

Rijkswaterstaat- Waterdienst

Assessment of economic instruments for the Marine Strategy Framework Directive

Sterk Consulting

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1 Introduction

1.1 Background

The European Union's Marine Strategy Framework Directive (MSFD) aims to more effectively protect the marine environment across Europe. It aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine related economic and social activities depend. GES means that the overall state of the environment in marine waters provides ecologically diverse and dynamic oceans and seas which are healthy and productive. In recent years, the emergence of the concept of environmental costs, the recognition of the need to apply more fully the polluter-pays principle and the adoption of the European Water Framework Directive (WFD) are elements that have widened the scope of economic instruments. From several studies it appears that economic instruments are a well-proven means of water management. Also in the MSFD economic obligations are mentioned:

- An economic and social analysis of the use of the North Sea;
- Member States must ensure that measures are cost-effective and that a cost-benefit analysis is carried out,
- Exceptions are possible when costs are disproportionate.

Textbox 1: MSFD quotes on economic obligations

In respect of each marine region or subregion, Member States shall make an initial assessment of their marine waters, taking account of existing data where available and comprising the following: an economic and social analysis of the use of those waters and of the cost of degradation of the marine environment (Article 8(c))

Member States shall ensure that measures are cost-effective and technically feasible, and shall carry out impact assessments, including cost-benefit analyses, prior to the introduction of any new measure (Article 13 (3)).

Member States shall develop and implement all the elements of marine strategies referred to in Article 5(2), but shall not be required, except in respect of the initial assessment described in Article 8, to take specific steps where there is no significant risk to the marine environment, or where the costs would be disproportionate taking account of the risks to the marine environment, and provided that there is no further deterioration (Article 14 (4)).

In the Netherlands research has been done to meet these obligations, such as the economic and social analyses of the marine environment and the costs of degradation of the Dutch North Sea environment.

1.2 Aim of the report

Optimisation of the use of economic incentives and instruments may contribute to more efficient and effective water management. This is acknowledged in the MSFD that claims specific attention for the use of economic instruments. In Annex 6 it is stated as one of the programmes of measures: *Economic incentives: management measures which make it in the economic interest of those using the marine ecosystems to act in ways which help to achieve the good environmental status objective*. This report holds a further analysis of the possibilities of using economic incentives and instruments in the Dutch North sea to reach the goals of the MSFD.

The purpose of the report is threesome:

- To create an overview of the economic incentives and instruments currently used for the protection of the Dutch North Sea environment;
- An analysis of the possibilities of optimising current or introducing new economic incentives for those aspects of the North Sea that are expected to need additional policy;
- A proposal on which economic incentives offer perspective for a more efficient and effective water management.

The report is based on a more practical rather than a theoretical approach. Stakeholders, both industry and environmental organisations, have played a vital role in the analyses. The stakeholders were interviewed and their opinions were an important input for this report. The report was written Sterk Consulting in cooperation with the economist of the Centre for Water Management.

1.3 Outline of the report

Chapter 2 gives a theoretical background on economic instruments and the use of economic instruments in water management. An overview of instruments that are currently in use for the protection of the marine environment is given in chapter 3. Chapter 4 describes how preliminary measures, that will be part of cost-benefit analyses of 2012, were listed. The views of stakeholders on this list are described in this chapter. The perspective for new economic instruments is elaborated on in chapter 5. It lists new possible economic instruments in the marine environment and assesses these instruments. Conclusions and recommendations are presented in chapter 6.

2 Theoretical background

As mentioned before, this report holds a practical rather than a theoretical approach. Some theoretical background information on economic instruments and on the way these instruments can be assessed with a review framework is relevant for this research and may prove useful. This chapter provides theoretical background on economic instruments (section 2.1). It then gives a preview on what is known about the use of economic instruments in watermanagement. Here a distinction is made between inland water management en water management in a marine environment (section 2.2). The review framework to assess different economic instruments and incentives is elaborated on in section 2.3.

2.1 What are economic instruments?

There are many answers to the question how to define economic instruments. In literature different definitions can be found. One of them is stated by ACTeon:

- Economic instruments are systems of economic incentives (positive or negative) put in place with the aim to change behaviour and decisions in order to enhance environmental protection. They are often divided into market-based and nonmarket based instruments.
- Economic instruments are used to increase the efficiency of using natural resources and can help to collect additional financial resources, being based on the polluter-pays principle.¹

Another definition was stated by Van der Doelen (1993) and used by Witteveen en Bos:

- A policy is a means that a policy actor (government) uses to achieve a particular performance (goods or services) or an intended effect (target group behaviour).
- Economic instruments stimulate voluntary behaviour that has financial consequences (in other words: is financially not optional). Examples are subsidies (e.g. beneficiary receives money for the construction of a wastewater treatment), payment for green-blue services (e.g. beneficiary receives money for construction of water storage), levy (e.g. beneficiary pays money for receiving a service, such as use of the sewer), fines (beneficiary must pay a fine for not meeting the goals of water), water price (beneficiary pays money for receiving water), markets (artificial market for CO2 trading).²
- In this report we choose to use the second definition for economic instruments. So economic instruments stimulate voluntary behaviour that has financial consequences. In this report we also mention economic incentives. This we define as any incentive that has a financial consequence such as a fine. A fine could be an economic incentive that is embedded in a legal instrument.

¹ Derived from: economic instruments in watermanagement in Europe, ACTeon (sept 2009)

² Experimenten met nieuwe praktijktoepassingen van economische instrumenten voor duurzaam waterbeheer, Witteveen en Bos, 2010.

The use of economic instruments can serve different goals such as to:

- finance the costs of measures;
- create price incentives (and change behaviour);
- generate revenues.

2.2 Use of economic instruments in water management

The use of economic instruments in water management in various European member states has been investigated by ACTeon in their report 'which role for economic instruments in the management of water resources in Europe (sept 2009). This report gives an overview of economic instruments used all over Europe and elaborates on the use of innovative instruments. In the MSFD the economic instruments would need to:

- mobilise sufficient financial resources for supporting the achievement of the environmental objectives of the MSFD;
- contribute to economic and allocative efficiency;
- account for basic economic principles (such as the polluter pays principle, but also the user-pays principle or the beneficiary pays principle).³

The main conclusions on the *use* of economic instrument are that they are a well proven means of water management. The quotes are framed in textbox 2.

Textbox 2: main conclusions on the use of economic instruments in water management

Economic instruments are a well-proven means of water management all over Europe, relying in most Member States on charges for water supply and sanitation services and on environmental (abstraction & pollution) charges. In recent years, the emergence of the concept of environmental costs, the recognition of the need to apply more fully the polluter-pays principle and the adoption of the Water Framework Directive (WFD) are elements that have widened the scope of economic instruments. Economic instruments, for example, are applied today to reduce morphological alterations or the management of excess water. Public budget constraints have furthermore motivated the search for innovative instruments, turning away from purely public investments and subsidies towards more elaborated economic mechanisms for environmental aims.

These conclusions apply to the inland water management. The marine environment faces us with different boundary conditions which may lead to different conclusions on the role of economic instruments. In general conditions that improve the chances for economic instruments or incentives to function well are:

³ Based on: economic instruments in watermanagement in Europe, ACTeon, september 2009.

