develop WRH plans in line with broader EU legislation, which in many ports had not been provided before the implementation of the PRF Directive.

The evaluation showed that even though consultation of port users is common practice in many larger ports, it remains an issue for smaller fishing and recreational ports. However, the results also showed that having a consultation mechanism to involve port users is not sufficient to ensure sound waste management practices, particularly for segregated solid waste at the ship-port interface. When developing and updating their WRH plans, ports have insufficiently addressed procedures for reception, collection, storage, treatment and disposal of ship-generated waste and cargo residues. Many stakeholders highlighted the problem that port reception facilities have no arrangements to process garbage that had been separated on-board. Moreover, ports have also insufficiently involved the local authorities responsible for implementation of waste legislation.

5.4. EQ 6: Cost recovery systems

5.4.1. The evaluation question

EQ6: Have the various cost recovery systems (CRS) set up under the PRF Directive ensured that all ships contribute to the costs of port reception facilities in a fair and transparent way, and provided sufficient and comparable incentives for ships to deliver their waste?

In order to answer this evaluation question, the question is broken down into several elements. First, the various types of CRS are reviewed. Next, the evaluation focuses on the extent to which these CRS provide *sufficient* and *comparable* incentives for ships to deliver their waste in port reception facilities. Finally, the extent to which CRS ensure that all ships contribute to the costs in a *fair* and *transparent* way is reviewed. The following interpretations have been applied:

- **Fairness:** following the requirement of the PRF Directive, all ships should contribute significantly to the costs, whilst ports have the possibility to differentiate for different types of ships. An element that lies implicitly under this evaluation question is the issue of fee reductions for green ships, which is addressed separately in Section 5.4.7.
- **Transparent:** this relates to the way ports inform users of the composition of the cost structure and tariffs.

5.4.2. Providing no incentive for ship to discharge at sea

One of the key elements of the PRF Directive is the introduction of cost recovery systems, which shall apply to all ships using port reception facilities without providing an 'incentive for ships to discharge their waste into the sea'. In doing so, the PRF Directive applies the 'polluter pays principle'. There is some friction between these two principles of the PRF Directive. The free-of-charge use of a port reception facility would provide a clear incentive for ships to land their waste ashore, while a paid port reception facility creates some incentives to land as little waste ashore as possible. The solution to this

[94] Note that the differences between different business sectors are not statistically significant, due to the small sample sizes.

friction introduced in the PRF Directive lies in Article 8(1), which requires that 'all ships calling at a port of a Member State shall contribute significantly to the costs, irrespective of their actual use of the facilities'[95]. By demanding that all ships, including those that do not discharge waste, contribute to the costs of port reception facilities, an incentive is given to discharge waste in the port reception facilities[96]. In combination with the principle of mandatory delivery of waste in the port, the PRF Directive introduces a system of all ships delivering all their waste, and all ships having to pay for it.

While the PRF Directive is clear that all ships need to contribute to the costs, it allows a variety of fee systems in ports and Member States for reasons of subsidiarity[97]. Strictly speaking, the only guidance the PRF Directive provides on the desired level of the contribution to the costs is that it should be significant, fair, transparent and non-discriminatory and consequently does not create incentives to discharge waste at sea. However, the European Commission interprets a 'significant' contribution as 'a figure of the order of at least 30% of the costs referred to in Article 8(1)'[98]. Whereas the legal status of this 30% provision is not entirely clear[99], most EU ports aim to cover a minimum of 30% of the annual total costs of waste handling through this fee[100].

5.4.3. Different types of cost recovery systems

This section assesses the variety of cost recovery systems in place. Subsequently, the extent to which these cost recovery systems are in line with the requirement 'not to create incentives to discharge at sea' is reviewed.

The cost recovery systems in place in the various Member States and ports could be categorised in three major groups[101]:

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

Within these three categories there is a wide variety of specific models used by individual ports and/or Member States, as a result of which there is often no harmonisation of cost recovery systems within a Member State. To add to the complexity, on top of the variety of cost recovery systems, ports and/or Member States sometimes have different cost recovery systems in place for different types of waste. The three main categories are presented below and explored in more detail.

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[95] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Article 8(2a).

[96] Compare for instance Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Preamble 14,

[97] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Preamble 14

[98] Official Journal of the European Communities (2000), Statement of the European Commission. (OJ L 332, volume 43, 28 December 2000, page 90)

[99] A Member State indicates not to consider this legally binding, as this additional statement was merely given as supplement to the Directive. See: UK Maritime Coastguard Agency (2003), The Informal Guidance on the Mandatory Charge Element of the Port Waste Facilities Regulations 2003 issued on November 2003 by Shipping Policy 2 Division, DfT/ Maritime and Coastguard Agency November 2003.

[100] 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, page 23.

[101] Following the categorization as stated in EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 18-19.

No special fee systems

Among cost recovery systems without special fees in place in European ports, several do not provide limits to the amounts of waste landed (referred to as *NSF/Unlimited use* system)[102]. In this system, no fee is charged in addition to the common waste handling fee, which the port authority charges to all ships. This handling fee does not depend on the quantity of the discharged waste, and is also charged if a vessel does not use the port reception facilities at all. The fee is normally based on ship size and sometimes also on ship type, and the waste handling fee can be included in the port dues or charged separately.

Ports with another variety of fee systems without 'special fee', accept waste up to a reasonable amount (referred to as *NSF/Reasonable amount*)[103], meaning that a specified amount of waste is covered by the common waste handling fee charged to all ships. All quantities of waste that are considered 'excessive' are charged separately, and may be charged by either the port authority or by waste operating companies. The amounts covered in the independent fee are defined by the port authority. Any additional waste is charged separately, based on the volume of discharged quantities[104].

Most EU ports have implemented a variation of the 'No Special Fee'[105]. In most cases, this system applies to garbage and oily waste, and in a few cases, sewage is included as well. Some ports have implemented a cost recovery system in which no special fee is only charged for garbage (referred to as the 'garbage-only' NSF system). Examples are the UK ports of Immingham and Southampton. In these cases, the indirect fee covers all garbage reception costs, while all other costs are charged based on the volumes of waste delivered.

Administrative waste fee/contribution systems

Administrative waste contribution systems generally consist of the administrative fee and an amount that is directly related to the volumes of waste delivered. One variation of this system is an administrative waste fee deposit (referred to as *ADM/deposit* system)[106]. An important difference in how the *ADM/deposit* system can be found in Member State ports is whether or not ships get a refund of their deposit after discharging waste at a port reception facility. In some ports, a non-refundable administrative waste fee is charged to ships. However, in most cases, ships receive a full or partial refund if they discharge waste. In this system, all ships pay a waste-handling 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. Another fee system type including an administrative fee that can be found is the *ADM/opposite fee* system[107]. In this case, all ships are charged a penalty fee unless they can submit proof of having discharged waste in that or another EU port.

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[102] Referred to as 'Indirect fee only', '100% indirect fee' and 'Full no special fee' on p. 14 of the EMSA *Technical report evaluating the variety of cost recovery systems* (.) and as 'Indirect Fee 100% (no limitations in waste volume) on p.36 of the *EMSA Study on the delivery of Ship-Generated Waste* (.). The system is described on pp. 5 and 14 of the EMSA *Technical report evaluating the variety of cost recovery systems* (.)

[103] 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, p. 6 and pp. 15-16.

[104] 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.

[105] EMSA (2010), *Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC)* p. 19.

[106] Described on pp. 17-19 of EMSA's technical study on cost recovery systems, pp. 19-20 of EMSA's horizontal assessment report on port reception facilities and pp. 35-41 of EMSA's study on the delivery of waste to port reception facilities in EU ports.

[107] Described on pp. 19 of EMSA's technical study on cost recovery systems, pp. 19-20 of EMSA's horizontal assessment report on port reception facilities and pp. 35-41 of EMSA's study on the delivery of waste to PRF's in EU ports.

Direct fee only systems
In addition to NSF and ADM cost recovery systems, one additional model was found. This covers all waste reception costs with a fee that is directly related to the amounts of waste landed. By only charging vessels that deliver waste, fully based on the volume of waste delivered, these systems do not provide incentives to discharge waste in ports. These are not in line with Article 8(2) of the PRF Directive, which requires that such incentives are in place. The PRF Directive does not prescribe a particular type of cost recovery system for cargo residues. Article 10 only requires that cargo residues are delivered in accordance with MARPOL and any fee for delivery of cargo residues is paid by the user of the port reception facilities.

5.4.4. Application of various cost recovery systems

After introducing the characteristics of the main cost recovery systems in use in the EU, an overview of the use of each of these systems, for a sample of 50 major ports in the EU is presented. This section takes into account that ports use different cost recovery systems for different waste types[108]. Overall, Figure 21 shows that many ports have either a 'no special fee system', or charge an 'administrative fee'. The 'no special fee system' is more commonly used than 'administrative fee' systems. Within the 'no special fee system, ports are more inclined to set limits to the amount of waste covered by the fixed fee, and use a 'reasonable amount' system more often than the 'unlimited use' system.

The cost recovery systems associated with **garbage** (MARPOL Annex V) in EU ports are often of an indirect nature, either through NSF or some form of ADM system. Only four ports receive garbage under a direct fee system. For **oily waste** (MARPOL Annex I) and particularly **sewage** (MARPOL Annex IV), more often a fee is charged directly related to the amount of waste discharged.

When divided by geographical region, it becomes clear that Member States in the Baltic Sea have adopted NSF systems, as illustrated in Figure 21. The ADM system is mostly found in continental North Sea ports, while fees in direct relation to volumes of waste discharged are found in the Mediterranean region and the Atlantic Ocean region for some types of waste (including the North Sea particularly for sewage).

[108] The data from various EMSA studies is pooled and updated where necessary. As such, the ports included follow EMSA initial selection criteria, which seeks to include the largest port, a medium-sized port and smaller port per Member State.

Figure 21 Cost recovery systems in the EU

Source: stakeholder consultation

5.4.5. Sufficient and comparable incentives

In order to understand the incentives created by the different fee systems, waste flows at the macro level of different ports with different fee systems should be assessed. Given the lack of comparable statistical data, and the multitude of factors influencing waste delivery in EU ports, this cannot be done with absolute certainty. However, a general trend of increased volumes of waste delivered to ports with fee systems in line with the requirements of the PRF Directive can be observed (NSF / ADM systems in their varieties)[109].

Data were collected on waste volumes delivered in 50 EU ports (see also Section 5.1 and Annex 5 to this report). Although the volumes delivered in ports give substantial insight into waste flows at the aggregate level, these are influenced by many external factors, such as traffic in the port, ship size calling in the ports, types of vessels calling at the port, price level, efficiency on waste operations, and the type of port operations[110]. From

[109] 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, page 22.

[110] EMSA (2012), Study on the delivery of ship-generated waste and cargo residues (Ramboll), page 5.

the most relevant factors, the amounts of waste delivered were taken as a proportion of the total gross tonnage (GT) of vessels calling in each port. This allowed a comparison of the average waste deliveries across ports, regardless of size and number of vessels calling in a port[111]. These figures were compared with the type of cost recovery system in each port, for each specific type of waste[112]. This gave valuable insight into the development of waste delivered over time in different types of cost recovery systems, in various geographical locations.

Other characteristics also influence trends in waste deliveries, such as the price level of waste delivery under the direct fee systems, the level of refund / penalties under ADM or the 'reasonable limits of waste delivery' set by ports under NSF. However, given that ports aim to maintain a competitive pricing policy, we have assumed that these differences between relevant ports were small enough not to distort the results[113].

Given the specificities of different waste types, and the different cost recovery system in place for different waste types in the same port, the results are presented by waste types. This allows different delivery patterns, created by the different cost recovery systems for similar types of waste and similar amounts of vessels, to be observed. For MARPOL Annex I waste, the results are presented in Figure 22 and show substantial variation for each cost recovery system. The vertical axis presents the average amounts (cubic metre) of waste delivered per 1,000 GT. Consistently increasing levels of oily waste are delivered to ADM / deposit systems. This indicated that in ports with these systems, a similar number of vessels deliver on average more Annex I waste than before.

Other cost recovery systems do not show a rising trend. There was a considerable difference in trend between deliveries in ports with ADM / deposit systems, and ports with ADM / opposite fee systems. This is puzzling, as in theory, the incentives created by these two cost recovery systems are not that different. But the trend of delivery in ports with ADM / opposite fee systems has been relatively stable since 2009, and remains relatively low compared to the rising volumes of delivery in ports with ADM / deposit systems.

The exceptions to this are the high levels in 2004 and 2005, which are impacted by particular high levels in Maltese ports that dropped considerably after these years. The difference between deposit and opposite fee systems could be explained by the psychological effect of rewarding port users instead of penalising them. Possibly, port users delivered only the minimal amount of waste necessary to avoid the penalty, and the reward of a 'discount' in waste deliveries contributed more to delivering all wastes. After a small increase in the early years in the direct fee systems, a slow but discernible downward trend in volumes delivered since 2006 was observed, which is overall in line with our expectations.

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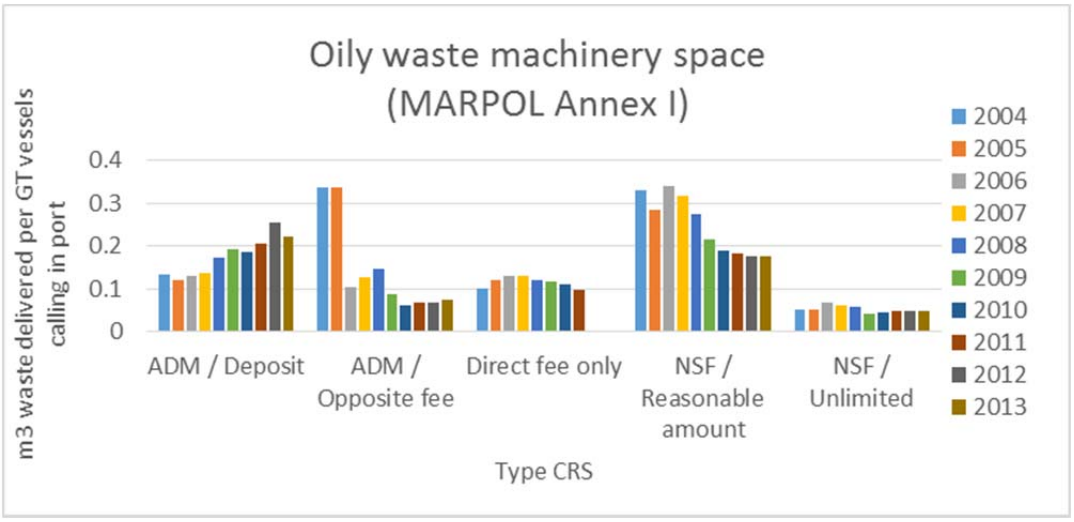
[111] Ideally, one would also control for types of vessels calling in ports, as types of vessels produce different types and amounts of waste (compare for instance a cruise ship with a larger container ship). However, a macro-level analysis of delivery patterns does not allow such detail to be included. Instead, where relevant this possibility will be included in the interpretation of the results.

[112] No data is available when individual ports implemented a cost recovery system in line with the PRF Directive. It can therefore not be excluded that ports had a different cost recovery system in place in years before 2013 for which data is presented.

[113] See, for instance, M.H. Nijdam and P.W. de Langen (2005), *Haven ontvangst installaties: Indirecte financiering en gevolgen voor de concurrentiepositie van Nederlandse Zeehavens*, Erasmus University.

Figure 22 Trends in waste delivery for MARPOL Annex I



Source: Panteia (2015)

The most noteworthy results of Figure 22 were found for ports that have a no special fee (NSF) system in place. Although vessels deliver relatively large amounts of waste under NSF / reasonable amounts, Figure 22 shows a reduction of volumes delivered in these systems over the years. Possibly, ports with these cost recovery systems have gradually reduced the amounts of waste set as 'reasonable', given that modern ship-building and engine technology also reduces the amounts of waste normally produced. This could have led to a reduction of waste delivered, as vessels would have to pay for waste volumes above the reasonable amount. Another explanation is that after the first few years of implementation of the cost recovery systems, ports have readjusted the reasonable amounts based on experience. This is supported by the stabilising trend that can be observed from 2008 onwards. Whereas the highest deliveries would be expected in NSF systems that allow unlimited discharges within the fee, relatively small amounts of waste were delivered in ports with these cost recovery systems. Possibly, the indirect waste fees in these ports are higher than in systems with partially indirect waste fees. However, this cannot fully explain this difference, because once a ship is in the port, waste can be fully discharged without additional charges under NSF / unlimited.

Another possible explanation of these counterintuitive findings is that ports with these systems receive vessels that produce relatively little oily waste, compared to other ports (this type of cost recovery systems is only found around the Baltic Sea for oily waste of machinery space – see Section 5.4.4). Ports that have NSF/ unlimited fee systems for MARPOL Annex I waste also offer special port dues (not only waste fees) related to environmental friendly ships. In this regard for instance, the port dues system in Stockholm (for waste NSF / unlimited) partly bases the level of port dues on the fuel content (% Sulphur oxide) of the ship[114]. In view of these broader environmental guidelines, these ports may attract cleaner ships, which also produce less oily waste from machinery space.

Except for the NSF systems, the volumes of MARPOL Annex V waste deliveries as shown in Figure 23 show relatively similar trends. Because ports generally do not have the same cost recovery systems for both Annex I and Annex V waste, similar trends are an indication that variation is more related to the type of cost recovery system than, for instance, geographical location of the port. A similar upward trend is observed for ADM / deposit systems for MARPOL Annex I waste. Relatively stable amounts of Annex V waste

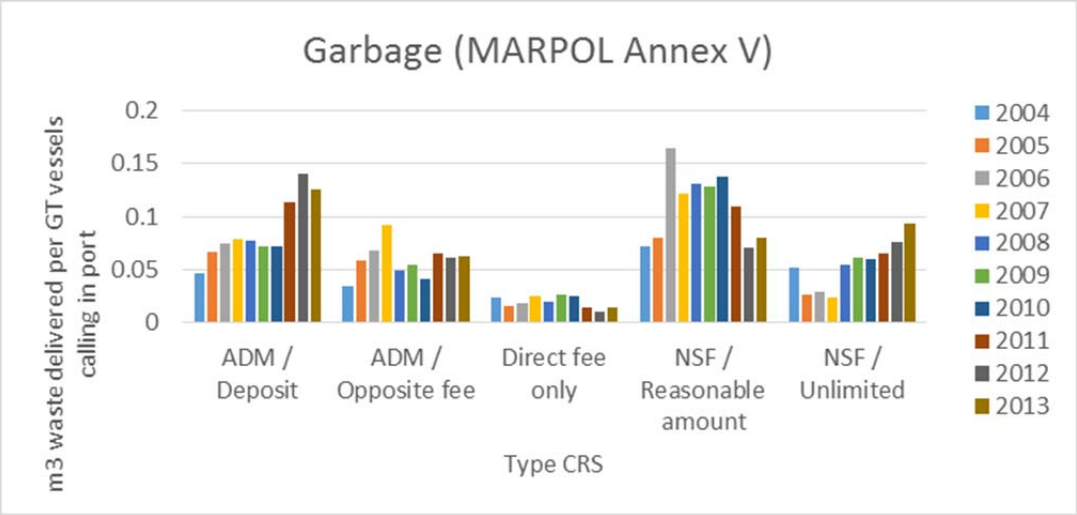
[114] See for instance Clean Baltic Sea Shipping, Sustainable Shipping and Port Development (available at: http://www.clean-baltic-sea-shipping.com/uploads/files/Sustainable_shipping_and_port_development_Task_3.6.pdf)

are being delivered to ports with an ADM opposite fee, in contrast to the outliers observed for Annex I waste (high levels in 2004 and 2005) in ADM / opposite fee systems.

For ports with direct fee only systems, Figure 23 confirms the trend also found for Annex I waste. Figure 23 shows that the levels of garbage delivered to the port with a direct fee system are considerably lower (compared to the same number / size of vessels) than in other cost recovery systems. This further strengthens the case that an indirect waste fee can functions as an incentive not to discharge at sea.

The deliveries of Annex V waste in ports with NSF / reasonable amount systems varies and does not show a clear trend. A clear difference with Annex I waste in Figure 23 is the rising trend of increased Annex V waste deliveries in ports with NSF / unlimited systems. Whereas these levels were relatively low until 2008, a clear rising trend has been observed in these ports in recent years. This finding is in line with how a NSF / unlimited cost recovery system provides incentives to discharge in the port.

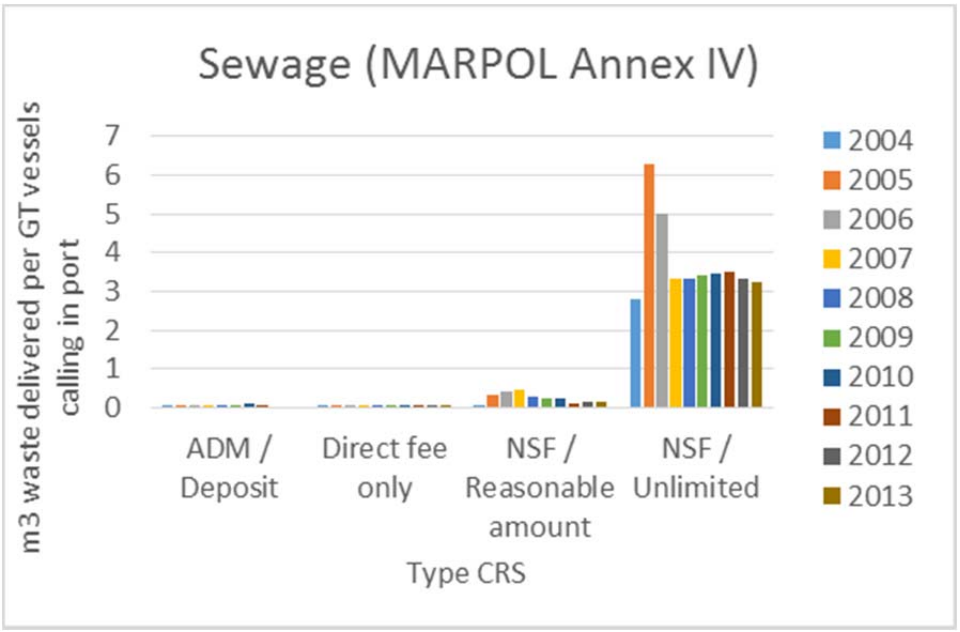
Figure 23 Garbage (MARPOL Annex V) collected for types of CRS

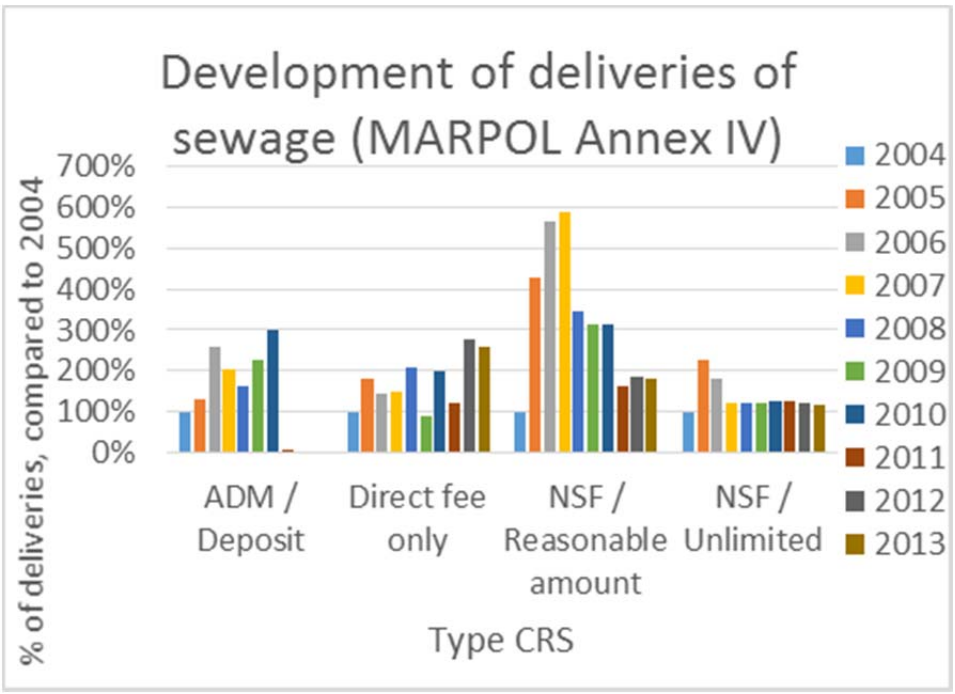


Source: Panteia (2015)

Finally, the waste volumes delivered for sewage (Annex IV waste) are presented in Figure 24. This figure shows that ports with a NSF / unlimited system receive comparatively higher amounts of waste than ports with other cost recovery systems. For comparison of trends in the other cost recovery systems, Figure 24 presents the trends in percentages, based on the 2004 values. No clear trends can be observed. The volumes of deliveries are relatively stable in ports with NSF / Unlimited systems, whereas delivery of sewage in NSF / reasonable amounts is reducing, possibly related to lower 'reasonable limits' set. In ports with ADM / deposit and direct fee systems, a positive trend in sewage deliveries can also be observed. However, measured in absolute volumes, these trends are minimal and suggest that ships deliver their sewage in ports with NSF systems (unlimited). Other ports do not provide comparable incentives for delivery and seemingly do not require ships to deliver waste in the port, as required under Article 7 of the PRF Directive.

Figure 24 Sewage (MARPOL Annex IV) for types of CRS





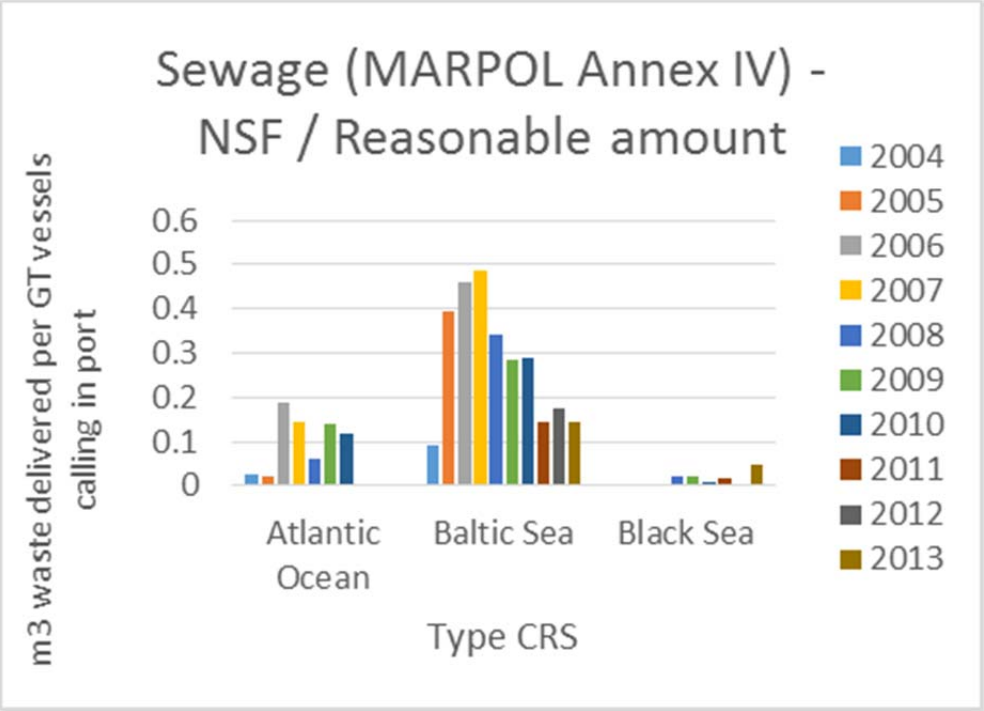
Source: Panteia (2015)

In the interpretation of these figures, the geographical location of ports needs to be taken into account. Only Member States on the Baltic Sea have NSF / Unlimited systems for Annex IV waste. Among ports with NSF / reasonable amount systems, Baltic Sea ports also have higher delivery of sewage compared with Member States in other sea basins, as evidenced by Figure 25.

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

facilities to adequately handle the higher demand for disposal of sewage wastes on shore[115]. These ports also require vessels to discharge sewage in the port reception facility more strictly before departure. In combination, these factors contribute to the considerably different discharge trends for sewage in the Baltic Sea region.

Figure 25 Sewage (Annex IV) for NSF / Reasonable amount



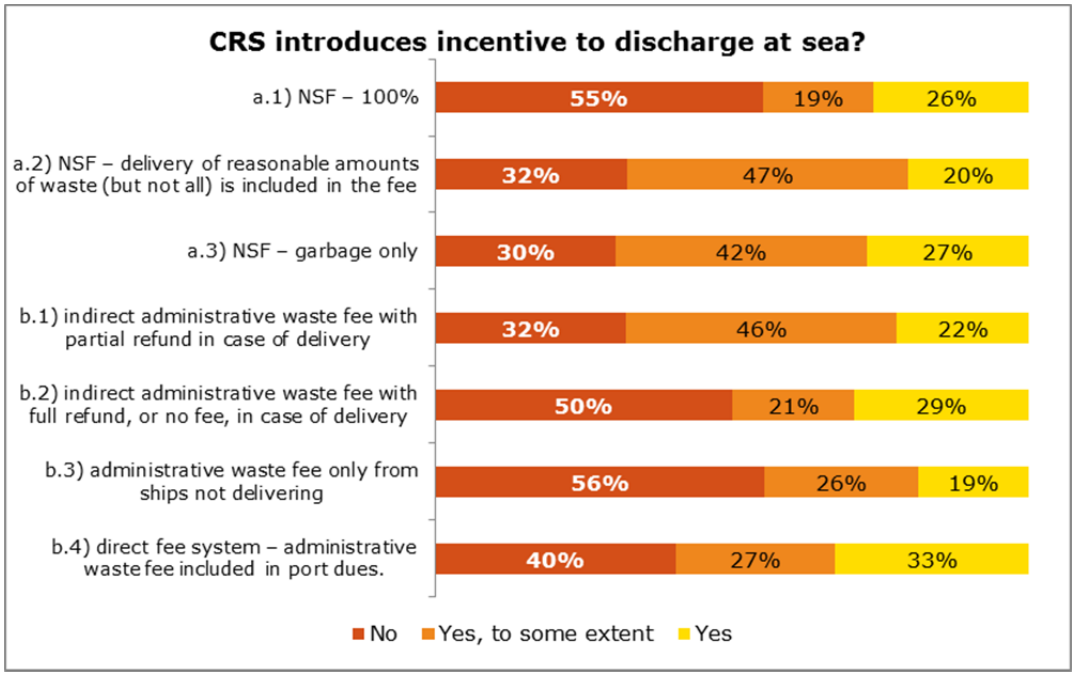
Source: Panteia (2015)

The findings based on the waste delivery under Annex I and V waste show increased deliveries in ports with an ADM deposit system. The variation in delivery trends for the various cost recovery systems applied to the different types of waste indicates that cost recovery systems affect incentives to port users to discharge waste. However, these are not the only elements affecting waste discharge; other factors, such as the amounts of waste allowed under NSF, and the level of compensation for waste delivery are also relevant. Moreover, other factors not directly related to the type of cost recovery system also have an effect, such as differences in enforcement standards by ports, other incentives in port dues, type of traffic / ships calling at the port, efficiency on waste operations, and the type of port operations. As already argued, among these factors, the higher environmental standards and incentives of other port dues in ports on the Baltic Sea can partly explain the relatively low volumes of Annex I waste deliveries in Baltic Sea ports, despite the 'no special fee' systems in place.

These findings were assessed against our stakeholder evaluation on the incentives that different cost recovery systems offer to prevent discharges at sea. Although stakeholders broadly agreed with the outcome of the data presented above, particularly on ADM fee systems differences were found. Figure 26 shows that 56% of stakeholders considered that ADM / opposite fee systems and NSF unlimited systems (55%) do not provide incentives to discharge at sea. Only a minority considered that NSF systems with reasonable amount (32%) or ADM systems with only partial refunds (32%) do not provide an incentive to discharge in seas. To better understand these differences, stakeholder responses were further analysed.

[115] See also HELCOM (2015), Baltic Sewage Port Reception Facilities.

Figure 26 Incentives to discharge waste at sea by cost recovery system



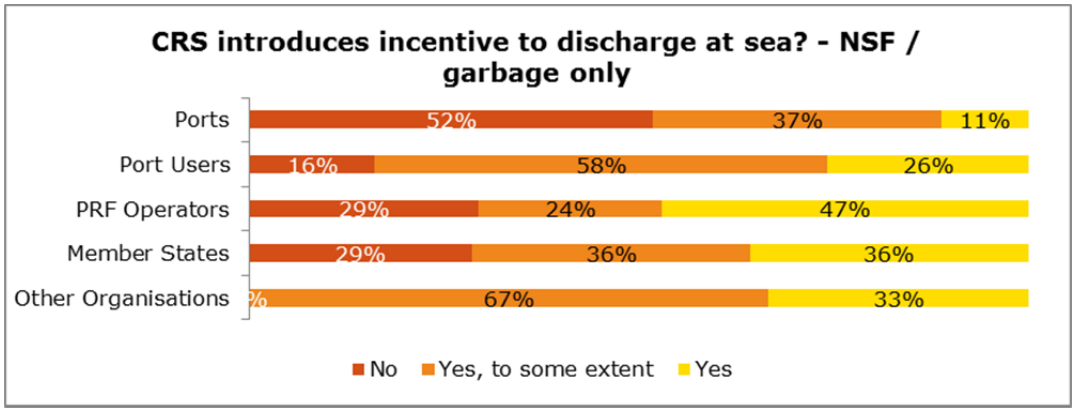
Source: stakeholder consultation

The results above were split up where relevant differences between stakeholders were found. A particular difference was found between ports and other stakeholders for the NSF-garbage only systems, as presented in Figure 27. Whereas a majority of ports (52%) expected that this does not create an incentive to discharge waste at sea, only 16% of port users considered this to be the case. Insufficient data have been collected on NSF / garbage only systems to substantiate this finding with waste delivery data.

A study in the UK investigated the impact of cost recovery systems, which charge a fee independent of the volume of garbage delivered while charging oily waste by volume (NSF / garbage only). The study found that this type of cost recovery system contributed to a significant reduction of oily waste from machinery space discharged at UK ports[116]. Port reception facilities in these ports indicated that they face competition with waste operators in other ports, where the discharge of oily wastes is partly included in the indirect fee. The increased volumes of Annex I waste delivered to ports with ADM systems partly confirm these conclusions. However, the data presented above show that reduction of oily waste delivered to port reception facilities is more widespread in EU ports than only in NSF / garbage only systems.

[116] European Commission (2012) Impact Assessment for the review of the 2000/59/EC Directive (Europe Economics, May 2012), page 137.

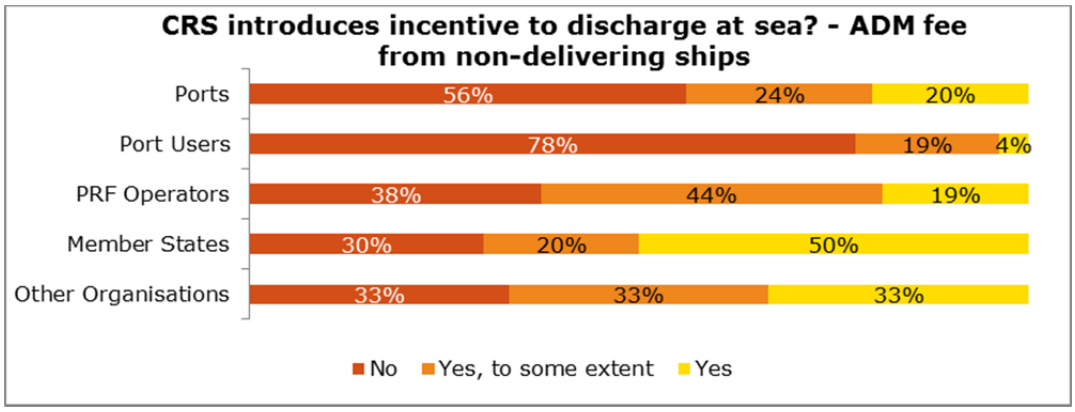
Figure 27 Incentives to discharge waste at sea by CRS for NSF-garbage only



Source: stakeholder consultation

Port users considered that incentives provided by an ADM system that only charges a fee for ships that do not deliver waste offers the least incentives to discharge at sea, as presented in Figure 28. This could be explained from the perspective of administrative burden. Instead of applying for a refund or a deposit after delivery of waste, the system would only target ships that do not deliver waste.

Figure 28 Incentives to discharge waste at sea by CRS for ÀDM



Source: stakeholder consultation

5.4.6. Transparency on the composition of waste fees

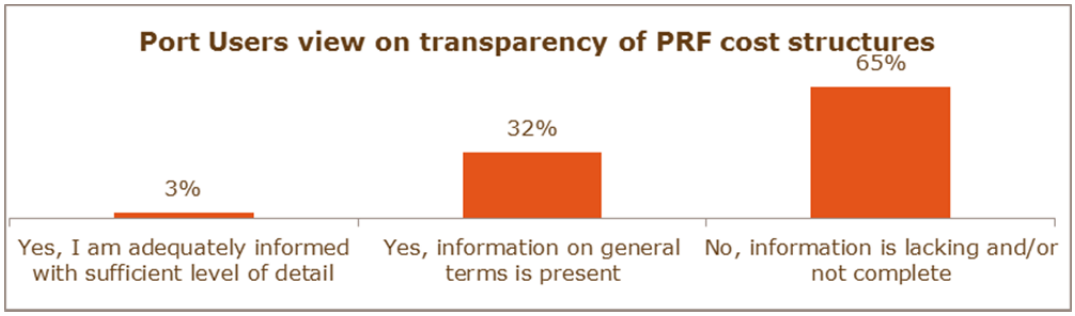
Whatever mechanism is applied to collect waste fees, the PRF Directive states in Article 8(1) that the costs of port reception facilities for ship-generated waste, including the treatment and disposal of waste, need to be covered by the collection of a fee from ships. This provision is in line with the 'polluter pays' principle, a central principle in EU waste legislation, as outlined by the Waste Framework Directive. Ships generating waste and cargo residues are the 'polluters' who can be charged for the treatment and disposal of their waste. Irrespective of the type of cost recovery systems, ports need to be transparent in their calculation of the costs charged to port users for waste handling. Often however, the relationship between fees charged to ships and the costs of port reception facilities is unclear. In 14 out of 22 Member States, instances were reported where the basis on which fees were calculated was unclear, or where it was not clear which part of the fee charged reflected the costs[117].

To get an overview of the various types of costs included in the waste fees, ports and port reception facilities operators were asked in our stakeholder consultation to provide information on costs included in the port reception facilities fees. Responses provided

[117] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 18.

differ by port and Member State. In only one case was it specifically mentioned that revenues are reported, while in most cases, ports reported that the fees charged are limited to cover port costs. While certain differences are present, the costs mentioned in the Member States and ports are similar in composition[118]. In most cases, fees include an administrative part, together with the collection and treatment costs for each waste stream, plus the transportation costs of each waste stream. Whereas waste operators and ports generally reported the costs they include in their fees, many port users (65%) indicated that information on the cost structure is lacking and/or incomplete. Only 3% indicated being adequately informed at a sufficient level of detail, as presented in Figure 29. Differences across ports and regions are reported in some cases. The cruise industry also reported a strong difference across Europe. Fees in Northern European ports are generally relatively easy to obtain, while in some Southern European ports it is harder to obtain information in advance on the fees charged for use of port reception facilities.

Figure 29 Transparency of port reception facilities cost structures

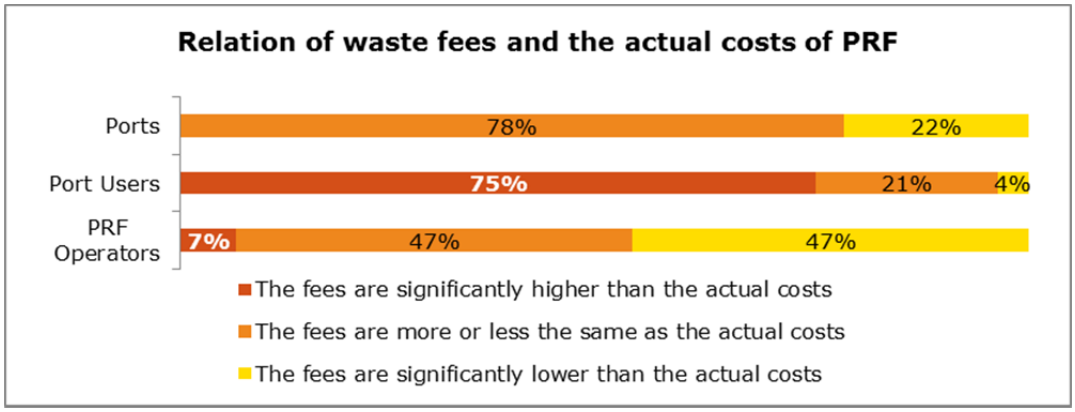


Source: stakeholder consultation

Related to the transparency of the fees charged is the relationship between the fees charged to vessels and the costs of port reception facilities. Stakeholders typically evaluate this transparency from different viewpoints. Port users focus on the individual fee charged to them, and ports and waste operators focus on the overall amount of fees received. This was taken into account in analysing the stakeholder responses, and explains the varying opinions, as reflected in Figure 30. As could be expected, a large number of port users (65%) generally reported that the fees charged are significantly higher than the costs, whereas 47% of the PRF operators indicated that the fees are significantly lower than the costs. Port authorities indicated in larger numbers (78%) that the fees are in balance.

[118] Based on stakeholder consultation

Figure 30 Relation of waste fees and costs of port reception facilities



Source: stakeholder consultation

This section shows that large numbers of port users did not feel adequately informed about the structure of the costs of waste delivery. This lack of transparency in the costs highly contributes to the perception that fees are too high. Most port users who indicated that there was a lack of information generally also reported that the fees were too high. However, this does not necessarily mean that the fees charged to vessels are not used to cover the costs of the port reception facilities system. It merely indicates that reliable data on the contribution to the costs are difficult to obtain for port users, which is not in line with the requirements of the PRF Directive[119].

5.4.7. Fairness and Green ships

There are no indications that the cost recovery systems in place, following the requirements of the PRF Directive, have put different types of vessels and of varying sizes at unequal disadvantages[120]. This section assesses the extent to which vessels that produce reduced quantities of ship-generated waste are disadvantaged because of the provision in the PRF Directive, which requires that all ships contribute to the costs of port reception facilities. This means that if no special arrangement is in place for such 'green ships', these ships share the costs of more polluting vessels by means of the indirect fee charged by ports. The PRF Directive proposes a way to prevent this scenario, and specifies in Article 8(2) of the PRF Directive that the fees may be reduced if a ship's master can demonstrate that environmental management, design, equipment and operation produce reduced quantities of ship-generated waste.

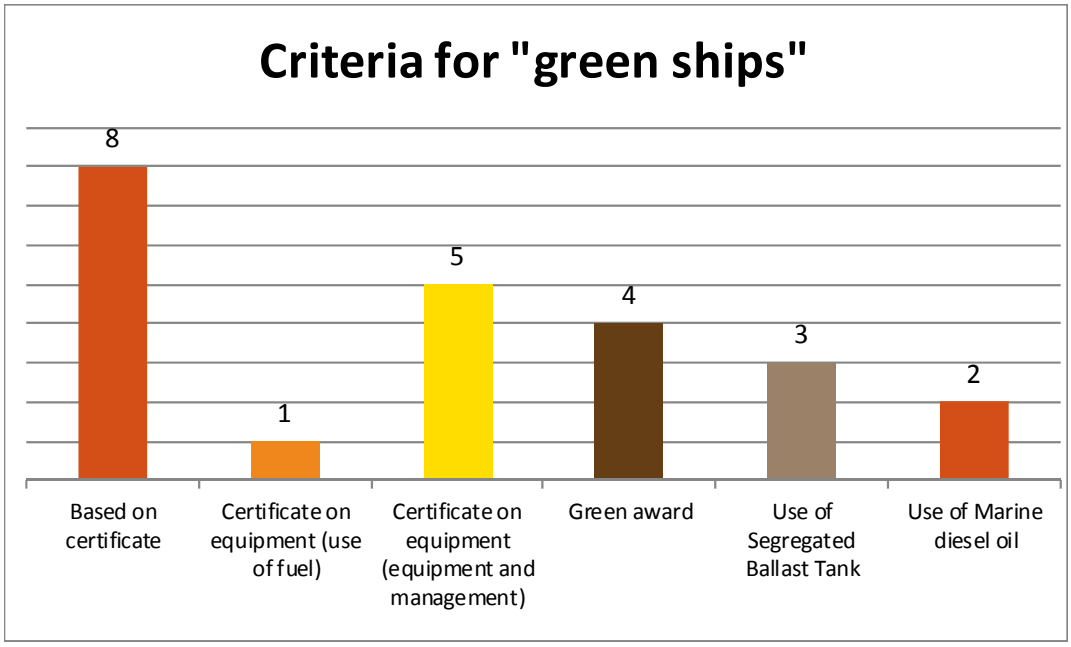
When asked in the stakeholder consultation whether the concept of a 'green ship' was given specific attention in national legislation, a large majority of Member States (79%) stated that they neither defined the concept of 'green ships' in relation to the PRF Directive nor considered the possibility to reduce fees for this type of vessel. Several Member States provided justification for not having defined the concept of 'green ships' at national level, while others specified that this was dealt with only at port level.

Ports were asked if reduced fees were charged for 'green ships'. About half declared that they charge reduced fees to ships with these characteristics, based on a study conducted by EMSA in 2004-2005[121]. Some ports not charging reduced fees mention that they did not have tools to assess whether a ship produces reduced quantities of ship-generated waste. Other ports commented that they were considering developing discounted fees in the future. In some cases, fee reductions are granted if the ship can document that it has implemented 'green technology', has followed a special environmental management

[119] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 25
[120] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC).
[121] 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.

system, or has introduced waste reducing elements in design and/or equipment[122]. Figure 31 presents the differences in approaches by various ports.

Figure 31 Criteria for 'green ships'



Source: 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, page 27.

These criteria are broad, not clearly defined, and thus not always suitable for the purpose of the PRF Directive. Moreover, some criteria mentioned in the Figure 31, particularly the use of segregated ballast tanks, have been implemented throughout the industry following MARPOL, and may not be relevant as additional 'green criteria'. Green awards, for instance, although giving publicity for environmentally responsible shipping, do not always have clear implications for the production of ship-generated waste, and are often not fully in line with the PRF Directive either[123].

This is further underlined by the fact that two-thirds of port users in the stakeholder consultation considered themselves to be equipped with an environmental management system aimed to reduce ship-generated waste, and that should allow them to qualify for reduced fees for the use of port reception facilities. Whereas environmental management systems may underline the environmental awareness of port users, it is doubtful whether the management systems in the context of the stakeholder consultation are in line with the PRF Directive. Without common criteria on what constitutes a 'green ship', and how criteria should be determined, there is the risk that the complex variety of cost recovery systems is further complicated by the fact that vessels in some ports qualify for an 'environmental discount', but not in other ports.

5.4.8. Conclusions

This chapter evaluated whether the various cost recovery systems ensured that all ships contribute to the costs of PRF in a fair and transparent way, and whether these provided sufficient and comparable incentives for ships to deliver their waste. To answer this question, an overview has been presented of the cost recovery systems for different types of waste in place in various ports. Some of the cost recovery systems are not fully

[122] EMSA (2005), A study on the availability and use of port reception facilities for ship-generated waste (CarlBro), page 42.

[123] EMSA (2008), EMSA Paper on the identification of ships producing reduced quantities of ship-generated waste as provided by Article 8.2.c of Directive 2000/59/EC.

in line with the PRF Directive's requirement to offer the right incentives. The waste delivery statistics presented show that cost recovery systems offer different incentives that are not always comparable or sufficient to convince port users to discharge their waste in the port. Considerably different waste volumes were delivered in ports with different cost recovery systems, even when corrected for the number and size of vessels calling in each port. With direct fee systems, which charge port users in direct relation to the volumes delivered, typically less waste was delivered compared to ports with a NSF or ADM system. This underlines the relevance of offering port users the incentive to discharge in the port, and illustrates that these direct fee systems are not in line with the PRF Directive. Particularly, the ADM system that refunds users an amount after the delivery of waste attracted relatively large amounts of waste.

The large variety of cost recovery systems does not provide sufficient and comparable incentives, and does not contribute to a level playing field for ports. The current variety of systems provides incomparable, and in some cases, insufficient incentives to discharge waste at ports. This has arisen as a result of allowing considerable local interpretation of the provisions of the PRF Directive.

The transparency of the costs charged by port reception facilities for the discharge of waste is problematic. Many port users did not know whether the fees charged were in line with the costs incurred by the port, and related to this, a large number of port users feel that ports and waste operators are overpricing. Lack of transparency contributed to distrust by port users, who are not confident that the fees charged are fully used to cover the costs of providing port reception facilities.

Finally, whereas the PRF Directive prescribes that all ships contribute to the costs of providing port reception facilities, the fees charged to all ships should be fair, and should not provide unsubstantiated benefits to certain types of vessels. Overall, this was not reported to be a problem. To avoid charging unfair fees to port users, ports generally charge differentiated tariffs, which may be based on the GT of a vessel, or, for instance, on the capacity of the engine. However, to avoid an indirect fee for all vessels in practice would also require 'green ships' to contribute to the costs of more polluting vessels. The PRF Directive allows differentiation for vessels that take measures to reduce the amount of ship-generated waste. This evaluation shows that only a limited number of Member States and half of the major ports have developed criteria to allocate a discounted waste fee for 'green ships'. This is not a strong incentive to port users to raise their environmental performance.

5.5. EQ 7: Effective operation and planning

5.5.1. The evaluation question

EQ7: Has the Directive helped ensure effective operation and planning, upholding the MARPOL requirement to avoid undue delay to ships?

This section addresses the two main elements of the PRF Directive aimed at improving effective operation and planning to prevent undue delay. These are (i) advance notification requirement and (ii) the possibility for exemptions. Other provisions in the PRF Directive with regard to undue delay, such as Article 12(1), which calls for the possibility to claim compensation, or Article 4(3), which calls for procedures for reporting 'alleged inadequacies', introduce more indirect measures to prevent undue delay, and are therefore not directly related to effective operation and planning. These provisions are therefore not further discussed in this chapter.

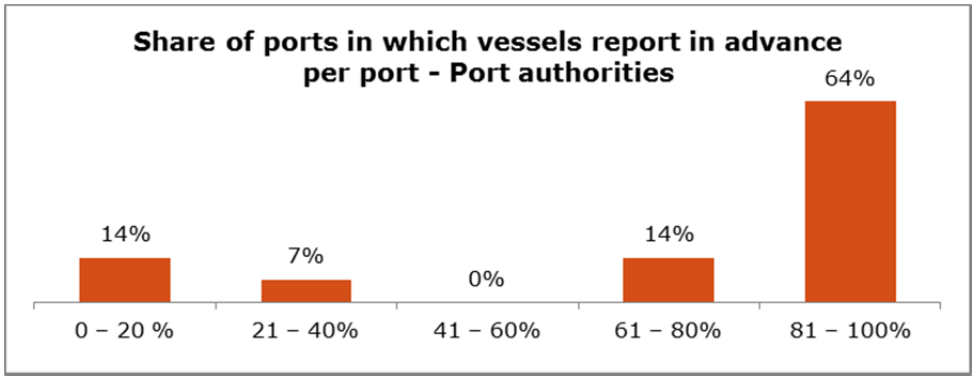
The notification by port users was assessed because this provides ports with an important tool to plan waste operations effectively and efficiently to prevent undue delay. First the behaviour of *port users* in their advance notification was assessed, after which the behaviour of *ports* was reviewed. The application of exemptions to port users was then reviewed in relation to the objective to ensure effective operation and planning.

5.5.2. Advance notifications

Each ship that is bound for an EU port (with the exception of fishing vessels and recreational craft that are not authorised to carry more than 12 passengers), needs to report the amounts of each type of ship-generated waste and cargo residue to be discharged in the port, as outlined in Article 6 and corresponding Annex II of the PRF Directive. This has to be done 24 hours in advance or as soon as possible after departure from the last port if the duration of the voyage is less than 24 hours[124]. These reporting requirements serve various functions, but most importantly provide the information to effectively plan waste management in ports[125]. There is no objective indicator to measure 'effective waste management', so the extent to which advance notification procedures are implemented and used was investigated.

To ensure effective operation and planning, it is important that port users report to the port of call in advance to announce their intention to discharge waste. To verify the current practice of advance notification, ports were asked to indicate the approximate percentage of ships that call at their ports and notify waste during the port calls. According to a majority of port authorities (64%), more than 80% of ships send advance notifications. The remaining ports reported this percentage to be slightly or significantly lower, between 61% and 80% (14%) or less than 40% (21%) of their port users respectively. This finding is in line with an EMSA assessment in 2005, which also showed that roughly 20% of port authorities indicated that less than 40% of port users reported their waste discharge intentions in advance. At the same time, a large majority (in 2005, 66%; now 78%) reported that more than 60% of vessels notified in advance, thus contributing to effective operations by the port. Whereas this shows better compliance with the requirement than in 2005, still one in five ports indicated that less than 40% of the ships notify their waste delivery in advance. The main reason for this is the lack of enforcement of this requirement. Despite the requirement in the PRF Directive, ports do not always use the data and therefore do not always require ships to send the notification forms[126].

Figure 32 Percentage of ships notifying waste before calling at port



Source: stakeholder consultation

To ensure that the advance reporting contributes to effective operations and planning of port reception facilities, it is equally necessary that port users complete the advance notification forms correctly in a usable format. The currently most pressing issue is the fact that the notification format, included as Annex II to the PRF Directive is outdated, as categories of waste and their definitions no longer match the categories and definitions set out in revised MARPOL Annex V and its recommended prior notification format. Often, the recommended notification formats by IMO and Annex II are both used, while it was also reported that ports developed their own notification forms to collect the data

[124] See Directive 2000/59/EC
[125] See Directive 2000/59/EC, recital 12
[126] See for instance EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 29.

required under both forms. Such differences do not contribute to effective operations. Another issue that impacts effective planning is related to the contents of these notification forms. Waste operators indicated that the contents of these notification forms, which consist of port users' estimates of waste deliveries, are incorrect. Port users seem to particularly underestimate volumes for MARPOL Annex V waste[127].

The advance reporting format, as prescribed in Annex II, specifically extends to cargo residues. However, as the volumes of cargo residues can only be sensibly estimated after discharging cargo, the estimates in the advance notification form are generally not very useful. A recent study commissioned by EMSA found that only a few ships report the estimates for quantities of cargo residues to the port authority, despite being required to do so by the PRF Directive[128]. Because the collection and payment of cargo residues are generally dealt with by the terminal operators directly, and port users do not report sufficiently accurate estimates for cargo residues, port authorities do not have reliable data on the amounts of cargo residues to be delivered, which also does not support effective operation and planning.

5.5.3. *Ports' use of notifications*

After port users notify ports of their intention to discharge waste, as well as their (remaining) storage capacity, the next step in effective operation and planning lies with the port authorities. The PRF Directive requires in Article 12(1d) that steps be taken to ensure that the information notified by ships is appropriately examined.

Port authorities generally describe in their WRH plans how the notification forms will be used. Based on the use of notification forms, there is a clear difference between port authorities that are directly responsible for waste handling, and ports where this responsibility is delegated. EMSA found that port authorities not directly responsible for waste collection generally did not review the contents of the notification and merely forward it to the relevant waste operators. In other ports, it was reported that sometimes waste operators are not even granted access to the notification forms[129]. Some waste operators in our stakeholder consultation also mentioned that sometimes the information about advance notification was not shared. EUROSHORE, the association of port reception facilities indicated that currently insufficient workable information is shared with the port reception facilities about the types and volumes of waste expected[130]. Instead, as the waste operators are often in direct contact with shipping agents, for instance to conclude the price, they request and receive the same information through this channel directly from the shipping agent[131]. Even though this method does not compromise the effective operation and planning, it is not the most efficient way of sharing information if other means of communication are required in the PRF Directive. Section 5.5.2 explores this in more detail.

In 2006, EMSA investigated to what extent port authorities were using the information contained in the advance notification forms and found that this was only the case for 36% of the major ports[132]. For 48% of the ports surveyed, EMSA established that the notification forms were used as input for invoicing, but not used as input for waste

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[127] Based on stakeholder consultation.

[128] 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

[129] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 29.

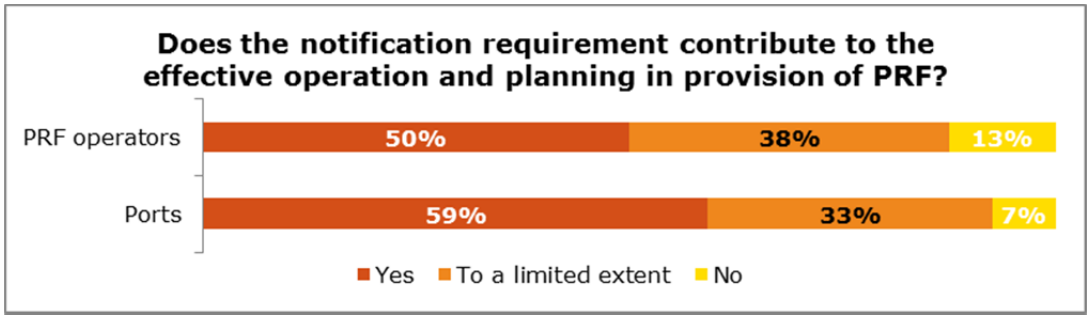
[130] Geert d'Haese, EUROSHORE in EMSA Workshop (2012) on the handling of cargo residues (Lisbon, 7 December 2012).

[131] Open comments stakeholder consultation. See also EMSA (2012), Study on the delivery of ship-generated waste and cargo residues (Ramboll), page 32.

[132] EMSA (2006), 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, page 42.

management[133]. This exercise was repeated in 2012, when 75% of all major ports in the sample indicated that they use the advance notification forms for planning the reception and handling of the waste[134]. Despite the above, our stakeholder consultation showed that overall a large number of ports (92%) and waste operators (88%) are of the opinion that the use of advance notification contributes (at least to a limited extent) to the effective operation and planning of waste practices in ports. One port, for instance, indicated that whereas the quality of information varies greatly (in terms of missing information or inaccurate estimation), the requirement for advance notification has significantly improved the port's ability to plan waste operations. This was also reflected in the generally positive comments received from stakeholders on the contribution of the notification requirements to the effective operation and planning for the provision of PRF, as presented in Figure 33. No statistical differences were observed between geographical regions on this issue.

Figure 33 Notification and effective operation and planning



Source: stakeholder consultation

The above indicates that the implementation of advance notification requirements as laid down in Article 6 does not fully contribute to effective operations and planning. If port authorities do not receive the advance notification, do not forward it to the waste operators, or if port users enter incorrect estimates, the contribution of these forms to effective operation and planning is limited. To ensure that their operation and planning of the waste discharge remains effective, waste operators may use other ways to obtain the necessary information for discharging waste efficiently, for instance, by informally requesting the required information from ship users.

The limitations of the advance notification and using alternative ways to gather information on expected waste volumes are in contrast with the administrative burden related to completing the advance notification on ships. This issue is further explored in Section 6.2.2, where the administrative burden is assessed.

5.5.4. Exemptions

To prevent undue administrative and financial burden for ships that visit the same ports frequently, Article 9 of the PRF Directive provides the possibility to apply for exemption from the reporting obligations in Article 6, the mandatory delivery principle in Article 7(1), and the significant contribution to the costs of port reception facilities under Article 8. 'Sufficient evidence of an arrangement to ensure the delivery of ship-generated waste and payment of fees in a port along the ship's route' needs to be provided, while a vessel also needs to show that it is 'engaged in scheduled traffic with frequent and regular port calls'[135].

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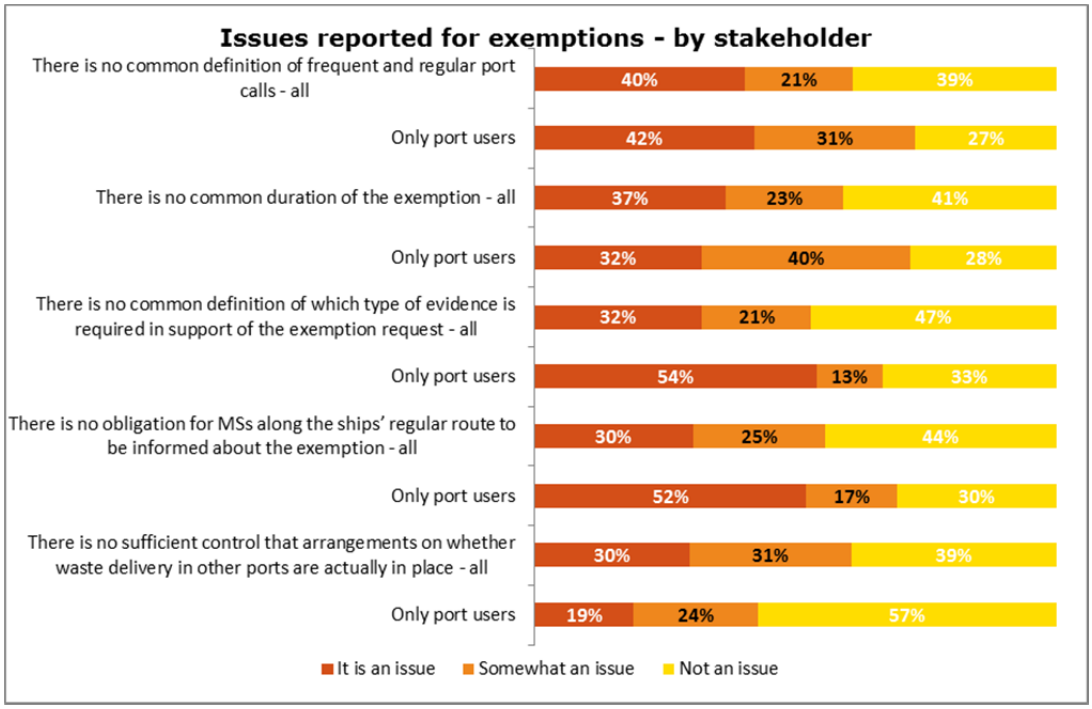
[133] EMSA (2006), *Technical report evaluating the variety of cost recovery systems adopted in accordance with Article 8 of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues*, page 42.

[134] EMSA (2012), Study on the delivery of ship-generated waste and cargo residues (Ramboll), page 32.

[135] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, Article 9.

Equipped with only this generic requirement in the PRF Directive, Member States have developed substantial discretion in granting exemptions. Whereas this enables local specificities to be taken account, currently the interpretations between Member States differ widely on the defining property of ships eligible for exemption[136]. Cases are also reported where Member States do not issue any exemptions at all[137]. Stakeholders were asked about a number of specific potential problems related to exemptions. Overall, the potential problems were rated similarly, and none of the criteria was considered particularly problematic. However, upon more detailed investigation, Figure 34 shows that port users generally see more potential problems with the current system of exemptions than other stakeholders.

Figure 34 Issues reported for exemptions



Source: stakeholder consultation

The first two aspects listed in Figure 34 do not point to substantial differences of opinion. In terms of the requirements for evidence required in different Member States when requesting an exemption, port users are more critical than other stakeholders (54% of port users thinks this is an issue versus 32% of all stakeholders). This can be understood from the user perspective. Take, for instance, a port user with a contract with a waste operator in a port. For each port on its route, exemptions have to be requested in each Member State. If these requirements are different in each Member State, this can become a considerable administrative burden. Port users also indicated the potential problem that currently Member States are not obliged to inform one another whether an exemption has already been granted (52% of port users versus 30% of all stakeholders). Port users considered the current control provisions for ports to ensure that waste delivery in other ports is in place to be considerably less problematic than other stakeholders (19% of port users against 30% of all stakeholders). In the open comments, some ports indicated that they do not have sufficient tools to confirm whether waste delivery arrangements are in place if a ship files a request for exemption. Whereas the view of port users in this respect is understandable, this shows that the PRF Directive

[136] EMSA (2008), EMSA note on Article 9 on exemptions under the Directive 2000/59/EC on port reception facilities for ship-generates waste and cargo residues, page 5-6.
[137] EMSA (2008), EMSA note on Article 9 on exemptions under the Directive 2000/59/EC on port reception facilities for ship-generates waste and cargo residues, page 6.

currently cannot sufficiently ensure that exemptions in one Member State are considered in waste delivery arrangements in another Member State.

5.5.5. Conclusions

The PRF Directive introduced a number of elements that should contribute to improving the operations and planning of port reception facilities and to prevent undue delay to ships. While port users indicated in the stakeholder consultation that unexpected delays could be a substantial cost, this has not been reported in the stakeholder consultation as a problem in EU ports. Much attention has been given to the role of advance notification forms, which should contribute to effective operations and planning and reduce the risk of undue delays. Even though the form is generally used, its contribution to the effectiveness of operation and planning of waste operations is limited. Often, waste operators do not receive the information reported to port authorities, or complain about the incorrect estimates made by port users.

The advance notification of estimated cargo residues is problematic because port users cannot accurately estimate these volumes before discharging their cargo. Because the notification format prescribed by the PRF Directive is outdated and no longer in line with the latest IMO version, the notification form as prescribed by the PRF Directive is often not used. This results in different reporting requirements for vessels in different ports, which is not necessarily a problem from the view of operations and planning, but poses an issue with regard to the associated administrative burden, as is further explored in Section 6.2.2.

Exemptions are another pillar through which the PRF Directive seeks to improve the effectiveness of operations while avoiding undue delay. Stakeholders were not able to single out one particular problem with regard to the implementation of the provisions on exemptions. In terms of its effects on effective operation and planning, stakeholders did not point to specific problems with this issue. Port users who applied for an exemption to improve their operation and planning normally did not have problems obtaining one.

Member States apply different criteria and requirements for the approval of exemptions. This does not hamper effective operation and focuses more on the enforcement of this provision. Differences in implementation of exemption regimes can lead to different costs for stakeholders in different regions. From the side of relevant authorities, the data show that there is insufficient control that delivery arrangements, as stated by exemption certificates, are in place. From the side of port users, attention was called for the need for more harmonisation of the criteria relevant for acquiring exemptions. Both sides seem to require more convergence in the criteria applied, albeit on different elements.

6. EFFICIENCY

Efficiency is the extent to which desired effects are achieved at a reasonable cost[138]. To evaluate this, the costs and benefits generated by the PRF Directive for various stakeholders are assessed in Section 6.1. Subsequently, the administrative burden and proportionality of the enforcement provisions in the PRF Directive are analysed in Section 6.2. Thirdly, the various effects on ports of different size, type and geographical location are considered in Section 6.3. For each of these sections conclusions are drawn, based on the evaluation question, which then contribute to the assessment of whether the effects of the PRF Directive are achieved at a reasonable cost.

6.1. EQ 8: Costs generated by compliance to the Directive

6.1.1. The evaluation question

EQ8: To what extent has the PRF Directive generated benefits and costs for different stakeholders (national administrations, ports/competent authorities, the maritime transport industry and the waste handling/disposal industry)?

In order to answer this evaluation question, the costs caused by requirements of the PRF Directive for different stakeholders are assessed. These costs are listed below and have been estimated based on the stakeholder interviews, available documentation and statistics, and data collected in our stakeholder consultation. In addition, the benefits are assessed, with focus on the benefits from avoided discharge at sea.

6.1.2. The approach to the assessment of costs and benefits

As indicated in Chapter 3, quantification of costs and notably the benefits has been difficult. Where feasible, we have quantified costs and benefits, and have added qualitative elements to support our conclusions. The approach for assessing costs and benefits is presented, identifying the steps that we would ideally have taken; the restrictions encountered, mostly related to the availability of data; and our approach followed, given the restrictions mentioned earlier.

Approach without restrictions

In an ideal world without restrictions, we would assess the overall balance of costs and benefits that have resulted from the implementation of the PRF Directive. We would have followed an incremental approach in which the situation without the PRF Directive (the base case) would be compared with the situation in which the PRF Directive is implemented (the project case). This process would consist of identifying the affected stakeholders, assessing their costs and benefits over time, and then comparing the overall benefits and costs.

Benefits created by the PRF Directive are defined in terms of protection of the marine environment, and more specifically a reduction in discharges at sea of ship-generated waste and cargo residues. Additional benefits could come from increased business of port reception facilities operators. Costs caused by the PRF Directive are the costs for all stakeholders to implement the PRF Directive. These includes costs for port users (waste delivery fees, inspection costs, costs for preparing advance notifications); ports (provision of port reception facilities, development and maintenance of WRH plans, costs for managing advance notifications); and costs for Member States (inspection costs, reviewing and approval of WRH plans).

[138] Evaluating EU Activities, a Practical Guide for the Commission Services (2004).

Restrictions

The situation for assessing costs and benefits related to the PRF Directive is not ideal, as we are faced with restrictions, as presented below:

- **Attribution**: the PRF Directive was introduced as the legal instrument, which reaffirmed the Member States' obligations under MARPOL[139]. The MARPOL Convention and the PRF Directive both concentrate on reducing discharges of ship-generated waste and cargo residues at sea. It is not possible to attribute benefits of reduced discharges to either MARPOL or the PRF Directive. Some costs can be clearly attributed to the PRF Directive, for example, costs related to the WRH plans and advance notification. However, other costs, such as waste delivery fees, cannot fully be attributed to the PRF Directive.
- **Data**: Section 3.5 presents the limitations of data availability, including the structural problems related to collecting volumes of waste discharged at sea, and, to a lesser extent, waste volumes collected in ports. In addition, difficulties were encountered in assessing costs, for example, costs of using port reception facilities.

Approach applied

Within the constraints of these restrictions, costs and benefits created by the PRF Directive have been assessed, based on assumptions as presented below:

- **Attribution**: For those costs and benefits where attribution is an issue, notably the benefits of reduced discharges at sea and the costs of waste delivery at ports, we have fully attributed benefits and the related costs[140] to the PRF Directive. Although we realise that full attribution is not a reflection of reality, the results provide better understanding of the balance between costs and benefits.
- **Data**: As we do not have data on waste volumes discharged at sea, we have taken the increase of waste collected at ports since 2004 as the effect of the PRF Directive. We can only apply this 'surplus of waste' approach to Annex V waste (garbage). Consequently, the quantified assessment is restricted to benefits related to Annex V waste. We have calculated the benefits of garbage not discharged at sea using a comparable indicator, the costs of cleaning up beach litter.

  In assessing costs, we used findings of our stakeholder consultation and translated these into annual figures at EU level, based on assumptions presented in Annex 5.

  In order to compare the costs of waste delivery at ports and the benefits related to benefits of garbage not discharged at sea, presented above, we have taken 34% of the total waste delivery costs, which is based on the percentage of the surplus of Annex V waste collected in EU ports in the period 2004-2012[141].

Based on these assumptions, costs and benefits are presented, and an overview of all quantified costs and benefits. This overview also includes administrative costs, which are presented in Section 6.2.

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[139] See Section 2.2.
[140] See the explanation of surplus of Annex V waste below.
[141] The surplus of waste is the additional waste that is collected as a result of the PRF Directive. The 34% is a reflection of the additional garbage (Annex V waste) that is collected in the period 2004-2012, compared to the base year 2004, divided by the total amount of garbage collected in that same period. The calculation is presented in Annex 5.

6.1.3. Costs for port users

The stakeholder consultation showed that port users consider costs related to the fees for the discharge of waste in port reception facilities as the key impact of the PRF Directive on their organisations. Other elements, such as costs associated with the administrative requirements of the PRF Directive and penalties, were ranked lower by port users. As hardly any enforcement sanctions or proceedings have been initiated by the relevant authorities, penalties are perceived as a minor cost[142].

The PRF Directive has introduced requirements on cost recovery systems that for different ports have had a different effect on the waste delivery costs for port users. For example, in some ports, port users delivering large amounts of waste have experienced reduced costs because of the introduction of a fee system that charges independently of volumes of waste delivered. Vessels with little or no waste on-board may have faced relatively high waste delivery costs due to the introduction of a common waste fee, charged regardless of waste delivery. Calculating the cost of waste delivery for port users is complex, particularly because ports have adopted different cost recovery systems, which differently affect the fees paid by port users.

Despite these limitations, the total costs of all deliveries of all ship-generated waste at EU level were assessed. This was done to put the different types of costs in perspective. Combining the estimation of waste volumes delivered at European ports and information on the costs charged to port users, as provided by a number of ports in different geographical regions, an EU-wide annual figure of 380 million EURO was derived for the total cost of port fees to the industry. We estimate the 'surplus' of waste collected that could be attributed to the PRF Directive at 34%, based on the volume of additional waste deliveries in 2005-2012 compared to baseline year 2004. This results in an estimated annual cost of 128.9 EURO attributable to the PRF. Details of the calculation are presented in Annex 5.

Stakeholders indicated that the mandatory delivery of waste has introduced additional costs for port users. This is based on the assumption that if a vessel has to deliver all waste and pay a fee to a port reception facility in every port, it may be more expensive than keeping the waste on-board and using a port reception facility in the next port of call. Article 7(2) of the PRF Directive allows a ship to proceed to the next port of call without delivering the ship-generated waste, under the condition that sufficient dedicated storage capacity for waste is available. However, the decision whether this flexibility is granted rests with the port or the harbour master and different conditions are applied throughout Europe, sometimes resulting in waste needing to be discharged, resulting in additional costs. We have not been able to quantify the potential cost increase resulting from this provision in the PRF Directive.

Other types of costs for port users created by the PRF Directive are mainly administrative burdens to comply with the additional requirements and to cooperate with possible inspections. These type of costs are discussed in in Section 6.2.

6.1.4. Costs for ports

The PRF Directive introduces costs that are borne by port authorities. One major obligation for ports that is directly related to the PRF Directive is the development, approval and updating of waste reception and handling plans. In addition, ports need to decide whether a ship has sufficient capacity to leave the port with all waste on-board and proceed to the next port of call. Furthermore, ports are engaged in enforcement and enforcement costs are presented in Section 6.2 on administrative burden.

[142] Finding from stakeholder consultation: only four ports reported to have initiated sanction proceedings in the framework of the PRF Directive since 2008.

Developing and updating of WRH plans

To estimate costs related to the development and update of WRH plans, data were collected on the average time spent to develop and update a WRH plan by ports. Through our stakeholder consultation, we received cost data on developing WRH plans ranging from 30 to 220 working days[143]. The range is quite wide, making an assessment of aggregated costs at EU level difficult. However, for individual ports[144], it is estimated that the costs of developing a WRH plan is within the range of 5,000 and 40,000 euros[145]. The stakeholder consultation showed that larger ports face higher costs for developing WRH plans, due to increasing complexity of such plans and the number and variety of port users to consult. However, particularly smaller ports reported problems with the costs of developing the WRH plans, and indicated that larger ports generally have the resources available for such plans, while smaller ports do not.

The PRF Directive requires that ports update their plans every three years. In the public consultation, public authorities indicated that they spent between 16 and 40 days per year collecting sufficient information to update the WRH plan, largely depending on the size of the port. These activities require, for example, conducting regular consultation with port users and other stakeholders and revising procedures. This results in an annual cost for ports to comply with this provision in the PRF Directive of between 3,000 and 7,000 EURO.[146]. Despite the requirement to regularly update the WRH plans, our evaluation showed that in many cases, ports do not frequently undertake this revision, and do not incur these costs (see Section 5.3.4). We estimated the annual costs related to developing and updating WRH plans for all EU ports to be 7.0 million euros[147]. Details are presented in Annex 5.

Deciding on an exception to mandatory delivery

Member States, often through the port authority, need to decide whether a ship has sufficient capacity to leave port with all waste on-board and proceed to the next port of call[148]. The harbour master or someone else responsible for this task needs to spend time on this task, resulting in costs created by the PRF Directive. We were not able to find information on the time spent on this activity and to calculate these costs.

6.1.5. Costs to Member States

While the main costs for developing and updating the WRH plans are borne by port authorities, Member States are responsible for approving the WRH plans. This approval is required for the first submission and the periodic updates (once every three years) of the WRH plans. In addition, Member States face costs in reviewing and approving exemptions for port users. The costs for these elements are directly linked to the requirements of the PRF Directive. The level of governance where these cost are incurred varies by Member State. In some cases, local authorities are the competent authority, and in other cases, the central inspectorate or ministry is responsible for approving the

[143] See stakeholder consultation report. Results complemented with results from interviews. Port authorities consistently indicate that it is very difficult to give such estimates.

[144] When mentioning individual ports, we are referring mostly to the larger ports, i.e. the ports that were included in the stakeholder consultation. In this respect, a small port or marina will not spend 30 days and 5,000 EURO on a WRH plan.

[145] Basis for the calculation is an 8-hour working day, calculated by the average hourly costs of public administrations, which in 2008 – the average year in our evaluation - has been calculated to be €22,51 by Eurostat. Details of the calculation are presented in Annex 5.

[146] Against the same wage costs as for the development of the WRH plans. Details of the calculation are presented in Annex 5.

[147] This is based on a total of 1,500 ports in EU, based on Annex VII (EUROSTAT list of European ports), as included in 2005/366/EC: Commission Decision of 4 March 2005 implementing Council Directive 95/64/EC on statistical returns in respect of carriage of goods and passengers by sea and amending Annexes thereto (notified under document number C(2005) 463).

[148] Here we refer to Article 7(2) of the PRF Directive, i.e. the exception to mandatory delivery.

WRH plans developed by ports. It is assumed that the level of governance responsible does not affect the level of costs.

In the stakeholder consultation, Member States provided information on costs related to checking and approving the WRH plans, and costs related to dealing with exemptions (receiving exemption requests, taking exemption decisions and communicating these decisions)[149]. We have presented the total costs incurred by Member States as a result of complying with the provisions of the PRF Directive, evaluation and approval of WRH plans and exemption requests.

The stakeholder consultation provided information on which we established the average allocation of time spent per port call per Member State for checking and approval of WRH Plans, and in dealing with exemption requests. Based on the total number of port calls at EU level, as determined by Eurostat, multiplied by the average wage costs for public administration[150], this leads to an estimated annual cost of roughly 4.4 million EURO for all coastal EU Member States. In some Member States, this cost is reimbursed through fees for granting approval and/or certification.

6.1.6. Benefits for the environment

The main benefit of the PRF Directive is prevention of ship-generated waste and cargo residues discharged at sea. Reduced levels of ship-generated waste in the marine environment result in cleaner seas and have a positive effect on marine ecosystems. Reduction in oily waste or garbage discharged at sea reduces the number of animals immobilised, entangled, smothered, poisoned and killed through ingestion. Moreover, reduced sea pollution has a positive impact on economic activities, such as the fishing industry and tourism.

The benefits of reduced waste discharges at sea are undisputed, but are difficult to quantify. As stated in Section 6.1.2, we have applied a comparable indicator, the costs of cleaning up beach litter, to assess the avoided costs of discharges of ship-generated waste in the form of garbage (MARPOL Annex V) at sea.

In order to arrive at clean-up costs, it was assumed that the increase in garbage or Annex V waste collected at ports in the EU can be fully attributed to the PRF Directive. Taking 2004 as the base year, we determined the annual surplus of waste collected at ports. We considered this to be the volume effect, the amount of cubic metres of garbage that is not discharged at sea.

To estimate the costs of ship-source marine litter, the costs for cleaning up beaches from ship-source marine litter was applied. While not all marine litter ends up on beaches, these costs represent to some extent the costs to local communities that deal with marine litter[151]. Beach clean-up of marine litter also includes waste not originating from vessels. However, the costs of cleaning a beach are not substantially different for cleaning garbage originating from ships or from land. Based on a Northern European survey, the removal cost of a cubic metre of garbage for various EU beaches is set at 673 euros[152]. We consider this to be the price effect, the avoided cost of a cubic metre of garbage not discharged at sea.

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[149] Stakeholders indicated that often the same desk officer handled these issues, and that it was therefore not possible to split the costs into separate activities.

[150] 2008 was taken as reference year, as this is an average between the entry into force of the Directive in 2002 and the time of evaluation in 2014. The average hourly wage cost of the public administration sector in 2008 was €22,51, adding up to €38,267 for a full year against 1700 annual hours worked (based on OECD EU Average annual hours actually worked for 2008).

[151] Karen Hall, 'Impacts of Marine Debris and Oil Economic and Social Costs to Coastal Communities; KIMO, 1999.

[152] Karen Hall, 'Impacts of Marine Debris and Oil Economic and Social Costs to Coastal Communities; KIMO, 1999

Based on the assumption that the increased volumes of garbage delivered in EU ports contribute directly to a similar reduction of waste discharged at sea, the average annual avoided costs for cleaning up beaches amount to 297 million EURO.

The figures above provide an estimate of benefits related to the surplus delivery of garbage or Annex V waste. Ideally, to come to a more complete overview of benefits, other types of waste should also be included. For instance, oily waste from machinery space (Annex I waste) has considerably higher clean-up costs than garbage discharged at sea[153]. The literature does not specify these costs for operational discharges, and instead focuses primarily on large-scale oil spills. These estimates are not comparable to the type and extent of operational discharges. As a result, insufficient data are available to calculate a similar value for Annex I waste.

Although we were unable to calculate the *total* benefits from savings on ship-generated waste discharges at sea, we concluded that the benefits from avoided disposal of *garbage* at sea are substantial, as illustrated above[154]. Although we were unable to quantify the effect, we concluded that a substantial additional benefit is achieved in avoiding the disposal of *oily waste at sea*. In addition, we assume savings from reduced *sewage* discharges (Annex IV waste)[155].

There are other non-quantified benefits for the marine eco-system and sea animals, as well as for the fishing industry and tourism.

6.1.7. Benefits for waste operators

The PRF Directive has contributed to increased waste delivery to port reception facilities, as described in Section 4.1[156]. Where the cost recovery system has created incentives to port users to discharge their waste in port reception facilities, waste operators have experienced higher demand for their services. This volume effect creates a benefit for waste operators. The price effect is manifest at an individual waste reception facility and port level and is thus difficult to assess. The fact that port authorities sometimes partially cover waste delivery costs adds to the complexity of assessing the benefits to waste operators.

The PRF Directive requires that the costs charged to vessels are used to 'cover the costs of the port reception facilities'[157]. We cannot assess how this affects the profitability of the waste operators because no data are available. It has been reported that in some Member States, no incentives have been introduced to deliver waste in port reception facilities, which has resulted in waste operators experiencing a reduction in demand, which may result in lower profitability for them.

6.1.8. Proportion between costs incurred and benefits achieved

The limitations related to estimating the costs and benefits and the extent to which they can be compared have been highlighted. Costs and benefits that could be quantified are presented in Table 6. We have also included the administrative burdens as assessed in the next section.

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[153] See for instance Christos A. Kontovas, Harilaos N. Psaraftis, Nikolaos P. Ventikos (2010), An empirical analysis of IOPCF oil spill cost data, Marine Pollution Bulletin 60 (9), 1455-1466.

[154] Details on the calculation of the benefits are presented in Annex 5.

[155] Although the delivery of sewage in the period 2004-2013 shows a rather varying trend, the level of sewage collected in 2013 is higher than in 2004. We are unable to quantify the effect, however, we assume that the PRF Directive has had a positive impact on avoided discharges of sewage at sea.

[156] Section 4.1 indicates increased volumes of Annex V waste collected. At the same time a reduction of Annex I waste is recorded. We cannot clearly attribute this to the PRF Directive. Still, we consider it safe to assume that more waste is delivered at ports as a result of the PRF Directive.

[157] As outlined by Article 8 of the PRF Directive.

Table 6 Costs and benefits (million EURO)

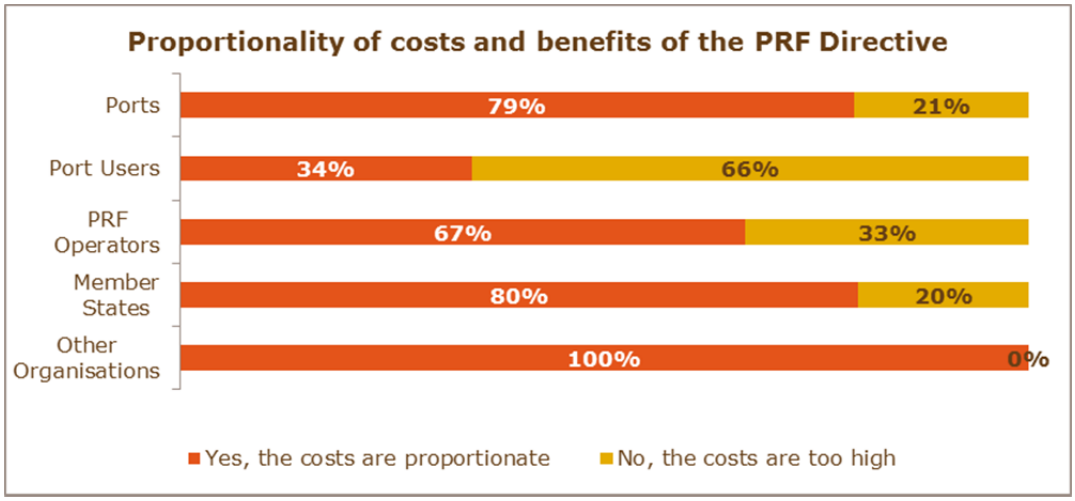
Type of cost or benefit	Stakeholder	Estimated annual costs
Costs for delivery of surplus of waste[158]	Port users	128.9
Costs for developing and updating WRH plans and inspections	Ports	7.0
Costs for checking and approving the WRH plans, combined with costs related to dealing with exemptions	Member States	4.4
Administrative burden due to advance notification	Port users	74.5
Administrative burden due to advance notification	Ports	8.6
Administrative burden due to inspection	Port users	1.4
Administrative burden due to inspection	Inspection authority	1.2
Total costs		**226.0**
Benefits for the environment – avoidance of discharged *garbage* at sea	Society	297.0
Benefits for the environment – avoidance of discharged *oily waste and sewage* at sea	Society	PM
Total benefits		**297.0**

Table 6 indicates that benefits are higher than costs incurred as a result of the PRF Directive. The difference between benefits and costs is based on avoided discharges of garbage at sea. It is estimated that this difference would be significantly greater if oily waste and sewage were also included.

Stakeholders largely confirmed these conclusions: 79% of the ports, 80% of the Member States and 100% of other non-governmental organisations stated that the costs of the PRF Directive are proportionate to the benefits (see Figure 35). Some port authorities (21%) noted that the costs are not proportional to benefits, particularly costs incurred for developing and updating the WRH plan. Member States indicated that the administrative costs are substantial for various levels of government to implement the provisions of the PRF Directive properly. However, other Member States indicated that there are hardly any costs for the administration.

[158] The surplus of waste refers to the additional waste that is collected as a result of the PRF Directive, as established in Section 6.1.2. For the calculation of 128.9 million EURO the percentage of 34% is applied, as established in Section 6.1.3. The calculation is presented in Annex 5.

Figure 35 Proportionality of costs and benefits of the PRF Directive



Source: stakeholder consultation

Port users and waste operators were less positive about the proportionality of the costs and benefits. Port users (66% reported that the costs are not proportional) indicated that the fees charged to port users are often disproportionally high, while 33% of waste operators thought that the costs outweigh the benefits.

6.1.9. Conclusions

This section assesses the costs incurred and benefits achieved as a result of the PRF Directive. Port users face substantial costs for discharging waste in port reception facilities. Ports and Member States also face costs to meet the requirements of the PRF Directive. The requirement for ports to develop WRH plans is a considerable cost, especially for smaller ports that have few resources available. Port users, ports and Member States face administrative burden related to advance notification and inspection. Total costs were calculated at 226.0 million EURO.

We assessed the annual benefits related to avoidance of disposal of garbage at sea at 297.0 million EURO. This benefit exceeds the calculated aggregated costs. If benefits from reduced discharges of oily waste and sewage were added, the gap between benefits and costs would be significantly higher. It is estimated that the environmental benefits clearly outweigh the costs related to the PRF Directive.

6.2. EQ 9: Administrative burden

6.2.1. The evaluation question

EQ9: What is the administrative burden generated by the PRF Directive for different stakeholders? Has enforcement been effective and proportionate? Are there areas of excessive costs that could be avoided?

This evaluation question focused on the administrative burden of meeting the information requirements of the PRF Directive, and also assessed the enforcement costs for the relevant authorities. Based on this information, conclusions have been drawn on the effectiveness and proportionality of the provisions to support enforcement of the PRF Directive. To answer the question on the effectiveness and proportionality of enforcement, a qualitative approach has been taken.

6.2.2. Administrative burden due to advance notification

An obligation related to the provision of information as a result of the PRF Directive is the advance notification of waste delivery. The PRF Directive requires port users to complete a notification form, in which port users estimate the volumes of each type of waste to be discharged in the port. These notification forms primarily aim at helping the port and

waste operator to effectively plan waste operations in order to avoid undue delay. The requirement to complete this form creates an administrative burden for the port user, while the analysis of the form creates an administrative burden for the port authority.

Administrative burden for port users

The calculation starts with the average time for port users to complete the notification form. The time for port users to file the notification forms can vary substantially, some stakeholders reported a matter of minutes, and others considered it to be a substantial burden. Due to the variety of forms (and definitions) in use in EU ports, crews spend considerable time collecting the required estimates for each port call. The size and type of the ship largely influences the time spent in completing the form.

The stakeholder consultation showed that an average sized cruise ship spends roughly eight man-hours to retrieve and/or estimate the necessary information on the amounts of waste to be discharged. Stakeholders in this sector indicated that significant time gains (up to half of the time) can be made if the procedures for advance notification were more streamlined, most visibly by using a common notification format. In this regard, the harmonisation of reporting requirements from June 2015 onwards through SafeSeaNet is likely to reduce this burden[159].

For other types of vessels, the advance notification of waste delivery is less of a burden. Most stakeholders indicated that this took about 30 to 60 minutes[160]. The requirement on port users to notify ports in advance is estimated to be between 14 and 215 EURO (depending on the ship type and size) for each port call, based on the average hourly wage costs of the European maritime sector in 2008[161]. The large share of freight transport in the number of annual port calls (85% in 2013) and the relatively small share of cruise ships (1%) and other passenger transport (14%) have been weighed in our calculation, resulting in total annual administrative costs of 74.5 million euros[162]. This figure excludes the possibility that vessels have exemptions for advance notifications, for which no data are available. However, this concerns only a fraction of the overall maritime traffic and would not materially change the estimates.

Administrative burden for ports

Once transmitted to the port authority, the advance notification form needs to be processed by the port authority, creating an administrative burden. The port of Piraeus indicated that one person works full time on the management of advance notification forms, which is roughly 10 minutes per port call[163]. This confirmed the data in an earlier study that estimated these administrative burdens[164]. Applying the 10 minutes per call and using the number of port calls in the EU[165], this administrative burden is estimated to be 8.6 million EURO annually for all port authorities in the EU.

Port reception facility operators do not experience administrative burdens directly caused by the PRF Directive. Some operators are required by port authorities to deliver a waste

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[159] Interview with Alessandro Bertorello, Director Environmental Management Costa Crociere S.p.a.
[160] Based on comments received in stakeholder survey
[161] 2008 was taken as reference year, as this is a good average between the entry into force of the Directive in 2002 and the time of evaluation in 2014. The average wage cost in the Maritime transport sector was €26,84 in 2008.
[162] 85% of port calls were freight vessels, with an average time of 1 hour work. Passenger vessels (14%) were around 4 hours, and cruise ships (1%) around 8 hours. The division as noted above was applied to the 2013 Eurostat statistics of port calls in the EU, against an average wage cost in the Maritime transport sector of €26,84 (also by Eurostat).
[163] Based on interview with Chryssanthi Kontogiorgi, Head of Environmental Protection Department, Port of Piraeus. The port of Piraeus had 17525 port calls in 2013.
[164] European Commission (2012) Impact Assessment for the review of the 2000/59/EC Directive (Europe Economics, May 2012).
[165] Based on the 2008 number of port calls in the EU, as recorded by Eurostat; 2.289.021

delivery receipt, as developed under IMO. This is not a requirement under the PRF Directive, and would exist without the PRF Directive.

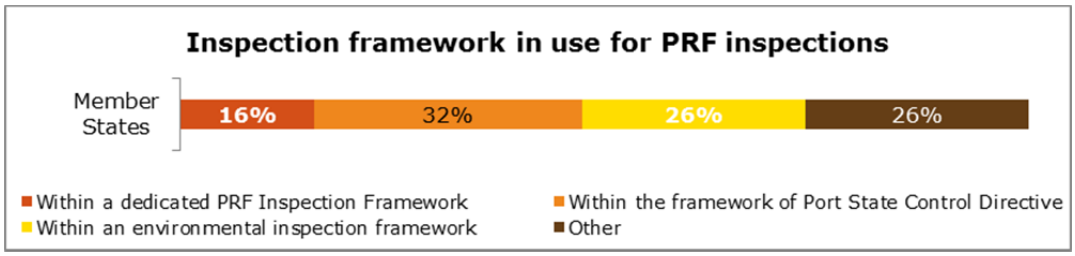
As pointed out in Section 5.5.2, in some ports, waste operators do not receive the notification forms from port authorities. In other cases, as outlined in Section 5.5.2, the advance notification contains very broad estimates, sometimes containing incorrect information. We have not been able to assess the impact on administrative costs of shortcomings related to reporting. However, we would like to point out that the administrative requirements imposed by the PRF Directive are of limited value if the forms contain incorrect data or port authorities do not use the notification forms for effective operation and planning.

6.2.3. Provisions for enforcement

Article 11 of the PRF Directive contains provisions to enforce the waste delivery requirements of Article 7 and 10. The responsibility of monitoring whether a vessel delivers waste lies with different actors in different Member States. In some Member States, the port authority is responsible and in others, a separate maritime enforcement agency is responsible. In a third set of Member States, governmental environmental agencies may be responsible.[166]. The PRF Directive only requires that Member States ensure that *any ship* may be subject to an inspection and a 'sufficient number' of inspections are carried out to ensure that any ship may be subject to an inspection. 'Sufficient' has been further defined by the PRF Directive to be a 25% inspection rate of all vessels calling in ports. This 25% inspection rate was also mentioned in the Port State Control (PSC) Directive when the PRF Directive was introduced, and thus further facilitated Member States to organise a combination of inspections in the framework of the PRF and PSC Directives (see Section 6.2.3).

Article 11(b) specifies that inspections may be undertaken in the framework of the PSC Directive 95/21/EC (repealed by the currently in force (2009/16/EC). This Directive introduces the elements of the Paris Memorandum of Understanding (MOU) into EU legislation and establishes common criteria for the control of ships by port States to 'drastically reduce the substandard shipping' within the EU[167]. The current PSC Directive (2009/16/EC) bases the frequency of inspections under the Port State Control system on the risk profile of ships. As a result, 'quality ships' that have satisfactory inspection records or do not carry an otherwise defined risk may undergo less frequent inspections. By conducting inspections under the PSC framework, relevant authorities can combine separate inspections in a single inspection visit, thus saving value resources.

Figure 36 Type of inspection framework in use



Source: stakeholder consultation

As Figure 36 illustrates, inspectorates make use of the option to use the PSC framework. 32% of the Member States indicate that they conduct the inspections together with the

[166] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 28.
Our stakeholder consultation found that in 13MS a national / regional maritime transport authority was responsible, in 5 Member States an Environmental authority, and in 5 other Member States the port authority's Harbour Master office.

[167] See Directive 2009/16/EC of the European Parliament and of the Council of 23 April 2009 on Port State Control, Article 1.

PSC inspections and only 16% of the Member States conduct dedicated inspections under the PRF Directive. The possibility to combine the inspection under the framework of the PSC offers a cost-efficient solution to the inspection requirements. However, it is essential for the effectiveness of enforcement that the inspections also focus on the elements prescribed by the PRF Directive. 30% of the surveyed port authorities indicated that in less than half of the cases PSC inspections take waste delivery requirements into account. Two of the surveyed Member States confirmed that waste delivery requirements were not always included[168]. If the PRF elements are not properly included in the inspection framework, inspection of the PRF elements, such as reporting or delivery requirements for waste, cannot be done effectively.