- the user is known: to know the user of the marine environment is a boundary condition for interaction with this user;
- the user is accountable: only when a user can be held accountable for its behaviour, it is possible to influence its behaviour;
- there is a stable and measurable entity for the economic instrument: an economic instrument will only work if the entity that it relies on is stable and measurable (such as tons of fish, m³ of sand et cetera);
- it is possible to monitor the behaviour of the user: reliable monitoring of behaviour through self regulation by sectors or by authorities is a boundary condition for the instrument to work.
- the risk of violation is acceptable: economic instrument that involve a high risk of violation should be avoided.

In the marine environment several of these conditions differ significantly from the conditions for inland waters. The size and more difficult accessibility of the North sea, the international character of the users, the diversity and mobility of users and the lack of ownership of the property can form a barrier for the functioning of (economic) instruments. This argumentation is laid down with an example in the textbox

Textbox 3: difference between instruments at sea and on land.

Tariff for drinking water on land

The owner of a house is known to the water company and is accountable for its behaviour. There is a stable and measurable entity to measure the use e.g. M³ drinking water. Also the behaviour of the household is measured by a simple measuring device (a water meter). This device can be checked every year so the risk of violation is relatively small. The boundary conditions for economic instruments to function well (a known and stable user with ownership whose behaviour can be monitored and who is accountable for what he does) work out almost perfectly well for this economic instrument. This is the reason why this instrument is widespread and successful.

Tariff for fishermen at sea

At sea, the picture is quite different. Suppose we would like the fishermen to pay for their use of the North sea. A first question would be whether or not we know the users? For the national fishermen this would probably be quite easy, but for international ships this would be more difficult. Also the monitoring of the behaviour of these ships is more difficult. This has to do with the size of the sea, the more difficult accessibility of the sea for supervision, but also the users are more mobile and move around which makes it more difficult to monitor them. Then one would also have to identify a measurable entity that is a good descriptor for the 'use' of the North Sea (such as the m³ price for drinking water). For the fishermen one could think of the tons of fish that the fishermen catch. Then one has to deal with issues as differentiation for different species of fish and how one should monitor if some of the fish were caught outside of the north sea. Monitoring behaviour is probably partially possible. Ships could be tracked by satellite and GPS devices, but exactly how the fish are caught and what they do with it cannot be seen with a satellite. Enforcement and supervision are harder at sea than on land. The risk of violation of rules is also larger as the users are more mobile and operate in a vast area. Also the users do not have legal ownership of the sea which imposes requirements on good housekeeping. Naturally modern technology can help to partially solve the barriers mentioned. Modern ICT and GPS satellite techniques can make a large sea look 'small' again. However the boundary conditions for economic instruments to function well (a known and stable user with ownership who's behaviour can be monitored and who is accountable for what he does) work out poorly.

It is safe to conclude that the marine environment faces us with different challenges such as enforcement, supervision and accountability, when it comes to implementing (economic) instruments and incentives.

2.3 Review framework for the assessment of economic instruments

A review framework is used to assess different economic instruments and incentives. The following criteria are used:⁴

- **effectiveness economic instrument:** the degree to which a financial incentive from the government contributes to the behaviour of a citizen, business or organisation. For example, by introducing economic instruments such as a discharge levy, x% of industrial businesses invest in the treatment of wastewater before discharging into surface waters;
- **effectiveness water management:** the extent to which measures that affect the water help to improve the condition of the water (change of environmental descriptor);
- **social efficiency water management:** the extent to which the social benefits of water management exceed these costs;
- **current principles:** the degree to which the instrument is in line with the Polluter Pays Principle and the Cost Recovery Principle;
- **justice:** the extent to which the polluter or user pays for its use and the extent to which the user that benefits, pays for these benefits;
- **other:** legal, technical and financial issues.

This set of criteria will be used to assess economic instruments.

⁴ Derived from: Experimenten met nieuwe praktijktoepassingen van economische instrumenten voor duurzaam waterbeheer, Witteveen en Bos, 2010.

3 Current use of instruments in the marine environment

3.1 Introduction

A broad variety of instruments is in use to protect the marine environment. In this chapter the instruments that were mentioned by the Dutch stakeholders during interviews, are described. The Dutch stakeholders are the industry on the one hand. Relevant sectors are fishing, gas and oil extraction, shipping, sand winning, energy production and recreation and tourism. On the other hand organisations for the protection of the marine environment were also interviewed.⁵ Stakeholders were asked which instruments are present in their sector for the protection of the marine environment. In section 3.2 an overview of legal instruments is presented. Section 3.3 describes the importance of international platforms such as OSPAR and IMO. Communicative instruments are presented in section 3.4 and in 3.5 the economic instruments are described.

3.2 Legal instruments

The vast majority of the instruments mentioned by the stakeholders can be characterised as legal instruments. With legal instruments a change of behaviour is imposed. This behaviour is sometimes optional and sometimes obligatory. Examples include licensing (e.g. beneficiary receives approval for the discharge of wastewater or removal of groundwater), obligation to tolerate (e.g. beneficiary is obliged to tolerate a temporary storage area for water) and prohibition (e.g. beneficiary is prohibited certain substances, e.g. certain pesticides).

European guidelines

Both the industry and the organisations for the protection of the environment stress the international focus of the marine environment and point out the importance of European guidelines. Below we mention some of the main European directives mentioned by the stakeholders:

- Marine Strategy Framework Directive; Directive 2008/56/EC aims at reaching a 'good environmental status in all European seas by 2020;
- Water framework Directive: Directive 2000/60/EC aims at improving the quality of surface and groundwater in Europe;
- Directive on port reception facilities: EC Directive 2000/59 aims at substantially reducing discharges of ship-generated waste and cargo residues into the sea;
- Directive on the conservation of wild birds: Directive 2009/147/EC aims at the protection of wild birds;
- Council Directive 1999/32/EC: Directive aims at reducing sulphur content;

⁵ For a complete overview of the stakeholders, see Annex II

- Emission Trading System: this system aims at combating climate change in a cost-effective way;
- Council Directive on the conservation of natural habitats and of wild fauna and flora: Directive 92/43/EEC aims at the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements;
- REACH is the European Community Regulation on chemicals and their safe use (EC 1907/2006). The aim of REACH in the production and use of chemicals to ensure a high level of safety for man and environment, while the competitiveness of the industry is maintained or improved.
- Common Fisheries Policy: CFP EG nr 2371/2002 (see textbox 4)

Textbox 4: details on the CFP.