The selection of vessels for inspection is another relevant aspect if PRF inspections are conducted under the PSC framework. The PRF Directive requires Member States to pay particular attention to ships that are not compliant with notification requirements, as outlined in Article 11(2a), and ships for which the waste notification indicates that the ship may not comply with the PRF Directive. Article 12(1d) creates an obligation for Member States to ensure that advance notification forms are appropriately examined. However, inspection reports indicate that where the PSC framework is used, inspection authorities do not use the contents of ships' advance notification, and only select vessels for inspection based on criteria under PSC[169].

This is an important finding, as the new PSC Directive (2009/16/EC)[170] specifically includes non-compliance with the advance reporting requirements under the PRF Directive (Article 6) as a possible reason for vessel inspection[171]. However, more than half of the Member States (12 of the 22) did not select ships for inspection based on an examination of the waste notification forms[172]. An explanation for this could be that port authorities, the body receiving the waste notification forms, are often not directly involved in 'enforcement' of waste delivery. Moreover, port authorities often consider ships as their clients, and leave inspections and enforcement to the relevant authorities.

The lack of communication and cooperation between ports and the PSC officers on waste reporting and delivery does not facilitate effective enforcement[173]. In view of the substantial costs of advance notification for port users and port authorities, as already mentioned, not using the information from advance notification in the enforcement process is inefficient.

Even if notification forms are used for selecting vessels for inspection, there is still an additional shortcoming in terms of effective enforcement. Ports report that particularly for Annex V waste, the estimates in the advance notifications are often incorrect. As these forms are the only empirical basis for selecting vessels for inspection under the PRF Directive[174], the lack of their use limits the effectiveness of enforcement. One port reported that there are often discrepancies between the waste delivery receipts and advance notification forms, which further underlines the problematic information provision for enforcement[175]. Currently, the PRF Directive does not require port reception facilities to provide waste delivery receipts, as suggested by IMO guidelines[176]. However,

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[168] Stakeholder consultation; not presented in figure here. See also EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 28.
[169] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 32.
[170] Directive 2009/16/EC of the European Parliament and of the Council of 23 April 2009 on port State control.
[171] In line with Article 5 of the PSC Directive (2009/16/EC). Annex I, chapter 2, Article 2b lists a number of number or reasons for inspections, one of them being ships that failed to comply with the advance notification requirement.
[172] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 34.
[173] EMSA (2012), Study on the delivery of ship-generated waste and cargo residues, p 5.
[174] See Article 11(2a).
[175] Open comment in the stakeholder consultation.
[176] IMO MEPC (2008), Standard format for the waste delivery receipt following a ship's use of port reception facilities; MEPC1/Circ.645.

waste delivery receipts are in use in some EU ports, and can be used to confirm the amounts of waste delivered in the previous port of call.

In 2010, nine Member States had not carried out the required number of ship inspections in the context of the PRF Directive, while another three Member States did not inspect vessels under their own flag[177]. This is related to the use of the PSC inspection framework, as the new PSC Directive[178] replaced the 25% inspection requirement by a risk-based assessment inspection regime. As a result, Member States can reduce the number of inspections for low-risk vessels in the context of the PSC Directive. This can lead to a legal incoherency, in which Member States can use this PSC criterion for selection of ships for inspection, while the PRF Directive still requires the 25% inspection target of all vessels to be maintained. This situation has caused uncertainty in the Member States, and has not supported effective enforcement of waste delivery.

6.2.4. Enforcement costs for administration

To estimate the enforcement costs related to ship inspection, the total number of port calls in the EU were matched with data provided in the stakeholder consultation on the number of inspections conducted. As data have not been provided by all Member States, an estimate was made based on the data collected. On average, 2.27% of all port calls are subject to inspection[179]. Although this percentage does not refer to the number of unique port calls per vessel, it is clearly below the 25% required by the Directive.

Based on the information collected in additional interviews and the stakeholder consultation, an inspection lasts generally no more than one hour, and requires a crew member to accompany the inspectors. An inspection may last longer, up to four hours, but this is only for larger (cruise) ships[180]. At the aggregated EU-level, this leads to an annual estimate of roughly 1.4 million EURO of administrative burden for the maritime sector[181]. The enforcement costs for the competent authority are based on the same calculation, but the EU average hourly wage costs for public administration were used. This leads to an annual estimate of 1.2 million EURO to cover the costs of inspection under the PRF Directive for all inspectorates.

Only a minimal number of sanctions have been given to port users[182]. Inspectorates in general do not keep or do not make available data on the number of vessels that have not complied with requirements under the PRF Directive. Thus, no data are available to substantiate the proportionality of inspections. This aspect is addressed in the stakeholder analysis in the following section.

6.2.5. Proportionality of enforcement and advance notification

Port users ranked the administrative burden related to obligations from the PRF Directive as relatively small and considered this administrative burden less of an issue than compliance costs, as assessed in Section 6.1. This is confirmed by our estimates of the compliance costs and the administrative burden related to the PRF Directive, although the administrative burden due to advance notification for port users (74.5 million EURO on an annual basis) cannot be disregarded.

In the stakeholder consultation, stakeholders were asked to express their views on whether the administrative costs imposed on their organisations by the PRF Directive are

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[177] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 33.

[178] Directive 2009/16/EC, replacing 1995/21/EC and introducing the elements of the New Inspection Regime under the Paris MOU into EU legislation.

[179] Based on data collected in the stakeholder consultation from BE, DK, DE, EE, ES, LT, MT, PL, FI, UK. As the data collected the major shipping regions in the EU, we consider the data collected valid enough as input for the calculations.

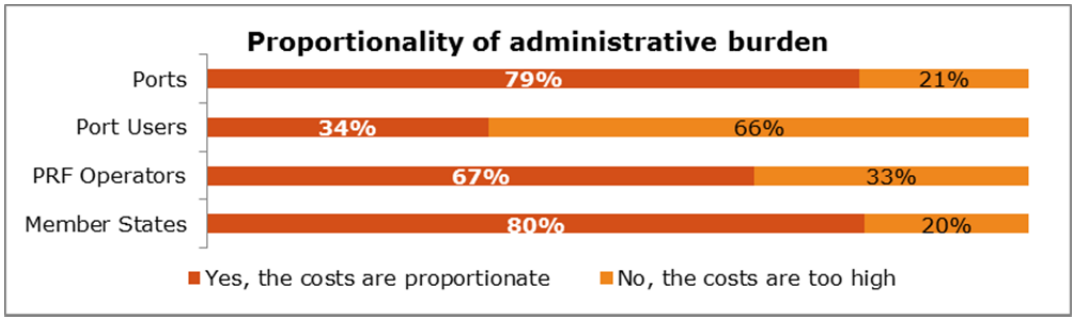
[180] Interview with Alessandro Bertorello, Director Environmental Management Costa Crociere S.p.a.

[181] Based on the 2008 number of port calls in the EU, and the EU average 2008 hourly wage costs for the maritime sector, both recorded by Eurostat; 2.289.021 port calls, and €26,82 per hour.

[182] Finding from stakeholder consultation: only four ports reported to have initiated sanction proceedings in the framework of the PRF Directive since 2008.

proportional to the benefits provided by its implementation. As presented in Figure 38, a clear majority of ports (79%), PRF operators (67%) and Member States (80%) indicated that the administrative costs are proportional to the benefits. For port users the perception was different as only 34% of the port users considered the costs incurred were proportional to the benefits. Based on the estimates of the administrative burden and the feedback of the stakeholders, we concluded that overall the administrative costs are proportional, although for port users, these costs are substantial, notably costs related to advance notification.

Figure 37 Proportionality of administrative burden



Source: stakeholder consultation

6.2.6. Conclusions

This section illustrates that the administrative burden of the PRF Directive concentrates on costs for inspections and advance notification. The administrative burden is relatively small for most stakeholders, but port users are faced with a considerable administrative burden of 74.5 million EURO annually for advance notification. Stakeholders confirmed this conclusion.

Enforcement of the PRF Directive has limitations. Where PRF related inspections are conducted in the framework of PSC, the inspections do not always take a vessel's compliance with waste delivery requirements into account, and ships are generally not selected on the basis of the contents of their notification form. When these forms are taken into account, the estimates of waste delivery are not always useful, especially if not confirmed by detailed waste delivery receipts (which are not required by the PRF Directive, but are recommended in standing albeit non-mandatory IMO Guidance). Moreover, the 2009 revision of the PSC Directive, which included a transfer to the 'risk-based' selection of vessels for inspection, rather than selecting a fixed percentage of vessels calling in the ports, is currently not in line with the PRF Directive's requirements for enforcement. As a result, the effectiveness of provisions to uphold enforcement of the PRF Directive is currently insufficient.

6.3. EQ 10: Effects on different ports: size, type and geographical location

6.3.1. The evaluation question

EQ10: Have the provisions of the PRF Directive been equally fit for the *ports of different size, type and geographical location*?

This evaluation question requires a focus on the proportionality of the rules and costs incurred for the diversity of ports in the EU. Different effects on different ports according to their size, type and geographical location are presented. Seaports are found in the 23 coastal Member States, and range in size from small fishing or recreational ports to large multimodal hubs to receive the world's largest vessels. The PRF Directive introduces an overarching legislative framework for improving the discharge of waste in port reception facilities in this large variety of ports.

In order to evaluate whether this framework is equally fit for purpose for the range of ports, key issues are discussed and analysed, including adequacy of port reception facilities, WRH plans, notification requirements and cost recovery systems. These are gathered from the evaluation questions and analysed in this section to come to a more general conclusion on whether the PRF Directive is equally fit for all ports.

6.3.2. Adequate port reception facilities

The PRF Directive specifically addresses the range of ports in the EU by requiring Member States to ensure the availability of port reception facilities adequate to meet the needs of the ships normally using the port (Article 4). The port reception facilities can vary from a simple garbage container in a small marina to advanced facilities for receiving large volumes of waste without causing undue delay to cruise ships. Stakeholders did not indicate problems with this requirement in the PRF Directive, because ports are often well aware of the needs of ships calling at their port. For smaller recreational and fishing ports, stakeholders indicated an increase in the number of adequate port reception facilities in small marinas and fishing harbours, some of which did not have adequate facilities before the introduction of the PRF Directive.

With regard to the ports in various locations, there are considerable geographical differences in the availability of adequate port reception facilities. This shows that some provisions in the PRF Directive may be better implemented in some regions than in others. In the region around the Baltic Sea, Member States saw less improvement in adequacy as a result of the PRF Directive. This may be because port reception facilities were relatively well established prior to the PRF Directive. In the Mediterranean Sea region, Member States saw some improvements, whereas around the North Sea, Atlantic Ocean and Black Sea considerable improvements in adequacy were reported. See Figure 14 in Section 5.2.3.

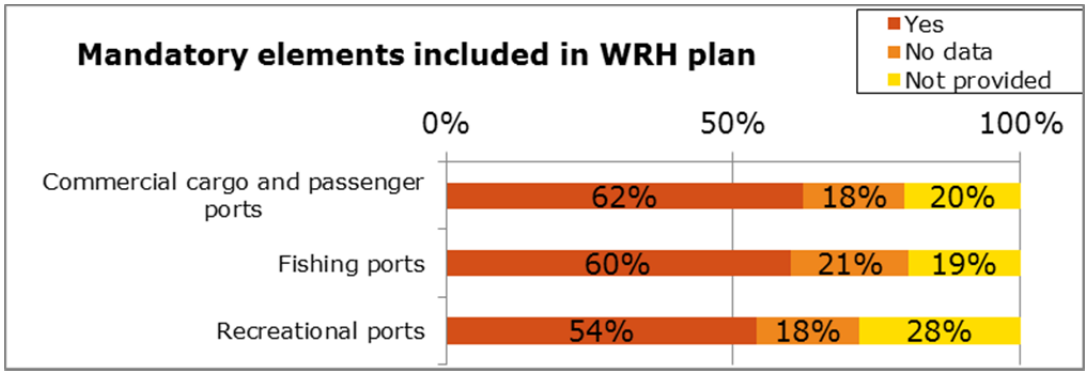
6.3.3. WRH plans

The obligation to develop and update WRH plans has been deemed a considerable burden for smaller ports (see Section 5.3.3). Generally, larger ports have the resources and expertise to develop WRH plans. It has been estimated that the development of a WRH plan costs between 5,000 and 40,000 EURO, which is a relatively large expense for smaller ports[183]. Member States have adopted different approaches for approving WRH plans for their smaller ports. Three Member States (Denmark, France, and Portugal) indicated that small and large ports are not treated differently, which could have contributed to relatively high costs for smaller ports. We have not received comments from other Member States on this aspect. However in some cases, Member States have different standards in place for approving WRH plans. Such different standards should ensure that ports of all types develop 'appropriate' WRH plans, where 'appropriate' has a different meaning for different types and sizes of ports. A number of common elements are listed in Annex I of the PRF Directive as mandatory for inclusion in a WRH plan. Inspections found that fishing and recreational ports are less compliant with the provisions of the PRF Directive, and the larger commercial ports slightly more compliant[184], as indicated in Figure 38 and Figure 39 for mandatory and recommended elements of Annex I to the PRF Directive respectively.

[183] As stated in Section 6.1.4, the range of 5,000 – 40,000 EURO is based on feedback from our stakeholder survey, which is biased towards medium and large ports. As such, this range is not representative for smaller ports or marinas.

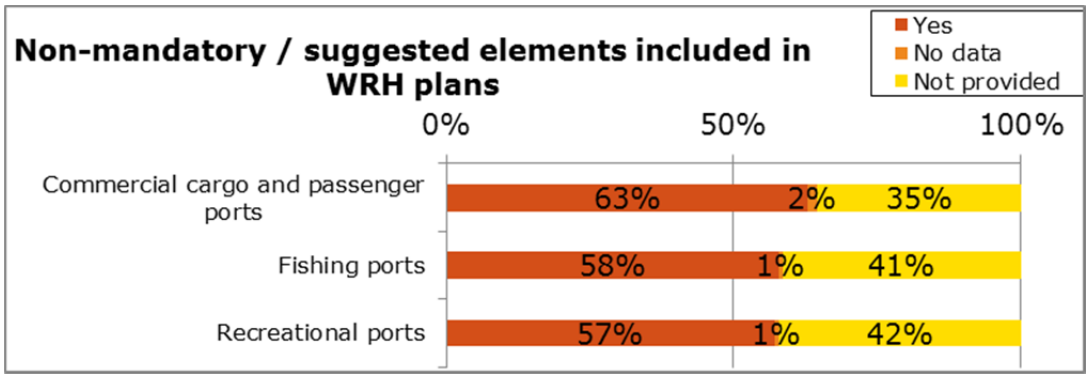
[184] EMSA (2006), Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC.

Figure 38 Mandatory elements Annex I included in WRH plans



Source: EMSA (2006), Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC.

Figure 39 Non-mandatory elements Annex I included in WRH plans



Source: EMSA (2006), Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC.

The PRF Directive explicitly allows the option for ports to work together to draw up a regional WRH plan. However, ports have not often used this option. EMSA has played an important role in hosting workshops with Member States to provide targeted guidance on the criteria required by the PRF Directive, and to emphasise that Member States could also encourage the development of shared WRH plans through regional cooperation.

6.3.4. Notification requirements

The advance notification requirements do not apply to a fishing vessel or recreational craft authorised to carry no more than 12 persons. As a result these requirements are mostly relevant for the ports that receive commercial cargo and passenger ships. There is no indication that this limitation in scope is problematic in the application of the PRF Directive. The notification requirements have been implemented in the different regions in the EU, and no issues were reported during the stakeholder consultation. Even though it would contribute to improving the effectiveness of waste delivery operations, the use of the PRF Directive's notification form in parallel with the IMO advance notification form will limit efficient reporting procedures. Although primarily noted by North Sea ports, this finding is equally valid for other regions.

6.3.5. Cost recovery systems

Section 5.4 on cost recovery systems outlines to what extent regions have implemented different cost recovery systems. Ports in the Baltic Sea generally have 'no special fee' systems, as a result of political agreements in the framework of HELCOM, while direct fees are charged for some types of waste in the Black Sea ports and in selected North Sea ports. The PRF Directive deliberately allows this variety of cost recovery systems, and only provides broad guidance on the required incentives.

Port users report considerable differences between fee levels charged by various ports, and the types of cost recovery system in place. Port users generally considered Northern European ports as relatively affordable for waste delivery, but a number of Southern European ports were seen as particularly expensive[185].

6.3.6. Conclusions

The provisions of the PRF Directive have different effects on ports of different size, type and geographical location. The PRF Directive has improved the adequacy of port reception facilities in the EU, but to varying degree in the different regions. Many differences result from implementation of certain elements in a national or regional context.

Significant differences have been identified in the approval of WRH plans by Member States. The development of these plans is perceived by some smaller ports to be a considerable burden, while a limited number of smaller ports have explored the potential to develop regional WRH plans. Different cost recovery systems can be put in place by Member States and ports to best accommodate the local context. It can be concluded that the provisions of the PRF Directive provide sufficient flexibility to meet the needs of ports of different size, type and geographical location.

[185] Based on open comments received in the stakeholder consultation.

7. EU ADDED VALUE

EU Added Value is defined as the additional value resulting from the EU interventions, over that achieved by Member States individually at the national and/or regional level[186]. Chapter 7.1 outlines EU added value of the obligations under the PRF Directive compared to international law. Subsequently, Section 7.2 discusses whether similar results could have been obtained without the PRF Directive. In Section 7.3, the EU added value created by the exchange of good practices by Member States is analysed. These three sections contribute to a conclusion on the EU added value of the PRF Directive.

7.1. EQ 11: EU added value of additional obligations under PRF Directive

7.1.1. The evaluation question

EQ11: What is the EU added value of the PRF Directive's obligations that go beyond the requirements in MARPOL 73/78? Has the coexistence of EU and international law in this domain created inefficiencies, overlaps or legal uncertainties?

To assess the added value of the obligations under the PRF Directive at the EU level, this study has assessed the added value of the advance notification requirements, the WRH plans, the cost recovery systems, the principle of mandatory delivery, and the inspection regime. For each of these elements, the theoretical assessment was complemented with views from the stakeholders in order to answer the second part of the evaluation question on inefficiencies, overlaps and legal uncertainties.

7.1.2. Advance notification requirements

The PRF Directive includes a requirement for advance waste notification for vessels, which was initially based on an IMO recommendation[187]. Annex II of PRF Directive proposes a detailed reporting format for use in the EU. With this common format, the PRF Directive aims to reduce inefficiencies in reporting requirements between Member States.

However, the latest revision of MARPOL Annex V by IMO has created uncertainties about the use of the advance notification form under the PRF Directive. IMO's Marine Environment Protection Committee (MEPC) has developed new guidelines and a new standard advance notification format for use worldwide[188]. However, this situation does not contribute to efficiency because of differences in the categorisation of waste types and the level of detail between the two forms.

The added value of the common advance notification form in the PRF Directive has been undermined and reduced by the introduction of the new IMO format. Even though use of the IMO form is not mandatory, many ports are using this form. Stakeholders indicate that in various EU ports, one of the two forms is currently in use, which adds to uncertainty and complexity for port users. As shown in Figure 40, only 16% of port users considers the EU provisions on advance notification to have significant additional benefits. Other stakeholders, who do not experience problems in using two different forms, perceive the advance notification requirements to have considerable benefits.

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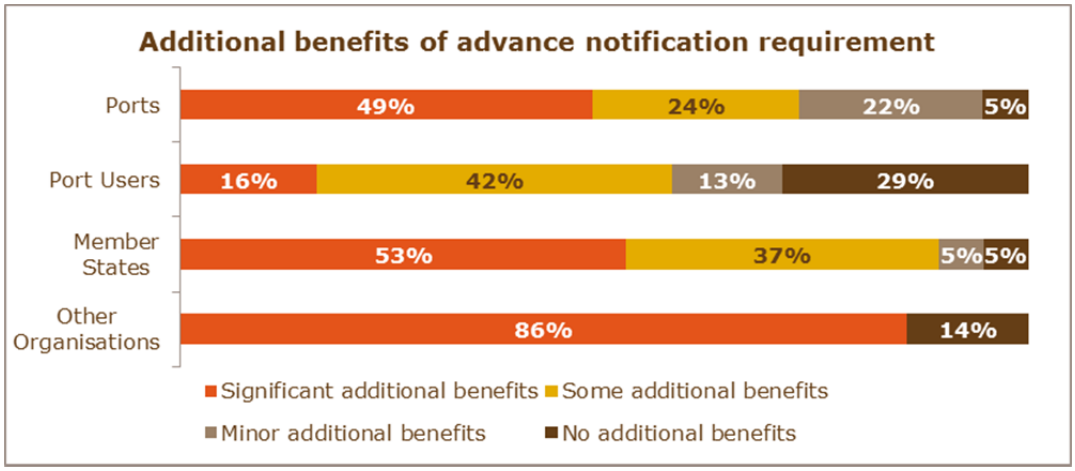
[186] European Commission (2004), Evaluating EU Activities: A practical guide for Commission services.

[187] IMO MEPC (2000), resolution 83(44): Guidelines for ensuring the adequacy of port waste reception facilities, Section 4.

[188] IMO MEPC (2013), MEPC.1/Circ.644/Rev.1 which revises the advance notification form approved by MEPC 58/23.

Figure 40 Benefits of advance notifications requirements[189]



Source: stakeholder consultation

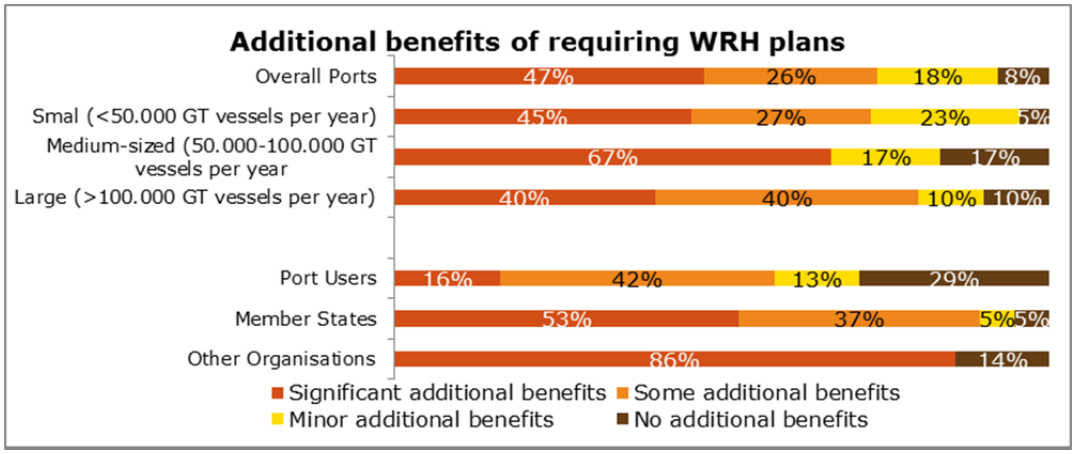
7.1.3. WRH plans

The PRF Directive introduced the requirement for ports to develop WRH plans (see Section 5.3.3). Although there are costs associated with the development of these plans (Section 6.1.3), the mandatory requirement to develop WRH plans is an example of the added value of the PRF Directive. The PRF Directive introduces in Annex I a list of elements that should be included in these WRH plans. This follows the IMO recommendation in the '2000 Guidelines for ensuring the adequacy of port waste reception facilities'[190], which also emphasised the need to consult port users and conduct periodic reviews[191]. By translating these guidelines into EU law, the PRF Directive seeks to ensure that ports across the EU interpret these guidelines in a similar way. This reduces uncertainties and improves information provisions to port users, while respecting the principle of subsidiarity.

By incorporating the recommendations of IMO guidelines into legal EU requirements, the PRF Directive has contributed significantly to added value on this issue. This was confirmed by our stakeholder consultation. Also among the ports, only 8% considered there is no additional benefit of developing these WRH plans. Given the reported burden on smaller ports (see Section 6.3.3), it was also assessed whether ports of different size have different perceptions of these benefits. Figure 41 shows that this is not the case and no statistically significant differences were found between ports of different sizes.

[189] Port reception facilities are not included in the figure.
[190] These 2000 guidelines have been superseded by more recent guidelines.
[191] See IMO MEPC (2000), Resolution MEPC 83(44), adopted on 13 March 2000.

Figure 41 Benefits of WRH plans for different port sizes



Source: stakeholder consultation

7.1.4. Cost recovery systems

The PRF Directive introduced provisions for cost recovery systems, which should not give port users any incentive to discharge ship-generated waste at sea. There are no provisions for types of cost recovery in MARPOL and annexes[192]. The provisions under the PRF Directive aim to reduce incentives for vessels to discharge waste at sea, including operational discharges allowed under MARPOL. This element complements the mandatory delivery requirement of Article 7, by offering financial incentives for ships to deliver their waste in port reception facilities.

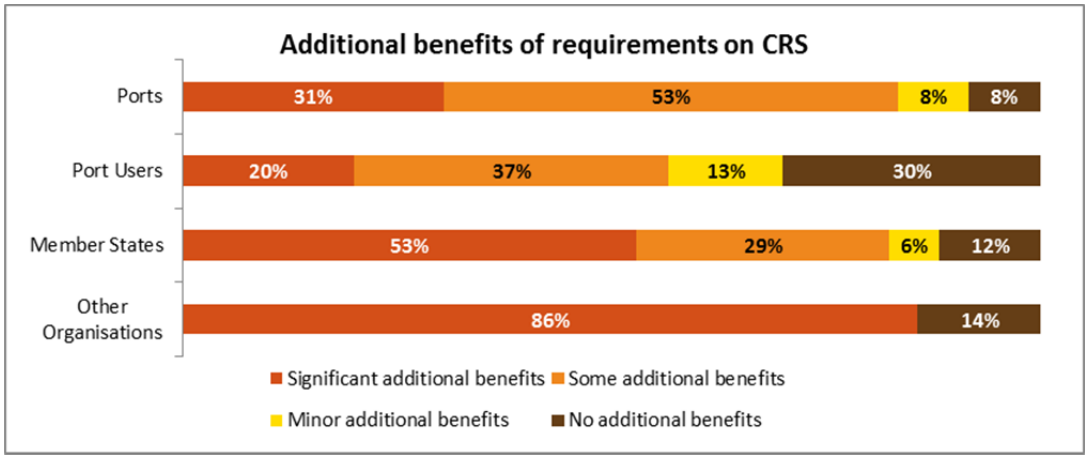
The level of fees charged by ports have an impact on ports' competitiveness. Therefore, the requirement that cost recovery systems for waste delivery contain adequate incentives is a crucial element in preventing distortion of competition between EU ports. This could not be achieved under MARPOL (see Section 7.2). This was further underlined in the political discussions on this issue during the preparation of the PRF Directive[193]. It is unlikely that all ports would have introduced an indirect component to their waste fees on their own initiative to contribute to the EU zero-waste objectives.

A large proportion of stakeholders also perceive considerable benefits in this provision, except for port users, of whom 30% do not perceive the added value of the requirements of the PRF Directive on cost recovery systems in the EU (see Figure 42). Given the importance of regional cooperation in cost recovery systems (as demonstrated by cooperation under HELCOM in the Baltic Sea), the responses of the Member States and port authorities were also analysed by geographical region. However, no statistically significant differences were found. In view of the absence of guidance or regulations in other international legislation, no inefficiencies, overlaps or legal uncertainties have arisen at this point.

[192] Note that the comprehensive manual on port reception facilities (1999 edition) describes various types of possible fee systems that may be applied.

[193] For a discussion on the political issues in preparation of the PRF Directive EMSA (2006), see 'Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC'

Figure 42 Benefits of requirements on cost recovery systems



Source: Stakeholder Consultation

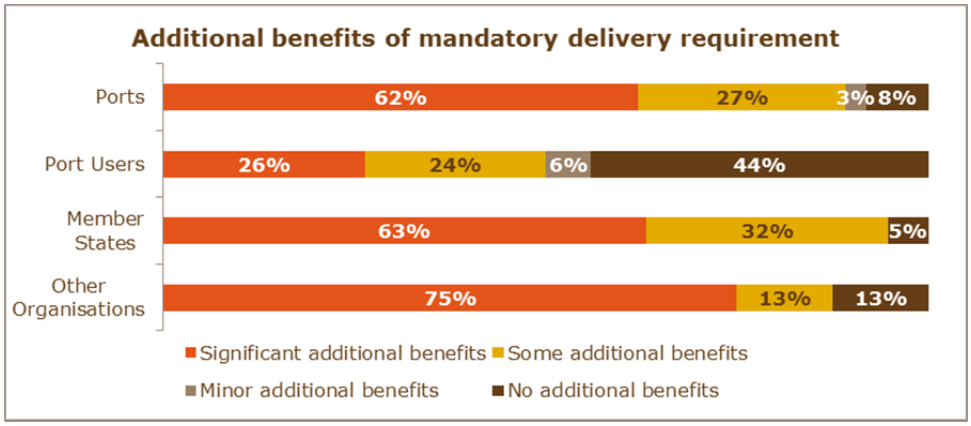
7.1.5. Principle of mandatory delivery

Article 7(1) introduces the principle of mandatory delivery, which requires that all vessels discharge all ship-generated waste before departure. Paragraph 2 of Article 7 describes the conditions under which the principle of mandatory delivery may not apply: 'a ship may proceed to the next port of call without delivering the ship-generated waste, if it follows from the information given […] that there is sufficient dedicated storage capacity'.

Advance notification, possibly confirmed through inspections, should provide evidence that sufficient space is available to store waste accumulated on the voyage to the port of delivery. In view of the MARPOL restrictions on discharges at sea, ships are required to have a dedicated waste tank and storage capacity for discharge in port reception facilities. However, the EU added value of the mandatory delivery principle is that it is more explicit in making the delivery of ship-generated waste mandatory before leaving the port and by placing the burden of proof on the port users. The principle of mandatory delivery before departure reduces the risk that ships discharge their waste at sea, as such pose a threat to marine environment.

However, many port users (44%, see Figure 43), and particularly stakeholders in the cruise and container sectors, do not see the additional benefits of this mandatory delivery principle. Some port users report that the mandatory delivery requirement is applied too strictly in some ports, for instance by not offering the option to retain waste on board to be delivered in another port, even though they have sufficient storage capacity.

Figure 43 Benefits of mandatory delivery requirements



Source: stakeholder consultation

Interviews with representatives of port authorities showed that the interpretation of 'mandatory delivery' varies widely in the EU. The decision to allow a ship to proceed to the next port of call without delivering the ship-generated waste, in accordance with Article 7(2), is often left to the discretion of the harbour master or PSC officer.

It is difficult to assess at EU level how the relevant authorities interpreted this regulation. Our interviews showed that several Member States have issued national guidelines to aid the relevant authorities. France, for instance, requires that ships have at least 30% of the waste storage capacity available before leaving port, while Sweden requires at least 70% of waste storage capacity available. This is illustrative of the differences in application of the principle of mandatory delivery in the EU. Various port users and port authorities reported that too strict application of the mandatory delivery principle would result in substantial costs (see Section 4.1.3) and would notably affect the short-sea shipping sector disproportionately.

In addition to the varied interpretation of the mandatory delivery principle, Member States identified a legal uncertainty between the mandatory delivery principle in the PRF Directive and the requirements under MARPOL, with the introduction of Directive 2007/71/EC amending Annex II of the Directive 2000/59/EC. More specifically, this amendment introduced the requirement that port users report in advance on the on-board volumes of sewage (as defined under MARPOL Annex IV) to be discharged in the port. However, the amended Annex II specifies in a footnote that 'sewage may be discharged at sea in accordance with regulation 11 of Annex IV of MARPOL', while underlining that reporting is not mandatory 'if it is the intention to make an authorised discharge at sea'. The footnote only states that reporting is not mandatory, but this element has introduced an uncertainty on interpretation of the entire provision on mandatory delivery under Article 7(1) on sewage. Article 7 refers to all ship-generated waste (defined in Article 2 of the PRF Directive as 'all waste, *including sewage*, and residues other than cargo residues, which are generated during the service of a ship and fall under the scope of Annexes I, IV and V to MARPOL 73/78'). The requirement that sewage should be delivered in the port, although it can be discharged at sea under certain conditions according to MARPOL Regulation, has effectively been interpreted by most Member States that ships can leave the port without discharging sewage.

Despite the theoretical EU added value of the mandatory delivery principle and other provisions of the PRF Directive, the various interpretations have resulted in differences in implementation of the PRF Directive in EU Member States. These different interpretations undermine the EU added value of this element of the PRF Directive.

7.1.6. Inspections

As the final additional element for implementing MARPOL in EU legislation, the PRF Directive lists the minimum requirements for inspections. MARPOL requires that Member

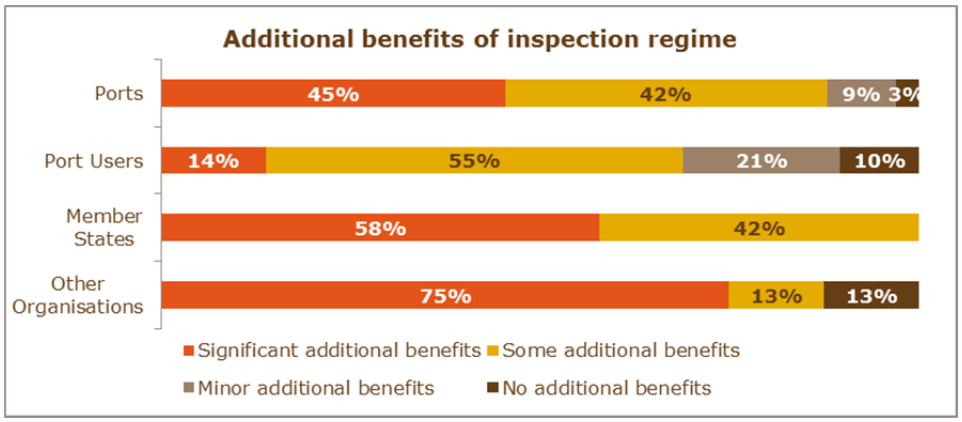
States enforce the requirements on the operation of the ship including the waste discharge requirements. The MARPOL Convention contains provisions on Port State Control that are complemented by Assembly Resolutions.

Meanwhile, the PRF Directive ensures that inspections in the Member States focus on similar elements, and aims at a similar number of inspections in all regions. The PRF Directive complements the provisions in MARPOL, by giving further detail. This is an element to which, given the regional competition between EU ports, there is clearly EU added value. By setting shared minimal inspection targets, the EU ensures a level playing field for all EU ports to contribute to the MARPOL and the PRF Directive's environmental objectives.

Despite the potential EU added value of an inspection framework proposed in the PRF Directive, the various approaches and interpretations by individual Member States in the enforcement of these provisions have not contributed to the EU added value of the PRF Directive (see for a detailed discussion on enforcement Section 6.2). Some Member States have organised their inspections under the framework of the PSC Directive, as specifically allowed under the PRF Directive. However, in many cases such inspections are not fully based on the requirements of the PRF Directive, if they include waste delivery at all. This undermines the EU added value of the PRF Directive.

Even though no inefficient overlap or uncertainties were identified with international legislation, Figure 44 shows most port users consider that the inspection regime provides 'some additional benefits' (55%) or, in fewer cases (21%) 'minor benefits'. Other stakeholders recognise more clearly the added value at the EU level of the inspection regime introduced by the PRF Directive and see in large numbers (75%) 'significant added value' of the inspection regime.

Figure 44 Benefits of inspection regime



Source: stakeholder consultation

7.1.7. Conclusions

This section evaluated to what extent each of the elements in the PRF Directive are more detailed or additional to MARPOL and provide EU added value. It shows that this EU added value in the provisions of the PRF Directive at the EU level is clear. By ensuring a common EU approach in the EU implementing the requirements of the MARPOL Convention, in an area of substantial regional port competition, the PRF Directive ensures that the objectives are not undermined by unequal opportunities. In particular, the combination of the mandatory delivery principle and the financial incentives introduced by the requirements on cost recovery systems in Article 8 (see section 7.1.5), and the inspections to enforce this (see section 7.1.6), create EU added value that cannot be achieved by Member States through international legislation alone. One Member State stated in the stakeholder consultation that 'For non-compliance of […] MARPOL obligations, the Port State could not been sanctioned. However, for non-compliance with the same obligations under the PRF Directive there is a risk of infringement procedure to

be initiated'. The vast majority of stakeholders confirmed this conclusion. Only a minority of port users are more critical about the EU added value, and then particularly on the issues that created a burden on them.

Despite the EU added value that the PRF Directive in theory offers, the coexistence of EU and international law has also created a number of inefficiencies and legal uncertainties. The fact that there are currently two different notification forms in use, which use slightly different definitions, causes uncertainty among port users and inefficiencies in the reporting process. Also with regard to the different application across ports and Member States of the mandatory delivery principle in relation to discharges allowed under MARPOL, in particular with regard to sewage, stakeholders point to legal uncertainties, which undermine the EU added value of the PRF Directive. Whereas the EU added value of the mandatory delivery principle (in combination with the other provisions, such as the financial incentives introduced in cost recovery systems, and enforcement by means of inspections) lies in the reduction of the risk that ships pose a threat of harm to the marine environment, its various interpretations across the EU do not enable the full potential of its EU added value. In addition, the different, and rather minimal implementation of the inspection requirements of the PRF Directive further reduce EU added value.

More generally, the PRF Directive introduced practical provisions on port operations, as opposed to the MARPOL provisions that are directed at regulating discharges and operations at sea. Particularly where the PRF Directive requires the introduction of cost recovery systems, which should not provide incentives to discharge waste at sea, the PRF Directive 'goes beyond' MARPOL. By working towards environmental objectives, while ensuring a level playing field for the impacted ports, the PRF Directive provides added value that could only be achieved at the EU level. However, where the PRF Directive introduced elements that are interpreted in different ways, and which are also not strictly enforced, the EU added value of the PRF Directive is seriously undermined. Therefore the PRF Directive currently does not live up to its full potential of EU added value.

7.2. EQ 12: Waste delivery and reduction of discharges without EU intervention

7.2.1. The evaluation question

EQ12: Would it have been possible to obtain the same results in terms of waste delivery and reduction of discharges without EU intervention, i.e. the PRF Directive?

To answer this evaluation question, the evaluation starts from a hypothetical legal analysis, listing the existing provisions on port reception facilities besides the PRF Directive. Answering this evaluation question is mostly a theoretical exercise, as stakeholders were not asked about hypothetical situations.

7.2.2. The MARPOL requirements without EU intervention

In line with the previous chapter, it is necessary to distinguish between the elements in the PRF Directive that implement the provisions of MARPOL at the EU level, and elements in the PRF Directive that were formulated in addition to MARPOL. All Member States are party to MARPOL and have therefore committed themselves to implementing the provisions of MARPOL, regardless of any EU intervention. It is therefore assumed that Member States would also uphold their obligations under MARPOL in the absence of the PRF Directive. At the same time, the implementation of MARPOL provisions into EU law would contribute to a common application of the requirements throughout the EU. Although a common approach at EU level may potentially contribute more positively to the objectives related to waste delivery and discharges at sea than the sum of individual Member States' approaches, this difference cannot be quantified. The following paragraphs provide an estimate to the contribution of the PRF Directive, whereas the no-intervention will be assessed qualitatively.

The various elements of the PRF Directive, such as the mandatory delivery requirement, advance notification requirements, waste reception and handling plans, and provisions on inspections (see Section 7.1), can be linked to the implementation of the MARPOL provisions. Whereas the PRF Directive provides additional guidance in order to harmonise these elements in the EU, it is assumed that Member States would have implemented them in one way or the other. For instance, mandatory delivery implicitly follows from the discharge restrictions under MARPOL. By restricting discharges at sea, the MARPOL Convention effectively requires the delivery of waste in ports if vessels do not have sufficient space on-board. At the same time, we acknowledge that the EU's ambitious policy objectives and policy actions, as well as its targeted input towards policy development (for instance, within IMO), act as catalysts that potentially pushed the development of MARPOL guidelines further than what would be the case without EU intervention[194.]

Whereas this cannot be quantified in a meaningful way, the issue here is to assess whether it would have been possible to obtain the same results in terms of waste delivery and reduction of discharges at sea without EU intervention. To address this issue, this section analyses the impact of the mandatory delivery requirement and the incentive structure put in place by the PRF Directive, which, as discussed in Section 5.1, contributed positively to the objectives of waste delivery and reduction of discharges at sea.

7.2.3. The importance of incentives to reduce discharges of waste at sea

In order to reduce the number and volumes of discharges at sea, the PRF Directive introduced a framework of fee systems to be applied in ports that provides 'no incentive for ships to discharge their waste into the sea'. In view of the exception to the current mandatory delivery requirement (see Sections 4.1 and 7.1.5), the primary mechanism for the PRF Directive to meet its objectives is to give ships sufficient incentives to discharge their waste in port reception facilities[195]. The leading principle is that if a vessel has paid for the facility, and the facility is adequate for its needs, there is no reason *not* to discharge at the port reception facility. Section 5.4 sets out the analysis that this principle has contributed to higher levels of waste delivered, and fewer discharges at sea. Whereas the MARPOL Convention has been in effect since 1983, a substantial reduction of discharges at sea and increasing waste deliveries in port reception facilities can be observed since the introduction of the PRF Directive. This indicates the importance of the additional obligations under the PRF Directive.

In the absence of an incentive structure in the waste fees, port users would have to pay for the volume of waste delivered. Shipping operators have a predominantly economic motivation. Therefore, such a system only gives commercially operating vessels the incentive to discharge the bare minimum in the port. Under MARPOL, some waste can be legally discharged and retained on board to be discharged at sea. In this hypothetical situation without the PRF Directive in place, the risk for illegal discharges into the sea is also more substantial if the operator does not want to pay the fees for landing, particularly for ships that do not have the relevant equipment in operation. Admittedly, MARPOL and its annexes have become stricter over the years. This is reflected, for example, in the latest revision of Annex V, which in principle restricts any discharge, excluding only a few types of garbage under certain conditions[196]. However, a hypothetical system with only legal discharge restrictions (MARPOL) without financial incentives to discharge waste in the port, would not fully contribute to waste delivery and a reduction of discharges at sea. This is confirmed by stakeholders, indicating that the specific cost recovery system in ports is a key consideration in the decision to discharge

[194] See for instance A. Carpenter (2012), The EU and Marine Environmental Policy: A Leader in Protecting the Marine Environment?, *Journal of Contemporary European Research* 8 (2): 248-267.

[195] 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, page 22.

[196] MARPOL Annex V (resolution MEPC.201(62)).

waste (see Section 4.1). As this is an answer concerning legal discharges, this is even more valid when referring to illegal discharges of waste.

The role of cost recovery systems and their different incentives have been recognised for many years by Member States around the Baltic Sea. By means of the Helsinki Agreement, these Member States have agreed to introduce 'no special fee systems', in order to reduce incentives to discharge ship-generated waste at sea. In light of the decisions by some Member States to implement this provision themselves, it could be argued that no EU intervention would have been necessary. However, there was resistance in other Member States to further increase indirect contributions to waste fees[197]. It is therefore unlikely that a similar cost recovery system would be introduced in other Member States. A situation where only some Member States introduce this system (in this case only the HELCOM members) is undesirable, as this can potentially lead to port users keeping their waste on board to the permitted extent so that they can discharge in no-special-fee ports. To financially cover the reception and handling of the additional waste types, these ports would have to increase their fees. This could hamper their regional competitiveness vis-à-vis ports without such indirect fees systems in place. Note that when comparing the deliveries of waste to different types of cost recovery systems (see Section 5.4.5), such an increase of deliveries to no special fee ports was found for Annex V, but not for Annex I. The evaluation therefore does not have conclusive evidence of this.

7.2.4. Conclusions

In this section it has been argued that in the absence of EU intervention, many policy developments would still have taken place through MARPOL, to which all EU Member States are party. As such, these Member States have committed themselves to implementing the provisions included in this international Convention. However, as has been noted earlier in this report, while MARPOL had been in place since 1983, the entry-into-force of the PRF Directive seems to have contributed substantially to increased volumes of waste delivered.

This section further analysed the extent to which the incentive structure in the fee systems in the PRF Directive contribute to waste deliveries in ports and reduce the number of discharges at sea. It is argued that the absence of this incentive structure, (even in an institutional environment that keeps all other MARPOL provisions in place), would not have brought about the observed increases in volumes of waste delivered in ports and hence reduced the number of discharges at sea. While some Member States developed regional initiatives to implement such provisions without EU intervention, such initiatives could distort regional competitiveness between ports that participate in such incentive based fee structures and ports that do not. Nevertheless, it would not have been possible to obtain the same results in terms of waste delivery and reduction of discharges without the PRF Directive.

7.3. EQ 13: Exchange of good practices

7.3.1. The evaluation question

EQ13: Has there been a recognised exchange of good practices at national/regional level (e.g., as regards the cost recovery systems) and how has this contributed to EU added value?

Desk research focused on exchange of good practices. To evaluate the EU added value of the exchange of good practices, such exchanges were studied at various governance levels. This section presents the exchanges of good practices at the EU level, the regional

[197] See 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, page 22.

level (cooperation agreements between groups of Member States sharing the same coastline) and the national and bilateral level. These findings are complemented with findings from the stakeholder consultation.

7.3.2. Exchange of good practices at EU level

EMSA and the European Commission are driving forces in the exchange of good practices in the EU. EU added value is primarily created in developing joint approaches to implementation of the Directive and promotion of harmonisation. For example, the European Commission and EMSA support information exchange between Member States by means of meetings, workshops and by making available the findings of EU horizontal inspections. The findings at a port level have been used to improve the plans used by the various ports, and to enable peer learning[198]. In this process, the smaller ports indicated that the development of waste reception and handling plans can be problematic because lack of resources. Therefore, EMSA has supported them by exploring the options under the PRF Directive to develop regional waste handling plans[199]. These activities contributed to a common understanding of the challenges in the EU, and as such contributed to EU added value.

After the entry into force of the Directive, EMSA organised workshops for policy makers in the Member States to support implementation of WRH Plans[200]. As the PRF Directive states that the WRH plans should be 'appropriate', a balance is sought between the level of detail required and available resources. This is particularly the case for small recreational ports in which only small amounts of non-specific waste types are deposited. Through workshops, Member States were given the opportunity to jointly explore the possible ways to evaluate different types of WRH plans[201].

The above shows the benefits of sharing good practices and discussing potential implementation issues on the PRF Directive. However, many stakeholders interviewed (particularly representatives of Member States and port authorities) indicated a stronger need for guidance and clarification on various aspects of the PRF Directive[202]. Stakeholders confirmed the relevance of exchanges of good practices, and suggested focusing on issues such as fee systems and segregating waste.

7.3.3. Exchanging good practices through regional cooperation

Participation of the European Commission in various regional arrangements (e.g. OSPAR or HELCOM) ensures continued exchange of views, practices and experience between policy makers. This enables regional bodies to focus on problems and challenges, as well as solutions that can be learned from other regions. For instance, additional regional coordination in the context of HELCOM has a clear impact on implementation of various aspects of the PRF Directive at the EU level.

Through the continuous involvement of the European Commission, regional cooperation can draw on the broader experience of other Member States and regional collaboration, as well as the experience of the individual Member States. It allows Member States to further streamline the implementation of provisions of the PRF Directive in a regional context, where harmonised implementation of principles at the EU level is not always feasible. This recognises that in some instances regional collaboration can achieve what cannot be achieved at the EU level. The European Commission plays an important role in

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[198] EMSA (2006), 'Technical report assessing the waste reception and handling plans adopted in accordance with Article 5 of Directive 2000/59/EC'.

[199] EMSA Workshop report (2011), EMSA workshop on Port Reception Facilities for ship-generated waste and cargo – Lisbon 13 & 14 April 2011: page 5.

[200] See for instance EMSA Workshop report (2011): EMSA workshop on Port Reception Facilities for ship-generated waste and cargo – Lisbon 13 & 14 April 2011.

[201] EMSA Workshop report (2011), EMSA workshop on Port Reception Facilities for ship-generated waste and cargo – Lisbon 13 & 14 April 2011: page 5.