For the North Sea special attention is required for the Common Fisheries Policy. As the activities of each national fishing fleet affect the opportunities of other fleets, the EU countries have decided to manage their fisheries in collaboration, through the Common Fisheries Policy (CFP EG) nr. 2371/2002). This policy brings together a range of measures designed to achieve a thriving and sustainable European fishing industry. The most important areas of action of the common fisheries policy are:

- laying down rules to ensure Europe's fisheries are sustainable and do not damage the marine environment;
- providing national authorities with the tools to enforce these rules and punish offenders;
- monitoring the size of the European fishing fleet and preventing it from expanding further;
- providing funding and technical support for initiatives that can make the industry more sustainable;
- negotiating on behalf of EU countries in international fisheries organisations and with non-EU countries around the world;
- helping producers, processors and distributors get a fair price for their products and ensuring consumers can trust the seafood they eat;
- supporting the development of a dynamic EU aquaculture sector (fish, seafood and algae farms);
- funding scientific research and data collection, to ensure a sound basis for policy and decision making;

National guidelines

Also at national level legislation is in place. Also the European legislation is transposed into national legislation. Crucial Dutch legislation is

- For oil and gas exploration: Mining Act and the Mining Decree (Mijnbouwwet);
- For shipping: Act on Prevention of Pollution from Ships (Wvvs) and Wvvs Decree (Wet voorkoming verontreiniging door schepen);
- For Fishing: Common Fisheries Policy (Gemeenschappelijk Visserij Beleid);
- For sand extraction: Extraction act and Extractios Decree (Ontgrondingenwet en het Ontgrondingenbesluit Rijkswateren);
- Environmental Protection Act (Wet Milieubeheer);
- Agreements/covenants within sectors (such as energy covenants).

3.3 International platforms

On an international level important and influential organisations were set up. These organisations discuss many issues concerning the protection of the marine environment. OSPAR and IMO are two key platforms.

OSPAR

OSPAR was mentioned by both industry and environmental NGOs as a relevant policymaker. OSPAR is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Community, cooperate to protect the marine environment of the North-East Atlantic. The new annex on biodiversity and ecosystems was adopted in 1998 to cover non-polluting human activities that can adversely affect the sea. OSPAR contributed to monitoring of substances, reduction in phosphorus and heavy metals inputs; a reduction of discharges from nuclear plants; regulation for offshore oil and gas activity; bans on dumping of waste and offshore platforms; ecological quality objectives for a healthy North Sea; and a growing network of OSPAR Marine Protected Areas. In 2007 OSPAR published Guidelines for the implementation of Fishing for Litter projects in the OSPAR Area.

IMO

IMO, the International Maritime Organization, was also mentioned by stakeholders as a vital party for international policy for the protection of the marine environment. IMO is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships. The overall objectives are summed up in the IMO slogan: “safe, secure and efficient shipping on clean oceans”. Contracting Governments enforce the provisions of IMO conventions as far as their own ships are concerned and also set the penalties for infringements, where these are applicable. Within IMO Marpol (International Convention for the Prevention of Pollution from Ships) annex 1 -6 is the most relevant document. This addresses the main environmental issues such as litter, noise, bilge water, energy, air emissions et cetera.

3.4 Communicative instruments

Another very important instrument to achieve goals are communicative instruments. The communicative instruments encourage voluntary change of behaviour. Communicative instruments play a vital role in the protection of the North sea. All relevant stakeholders such as governments, environmental NGO's, syndicates for the different industrial sectors use communicative instrument to reach their goals. Communication is organised through many different ways such as education, conferences, web sites, intervision, networking et cetera. There are many international consultative organisations that play a vital role in communicating agreements throughout their sectors.

Textbox 5: example of a communicative instrument.

Course Marine Awareness

An example of a communicative instrument initiated by the industry itself is a course on Marine Awareness. First the Dutch Shipping Sector (the NVRD) initiated the organisation Prosea. Prosea is an independent non-profit educational organisation specialized in marine awareness and sustainability. Prosea initiated a course in the Netherlands that was so successful that it has been internationally implemented. The course Marine Awareness is now internationally well known.

3.5 Economic instruments

In this section we state the economic instruments (stimulate voluntary behaviour that has financial consequences) and economic incentives (any incentive that has a financial consequence) in the marine environment that were mentioned by the stakeholders:

Tariffs and taxes

Within legislation tariffs for activities are stated. Environmental considerations may influence the height of these tariffs and taxes:

- Sand: for the winning of sand a tariff is charged per m³ sand. Currently the tariff is regionally differentiated. Winning of sand in inland waters is charged with 2,11 euro whereas winning of sand at sea is charged with 0,88 euro per M³. This type of differentiation turns environmental preferences into financial incentives.
- Gas and oil: for the exploration of oil and gas similar elements are part of the legislation. In this case the Mining Act regulates that the government takes part in the winning of gas and oil and receives a fee per unit extracted. A company that proves that there are recoverable reserves, can apply for a permit to extract it. Subsequently, the Minister of Economic Affairs, Agriculture and Innovation (ELI) will decide on the permit (requires financial, technical and quality criteria). When the extraction is carried out effectively, the government participates in the production and gets paid an amount per unit extracted. This results in a yield of 8 to 13 billion euro per year for the Dutch government. Differentiation within these fees could be used to improve protection of the marine environment.

- Shipping: adequate port reception facilities play a vital role in the policy of "zero tolerance of illegal discharges from ships". Ship pay a tariff for the use of these reception facilities. At the moment the way ship are charged (variable and fixed costs) differs per port. This tariff could be used for a better protection of the marine environment
- The shipping tonnage tax is a tax levied on the taxable profits from shipping. The profit is determined on the basis of the net tonnage of the taxable vessels.

Fines

Another economic incentive that is regularly part of legislation is the fine or penalty. The penalty is linked to the offense of the agreements in legislation. Virtually all legislation holds penalties that apply when rules are violated. Examples are penalties for:

- dumping waste;
- fishing in forbidden areas, on the wrong days, too many fish (above the quota);
- oil spills;
- stocking hazardous substances;.

Penalties can be costly for companies and at the same time they can be very critical in terms of negative media attention. Think of the penalties for BP for violating environmental regulation. The following examples illustrate this.

Textbox 6: example of a fine in the marine environment

Exxon Valdez (source: several news items summarised by Sterk Consulting)

The Exxon Valdez oil spill occurred in Prince William Sound, Alaska, on March 24, 1989, when the Exxon Valdez, struck Bligh Reef and spilled 260,000 to 750,000 barrels (41,000 to 119,000 m³) of crude oil. It is one of the most devastating human-caused environmental disasters. The region is a habitat for salmon, sea otters, seals and seabirds. The oil, covered 1,300 miles of coastline, and 11,000 square miles of ocean.



Exxon mobile was convicted to pay \$4.5 billion as a result of the accident, including compensatory payments, clean-up payments, settlements and fines. The accident dominated the world news for months.

Textbox 7: another example of a fine for an oil company

Another multi-million fine for BP (source: nu.nl)

WASHINGTON - The British oil company BP will pay another \$ 50 million (over 36 million euros) in fines in connection with an explosion in 2005 at a Texas refinery.



These penalties have to be paid because of violations of environmental regulations in the years during and after the explosion. BP has not pleaded guilty, but has agreed to pay the amount, in addition to the previously imposed \$ 100 million.

Fund

NOx fund Norway: reduced NOx emissions are the primary objective of the Environmental Agreement relating to NOx and the Business Sector's NOx Fund. The Fund is a cooperative effort where participant enterprises may apply for financial support for NOx reducing measures. Payments made to the Fund replaces the governmental NOx tax for participant enterprises. The NOx fund is established by 15 cooperating business organisations. The Fund is managed in accordance with the full cost principle (non-profit), i.e. all the financial means which the Fund receives will be utilized in accordance with its purpose of reducing NOx emissions in a cost-effective way with the exception of necessary administrative costs.