[202] Qualitative interviews with various Member States / port authority representatives, conducted between 2-13 February 2015.

exchanging good practices between these regions, to further stimulate policy learning, which contributes to added value at the EU level. Whereas the European Commission has been active in this respect, it is unclear to what extent such regional cooperation finds its way to EU added value.

For example, the OSPAR Member States agreed to identify best practices in relation to inspections for MARPOL Annex V ship-generated waste. These practices are related to better management of reporting data, and take into consideration the Paris MOU on port state control[203]. Another issue discussed on port reception facilities is implementation of the ISO standard 201070:2013. The Clean Baltic Sea, a joint project by HELCOM and the European Commission is yet another example. This project seeks to exchange environmental practices in ports on the Baltic Sea[204]. The European Commission has a crucial role to play as linking pin between these regional initiatives, and can as such contribute to EU added value. In theory, these regional approaches yield valuable experience for *all* Member States, and not just for those implementing it. As such, there is a clear EU added value to further apply these experiences in other regional contexts. In practice however, these experiences remained relatively isolated and do not seem sufficiently exchanged at the EU level. As a result, the EU added value gained through this regional cooperation is relatively limited.

7.3.4. Exchanging good practices through bilateral cooperation

In addition to direct interventions and initiatives at regional and EU level, EU ports and Member States also exchange their experiences directly. For example, several ports in the Netherlands and Belgium are discussing the adoption of common elements for cost recovery systems for waste discharge based on the principle that quality waste management should not be a matter of competition between ports. A first step to commonality is harmonisation of the criteria for fee calculation. The ports of Rotterdam, Amsterdam and Antwerp have reviewed these criteria in order to decide on a common approach. Based on this, these ports have defined the goal to continue to explore more detailed approaches for common cost recovery systems[205]. It is unclear to what extent such initiatives are being taken elsewhere and are in common practice. However, this example illustrates how the PRF Directive stimulates stakeholders to find each other in closer cooperation towards the overall objectives of better protection of the marine environment.

7.3.5. Conclusions

Exchange of good practices has been supported by the European Commission through various channels. This exchange supports policymakers in identifying common issues and possible solutions. The exchanges identified on specific elements of the PRF Directive, such as waste reception and handling plans, and cost recovery systems, provide a basis for more European cooperation.

The EU added value for the Member States also lies in finding common solutions to shared problems. While a number of exchanges of good practices have been identified, the wide range of targeted issues indicates that there is scope to expand these exchanges of good practices, especially from a regional perspective. For instance the approach taken by the Member States around the Baltic Sea has not been fully embraced or fully appreciated in other regions. The PRF Directive proposes a common approach to MARPOL implementation, and a structured exchange of experiences and good practices further contributes to this objective. The Commission plays an active role in this at the EU level, which as such contribute to EU added value. However, the largely regional focus

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[203] Consult for instance OSPAR (2014) Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic.

[204] http://www.clean-baltic-sea-shipping.com/uploads/files/An_analysis_of_environmentally_differentiated_port_fees_Task_4.6.pdf

[205] Interviews with Coen Peelen, Dutch Ministry of Infrastructure and Environment, and Henri van der Weiden, Port Amsterdam.

and lack of continuous exchange of good practices between these regions in the implementation of the PRF Directive limits the potential EU added value.

8. COHERENCE

Coherence is the extent to which the intervention does not contradict other interventions with similar objectives[206]. Firstly, this chapter assesses how well the PRF Directive interacts and contributes to the objectives of other EU legislation (Section 8.1). Subsequently, in Section 8.2 the coherence of the PRF Directive with waste legislation is evaluated, particularly with regard to the processing of ship-generated waste and cargo residues. Thirdly, Section 8.3 evaluates whether the PRF Directive is coherent with the wider structure of reporting formalities defined by other legislation, particularly by the Reporting Formalities Directive. Finally, the contribution of the PRF Directive to the objectives and approach of the PRF Directive on ship-source pollution is evaluated (Section 8.4). Based on these four sections, conclusions are drawn on the overall coherence of the PRF Directive with the wider body of EU legislation.

8.1. EQ 14: Contribution to objectives of other EU legislation

8.1.1. The evaluation question

EQ14: How well does the PRF Directive interact/contribute to the objectives of relevant EU environmental legislation, in particular: the Marine Strategy Framework Directive (Directive 2008/56/EC), the Directive on the Sulphur Content of Marine Fuels (Directive 2012/33/EU), the Waste Framework Directive (Directive 2008/98/EC) and other relevant EU waste legislation, as well as the recent Commission initiative on marine litter (SWD(2012) 365 final)?

This section presents the interaction of the PRF Directive with the relevant EU environmental legislation. To answer this evaluation question, the interaction of the PRF Directive is assessed in view of the main approaches of each of the legal instruments mentioned. Based on this assessment, conclusions are drawn on the overall coherence of the PRF Directive with the broader structure of EU environmental legislation. Whereas coherence with the broader principles set out in the Waste Framework Directive is discussed in this section, Section 8.2 discusses in more detail the coherence of the PRF Directive with respect to the reception and handling of ship-generated waste and cargo residues.

8.1.2. Contribution of PRF Directive to EU Marine Strategy (Marine Strategy Framework Directive / Commission Initiative on Marine Litter)

As presented in Section 2.3, the scope of the MSFD is considerably different from the scope of the PRF Directive and focuses primarily on achieving Good Environmental Status (GES) of the EU marine waters by 2020. It does so 'to protect the resource base on which marine-related economic and social activities depend'. The MSFD also legally enshrines the ecosystem approach to the management of human activities, having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use. As such, the MSFD clearly forms part of the EU environmental acquis.

The MSFD is relevant to the PRF Directive in the sense that the MSFD effectively introduces monitoring tools to evaluate progress towards environmental goals. The MSFD sets environmental targets and associated monitoring indicators for the 'good environmental status' of the four main European marine regions[207] in contaminants (oily waste/sewage), eutrophication (sewage), and marine litter (garbage), and links into

[206] Evaluating EU Activities, a Practical Guide for the Commission Services (2004).
[207] The Baltic Sea, the North-east Atlantic Ocean, the Mediterranean Sea and the Black Sea

other EU strategies and specific measures, such as the PRF Directive[208]. The MSFD offers an accessible framework for monitoring environmental progress concerning the specific types of waste that are included in the PRF Directive. The PRF Directive serves to align EU legislation with the MARPOL Convention to prevent pollution from shipping at sea. Whereas in theory its provisions/objectives fit well into the framework of the MSFD, its practical implementation is different as it is more based on the maritime acquis. Consider for instance the different definitions and concepts used in the MSFD (contaminants or marine litter, which do not correspond fully with the categories of ship-generated waste and cargo residues, defined in the MARPOL annexes). This reflects the different legal framework of the MSFD as compared to the PRF Directive.

In the recent communication on the '[a] zero waste programme for Europe',[209] the European Commission sets a target of reducing marine litter by 13% by 2020 (compared to 2015) and by 27% by 2030. The European Commission objective builds on the complementary function of the MSFD and the PRF Directive in leading to reductions in marine litter.[210] The underlying rationale is that through adequate port reception facilities, efficient enforcement mechanisms, and provision of the right incentives, reduction goals could be achieved more efficiently. The monitoring indicators introduced by the MSFD serve to evaluate environmental progress. Descriptor 10 of the MSFD requires that the: 'properties and quantities of marine litter do not cause harm to the coastal and marine environment'. Ship-generated waste, particularly operational waste, is a source of marine litter,[211] which is defined as 'a range of materials including plastic, metal, wood, rubber, glass and paper.'[212] Whereas this definition of marine litter is not fully in line with the definitions of the PRF Directive or MARPOL Annexes, the PRF Directive contribute to reducing marine litter nonetheless. It does so through the obligation for Member States to provide adequate port reception facilities, the mandatory delivery principle, and the incentives prescribed for the cost recovery systems, all of which seek to reduce the ship-generated waste discharged at sea (including the elements defined as marine litter by the MSFD). This combined approach of several incentives introduced by the PRF Directive contributes to the objective of the Commission Initiative on Marine Litter. The result is that port users have less incentives to discharge their waste at sea.

8.1.3. New types of waste through stricter air pollution standards (Directive on the sulphur content of marine fuels)

The Sulphur Directive envisages that there will be a potential role for the PRF Directive in ensuring the proper handling of the waste produced by exhaust gas cleaning systems (EGCS, or 'scrubbers', see also 2.3)[213]. Recently, guidelines have been introduced under MARPOL Annex VI for the reception of waste related to these scrubbers, which consists of wastewater, sludge and solid waste[214]. At the time of this evaluation (March 2015) this waste type is outside of the scope of the PRF Directive, but the need to properly discharge this waste is expected to increase in the short term. Therefore, the Exhaust Gas Cleaning System (EGCS) Sub-Group of the EC-led European Sustainable Shipping Forum (ESSF) began looking at the requirements for disposing of EGCS residues in ports.

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[208] See for instance http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-8/index_en.htm

[209] European Commission (2014), Towards a circular economy: A zero waste programme for Europe, (COM(2014) 398 final.

[210] European Commission (2012), Overview of EU policies, legislation and initiatives related to marine litter, Commission Staff Working Document SWD(2012) 365 final, pp. 10 / 12,13.

[211] Van Franeker, J.A. *et al.*, *Fulmar Litter EcoQO monitoring along Dutch and North Sea coasts in relation to EU Directive 2000/59/EC on port reception facilities*, Report nr. C037/11, Institute for Marine Resources and Ecosystem Studies, Wageningen (July 2011), p. 5.

[212] European Commission (2012), Overview of EU policies, legislation and initiatives related to marine litter, Commission Staff Working Document SWD(2012) 365 final, p. 2.

[213] Directive 2012/33/EU of the European Parliament and European Council: Recital 27.

[214] IMO / MEPC (2011), Resolution MEPC.199(62) on 15 July 2011: 2011 Guidelines for Reception Facilities under MARPOL Annex VI.

This also led to further consideration regarding the inclusion of this type of waste in the framework of the PRF Directive during any potential revision of the PRF Directive[215].

Within the forum of the ESSF, shipping companies using EGCS have been working in conjunction with ports, the EGCS manufacturers association, and the waste management industry in Europe to identify the chemical nature of these wastes. This research will also consider the likely quantities that will need to be landed in the near future in order to develop appropriate handling and landing methods, reception facilities, transport requirements, and safe and environmentally sound disposal methods[216]. The findings from this research will be presented to the ESSF in due course. However, no decisions have been taken on the framework for receiving this specific type of waste, and where port reception facilities should be logically located for receiving the scrubber waste to prevent discharge at sea. It could thus be envisaged to bring ECGS residues into the scope of the PRF Directive by including MARPOL Annex VI waste into the definition of ship-generated waste.

The stakeholders confirm the discussion above. However, it can be concluded from the responses in the stakeholder consultation that there are currently not many ships equipped with such scrubbers. As a result, no issues have yet been reported with regard to the delivery of scrubber waste to European ports. This is linked to the entry-into-force of new requirements under MARPOL Annex VI and the revised Directive on the Sulphur Content of Marine Fuels (Directive 2012/33/EU) only took place as of 1 January 2015. Even those few stakeholders reporting that EU ports are currently inadequately equipped for receiving this type of waste, soften this observation by referring to the ongoing discussions within the ESSF. This is supported by the following quote from the stakeholder consultation: 'As there are many as yet unknown or inadequately determined issues relating to exhaust gas cleaning systems, it is not possible to state that current facilities are adequate'.[217]

Based on the above, the PRF Directive could contribute to the objectives of the Sulphur Directive by including Annex VI waste into its scope and improving the adequacy and use of port reception for this particular type of waste. This will depend however, on the outcome of ongoing studies and discussions with the sector.

8.1.4. Discourage the production of waste while reducing impacts of disposal (Waste Framework Directive)

The PRF Directive and the Waste Framework Directive (WFD) pursue similar objectives, namely to prevent adverse impacts related to the generation of waste, and to reduce the adverse impacts of waste disposal as much as possible. The PRF Directive focuses entirely on reducing the number of discharges at sea of ship-generated waste (particularly illegal discharges), while the WFD encompasses the entire waste cycle and all types of waste, unless explicitly excluded in Article 2. The PRF Directive defines ship-generated waste and cargo residues as all waste generated during the service of a ship and fall under the scope of MARPOL Annexes I, IV and V. However, in addition it specifies that ship-generated waste and cargo residues will be considered within the meaning of Article 3 of the WFD[218], 'any substance or object which the holder discards or intends or is required to discard'. Exceptions to this broad category are formulated in WFD Article 2, which lists a number of waste types that are excluded from its scope, including among

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[215] See for instance DG MOVE – ESSF (2014) Member State Position on EGCS wastewater discharge, available at http://www.intertanko.com/upload/101858/ESSF-EU-MS-Position-on-EGCS-washwater.pdf

[216] See European Sustainable Shipping Forum (2014), Final report submission from the ESSF sub-groups: report 3rd plenary meeting, Brussels 4 December 2014, available at http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetailDoc&id=17035&no=3

[217] Stakeholder consultation.

[218] PRF Directive Article 2 refers to Article 1(a) of Council Directive 75/442/EEC, which under the current legislative framework refers to Article 3 of the WFD. Council Directive 75/442/EEC was repealed by Directive 2006/12/EC of the European Parliament and of the Council, which was repealed by the Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council).

others wastewater and processed food products covered by animal by-products regulations.

In view of the above, the WFD Directive applies to the waste types covered by the PRF Directive. To date, it is unclear whether this application extends to the waste when still on board, or only becomes relevant once the waste has been delivered on shore. However, it should be noted that the former interpretation would pose serious problems for enforcing the legislation on ships sailing in international waters. . One of the key provisions of the WFD is the 'polluter pays principle', which is embraced in the requirements on cost recovery systems of the PRF Directive. The PRF Directive balances between preventing the creation of (financial) incentives to discharge waste at sea, while upholding the 'polluter pays principle'. By requiring all ships to contribute to port reception facilities, the PRF Directive remains coherent with the WFD.

Another key element in the WFD is the introduction of a so-called 'waste hierarchy', in which the *prevention* of waste generation is the highest priority, as opposed to the *disposal* of waste[219]. Although the PRF Directive aims at regulating operations and waste management in ports, it also refers to encouraging more environmentally conscious procedures for on-board waste management: Article 8 (2c) specifically allows Member States to introduce reduced fees for vessels with such procedures in place. As such, this provision follows the predominant logic of waste prevention, as set out in waste legislation, and contributes positively to the objectives of the WFD. Whereas this evaluation shows that Member States generally have such provisions in place to recognise environmentally sound ships, only a limited amount of ships calling in EU ports make use of this possibility (see Section 5.4.7).

Despite this theoretical coherence, some stakeholders active in the passenger cruise sector, note that in practice the PRF Directive limits the potential use of waste as a resource, as envisaged by various preambles in the WFD (recital 19, 28, 42). Instead, the packaging of materials, plastics, and paper, which are used in large numbers aboard cruise ships are marked as waste and cannot be defined as a 'resource', which limits the potential to recycle. The potential under the PRF Directive to uphold the waste hierarchy more specifically with regard to the collection, processing and disposal of ship-generated waste and cargo residues, including possibilities to re-use and recycle elements of waste is addressed in detail in Section 8.2.

8.1.5. Conclusions

This section assessed the coherence between the PRF Directive and the wider body of related EU environmental legislation. Despite the fact that the PRF Directive forms part of the EU transport acquis (as it is based on the transport article of the Treaty) it has an overall environmental objective. In this context, it works coherently with the relevant environmental legislation, in particular the MSFD. Whereas different definitions are in use by the different pieces of legislation, the PRF Directive is instrumental in achieving progress on the indicators monitored in the MSFD. Furthermore, even if the PRF Directive's focus is broader than only marine litter, it is a key tool to target marine litter from shipping.

In addition, the PRF Directive has been considered relevant for dealing with the waste arising from the application of stricter regulations on air pollution. The possible requirements for disposing residues from exhaust gas cleaning systems in ports are currently being investigated, and it is likely that port reception facilities have an important role to play in this regard. Finally, the PRF Directive also contributes to the broad objectives and provisions of the WFD where the production and disposal of waste are concerned. Despite their different origin and focus, both Directives seek to reduce the adverse impacts of waste disposal. As shown in the next section, some incoherencies

[219] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives: Article 4

exist where the specific reception and handling of ship-generated waste and cargo residues is concerned.

8.2. EQ 15: Processing of ship-generated waste and cargo residues in relation to EU waste legislation

8.2.1. The evaluation question

EQ 15: To what extent has the PRF Directive contributed to the efficient collection, handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues, as defined in EU waste legislation?

The PRF Directive provides the structure for waste delivery in port reception facilities. However, it does not describe how the waste is to be collected, handled, re-used, recycled and disposed. These elements should be addressed by the WRH plans that ports need to develop (see Section 5.3.3). In order to provide an answer to this evaluation question, it is necessary to include stakeholder views on the WRH plans implemented and the actual practices adopted by ports. This section will do so, and starts with a legal analysis, followed by these stakeholder views.

8.2.2. Towards efficient collection, handling, re-use and recycling

The requirement of efficient collection, handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues, follows from the requirements under the WFD, as outlined in the previous section. One of the key provisions in the WFD is the introduction of a 'waste hierarchy', in which the prevention of waste generation, as opposed to waste disposal, is the highest priority[220]. The PRF Directive contributes to the objectives of reducing the volumes of waste produced on-board, notably through the principle of 'green ships' (see Section 5.4.7) and its contribution to reducing the negative effects of disposal by discouraging illegal discharge at sea. In contrast, crucial elements stipulated in the WFD are the efficient collection, handling, re-use, recycling and environmentally sustainable disposal. These elements are explored in more detail below.

Ship-generated waste and cargo residues within the scope of the PRF Directive are specifically defined as waste under the WFD by Article 2 of the PRF Directive. Thus, the requirements of the WFD on waste apply equally to ship-generated waste and cargo residues, though with the exception of Article 2 of the WFD, which excludes wastewater and certain types of food waste. In that sense, these Directives are complementary to each other and should in principle form a coherent whole.

The key principle of the waste hierarchy is to prevent the production of waste. Where this is not possible, it aims to reduce the adverse impacts on the environment and related human health issues through the preparation for re-use and recycling of waste. The WFD requires waste producers to take steps to allow reprocessing of waste into new products, substances or materials so as the material can be used again in the same or another application; it promotes the use of waste as a 'resource'.[221] Recycling is more efficient when the waste is segregated into certain main categories of waste, such as glass, plastic, metal and paper. For this purpose, Article 11(1) of the WFD imposes the obligation that by 2015, the separate collection of these four categories of waste (paper, metal, plastic and glass) must be set up across the EU, where technically, environmentally and economically practical.

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[220] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives: Article 4

[221] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives: Article 3(17).

It has been indicated elsewhere (see Section 5.3.6) that, for reasons of subsidiarity, the exact content of waste reception and handling procedures is beyond the scope of the PRF Directive. Annex I of the PRF Directive only requires that ports describe in their WRH plans how the ship-generated waste and cargo residues are collected and disposed[222]. In addition, the PRF Directive requires in Article 12(1g) that the treatment, recovery, and disposal of ship-generated waste and cargo residues is done in line with (the legal predecessors of) the WFD. Port users generally have procedures for on-board separation of solid waste, as these are formulated in IMO guidelines and are also a prerequisite for ships to obtain ISO 21070 on the management and handling of shipboard waste.[223]

The WFD requires that Member States develop national waste management plans, containing information on the type and quantity of waste, and the existing collection schemes, including arrangements for waste oil and various other waste streams. These national waste management plans, should serve as the reference criteria against which the WRH plans developed by ports are evaluated. In theory, this mechanism serves to indirectly bring the waste management procedures in ports, as laid down in their WRH plans, in line with the requirements of EU waste legislation.

However, port reception facilities are often not supportive of the on-board separation efforts of solid waste, as many port reception facilities collect all Annex V waste in one skip. This removes the potential environmental gains to be made through recycling as promoted by the WFD. Whereas EU waste legislation (Article 11 of the WFD) requires the separate collection of waste to allow re-use and recycling, it only does so where technically, environmentally and economically practicable and appropriate. Due to the considerable room for interpretation for (local) authorities, this situation can persist. This is considered particularly frustrating by shipping crews whose efforts to properly segregate waste are undone. These practices do not contribute to efficient collection or environmentally friendly waste disposal. Stakeholders note that this is also problematic in view of the strict requirements on international catering waste, as laid down by the Animal by-products regulations[224]. These regulations require that all waste that has been in contact with food waste from outside the EU be classified as hazardous waste. Without proper on-board segregation of solid waste, or at the ship-port interface, the possibilities to recycle these waste types on-shore are limited.

8.2.3. Discrepancies in waste reception and handling procedures between land and sea

In addition to this inefficiency in the collection of waste, stakeholders indicated to what extent they experienced discrepancies between the requirements under the PRF Directive and land-based waste legislation.

The stakeholders directly impacted (port users and PRF operators), identified in majority (at least some) discrepancies between the PRF Directive and the relevant land based legislation applicable to ship-generated waste and cargo residues; 59% of port users and 63% of the waste operators indicate that such discrepancies exist. These differences could not be attributed to specific regions or Member States, but refer primarily to discrepancies with the requirements by the local authorities, which can vary substantially. These discrepancies in legislation are also observed by a substantial minority of ports (47%) and Member States (40%).

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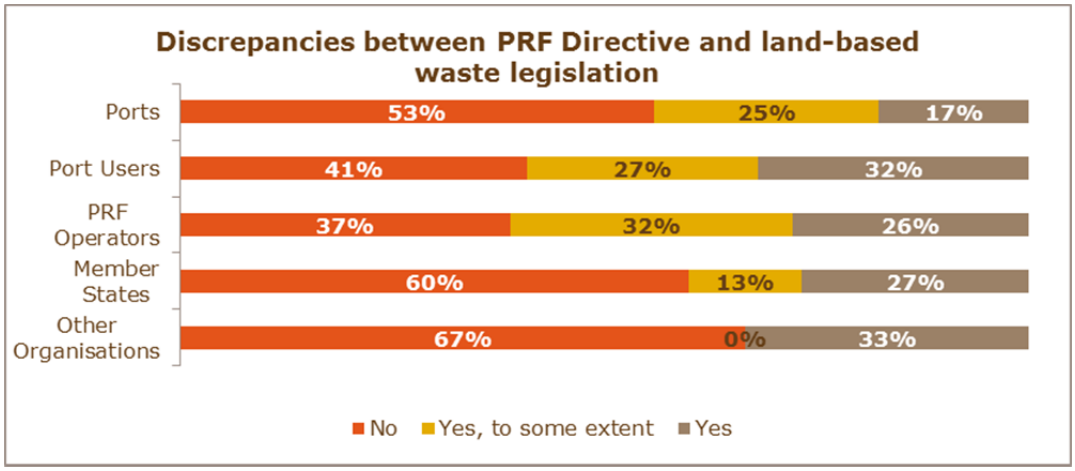
[222] Note that Annex I of the PRF Directive only includes a reference to Council Regulation (EEC) No 1836/93 allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme.

[223] http://www.iso.org/iso/catalogue_detail.htm?csnumber=51003

[224] Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive.

Figure 45 PRF Directive and land-based waste legislation



Source: stakeholder consultation

Examples of such discrepancies were collected during the stakeholder consultation. Stakeholders most often reported on discrepancies between the competences of various ministries / inspectorates and local governments. The impact of local governments on waste legislation vary substantially across the EU. In some Member States local governments set all the rules and are fully involved in the development of the WRH plans, whereas in other Member States it can be the competence of the central or regional government[225]. The result is that many port users experience substantial variation in waste regulations, even within Member States. This has a negative influence on the efficient collection, handling and disposal of waste. Moreover, a practical problem with regard to differences in definitions for the various waste types is perceived as a problem. The definitions assigned to different waste types for transport and treatment of waste on land is different than the terminology used by the PRF Directive for classifying ship-generated waste. This is particularly an issue for hazardous waste, which is often not accepted by port reception facilities when mixed with other Annex V waste. This is however highly dependent on the local regulation[226].

8.2.4. Conclusions

The PRF Directive provides incentives to reduce the discharges of waste into the sea, by requiring that all ships calling in a port of a Member State deliver their waste to port reception facilities. As such, the PRF Directive does not regulate the management of waste, neither on-board of ships, or after it has been landed on shore. Instead, it contains a general requirement that the treatment, recovery and disposal of ship-generated waste and cargo residues shall be carried out in accordance with the WFD (Article 12(1g)), and as such in theory ensures coherence between the two Directive.

EU waste legislation requires the separate collection of waste to allow re-use and recycling, where technically, environmentally and economically practicable and appropriate to meet the necessary quality standards for the relevant recycling sectors (Article 11 of the WFD). This WFD article gives the MS considerable discretion to organise the waste collection on their territory as deemed appropriate. As a result, the rules for receiving and handling ship-generated waste and cargo residues vary per municipality or region, including provisions for recycling of waste. This evaluation shows that the WRH plans developed by ports focus primarily on the disposal of waste, even for waste types that could easily be recycled. Considering the various developments in on-board waste management practices which have shifted towards more environmentally sustainable practices, this multitude of approaches have caused inefficiencies in the collection,

[225] Based on interviews with various Member States.
[226] This issue was mentioned by various stakeholders, in various regions.

handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues in port reception facilities. The PRF Directive aims to reduce discharges of waste at sea through the provision and use of available PRF on land and does not aim to regulate how the waste is actually being treated or disposed of. Due to this focus, it has not contributed to a more effective implementation of EU waste legislation on land.

In addition, possible inefficiencies were discussed in the collection of ship-generated waste as a result of discrepancies between land-based waste legislation and the PRF Directive. Port reception facilities for ship-generated waste experience difficulties aligning MARPOL terminology with land-based EU waste terminology. They receive waste streams from port users classified under MARPOL codes and need to register these under the EU waste codes in their registers.

8.3. EQ 16: Reporting formalities

8.3.1. The evaluation question

EQ16: Is the current framework of the PRF Directive adequate in the long run to ensure the exchange of information, as well as reporting in line with requirements under the Directive on reporting formalities for ships arriving in and/or departing from ports (*Directive 2010/65/EC*)?

To respond to this evaluation question, the reporting requirements set out by the PRF Directive were reviewed in section 8.3.2. These were compared against the requirements of the Reporting Formalities Directive (2010/65/EC), which has been in effect since May 2012. This sets out the overall framework for reporting formalities, based on which an answer can be given to the evaluation question. Based on this exploration, section 8.3.3 further assessed whether the current framework of the PRF Directive is adequate in terms of ensuring exchange of information between authorities as required under the Reporting Formalities Directive. Subsequently, in 8.3.4, the evaluation assessed whether the PRF Directive is adequate in the long term to ensuring that the reporting by vessels is in line with the requirements under the Reporting Formalities Directive. As such, the focus of this second component lies with the *port users*, whereas the first point is more related to enforcement by relevant authorities.

8.3.2. Reporting requirements for vessels

Section 5.5.2 outlines how Article 6 of the PRF Directive requires vessels calling at a port to notify that port 24 hours in advance, or as soon as it has left the previous port if the journey time is less than 24hrs, of the type and amount of waste they will deliver. Annex II of the PRF Directive specifies in detail the type of information ships need to report for several types of waste. For all these types of waste, vessels need to report the volumes they intend to deliver, the maximum dedicated storage available, the amount of waste that will be retained on board, the port where remaining waste will be delivered, and the estimated amount of waste to be generated between the two scheduled ports. The primary goal of these reporting requirements is to give enough information to effectively plan the waste delivery (see Section 5.5.2). Another important objective is to allow for an effective enforcement of the PRF Directive, in particular related to the mandatory discharge requirement for ship-generated waste.

Almost all ports require vessels to notify the intended waste delivery in advance. Although in some ports the notification forms are delivered by fax or e-mail, IT-based systems are increasingly being used at national or port level to meet the notification requirements[227]. Directive 2010/65/EC requires the integration of the reporting

[227] EMSA (2011), The Decision Making Process related to the Obligation or Granted Exception for a Ship to deliver its Wastes or Residues, draft working document, page 4. See also
EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 29.

requirements under Article 6 and Annex II of the PRF Directive through the National Single Window (NSW), which is being developed as part of SafeSeaNet[228].

When calling at a port, vessels need to comply with a larger body of reporting requirements than only the requirements laid down by Article 6 of the PRF Directive. In the EU, a broader legislative framework (based on various Directives) exists for reporting formalities for ships that arise from the International Convention on Facilitation of Maritime Travel and Transport (FAL Convention). Directive 2010/65/EC provides a reporting framework, which does not deal with the content of reporting in detail, but seeks instead to combine and streamline the various reporting requirements under different international Conventions and EU Directives. This Directive specifies that it should not introduce additional reporting requirements beyond those defined by relevant legislation[229]. The reporting framework is relatively flexible and its wording enables the inclusion of different reporting requirements when amended in the original law. Instead of outlining reporting requirements in detail, it merely refers to the notification requirements in Article 6 and Annex II of the PRF Directive.

The main goal of Directive 2010/65/EC is to rationalise the reporting formalities of ships into a National Single Window no later than June 2015. The idea is that port users fill in a single electronic reporting form, in which all information requested by EU legislation is collected, when entering and leaving the port. This will prevent double data collection and reduce the administrative burden on port users. Another objective of the Reporting Formalities Directive is to improve cooperation between the competent authorities in the EU and to make more effective use of information exchange systems[230].

8.3.3. Adequacy to ensure the exchange of information

As part of the first component to answer the evaluation question, this section assesses whether the framework of the PRF Directive is adequate to ensure the exchange of information of relevant information on waste deliveries between relevant authorities, as required under the Reporting Formalities Directive.

The PRF Directive does not unambiguously specify to what extent information can be exchanged among relevant authorities. The only reference to exchanging information between authorities is Article 11(2d) of the PRF Directive, which specifies that in case there is 'clear evidence that a ship has proceeded to sea without having complied with Article 7 or 10, the competent authority of the next port of call shall be informed'. However, other information obligations (such as the reporting on waste deliveries, exemptions, alleged inadequacies) put forward by the PRF Directive are also potentially relevant to be exchanged between relevant authorities. To enable such exchange of information, Article 12(3) of the PRF Directive foresees a common monitoring and information exchange system to be set up, but this has never been fully developed. Without this system in place, it is currently unclear to some stakeholders to what extent the PRF Directive permits the exchange of information between authorities on reporting obligations that are not specifically mentioned in article 11(2d). In a very narrow interpretation, the PRF Directive would only allow the exchange of information between relevant authorities when there is clear evidence a ship has proceeded to sea without having complied with article 7 or 10. In this logic, the PRF Directive would not allow the exchange of information in any other situation. In comparison, article 6 of the Reporting Formalities Directive is broader than this narrow interpretation, and requires that information received in accordance with the legal reporting requirements (which is for the PRF Directive the advance notification of waste delivery) is made available to other Member States[231]. Whereas the Reporting Formalities Directive does not intend to

[228] Consult Article 5 of Directive 2010/65/EC
[229] Directive 2010/65/EC, recital 2.
[230] Directive 2010/65/EC, recital 5
[231] Some exceptions are mentioned in Article 6(1), including information received pursuant to Regulation (EEC) No 2913/92, Regulation (EEC) No 2454/93, Regulation (EC) No 562/2006 and Regulation (EC) No 450/2008.

introduce *additional reporting requirements* for ships (recital 2), it explicitly enables that SafeSeaNet is used for *additional exchange of information* for the facilitation of maritime transport (recital 10). The extent to which the PRF Directive coherently allows for this information exchange is currently not clear, and is a point of concern for stakeholders. Moreover, it is also not clear what this means for the exchange of information between authorities that is not required by the PRF Directive.

Regardless of the interpretation of the coherence of the two Directive above, this evaluation shows (see 6.2) that the current practice of information exchange is currently insufficient[232]. Member States replying to our stakeholder consultation indicate that ports sometimes contact the next port of call, but that no structural procedures within the framework of the PRF Directive are in place. This is confirmed by port inspections conducted by EMSA, which also show that the exchange of information between ports on a ship's route on the content of advanced waste notification forms is currently insufficient. This lack of communication impedes effective enforcement of the PRF Directive and underlines the need for *additional exchange of information* between relevant authorities as foreseen under the Reporting Formalities Directive (but restricted to existing information obligations). Without the information on previous waste deliveries, exemptions, or enforcement along the route of a vessel, the competent authority does not have sufficient information to assess the credibility of the advance notification form[233]. From that perspective the objective of the Reporting Formalities Directive to improve the exchange of information without raising administrative burden on port users coherently facilitates better enforcement of the PRF Directive and as such contributes to its objectives.

8.3.4. Adequacy of PRF framework to ensure that reporting requirements are in line

As a second component, the extent to which the PRF Directive is adequate for ensuring that the reporting by vessels remains in line with the requirements of the Reporting Formalities Directive is assessed. For this, the current use of various notification forms in different ports is relevant. Generally, EU ports receive filled in advance notification forms from ships in the format required in Annex II of the PRF Directive[234]. However, in its guidelines, the IMO also recommends that ports require advance notification of intended waste delivery, in order to improve logistical operations and to minimise the risk of incurring delays. A specific advance notification form has been developed by IMO's Marine Environment Protection Committee, which requests slightly more detailed information on ship identification, the terminal name, the person submitting the form, and more crucially, on the types of waste to be delivered. Moreover, the IMO adapted its reporting format to take the amended MARPOL Annex V definitions into account, which entered into force on 1 January 2013[235]. However, the current version of Annex II of the PRF Directive does not incorporate recent amendments and revisions of the waste types defined by the MARPOL annexes.

EU ports sometimes use one type of these forms, while others use the IMO form parallel to the notification form prescribed by Annex II of the PRF Directive. Stakeholders also report that some ports have designed their own notification forms. The use of these various formats and different notification requirements have caused difficulties in integrating the reporting requirements into a harmonised waste notification form in the National Single Window, as required by the Reporting Formalities Directive[236]. To solve this, the advance notification form that will be used for reporting into the National Single Window will require a higher level of detail. This more detailed and specific information

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[232] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC).
[233] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC).
[234] EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC).
[235] MEPC.1/Circ.644/Rev.1, IMO, Standard format for the advance notification form for waste delivery to port reception facilities, 1July 2013.
[236] See for instance presentation Roel Hoenders – Antwerp, 25 October 2012 http://www.euroshore.com/sites/euroshore.com/files/documents/7.%20emsa%20-%20safeseanet%20and%20the%20advance%20waste%20delivery%20notification.pdf

deviates from Annex II of the PRF Directive. However, the level of detail requested in the data form of the National Single Window can be aggregated to the categories requested in Annex II in the PRF Directive. This will solve the problem of inconsistencies on the entry into force of SafeSeaNet by June 2015[237].

The issue of exemptions is another element that influences the adequacy of reporting requirements in the long term. Without specific attention, the inclusion of advance notification information in the single electronic form would implicitly make the advance notification under Article 6 of the PRF Directive obligatory to *all* reporting vessels, while the current Directive allows for the exemption of certain vessels. This would not be in line with Article 1(c) of the Reporting Formalities Directive, which states that the Directive does not apply to ships exempted from reporting formalities. Indeed stakeholders were worried how the exemption provisions under the PRF Directive could be taken into account if the notification requirements of port reception facilities were to be integrated with other reporting formalities in the National Single Window[238]. As a solution, it has been made possible to indicate whether a vessel has an exemption under the PRF Directive in the reporting system. This way, data users can see that the non-reporting on waste delivery is linked to an existing exemption, rather than non-compliance with the reporting formalities[239]. As such, this potential incoherency has also been dealt with, thus clearing the way for the entry into force of SafeSeaNet by June 2015.

With these initial potential incoherencies out of way, our stakeholder consultation also shows that most respondents (70%) do not expect problems with integrating the reporting requirements under the PRF Directive into SafeSeaNet. A minority of 30% has an opposing view, but the main reason for concern among stakeholders does not lie with the port reception facilities framework being in line with reporting requirements, but on the technical implementation of SafeSeaNet instead.

8.3.5. Conclusions

The current framework of the PRF Directive is in broad terms aligned with the requirements under the Directive on reporting formalities. However, the adequacy to ensure the exchange of information between authorities and reporting by ships in the long term is impacted by a number of coherency issues that were highlighted here. Firstly, the PRF Directive called for a monitoring system for the exchange of information in article 12(3), but this had never been fully developed. As a result, information has not been exchanged systematically between authorities until now, which limited effective enforcement. Only recently, with the adoption of the Reporting Formalities Directive (Directive 2010/65), the exchange of information between authorities is taking shape. The provision of electronic reporting of the waste notification into SafeSeaNet (through the National Single Window), will become mandatory as of June 2015 and will facilitate this exchange of information among relevant authorities, in line with the Reporting Formalities Directive. Despite the space provided by the PRF Directive in article 12(3), which calls for such a system to be set up, some stakeholders expressed their concern on the extent to which the other articles of the PRF Directive allow the additional exchange of information between competent authorities as foreseen by the Reporting Formalities Directive. This potential incoherency has so far not been addressed and is a cause for legal uncertainty among stakeholders. At the same time, it has the potential to contribute directly to the objectives of the PRF Directive by strengthening the potential for enforcement.

Additionally, the continued use of different notification forms in parallel continues to contribute to legal uncertainty among stakeholders. However, the development of the

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[237] Expert group on maritime simplification and electronic information services, Waste sub-group (2012), Waste message – business rules.

[238] High level steering group on SafeSeaNet (2014), Draft summary minutes (16 January 2014): Page 4.

[239] Expert group on maritime simplification and electronic information services: Waste sub-group (2012), Waste message – business rules, page 9.

operational rules of SafeSeaNet has carefully addressed a number of potential incoherencies between the PRF Directive and the Reporting Formalities Directive. Good examples of this are for instance the consolidation of various notification forms used in different ports into one waste message (thereby solving the problem of different notification forms), and the inclusion of exemptions into the system of reporting. Although such practical solutions have been found to ensure consistency on the short term, definitions in the PRF Directive may have to be aligned with the IMO definitions to ensure reporting under the PRF Directive is adequate with the Reporting Formalities Directive in the long term.

8.4. EQ 17: Instruments to prevent ship-source pollution

8.4.1. The evaluation question

EQ17: How well does the PRF Directive complement *Directive 2005/35/EC* as the key instrument to prevent *ship-source pollution*?

In order to answer this evaluation question, a legal analysis of the complementarity of the PRF Directive in relation to Directive 2005/35 has been conducted. This requires an exploration of key elements of Directive 2005/35/EC, after which the complementarity of the two Directives can be assessed. In particular, this assessment focuses on the extent to which the two instruments complement one another in working towards the 'zero waste' objective of the European Commission[240], and contribute to the objectives of MARPOL. Both Directives share the same ultimate goal of improving maritime safety, thereby enhancing the protection of the marine environment. From that perspective, the Directive on Ship Source Pollution (2005/35/EC) mentions the PRF specifically as one of the key partner legal instruments to prevent ship-source pollution.

8.4.2. Approach taken by the two Directives

Whereas both Directives seek to reduce ship-source pollution and both find their origin in MARPOL legislation, the Directives have a slightly different scope. Whereas the PRF Directive regulates ship-generated waste defined in Annex I, IV, and V of the MARPOL Convention and cargo residues, Directive 2005/35/EC covers polluting substances, which are further defined as substances regulated by MARPOL Annex I (oily waste) and MARPOL Annex II (noxious liquid substances in bulk).[241] As such, the Directives share overlap in their coverage of waste types (ship-generated waste or cargo residues) defined under MARPOL Annex I, as well as for cargo residues of noxious liquid substances in bulk (in particular tank washings of cargo qualified as MARPOL Annex II).

At this stage, it is important to realise that the PRF Directive aims to reduce the number of discharges at sea, while the Directive on ship-source pollution exclusively focuses on *illegal* discharges. The PRF Directive introduces measures that should encourage that all vessels leave the port with as little ship-generated waste on-board as possible. In comparison, the Directive on ship-source pollution introduces measures to punish vessels that discharge *illegally*, but does apply to vessels discharging oily waste in accordance with the discharge norms of MARPOL Annex I.

The PRF Directive complements Directive 2005/35 by creating a conducive environment in which port users have a viable option for discharging their ship-generated waste and cargo residues in ports, rather than illegally at sea. In that sense, the PRF Directive is a necessary first step, which offers the possibility to ship users to deliver waste. Article 4(1) requires Member States to ensure the provision of adequate port reception facilities, which is further defined in article 4(2) as 'capable of receiving the types and quantities of

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[240] European Commission (2012), Overview of EU policies, legislation and initiatives related to marine litter, Commission Staff Working Document: SWD 2012:365 final.

[241] Directive 2005/35/EC of the European Parliament and of the Council on ship-source pollution and on the introduction of penalties for infringements, Article 2(2).

ship-generated waste and cargo residues from ships normally using the port'. With these adequate facilities in place, the Directive on ship-source pollution is a logical next step, in which ongoing illegal discharges at sea of MARPOL Annex I and II waste is made a criminal offence. In addition to this provision, the PRF Directive further contributes to the objective of reducing (illegal) discharges by introducing the principle of mandatory delivery and positive incentives for ships through the cost recovery system, as discussed at length elsewhere. These provisions however do not apply to cargo residues, and therefore only complement the Directive on ship-source pollution on reducing discharge of ship-generated waste classified as MARPOL Annex I.

The criminal penalty introduced by Directive 2005/35/EC has the potential of deterring deliberate, illegal discharges of polluting substances, and as such it contributes directly to the objectives of the PRF Directive. Where the PRF Directive offers the preventive measure, the Directive on ship-source pollution introduces the punitive measures. As such, the two Directives complement each other in reducing illegal discharges at sea. The theoretical link between the two Directives is in the number of *illegal* discharges at sea where the introduction of criminal sanctions could contribute to an increase in the demand for adequate port reception facilities. An improvement in the availability of adequate port reception facilities may also reduce the number of criminal penalties.

In addition to the broad complementarity of the two Directives in reducing illegal discharges at sea, the Directives also complement each other in more specific terms. The notification requirement of the PRF Directive creates an obligation for all masters of a ship (other than a fishing vessel or recreational craft authorised to carry no more than 12 passengers), which are calling at a port of a Member State, to fill in a form, and submit this to the port authority.[242] This obligation is complementary to Directive 2005/35/EC in the sense that the information provided though the advance notification can help detect irregularities in reporting that may lead to waste discharge at sea. A ship with such irregularities can later be investigated when it arrives at the port, in accordance with Article 6 of Directive 2005/35/EC. This Article calls member states to ensure appropriate inspections, in line with relevant IMO guidelines, of those vessels for which irregularities or concrete information points to illegal discharges of polluting discharges. As such, the information requirements in the PRF Directive also complement the enforcement provisions of the Directive on ship-source pollution. The Directive on ship-source pollution complements the incentives given by the PRF Directive by providing the legal framework introducing criminal penalties for illegal discharges at sea for a number of waste types.

[242] Directive 2005/35/EC of the European Parliament and of the Council on ship-source pollution and on the introduction of penalties for infringements, Article 6.

8.4.3. Conclusions

Whereas the scope and objectives of the two Directives show similarities, there are also crucial differences. The main difference is that the PRF Directive aims to reduce *all* discharges at sea of ship-generated waste and cargo residues, whereas the ship-source pollution Directive specifically targets *illegal* discharges of substances defined in MARPOL Annex I and II. However, there are no substantial incoherencies found with regard to this difference in scope, as the measures proposed in both Directives are complementary and work together towards the overall objective of better protection of the marine environment. The PRF Directive provides the framework for giving ships incentives to discharge their ship-generated waste and cargo residues at the port, while the Directive on ship-source pollution introduces (criminal) penalties for illegal discharges of MARPOL Annex I and II waste. Moreover, for ship-generated waste classified as MARPOL Annex I, the PRF Directive provides additional complementarity, by introducing the principle of mandatory delivery in the port and introducing cost recovery systems that do not provide incentives to discharge at sea. Together, these two Directives establish a legal framework of positive incentives complemented by punishment for illegal discharges of Annex I and II waste, which together works towards the overall objective of better protection of the marine environment.

PART III – CONCLUSIONS AND RECOMMENDATIONS

9. CONCLUSIONS

This Chapter presents the evaluation conclusions based on the analysis presented in Part II of this report. These conclusions are presented under the five evaluation criteria.

9.1. Relevance

9.1.1. EQ 1: Mandatory delivery of ship-generated waste and Commission priorities

- The mandatory delivery of ship-generated waste in the EU is relevant to reducing discharges at sea and improving the protection of the marine environment. Requiring ships to discharge all ship-generated waste in port reception facilities before departure by itself is not a guarantee for reducing discharges at sea. However, in combination with the other provisions of the PRF Directive, mandatory delivery is a relevant measure towards reducing discharges of waste at sea.
- In view of the role of marine transport in ongoing discharges of oily waste, raw sewage and of garbage (MARPOL Annexes I, IV, V) and the negative impacts of such discharges on the marine environment, the mandatory delivery principle is relevant to be applied to these waste types.

9.1.2. EQ 2: Provision of adequate port reception facilities and fewer discharges of ship-generated waste and cargo residues

- The obligation on Member States to provide adequate port reception facilities is a prerequisite to reaching the PRF Directive's objective to reduce discharges of ship-generated waste and cargo residues at sea.
- With adequate port reception facilities in place, the European Commission, Member States, and port authorities can implement the other provisions of the PRF Directive. Adequate port reception facilities are a prerequisite for the effective implementation of the mandatory delivery principle, effective appropriate financial incentives, and ensuring enforcement. In order to be relevant for the objectives of the PRF Directive, these measures should be considered in a coherent way.

9.1.3. Conclusions for relevance

The PRF Directive introduces relevant policy measures in relation to its objectives. It requires Member States to provide adequate port reception facilities. The principle of mandatory delivery requires that all ships deliver all their ship-generated waste, unless ships have sufficient dedicated storage capacity until the next port of call. The PRF Directive's combined approach of hard measures (enforcement) and soft measures (incentives) are relevant to alter the behaviour of port users in favour of the environmental objectives set by the EU.

The maritime transport sector contributes to the presence of oily waste, sewage and garbage in the marine environment. In view of the harmful effects of these waste types, the mandatory delivery principle for these types of waste is relevant towards the objectives of improving the environmental

quality of marine waters in the EU under the Marine Strategy Framework Directive and the Zero-Waste Programme.

Through the principle of mandatory delivery, the PRF Directive aims to ensure that ships leaving European ports have only minimal volumes of waste on-board for disposal in the port of delivery. To subsequently minimise the risk that ships discharge at sea *before* calling at their next port, the PRF Directive requires the provision of adequate port reception facilities. As such, these requirements strengthen each other in contributing to the shared objectives of reducing discharges at sea and improving the protection of the marine environment.

9.2. Effectiveness

9.2.1. EQ 3: Delivery of ship-generated waste to EU ports

- Many ports do not collect the data on actual deliveries of ship-generated waste and cargo residues in a systematic and comparable way.
- The estimated volumes of oily waste discharged at sea have decreased since the implementation of the PRF Directive. No evidence could be found, however, for a concurrent increase in the delivery of oily waste in EU port reception facilities. As a result, this evaluation cannot confirm the contribution of the PRF Directive to fewer discharges of oily waste at sea.
- The volumes of sewage delivered to EU ports have not increased substantially, possibly due to the widely different approaches of Member States in the application of mandatory delivery of sewage. The revision of annex II in the PRF Directive introduced by the Directive 2007/71/EC may have contributed to uncertainty among Member States, which hampered effectiveness.
- The trend of increasing volumes of garbage deliveries to port reception facilities indicates that the PRF Directive has been effective in increasing the delivery of garbage to port reception facilities and its possible role in reducing discharges at sea.

9.2.2. EQ 4: Adequacy of port reception facilities

- The types of ship-generated waste included in the PRF Directive are generally accepted by all major European ports.
- The availability of adequate port reception facilities to receive ship-generated waste and cargo residues in EU ports has improved since the PRF Directive came into force.
- A limitation related to the adequacy of port reception facilities relates to the collection of segregated garbage, which is often not possible in port reception facilities.

9.2.3. EQ 5: Improving waste management practices

- The requirement for ports to develop WRH plans in line with wider EU legislation has contributed to improved waste management practices in a large number of ports, particularly where such plans were not already in place.
- Port users have not always been sufficiently consulted by ports during the development of WRH Plans, despite the importance of such regular consultations. In addition, local authorities responsible for the

implementation of the relevant legislation on waste management have not been sufficiently involved in the process either.
- Despite the overall improvement of waste management practices observed, the PRF Directive has not been able to ensure full engagement of relevant stakeholders, which limits overall effectiveness.

9.2.4. EQ 6: Cost recovery systems

- In line with the requirements in the PRF Directive, most ports have implemented cost recovery systems that ensure that all ships contribute to the costs of port reception facilities. This is done by the introduction of a waste fee that is (partly) unrelated to the volumes of waste discharged.
- However, ports developed a large number of different variations to this principle, which limits the transparency of the waste fees charged to port users.
- This evaluation finds different waste delivery trends in ports with different cost recovery systems, also when controlling for the number and size of vessels calling at each ports. Even though various other factors also impact the delivery patterns of waste to port reception facilities, this shows that the type of cost recovery system has an impact on waste delivery behaviour of port users. In view of the different trends found across the EU, it is also concluded that the current variety of systems in place does not provide sufficient and comparable incentives to ensure that port users deliver their waste in port reception facilities.
- Lower amounts of waste are delivered to ports that charge in relation to the volumes of waste delivered, than in ports with indirect fee systems in place, which suggests that the latter are indeed more in line with the objectives of the PRF Directive.

9.2.5. EQ 7: Effective operation and planning

- The evaluation results overall do not point to a problem of undue delays in EU ports caused by the PRF directive.
- Advance notification requirements are not used to their potential to ensure effective operation and planning. This can be partly explained due to outdated categories used and incoherence with MARPOL documents. Another issue is that the reporting formats often contain rough estimates from port users that are often incorrect. This has practical implications for operations and planning, and is also important for enforcement.
- The procedures for approval and monitoring of exemptions vary across the EU. This has an effect on possibilities for Member States to enforce the provisions of the Directive, but does not seem a particular issue in operation and planning for stakeholders.

9.2.6. Conclusions for effectiveness

The PRF Directive has contributed to higher volumes of garbage (MARPOL Annex V) delivered to EU ports since the implementation of the PRF Directive. Volumes of sewage (MARPOL Annex IV) delivery to port reception facilities have been relatively stable, and overall a negative trend was found for oily waste (MARPOL Annex I) delivered to ports. At the same time the estimated discharges of oily waste at sea have gone down considerably. The increased volumes of garbage delivered to ports indicate a positive effect of the PRF

Directive on its objective to reduce discharges at sea. For the other waste types (oily waste and sewage) such a conclusion cannot be drawn based on the delivered volumes to ports.

The collected data shows that variations in waste delivery are influenced by the cost recovery systems put in place by ports. Most ports introduced a cost recovery system in line with the requirements of the PRF Directive, but these have not introduced comparable incentives in the various ports/regions. Higher volumes of waste are delivered in certain types of indirect fee systems, as compared to direct fee systems. This finding is in line with the Directive. Also within indirect fee systems substantial variation in waste delivery trends was found. This shows the potential for using cost recovery systems to influence port users' incentives to deliver waste in port reception facilities. At the same time, it is illustrative for the differences in interpretation of the PRF Directive by individual Member States, which is not only the case for cost recovery systems, but also for other provisions of the PRF Directive. This to some extent limits the effectiveness of the PRF Directive.

This evaluation shows that in general the adequacy of port reception facilities has improved, waste management practices in ports have improved due the introduction of regularly updated WRH plans, and effective operations and planning are in place under the provisions of the PRF Directive. Whereas all these aspects contribute to the policy objectives at EU level, there are substantial differences between ports and regions, particularly with regard to implementation of the various cost recovery systems, exemption regimes and application of the mandatory delivery principle. These differences created limitations to the overall effectiveness of the PRF Directive in view of its objectives. It is therefore concluded that the PRF Directive has been partially effective in achieving its policy objectives.

9.3. Efficiency

9.3.1. EQ 8: Costs generated by compliance to the PRF Directive

- Port users face substantial costs for discharging waste in port reception facilities. Ports and Member States also face costs to meet the requirements of the PRF Directive. The requirement for ports to develop WRH plans is a considerable cost, especially for smaller ports. Total annual costs, including administrative burden, were estimated at 226.0 million EURO.
- We assessed the annual benefits related to avoidance of disposal of garbage at sea at 297.0 million EURO. This benefit exceeds the calculated aggregated costs. If benefits from reduced discharges of oily waste and sewage would be added, the gap between benefits and costs would be higher. Thus it is estimated that the environmental benefits clearly outweigh the costs related to the PRF Directive.

9.3.2. EQ 9: Administrative burden

- The administrative burden of the PRF Directive concentrates on costs for inspections and advance notification. The administrative burden is relatively small for most stakeholders, but port users are faced with a considerable administrative burden of 74.5 million EURO annually for advance notification.
- Currently there are limitations to the effective use of the system of advance notification in providing information for planning and

inspections purposes. These limitations are important, given the substantial administrative burden related to advance notification for port users.

9.3.3. EQ 10: Effects on different ports: size, type and geographical location

- The provisions of the PRF Directive have different effects on ports of different size, type and geographical location. The PRF Directive has improved the adequacy of port reception facilities in the EU, but to varying degree in the different regions.
- The development of WRH plans is perceived by some smaller ports to be a considerable burden, while a limited number of smaller ports have explored the potential to develop regional WRH plans.
- Cost recovery systems can be put in place by Member States and ports to best accommodate the local context. The provisions of the PRF Directive provide sufficient flexibility to meet the needs of ports of different size, type and geographical location.

9.3.4. Conclusions for efficiency

Although the benefits of the PRF Directive are clear, quantification of the benefits is a challenge. We have estimated the annual benefits of not discharging garbage waste at sea at 297.0 million EURO. Including other waste types would substantially increase this estimate. Comparing these benefits to estimated annual costs related to the PRF Directive of 226.0 million EURO shows that the benefits outweigh the costs. Included in these costs is the administrative burden, which is substantial for port users at 74.5 million EURO, as a result of the need to fill in advance notification forms.

However, the benefits of the PRF Directive are not achieved in the most efficient way. For example, ports and inspection authorities make insufficient use of the information contained in the advance notification forms. Collecting the information and filling out these forms creates a burden on port users. The rapidly approaching implementation (June 2015) of the National Single Window has the potential to reduce this administrative burden, while also improving the possibilities for using and exchanging the information between competent authorities. The provisions of the PRF Directive provide sufficient flexibility to meet the needs of ports of different size, type and geographical location, but the requirement on smaller ports to develop WRH plans continues to be perceived as an issue by these ports.

9.4. EU added value

9.4.1. EQ 11: EU added value of additional obligations under PRF Directive

- The approach of the PRF Directive to reduce discharges at sea provides EU added value, through the common implementation and enforcement of MARPOL provisions at EU level.
- Substantial differences in implementation and limitations in enforcement of the main provisions of the PRF Directive by Member States were identified. This contributed to some legal uncertainties, which on their turn had a negative impact on effectiveness. The different interpretations and approaches taken by Member States in the implementation and enforcement of the PRF Directive, are reasons that the PRF Directive did not achieve its full potential EU added value.
- The substantial differences in interpretation and implementation of the mandatory delivery principle, cost recovery systems and enforcement

through inspections have limited the EU added value of the Directive in practice. However, by offering the means to act at EU level, the PRF Directive remains an important factor of EU added value.

9.4.2. EQ 12: Waste delivery and reduction of discharges without EU intervention

- In a scenario without the PRF Directive, many policy developments still would have taken place at the level of IMO and MARPOL, to which all EU Member States are Party. As such, legislation that restricts discharges at sea, and which requires adequate port reception facilities would be in place without the PRF Directive.
- Through the mandatory delivery of waste before departure, the introduction of cost recovery systems without incentives to discharge waste at sea, as well as its other provisions (all elements that could not have been introduced at another level), the PRF Directive contributes to increased volumes of waste delivered, indicating the added value of EU action.
- It is concluded that it would not have been possible to obtain the same results in terms of waste delivery and reduction of discharges without EU intervention.

9.4.3. EQ 13: Exchange of good practices

- Exchanges of good practices provided guidance to stakeholders on issues such as WRH plans, and approaches to cost recovery systems. Through the provision of these exchanges of good practices at various levels of governance, EU added value has been created.
- Exchanges of good practices show how European cooperation is more than the development of common procedures and guidelines. Cooperation offers policymakers from different Member States the means to identify common issues and develop shared solutions to these problems. This contributes to the creation of EU added value.

9.4.4. Conclusions for EU added value

The theoretical EU added value of the PRF Directive is apparent. It offers the possibility to enforce the requirements of MARPOL at EU level, while further developing objectives on reducing discharges at sea. Whereas the restrictions on discharges at sea would also be in place without the PRF Directive (under MARPOL), the PRF Directive creates added value in creating common provisions for ports and their Member States in response to the MARPOL requirements. These provisions have the objectives not only of banning illegal discharges at sea, but also of reducing the overall operational discharges. This is done through implementing and enforcing the common provisions put forward in the PRF Directive, and through the regular exchange of good practices.

In practice, Member States have interpreted various elements in the PRF Directive in different ways, such as the principle of mandatory delivery, the requirements on cost recovery systems and the provision on inspections. As a result, these common provisions have not been developed in a harmonised way. This created limits to overall effectiveness, as already established above, but also restricts the EU added value that could have been reached with a common approach. Overall, it is therefore concluded that the PRF Directive offers EU added value, but has not been able to develop this to its full potential.

9.5. Coherence

9.5.1. EQ 14: Contribution to objectives of other EU legislation

- In the EU, the PRF Directive is the key legal instrument to address the issue of marine litter from sea-based sources and as such contributes to improving the 'good environmental status' of European seas, as introduced in the MSFD. The Directives coherently complement each other, despite the use of overlapping and incoherent key definitions.
- The increased use of scrubbers to reduce air pollution in line with the Sulphur Directive necessitates adequate discharge of this waste to port reception facilities. However, MARPOL Annex VI waste is currently not covered by the PRF Directive.
- Despite their different origins, the PRF Directive complements the broad objectives of the WFD by following the 'polluter pays principle' and introducing incentives to limit waste generation, for instance by encouraging ports to apply differentiated waste fees to ships with higher environmental standards.

9.5.2. EQ 15: Processing of ship-generated waste and cargo residues in relation to EU waste legislation

- The PRF Directive requires that WRH plans are developed in coherence with local, national and European waste legislation.
- Despite this requirement, the PRF Directive does not directly contribute to efficient collection, handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues, as defined in EU waste legislation.
- Incoming waste streams are classified under MARPOL codes, but need subsequently to be registered under the (different) EU waste codes, based on land-based EU waste terminology. This complicates the processing of ship-generated waste and cargo residues.

9.5.3. EQ 16: Reporting formalities

- The provisions in the PRF Directive to set up an information and monitoring system, allowing an information exchange between relevant authorities, have not been implemented in the past. Starting from June 2015, the information obligations under the PRF Directive will be included in the mandatory reporting into SafeSeanet through the National Single Window, which will contribute to the exchange of this information between relevant authorities.
- In the development of reporting into the National Single Window, a number of practical solutions were formulated to potential legal incoherencies. On the long term however, adequate reporting is limited due to incoherent use of definitions in the PRF Directive and revised MARPOL definitions.

9.5.4. *EQ 17: Instruments to prevent ship-source pollution*

- Despite their different scopes, the PRF Directive and the Directive on ship-source pollution coherently complement each other with respect to MARPOL Annex I waste and MARPOL Annex II cargo residues.
- A crucial difference is that the PRF Directive aims to reduce *all* discharges of ship-generated waste (MARPOL Annex I, IV and V) and cargo residues at sea, whereas the ship-source pollution Directive

specifically targets illegal and accidental discharges (of MARPOL Annex I and II wastes).
- The measures proposed in each Directive complement each other towards achieving the shared objective of reducing discharges and improving protection of the marine environment.

9.5.5. Conclusions for coherence

Overall, the PRF Directive is coherent with the objectives and approaches set by other relevant EU Directives, such as the Marine Strategy Framework Directive, the Directive on ship-source pollution, and the Waste Framework Directive. The only exception is that currently, the PRF Directive does not fully contribute to the objectives of the Sulphur Directive, as MARPOL Annex VI waste lies outside its scope of the PRF Directive.

Though coherent with the wider objectives, this chapter showed a number of incoherencies with the provisions of these Directives. Take for instance incoherency found with the Waste Framework Directive, particularly where separate collection of waste and inconsistencies of waste categorisation between on-board and land-based waste are concerned. The background of the PRF Directive as part of the EU transport acquis, and its link to the MARPOL Convention are the reasons that the PRF Directive builds on a different set of key terms and definitions, which are partially incoherent and overlapping with terms used for types of waste. It is however noted that this does not prevent the PRF Directive to provide a coherent contribution to the objectives of the various Directives.

As required by the Reporting Formalities Directive, mandatory reporting into SafeSeaNet through the National Single Window is being implemented and should be operational by June 2015. De facto, this implements the information and monitoring system that allows the exchange of information between relevant authorities. This was already foreseen in the PRF Directive, but had never been implemented. Some stakeholders expressed doubts whether the other provisions in the PRF Directive would allow such an exchange of information, but it also noted that the provisions of the Reporting Formalities Directive contribute directly to the PRF Directive's objectives, by improving the possibilities for enforcement. At the same time this is achieved without creating additional administrative burden on port users, which is a central requirement of the Reporting Formalities Directive. The rationalisation of reporting formalities for port users into the National Single Window has also been the driving force to consolidate the various forms used for advance notification, based on different definitions into one waste message. This ensures on the short-term coherency between these Directives. To ensure adequate reporting on the longer term, the inconsistency between the PRF Directive and the revised waste type definitions of the MARPOL annexes are insufficient.

Overall, the PRF Directive is coherent with the wider body of EU legislation. It is instrumental to environmental legislation to improve the protection of the marine environment, while its objectives further complement a number of other key pieces of legislation, such as the Directive on Ship-Source Pollution and the Reporting Formalities Directive. However, in light of the crucial incoherencies found with waste legislation, particularly caused by incoherent use of key definitions, which affect the practical implementation of the PRF Directive, it is concluded that the PRF Directive is only partially coherent with EU legislation.

10. RECOMMENDATIONS

Based on the findings for each evaluation criteria, specific recommendations have been developed that directly build on findings under each evaluation criterion. For easy reference, these are grouped according to the evaluation criteria.

10.1. Relevance

Finding: Adequate port reception facilities are a prerequisite for increasing the delivery of waste onshore and reducing discharges at sea. However, adequate facilities alone are not sufficient to achieve a zero-waste objective in maritime transport.

➔ **Recommendation:** To ensure continued relevance of the PRF Directive, a possible revision of the PRF Directive needs to explicitly encourage the development of measures / innovative practices that reduce the amounts of waste produced on-board. For this, the current provisions for green ships should be further improved, in collaboration with IMO, by defining minimal criteria for a more uniform application of a discount on waste fees charged by port reception facilities.

10.2. Effectiveness

Finding: Not all port authorities keep track of the volumes of waste delivered to their port over time. Ports that collect this information do so on the basis of their own data needs, using their own units of measurement, which complicates monitoring progress to the objectives of the PRF Directive.

➔ **Recommendation**: A possible revision to the PRF Directive should include provisions on the reporting on delivery statistics to enable EU-level statistics on waste delivery to be developed as a monitoring tool.

Finding: Port users are insufficiently consulted in the development of WRH plans, which is the main reason for ongoing inadequacies in port reception facilities, particularly where the lack of segregation procedures in the collection of solid waste is mentioned.

➔ **Recommendation:** A possible revision of the PRF Directive should strengthen the requirements for systematic consultation of stakeholder in the development and updating of WRH plans. This should be supplemented by exchange of good practices of port user involvement.

Finding: WRH plans developed by ports and approved by the relevant (local) authorities do not always sufficiently take into account the waste hierarchy presented by the WFD, which leads to inefficiencies at the ship-port interface.

➔ **Recommendation:** The PRF Directive should include a reference to the waste hierarchy presented in the Waste Framework Directive, as a means to involve local authorities in ensuring that the waste legislation is well implemented particularly with respect to segregated garbage at the ship-port interface.

Finding: A large variety of cost recovery systems has been implemented to charge port users for the delivery of waste to port reception facilities, which has not contributed to transparency in waste fees charged to port users.

➔ **Recommendation:** Actively promote the use of comparable methodologies to calculate waste fees, which departs from a more specific definition of 'indirect contribution'.

Finding: Due to the fact that the prescribed advance notification form is not in line with the IMO Guidelines and Circulars, different notification forms are in use in ports across the EU.

➔ **Recommendation:** Update the notification form (Annex II of the PRF Directive) to reflect the IMO standard and its definitions and categories, and reflect these updates in the electronic reporting into SSN through the National Single Reporting Window (NSW).

Finding: Different procedures are employed to evaluate exemption requests across the EU, which may increase the administrative burden on port users, while limiting the potential for relevant authorities in different Member States to cooperate.

➔ **Recommendation:** Develop common criteria to be applied for approval of exemption requests, while also setting minimal requirements on information exchange between relevant authorities, for example by means of mandatory reporting into SSN through the NSW.

10.3. Efficiency

Finding: The costs for stakeholders to comply with the Directive (including administrative burden) are outweighed by the benefits. However, the non-transparent nature of fees charged to port users reduces support and commitment from this crucial stakeholder group.

➔ **Recommendation:** Require higher levels of transparency on the various elements of costs charged to port users for the use of port reception facilities.

Finding: The limited use of the information from the advance notification forms for enforcement purposes renders its administrative burden on port users inefficient and disproportionate.

➔ **Recommendation:** The efficient integration of reporting tools in SafeSeaNet should be pursued in order to reduce administrative burden for port users, while increasing the effective use of information collected to enforce the provisions of the PRF Directive.

Finding: A low number of PRF-inspections have been conducted, mainly due to legal uncertainty created by contradictions between the minimum requirements in the PSC and PRF Directives.

➔ **Recommendation:** The requirements on the minimum number of inspections in the PRF Directive should be updated and should be based on a risk-based selection of vessels.

10.4. EU added value

Finding: Despite reducing some of the differences in approaches of Member States with ports in the various sea basins, there are still substantial differences between the various ports and Member States in interpretation and implementation of key elements of the PRF Directive; particularly for the mandatory delivery principle, elements in cost recovery systems and enforcement provisions. These different applications have limited the EU added value of the Directive in practice.

➔ **Recommendation**: Provide additional guidance to Member States on the key elements (mandatory delivery, relevant requirements on cost recovery systems and enforcement) in a possible revision of the PRF Directive in order to encourage that the various approaches in the different sea basins around Europe are brought closer together, while respecting subsidiarity.

10.5. Coherence

Finding: The increased use of scrubbers to reduce air pollution in line with the Sulphur Directive necessitates adequate discharge of this waste to port reception facilities. However, MARPOL Annex VI waste is currently not covered by the PRF Directive.

➔ **Recommendation:** Widen the scope of the PRF Directive in a possible future revision to ensure that port reception facilities can adequately receive, handle and dispose waste created by exhaust gas cleaning systems (MARPOL Annex VI).

Finding: The differences in implementation of the PRF Directive in terms of waste handling show that the EU waste requirements 'to efficiently collect, handle, re-use, recycle and sustainable dispose' ship-generated waste and cargo residues are not always followed.

➔ **Recommendation:** Include in a possible revision of the Directive an explicit reference to the intentions of the waste hierarchy under the Waste Framework Directive, particularly where waste legislation needs to be implemented under subsidiarity by competent local authorities and provide guidance as appropriate.

Finding: The information that will be exchanged with relevant authorities through SafeSeaNet does not include the most relevant information for enforcement, as the data is based on rough estimates, rather than actual waste deliveries.

➔ **Recommendation:** Extend the information obligations of the PRF Directive to include mandatory reporting on the actual quantities and types of waste delivered at PRF, in addition to the information currently requested on the advance notification forms, to be exchanged between relevant authorities through SafeSeaNet.

ANNEX 1 BIBLIOGRAPHY

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ANNEX 2 EVALUATION FRAMEWORK

Relevance 1. To what extent is the mandatory delivery of ship-generated waste in the EU relevant to the overall objectives of zero waste in maritime transport and the protection of the marine environment?	
What do we want to measure? The purpose of this question is to investigate the extent to which the PRF Directive's obligation for ships to deliver SGW and CR is relevant on the one hand to the EU policy objective of zero waste in maritime transport243 and on the other for the environmental policy objective of protecting the marine environment.	
Indicators	Sources
1. Developments in the trend in waste volume delivered in ports after the Directive entered into force per waste category (i.e., Annex I, Annex V, etc.) per year (data needed at least since 2000 – prior to the entry into force of the Directive); 2. Development in the annual number of port calls for ports studied; 3. The degree to which the mandatory delivery requirement covers waste types relevant for the objectives of zero waste and protection of marine environment (e.g., to what extent would it be relevant for the requirement to cover also Annex VI types of waste currently not included in the ambit of the Directive); 4. Number of reported pollution incidents related to illegal discharges; 5. Impact of waste discharges on the marine environment (the EMSA workshop report of March 2006 suggests two additional indicators for measuring the PRF Directive's impact on the marine environment, namely: a. the waste quantities received by PRFs; and b. development in detection of illegal oil spills by aerial and satellite surveillance).	1.1. EMSA monitoring data; 1.2. Monitoring data by HELCOM, OSPAR, REMPEC, BSC; 1.3. EMSA Workshop report on Port Reception Facilities for ship–generated waste and cargo residues; 1.4. Questionnaire for port authorities and other associations on volume of waste delivered per waste category per year (if available). 1.5. EMSA Horizontal Report (2010); 1.6. IA Report (problem definition) (EE May 2012), p. 115 (data for the 40 large ports, between 2005-2008). 2.1. Ramboll Final Report – EMSA Study on the delivery of SGW and CR (2012), Section 3 on parameters influencing the delivery behaviour of SGW and CR. 2.2. Questionnaire to port authorities; 3.1. Interview with experts; 4.1. HELCOM (2013) Annual report on Baltic Marine Environment Protection Commission Illegal discharges observed during aerial surveillance; 4.2 Bonn Agreement; aerial surveillance. 5.1. EMSA Workshop Report on CRS (2

243 European Commission Communication, 'Strategic goals and recommendations for the EU's maritime transport policy until 2018', COM(2009) 8 final.

	March 2006), p. 4 et seq. 5.2. Various academic studies on the effects of waste discharges on the marine environment;
Additional information for evaluation	Sources
Stakeholder questionnaire input relating to: 6. Indicated reasons for illegal ship waste discharge at sea 7. Stakeholders' perception on the extent to which making delivery of waste mandatory at ports decreases the incentive for discharges at sea; 8. Stakeholders' opinion on whether the existence of incentive measures (such as cost recovery systems) could ease the compliance with the mandatory delivery requirement; 9. Stakeholders' opinion on whether the current mandatory delivery system contributes to a better protection of the marine environment;	The information from 8 to 9 will be collected through: Questionnaire for port users; Questionnaire for waste operators; Questionnaire for port authorities. Questionnaire for Member States; Questionnaire for other associations, organisations, NGOs.

Methodology

In order to assess the relevance of the mandatory delivery in light of the objective of zero maritime waste it is relevant to consider the developments in the trend in waste volumes delivered in the EU ports after the PRF Directive. Furthermore, the number of annual port calls and the number of pollution incidents could serve as supplementary indicators. Additionally, it should be investigated under what circumstances the maritime transport industry (port users) indeed has the incentives to deliver ship-generated waste to appropriate facilities as a way to prevent illegal discharge (also in relation to the criminal prosecution as introduced by Directive 2005/35), what are the underlying reasons for continuing the illegal discharges, as well as the stakeholders' opinion on whether sufficient incentives exist (for instance in terms of facility availability, CRSs, etc.) to ease compliance with the mandatory delivery requirement.

In order to investigate the relevance of the mandatory delivery for the protection of the marine environment, we will first assess the literature on impacts of waste discharges at sea on the marine environment. Where possible, we will consider the impact of different waste types (i.e., MARPOL Annexes) covered by the PRF Directive. The impacts will be assessed through existing scientific research on this topic. Once the impact is established, we will consider whether the mandatory delivery obligation is relevant for protecting the marine environment. Relevance will be assessed based on two indicators: a. the waste quantities received by PRFs after the Directive entered into force; and b. developments in detection of illegal oil spills by aerial and satellite surveillance. The mandatory delivery requirement could be determined to be relevant when the first indicator shows increasing volumes while the second indicator decreasing detections of illegal discharges.

This question will be approached by reviewing existing material on the issue and through questionnaires for stakeholders.

Relevance

2. To what extent does the obligation for Member States to provide for adequate port reception facilities correspond to generating fewer discharges of ship-generated waste and cargo residues at sea?

What do we want to measure?

First, a link should be established between the obligation of the Directive to provide PRFs and the current supply of adequate PRFs. For this, the development of the current number of 'adequate PRFs' will be assessed, based on a quantitative indicator. Secondly, it is necessary to determine whether fewer discharges at sea take place as the number of adequate port reception facilities rise. To this extent, the approximations in developments of illegal discharges at sea will be considered. Furthermore, through scientific articles, studies or reports, it can be investigated whether there is support for a link between fewer discharges of ship-generated waste and cargo residues at sea and the availability of adequate PRFs.

Quantitative indicators	Sources
1. Development in the number of PRF availability in EU ports before and after the Directive; 2. Developments in the volume of (approximate) illegal discharges at sea before and after the Directive;	1.1. Questionnaire for port authorities; 2.1. Monitoring data by EMSA, HELCOM, OSPAR, REMPEC, BSC;
Additional information for evaluation	Sources
3. Stakeholders' perception on whether fewer illegal discharges at sea are decreasing as a result of the increased availability of PRFs; 4. Ships general view on (in)adequacy of EU PRFs and the reasons behind their view;	3.1. Questionnaire for Member States; 3.2. Questionnaire for port users; 3.3. EMSA Assessment of international instruments covering cargo residues (2008); 3.4. EMSA report of an informal meeting with industry on cargo residues (March 2011); 4.1. Interviews with stakeholders (in particular ships and port authorities) on their perceptions of adequacy of PRFs 4.2. Figure A2.2 of IA Report 2012, p. 117. 4.3. Table A2.1., IA Report 2012, p. 120 4.4 IMO GISIS database on PRF

Methodology

The core question to be addressed is to what extent shipping industry would still discharge illegally at sea if adequate facilities were offered in the ports. To answer the qualitative part of this evaluation question, the evaluation team proposes to make use of the existing knowledge in different literatures on the correspondence between number of adequate PRFs and number of discharges at sea. Through the questionnaires, the stakeholders will be asked to provide their opinions on whether the obligation to provide PRFs could contribute to fewer discharges at sea.

Effectiveness 3. Has the PRF Directive facilitated and improved the delivery of ship-generated waste in EU ports, and resulted in fewer discharges at sea?	
What do we want to measure? This question aims to analyse three subjects: Has the Directive resulted in increases of the number of ports accepting waste, and therefore facilitated the delivery of waste? Has the Directive resulted in increased delivery of ship-generated waste in EU ports over time, by region and by port type/size? Has the number of reported discharges at sea gone down? For this question, it is also relevant to have an estimation of the waste delivered in European ports as share of the estimated production of waste of vessels that enter European ports.	
Indicators	Sources
1. The number of ports accepting waste by type of waste; 2. (estimated) waste volume statistics by type of waste; 3. Number of reported and estimated illegal discharges at sea (pollution incidents);	1.1 EMSA waste delivery statistics (the information and monitoring system, where possible updated); 1.2 Ramboll (2012) EMSA study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports; 2.1 EMSA reports on Inspection Visits to Member States under Directive 2000/59/EC; 3.1 EMSA CleanSeaNet Satellite Oil Spill Monitoring statistics; 3.2 HELCOM (2013) Annual report on Baltic Marine Environment Protection Commission Illegal discharges observed during aerial surveillance; 3.3 Bonn Agreement data 3.4 HELCOM: reports, workshop minutes, data and statistics such as estimates for illegal oily discharges; 3.5 OSPAR: reports, workshop minutes, data and statistics such as Dumping of Wastes or Other Matter at Sea, Litter in the Marine Environment, etc. 3.6 REMPEC reports, workshop minutes, data and statistics; 3.7 IMO reports, workshop minutes, data

	and statistics; Questionnaire for port authorities; Questionnaire for port users; Questionnaire for waste operators at ports;
Additional information for evaluation	Sources
4. Stakeholder opinions on acceptance of different types of waste (incl. Annex II, IV) is adequate to needs 5. Satisfaction with the ability of the Directive to facilitate and improve the delivery of ship-generated waste 6. Estimation of the waste delivered in European ports as share of the estimated production of waste of vessels that enter European ports.	4.1. Questionnaire for port authorities and port users; 5.1. Questionnaire for all stakeholder groups. 6.1. Stakeholder interviews;
Methodology In a first step data and statistics (preferably time series) will be collected in the desk research and where possible enriched with the latest information available. Based on this information the following quantitative analyses will be carried out: Make an estimate of the number of ports accepting certain types of waste, and therefore the facilitation of the actual delivery of waste in different geographical regions and port types. Changes in delivery patterns (volumes and types of waste) over time in a selected number of ports in different geographical regions and with different cost recovery systems. Where possible and relevant assessments will be made of the development of total amounts of waste in relation to the available facilities and their capacities over time. The stakeholder questionnaires will be used to gather further evidence and data from their respective perceptions. It is for instance relevant to ask port authorities, but also users and waste collectors, whether they perceived a rising trend of waste delivery, and to what extent this can be attributed to the Directive. Based on these analyses and results from the questionnaires conclusions will be drawn to what extent the Directive has facilitated improved the delivery of waste. Secondly, conclusions will be drawn to what extent the Directive has resulted in fewer discharges at sea.	

Effectiveness Has the PRF Directive improved the adequacy of port reception facilities to receive ship-generated waste and cargo residues?	
What do we want to measure? This question relates to two topics: How has compliance with the Directive improved (availability of facilities and services) over time? This question relates to the actual increase number of ports having facilities ready to deal with different types of waste (annex I-V types). How has the adequacy developed over time: are the facilities sufficient in terms of quality and capacity for the types of waste? As adequacy is intrinsically linked to needs, this question relates primarily to stakeholder perceptions.	
Indicators	Sources
1. Estimated number of ports accepting diversity of waste (based on sample); 2. Adequacy in terms of availability, capacity and quality. 3. For capacity: estimates of volume of waste produced weighted against the estimates of volume of waste collected	1.1. IMO's Action Plan on tackling the inadequacy of port reception facilities; 1.2 Port Reception Facility Database (PRFD) - module of the IMO GISIS; 2.1 EMSA (2010) horizontal assessment report on Port Reception Facilities; 2.2 Questionnaire for port authorities; 2.3, 4.1 Questionnaire for port users; 2.4 Questionnaire for waste operators at ports; 3.1. IA Report, May 2012, p. 125, para. A2.50.
Additional information for evaluation	Sources
4. Stakeholder views on the adequacy of PRFs to receive SGW and CR. 5. Stakeholders' perception of reasons for inadequacy of PRFs. 6. Number of complaints received on inadequacy of PRFs (through IMO's complaint system).	5.1. Stakeholder interviews; 4.1. and 5.2. Questionnaire for port authorities; 4.1. and 5.2. Questionnaire for port users; 5.3. Figure A2.2 of IA Report May 2012, p. 117, Table A2.1., IA Report 2012, p. 120. 6.1. IMO complaints database.

Methodology

In a first step data will be collected on the compliance with the Directive and a desk research will be carried out on the (alleged) inadequacies which have been reported. Based on this information the following analyses are proposed:

Development of the number ports in non-compliance with the Directive. Analyses will be carried out between geographical regions and types/sizes of ports.

Assessments of adequacy of facilities according to stakeholders will be made.

Qualitative analyses on areas of improvement: which improvements have been implemented and which are still needed?

Considering the partially subjective character of the term or concept of adequacy the answer to this question will be partially subjective in nature. Despite the introduction of a uniform methodology for the estimation of the required capacity the users (ship owners) might have different views. In order to get a better understanding of the stakeholder position on this interviews will complement the findings from the survey and provide the opportunity to assess the concept of adequacy and the situation in different ports in more detail.

Based on these analyses conclusions will be drawn on the formal compliance with the Directives and perceptions on the adequacy. Due attention will be given to the level of representativeness of (partially) subjective statements.

Effectiveness Has the PRF Directive caused ships and ports to improve their waste management practices, in line with EU waste legislation, in particular as regards the separation of solid waste at the ship-port interface?	
What do we want to measure? This question relates to three topics: Has the PRF directive caused ship owners to improve their waste management in line with EU waste legislation? This sub-question is interpreted to relate to ship-generated waste and the legislation on this subject. However, more general legislation on solid waste also applies to ships and will therefore be taken into account. Has the PRF directive caused ports to improve waste management in line with EU waste legislation? More general legislation on solid waste also applies to ports and will therefore be taken into account. To what extent has the Directive contributed to the separation of solid waste at the ship-port interface? This could include glass, paper, cardboard, aluminium and steel cans, and plastics, and it can be either non-hazardous or hazardous in nature. This question aims to find evidence of practices, but also the presence of waste management plans, and compliance or infringements.	
Indicators	Sources
1. The estimated share ports that have a waste handling plan; 2. The share of ship owners / operators that follow reporting requirements requested by waste management plan; 3. Nature of waste management plans, as compared to annex 1 of the directive 4. The use waste notifications by port authorities / waste operators 5. Compliance and infringements reports of the Directive, also for other EU waste legislation.	1.2 Ramboll (2012) EMSA study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports; 1.3, 3.1 EMSA (2010) horizontal assessment report on Port Reception Facilities; 1.4, 3.2 EMSA (2005) A Study on the Availability and Use of Port Reception Facilities for Ship-Generated Waste; 1.1 Questionnaire for port authorities; 4.1 Questionnaire for port users; 4.2 Questionnaire for waste operators at ports. 5.1 Compliance and infringement reports;
Additional information for evaluation	Sources
6. Statements and opinions from stakeholders on separation for solid waste. 7. Stakeholders' opinion on the extent that the PRF directive improved waste	6.1. Stakeholder interviews; 7.1. Questionnaire for port users; 8.1. Questionnaire for port authorities and waste operators.

management practice on ships. 8. Stakeholders' opinion on the extent that the PRF directive improved waste management practice in ports.	
Methodology In the desk research phase the relevant literature and presentations will be reviewed, as well as formal compliance and infringement reports of ports and ships that are available. As individual assessments of vessels are not available centrally, the number of infringement reports could be taken as a proxy, as well the availability of waste handling plans. The historic development (possibly also corrected for the growth in maritime traffic) will be sought after. In addition, stakeholders will be asked in the questionnaires to provide estimates of the level of compliance or infringement. Comparisons will be made between information from literature and new information from the questionnaires.	

Effectiveness Have the various cost recovery systems (CRS) set up under the PRF Directive ensured that all ships contribute to the costs of PRF in a fair and transparent way, and provided sufficient and comparable incentives for ships to deliver their waste?	
What do we want to measure? This question relates to a number of topics: What are the various cost recovery systems? For these analyses the two major type of cost recovery systems will be distinguished: the 'No special fee system (indicated as indirect fee)' and the 'Administrative waste fee/contribution system (often referred to as (partially) direct fee))'. Within these frameworks there can be a range of variations. To what extent do different cost recovery systems ensure that all ships contribute to the costs in a fair and transparent way? The essence of this sub-question is whether the cost structure and tariffs are fair and transparent. The term fairness is considered as whether tariffs that ship owners have to pay correspond with actual costs incurred by the port operators (as required by the Directive), while also taking into account that small ships do not carry as much waste as larger ships and/or its waste management contractors. Previous studies have indicated discrepancies between views of these stakeholder types. The second element of the sub-question relates to the ways and comprehensiveness of how ports inform users of the cost structure and tariffs. To what extent do CRS provide sufficient incentives for ships to deliver waste? Different cost structures can constitute different incentives for delivery. To what extent do CRS provide comparable incentives for ships to deliver their waste?	
Indicators	Sources
1. Share of ports using specific cost recovery systems in different Member States and differentiated by port type/size; 2. Share of ports that publish detailed information about the cost recovery system and tariffs; 3. Perception of transparency and fairness of various CRS; 4. Academic literature on incentives of different cost recovery systems.	1.1, 2.1 EMSA (2010) horizontal assessment report on Port Reception Facilities (p21-22); 3.1 Questionnaire for port users;
Additional information for evaluation	Sources
4. Stakeholder perception on sufficient and comparable incentives for ships to deliver their waste;	4.1. Questionnaire for port authorities, port users, and waste operators; 4.2. Stakeholder interviews;

Methodology

To answer this question first an overview will be produced of the presence of the different cost recovery systems (CRSs) in ports by region and type/size of port. The CRSs will be distinguished in two main categories: no direct fee (indirect fee) and administrative contribution system (direct fee). Within these categories, numerous variations of CRSs exist. We will examine these at the level of ports. Data on the number of ports using the different cost recovery systems will be collected preferably by country and port type/size in the desk research and through questionnaires and stakeholder representation interviews. Also, evidence will be collected on whether or information on the cost recovery systems and tariffs are published. Next, where possible, quantitative analyses of the relation between the amounts of delivered waste per type of cost recovery system will be made to determine whether there are clear preferences for a specific type of cost recovery system. Given the limited availability of data, a number of illustrative ports will be selected from different regions.

To assess fairness and transparency, the perceptions of different stakeholders on costs and tariffs are of relevance. Both ship-owners and operators, and port operators will be asked in the questionnaires whether transparent information is available and the costs are perceived as being fair. These results will be compared with similar evidence emerging from the desk research. Conclusions will be drawn on the question whether all ships contribute to the costs of PRF.

Effectiveness Has the Directive helped ensure effective operation and planning, upholding the MARPOL requirement to avoid undue delay to ships?	
What do we want to measure? MARPOL imposes obligations to provide facilities for the reception of ship-generated residues and garbage that cannot be discharged into the sea. The reception facilities must be adequate to meet the needs of ships using the port, without causing undue delay to ships. The requirements for port reception facilities create an incentive for ships to comply with MARPOL and to minimize discharges to sea. The question whether implementation of the Directive helped ensure effective operation and planning therefore refers to the reduction of delays caused by waste delivery prior to implementation of the Directive, and whether new delays have been avoided with requirement to use the new facilities established because of the Directive. The terms 'undue delay' is formulated in qualitative terms only however, which means an agreement will need to be reached on its definition. Discussions with stakeholders (ship owners and ports) could be useful to formulate a working definition. This way, the definition could include both the (objective) average lost time as well as the (subjective) perception of the port users of whether the average delay they experience is undue or not. Relevant for answering this question is to determine to what extent the current notification regime contributes to an effective operation and planning.	
Indicators	Sources
1. Stakeholder opinions on delays caused and/or avoided by the implementation of the Directive; 2. Share of ports and ship owners indicating that the Directive helped ensure effective operation; 3. Stakeholders' perception on whether the average delay they experience is undue or not. 4. Differences in national exemption regimes (incl. reporting requirements); 5. Stakeholder opinions on the application of the exemptions regimes. 6. Stakeholder opinion on effectiveness of notification regime.	1.1 EMSA (2010) horizontal assessment report on Port Reception Facilities (p.43); 1.2 EMSA workshop minutes; 1.3 / 2.1 Questionnaire for port authorities; 1.4 / 2.2 Questionnaire for port users; 2.3 Questionnaire for Member States. 3.1. Questionnaire for port users. 4.1 EMSA note on Article 9 exemptions; 4.2 EMSA workshop report on CRS; 5.1. Questionnaire for port authorities, port users, and Member States.
Additional information for evaluation	Sources
6. Key performance data on turnaround time in ports.	6.1. Stakeholder interviews;

Methodology

The first step will be to analyse reports, presentations and workshop minutes. Subsequently, stakeholders will be asked about their opinion on the effect of the Directive on the effective operation and planning. The questions will also assess which problems still cause undue delays. Relevant is also to what extent the current notification regime contributes to ensuring effective operation and planning. Early notification, as required under the Directive, can help ports in organising the right facilities at the right time, but to do so, the notification should be used in the overall planning of ports. These issues will be discussed with industry representatives. Subsequently, the issue of exemptions (under Article 9 of the Directive) will be identified, which is a crucial element of the Directive in effective operations and also in upholding the MARPOL requirement to avoid undue delay.

Efficiency 8. To what extent has the PRF Directive generated benefits and costs for different stakeholders (e.g. national administrations, port/competent authorities, the maritime transport industry and the waste handling/disposal industry)?	
What do we want to measure? We want to present the costs related to the PRF Directive for different stakeholders in relation to the benefits. For this, this evaluation will make use of the typology of regulatory costs and benefits as outlined in the relevant Commission guidelines244. This typology distinguishes between direct regulatory costs, enforcement costs, and direct benefits, which will be assessed as presented below. For direct regulatory costs: Direct compliance costs Measured by the charges related to the measure The costs of organising compliance with the measure The administrative burden of ensuring continued compliance Hassle (measured by an increased turnaround time for ships, or other if indicated in the workshop) In terms of 'enforcement costs' Monitoring (by relevant authority) Enforcement (by relevant authority) (Adjudication) -> hardly relevant in this evaluation, therefore not included The benefits can be defined as Contribution towards objective of zero waste of maritime transport (not quantified)	
Quantitative indicators	Sources
In terms of 'direct compliance costs' 1. Average costs for ships using PRFs in EU 2. Costs of meeting administrative requirements (of port authorities & maritime transport industry) 3. Additional turnaround time for vessels that can be related to using PRFs. In terms of 'enforcement costs' 4. Costs incurred by authority for monitoring 5. Costs incurred by authority for	EMSA (2010) horizontal assessment report (and, where available, individual Member States reports, as sent to the European Commission / Maritime administration and Permanent Representation of MS); DG MOVE (2013), (draft) assessment report on the operation of the system provided by the Port Reception Facilities Directive; DG MOVE (2012) study: Impact Assessment for the review of the Directive 2000/59/EC (Europe Economics); EMSA study on the delivery of ship-generated waste and cargo residues to port reception facilities in EU ports (August 2012); EMSA technical report assessing Waste

244http://ec.europa.eu/smart-regulation/impact/commission_guidelines/docs/131210_cba_study_sg_final.pdf

enforcement The potential benefits can be defined as: 6. Reduced illegal discharges and contribution to the zero waste in maritime transport (environmental benefit). 7. Revenues of waste processing, that can be linked to PRFs (financial benefit). Other benefits will be researched.	Reception and Handling Plans adopted in accordance with Article 5 of Directive 2000/59/EC (2007); EMSA study on the availability and use of port reception facilities for ship-generated waste (December 2005); EMSA technical report evaluating the variety of of cost recovery systems adopted in accordance with Article 8 of Directive 2000/59/EC (2006); Implementation questionnaire developed by DG MOVE for MS; Questionnaire for port authorities; Questionnaire for port users; Questionnaire for waste operators at ports.
Additional information for evaluation	Sources
Stakeholder opinion on generated benefits; Stakeholder opinion on the proportionality of generated costs (other than administrative costs).	Questionnaire for all stakeholder groups; Qualitative comments for stakeholder surveys; EMSA workshop report on the handling of cargo residues (December 2007); EMSA Workshop report on Port Reception Facilities (September 2007); EMSA workshop report on the cost recovery systems of Directive 2000/59/EC (March 2006).
Methodology Based on the quantitative indicators presented above, the evaluation aims to providing a picture of the costs and benefits for different stakeholders, as a result of the PRF Directive. The development of costs will be accompanied by an overview of potential benefits adduced by the Directive, such as reductions in the illegal discharges at sea (and thereby contributing to the objective of zero waste in maritime transport and better protection of the marine environment). The Standard Cost Model will serve as the basis of the cost calculations required for this evaluation question. Additionally, to complement the quantitative findings on the costs and potential benefits of PRFs, this evaluation will ask stakeholders about their perception of the costs and benefits of the PRF Directive (through the qualitative sections in the survey), to gain a richer picture of the actual efficiency of the Directive in providing incentives for reducing illegal discharges at sea.	

Efficiency 9. What is the administrative burden generated by the PRF Directive for different stakeholders? Has enforcement been effective and proportionate? Are there areas of excessive costs that could be avoided?	
What do we want to measure? This question seeks to investigate the specific administrative burden under the requirements of the PRF Directive, for all stakeholders, and to identify potentially excessive costs for (a particular type of) stakeholders. Subsequently, it will investigate the effectiveness and proportionality of different enforcement regimes in MS, by looking at differences in number and types of inspections on adherence of the PRF Directive.	
Indicators	Sources
Distribution of administrative burden for stakeholders (for national administrations, port authorities, maritime transport sector); Number of inspections per port / MS.	Questionnaire for port authorities; Questionnaire for port users; Questionnaire for waste operators at ports; DG MOVE (2013), (draft) assessment report on the operation of the system provided by the Port Reception Facilities Directive; DG MOVE (2012) study: Impact Assessment for the review of the Directive 2000/59/EC (Europe Economics), including position papers by various stakeholders; EMSA (2011) Horizontal Assessment (and, where available, individual Member States reports, as sent to the EC / Maritime administration and Permanent Representation of MS); Implementation questionnaire developed by DG MOVE for MS;
Additional information for evaluation	Sources
Stakeholder opinions on perceived administrative burden; Stakeholder opinions on perceived adequacy of enforcement.	Questionnaire for all stakeholder groups; EMSA workshop report on the handling of cargo residues (December 2007); EMSA Workshop report on Port Reception Facilities (September 2007); EMSA workshop report on the cost recovery systems of Directive 2000/59/EC (03 / 2006); EMSA report of an informal meeting with industry on cargo residues (March 2011).

Methodology

In order to assess the administrative burden, the standard cost model will be applied to the input received from the three types of stakeholders. In addition, and for validation purposes, the evaluation team will include 'hard data', where possible. This will allow an assessment of the burden generated by the Directive for the different stakeholders.

To assess the effectiveness and proportionality of enforcement, in addition to factual information about the enforcement policies in ports, based on the EMSA visits (reported in the horizontal assessment), more qualitative information will be collected from the stakeholders through the qualitative comment space reserved in the survey.

<table>
<tr><td colspan="2">Efficiency

10. Have the provisions of the PRF Directive been equally fit for the ports of different size, type and geographical location?</td></tr>
<tr><td colspan="2">What do we want to measure?