Labelling

A true market based economic incentive is voluntary labeling. Ecolabels can give companies a competitive advantage. Two ecolabels were mentioned for the marine environment:

- **The Blue Flag** is a voluntary eco-label awarded to beaches and marinas. The Blue Flag Programme is owned and run by the non-government, non-profit organisation the Foundation for Environmental Education (FEE). The Blue Flag works towards sustainable development of beaches and marinas through strict criteria dealing with water quality, environmental education and information, environmental management, and safety and other Services.
- **Clean Shipping Index (CSI)** is also a label and takes into account the major part of environmental effects connected to shipping, such as emissions to air and water, use of chemicals, antifouling etc. The index rank vessels or shipping companies according to the most relevant issue, decided by the viewer. If you are a cargo owner seeking

shipping companies with the best performance when it comes to carbon dioxide (CO₂) emissions, or any other issue close to your heart, you can make that choice in the database.

Rewarding or compensation

- **Payments for Environmental Services (PES):** PES is the practice of offering incentives to parties in exchange for some sort of ecological service. There is a growth in demand and willingness to pay for environmental services at global, regional and local level. Most of the PES schemes so far are led by the public sector, at national and international level, although private sector is increasingly involved in paying to promote environmental service provision. Fishing for litter does not fit the definition of a PES just now. Ships that pick up litter are stimulated to take this litter with them (instead of throwing it back into the sea) and hand it in on land without costs. An extra step would be to reward the fishermen financially for this activity. Then fishing for litter would qualify as a PES.
- **Rewarding system for clean ships:** a very recent initiative, related to the CSI label is a good example of an economic instrument. The instrument is based on the CSI labeling system and initiated by Port of Rotterdam. The essence is that clean ships (CSI) receive a discount on the port charges of up to 15.000 euro per visit. Initiatives like this one can count on media attention. The following article was published on nu.nl.

Other countries

In other countries economic instruments are used. Examples are:

- Plastic bag tax in Ireland that is successful in reducing plastic bag litter. The effect on the marine environment was not specifically measured;
- Deposit refund schemes for plastic bottles in both the UK and Denmark. This instrument has lowered costs and pollution with waste.

Textbox 8: example of an economic instrument based on rewarding

Rotterdam rewards cleanest ships (source: nu.nl)

Last update: September 12, 2011 11:16 info

ROTTERDAM – Following the competing port of Antwerp, The Rotterdam harbour is rewarding more "clean" vessels with a discount on port fees.

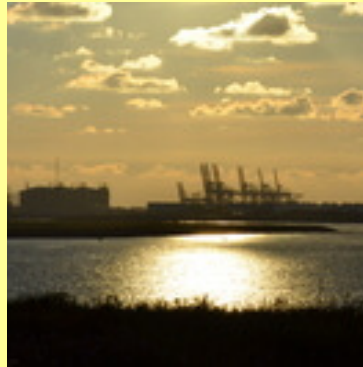


Photo: NU.nl/Marga Plomp

For this and next year it will be at least 25 vessels, Port Authority announced Monday. These are ships that score better than the legal standard regarding emissions of harmful substances. They are included in the so-called Environmental Ship Index (ESI), an initiative of a group of European ports. This list now includes 375 ships.

Only the best

The Rotterdam port authorities had initially chosen only to reward the very best ships, that get a score of 31 points. There are only six of those ships, of which so far only one has arrived at the port of Rotterdam. The Antwerp Port Authority introduced for this year and the next a more flexible standard and Rotterdam now follows this. This means that ships having more than 20 score points, can count on a discount. Which can amount to 15,000 euro.

3.6 Conclusions

There are many instruments present to protect the marine environment. Legal instruments seem to be the most common and the most influential. At the same time also communicative instruments and economic instruments and incentives are operational. The economic incentives found were: tariffs, taxes, fines, funds, labelling and PES (rewarding systems). The different instruments are often interdependent. Legal instruments can depend on or stimulate economic incentives such as fines, but they can also depend on communicative instrument that make stakeholders know of laws. Within the marine environment an increase of the use of economic instruments seems possible as quite a large part of the economic instruments have started recently.

4 Measures for the MSFD

This chapter describes the process of defining the measures for the MSFD (section 4.1), explains what the role present policies such as IMO and CFP play in this process (section 4.2), presents the preliminary list of measures (section 4.3) and then elaborates on the stakeholders view of the preliminary list of measures to protect the marine environment (section 4.4). The conclusions are given in section 4.5.

4.1 The process of defining measures

Measures for the protection of the marine environment are regarded in relation to the 11 descriptors of good environmental status (GES) laid down in Annex I of the MSFD.

Textbox 9: Qualitative descriptors for determining GES

Qualitative descriptors for determining GES (Annex I)

1. Biological diversity
2. Non-indigenous species
3. Population of commercial fish / shell fish
4. Elements of marine food webs
5. Eutrophication
6. Sea floor integrity
7. Alteration of hydrographical conditions
8. Contaminants
9. Contaminants in fish and seafood for human consumption
10. Marine litter
11. Introduction of energy, including underwater noise

In The Netherlands a process of creating and selecting possible measures has taken place in preparation of the national cost benefit analysis, which is scheduled for 2012. The following criteria were vital in this preliminary selection process:

- Only measures aiming at descriptors that are expected to show a gap in meeting the good environmental status are taken into account.
- Current policies (such as IMO, OSPAR) played a vital role in the choices made (section 4.2).

4.2 Present policies lead to a focus on litter

Present policies play a vital role in the selection of measures for the MSFD. The most important present policies in the marine environment are Common Fisheries Policies, IMO, European Water Framework Directive, including 'basic measures' e.g. Nitrate Directive, Urban Waste Water Directive, IPPC, etc. The Dutch assume that these policies will achieve their respective objectives, and by doing so, also achieve the objectives of the MSFD. E.g. the Common Fisheries Policies is expected to result in sustainable fisheries, IMO will

prevent the introduction of alien species, and the Water Framework Directive is expected to solve the eutrophication problems in the North Sea. If by any chance these policies would fail to achieve their objectives, MSFD will address these other policy areas to achieve their objectives, because the marine environment is depending on that. In this way, MSFD will be agenda setting for the other policy arenas. The Dutch do not want to disturb the current negotiation processes in these policy areas by adding new measures. With respect to noise, much is still unknown. For example, it is not clear whether ambient noise from shipping causes a serious problem for the environment. Since it is not known whether there is a problem in the first place, it is no use to already look for, let alone implement, additional policies. The most important problem in the marine environment that is not handled/solved yet by present policies is **waste / litter** (GES descriptor 10). The Dutch government acknowledges that marine litter and especially plastic waste is a growing problem and that an international approach is essential. The goal for 2020 is that the amount of waste in the water column, on the seabed and on the coast has declined. It also aspires to achieve a downward trend in the amount of litter in marine organisms. To achieve this two parallel paths are used:

- By focusing on the development of knowledge, a more complete picture emerges of the problem, sources and effects of litter in the sea, and in particular the micro plastics.
- In addition, the government will focus on preventing that waste is disposed of in the ocean. This should be an integrated approach that sets goals for the various sources of litter present in the sea.⁶

4.3 Litter and measures

The conclusion of section 4.2 is that litter is the main and only descriptor with an expected gap between the current situation and the targeted situation in 2020. For all other descriptors there is either no gap or the gap is expected to be bridged by current policy (such as CFP, IMO etcetera).

What do we know about litter?

Plastics are a major problem as these break down in small particles that enter the food chain and cannot be removed (micro plastics). Measures should aim at introducing less (or other kinds) of litter in the environment (source oriented) or removing the litter from the sea (end of pipe oriented).⁷ It is important to understand that our knowledge of marine litter is limited. It is estimated that 20.000 tonnes of litter is dumped in the North Sea annually. 70% sinks to the sea bottom, 15% floats and 15% washes ashore. The main sources of litter are the rivers, shipping, fishing and tourism.⁸

⁶ Source: Bespreeknotitie IDON, p 4, 7 november 2011

⁷ This report does not go deeper into describing the particulars of the various measures. For this a separate study by LEI was commissioned

⁸ Source: overzicht van organisaties die betrokken zijn bij Marien afval op de noordzee Deltares, initial assessment, draft, 2011

This report also states that the current knowledge regarding marine litter is limited. The initial assessment of Deltares also states that ‘limited quantitative information is available about the sources of marine litter’.⁹ Also German research calls for additional research on the effect of litter on the marine ecology.¹⁰

Measures

In preparation of the national cost benefit analysis the following list of measures that focuses on litter was developed (numbers refer to listing used by LEI study):¹¹

Table 1: preliminary list of selected measures

	Measure
17	Different packaging standards of plastic pellets
18	Alternative for bundles of nylon wires used to protect fishing gear
19	Biodegradable nets
20	Higher fines for littering
23	Silent construction methods
58	Ban on use of plastic bags in supermarkets
59	Do it yourself beaches
60	Biodegradable user plastics at beaches
61	Biodegradable balloons, balloon valves and ribbons
62	Stricter enforcement on the use of port reception facilities to collect waste
63	Fishing for litter
64	Adding individually recognisable ID-markers to fishing nets and wires
65	Additional Beach cleaning
66	Deposits on all plastics

The measures above aim at various sources of litter and various routes.

4.4 Stakeholders view on measures

The above list was discussed with Dutch stakeholders in face to face interviews (for a list of interviews see appendix 1). This has led to the following general findings:

- Most stakeholders think that current policy alone will solve most, but not all, problems related to the marine environment. Organisations for the protection of the environment do not agree with the choice of litter to be the only descriptor with an expected gap between the current situation and the targeted situation in 2020;

⁹ Initial assessment, Deltares, p 162, may 2011.

¹⁰ Methodische Grundlagen für sozio-ökonomische Analysen sowie Folgenabschätzungen von Maßnahmen einschließlich KostenNutzen Analysen nach EG-Meeresschutzstrategie-Richtlinie

¹¹ During stakeholder interviews, a slightly larger list of possible measures was used. This report presents only the measures that are also part of the preparatory study for the upcoming cost-benefit analysis. Stakeholder opinions on other measures have been shared with the principal of this research.

- In general, the stakeholders find the list quite limited. In view of the point above this is not strange. However, some stakeholders do not like that present policy is left out of the CEA as this means that the current work done is obscured from view. In particular, most stakeholders (including the fishing industry itself) feel that the common fishing policy should be part of the CEA. In this way all measures for all sectors can be assessed on a similar basis.
- Many stakeholders feel that more research is needed to find out what exactly causes the (mainly litter) problems. Little is known about sources, routes and effects. The stakeholders representing the industry feel in general that the precautionary principle should not be followed, first more emphasis should be given to research.

The following findings came up regarding the individual measures:

- Different packaging standards of plastic pellets: the problem is known to both the shipping industry and the harbours. Plastic pellets are present at the bottom of the sea and flush ashore. It is however unclear whether plastic pellets are still disposed of at sea. Under IMO it is already regulated that no plastic may be discharged to the sea. Flushing bulk cargo is regulated already and is no longer a problem due to different construction techniques of ships. It seems that measure should focus on dealing with the pellets that are already in the sea instead of stopping the disposal of plastic pellets.
- Alternatives for bundles of nylon wires to protect fishing gear: alternatives to nylon are available (cocos) and do not necessarily mean higher costs. The fishing industry is positive towards this measure provided that it is made clear that this indeed is causing problems at the moment.
- Biodegradable nets: Many stakeholders point out that biodegradable plastics may not be a good solution as they still decompose in small particles (even faster than normal plastics) and therefore are also problematic. An alternative measure that targets a deposit system on nets is questioned by the sector. Nets are valuable to fishermen and they therefore take good care of not wasting nets. It is therefore doubtful that a deposit on the nets will lead to a change of behaviour.
- Higher fines for littering: all stakeholders that had an opinion on this measure feel that this measure will have no effect. It would be better to improve enforcement of the already quite high fines.
- Silent construction methods: interesting, in particular for doing further research. Current knowledge dictates that the noise in itself is not such a problem (for marine mammals), but the unexpected start of it is. Therefore the first 'bang' should not be too loud. Also care should be given to the fact that species should be able to flee to quieter places (so do not build everywhere at the same time).
- Ban on use of plastic bags in supermarkets: this measure was later rephrased as a deposit or fee on the use of plastic bags in supermarkets. This is regarded as an effective measure by some stakeholders, but one with a much higher impact than for the marine environment alone.

- Do it yourself beaches: this is valued as an interesting concept. It is still in development. Mainly aimed at litter that is left at beaches (by the public), not at litter that washes ashore.
- Biodegradable user plastics at beaches: Many stakeholders point out that biodegradable plastics may not be a good solution as they still decompose in small particles (even faster than normal plastics) and therefore are also problematic.
- Biodegradable balloons, balloon valves and ribbons: Many stakeholders point out that biodegradable plastics may not be a good solution as they still decompose in small particles (even faster than normal plastics) and therefore are also problematic. However, products are available and under development.
- Stricter enforcement on the use of port reception facilities to collect waste: It seems that especially the lack of uniformity and transparency among the harbours is a problem. In every harbour there are different rules and ships may 'shop' for the optimal wasteconditions.
- Fishing for litter: this is a successful concept (130 ships at the moment) but scale-up would be welcome. Additional financing is needed. Also it is seen as a problem that collected chemical waste is charged to the fishermen (fills up the quota). Possible (economic) incentives to promote this practice are welcome (e.g. special treatment during waste delivery).
- Adding individually recognisable ID-markers to fishing nets and wires: This will only work if losing nets can be limited at all. Nets are considered valuable by fishermen who often turn around to retrieve lost nets (see biodegradable nets) .
- Additional beach cleaning: could work well, this is a measure that may invoke good behaviour from others provided that the cleaners are well-recognisable for the public.
- Deposits on all plastics: this does not seem to be a measure acceptable to the Dutch (packaging) industry. Also it is a measure that should not be taken for the marine environment alone. However, the measure is successful in Scandinavian countries and Germany.