The previous questions 8 and 9 should take the different sizes, types and geographical locations fully into account. For this, when analysing the results of these evaluation questions, it is essential to always split out in term of size, type and geographical location; this specific output allows to draw specific conclusions on this evaluation question.</td></tr>
<tr><td>Indicators</td><td>Sources</td></tr>
<tr><td>No quantitative indicator defined</td><td>n.a.</td></tr>
<tr><td>Additional information for evaluation</td><td>Sources</td></tr>
<tr><td>Compare results on efficiency of stakeholder survey on size, type and geographical location for specific patterns

Fitness asked to ports of different size, type and geographical location on the following items:

Setting up PRF, taking into account the operational needs of the users;

Appropriate waste reception and handling plan available in port, in consultation with its stakeholders;

Notification requirements;

Fee system requirements.</td><td>Questionnaire for port authorities;

EMSA (2011) Horizontal Assessment (and, where available, individual Member States reports);

DG MOVE (2013), (draft) assessment report on the operation of the system provided by the Port Reception Facilities Directive.</td></tr>
<tr><td colspan="2">Methodology

This evaluation question is hard to measure using a quantitative indicator. It is necessary to split out the results on the evaluation questions 8 and 9 by size, type and location of ports. However, to gain additional insight in whether the separate provisions of the Directive are fit for ports of different sizes, types and locations, this will be specifically asked in the survey for port authorities. This allows to identify the overall fitness of the Directive’s provisions. Where the findings of the survey give reason to particular provisions that are problematic, the evaluation team proposes additional interview with ports that have the characteristic that proves problematic.</td></tr>
</table>

EU Added Value 11. What is the EU added value of the PRF Directive's obligations that go beyond the requirements in Marpol 73/78 (in particular: development of a waste reception and handling plan, notification, mandatory delivery, fees and inspection)? Has the coexistence of EU and international law in this domain created inefficiencies, overlaps or legal uncertainties?	
What do we want to measure? This section will look at whether, and if so, to what extent, did the PRF Directive's additional obligations bring benefits on EU level. As a second step, it will assess the extent to which the PRF Directive (EU law) complements and is coherent with the MARPOL 73/78 (international law) obligations.	
Indicators	Sources
1. The extent to which the same results on the availability and use of PRFs could have been reached without the PRF Directive's additional obligations; 2. The benefits adduced by the additional obligations; 3. The degree of (in)compatibility or overlaps between the PRF Directive MARPOL 73/78 (e.g. in terms of differences in definitions, different reporting requirements, lack of inclusion into the Directive of Annex VI facilities, etc.);	1.1. DG MOVE (2012) study: Impact Assessment for the review of the Directive 2000/59/EC (Europe Economics); 2.1. Questionnaire for port users and port authorities; 2.2. Interview with experts; 3.1. EMSA Assessment of International Instruments (2008); 3.2. EMSA Note on revision of MARPOL Annex V (2012); 3.3. EMSA Note on inclusion of MARPOL Annex VI (2012); 3.4. EMSA Horizontal Assessment Report (2010) 3.5. DG MOVE (2012) study: Impact Assessment for the review of the Directive 2000/59/EC (Europe Economics); 3.6. EMSA informal industry meeting on cargo residues (2011); 3.7. Questionnaire for port authorities, port users and Member States;; 3.8. Interview with experts;
Additional information for evaluation	Sources
4. Stakeholders' opinion on whether it was necessary to go beyond the requirements of MARPOL in order to better achieve the objective of reducing illegal	4.1. Questionnaire for port users; 4.2. Questionnaire for port authorities; 4.3. Questionnaire for waste operators;

discharges; 5. Stakeholders' opinion on whether the additional obligations (WRH plans, notification, etc.) contribute to better achieving the objectives of the Directive;	4.4. Interview with experts; 5.1. Questionnaire for port authorities; 5.2. Questionnaire for port users.
Methodology This question will be answered by looking at the situation that would have existed without the additional obligations of the PRF Directive (that is, where only the MARPOL obligations would have been in place), and will compare that situation to the existing one where the obligations are in force. This will allow the measuring of benefits (i.e., added values) of the additional obligations on the use of PRFs. Stakeholders will be involved by asking their views on whether it was necessary to go beyond the original set of obligations under MARPOL, and whether these additional obligations contribute to better achieving the objectives of the Directive. Consideration will also be given to the extent to which the Directive complements the MARPOL obligations, and whether there are overlaps that (could) result in legal uncertainties (such as differences in definition between the Directive and MARPOL on certain 'cargo residues' under Annex II of MARPOL).	

EU added value 12. Would it have been possible to obtain the same results in terms of waste delivery and reduction of discharges without EU intervention, i.e. the PRF Directive?	
What do we want to measure? The extent to which the situation that existed prior to the enactment of the Directive would have led to the same results on waste delivery and reducing the ships' incentive to discharge waste at sea.	
Indicators	Sources
1. The impact that MARPOL 73/78 alone could have had on the development of waste delivery and reduction of discharges at sea; 2. The situation that existed prior to the PRF Directive in terms of availability, adequacy, and efficiency of port reception facilities; 3. The extent to which other EU (waste) legislation would play a role if there was no PRF Directive in achieving the intended results.	1.1. Questionnaire for port users and Member States; 1.2. Interview with experts; 1.3. Comparison with situation in non-EU MARPOL countries (as indication of possible results); 1.4. EMSA Assessment of international instruments covering cargo residues (2008); 2.1. Questionnaire for port authorities, port users, and Member States; 2.2. Implementation questionnaire developed by DG MOVE for the Member States on the implementation of Directive 2000/59/EC; 2.3. DG MOVE (2012) study: Impact Assessment for the review of the Directive 2000/59/EC (Europe Economics); 3.1. Interview with experts; 3.2. EUR-LEX.
Additional information for evaluation	Sources
4. Stakeholders' perception on whether it was necessary to enact the PRF Directive or the same levels in reduction of discharges at sea could have been achieved also without the Directive;	The information will be obtained from: Questionnaire for port users; Questionnaire for port authorities; Questionnaire for waste operators.

Methodology

This section will rely on the approach that would have existed if there was no PRF Directive in place. It will look at how the availability and use of PRFs would have been affected if Member States were only bound by the provisions of MARPOL 73/78. Since MARPOL 73/78 entered into force in 1983 and the EU Member States were parties to it, it is feasible to consider the situation that existed prior to the PRF Directive as a benchmark for considering whether the same results could have been reached without the EU intervention. It is proposed to take 1999 as a benchmark year (one year prior to the enactment of the Directive) and consider the results that could have been achieved in the past 15 years in a situation where only the MARPOL 73/78 obligations would have been in force. It is proposed to evaluation 'results' in terms of availability and adequacy of PRFs as well as estimated development of waste volumes illegally discharged at sea.

The obtained results will then be compared to the ones that exist currently (with the PRF Directive being in force).

Additionally, consideration will be given to what extent would other relevant EU legislation play a contributory role in achieving the desired results in terms of waste delivery and reduction of discharges, if there was no PRF Directive (for instance Directive 2005/35/EC on sanctions for ship-source pollution).

<table>
<tr><td colspan="2">EU added value

13. Has there been a recognised exchange of good practices at national/regional level (e.g. as regards the cost recovery systems) and how has this contributed to the EU added value?</td></tr>
<tr><td colspan="2">What do we want to measure?

This question will look at the extent to which exchanges of good practices exists at the various national or regional levels of Member States, and whether these are shared across the EU. The secondary step will be to assess whether and how such exchanges bring benefits on EU level.</td></tr>
<tr><td>Indicators</td><td>Sources</td></tr>
<tr><td>1.National or regional level measures on the promotion of exchange of good practices in PRF operation per Member State;

2. EU level benefits (in terms of better operation of the PRF Directive) resulting from exchanges of good practices.</td><td>1.1., Questionnaire for port authorities and Member States;

1.2. and 2.1. Oranjewoud, ‘Managing undesirable ship-generated waste discharges in Marine Environments’ (2012);

2.2. EMSA (2010) horizontal assessment report on Port Reception Facilities (pp. 6, 13);

2.3. Impact Assessment Report (EE May 2012) (relevant info throughout the report);

2.4. EMSA Technical report assessing WRH plans (Section 5.3.9).</td></tr>
<tr><td>Additional information for evaluation</td><td>Sources</td></tr>
<tr><td>3. Stakeholders’ opinion on the need for exchanges of good practices, and if so, which measure(s) of the Directive would benefit the most from such exchanges;

4. Expert input on the existence, reliance on, and benefits of the exchange of national/regional good practices.</td><td>3.1. Questionnaire for port authorities;

3.2. Questionnaire for port users;

3.3. Questionnaire for waste operators;

4.1. Interview with experts.</td></tr>
<tr><td colspan="2">Methodology

Through the questionnaires, we will determine whether national and regional exchanges of good practices are in place. Such exchanges may be facilitated through guidelines on national, regional or international level. An example of an international level guideline already exists in the form of the IMO Guide to Good Practice for Port Reception Facility Providers and Users (MEPC.1/CIRC.671) which sets out practical guides to ship crew and PRF providers on timely and efficient use of port reception services. Similar measures will be researched on a national and regional level (among</td></tr>
</table>

stakeholders). As a second step, the EU level benefits of such exchanges will be examined (benefits in terms of e.g., time, cost reduction, increased efficiency in operation of PRFs, etc.). The stakeholders' and experts' opinion will also be sought on their perception about the benefit of such exchanges.

Coherence 14. How well does the PRF Directive interact/contribute to the objectives of relevant EU environmental legislation, in particular: the Marine Strategy Framework Directive (Directive 2008/56/EC), the Directive on the sulphur content of marine fuels (Directive 2012/33/EU), the Waste Framework Directive (Directive 2008/98/EC) and other relevant EU waste legislation, as well as the recent Commission initiative on marine litter (SWD(2012) 365 final)?	
What do we want to measure? The extent to which the PRF Directive fits into the EU environmental legislation with particular view on potential discrepancies, overlaps and contradictions.	
Indicators	Sources
1.The level of conflict/incompatibility between the obligations created under the PRF Directive and the indicated EU environmental legislation (Directive 2008/56/EC, Directive 2012/33/EU, Directive 2008/98/EC). Other qualitative indicators will also be taken into account, such as: differences and similarities in the legal bases, objectives and scope, definitional coherence, coherence on substantive obligations for common actors (e.g., waste producers, waste collectors, competent authorities, etc.) 2. Level of compatibility with other EU waste legislation (such as legislation on waste management: Regulation 1013/2006 in shipments of waste, Decision 2000/532 establishing a classification system for wastes, Directive 2000/76 on incineration of waste; and legislation on specific waste streams, such as: Directive 75/439 on disposal of waste oils, legislation on batteries and accumulators (Directive 91/157/EEC), etc.). 3. Level of to which the waste reporting requirements stipulated under EU legislation (in particular the Waste Framework Directive and Directive on disposal of waste oils) are in coherence with the requirements of the PRF Directive; 4. The level to which the PRF Directive facilitates the objectives set out in the Commission initiative	1.1. and 2.1. EUR-Lex; 2.2. and 3.1. EMSA, 'Note to the File on reporting requirements in Community waste management legislation' (January 2006), pp. 1-5. 4.1. Commission initiative on marine litter (SWD(2012) 365 final); 4.2. JRC et al, 'Marine Strategy Framework Directive: Report on Marine Litter', (April 2010), available here. 5.1. Data along the North Sea costs until 2011 available through the Report of the Institute for Marine Resources, 'Fulmar Litter EcoQO monitoring' (May 2013), available here. 6.1. Questionnaires for port users; 7.1. Expert interviews.

on marine litter 5. Development in marine litter statistics since the entry into force of the Directive 6. To extent to which the current availability of port reception facilities are adequate to meet the needs of ships using exhaust gas cleaning systems (falling under Directive 2012/33/EU) 7. The extent to which the PRF Directive aligns with the waste management principles and waste management plan requirements of the Waste Framework Directive.	
Additional information for evaluation	Sources
8. Expert input on the legal coherence between the PRF Directive and EU environmental legislation 9. Stakeholders' opinion on to what extent could the reporting requirements under the Waste Framework Directive be complemented through the PRF Directive's systems (e.g., notification requirement); 10. Stakeholder input on their perception of the conflicting obligations imposed by the PRF Directive and EU environmental legislation.	8.1. Interviews with experts in EU waste legislation; 9. till 10 will be answered through: Questionnaires for waste operators; Questionnaire for port authorities; Questionnaire for port users;
Methodology As a first step, we will identify the relevant EU environmental legislation that could potentially interact with the PRF Directive. Comparative (and qualitative) analysis between the PRF Directive and various other EU legal instruments will be carried, with a view to determine potential discrepancies, overlaps, and contradictions relating to the rights or obligations created between them. A semantic analysis will be carried out for the various environmental legal instruments in order to analyse possible discrepancies. This analysis will be completed with stakeholders' perception and experiences on existing problems resulting from such discrepancies.	

Coherence 15. To what extent has the PRF Directive contributed to the efficient collection, handling, re-use, recycling and environmentally sustainable disposal of ship-generated waste and cargo residues (as defined in the EU waste legislation)?	
What do we want to measure? This section will look into the PRF Directive's level of contribution to the operation of other EU waste legislation (for instance, Directive 2008/98/EC).	
Indicators	Sources
1. Level of additional burden imposed by the PRF Directive on waste operators handling waste at ports (and other stakeholders); 2. The extent to which the PRF Directive aligns with the waste management principles of the Waste Framework Directive (Directive 2008/98/EC). 3. The level to which the PRF Directive's lack of segregation requirement influences the efficiency of collection, handling and re-recycling of waste. 4. Level of harmonized procedural rules between the PRF Directive and other EU waste legislation. 5. The extent to which the PRF Directive facilitates the application of the priority order to be followed for waste management hierarchy under Directive 2008/98/EC (preparing for re-use, recycling, recovery, disposal).	1.1, 2.1. 4.1 EUR-Lex; 3.1. Impact Assessment Report (EE May 2012), p. 127 et seq. 3.2. Responses from the public consultation* on stakeholders' perception on the problem of segregation in PRF (Q15); 5.1. Questionnaire to waste operators;
Additional information for evaluation	Sources
6. Stakeholder input, in particular from waste operators, on the PRF Directive's contributory role in the efficient handling and disposal of SGW and CR. 7. Stakeholders' opinion on whether the lack of segregation requirement under the PRF Directive hinders the efficient collection, re-use, recycling and disposal of waste.	6 to 7 will be obtained through: Questionnaire for waste operators at ports; Questionnaire for port users;

Methodology

For this question, the analysis will relate to the extent to which the PRF Directive contributes to the efficient collection, handling, re-use and disposal of SGW and CR. In order to do so, the procedures of the PRF Directive will be examined with a view to determine whether they facilitate the treatment of waste according to the waste hierarchy established under Directive 2008/98/EC.245 To this extent, this question is related to Evaluation Question 14 in that both questions will examine the coherence between the PRF Directive and Directive 2008/98/EC. Nonetheless, a separation will be made: for EQ 14, the analysis will consider the coherence and complementarity between the objectives of the two instruments, while under the present EQ, the analysis will consider the operational and substantive coherence between the two instruments.

245 Article 4.

<table>
<tr><td colspan="2">Coherence

16. Is the current framework of the PRF Directive adequate in the long run to ensure the exchange of information, as well as reporting in line with requirements under the Directive on reporting formalities for ships arriving in and/or departing from ports (Directive 2010/65/EC)?</td></tr>
<tr><td colspan="2">What do we want to measure?

This section will examine whether there is coherence between the current mechanism of the PRF Directive and the reporting requirements of Directive 2010/65/EC.</td></tr>
<tr><td>Indicators</td><td>Sources</td></tr>
<tr><td>1. The level of compatibility between the PRF Directive's notification requirement (Article 6) and the reporting formalities required under Directive 2010/65/EC (in particular under Article 4 on notification prior to arrival);

2. The extent to which the PRF Directive is coherent with the requirements of electronic transmission of data through a Single Window and compatible for being exchanged through SafeSeaNet.

3. The extent to which the PRF Directive promotes (or hinders) the possible exchange of information that may occur between Member States through the SaveSeaNet.</td><td>1.1. and 2.1. EUR-Lex;

1.2., 2.2. and 3.1. Questionnaire for port authorities;

1.3. and 2.3. Questionnaire for port users;

3.1 Report from the Commission on the functioning of Directive 2010/65/EU, COM(2014) 320 final, available here.</td></tr>
<tr><td>Additional information for evaluation</td><td>Sources</td></tr>
<tr><td>4. Stakeholders' perception on any possible problems that may arise after 1 June 2015, when the reporting formalities Directive will be fully applied by Member States.

5. Expert opinion on the long-term adequacy of the PRF Directive to meet the reporting requirements of Directive 2010/65/EC.</td><td>4.1. Questionnaire for Member States;

5.1. Interview with experts in ship reporting formalities/the Single Window system and the SaveSeaNet;</td></tr>
<tr><td colspan="2">Methodology

The answer to this question will be given through an analysis of the notification requirements of the PRF Directive and the reporting formalities of Directive 2010/65/EC with a view to determine the level of compatibility between the two. The analysis will also consider the view of the ship operators on the differences and overlaps in the requirements of the two instruments.</td></tr>
</table>

<table>
<tr><td colspan="2">Coherence

17. How well does the PRF Directive complement Directive 2005/35/EC (as amended) as the key instruments to prevent ship-source pollution?</td></tr>
<tr><td colspan="2">What do we want to measure?

This section will look at the contributory role of the PRF Directive in strengthening the operation of Directive 2005/35/EC (as amended) on ship-source pollution.</td></tr>
<tr><td>Indicators</td><td>Sources</td></tr>
<tr><td>1. Number of vessel inspections carried out under Directive 2000/59;

2. Number of sanctions proceedings initiated under Directive 2005/35/EC;

3. Volume of oil and other noxious waste (falling under the Directive 2005/35/EC) discharged at PRFs after the introduction of Directive 2005/35/EC.</td><td>1.1. EUR-Lex;

1.2., 2.1. and 3.1. Questionnaire for port authorities and Member States;</td></tr>
<tr><td>Additional information for evaluation</td><td>Sources</td></tr>
<tr><td>4. Stakeholders’ opinion on how does the introduction of criminal sanctions influence discharges at sea and whether the PRF Directive complements this.

5. Stakeholders’ opinion on the extent to which the PRF Directive’s enforcement mechanism (inspections) needs to be complemented by criminal sanctions to raise the incentive not to discharge at sea.

6. Experiences (possible case studies) by stakeholders.</td><td>4.1. and 5.1. Questionnaire for port users and Member States;

6.1. Interview with selected port users (selected though having a prior experience with coming within the scope of Directive 2005/35/EC);

6.2. Interview with authorities enforcing the criminal sanctions imposed by Directive 2005/35/EC.</td></tr>
<tr><td colspan="2">Methodology

Enforcement measures for non-compliance with the MARPOL obligations are available under both the PRF Directive (inspections and denial to leave port) and Directive 2005/35/EC (criminal sanctions). The complementary nature of the PRF Directive to Directive 2005/35/EC will be assessed on two aspects: firstly, it is relevant to assess whether the PRF Directive’s 25% minimum inspection requirement results in a more effective operation of Directive 2005/35/EC; and secondly, whether the introduction of sanctions (in particular criminal sanctions) resulted in an increased discharge of waste at ports (and hence an increased use of the PRFs).</td></tr>
</table>

ANNEX 3 STAKEHOLDERS CONSULTED

Stakeholders have been consulted by means of (i) the public consultation and (ii) interviews with experts.

Public consultation

The survey conducted was addressed to different stakeholder categories, namely:

- **Ports:** Port Authorities and Harbour Masters;
- **Port users:** Users of Port Reception Facilities, Shipping Companies, Fishing Operators, Recreational Vessel Operators;
- **PRF operators:** Providers of Port Reception Facilities, Waste Operators and Terminal Operators;
- **Member States:** National or Regional Authorities;
- **Other organisations:** Non-Governmental Organisations, Fisheries Commissions, Advisory Councils, Other types of commissions and environmental protection organisations, Other types of stakeholders not grouped elsewhere.

Respondents from each of the above-mentioned categories received a questionnaire that was tailored to that specific stakeholder category. Questions on general information and opinions were replicated in all questionnaires. Each questionnaire then included a different set of questions to collect specific information depending on the activity of the respondent. As a result we can present results of the survey at different levels, either at a general level, for those questions that were included for all respondents, or at the level of stakeholder categories.

The survey was launched on 6 November 2014 and closed on 5 December 2014. In total, 129 responses were collected, as presented in Table 7.

Table 7 Number of responses by stakeholders' category

Stakeholders category	Reponses collected
Ports	40
Port users	39
PRF operators	23
Member States	19
Other organisations	8
Total	*129*

Responses collected were organised geographically to analyse the coverage of the survey. In order to indicate regional effects, we have only included ports and Member States, as these stakeholder categories can be linked to Member States.

The results of the geographical coverage, as presented in Figure 46, are satisfactory, with all European macro-regions well covered. The region with fewer responses collected was that of the West Mediterranean (and Iberia), counting nine questionnaires received. The number is proportionate with the number of countries of this region, which is smaller than that of the others.

Figure 46 Geographical range of responses, port users excluded

Legend:

Number of responses

31 and more

21 - 30

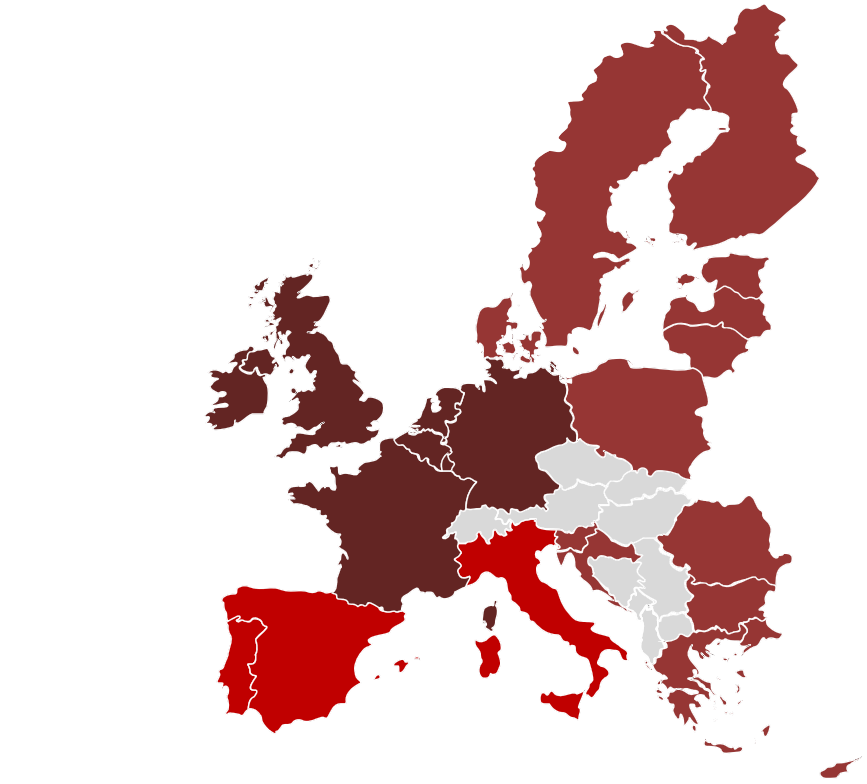
11 - 20

0 - 10

n/a

Coherently with the focus of the analysis, port users were accounted for the geographical range where they carry out their business activities, as provided in questionnaires. Geographic coverage of responses tends to be higher in this case, because each port user is generally active in more than one region. Figure 47 presents the geographical coverage in which also port users are included.

Figure 47 Geographical range of responses, port users included



Legend:

Number of responses

61 and more

41 - 60

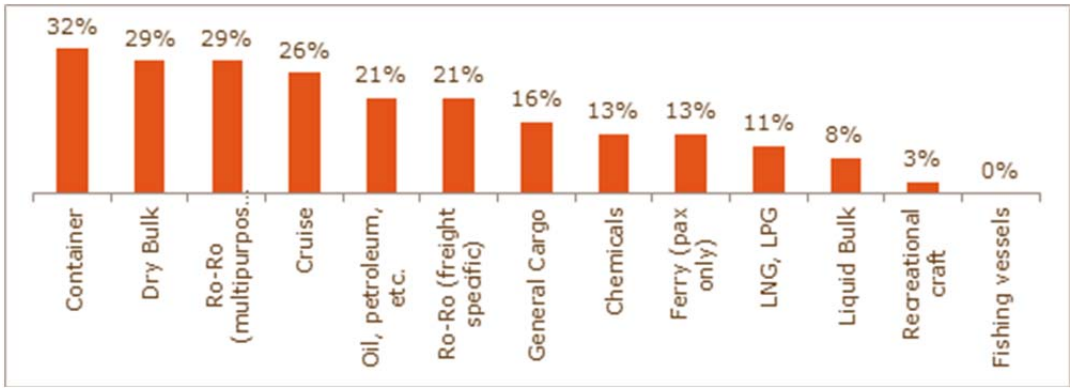
21 - 40

0 – 20

n/a

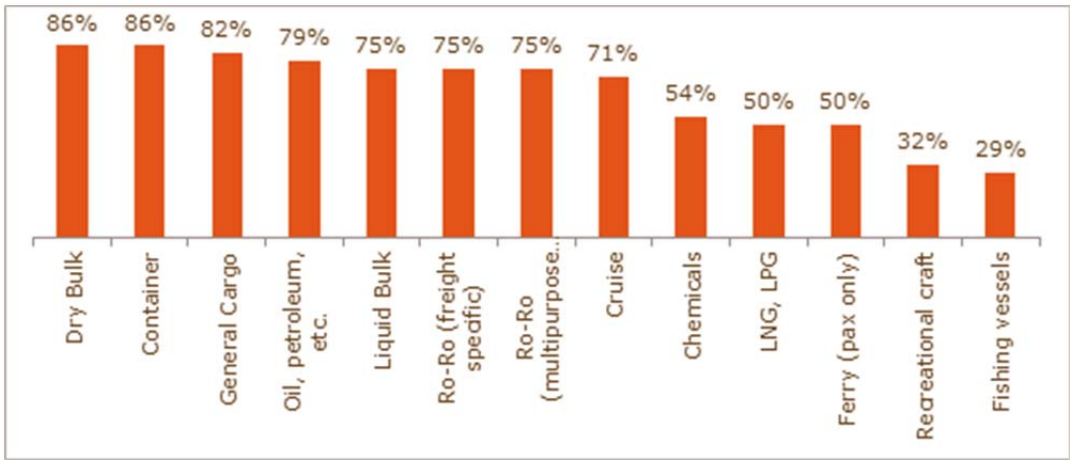
From a business perspective, most port users responding were active in transportation of containers, dry bulk, Ro-Ro traffic and cruises. Figure 48 presents on overview of main types of businesses of port users participating in the survey.

Figure 48 Main types of businesses of port users participating in the survey



Statistics on business carried out in ports show a more balanced number of activities across respondents, as presented in Figure 49. Major businesses carried out are coherent with responses from port users, and include dry bulk, container and oil shipping, with the inclusion of general cargo.

Figure 49 Main types of businesses carried out in ports participating in the survey



Interviews with experts

A series of interviews was conducted to cover additional information needs or to verify information. Table 8 includes a list of interviewed persons.

Table 8 Interviews carried out

Organisation	Subject
Ministry of Infrastructure and Environment (Netherlands)	Cost recovery systems, experiences of the Netherlands, regional cooperation, Green Deal on cooperation in the waste chain.
VOMS (umbrella organisation for Dutch organisations involved in maritime waste)	Cost recovery systems, practical experiences with the PRF Directive, volumes of waste collected.

Organisation	Subject
Ministry of Public Works and Transport Secretary of State of Transports (Spain)	Review of the Spanish system with a focus on main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery.
Ministry of Public Works and Transport General Direction of Merchant Marine (Spain)	Review of the Spanish system with a focus on main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery.
Ministers of Transport General Directorate transport and sea Subdivision ports and waterways (France)	Review of the French system with a focus on four main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery.
Port of le Havre (France)	Review of the port reception facilities and the functioning the PRF Directive, with focus on four main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery.
Port of Bayonne (France)	Review of the port reception facilities and the functioning the PRF Directive, with focus on four main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery.
Swedish transport agency	Review of the Swedish system with a focus on four main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery.
Maritime and coastguard agency Department of transport UK	Review of the UK system with a focus on 4 main topics: exemption; WRH plan; enforcement/ inspection; and cost recovery
Waste Operator, Greece (the waste operator did not want to be identified in the report)	Factors influencing the amount of waste delivered, cost recovery system applied, costs related to the implementation of the Directive, prices charged to vessels for discharging waste, advance notifications, elements of concern.
Piraeus Port Authority SA, Environmental Protection Department (Greece)	Time required to handle advance notifications, develop a new waste reception plan and update an existing one, costs related to the implementation of the Directive, statistics on port calls, issues encountered.
Costa Crociere SpA (Shipping company, Italy)	Fees charged to vessels, time spent to fill advance notifications, discharge waste and carry out inspections, costs related to the implementation of the Directive, differences encountered compared to other EU/World countries, problematic elements.
Port of Amsterdam / Dutch-Flemish ports working group	Regional cooperation; harmonization of PRF tariff-structure in Dutch and Flemish ports.
EMSA - Vessel Reporting Services Information Services User Management	Implementation of reporting requirements under PRF and SafeSeaNet

ANNEX 4 QUESTIONNAIRES STAKEHOLDER CONSULTATION

As indicated in Annex 3 in total five stakeholder categories are approached:

- **Ports:** Port Authorities and Harbour Masters;
- **Port users:** Users of Port Reception Facilities, Shipping Companies, Fishing Operators, Recreational Vessel Operators;
- **PRF operators:** Providers of Port Reception Facilities, Waste Operators and Terminal Operators;
- **Member States:** Member States, National or Regional Authorities;
- **Other organisations:** Non-Governmental Organisations, Fisheries Commissions, Advisory Councils, Other types of commissions and environmental protection organisations, Other types of stakeholders not grouped elsewhere.

For each of these stakeholder groups a separate questionnaire was prepared, as presented in the next sections.

Questionnaire 1 Questionnaire for Member States

Evaluation of Port Reception Facilities Directive

ADDRESSEES

Member States, National or Regional Authorities

INTRODUCTION

The European Commission has appointed PwC and Panteia to carry out an external ex-Post Evaluation of *Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (PRF Directive). Please, refer to the attached letter of support from the European Commission for further information.

This consultation aims to collect your views on the impact which the Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues has had on the management, movement and final disposal of ship generated waste. This Directive aims to reduce illegal discharges into the sea by focusing on ship operations in European Union ports. It aims to improve the availability, adequacy, and use of port reception facilities, thereby enhancing the protection of the marine environment. Furthermore, it addresses in detail the legal, financial and practical responsibilities of the different operators involved in the delivery of ship-generated waste and cargo residues.

We kindly ask you to answer to the following questions by providing your opinion on the outcomes of the Directive after more than 10 years of its implementation.

The Questionnaire should be completed by **Friday 28/11/2014**. If you need additional time to do so, please inform us of this as soon as possible.

The questionnaire is divided into the following sections:

I. Identification of respondent
II. General
III. Facilities: adequacy and availability
IV. Planning and control Procedures
V. Enforcement
VI. Impacts
VII. Cost recovery systems
VIII. Horizontal issues
IX. Statistics

The information provided will be treated anonymously; it will only be used for the purposes of the Evaluation report, collated and reported directly and anonymously by sector. This will be passed on to the European Commission and no accountable quotes will be given. PwC/ Panteia will not disclose the information provided by you to anyone besides from their own personnel involved in the processing of the data you provide.

INSTRUCTIONS

This PDF form can be saved, e-mailed, shared in any way you like, without having it submitted.
When the questionnaire is completed and you decide to submit it to PwC/Panteia, you should press the "SUBMIT" button at the end of the questionnaire. A security warning popup might appear.
Simply press the "Allow" button and the PDF will be sent. In order for the submission to succeed, please consider that you must be connected to the Internet.
In case you would like to submit more questionnaires, after having saved and submitted the first questionnaire, kindly save it under another name, then change the answers and simply submit it as if it was the first time you did so.
In case you need support, the contacts of the person ready to help you can be found at the end of this document.
.

I. Identification of the respondent

This preliminary set of questions will help to identify and categorise the responses you provide.

Name

e-mail

I speak on behalf of

- ◯ Myself
- ◯ An individual organisation
- ◯ An association representing other organisations

Company/ Organisation

Role covered in the Organisation

Please, specify whether you are:

- ◯ Port Authority or Harbour Master
- ◯ Port User - Shipping Operator
- ◯ Waste Operator or Management Company (if different from Port Authority)
- ◯ Member States/National/Regional or other Authority
- ◯ Non-governmental organisation (NGOs)
- ◯ Other (Please specify) [ ]

Company/ Organisation size

- ◯ Micro-entities (less than 10 persons employed)
- ◯ Small company/ organisation (between 10 and 49 persons employed)
- ◯ Medium-sized company/ organisation (between 50 and 249 persons employed)
- ◯ Big company/ organisation (250 or more persons employed)

Country in which you are based [ ]

II. General

II.1 What common reasons can you think of for illegal discharges taking place at sea? Please select the three most relevant.

- ☐ Ports not accepting all types of waste
- ☐ The reception of (types of) waste requires the payment of too high a fee
- ☐ Insufficient port reception facilities capacity
- ☐ It is time consuming to wait for the facilities to be used
- ☐ No sufficient inspections are performed
- ☐ Fines/punishment for illegal discharges are too low
- ☐ Seafarers are not adequately trained/informed
- ☐ It is easier to discharge at sea
- ☐ Other (Please specify below) [ ]

II.2 Please use this space to elaborate on your answer.

[ ]

II.3 Has the PRF Directive led to improvements of PRF in receiving ship generated waste?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.4 Please use this space to elaborate on your answer.

II.5 Has the PRF Directive led to improvements of PRF in receiving cargo residues?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.6 Please use this space to elaborate on your answer.

III. Facilities: adequacy and availability

III.1 Have the port reception facilities changed in number, capacity or types of waste received after the introduction of the PRF Directive? Are there any differences attributable to the size and location of ports? Please provide figures to support your answer.

As of Art. 5 of Directive 2000/59/EC requires the development and implementation of appropriate waste reception and handling (WRH) plans for each port within the EU. The purpose of such a plan is to achieve an adequate functioning of port reception facilities and, in most Member States, it is the responsibility of the port authority or other port management body to develop this plan.

In general, there is still no full implementation of the provisions stipulated in Art. 5. It seems that most of the problems relate to smaller ports, fishing harbours and marinas. There also appear to be problems with the processes employed by Member States to evaluate the plans prior to their approval and regarding the monitoring of their implementation.

III.2 Do you evaluate and/or approve the WRH plans for your ports, as well as monitor their implementation and ensure that the plans are re-approved every 3 years?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes
- ◯ Don't know

III.3 Please use this space to elaborate on your answer. Are there any differences on the basis of port size and/or location?

IV. Planning and control procedures

Delivery

PRF Directive Article 7(1) states that the master of a ship calling at a Community port shall, before leaving the port, deliver all ship-generated waste to a port reception facility. In practice, the definition of "all waste" is open to interpretation.

PRF Directive Art.7(2) states that a ship may be exempted from the mandatory delivery of ship generated waste if it has sufficient dedicated storage capacity to proceed to the next port of call, and if the next port of call is known and has adequate facilities. The application of the exception in Art. 7(2) differs from Member State to Member State, with varying requirements regarding the volume and types of ship-generated waste that a vessel can leave port with. Nor is there any uniform definition or guidance concerning what should be considered sufficient dedicated storage capacity.

IV.1 How is "all waste" defined when requiring vessels to discharge and how is "sufficient dedicated storage capacity" defined?

Exemptions

In order to avoid any undue administrative and financial burdens for ships visiting the same ports frequently and regularly, a possibility for exemptions was inserted into Article 9 of the Directive, namely that a ship can be exempted by Member States from the mandatory delivery of ship-generated waste (Art. 7(1)), advance waste notification (Art. 6) and from paying the waste fee (Art. 8), on the condition that the Member State is satisfied that the ship takes care of its waste management along its regular route.

In practice, Member States use different definitions of "frequent and regular port calls". The temporal validity of the exemptions also vary widely among Member States. A key question related to the transparency of the exemption regime relates to the quality of evidence provided in support of the exemption request.

IV.2 In your view, are there any issues with the exemptions to the requirements of the PRF Directive for vessels engaged in scheduled traffic with frequent and regular port calls? Please rate the following list of potential issues as appropriate.

	Not an issue	Somewhat an issue	It is an issue	Don't know
There is no common definition of frequent and regular port calls	○	○	○	○
There is no common duration of the exemption	○	○	○	○
There is no common definition of which type of evidence is required in support of the exemption request	○	○	○	○
There is no obligation for MSs along the ships' regular route to be informed about the exemption	○	○	○	○
There is no sufficient control that arrangements on whether waste delivery in other ports are actually in place	○	○	○	○

IV.3 Please use this space to elaborate on your answer and to indicate any further issues.

V. Enforcement

PRF Directive Art. 11 states that "[...]Member States shall ensure that any ship may be subject to an inspection in order to verify that it complies with Articles 7 and 10 and that a sufficient number of such inspections are carried out.[...]" . The selection of the ships to be inspected must take into account ships which have not complied with the notification requirements set by the PRF Directive and those ships for which the examination of the information (provided within the above mentioned notification) has revealed other grounds for believing that the ship does not comply with the PRF Directive.

V.1 Are the following statements concerning the enforcement practice correct?

	Disagree	Somewhat agree	Agree	Don't know
Ships are selected for inspection based on an examination of the notification form	○	○	○	○
There are systems identifying ships which have not delivered their waste and residues, as well as alerting the next port of call in such instances	○	○	○	○
Recreational craft and fishing vessels are also subject to inspections	○	○	○	○

V.2 Please use this space to elaborate on your answer and to indicate any further issues.

Directive 2005/35/EC establishes (criminal) penalties for ship-source pollution, in particular in the event of discharges of oil and other noxious substances from vessels. As such, this Directive aims to contribute to the better enforcement of the MARPOL obligations. Enforcement measures are also available under the PRF Directive, in the form of inspections, requirement of notification, and, ultimately the possibility to deny the ship to leave the port in case of non-compliance. It remains unclear, however, to what extent the two systems complement each other in their shared goal of reducing illegal discharges at sea.

V.3 Which authority is in charge of performing inspections under the PRF Directive?

V.4 Which authority is in charge of performing inspections under the Directive on Ship-source Pollution and Criminal Penalties?

- ◯ Don't know
- ◯ Same as above
- ◯ Other, namely

Directive 2009/16/EC on Port State Control, as amended by the Directive 2013/38/EU, ensures that there is effective control of compliance with international standards by ships in EU ports and, thereby, ensure that ships sailing in EU waters have been appropriately constructed and are adequately maintained. The Directive establishes common criteria for the control of ships by the port State and harmonises procedures on inspections and detentions, building upon the expertise and experience gained under the Paris MOU. In compliance with the Directive, all ships should be inspected with a frequency depending on their risk profile, with ships posing a higher risk being subject to a more detailed inspection carried out at more frequent intervals.

V.5 Under which framework are inspections with regards to compliance to the PRF Directive carried out?

- ◯ Within a dedicated PRF Inspection Framework
- ◯ Within the framework of Port State Control Directive
- ◯ Within an environmental inspection framework
- ◯ Other (Please specify)

V.6 Please, present the number of vessel inspections carried out in port(s) under your jurisdiction regarding compliance to the PRF Directive in 2013

V.7 In case inspections are carried out within the framework of the Port State Control Directive, how often is the compliance with the specific PRF Directive's requirements checked?

- ◯ 0 – 20 %
- ◯ 21 – 40%
- ◯ 41 – 60%
- ◯ 61 – 80%
- ◯ 81 – 99%
- ◯ Always

V.8 Please use this space to elaborate on your answers to previous questions.

PRF Directive Art. 11(d) states that when there is clear evidence that a ship has proceeded to sea without having complied with Articles 7 or 10 (Obligations with regards to delivery of ship-generated waste and cargo residues), the competent authority of the next port of call shall be informed thereof and such a ship shall […] not be permitted to leave that port until a more detailed assessment of factors relating to the ship's compliance with this Directive […] has taken place.

V.9 In your port(s), has clear evidence been found that a ship has proceeded to sea without having complied with Articles 7 or 10?

- ◯ No
- ◯ Yes
- ◯ Don't know

V.10 If yes, please elaborate on the nature and frequency of such detections.

VI. Impacts

VI.1 Would you consider the costs imposed on your organisation in connection with the implementation of the PRF Directive to be proportionate to the environmental (or other) benefits?

- ◯ No, the costs are too high
- ◯ Yes, the costs are proportionate
- ◯ Don't know

VI.2 Please use this space to elaborate on your answer.

VI.3 What kind of administrative burden related to PRF does your organisation bear? Please, specify types of administrative activity (e.g. evaluation and approval of Waste Reception Handling plans, monitoring of implementations of WRH plans, etc.) and efforts in person-days per year.

VI.5 Would you consider the administrative costs incurred by your organisation to be proportionate to the benefits?

- ◯ No
- ◯ Yes
- ◯ Don't know

VI.6 Please use this space to elaborate on your answer.

VII. Cost recovery systems

The PRF Directive includes provisions ensuring that the costs of port reception facilities for ship-generated waste are covered through the collection of a fee from ships. The principle in the Directive sets out to ensure that "all ships" contribute to the costs of PRF and that such a contribution shall be "significant", irrespective of the actual use of the facilities. In a separate declaration to the Directive, the Commission declared that "significant" shall mean a contribution of at least 30%, irrespective of delivery. Article 8(2) furthermore specifies that the fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.

Different ports have different ways of calculating and collecting these fees. These variations range from almost full to partial coverage of the principles and from indirect to direct fees. There are basically two main approaches used to implement the cost recovery system in the ports of the Member States:
a) ***No Special Fee systems (NSF)*** *foreseen that the ship is always charged irrespective of the use of PRF and is (normally) allowed to deliver at least a reasonable amount of ship generated waste within that fee;*
b) ***Administrative waste fee/contribution systems (ADM)*** *in which an administrative waste fee is charged by the port and a separate direct charging system, usually operated by the waste contractor, applies to actual delivery.*

These two systems have a number of variants which are described hereafter.

Three variants of the NSF:
a.1- NSF – 100%: the principle here is that all waste (100%) is included in the fee. However, ports with 100% NSF have tended to define 'excessive amounts' in order to avoid the abuse of the system.
a.2- NSF – delivery of reasonable amounts of waste (but not all) is included in the fee: volumes included have been defined and limits set at the outset clearly indicating volumes included in the fee and at what fees additional volumes (above the set limit) will be directly charged.
a.3- NSF – garbage only: Includes only Marpol Annex V (garbage). Volume limitations may also be applied in this group.

Variants of the ADM:
b.1- indirect administrative waste fee with partial refund in case of delivery;
b.2- indirect administrative waste fee with full refund, or no fee, in case of delivery;
b.3- administrative waste fee only from ships not delivering;
b.4- direct fee system – administrative waste fee included in port dues.

A number of questions are presented below regarding the fees charged to ships for using port reception facilities.

VII.1 In your view, does the presence of the following cost recovery systems decrease the incentive to land waste in a specific port? Please indicate this as appropriate in the table.

	No	Yes, to some extent	Yes	Don't know
a.1) NSF – 100%	○	○	○	○
a.2) NSF – delivery of reasonable amounts of waste (but not all) is included in the fee	○	○	○	○
a.3) NSF – garbage only	○	○	○	○
b.1) indirect administrative waste fee with partial refund in case of delivery	○	○	○	○
b.2) indirect administrative waste fee with full refund, or no fee, in case of delivery	○	○	○	○
b.3) administrative waste fee only from ships not delivering	○	○	○	○
b.4) direct fee system – administrative waste fee included in port dues.	○	○	○	○

VII.2 Please use this space to elaborate on your answer or to comment on other cost recovery systems which are not mentioned above.

VII.3 Have you defined the concept of "Green Ships" in relation to the PRF Directive and the possibility for a reduction of fees?

○ No
○ Yes
○ Don't know

VII.4 Please use this space to elaborate on your answer.

VIII. Horizontal issues

The aim of this section is to evaluate the coherence of the PRF Directive with the international legislation and with other relevant EU legislation. A brief description of relevant legislation is provided hereafter.
*The **International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)** sets out which types of ship-generated wastes and cargo residues can be legally discharged by ships into the marine environment and under which conditions. It also requires Parties to provide reception facilities in ports and terminals for those wastes and residues that are not allowed to be discharged into the sea. The new MARPOL Annex V (garbage) and Annex VI (air emissions) have not been incorporated in the PRF Directive, which leads to certain inconsistencies and operational difficulties.*
***Directive 2008/98/EC (Waste Framework Directive)** sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains how to distinguish between waste and by- products.*
***Directive 2010/65/EU (Reporting formalities for ships)** aims to simplify the reporting formalities for ships by establishing a standard electronic transmission of information through a single window. Art. 4 of Directive 2010/54/EU sets out the obligation of prior notification, requiring ships to provide the competent authorities with the required information before arriving in a port of the EU. This provision interconnects with Art. 6 of the PRF Directive, which require ships calling at EU ports to complete a waste notification form (as provided in Annex II to the Directive) prior to arrival in the port. As of June 2015 the advance waste notification will be exchanged through the SafeSeaNet (SSN) system.*
***Directive 2008/56/EC (Marine Strategy Framework Directive - MSFD)** aims to achieve Good Environmental Status (GES) for the EU's marine waters by 2020. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy) after an initial assessment of the current environmental status, the determination of what GES means for national marine waters and the establishment of environmental targets and associated indicators to achieve GES by 2020.*
The need for coherent approaches in the preparatory stages of marine strategies has led to a Commission Decision (2010/477/EU) under Article 9(3) of MSFD "on criteria and methodological standards on good environmental status of marine waters". Among others, the Decision addresses marine litter in descriptor 10 and aims at achieving that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". As a follow up to the Commission Decision, a technical subgroup under the Working Group on GES (WG GES) was established for further development the Descriptor 10 "Marine Litter".

VIII.1 What incompatibilities or overlaps do you experience between the PRF Directive and the MARPOL Convention?

VIII.2 Do the additional obligations of the PRF Directive which go beyond the requirements in MARPOL 73/78 provide for additional environmental (or other) benefits? Rank the obligations according to their additional benefits in the table below.

	No additional benefits	Minor additional benefits	Some additional benefits	Significant additional benefits	Don't know
Mandatory delivery of waste	○	○	○	○	○
Development of Waste Reception and Handling Plans	○	○	○	○	○
Advance waste notifications	○	○	○	○	○
Cost recovery systems	○	○	○	○	○
Inspections	○	○	○	○	○

VIII.3 Please use this space to elaborate on your answer.

VIII.4 In your opinion, does the lack of segregation requirement for waste landed in ports under the EU waste legislation hinder efficient waste management on board of ships?

○ No, it does not represent an issue / it is of little relevance
○ Yes, the lack of segregation requirement represents an issue
○ Don't know

VIII.5 Please use this space to elaborate on your answer.

VIII.6 Do you experience any other discrepancies with the land based legislation applicable to ship generated waste and cargo residues once they have been delivered on shore?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes
- ◯ Don't know

VIII.7 Please use this space to elaborate on your answer.

VIII.8 How do you ensure that the treatment, recovery or disposal of ship-generated waste and cargo residues is carried out in accordance with the Waste Framework Directive and other relevant waste legislation (cf article 12(g) of the PRF Directive)? Please explain.

VIII.9 In your view, are the notification requirements under PRF Directive (Art. 6) coherent with reporting formalities required under Directive 2010/65/EC on reporting formalities on ships(in particular under Art. 4 on notification prior to arrival) and do you expect any problems with the electronic reporting in SafeSeaNet? Please present your opinion on the matter.

VIII.10 Have you experienced any potential overlaps and/or links between the PRF Directive and other EU environmental legislation, in particular the Marine Strategy Framework Directive and the recent initiatives on marine litter? Please elaborate on your views.

IX Statistics

You are kindly requested to provide statistics on waste delivered on shore on your ports. Please feel free to use the attached excel spreadsheet

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CONTACT DETAILS

For any doubts, requests, clarifications, please do not hesitate to contact:

PwC
Valerio Gori
Phone: +39 06 570 831 20 75
e-mail: valerio.gori@it.pwc.com

If you completed filling-in the questionnaire, please press the "Submit" button below.

Submit

Questionnaire 2 Questionnaire for Ports

Evaluation of Port Reception Facilities Directive

ADDRESSEES

Port Authorities and Harbour Masters

INTRODUCTION

The European Commission has appointed PwC and Panteia to carry out an external ex-Post Evaluation of *Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (PRF Directive). Please, refer to the attached letter of support from the European Commission for further information.

This consultation aims to collect your views on the impact which the Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues has had on the management, movement and final disposal of ship generated waste. This Directive aims to reduce illegal discharges into the sea by focusing on ship operations in European Union ports. It aims to improve the availability, adequacy, and use of port reception facilities, thereby enhancing the protection of the marine environment. Furthermore, it addresses in detail the legal, financial and practical responsibilities of the different operators involved in the delivery of ship-generated waste and cargo residues.

We kindly ask you to answer to the following questions by providing your opinion on the outcomes of the Directive after more than 10 years of its implementation.

The Questionnaire should be completed by **Friday 28/11/2014**. If you need additional time to do so, please inform us of this as soon as possible.

The questionnaire is divided into the following sections:

I. Identification of respondent
II. General
III. Facilities: adequacy and availability
IV. Planning and control Procedures
V. Enforcement
VI. Impacts
VII. Cost recovery systems
VIII. Horizontal issues
IX. Statistics

The information provided will be treated anonymously; it will only be used for the purposes of the Evaluation report, collated and reported directly and anonymously by sector. This will be passed on to the European Commission and no accountable quotes will be given. PwC/ Panteia will not disclose the information provided by you to anyone besides from their own personnel involved in the processing of the data you provide.