4.5 Conclusions

The following conclusions can be drawn from the stakeholder consultations described above:

- Most stakeholders (especially those from the industry) share the feeling of the ministry that current policy will bridge most gaps for meeting the GES.
- The stakeholders feel that the current list of measures (which will be submitted to a CBA next year) is too limited. This requires further explanation to the stakeholders or alternatively, changing the list to include a wider array of measures.
- Maintaining/reaching uniformity (level playing field) is a major concern for stakeholders. This applies to the different sectors involved ('Why are CFP measures not included in CBA') and different countries that carry out the directive (different

standards/rules in every harbour). Stakeholders feel that the fact that this is a European directive should be an important driver for this.

- More research into cause-effect relations and (pollution) routes is needed. A number of stakeholders has its own research programmes that cover some of the knowledge gaps. The stakeholders from the industry use this as an argument to postpone certain measures until it becomes clear that they indeed have an effect on the problem.
- For some of the measures, e.g. different packaging standards of plastic pellets, the various measures that promote biodegradable materials, the stakeholders do not recognize the problem (pellets) or find that the solutions (biodegradable plastics) are still too uncertain or undesirable.
- For some measures, stakeholders are / will be actively involved in the implementation. E.g. fishing for litter is carried out by the fishing industry.
- The MSFD is relatively unknown to the users of the North Sea. More, and more accurate, publicity is required.

Table 2 summarizes the stakeholders' opinions on the selected measures

Table 2: stakeholders view on preliminary list of selected measures

Measure	Stakeholder view
17 Different packaging standards of plastic pellets	Unknown, find solution for pollution caused in the past
18 Alternative for bundles of nylon wires used to protect fishing gear	Positive, further research measure
19 Biodegradable nets	Unknown, biodegradable plastic undesirable
20 Higher fines for littering	Negative, no effect expected
23 Silent construction methods	Positive, research measure
58 Ban on use of plastic bags in supermarkets	Positive, but not for marine alone
59 Do it yourself beaches	Positive, to be further promoted
60 Biodegradable user plastics at beaches	Unknown, biodegradable plastic undesirable
61 Biodegradable balloons, balloon valves and ribbons	Unknown, biodegradable plastic undesirable
62 Stricter enforcement on the use of port reception facilities to collect waste	Positive, specifically harmonisation across harbours
63 Fishing for litter	Positive, to be further promoted
64 Adding individually recognisable ID-markers to fishing nets and wires	Negative, no effect is expected
65 Additional Beach cleaning	Positive, to be further promoted
66 Deposits on all plastics	Positive, but not for marine alone

5 Perspectives for new economic incentives

From chapter 2 we have learned that 'Economic instruments are a well-proven means of water management all over Europe'. In this chapter we will describe and assess the options for new economic incentives and instruments in the marine environment. These options were partially suggested by stakeholders (both industry and environmental organisations) and partially deduced by the researchers.

5.1 New economic incentives

The stakeholders of the North sea were asked to share their thoughts on possibilities for economic instruments and incentives to protect the marine environment. Before the interview the stakeholders were informed with a short overview of possible economic instruments and incentives.

Textbox 10: illustrative overview of economic instruments and incentives

Economic instruments and incentives
Economic instruments stimulate voluntary behavior that has financial consequences
Tariffs
Levy - tax
Subsidies
Quota
Tradable rights
Fines
Rewards (payment for services)
Depositsystems

Together with the researchers a number of options was listed. The list has an inventory character, this report does not assess the support for these options. Obviously the industry may favor other options than the environmental organizations do. In this paragraph the options are described. The options are not specific for the GES litter but for the general protection of the marine environment.

- **Tariffs and -differentiation**

- **Rewarding system for clean ships:** the essence of this instrument is that clean ships according to the Clean Shipping Index (CSI) receive a discount on the port charges of up to 15.000 euro. Litter is one of the issues of CSI so this instrument may also prove useful in reducing marine litter. This recent initiative, initiated by Port of Rotterdam, is a good example of tariff differentiation. The system could be supported and expanded.

- **Clean harbour:** similar to the Clean Shipping Index (CSI) a label for ‘clean harbours’ could be initiated. Ships could then use a database to choose the harbours that score best on certain environmental criteria. This would be an economic incentive for harbours to work on their environmental performance. This could possibly qualify as a PES (the practice of offering incentives to parties in exchange for some sort of ecological service).
 - **Good sandwinning techniques or zones:** it can be considered to reward sand winning techniques that cause little damage to the marine environment or reward winning sand in zones that are less environmentally harmful. This could be financed by differentiating the tariffs for the winning per m³. Another option for financing this is to allow sandwinners to finish sandwinning jobs with a rugged profile instead of a straight profile. This may be better for the environment and saves costs at the same time.
- **Taxes**
 - **Clean ships:** it can be considered to reward ships with a good environmental performance with a tax cut. The height of the shipping tonnage tax could be related to the environmental performance of ships (CSI, so this is a combination with labeling). This is comparable with tax measures in the Dutch car industry that favor cars that have a better environmental performance. In the Dutch car industry this is a very successful instrument.
- **Subsidies for research**
 - Both the industry and the environmental organizations feel that there is still a lack of knowledge on several main themes in the MSFD domain. For example, the origin of and the damage done by litter (e.g. micro plastics) is only partly understood. Instruments meant to reach good environmental status for litter can only be effective when the actual problem is well understood. Also in terms of solutions there is a strong need for knowledge. For example the use of biodegradable materials for nets and balloons is often presented as a solution but at the same time still holds many questions on its feasibility. Also research on techniques that enable the functioning of a mass balance for ships could prove very useful. With this mass balance the disposal of waste by ships could be better controlled.
- **Rewarding systems**
 - **Fishing for litter:** similar to farmers that provide environmental or waterservices such as storage of water on their land or creating and maintain environmentally friendly shores, it could be considered to pay fisherman to fish for litter. Now their only incentive is that they can hand in the waste for free. An extra step would be to reward the fishermen financially (or any other way) for this activity. Then fishing for litter would qualify as a PES

- **Beach club reward:** similar to the rewarding system for clean ships in harbours, a reward could be considered for beachclubs that keep their beach clean. A possibility to reward them is to lower the cost of their tenancy contract. Coastal towns could finance a discount on the tenancy contract with the possible savings on beachcleaning. Although not explicitly examined, it is expected that most beach clubs have a tenancy contract. Another option would be to pay for these services as for a PES .
- **Good fishing techniques or fishing in zones:** it can be considered to reward fishermen for fishing or not fishing in certain zones of with certain techniques. Fishing with certain techniques or at certain specific times could possibly also qualify as a PES.

Financing the initiatives.

Not all of the options mentioned above automatically have a financing source. The most applicable source of financing and the size of it also depend on the exact way the instrument is implemented. We now state some additional possibilities to for additional financing:

- **Levy on the use of the North sea:** one option is imposing a levy on the users of the North sea. Similar to the use of roads or the water management for farmers, a tax for the use of the North sea could be considered. How to implement this would be a matter for further research
- **Voluntary fund:** another option could be to initiate a voluntarily fund. This fund could then be used for the instruments mentioned, comparable to the landscape fund on land where money is used to a clear sight guarantee (Jantzen 2007).
- **Fund based on platform decommissioning:** it is useful to start a discussion on the cost effectiveness of decommissioning platforms in the North sea. 'Small fields policy "(in short: first use oil and gas from small fields then use the big gas field) results in the depletion of a lot of gasfields in the coming decades. After that the platforms will be decommissioned. The estimated costs are huge (up to 100 billion euro). A discussion could be initiated on whether or not a different approach to decommissioning the platforms could be more cost effective for the marine environment. If for example 10% of the money needed for the platforms could be put into a marine environmental protection fund, this fund could pay for a step forward in the North Sea environment. With this type of funding the financing of instruments that were mentioned above would come within reach. But even more extreme instruments such as sector buy outs, could become feasible. The oil and gas exploration sector however is very cautious when it comes to conducting this very sensitive discussion. From an economic perspective this is an interesting idea. From a legal perspective it may prove difficult.

5.2 Assessment of new (litter related) economic incentives

In this paragarph we assess the options that have a relation with litter as this is the focus of the present list of measures considered for the MSFD. Options for economic instruments that have nothing to do with GES litter dropped out of the list. The option 'Good sandwinning

techniques or zones' does not seem to have any relation with litter and will therefore not be further assessed. Table 2 holds the initial ex ante assessment of litter related options:

Table 2: initial assessment of new economic instruments and incentives to reduce marine litter

Criteria	Effectiveness (change of behaviour)	Effectiveness (change of GES litter)	Efficiency	CRP and PPP	Fairness	Other
Incentives						
Tariff						
Port charge clean ships	+ (if strong enough)	± (litter one of the issues)	+ (limited costs exp.)	+	+ (effort pays)	labeling system
Clean harbour	+ (if strong enough)	± (litter one of the issues)	?	+	+ (effort pays)	labeling system
Taxes						
Tonnage tax clean ships	+ (if strong enough)	± (litter one of the issues)	± (sign. costs expected)	+	+ (effort pays)	labeling system
Rewarding system PES						
Fishing for litter	+ (if strong enough)	+ (litter the main issue)	++ (costs rel. small)	Na	+ (effort pays)	funding tr costs.
Beach club reward	+ (if strong enough)	± (litter the main issue)	++ (costs rel. small)	Na	+ (effort pays)	funding tr costs.
Subsidy research						
Origin and effect of litter	Na	+	+ (will help avoid wrong measures,WFD)	+	+ (helps to address true parties)	
Possibilities of biodegr. materials	Na	+	+ (will help avoid wrong measures)	+	na	
Possibilities of mass balance ships	Na	+	?	+	+ (helps to address true parties)	

A qualitative explanation of the scores now follows for each of the different categories of economic instruments:

- **tariff and tariff differentiation:** the effectiveness of these incentives will largely depend on the height of the economic incentive and the elasticity of the behaviour to this incentive. The incentive holds a package of environmental issues. Litter is one of them, the incentive may be effective on any of these incentives. It can be an efficient

system as it builds on market principles and as activities are integrated within the sector. Ships or harbours that stand out on their environmental performance may profit if that is what the market demands. The instruments are in line with PPP and CRP and it seems fair to reward the best performers. A boundary condition for these instruments to work is by the credibility of the labelling systems and organisations that provide the required labels;

- **Changes in tax systems:** a change in the tax system can also provide an incentive for the protection of the environment. It's success will also largely depend on the height of the economic incentive and the presence of a good labeling system. Here too the incentive may hold a package of environmental issues and litter is one of them. It can be an efficient system as it builds on a market principle that parties will look for ways to cut costs. This instrument is also in line with PPP and CRP and it is fair to reward best performers by lowering their tax. This system holds no means to finance it and can be costly.
- **Rewarding systems:** a rewarding system such as PES for fishermen or beach clubs, may prove successful. The height of the payment/reward is a boundary condition for the instrument to work. It may be very efficient as the parties that deal with the activities can combine these environmental activities with their regular activities. Litter surely is one of the most vital issues for fishermen and beachclubs so this instrument will influence their behavior on this topic. The instruments do not conflict with PPP and CRP and it seems fair to reward parties for their effort to clean up litter. Critical points are the incomplete financing of these systems (for beach cleaning part of it could be financed with savings on beachcleaning) and the possibly high transaction costs (many organizations with different and specific contracts);
- **Subsidy research:** research will play a crucial role to achieve efficient protection of the marine environment. With this research one can enlarge the chances that the right measures will be taken for the problems. For each measure the risk of failure of the measure should be assessed;

Financing the options

Some of the possibilities mentioned have their own financing system. (such as tariff differentiation or change in taxes by the government). For other options such as the subsidy for research or the PES options no financial means are in place yet. The three options for financing them are now assessed:

- Levy on the use of the North Sea: in advance it can be expected that a North sea tax will be very complex. This option assumes that both the user and the entity that will be taxed can be defined. It also assumes that transaction costs are in balance with the yield of the tax. In advance this possibility is not a very promising one as both finding an entity and keeping transaction costs reasonable may prove difficult.
- Voluntary fund: another option could be to initiate a voluntarily fund. This fund could then be used for the instruments mentioned. With a voluntary fund the problems mentioned for a tax will largely be resolved. The downside however is that industry and

environmental organizations must have the willingness and means to finance this fund. It's feasibility is therefore doubtful.

- Fund platform decommissioning: the third option is an interesting option. It requires a large degree of 'out of the box thinking' to imagine this work. In terms of legislation significant changes would have to be implemented to make a different decommissioning of platform possible. In terms of financial possibilities this option is interesting as there is a lot of money involved in the decommissioning of platforms. (sums up to 100 billion euro are mentioned). A first step could be to initiate a commission to further investigate this option. This should be a commission in which authorities, industry and environmental organizations are represented.

5.3 Conclusions

The assessment is an initial assessment. Further, more detailed analyses would be required to come to more robust conclusions. However with the current knowledge it can be concluded that:

- There are options for economic instruments and incentives that may be successful in protecting the marine environment in a more efficient way;
- Instrument that use tariffs and tariff differentiation (port charge clean ships and ecolabelling harbours) are promising as they score well in the review framework. Their success will largely depend on the height of the economic incentive and the elasticity of the behaviour to this incentive;
- Changes in tax systems (tonnage tax clean ships) in general score well in the review framework. The extent of the tax cut and the presence of a good reliable labeling system is decisive for its success. The downside is that this system holds no means to finance it. The instrument was successfully used in the Dutch car industry;
- Rewarding systems such as PES for fishermen or beach clubs scores exceptionally well on efficiency. A sufficient payment/reward is a boundary condition for the instrument to work. The downside is that this system holds no means to finance it although part of the PES could be financed with savings on beachcleaning. Transaction costs may be high due to diversity of parties;
- Research seems to be a boundary condition to achieve efficient protection of the marine environment. A lack of knowledge may lead to choosing wrong measures.
- Not all of the instruments have a financing source. There are different possibilities to create funding. A fund based on a voluntary agreement or based on possible means that may be created with a different way of decommissioning the platforms is worth investigating.