INSTRUCTIONS

This PDF form can be saved, e-mailed, shared in any way you like, without having it submitted. When the questionnaire is completed and you decide to submit it to PwC/Panteia, you should press the "SUBMIT" button at the end of the questionnaire. A security warning popup might appear. Simply press the "Allow" button and the PDF will be sent. In order for the submission to succeed, please consider that you must be connected to the Internet.
In case you would like to submit more questionnaires, after having saved and submitted the first questionnaire, kindly save it under another name, then change the answers and simply submit it as if it was the first time you did so.
In case you need support, the contacts of the person ready to help you can be found at the end of this document.

I. Identification of the respondent

This preliminary set of questions will help to identify and categorise the responses you provide.

Name

e-mail

I speak on behalf of

- ◯ Myself
- ◯ An individual organisation
- ◯ An association representing other organisations

Company/ Organisation

Role covered in the Organisation

Please, specify whether you are:

- ◯ Port Authority or Harbour Master
- ◯ Port User - Shipping Operator
- ◯ Waste Operator or Management Company (if different from Port Authority)
- ◯ Member States/National/Regional or other Authority
- ◯ Non-governmental organisation (NGOs)
- ◯ Other (Please specify)

Company/ Organisation size

- ◯ Micro-entities (less than 10 persons employed)
- ◯ Small company/ organisation (between 10 and 49 persons employed)
- ◯ Medium-sized company/ organisation (between 50 and 249 persons employed)
- ◯ Big company/ organisation (250 or more persons employed)

Country in which you are based

Port(s) you respond for

Please specify the main type(s) of business of your port

- ☐ Liquid Bulk
- ☐ Dry Bulk
- ☐ Oil, petroleum, etc.
- ☐ LNG, LPG
- ☐ Chemicals
- ☐ Container
- ☐ General Cargo
- ☐ Ro-Ro (freight specific)
- ☐ Ro-Ro (multipurpose pax and freight)
- ☐ Ferry (pax only)
- ☐ Cruise
- ☐ Fishing vessels
- ☐ Recreational craft
- ☐ Not applicable
- ☐ Other

What is the role of your organisation with regards to port reception facilities (PRF)?

- ◯ None
- ◯ My organisation operates the PRF itself or on behalf of the municipality or other authority
- ◯ My organisation sub-contract to private operator(s)
- ◯ Other

Please specify the annual number of port calls in 2013:

II. General

II.1 What common reasons can you think of for illegal discharges taking place at sea? Please select the three most relevant.

- ☐ Ports not accepting all types of waste
- ☐ The reception of (types of) waste requires the payment of too high a fee
- ☐ Insufficient port reception facilities capacity
- ☐ It is time consuming to wait for the facilities to be used
- ☐ No sufficient inspections are performed
- ☐ Fines/punishment for illegal discharges are too low
- ☐ Seafarers are not adequately trained/informed
- ☐ It is easier to discharge at sea
- ☐ Other (Please specify below) [ ]

II.2 Please use this space to elaborate on your answer.

[ ]

II.3 Which aspects of the PRF could benefit the most from a continued exchange of best practices?

[ ]

II.4 Has the PRF Directive led to improvements of PRF in receiving ship generated waste?

- ○ No
- ○ Yes, to some extent
- ○ Yes

II.5 Please use this space to elaborate on your answer.

[ ]

II.6 Has the PRF Directive led to improvements of PRF in receiving cargo residues?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.7 Please use this space to elaborate on your answer.

III. Facilities: adequacy and availability

III.1 Have the port reception facilities in your port(s) changed in number, capacity, or types of waste received after the introduction of the PRF Directive? Please provide figures to support your answer.

III.3 Which components in the following list do you think are most relevant in determining whether port reception facilities (PRFs) are adequate for addressing the needs of port users? Please, rank them in order of importance (1 for most important, 8 for least important).

	1	2	3	4	5	6	7	8
Availability of reception facilities for different waste types	○	○	○	○	○	○	○	○
Capacity / discharge rate	○	○	○	○	○	○	○	○
Costs	○	○	○	○	○	○	○	○
Possibility for waste separation and recycling	○	○	○	○	○	○	○	○
Timeliness and readiness of PRF services	○	○	○	○	○	○	○	○
Location of PRF services	○	○	○	○	○	○	○	○
Efficiency of inspections	○	○	○	○	○	○	○	○
Location and/or size of the port	○	○	○	○	○	○	○	○

III.3 Please use this space to elaborate on your answer and to indicate any other components relevant in determining whether PRFs are adequate for addressing the needs of port users.

III.4 Please select which of the following types of waste are received in your port.

- ☐ Oily waste - Marpol Annex I
- ☐ Sewage - Marpol Annex IV
- ☐ Garbage - Marpol Annex V
- ☐ Exhaust Gas Cleaning System residues - (Marpol Annex VI)

III.5 Please use this space to elaborate on your answer or to provide additional information.

Waste Reception and Handling Plans

Art. 5 of Directive 2000/59/EC requires the development and implementation of appropriate waste reception and handling (WRH) plans for each port within the EU. The purpose of such a plan is to achieve an adequate functioning of port reception facilities and in most Member States it is the responsibility of the port authority or other port management body to develop this plan.
In general, there is still no full implementation of the provisions stipulated in Art. 5. It seems that most of the problems relate to smaller ports, fishing harbours and marinas. There also appear to be problems with the processes employed by Member States to evaluate the plans prior to their approval and regarding the monitoring of their implementation.

III.6 Please provide information concerning the Waste Reception and Handling (WRH) plan for your port. Are the following statements concerning the WRH plan of your port applicable?

	No	Yes	Don't know
The WRH plan has been adopted	○	○	○
The WRH plan has been approved	○	○	○
The WRH plan has been updated and re-approved at least once	○	○	○
Port users have been consulted on the initial drafting of WRH plan	○	○	○
Port users have been consulted during the implementation of the WRH plan	○	○	○
The WRH plan describes the cost recovery system	○	○	○
The WRH plan describes the waste delivery procedures	○	○	○
The implementation of the WRH plan has been monitored by the competent authority (e.g. by means of inspections)	○	○	○

III.7 Please use this space to elaborate on your answer.

IV. Planning and control procedures

Notification

IV.1 Please indicate the approximate percentage of ships which call at your port and which notify waste during the port calls.

- ◯ 0 – 20 %
- ◯ 21 – 40%
- ◯ 41 – 60%
- ◯ 61 – 80%
- ◯ 81 – 100%
- ◯ Don't know

IV.2 Do the notification requirements in the PRF Directive contribute to the effective operation and planning for the provision of PRF in your port?

- ◯ No
- ◯ To a limited extent
- ◯ Yes
- ◯ Don't know

IV.3 Please use this space to elaborate your answers.

Delivery

PRF Directive Article 7(1) states that the master of a ship calling at a Community port shall, before leaving the port, deliver all ship-generated waste to a port reception facility. In practice, the definition of "all waste" is open to interpretation.

PRF Directive Art.7(2) states that a ship may be exempted from the mandatory delivery of ship generated waste if it has sufficient dedicated storage capacity to proceed to the next port of call, and if the next port of call is known and has adequate facilities. The application of the exception in Art. 7(2) differs from Member State to Member State, with varying requirements regarding the volume and types of ship-generated waste that a vessel can leave port with. Nor is there any uniform definition or guidance concerning what should be considered sufficient dedicated storage capacity.

IV.4 How is "all waste" defined when requiring vessels to discharge and how do is "sufficient dedicated storage capacity" defined?

Exemptions

In order to avoid any undue administrative and financial burdens for ships visiting the same ports frequently and regularly, a possibility for exemptions was inserted into Article 9 of the Directive, namely that a ship can be exempted by Member States from the mandatory delivery of ship-generated waste (Art. 7(1)), advance waste notification (Art. 6) and from paying the waste fee (Art. 8), on the condition that the Member State is satisfied that the ship takes care of its waste management along its regular route.

In practice, Member States use different definitions of "frequent and regular port calls". The temporal validity of the exemption also varies widely among Member States.
A key question related to the transparency of the exemption regime relates to the quality of evidence provided in support of the exemption request.

IV.5 In your view, are there any issues with the exemptions to the requirements of the PRF Directive for vessels engaged in scheduled traffic with frequent and regular port calls? Please rate the following list of potential issues as appropriate.

	Not an issue	Somewhat an issue	It is an issue	Don't know
There is not a common definition of frequent and regular port calls	○	○	○	○
There is no common duration of the exemption	○	○	○	○
There is no common definition of which type of evidence is required in support of the exemption request	○	○	○	○
There is no obligation for MSs along the ships' regular route to be informed about the exemption	○	○	○	○
There is no sufficient control that arrangements on whether waste delivery in other ports are actually in place	○	○	○	○

IV.6 Please use this space to elaborate on your answer and to indicate any further issues.

V. Enforcement

PRF Directive Art. 11 states that "[...]Member States shall ensure that any ship may be subject to an inspection in order to verify that it complies with Articles 7 and 10 and that a sufficient number of such inspections are carried out.[...]" . The selection of the ships to be inspected must take into account ships which have not complied with the notification requirements set by the PRF Directive and those ships for which the examination of the information (provided within the above mentioned notification) has revealed other grounds for believing that the ship does not comply with the PRF Directive.

V.1 Are the following statements concerning the enforcement practice correct?

	Disagree	Somewhat agree	Agree	Don't know
Ships are selected for inspection based on an examination of the notification form	○	○	○	○
There are systems identifying ships which have not delivered their waste and residues, as well as for alerting the next port of call in such instances	○	○	○	○
Recreational craft and fishing vessels are also subject to inspections	○	○	○	○

V.2 Please use this space to elaborate on your answer and to indicate any further issues.

Directive 2005/35/EC establishes (criminal) penalties for ship-source pollution, in particular in the event of discharges of oil and other noxious substances from vessels. As such, this Directive aims to contribute to the better enforcement of the MARPOL obligations. Enforcement measures are also available under the PRF Directive, in the form of inspections, requirement of notification, and, ultimately the possibility to deny the ship to leave the port in case of non-compliance. It remains unclear, however, to what extent the two systems complement each other in their shared goal of reducing illegal discharges at sea.

V.3 Which authority is in charge of performing inspections under the PRF Directive?

V.4 Which authority is in charge of performing inspections under the Directive on Ship-source Pollution and Criminal Penalties?

- ◯ Don't know
- ◯ Same as above
- ◯ Other, namely

Directive 2009/16/EC on Port State Control, as amended by the Directive 2013/38/EU, ensures that there is effective control of compliance with international standards by ships in EU ports and, thereby, ensure that ships sailing in EU waters have been appropriately constructed and are adequately maintained. The Directive establishes common criteria for the control of ships by the port State and harmonises procedures on inspections and detentions, building upon the expertise and experience gained under the Paris MOU. In compliance with the Directive, all ships should be inspected with a frequency depending on their risk profile, with ships posing a higher risk being subject to a more detailed inspection carried out at more frequent intervals.

V.5 Under which framework are inspections with regards to compliance to the PRF Directive carried out?

- ◯ Within a dedicated PRF Inspection Framework
- ◯ Within the framework of Port State Control Directive
- ◯ Within an environmental inspection framework
- ◯ Other (Please specify)

V.6 Please, present the number of vessel inspections carried out in port(s) under your jurisdiction regarding compliance to the PRF Directive in 2013

V.7 In case inspections are carried out within the framework of the Port State Control Directive, how often is the compliance with the specific PRF Directive's requirements checked?

- ◯ 0 – 20 %
- ◯ 21 – 40%
- ◯ 41 – 60%
- ◯ 61 – 80%
- ◯ 81 – 99%
- ◯ Always

V.8 Please use this space to elaborate on your answers to previous questions.

PRF Directive Art. 11(d) states that when there is clear evidence that a ship has proceeded to sea without having complied with Articles 7 or 10 (Obligations with regards to delivery of ship-generated waste and cargo residues), the competent authority of the next port of call shall be informed thereof and such a ship shall […] not be permitted to leave that port until a more detailed assessment of factors relating to the ship's compliance with this Directive […] has taken place.

V.9 In your port(s), has clear evidence been found that a ship has proceeded to sea without having complied with Articles 7 or 10?

- ◯ No
- ◯ Yes
- ◯ Don't know

V.10 If yes, please elaborate on the nature and frequency of such detections.

VI. Impacts

VI.1 Would you consider the costs imposed on your organisation in connection with the implementation of the PRF Directive to be proportionate to the environmental (or other) benefits?

- ◯ No, the costs are too high
- ◯ Yes, the costs are proportionate
- ◯ Don't know

VI.2 Please use this space to elaborate on your answer.

VI.3 In your opinion, has the implementation of the PRF Directive increased/reduced time spent in waste reception operations? (When answering this question only the overall effect of the obligations in addition to MARPOL 73/78 should be considered – i.e. Mandatory delivery of waste, Development of Waste Reception and Handling Plans, Advance waste notifications, Cost recovery systems, Inspections).

- ◯ Decreased
- ◯ Somewhat decreased
- ◯ No change
- ◯ Somewhat increased
- ◯ Increased
- ◯ Don't know

VI.4 Please use this space to elaborate on your answer.

VI.5 What kind of administrative burden related to PRF does your organisation bear? Please, specify types of administrative activity (e.g. preparation and update of Waste Reception Handling plans, provision of evidence to relevant enforcement authorities on the PRF plan, etc.) and efforts in person-days per year.

VI.6 Would you consider the administrative costs incurred by your organisation to be proportionate to the benefits?

- ◯ No
- ◯ Yes
- ◯ Don't know

VI.7 Please use this space to elaborate on your answer.

VII. Cost recovery systems

The PRF Directive includes provisions ensuring that the costs of port reception facilities for ship-generated waste are covered through the collection of a fee from ships. The principle in the Directive sets out to ensure that "all ships" contribute to the costs of PRF and that such a contribution shall be "significant", irrespective of the actual use of the facilities. In a separate declaration to the Directive, the Commission declared that "significant" shall mean a contribution of at least 30%, irrespective of delivery. Article 8(2) furthermore specifies that the fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.

Different ports have different ways of calculating and collecting these fees. These variations range from almost full to partial coverage of the principles and from indirect to direct fees. There are basically two main approaches used to implement the cost recovery system in the ports of the Member States:
a) ***No Special Fee systems (NSF)*** *foreseen that the ship is always charged irrespective of the use of PRF and is (normally) allowed to deliver at least a reasonable amount of ship generated waste within that fee;*
b) ***Administrative waste fee/contribution systems (ADM)*** *in which an administrative waste fee is charged by the port and a separate direct charging system, usually operated by the waste contractor, applies to actual delivery.*

These two systems have a number of variants which are described hereafter.

Three variants of the NSF:
a.1- NSF – 100%: the principle here is that all waste (100%) is included in the fee. However, ports with 100% NSF have tended to define 'excessive amounts' in order to avoid the abuse of the system.
a.2- NSF – delivery of reasonable amounts of waste (but not all) is included in the fee: volumes included have been defined and limits set at the outset clearly indicating volumes included in the fee and at what fees additional volumes (above the set limit) will be directly charged.
a.3- NSF – garbage only: Includes only Marpol Annex V (garbage). Volume limitations may also be applied in this group.

Variants of the ADM:
b.1- indirect administrative waste fee with partial refund in case of delivery;
b.2- indirect administrative waste fee with full refund, or no fee, in case of delivery;
b.3- administrative waste fee only from ships not delivering;
b.4- direct fee system – administrative waste fee included in port dues.

A number of questions are presented below regarding the fees charged to ships for using port reception facilities.

VII.1 In your view, does the presence of the following cost recovery systems decrease the incentive to land waste in a specific port? Please indicate this as appropriate in the table.

	No	Yes, to some extent	Yes	Don't know
a.1) NSF – 100%	○	○	○	○
a.2) NSF – delivery of reasonable amounts of waste (but not all) is included in the fee	○	○	○	○
a.3) NSF – garbage only	○	○	○	○
b.1) indirect administrative waste fee with partial refund in case of delivery	○	○	○	○
b.2) indirect administrative waste fee with full refund, or no fee, in case of delivery	○	○	○	○
b.3) administrative waste fee only from ships not delivering	○	○	○	○
b.4) direct fee system – administrative waste fee included in port dues.	○	○	○	○

VII.2 Please use this space to elaborate on your answer or to comment on other cost recovery systems which are not mentioned above.

VII.3 In your opinion, to what extent do fees charged to ships for using port reception facilities reflect their actual costs?

- ◯ The fees are significantly higher than the actual costs
- ◯ The fees are more or less the same as the actual costs
- ◯ The fees are significantly lower than the actual costs
- ◯ Don't know

VII.4 Please use this space to elaborate on your answer.

VII.5 Please specify the type of costs that you include in your fees when charging ships for port reception facilities.

VII.6 Do you charge reduced fees to ships whose environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste?

- ◯ No
- ◯ Yes
- ◯ Don't know

VII.7 Please use this space to elaborate on your answer.

V III. Horizontal issues

The aim of this section is to evaluate the coherence of the PRF Directive with the international legislation and with other relevant EU legislation. A brief description of relevant legislation is provided hereafter.

*The **International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)** sets out which types of ship-generated wastes and cargo residues can be legally discharged by ships into the marine environment and under which conditions. It also requires Parties to provide reception facilities in ports and terminals for those wastes and residues that are not allowed to be discharged into the sea. The new MARPOL Annex V (garbage) and Annex VI (air emissions) have not been incorporated in the PRF Directive, which leads to certain inconsistencies and operational difficulties.*

***Directive 2012/33/EU (EU Sulphur Directive)** states that wash water resulting from exhaust gas cleaning systems which make use of chemicals, shall not be discharged into the sea. This includes enclosed ports, harbours and estuaries, unless it is demonstrated by the ship operator that such wash water discharge has no significant negative impacts and does not pose any risk to human health and to the environment.*

***Directive 2008/98/EC (Waste Framework Directive)** sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains how to distinguish between waste and by- products.*

***Directive 2010/65/EU (Reporting formalities for ships)** aims to simplify the reporting formalities for ships by establishing a standard electronic transmission of information through a single window. Art. 4 of Directive 2010/54/EU sets out the obligation of prior notification, requiring ships to provide the competent authorities with the required information before arriving in a port of the EU. This provision interconnects with Art. 6 of the PRF Directive, which require ships calling at EU ports to complete a waste notification form (as provided in Annex II to the Directive) prior to arrival in the port. As of June 2015 the advance waste notification will be exchanged through the SafeSeaNet (SSN) system.*

***Directive 2008/56/EC (Marine Strategy Framework Directive - MSFD)** aims to achieve Good Environmental Status (GES) for the EU's marine waters by 2020. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy) after an initial assessment of the current environmental status, the determination of what GES means for national marine waters and the establishment of environmental targets and associated indicators to achieve GES by 2020.*

The need for coherent approaches in the preparatory stages of marine strategies has led to a Commission Decision (2010/477/EU) under Article 9(3) of MSFD "on criteria and methodological standards on good environmental status of marine waters". Among others, the Decision addresses marine litter in descriptor 10 and aims at achieving that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". As a follow up to the Commission Decision, a technical subgroup under the Working Group on GES (WG GES) was established for further development of the Descriptor 10 "Marine Litter".

VIII.1 What incompatibilities or overlaps do you experience between the PRF Directive and the MARPOL Convention?

VIII.2 Do the additional obligations of the PRF Directive which go beyond the requirements in MARPOL 73/78 provide for additional environmental (or other) benefits? Rank the obligations according to their additional benefits in the table below.

	No additional benefits	Minor additional benefits	Some additional benefits	Significant additional benefits	Don't know
Mandatory delivery of waste	○	○	○	○	○
Development of Waste Reception and Handling Plans	○	○	○	○	○
Advance waste notifications	○	○	○	○	○
Cost recovery systems	○	○	○	○	○
Inspections	○	○	○	○	○

VIII.3 Please use this space to elaborate on your answer.

VIII.4 In your opinion, does the lack of segregation requirement for waste landed in ports under the EU waste legislation hinder efficient waste management on board of ships?

○ No, it does not represent an issue / it is of little relevance
○ Yes, the lack of segregation requirement represents an issue
○ Don't know

VIII.5 Please use this space to elaborate on your answer.

VIII.6 Do you experience any other discrepancies with the land based legislation applicable to ship generated waste and cargo residues once they have been delivered on shore?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes
- ◯ Don't know

VIII.7 Please use this space to elaborate on your answer.

VIII.8 In your view, are the notification requirements under PRF Directive (Art. 6) coherent with reporting formalities required under Directive 2010/65/EC on reporting formalities on ships(in particular under Art. 4 on notification prior to arrival) and do you expect any problems with the electronic reporting in SafeSeaNet? Please present your opinion on the matter.

VIII.9 Have you experienced any potential overlaps and/or links between the PRF Directive and other EU environmental legislation, in particular the Marine Strategy Framework Directive and the recent initiatives on marine litter? Please elaborate on your views.

IX Statistics

You are kindly requested to provide statistics on waste delivered on shore on your port. Please feel free to use the attached excel spreadsheet.

CONTACT DETAILS

For any doubts, requests, clarifications, please do not hesitate to contact:

PwC
Valerio Gori
Phone: +39 06 570 831 20 75
e-mail: valerio.gori@it.pwc.com

If you completed filling-in the questionnaire, please press the "Submit" button below.

Submit

Questionnaire 3 Questionnaire for Port users

Evaluation of Port Reception Facilities Directive

ADDRESSEES

Users of Port Reception Facilities, Shipping Companies, Fishing Operators, Recreational Vessel Operators

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INTRODUCTION

The European Commission has appointed PwC and Panteia to carry out an external ex-Post Evaluation of *Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (PRF Directive). Please, refer to the attached letter of support from the European Commission for further information.

This consultation aims to collect your views on the impact which the Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues has had on the management, movement and final disposal of ship generated waste. This Directive aims to reduce illegal discharges into the sea by focusing on ship operations in European Union ports. It aims to improve the availability, adequacy, and use of port reception facilities, thereby enhancing the protection of the marine environment. Furthermore, it addresses in detail the legal, financial and practical responsibilities of the different operators involved in the delivery of ship-generated waste and cargo residues.

We kindly ask you to answer to the following questions by providing your opinion on the outcomes of the Directive after more than 10 years of its implementation.

The Questionnaire should be completed by **Friday 28/11/2014**. If you need additional time to do so, please inform us of this as soon as possible.

The questionnaire is divided into the following sections:

I. Identification of respondent
II. General
III. Facilities: adequacy and availability
IV. Planning and control Procedures
V. Enforcement
VI. Impacts
VII. Cost recovery systems
VIII. Horizontal issues

The information provided will be treated anonymously; it will only be used for the purposes of the Evaluation report, collated and reported directly and anonymously by sector. This will be passed on to the European Commission and no accountable quotes will be given. PwC/ Panteia will not disclose the information provided by you to anyone besides from their own personnel involved in the processing of the data you provide.

INSTRUCTIONS

This PDF form can be saved, e-mailed, shared in any way you like, without having it submitted. When the questionnaire is completed and you decide to submit it to PwC/Panteia, you should press the "SUBMIT" button at the end of the questionnaire. A security warning popup might appear. Simply press the "Allow" button and the PDF will be sent. In order for the submission to succeed, please consider that you must be connected to the Internet.
In case you would like to submit more questionnaires, after having saved and submitted the first questionnaire, kindly save it under another name, then change the answers and simply submit it as if it was the first time you did so.
In case you need support, the contacts of the person ready to help you can be found at the end of this document.
.

I. Identification of the respondent

This preliminary set of questions will help to identify and categorise the responses you provide.

Name

e-mail

I speak on behalf of

- ◯ Myself
- ◯ An individual organisation
- ◯ An association representing other organisations

Company/ Organisation

Role covered in the Organisation

Please, specify whether you are:

- ◯ Port Authority or Harbour Master
- ◯ Port User - Shipping Operator
- ◯ Waste Operator or Management Company (if different from Port Authority)
- ◯ Member States/National/Regional or other Authority
- ◯ Non-governmental organisation (NGOs)
- ◯ Other (Please specify)

Company/ Organisation size

- ◯ Micro-entities (less than 10 persons employed)
- ◯ Small company/ organisation (between 10 and 49 persons employed)
- ◯ Medium-sized company/ organisation (between 50 and 249 persons employed)
- ◯ Big company/ organisation (250 or more persons employed)

Country in which you are based

Geographical area of interest

- ☐ UK and Ireland
- ☐ Scandinavian and Baltic
- ☐ Hamburg - Le Havre
- ☐ Atlantic arc (Le- Havre - Gibraltar)
- ☐ West Mediterranean (Italy included)
- ☐ Black Sea and East Mediterranean

Please specify your business activity

- ☐ Liquid Bulk
- ☐ Dry Bulk
- ☐ Oil, petroleum, etc.
- ☐ LNG, LPG
- ☐ Chemicals
- ☐ Container
- ☐ General Cargo
- ☐ Ro-Ro (freight specific)
- ☐ Ro-Ro (multipurpose pax and freight)
- ☐ Ferry (pax only)
- ☐ Cruise
- ☐ Fishing vessels
- ☐ Recreational craft
- ☐ Other

II. General

II.1 What common reasons can you think of for illegal discharges taking place at sea? Please select the three most relevant.

- ☐ Ports not accepting all types of waste
- ☐ The reception of (types of) waste requires the payment of too high a fee
- ☐ Insufficient port reception facilities capacity
- ☐ It is time consuming to wait for the facilities to be used
- ☐ No sufficient inspections are performed
- ☐ Fines/punishment for illegal discharges are too low
- ☐ Seafarers are not adequately trained/informed
- ☐ It is easier to discharge at sea
- ☐ Other (Please specify below) [ ]

II.2 Please use this space to elaborate on your answer.

[ ]

II.3 Which aspects of the PRF could benefit the most from a continued exchange of best practice?

[ ]

II.4 Has the PRF Directive led to improvements of PRF in receiving ship generated waste?

- ○ No
- ○ Yes, to some extent
- ○ Yes

II.5 Please use this space to elaborate on your answer.

[ ]

II.6 Has the PRF Directive led to improvements of PRF in receiving cargo residues?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.7 Please use this space to elaborate on your answer.

III. Facilities: adequacy and availability

III.1 Have the port reception facilities, in the ports you visit, improved in terms of numbers, capacity or types of waste received after the introduction of the PRF Directive? Please rate these as appropriate.

	Not improved	Slightly improved	Improved	Don't know
Number of facilities	◯	◯	◯	◯
Capacity	◯	◯	◯	◯
Types of waste received	◯	◯	◯	◯

III.2 Please use this space to elaborate on your answer. Are there any differences on the basis of port size and/or location?

III.3 Which components in the following list do you think are most relevant in determining whether port reception facilities (PRFs) are adequate for addressing the needs of port users? Please, rank them in order of importance (1 for most important, 8 for least important).

	1	2	3	4	5	6	7	8
Availability of reception facilities for different waste types	○	○	○	○	○	○	○	○
Capacity / discharge rate	○	○	○	○	○	○	○	○
Costs	○	○	○	○	○	○	○	○
Possibility for waste separation and recycling	○	○	○	○	○	○	○	○
Timeliness and readiness of PRF services	○	○	○	○	○	○	○	○
Location of PRF services	○	○	○	○	○	○	○	○
Efficiency of inspections	○	○	○	○	○	○	○	○
Location and/or size of the port	○	○	○	○	○	○	○	○

III.4 Please use this space to elaborate on your answer and to indicate any other components relevant to determining whether PRFs are adequate for addressing the needs of port users.

III.5 In your view, which of the following types of waste are not adequately received in ports you call at?

- ☐ Oily waste - Marpol Annex I
- ☐ Sewage - Marpol Annex IV
- ☐ Garbage - Marpol Annex V
- ☐ Exhaust Gas Cleaning System residues - (Marpol Annex VI)
- ☐ Other (Please specify)

III.6 Please use this space to elaborate on your answer or to provide additional information.

Waste Reception and Handling Plans

Art. 5 of Directive 2000/59/EC requires the development and implementation of appropriate waste reception and handling (WRH) plans for each port within the EU. The purpose of such a plan is to achieve an adequate functioning of port reception facilities and in most Member States it is the responsibility of the port authority or other port management body to develop this plan.
In general, there is still no full implementation of the provisions stipulated in Art. 5. It seems that most of the problems relate to smaller ports, fishing harbours and marinas. There also appear to be problems with the processes employed by Member States to evaluate the plans prior to their approval and regarding the monitoring of their implementation.

III.7 You are kindly asked to provide information concerning the Waste Reception and Handling (WRH) plan of a port of your choice. Please indicate the name of the port.

III.8 Are the following statements concerning the WRH plan of the port of your choice correct?

	No	Yes	Don't know
The WRH plan has been adopted	○	○	○
You have been consulted on initial drafting of WRH plan	○	○	○
You have been consulted during the implementation of the WRH plan	○	○	○
The WRH plan describes the cost recovery system	○	○	○
The WRH plan describes the waste delivery procedures	○	○	○

III.9 Please use this space to elaborate on your answer.

IV. Planning and control procedures

Notification

PRF Directive Article 6(1) states that the master of a ship (excluding fishing vessels or recreational craft) calling at a Community port shall complete the form in Annex II and send that information to the authority or body designated for this purpose by the Member State in which the port is located:
(a) at least 24 hours prior to arrival, if the port of call is known; or
(b) as soon as the port of call is known, if this information is available less than 24 hours prior to arrival; or
(c) at the latest upon departure from the previous port, if the duration of the voyage is less than 24 hours.
Furthermore, according to Article 6(2), the information referred to in Art. 6(1) shall be kept on board at least until the next port of call and shall upon request be made available to the Member States' authorities.

IV.1 Have you experienced any difficulties with the advance waste notification as in Article 6 and Annex II of the PRF Directive?

Delivery

PRF Directive Article 7(1) states that the master of a ship calling at a Community port shall, before leaving the port, deliver all ship-generated waste to a port reception facility. In practice, the definition of "all waste" is open to interpretation.

PRF Directive Art.7(2) states that a ship may be exempted from the mandatory delivery of ship generated waste if it has sufficient dedicated storage capacity to proceed to the next port of call and if the next port of call is known and has adequate facilities. The application of the exception in Art. 7(2) differs from Member State to Member State, with varying requirements regarding the volume and types of ship-generated waste that a vessel can leave port with. Nor is there any uniform definition or guidance concerning what should be considered sufficient dedicated storage capacity.

IV.2 Are you aware of how the delivery exemptions are being implemented in different ports? In your opinion, are there any issues within the different procedures, requirements and control measures in place in different ports?

Exemptions

In order to avoid any undue administrative and financial burdens for ships visiting the same ports frequently and regularly, a possibility for exemptions was inserted in Article 9 of the Directive, namely that a ship can be exempted by Member States from the mandatory delivery of ship-generated waste (Art. 7(1)), advance waste notification (Art. 6) and from paying the waste fee (Art. 8), on the condition that the Member State is satisfied that the ship takes care of its waste management along its regular route.

In practice, Member States use different definitions of "frequent and regular port calls". The temporal validity of exemptions also vary widely among Member States. A key question related to the transparency of the exemption regime relates to the quality of evidence provided in support of the exemption request.

IV.3 In your view, are there any issues with the exemptions to the requirements of the PRF Directive for vessels engaged in scheduled traffic with frequent and regular port calls? Please rate the following list of potential issues as appropriate.

	Not an issue	Somewhat an issue	It is an issue	Don't know
There is not common definition of frequent and regular port calls	○	○	○	○
There is no common duration of the exemption	○	○	○	○
There is no common definition of which type of evidence is required in support of the exemption request	○	○	○	○
There is no obligation for MSs along the ships' regular route to be informed about the exemption	○	○	○	○
There is no sufficient control that arrangements on whether waste delivery in other ports are actually in place	○	○	○	○

IV.4 Please use this space to elaborate on your answer and to indicate any further issues.

V. Enforcement

PRF Directive Art. 11 states that "[...]Member States shall ensure that any ship may be subject to an inspection in order to verify that it complies with Articles 7 and 10 and that a sufficient number of such inspections are carried out.[...]" . The selection of the ships to be inspected must take into account ships which have not complied with the notification requirements set by the PRF Directive and those ships for which the examination of the information (provided within the above mentioned notification) has revealed other grounds for believing that the ship does not comply with the PRF Directive.

V.1 What problems have you encountered with the enforcement of PRF Directive in EU ports? Are the following statements concerning the enforcement practice correct?

	Disagree	Somewhat agree	Agree	Don't know
Ships are selected for inspection based on an examination of the notification form	○	○	○	○
There are systems identifying ships which have not delivered their waste and residues, as well as for alerting the next port of call in such instances	○	○	○	○
Recreational craft and fishing vessels are also subject to inspections	○	○	○	○

V.2 Please use this space to elaborate on your answer and to indicate any further issues.

VI. Impacts

VI.1 Please indicate the impact of the following costs on your organisation in relation to waste delivery operations. Rank the listed costs according to their importance/ relevance to your business. (1 for most important, 6 for least important)

	1	2	3	4	5	6
Fees	○	○	○	○	○	○
Administrative requirements (e.g. notifications)	○	○	○	○	○	○
Unexpected delays	○	○	○	○	○	○
Duration of waste reception operations	○	○	○	○	○	○
Penalties	○	○	○	○	○	○
Requirements in terms of segregation of waste	○	○	○	○	○	○

VI.2 Please use this space to indicate any other type(s) of costs borne by your organisation and to comment on your answers to the previous question.

VI.3 Would you consider the costs imposed on your organisation in connection with the implementation of the PRF Directive to be proportionate to the environmental (or other) benefits?

- ○ No, the costs are too high
- ○ Yes, the costs are proportionate
- ○ Don't know

VI.4 Please use this space to elaborate on your answer.

VI.5 Have you experienced any relevant difference in waste reception costs on the basis of port size and/or location? Please elaborate.

VI.6 In your opinion, has the implementation of the PRF Directive increased/reduced time spent in waste reception operations? (When answering this question only the overall effect of the obligations in addition to MARPOL 73/78 should be considered – i.e. Mandatory delivery of waste, Development of Waste Reception and Handling Plans, Advance waste notifications, Cost recovery systems, Inspections).

- ◯ Decreased
- ◯ Somewhat decreased
- ◯ No change
- ◯ Somewhat increased
- ◯ Increased
- ◯ Don't know

VI.7 Please use this space to elaborate on your answer.

VI.8 What kind of administrative burden related to PRF does your organisation bear? Please, specify types of administrative activity (e.g. waste notification, provision of evidence to relevant enforcement authorities, etc.) and specify efforts in person-minutes per port call where possible.

VI.9 Would you consider the administrative costs incurred by your organisation to be proportionate to the benefits?

- ◯ No
- ◯ Yes
- ◯ Don't know

VI.10 Please use this space to elaborate on your answer.

VII. Cost recovery systems

The PRF Directive includes provisions ensuring that the costs of port reception facilities for ship-generated waste are covered through the collection of a fee from ships. The principle in the Directive sets out to ensure that "all ships" contribute to the costs of PRF and that such a contribution shall be "significant", irrespective of the actual use of the facilities. In a separate declaration to the Directive, the Commission declared that "significant" shall mean a contribution of at least 30%, irrespective of delivery. Article 8(2) furthermore specifies that the fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.

Different ports have different ways of calculating and collecting these fees. These variations range from almost full to partial coverage of the principles and from indirect to direct fees. There are basically two main approaches used to implement the cost recovery system in the ports of the Member States:
*a) **No Special Fee systems (NSF)** foreseen that the ship is always charged irrespective of the use of PRF and is (normally) allowed to deliver at least a reasonable amount of ship generated waste within that fee;*
*b) **Administrative waste fee/contribution systems (ADM)** in which an administrative waste fee is charged by the port and a separate direct charging system, usually operated by the waste contractor, applies to actual delivery.*

These two systems have a number of variants which are described hereafter.

Three variants of the NSF:
a.1- NSF – 100%: the principle here is that all waste (100%) is included in the fee. However, ports with 100% NSF have tended to define 'excessive amounts' in order to avoid the abuse of the system.
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b.1- indirect administrative waste fee with partial refund in case of delivery;
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b.4- direct fee system – administrative waste fee included in port dues.

A number of questions are presented below regarding the fees charged to ships for using port reception facilities.

VII.1 Are you adequately informed on the PRF cost structures and tariffs applied in EU ports?

- ◯ No, information is lacking and/or not complete
- ◯ Yes, information on general terms is present
- ◯ Yes, I am adequately informed with sufficient level of detail
- ◯ Don't know

VII.2 Please use this space to elaborate on your answer. If applicable, what kind of information is generally missing?

VII.3 In your view, does the presence of the following cost recovery systems decrease the incentive to land waste in a specific port? Please indicate this as appropriate in the table.

	No	Yes, to some extent	Yes	Don't know
a.1) NSF – 100%	○	○	○	○
a.2) NSF – delivery of reasonable amounts of waste (but not all) is included in the fee	○	○	○	○
a.3) NSF – garbage only	○	○	○	○
b.1) indirect administrative waste fee with partial refund in case of delivery	○	○	○	○
b.2) indirect administrative waste fee with full refund, or no fee, in case of delivery	○	○	○	○
b.3) administrative waste fee only from ships not delivering	○	○	○	○
b.4) direct fee system – administrative waste fee included in port dues.	○	○	○	○

VII.4 Please use this space to elaborate on your answer or to comment on other cost recovery systems which are not mentioned above.

VII.5 In your opinion, to what extent do fees charged to ships for using port reception facilities reflect their actual costs?

- ◯ The fees are significantly higher than the actual costs
- ◯ The fees are more or less the same as the actual costs
- ◯ The fees are significantly lower than the actual costs
- ◯ Don't know

VII.6 Please use this space to elaborate on your answer.

VII.7 Do you have an environmental management system in place for reducing ship-generated waste that allows you to qualify for reduced fees for the use of PRF?

- ◯ No
- ◯ Yes
- ◯ Don't know

VII.8 Please use this space to elaborate on your answer.

VIII. Horizontal issues

The aim of this section is to evaluate the coherence of the PRF Directive with the international legislation and with other relevant EU legislation. A brief description of relevant legislation is provided hereafter.

*The **International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)** sets out which types of ship-generated wastes and cargo residues can be legally discharged by ships into the marine environment and under which conditions. It also requires Parties to provide reception facilities in ports and terminals for those wastes and residues that are not allowed to be discharged into the sea. The new MARPOL Annex V (garbage) and Annex VI (air emissions) have not been incorporated in the PRF Directive, which leads to certain inconsistencies and operational difficulties.*

***Directive 2012/33/EU (EU Sulphur Directive)** states that wash water resulting from exhaust gas cleaning systems which make use of chemicals, shall not be discharged into the sea. This includes enclosed ports, harbours and estuaries, unless it is demonstrated by the ship operator that such wash water discharge has no significant negative impacts and does not pose any risk to human health and to the environment.*

***Directive 2008/98/EC (Waste Framework Directive)** sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains how to distinguish between waste and by- products.*

***Directive 2010/65/EU (Reporting formalities for ships)** aims to simplify the reporting formalities for ships by establishing a standard electronic transmission of information through a single window. Art. 4 of Directive 2010/54/EU sets out the obligation of prior notification, requiring ships to provide the competent authorities with the required information before arriving in a port of the EU. This provision interconnects with Art. 6 of the PRF Directive, which require ships calling at EU ports to complete a waste notification form (as provided in Annex II to the Directive) prior to arrival in the port. As of June 2015 the advance waste notification will be exchanged through the SafeSeaNet (SSN) system.*

***Directive 2008/56/EC (Marine Strategy Framework Directive - MSFD)** aims to achieve Good Environmental Status (GES) for the EU's marine waters by 2020. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy) after an initial assessment of the current environmental status, the determination of what GES means for national marine waters and the establishment of environmental targets and associated indicators to achieve GES by 2020.*

The need for coherent approaches in the preparatory stages of marine strategies has led to a Commission Decision (2010/477/EU) under Article 9(3) of MSFD "on criteria and methodological standards on good environmental status of marine waters". Among others, the Decision addresses marine litter in descriptor 10 and aims at achieving that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". As a follow up to the Commission Decision, a technical subgroup under the Working Group on GES (WG GES) was established for further development of the Descriptor 10 "Marine Litter".

VIII.1 What incompatibilities or overlaps do you experience between the PRF Directive and the MARPOL Convention?

VIII.2 Do the additional obligations of the PRF Directive which go beyond the requirements in MARPOL 73/78 provide for additional environmental (or other) benefits? Rank the obligations according to their additional benefits in the table below.

	No additional benefits	Minor additional benefits	Some additional benefits	Significant additional benefits	Don't know
Mandatory delivery of waste	○	○	○	○	○
Development of Waste Reception and Handling Plans	○	○	○	○	○
Advance waste notifications	○	○	○	○	○
Cost recovery systems	○	○	○	○	○
Inspections	○	○	○	○	○

VIII.3 Please use this space to elaborate on your answer.

VIII.4 In your view, are the current availability of port reception facilities adequate to meet the needs of ships using exhaust gas cleaning systems (falling under Directive 2012/33/EU on the sulphur content of marine fuels)?

- ○ No
- ○ Yes, to some extent
- ○ Yes
- ○ Don't know

VIII.5 Please, use this space to elaborate on your answer.

VIII.6 In your opinion, does the lack of segregation requirement for waste landed in ports under the EU waste legislation hinder efficient waste management on board of ships?

- ◯ No, it does not represent an issue / it is of little relevance
- ◯ Yes, the lack of segregation requirement represents an issue
- ◯ Don't know

VIII.7 Please use this space to elaborate on your answer.

VIII.8 Do you experience any other discrepancies with the land based legislation applicable to ship generated waste and cargo residues once they have been delivered on shore?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes
- ◯ Don't know

VIII.9 Please use this space to elaborate on your answer.

VIII.10 In your view, are the notification requirements under PRF Directive (Art. 6) coherent with reporting formalities required under Directive 2010/65/EC on reporting formalities on ships(in particular under Art. 4 on notification prior to arrival) and do you expect any problems with the electronic reporting in SafeSeaNet? Please present your opinion on the matter.

VIII.11 Have you experienced any potential overlaps and/or links between the PRF Directive and other EU environmental legislation, in particular the Marine Strategy Framework Directive and the recent initiatives on marine litter? Please elaborate on your views.

CONTACT DETAILS

For any doubts, requests, clarifications, please do not hesitate to contact:

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If you completed filling-in the questionnaire, please press the "Submit" button below.

Submit

Questionnaire 4 Questionnaire PRF operators

Evaluation of Port Reception Facilities Directive

ADDRESSEES

Providers of Port Reception Facilities, Waste Operators and Terminal Operators

INTRODUCTION

The European Commission has appointed PwC and Panteia to carry out an external ex-Post Evaluation of *Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (PRF Directive). Please, refer to the attached letter of support from the European Commission for further information.

This consultation aims to collect your views on the impact which the Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues has had on the management, movement and final disposal of ship generated waste. This Directive aims to reduce illegal discharges into the sea by focusing on ship operations in European Union ports. It aims to improve the availability, adequacy, and use of port reception facilities, thereby enhancing the protection of the marine environment. Furthermore, it addresses in detail the legal, financial and practical responsibilities of the different operators involved in the delivery of ship-generated waste and cargo residues.

We kindly ask you to answer to the following questions by providing your opinion on the outcomes of the Directive after more than 10 years of its implementation.

The Questionnaire should be completed by **Friday 28/11/2014**. If you need additional time to do so, please inform us of this as soon as possible.

The questionnaire is divided into the following sections:

I. Identification of respondent
II. General
III. Facilities: adequacy and availability
IV. Planning and control Procedures
V. Enforcement
VI. Impacts
VII. Cost recovery systems
VIII. Horizontal issues

The information provided will be treated anonymously; it will only be used for the purposes of the Evaluation report, collated and reported directly and anonymously by sector. This will be passed on to the European Commission and no accountable quotes will be given. PwC/ Panteia will not disclose the information provided by you to anyone besides from their own personnel involved in the processing of the data you provide.

INSTRUCTIONS

This PDF form can be saved, e-mailed, shared in any way you like, without having it submitted. When the questionnaire is completed and you decide to submit it to PwC/Panteia, you should press the "SUBMIT" button at the end of the questionnaire. A security warning popup might appear. Simply press the "Allow" button and the PDF will be sent. In order for the submission to succeed, please consider that you must be connected to the Internet.
In case you would like to submit more questionnaires, after having saved and submitted the first questionnaire, kindly save it under another name, then change the answers and simply submit it as if it was the first time you did so.
In case you need support, the contacts of the person ready to help you can be found at the end of this document.

I. Identification of the respondent

This preliminary set of questions will help to identify and categorise the responses you provide.

Name

e-mail

I speak on behalf of

- ◯ Myself
- ◯ An individual organisation
- ◯ An association representing other organisations

Company/ Organisation

Role covered in the Organisation

Please, specify whether you are:

- ◯ Port Authority or Harbour Master
- ◯ Port User - Shipping Operator
- ◯ Waste Operator or Management Company (if different from Port Authority)
- ◯ Member States/National/Regional or other Authority
- ◯ Non-governmental organisation (NGOs)
- ◯ Other (Please specify)

Company/ Organisation size

- ◯ Micro-entities (less than 10 persons employed)
- ◯ Small company/ organisation (between 10 and 49 persons employed)
- ◯ Medium-sized company/ organisation (between 50 and 249 persons employed)
- ◯ Big company/ organisation (250 or more persons employed)

Country in which you are based

Port you respond for

II. General

II.1 What common reasons can you think of for illegal discharges taking place at sea? Please select the three most relevant.

- ☐ Ports not accepting all types of waste
- ☐ The reception of (types of) waste requires the payment of too high a fee
- ☐ Insufficient port reception facilities capacity
- ☐ It is time consuming to wait for the facilities to be used
- ☐ No sufficient inspections are performed
- ☐ Fines/punishment for illegal discharges are too low
- ☐ Seafarers are not adequately trained/informed
- ☐ It is easier to discharge at sea
- ☐ Other (Please specify below)

II.2 Please use this space to elaborate on your answer.

II.3 Which aspects of the PRF could benefit the most from a continued exchange of best practices?

II.4 Has the PRF Directive led to improvements of PRF in receiving ship generated waste?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.5 Please use this space to elaborate on your answer.

II.6 Has the PRF Directive led to improvements of PRF in receiving cargo residues?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.7 Please use this space to elaborate on your answer.

III. Facilities: adequacy and availability

III.1 Have the port reception facilities in your port changed in number, capacity or types of waste received after the introduction of the PRF Directive? Please provide figures to support your answer.

III.2 Which components in the following list do you think are most relevant in determining whether port reception facilities (PRFs) are adequate for addressing the needs of port users? Please, rank them in order of importance (1 for most important, 8 for least important).

	1	2	3	4	5	6	7	8
Availability of reception facilities for different waste types	○	○	○	○	○	○	○	○
Capacity / discharge rate	○	○	○	○	○	○	○	○
Costs	○	○	○	○	○	○	○	○
Possibility for waste separation and recycling	○	○	○	○	○	○	○	○
Timeliness and readiness of PRF services	○	○	○	○	○	○	○	○
Location of PRF services	○	○	○	○	○	○	○	○
Efficiency of inspections	○	○	○	○	○	○	○	○
Location and/or size of the port	○	○	○	○	○	○	○	○

III.3 Please use this space to elaborate on your answer and to indicate any other components relevant to determining whether PRFs are adequate for addressing the needs of port users.

III.4 Please select which of the following types of waste are received in your port.

- ☐ Oily waste - Marpol Annex I
- ☐ Sewage - Marpol Annex IV
- ☐ Garbage - Marpol Annex V
- ☐ Exhaust Gas Cleaning System residues - (Marpol Annex VI)

III.5 Please use this space to elaborate on your answer or to provide additional information.

IV. Planning and control procedures

Notification

IV.1 Do the notification requirements in the PRF Directive contribute to the effective operation and planning for the provision of PRF in your port?

- ◯ No
- ◯ To a limited extent
- ◯ Yes
- ◯ Don't know

IV.2 Please use this space to elaborate your answers.