6 Conclusions and recommendations

6.1 Conclusions

Present instruments

- There are many instruments present to protect the marine environment. Legal instruments seem to be the most common and the most influential. At the same time communicative and economic instruments and incentives are operational;
- The economic incentives found were: tariffs, taxes, fines, funds, labelling, PES (rewarding systems). Within the marine environment a recent increase of the use of economic instruments has taken place;
- The different instruments are often interdependent. Legal instruments can depend on economic incentives such as fines but they can also depend on communicative instruments that make sure stakeholders are well informed.
- Operating on an international level is a boundary condition for some of the economic instruments and incentives.

Measures

- For the MSFD the Dutch governments focuses on measures related to litter. The environmental organisations do not agree that this is the only GES that needs attention in the MSFD.
- In general, the stakeholders (especially those from the industry) share the feeling of the ministry that current policy will bridge most gaps for meeting the GES. Some feel the current list of measures is too limited and does not make their efforts visible. All parties feel maintaining/reaching uniformity (an international level playing field) is a major concern.
- The MSFD is relatively unknown. More, and more accurate, publicity is required to increase awareness.

The stakeholders' opinions on the selected measures is summarised in the table:

Measure	Stakeholder view
17 Different packaging standards of plastic pellets	Unknown, find solution for pollution caused in the past
18 Alternative for bundles of nylon wires used to protect fishing gear	Positive, further research measure
19 Biodegradable nets	Unknown, biodegradable plastic undesirable
20 Higher fines for littering	Negative, no effect expected
23 Silent construction methods	Positive, research measure
58 Ban on use of plastic bags in supermarkets	Positive, but not for marine alone
59 Do it yourself beaches	Positive, to be further promoted
60 Biodegradable user plastics at beaches	Unknown, biodegradable plastic undesirable
61 Biodegradable balloons, balloon valves and ribbons	Unknown, biodegradable plastic undesirable
62 Stricter enforcement on the use of port reception facilities to collect waste	Positive, specifically harmonisation across harbours
63 Fishing for litter	Positive, to be further promoted
64 Adding individually recognisable ID-markers to fishing nets and wires	Negative, no effect is expected
65 Additional Beach cleaning	Positive, to be further promoted
66 Deposits on all plastics	Positive, but not for marine alone

Perspective for new economic instruments

The assessment of different economic instruments and incentives has shown that:

- an increase of the use of economic instruments within the marine environment is possible and desirable;
- there are several options for economic instruments and incentives that may be successful in protecting the marine environment in a more efficient way;
- not all of the instruments have a financing source.

6.2 Recommendations

- Stakeholders should decide on the list of selected measures using the results of the assessment of this report.
- Instrument that use tariffs in combination with labeling systems are market based and seem promising. They are worth further stimulation and investigation. Examples are 'port charge for clean ships' and a label for 'clean harbours'. Dutch authorities can help to market the idea of port charges e.g. to other European member states and create political support for this concept.

- Changes in tax systems (tonnage tax clean ships) can provide an incentive for efficient protection of the marine environment. Dutch authorities could investigate the political possibilities / support for a tax cut for clean ships. The sector could investigate price elasticity of the sector for this instrument.
- Rewarding systems such as PES (the practice of offering incentives to parties in exchange for some sort of ecological service) for fishermen or beach clubs is promising and may be prove very efficient. They are in line with recent European developments and are worth investigating. Stakeholders can initiate a draft contract for a PES for beachclubs and for fishing for litter and present it to other European member states. After this and depending on the results, pilots could be initiated.
- Research will play a crucial role to achieve efficient protection of the marine environment since it reduces the risk of implementing inefficient measures. The stakeholders should define the research agenda together. Also they should discuss how this research should be financed.
- For the instruments that do not have a financing source the discussion on how te create the necessary means is essential. It is advised to investigate the possibilities of both a voluntary fund and a fund based on the possible revenues of a different way of decommissioning the platforms.

- **Annex 1: list stakeholders**

- S. van den Akker, Stichting Noordzee;
- P. Altena en N. van den Minkelis, Koninklijke Vereniging van Nederlandse Reders;
- C. Seip, Productschap Vis;
- C. van putten, Nederlandse Vereniging van Zandwinners;
- A. Tacoma, Nederlandse Olie en Gas Exploratie en Productie Associatie (NOGEPA);
- B. Veerman KIMO (Kommunenenes Internasjonale Miljøorganisasjon);
- P. Visser, Visned;
- J. Wijnstroom, Sportvisserij Nederland;
- P. de Wit en M. Prinsen, Havenbedrijf Rotterdam;
- H. Klein Teeselink, Stichting Nederland Schoon;
- E. van Dijk, Stichting Keurmerk, Milieu, Veiligheid en Kwaliteit (KMVK).

- **Annex 2: format interviews**

	Organisatie: Vertegenwoordiger: Datum:
1	Algemeen beeld van maatregelen en instrumenten <ul style="list-style-type: none"> • gaat om het voorkomen van afval, achteruitgang van biodiversiteit en geluidsoverlast in het mariene milieu? • Wat zijn de meest recente initiatieven in uw sector? • Welke (additionele) maatregelen en instrumenten acht u zelf kansrijk voor realisatie van de KRM en zou u willen meenemen in een kosten-batenanalyse?
2	Beeld van maatregelen uit Proef MKBA <ul style="list-style-type: none"> • Hoe beoordeelt u de maatregelen die men (vooralsnog) in de proef kosten-batenanalyse wil meenemen (zie tabel)

Measures for the CBA	Focus GES
Active elimination of newly introduced species in yacht harbours	Biodiversity
Different packaging standards of plastic pellets	Litter
Alternative for bundles of nylon wires used to protect fishing gear	Litter
Biodegradable nets	Litter
Higher fines for littering	Litter
Silent construction methods	Noise
Introducing hard substrate items in bottom-protection zones	Biodiversity
Ban on use of plastic bags in supermarkets	Litter
Do it yourself beaches	Litter
Biodegradable user plastics at beaches	Litter
Biodegradable balloons, balloon valves and ribbons	Litter
Stricter enforcement on the use of port reception facilities to collect waste	Litter
Fishing for litter	Litter
Adding individually recognisable ID-markers to fishing nets and wires	Litter
Additional Beach cleaning	Litter
Deposits on all plastics	Litter
Reduction of noise emissions	Noise
Redevelop seafloor	Biodiversity , litter

3	<p>Mogelijkheden economische prikkels</p> <ul style="list-style-type: none"> • Welke mogelijkheden ziet u als het gaat om het sturen met economische prikkels? Navolgende tabel kan u hierbij helpen op ideeën te komen.
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	Mogelijkheden economische prikkels
	Economische instrumentarium is een complex van positieve of negatieve economische prikkels waarmee men gedrag probeert te beïnvloeden
	<i>Marktconforme instrumenten: gebruik makend van bestaand marktmechanisme</i>
	Tarieven (betalen voor diensten)
	Heffingen (voor emissies, inputs, outputs, accijnzen)
	Subsidies (voor aanleg, beheer, gedeerde inkomsten, projecten, et cetéra)
	<i>Niet marktconform (introduceren markt)</i>
	Quotaregelingen
	Verhandelbare rechten / plichten
	<i>Overige economische prikkels</i>
Boetes	
Beloningen	
Statiegeldsystemen	
Overig	<ul style="list-style-type: none"> • Heeft u verder suggesties met betrekking tot de realisatie van de KRM?