V. Enforcement

You are not asked to answer any questions under this section

VI. Impacts

VI.1 Would you consider the costs imposed on your organisation in connection with the implementation of the PRF Directive to be proportionate to the environmental (or other) benefits?

- ◯ No, the costs are too high
- ◯ Yes, the costs are proportionate
- ◯ Don't know

VI.2 Please use this space to elaborate on your answer.

VI.3 In your opinion, has the implementation of the PRF Directive increased/reduced time spent in waste reception operations? (When answering this question only the overall effect of the obligations in addition to MARPOL 73/78 should be considered – i.e. Mandatory delivery of waste, Development of Waste Reception and Handling Plans, Advance waste notifications, Cost recovery systems, Inspections).

- ◯ Decreased
- ◯ Somewhat decreased
- ◯ No change
- ◯ Somewhat increased
- ◯ Increased
- ◯ Don't know

VI.4 Please use this space to elaborate on your answer.

VI.5 What kind of administrative burden related to PRF does your organisation bear? Please, specify types of administrative activity and efforts in person-days per year.

VI.6 Would you consider the administrative costs incurred by your organisation to be proportionate to the benefits?

- ◯ No
- ◯ Yes
- ◯ Don't know

VI.7 Please use this space to elaborate on your answer.

VII. Cost recovery systems

The PRF Directive includes provisions ensuring that the costs of port reception facilities for ship-generated waste are covered through the collection of a fee from ships. The principle in the Directive sets out to ensure that "all ships" contribute to the costs of PRF and that such a contribution shall be "significant", irrespective of the actual use of the facilities. In a separate declaration to the Directive, the Commission declared that "significant" shall mean a contribution of at least 30%, irrespective of delivery. Article 8(2) furthermore specifies that the fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.

Different ports have different ways of calculating and collecting these fees. These variations range from almost full to partial coverage of the principles and from indirect to direct fees. There are basically two main approaches used to implement the cost recovery system in the ports of the Member States:
a) ***No Special Fee systems (NSF)*** *foreseen that the ship is always charged irrespective of the use of PRF and is (normally) allowed to deliver at least a reasonable amount of ship generated waste within that fee;*
b) ***Administrative waste fee/contribution systems (ADM)*** *in which an administrative waste fee is charged by the port and a separate direct charging system, usually operated by the waste contractor, applies to actual delivery.*

These two systems have a number of variants which are described hereafter.

Three variants of the NSF:
a.1- NSF – 100%: the principle here is that all waste (100%) is included in the fee. However, ports with 100% NSF have tended to define 'excessive amounts' in order to avoid the abuse of the system.
a.2- NSF – delivery of reasonable amounts of waste (but not all) is included in the fee: volumes included have been defined and limits set at the outset clearly indicating volumes included in the fee and at what fees additional volumes (above the set limit) will be directly charged.
a.3- NSF – garbage only: Includes only Marpol Annex V (garbage). Volume limitations may also be applied in this group.

Variants of the ADM:
b.1- indirect administrative waste fee with partial refund in case of delivery;
b.2- indirect administrative waste fee with full refund, or no fee, in case of delivery;
b.3- administrative waste fee only from ships not delivering;
b.4- direct fee system – administrative waste fee included in port dues.

A number of questions are presented below regarding the fees charged to ships for using port reception facilities.

VII.1 In your view, does the presence of the following cost recovery systems decrease the incentive to land waste in a specific port? Please indicate this as appropriate in the table.

	No	Yes, to some extent	Yes	Don't know
a.1) NSF – 100%	○	○	○	○
a.2) NSF – delivery of reasonable amounts of waste (but not all) is included in the fee	○	○	○	○
a.3) NSF – garbage only	○	○	○	○
b.1) indirect administrative waste fee with partial refund in case of delivery	○	○	○	○
b.2) indirect administrative waste fee with full refund, or no fee, in case of delivery	○	○	○	○
b.3) administrative waste fee only from ships not delivering	○	○	○	○
b.4) direct fee system – administrative waste fee included in port dues.	○	○	○	○

VII.2 Please use this space to elaborate on your answer or to comment on other cost recovery systems which are not mentioned above.

VII.3 In your opinion, to what extent do fees charged to ships for using port reception facilities reflect their actual costs?

- ◯ The fees are significantly higher than the actual costs
- ◯ The fees are more or less the same as the actual costs
- ◯ The fees are significantly lower than the actual costs
- ◯ Don't know

VII.4 Please use this space to elaborate on your answer.

VII.5 Please specify the type of costs that you include in your fees when charging ships for port reception facilities.

VIII. Horizontal issues

The aim of this section is to evaluate the coherence of the PRF Directive with the international legislation and with other relevant EU legislation. A brief description of relevant legislation is provided hereafter.
***Directive 2008/98/EC (Waste Framework Directive)** sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains how to distinguish between waste and by- products.*
***Directive 2008/56/EC (Marine Strategy Framework Directive - MSFD)** aims to achieve Good Environmental Status (GES) for the EU's marine waters by 2020. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy) after an initial assessment of the current environmental status, the determination of what GES means for national marine waters and the establishment of environmental targets and associated indicators to achieve GES by 2020.*
The need for coherent approaches in the preparatory stages of marine strategies has led to a Commission Decision (2010/477/EU) under Article 9(3) of MSFD "on criteria and methodological standards on good environmental status of marine waters". Among others, the Decision addresses marine litter in descriptor 10 and aims at achieving that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". As a follow up to the Commission Decision, a technical subgroup under the Working Group on GES (WG GES) was established for further development of the Descriptor 10 "Marine Litter".

VIII.1 In your opinion, does the lack of segregation requirement for waste landed in ports under the EU waste legislation hinder efficient waste management on board of ships?

- ◯ No, it does not represent an issue / it is of little relevance
- ◯ Yes, the lack of segregation requirement represents an issue
- ◯ Don't know

VIII.2 Please use this space to elaborate on your answer.

VIII.3 Do you experience any other discrepancies with the land based legislation applicable to ship generated waste and cargo residues once they have been delivered on shore?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes
- ◯ Don't know

VIII.4 Please use this space to elaborate on your answer.

VIII.5 Have you experienced any potential overlaps and/or links between the PRF Directive and other EU environmental legislation, in particular the Marine Strategy Framework Directive and the recent initiatives on marine litter? Please elaborate on your views.

CONTACT DETAILS

For any doubts, requests, clarifications, please do not hesitate to contact:

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e-mail: valerio.gori@it.pwc.com

If you completed filling-in the questionnaire, please press the "Submit" button below.

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Questionnaire 5 Questionnaire for other organisations

Evaluation of Port Reception Facilities Directive

ADDRESSEES

Non-Governmental Organisations, Fisheries Commissions, Advisory Councils, Other types of commissions and environmental protection organisations, Other industry associations

INTRODUCTION

The European Commission has appointed PwC and Panteia to carry out an external ex-Post Evaluation of *Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues* (PRF Directive). Please, refer to the attached letter of support from the European Commission for further information.

This consultation aims to collect your views on the impact which the Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues has had on the management, movement and final disposal of ship generated waste. This Directive aims to reduce illegal discharges into the sea by focusing on ship operations in European Union ports. It aims to improve the availability, adequacy, and use of port reception facilities, thereby enhancing the protection of the marine environment. Furthermore, it addresses in detail the legal, financial and practical responsibilities of the different operators involved in the delivery of ship-generated waste and cargo residues.

We kindly ask you to answer to the following questions by providing your opinion on the outcomes of the Directive after more than 10 years of its implementation.

The Questionnaire should be completed by **Friday 28/11/2014**. If you need additional time to do so, please inform us of this as soon as possible.

The questionnaire is divided into the following sections:

I. Identification of respondent
II. General
III. Facilities: adequacy and availability
IV. Planning and control Procedures
V. Enforcement
VI. Impacts
VII. Cost recovery systems
VIII. Horizontal issues
IX. Statistics

The information provided will be treated anonymously; it will only be used for the purposes of the Evaluation report, collated and reported directly and anonymously by sector. This will be passed on to the European Commission and no accountable quotes will be given. PwC/ Panteia will not disclose the information provided by you to anyone besides from their own personnel involved in the processing of the data you provide.

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In case you would like to submit more questionnaires, after having saved and submitted the first questionnaire, kindly save it under another name, then change the answers and simply submit it as if it was the first time you did so.
In case you need support, the contacts of the person ready to help you can be found at the end of this document.

I. Identification of the respondent

This preliminary set of questions will help to identify and categorise the responses you provide.

Name

e-mail

I speak on behalf of

- ◯ Myself
- ◯ An individual organisation
- ◯ An association representing other organisations

Company/ Organisation

Role covered in the Organisation

Please, specify whether you are:

- ◯ Port Authority or Harbour Master
- ◯ Port User - Shipping Operator
- ◯ Waste Operator or Management Company (if different from Port Authority)
- ◯ Member States/National/Regional or other Authority
- ◯ Non-governmental organisation (NGOs)
- ◯ Other (Please specify) _____

Company/ Organisation size

- ◯ Micro-entities (less than 10 persons employed)
- ◯ Small company/ organisation (between 10 and 49 persons employed)
- ◯ Medium-sized company/ organisation (between 50 and 249 persons employed)
- ◯ Big company/ organisation (250 or more persons employed)

Country in which you are based _____

II. General

II.1 What common reasons can you think of for illegal discharges taking place at sea? Please select the three most relevant.

- ☐ Ports not accepting all types of waste
- ☐ The reception of (types of) waste requires the payment of too a high fee
- ☐ Insufficient port reception facilities capacity
- ☐ It is time consuming to wait for the facilities to be used
- ☐ No sufficient inspections are performed
- ☐ Fines/punishment for illegal discharges are too low
- ☐ Seafarers are not adequately trained/informed
- ☐ It is easier to discharge at sea
- ☐ Other (Please specify below) _____

II.2 Please use this space to elaborate on your answer.

II.3 Which aspects of the PRF could benefit the most from a continued exchange of best practices?

II.4 Has the PRF Directive led to improvements of PRF in receiving ship generated waste?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.5 Please use this space to elaborate on your answer.

II.6 Has the PRF Directive led to improvements of PRF in receiving cargo residues?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes

II.7 Please use this space to elaborate on your answer.

III. Facilities: adequacy and availability

III.1 Have the port reception facilities changed in number, capacity or types of waste received after the introduction of the PRF Directive? Are there any differences attributable to the size and location of ports? Please provide figures to support your answer.

IV. Planning and control procedures

Exemptions

In order to avoid any undue administrative and financial burdens for ships visiting the same ports frequently and regularly, a possibility for exemptions was inserted into Article 9 of the Directive, namely that a ship can be exempted by Member States from the mandatory delivery of ship-generated waste (Art. 7(1)), advance waste notification (Art. 6) and from paying the waste fee (Art. 8), on the condition that the Member State is satisfied that the ship takes care of its waste management along its regular route.

In practice, Member States use different definitions of "frequent and regular port calls". The temporal validity of exemptions also vary widely among Member States.
A key question related to the transparency of the exemption regime relates to the quality of evidence provided in support of the exemption request.

IV.1 In your view, are there any issues with the exemptions to the requirements of the PRF Directive for vessels engaged in scheduled traffic with frequent and regular port calls? Please rate the following list of potential issues as appropriate.

	Not an issue	Somewhat an issue	It is an issue	Don't know
There is no common definition of frequent and regular port calls	○	○	○	○
There is no common duration of the exemption	○	○	○	○
There is not a common definition of which type of evidence is required in support of the exemption request	○	○	○	○
There is no obligation for MSs along the ships' regular route to be informed about the exemption	○	○	○	○
There is no sufficient control that arrangements on whether waste delivery in other ports are actually in place	○	○	○	○

IV.2 Please use this space to elaborate on your answer and to indicate any further issues.

V. Enforcement

PRF Directive Art. 11 states that "[...]Member States shall ensure that any ship may be subject to an inspection in order to verify that it complies with Articles 7 and 10 and that a sufficient number of such inspections are carried out.[...]" . The selection of the ships to be inspected must take into account ships which have not complied with the notification requirements set by the PRF Directive and those ships for which the examination of the information (provided within the above mentioned notification) has revealed other grounds for believing that the ship does not comply with the PRF Directive.

V.1 What problems have you encountered with the enforcement of PRF Directive in EU ports? Are the following statements concerning the enforcement practice correct?

	Disagree	Somewhat agree	Agree	Don't know
Ships are selected for inspection based on an examination of the notification form	○	○	○	○
There are systems identifying ships which have not delivered their waste and residues, as well as for alerting the next port of call in such instances	○	○	○	○
Recreational craft and fishing vessels are also subject to inspections	○	○	○	○

V.2 Please use this space to elaborate on your answer and to indicate any further issues.

VI. Impacts

VI.1 Would you consider the costs imposed on businesses and public sector in connection with the implementation of the PRF Directive to be proportionate to the environmental (or other) benefits?

- ◯ No, the costs are too high
- ◯ Yes, the costs are proportionate
- ◯ Don't know

VI.2 Please use this space to elaborate on your answer.

VII. Cost recovery systems

The PRF Directive includes provisions ensuring that the costs of port reception facilities for ship-generated waste are covered through the collection of a fee from ships. The principle in the Directive sets out to ensure that "all ships" contribute to the costs of PRF and that such a contribution shall be "significant", irrespective of the actual use of the facilities. In a separate declaration to the Directive, the Commission declared that "significant" shall mean a contribution of at least 30%, irrespective of delivery. Article 8(2) furthermore specifies that the fees may be reduced if the ship's environmental management, design, equipment and operation are such that the master of the ship can demonstrate that it produces reduced quantities of ship-generated waste.

Different ports have different ways of calculating and collecting these fees. These variations range from almost full to partial coverage of the principles and from indirect to direct fees. There are basically two main approaches used to implement the cost recovery system in the ports of the Member States:
a) ***No Special Fee systems (NSF)*** *foreseen that the ship is always charged irrespective of the use of PRF and is (normally) allowed to deliver at least a reasonable amount of ship generated waste within that fee;*
b) ***Administrative waste fee/contribution systems (ADM)*** *in which an administrative waste fee is charged by the port and a separate direct charging system, usually operated by the waste contractor, applies to actual delivery.*

These two systems have a number of variants which are described hereafter.

Three variants of the NSF:
a.1- NSF – 100%: the principle here is that all waste (100%) is included in the fee. However, ports with 100% NSF have tended to define 'excessive amounts' in order to avoid the abuse of the system.
a.2- NSF – delivery of reasonable amounts of waste (but not all) is included in the fee: volumes included have been defined and limits set at the outset clearly indicating volumes included in the fee and at what fees additional volumes (above the set limit) will be directly charged.
a.3- NSF – garbage only: Includes only Marpol Annex V (garbage). Volume limitations may also be applied in this group.

Variants of the ADM:
b.1- indirect administrative waste fee with partial refund in case of delivery;
b.2- indirect administrative waste fee with full refund, or no fee, in case of delivery;
b.3- administrative waste fee only from ships not delivering;
b.4- direct fee system – administrative waste fee included in port dues.

A number of questions are presented below regarding the fees charged to ships for using port reception facilities.

VII.1 In your view, does the presence of the following cost recovery systems decrease the incentive to land waste in a specific port? Please indicate this as appropriate in the table.

	No	Yes, to some extent	Yes	Don't know
a.1) NSF – 100%	○	○	○	○
a.2) NSF – delivery of reasonable amounts of waste (but not all) is included in the fee	○	○	○	○
a.3) NSF – garbage only	○	○	○	○
b.1) indirect administrative waste fee with partial refund in case of delivery	○	○	○	○
b.2) indirect administrative waste fee with full refund, or no fee, in case of delivery	○	○	○	○
b.3) administrative waste fee only from ships not delivering	○	○	○	○
b.4) direct fee system – administrative waste fee included in port dues.	○	○	○	○

VII.2 Please use this space to elaborate on your answer or to comment on other cost recovery systems which are not mentioned above.

VIII. Horizontal issues

The aim of this section is to evaluate the coherence of the PRF Directive with the international legislation and with other relevant EU legislation. A brief description of relevant legislation is provided hereafter.

*The **International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)** sets out which types of ship-generated wastes and cargo residues can be legally discharged by ships into the marine environment and under which conditions. It also requires Parties to provide reception facilities in ports and terminals for those wastes and residues that are not allowed to be discharged into the sea. The new MARPOL Annex V (garbage) and Annex VI (air emissions) have not been incorporated in the PRF Directive, which leads to certain inconsistencies and operational difficulties.*

***Directive 2008/98/EC (Waste Framework Directive)** sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains how to distinguish between waste and by- products.*

***Directive 2008/56/EC (Marine Strategy Framework Directive - MSFD)** aims to achieve Good Environmental Status (GES) for the EU's marine waters by 2020. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy) after an initial assessment of the current environmental status, the determination of what GES means for national marine waters and the establishment of environmental targets and associated indicators to achieve GES by 2020.*

The need for coherent approaches in the preparatory stages of marine strategies has led to a Commission Decision (2010/477/EU) under Article 9(3) of MSFD "on criteria and methodological standards on good environmental status of marine waters". Among others, the Decision addresses marine litter in descriptor 10 and aims at achieving that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". As a follow up to the Commission Decision, a technical subgroup under the Working Group on GES (WG GES) was established for further development of the Descriptor 10 "Marine Litter".

VIII.1 What incompatibilities or overlaps do you experience between the PRF Directive and the MARPOL Convention?

VIII.2 Do the additional obligations of the PRF Directive which go beyond the requirements in MARPOL 73/78 provide for additional environmental (or other) benefits? Rank the obligations according to their additional benefits in the table below.

	No additional benefits	Minor additional benefits	Some additional benefits	Significant additional benefits	Don't know
Mandatory delivery of waste	○	○	○	○	○
Development of Waste Reception and Handling Plans	○	○	○	○	○
Advance waste notifications	○	○	○	○	○
Cost recovery systems	○	○	○	○	○
Inspections	○	○	○	○	○

VIII.3 Please use this space to elaborate on your answer.

VIII.4 In your opinion, does the lack of segregation requirement for waste landed in ports under the EU waste legislation hinder efficient waste management on board of ships?

- ○ No, it does not represent an issue / it is of little relevance
- ○ Yes, the lack of segregation requirement represents an issue
- ○ Don't know

VIII.5 Please use this space to elaborate on your answer.

VIII.6 Do you experience any other discrepancies with the land based legislation applicable to ship generated waste and cargo residues once they have been delivered on shore?

- ◯ No
- ◯ Yes, to some extent
- ◯ Yes
- ◯ Don't know

VIII.7 Please use this space to elaborate on your answer.

VIII.8 Have you experienced any potential overlaps and/or links between the PRF Directive and other EU environmental legislation, in particular the Marine Strategy Framework Directive and the recent initiatives on marine litter? Please elaborate on your views.

CONTACT DETAILS

For any doubts, requests, clarifications, please do not hesitate to contact:

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If you completed filling-in the questionnaire, please press the "Submit" button below.

Submit

ANNEX 5 CALCULATIONS ON DISCHARGES OF WASTE

In order to estimate the additional waste discharged at EU ports since the introduction of the PRF Directive, information on waste deliveries was directly obtained from stakeholders. This annex will outline in detail the methodology used for the obtained data to draw conclusions on the EU level.

1. EMSA Report; study on the delivery of ship-generated waste (Ramboll 2012)

This report contains time series data for 2004-2011 for 40 large commercial ports that were included in the study. Waste delivery data was collected for the various types of ship-generated waste and cargo residues within the scope of the Directive. The data is reported in cubic meter (m^3). In order to arrive at m^3, in some cases tonnes were transformed into m^3. For oily machinery waste (Annex I), the transformation 1=1 was used, while for Annex V the transformation 1 tonne =2 m^3 was used[246].

2. Stakeholder consultation

Stakeholders were requested to deliver waste delivery data for the various types of waste within the scope of the PRF Directive, for the years 2008-2013. These years were specifically chosen, to prevent asking too much historical data of dubious quality, while allowing to draw conclusions on possible trends. Stakeholders were asked to deliver the data as much as possible in cubic meters (m^3), but in order to collect as much valid data as possible were given the option to indicate the unit of measurement separately and deliver data in other units of measurement. To match the data collected by the EMSA (2012) report, the same conversion methodology was adopted where necessary to arrive from tons to m^3.

Pooling data into integrated dataset

These two data sources were pooled into one dataset stretching from 2004 to 2013, and covering all ship-generated waste and cargo residues within the scope of the PRF Directive, in total adding up to data on waste deliveries for 50 EU ports. For years where no data was available, the EMSA (2012) report assumed that the waste delivery amounts were similar to the last year for which data was available. Given the possibility to pool data, all these assumptions were disregarded, so that the final dataset only contains observed values, and contains a missing value for some years. As data has been collected for a sufficient number of ports across a sufficient number of years, these missing values do not complicate the analysis. To be able to map *actual* trends in delivery of ship-generated waste / cargo residue these missing values were *not* replaced with assumed values / estimates.

The overlap in data for the years 2008/2009/2010 allowed a validity check for the data collected. In a number of cases it was observed that data reported in the EMSA (2012) report as 'm3', was actually measured in tons. In case of doubt, the data collected by the stakeholder consultation was taken as leading, provided that this contained the most recent data; in some cases it was also observed that the ports reported slight adjustments to the figures already provided to the EMSA (2012) report.

The result of the pooling, in addition to checking the validity of the data, allowed to combine the data collected in the EMSA report and in the stakeholder consultation for 13 ports, allowing a time series 2004-2013. Data for ports that were not included in both data collections were included *as is*, after a consistency check of the data. The result of

[246] We follow the same conversion factors as in "EMSA (2012), Study on the delivery of ship-generated waste and cargo residues "by Ramboll, to assume one average density for the variety of MARPOL Annex V waste. For reasons of comparability the same value (1 tonne = 2 m^3) was followed.

this exercise is a pooled dataset containing the absolute waste deliveries to 50 EU ports of ship-generated waste for 'oily waste from machinery space (Annex I), sewage (Annex IV) garbage (Annex V), and for cargo residues for oily waste from cargo residues (Annex I), and liquid cargo residues (Annex V).

The data for these cargo residues has not been delivered by all ports (only 15 of the 50 ports delivered all the required information), and are therefore considerably less reliable. These have not been included in the analysis.

Adding additional statistical data
The dataset was extended by including data from Eurostat on the amount of GT Vessels called in each port for each year. This allows the subsequent analysis to take the specific port activity of the ports into account. GT Vessels was chosen over number of port calls, as presumably larger vessels also produce more waste. To indicate the importance of total GT Vessels for the waste volumes received, it is noted that in a number of cost recovery systems, the waste fees charged to port users are actually based on the GT-class of a vessel[247].

Adding cost recovery systems
For additional calculations needed for the evaluation, data was also included on the type of cost recovery system in place for each specific type of waste in each port in the dataset. This data was obtained from the following data sources:

- 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.
- EMSA (2005), A Study on the Availability and Use of Port Reception Facilities for Ship-Generated Waste (Carl Bro a/s.).
- EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC).
- EMSA (2012), Study on the delivery of ship-generated waste and cargo residues (Ramboll).

Amounts of waste delivered per GT in each port
Based on the data collected above, the amount of waste delivered per 1,000 GT per year were calculated for each waste type in each port, by dividing the amount of waste delivered by the number of 1,000 GT that called at that port in that year. The resulting value represents the m3 of that waste type per 1,000 GT that called at that port in that year. This is the key indicator used for calculations on waste deliveries in the report.

Representativeness of data
As indicated in Table 9, the total annual GT that calls in the ports in our dataset is around 26-30% of the total annual GT that calls in EU ports. This gives sufficient confidence that the collected data is representative for the EU as a whole.

[247] See specific port cost recovery systems (among others Amsterdam, Tallinn, Stockholm, Hamburg), but see for more details 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

Table 9 Total annual GT in dataset and EU

Year	Total annual GT (in 1,000 GT) Ports in dataset	Total Annual GT (in 1,000 GT) EU	Share selected ports of total GT (in 1,000) EU port calls
2004	3,821,946	13,432,537	28%
2005	3,889,659	13,571,439	29%
2006	4,073,064	14,060,727	29%
2007	4,339,695	15,046,044	29%
2008	4,597,615	15,226,058	30%
2009	4,038,900	15,307,491	26%
2010	4,364,023	15,868,770	28%
2011	4,772,444	16,301,431	29%
2012	4,660,775	16,055,339	29%
2013	4,804,888	15,824,074	30%

Calculation of EU aggregate

To aggregate the data retrieved thus far to the EU level, for each waste type the *average* m3 of waste per GT calling in an EU port was calculated, and subsequently multiplied by the total GT calling at EU ports in each year, based on the data above. For ship-generated waste, this leads to the aggregated values, as presented in Table 10.

Table 10 Delivery of ship-generated waste (Annex I and V) at EU level

Measured in m^3	Oily waste from machinery space (MARPOL Annex I)	Garbage (MARPOL Annex V)
2004	3,103,718	763,886
2005	2,840,289	875,500
2006	2,984,985	1,501,156
2007	3,080,303	1,249,659
2008	3,331,547	1,702,478
2009	2,662,329	1,409,669
2010	2,328,517	1,641,412
2011	2,374,729	1,431,787
2012	2,313,924	1,096,725
2013	2,257,684	1,166,426

Measuring the additional delivery of ship-generated waste in the EU

To define the additional amounts of waste delivered in EU ports due to the entry-into-force of the PRF Directive the amounts of ship-generated waste / cargo residues were calculated against the base value for GT calling in EU ports in 2004. This way, the increase of traffic to EU ports in the years under evaluation, is adjusted for. Instead the only factor that changes is the amount of waste delivered per GT, which, it is assumed, may be primarily related to the PRF Directive. Whereas the official entry-into-force of the PRF Directive is in 2002, the introduction of the cost recovery systems experienced delays, as a result of which 2004 is considered a more appropriate basis year[248]. The

[248] *M.H. Nijdam & P.W. de Langen; Haven Ontvangst Installaties, Indirecte financiering en gevolgen voor de concurrentiepositie van Nederlandse Zeehavens; Eindrapport juni 2005.
*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
*EMSA (2005), A study on the availability and use of port reception facilities for ship-generated waste (CarlBro)

results of this calculation, based on the amount of GT called in EU ports in 2004 is presented in Figure 50 and Figure 51. To calculate from these values the *additional* delivery of ship-generated waste in the EU since 2004, 2004 is taken as base year (value =0). The difference with 2004 will be credited to the additional effect of the PRF Directive; recall that also the total GT of vessels calling at EU ports is held constant at 2004 values, which is the reason why the figures below do not fully match the *actual* figures of waste delivery as presented in the previous section.

Figure 50 EU aggregate trend oily waste from machinery space (MARPOL Annex I)

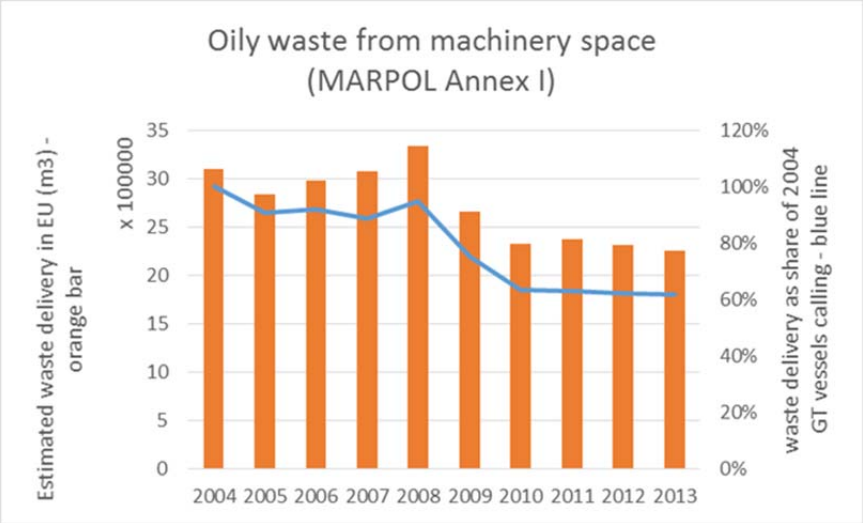
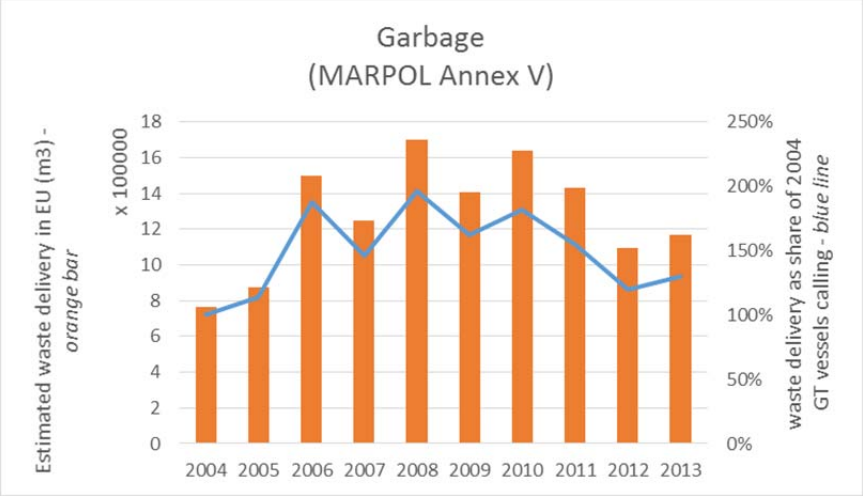


Figure 51 EU aggregate trend garbage (MARPOL Annex V)



Including the impact of passenger numbers

As sewage is primarily associated as a waste type for passenger transport (more particularly the cruise sector), the delivery of this type of waste in ports was not compared against the size / number of vessels calling in EU ports (as above for MARPOL Annex I waste), but instead against the number of passenger received by ports. For MARPOL Annex V waste, both the methodology on port calls in GT and number of pax was conducted. A similar methodology as above on GT/calling in ports was followed. For each port, the number of inward passengers (x1,000) was collected from Eurostat data. Ports with less than 100,000 passengers were excluded from the analysis to ensure that the results are comparable. This left a total of 20 ports with information on sewage deliveries (MARPOL Annex IV), and 27 ports with information on garbage deliveries (MARPOL Annex V). For these two

wastes types, the average volume of delivery was calculated for each year in each port per 1,000 passengers. The result is an average waste delivery per 1,000 passengers, for which the results are presented below.

Figure 52 EU aggregate trend sewage (MARPOL Annex IV) against passenger data

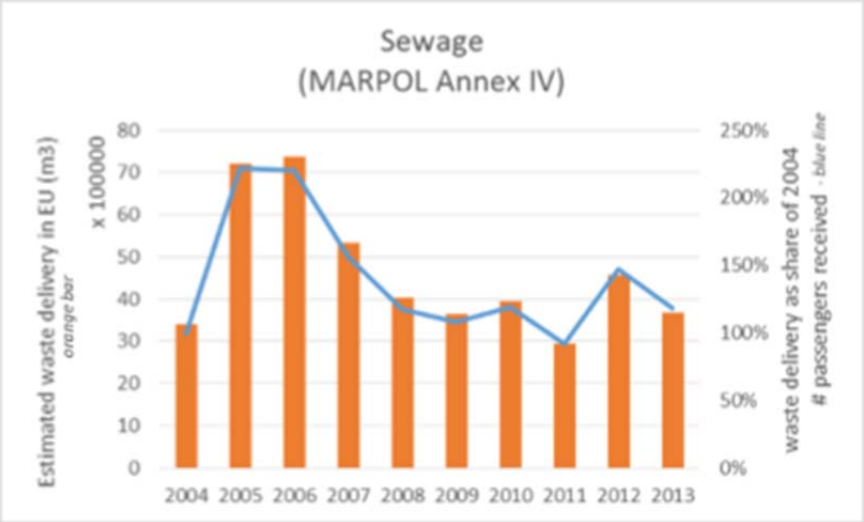
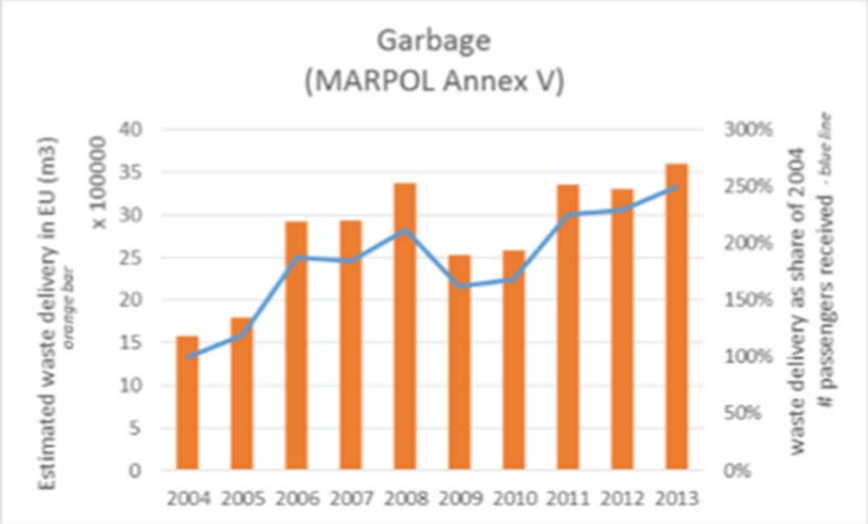


Figure 53 EU aggregate trend garbage (MARPOL Annex V) against passenger data



Validation of findings

In order to estimate whether these figures are a valid representation of the development of deliveries of ship-generated waste, the figures presented above were compared to the findings of other reports. Whereas existing sources do not provide a similar comprehensive picture, data will be compared where there is overlapping data available. Table 11 shows the volumes of Annex I received in the years 2003, 2004 and 2005 in the ports for which EMSA's report on waste fee systems provides this data[249].

[249] 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

Table 11 Volumes MARPOL Annex I waste delivered 2003-2005

Port	2003	2004	2005	Difference 2005 - 2003	% Increase
Rotterdam	30,366	34,749	39,309	8,943	29%
Bremen	23,455	26,859	28,253	4,798	20%
Hamburg	37,500	42,000	52,500	15,000	40%
Klaipeda	10,915	8,695	10,481	-434	-4%
Copenhagen	3,505	3,095	2,164	-1,341	-38%
Thessaloniki	5,260	8,129	7,319	2,059	39%
Bilbao	3,125	3,864	4,125	1,000	32%
Napoli	7,225	7,179	7,679	454	6%
Total	121,351	134,570	151,830	30,479	**25%**

Our findings deviate slightly from these findings, which point to a largely positive trend, not only for 2003-2005, but also in the years 2004-2005. This difference provides reasons to treat the results for this waste type carefully, and also include other findings when interpreting these results.

EMSA's report on waste fee systems provides data of the volumes of Annex V waste delivered in ports in the years 2003-2005, as presented in Table 12.

Table 12 Volumes MARPOL Annex V waste delivered 2003-2005

Port	2003	2004	2005	Difference 2005 - 2003	% Increase
Rotterdam	19,190	19,923	26,105	6,915	36%
Bremen	10,687	10,549	10,725	38	0%
Hamburg	5,400	5,300	4,900	-500	-9%
Thessaloniki	3,688	4,217	3,840	152	4%
Bilbao	5,742	5,342	5,426	-316	-6%
Napoli	6,622	6,590	6,133	-489	-7%
Total	51,329	51,921	57,129	5,800	**11%**

This coincides very well with the average 13% increase found between 2004 and 2005 for Annex V waste at the EU level.

Calculation of benefits

With regards to the marginal costs of Annex V waste being discharged into the sea, the clean-up costs are used as an indicator. For Annex V waste, Hall[250] calculates the removal costs per ton of garbage for various EU beaches. Using this data, and taking the exchange rate between GBP and EUR and the inflation since the writing of the article in account, the average clean-up cost per ton of Annex V waste is calculated at € 1.347. Given that our waste delivery measurements are not in tons but in m3, we follow the same conversion as to our data, which is 2ton = 1 m3 of Annex V waste.

[250] Karen Hall, 'Impacts of Marine Debris and Oil Economic and Social Costs to Coastal Communities; KIMO, 1999.

The costs of additional deliveries (compared with deliveries in 2004) were calculated using this amount (see Table 13).

Table 13 Benefits from avoided discharge of Annex V waste at sea

Year	Total Annex V delivered	Difference with 2004	Clean-up cost per m3	Total
2004	763,886	0	€ 673	€ -
2005	866,540	102,654	€ 673	€ 69,086,142
2006	1,434,089	670,204	€ 673	€ 451,047,292
2007	1,115,648	351,762	€ 673	€ 236,735,826
2008	1,501,938	738,053	€ 673	€ 496,709,669
2009	1,237,004	473,118	€ 673	€ 318,408,414
2010	1,389,417	625,531	€ 673	€ 420,982,363
2011	1,179,807	415,921	€ 673	€ 279,914,833
2012	917,564	153,678	€ 673	€ 103,425,294
Total	10,405,893	3,530,921	€ 673	€ 2,376,309,833
% of surplus vs total		34%		*Annual €297,038,729*

Table 13 indicates that the increase of delivered garbage to ports (compared to 2004 levels) as compared to the total garbage delivered amount to 34%. This percentage is applied to total waste delivery costs to provide a basis for comparison of costs and benefits.

In theory, a similar calculation could be made for oily waste. However, the literature on clean-up costs for oil focus primarily on large-scale oil-spills as a result of incidents which are not comparable to the type and extent of operational discharges. This makes the amounts mentioned in the literature (which are also often based on the level of environmental claims, as recorded by the International Tanker Owners Pollution Federation (ITOPF), incomparable to the actual benefits achieved by the Directive. Moreover, the reduction of oily waste delivered makes an approach based on 'additional benefits' complicated. Therefore, it will be assumed in this evaluation that the benefits calculated for Annex V represent a lower bound for total benefits,

Costs for port users

The total fees charged to port users cannot easily be calculated given large differences in approaches to determine these fees. Moreover, ports are generally not willing to share insights in the revenues of port reception facilities per year. Therefore it was necessary to base the costs on a number of ports which provide their prices publicly on their website, and who base their fees on the GT of the ship. This allows to extrapolate findings to the EU level. The only systems where such prices can be given irrespective of the amounts of waste discharged are based on the fees charged in systems with a 'no special fee system'. Unfortunately, this only takes the average in price between various waste types, but more detail is not available. We assume that these costs indeed cover the costs of waste reception and handling as required by the PRF Directive. Table 14 shows the estimated total waste reception costs of the ports of Tallinn, Stockholm and Hamburg (in Hamburg we were not able to find recent data) together with the total annual GT in the corresponding year, leading to an estimated average € per 1.000 GT[251]:

[251] Derived from the WRH plans outlining indirect fee in the port.

Table 14 Estimated average costs of waste delivery

Port	Year	Total costs (in 2013 €)	Total GT (in 1.000 GT)	€ / 1.000 GT
Hamburg	2005	€ 4,017,049	180,350	€ 22,27
Stockholm	2013	€ 4,315,750	186,072	€ 23,19
Tallinn	2013	€ 3,884,900	221,000	€ 17,58
Average				**€ 21,02**

As the selection of only northern 'no special fee' systems may bias the results, additional data was obtained for the Netherlands, where ADM systems are in place. As ports were not willing to share the data on the level of individual ports, Table 15 shows the annual waste reception costs of all Dutch ports together, provided by the Dutch Ministry of Infrastructure & Environment. In combination with Eurostat data on the annual GT calling at Dutch ports, this leads to an estimated average € per 1.000 GT, which comparable to the finding above.

Table 15 Estimated average costs of waste delivery in the Netherlands

Year	Indirect costs charged €	Direct costs charged €	Total costs	Total GT NL (in 1.000 GT)	€ / 1.000 GT
2013	€13,162,448	€7,866,968	€21,029,416	694,868	€ 30.26
2012	€13,262,661	€6,639,218	€19,901,879	707,669	€ 28.12
2011	€12,630,555	€7,631,470	€20,262,025	691,592	€ 29.30
2010	€11,556,515	€8,023,978	€19,580,493	740,132	€ 26.46
2009	€12,969,122	€6,509,588	€19,478,710	689,837	€ 28.24
2008	€13,142,914	€6,113,681	€19,256,595	762,572	€ 25.25
2007	€9,971,766	€6,275,802	€16,247,568	746,769	€ 21.76
2006	€7,102,290	€5,815,583	€12,917,873	726,296	€ 17.79
Average					**€ 25.90**

Since 2013 is the most recent year of which data is available on the fees charged to ships as well as the total amount of GT calling at EU ports (except in the case of the port of Hamburg, for which recent data is not available, data from 2013 will be used) in the estimation of the amount of € / 1.000 GT and the corresponding total annual figures of waste fees charged to ships. Based on the above, we adopt an estimate of waste costs of €25 per 1,000 GT. The total costs are an estimate of the total amount of all waste fees paid by port users for using port reception facilities in the EU.

Table 16 Estimation of overall waste fees charged to port users in EU

Year	Total Annual GT (in 1,000 GT) EU[252]	Waste costs per unit GT	
2004	13,432,537	€ 25	€ 335,813,425
2005	13,571,439	€ 25	€ 339,285,975
2006	14,060,727	€ 25	€ 351,518,175
2007	15,046,044	€ 25	€ 376,151,100
2008	15,226,058	€ 25	€ 380,651,450
2009	15,307,491	€ 25	€ 382,687,275
2010	15,868,770	€ 25	€ 396,719,250
2011	16,301,431	€ 25	€ 407,535,775
2012	16,055,339	€ 25	€ 401,383,475
2013	15,824,074	€ 25	€ 395,601,850
Total			€ 3,767,347,750

Based on Table 16, the total annual waste fee charged to port users is estimated at 380 million EURO (3.8 billion EURO in 10 years). If we apply the 34% increase of delivered garbage, as mentioned in Table 13, we arrive at annual costs for delivery of the surplus of garbage waste of 128.9 million EURO.

Costs for ports

In the consultation, port authorities were asked to indicate how much time they spent to develop WRH plans. Those that answered to this question in the stakeholder consultation[253], indicated that they spent between 30 and 220 days on developing the WRH plan and between 16 and 40 days per year to update the WRH plan. Time spent on the WRH plans largely depends on the size of the port[254]. Results are presented in Table 17.

Table 17 Estimation of cost of developing and updating WRH plans

Hourly wage costs (Eurostat data for public administrations)	Daily wage costs, derived from Eurostat (based on 8 hours)	Number of days required for developing	Costs for developing WRH Plan
€ 22.51	€180.08	30	€ 5,402
€ 22.51	€180.08	220	€ 39,617

Hourly wage costs (Eurostat data for public administrations)	Daily wage costs, derived from Eurostat (based on 8 hours)	Number of days required for updating	Costs for updating WRH Plan
€ 22.51	€180.08	16	€ 2,881
€ 22.51	€180.08	40	€ 7,203

[252] Based on Eurostat, who includes ports that handle more than 1 million tonnes of goods or over 200,000 passenger per year.

[253] Port authorities were asked in the stakeholder consultation to indicate the extent of the administrative burden. 36 port authorities responded to this question, 18 of which provided the requested numbers. The calculations as provided here for the update / development of WRH plans are based on the responses of these 18 ports, which are of varying in size and are geographically spread across the EU.

[254] See stakeholder consultation report. Results complemented with results from interviews. Port authorities consistently indicate that it is very difficult to give such estimates.

In order to arrive at annual costs of developing and updating WRH plans, the following assumptions are made:

- On average 10,000 EURO is spent on developing WRH plans. We have taken a value below the average of the two values listed in Table 17, as we think there may be a bias towards the values being based on somewhat larger ports (as inputs are taken from our survey, which has few responses from small ports).
- On average 4,000 EURO is spent annually on updating WRH plans, again using a value below the average, following the same reasoning as above.
- We assume that a new WRH plan has a useful life time of 15 years, after which the WRH plan will be newly developed.
- We assume there are 1,500 ports in the EU[255].

Based on the above-mentioned assumptions, the total annual costs for WRH plans for port users are presented in Table 18.

Table 18 Total annual costs for WRH plans for port users (EURO)

Activity of WRH plan	Number of ports	Average annual costs (EURO)	Total annual costs (EURO)
Development	1,500	€ 667	€ 1,000,000
Update	1,500	€ 4,000	€ 6,000,000
Total			€ 7,000,000

Costs for Member States

In the stakeholder consultation Member States provided information on costs related to checking and approving the WRH plans, combined with costs related to dealing with exemptions (receiving of exemption requests, taking exemption decisions and communicating these decisions)[256]. The answers from port authorities and member states were compared against the average number of port calls they received. This way, the answers from various respondents could be better assessed. Based on this input, it was found that one FTE desk officer on average handled the administrative costs that follow from roughly 20,000 port calls. Clearly, this does not mean that the desk officer is involved in every port call; this figure is instead an approximation of the number of port calls that creates the need for Member States to dedicate one (1) desk officer. For the calculation, the total port calls, as established by Eurostat will be divided by this number (20,000) to obtain an estimate on the number of staff needed for public administration (either locally, regionally, or at the central level). As a result, Table 19 presents the total costs incurred by Member States as a result of complying with the provisions of the PRF Directive, including the evaluation and approval of the WRH plans and the exemptions.

Table 19 Estimates of costs for Member States

Hourly wage costs (Eurostat data for public administrations)	Annual hours (OECD EU Average annual hours actually worked for 2008)	Calculated average annual wage cost EU for public administration
€ 22.51	1,700	€ 38,267

[255] Based on Annex VII (EUROSTAT list of European ports), as included in 2005/366/EC: Commission Decision of 4 March 2005 implementing Council Directive 95/64/EC on statistical returns in respect of carriage of goods and passengers by sea and amending Annexes thereto (notified under document number C(2005) 463).

[256] Stakeholders indicated that often the same desk officer handled these issues, and that it was therefore not possible to split the costs into separate activities.

2008 number of port calls (Eurostat)	Number of staff needed	Estimated costs
2,289,021	114.45	€ 4,379,698

Calculating administrative burden

Regarding the information obligations of the PRF Directive, stakeholders indicate that it generally does not take longer to collect the data for the advance notification requirement and file it than 30-60 minutes, but an average sized cruise ship spends roughly 8 man-hours to retrieve and/or estimate the necessary information on the amounts of waste to discharge. Passenger vessels that are not cruise ships face similar difficulties as cruise ships, though not as substantially; we therefore assume 4 hours for this category. 85% of port calls were freight vessels, with an estimated average time of 1 hour work. Passenger vessels (14%) around 4 hours, and cruise ships (1%) around 8 hours. The division as noted above was applied to the 2013 Eurostat statistics of port calls in the EU, against an average wage cost in the Maritime transport sector of €26,84 (also by Eurostat).

The requirement on port users to notify ports in advance is therefore estimated to be between 13.42 and 214.72 EURO for each port call, based on the average hourly wage costs of the European maritime sector[257]. The large share of freight transport in the number of annual port calls (85% in 2013) and the relatively small share of cruise ships (1%) and other passenger transport (14%) have been weighed in our calculation, resulting in total annual costs of 74.5 million EURO.

Costs for port users

Table 20 Estimated administrative burden on port users

Number of hours required for notification	Sector – share in overall port calls EU	Number of port calls 2013 (Eurostat)	Hourly wage costs (Eurostat)	Estimated total costs
1	Freight – 85%	1,582,836	€ 26.84	€ 42,483,318
4	Passengers – 14%	260,702	€ 26.84	€ 27,989,009
8	Cruise ships – 1%	18,622	€ 26.84	€ 3,998,429
Total				**€ 74,470,756**

Costs for competent authorities

Once transmitted to the port authority, the advance notification form needs to be processed by the relevant authorities, creating an administrative burden on the side of the port authority. The port of Piraeus indicated that they have one person full time working on the management of advance notification forms, which comes down to roughly 10 minutes per port call. Calculations are presented in Table 21.

Table 21 Enforcement costs for authorities

Number of hours required for notification	Number of port calls 2008 (Eurostat)	Hourly wage costs public administration (Eurostat)	Estimated total costs
0.16	2,289,021	€ 22.51	€ 8,587,643

[257] 2008 was taken as reference year, as this is a good average between the entry into force of the Directive in 2002 and the time of evaluation in 2014. The average wage cost in the Maritime transport sector was €26,84 in 2008.

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