



Study in relation to options for new initiatives regarding dismantling of ships

*Note on the ship dismantling fund
Pros and cons of the three options*

milieu
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The ship dismantling fund

1. Introduction and some overall considerations

1.1 Briefly about this note

This note presents scenarios for an EU ship dismantling fund as part of a possible early transposition of the Ship Recycling Convention¹ and whether the different scenarios may be extended to global level. It focuses on the pros and cons of three options for establishing a ship dismantling fund.² The note aims at facilitating the Commission's internal discussions and decision making on the feasibility of establishing a ship dismantling fund to finance ship recycling in safe and environmentally sound facilities.

On 9 June 2009, a stakeholder workshop was held at DG Environment. This followed the public stakeholder consultation launched on 6 April 2009 with a view to gathering stakeholder opinions on the options for new EU initiative regarding dismantling of ships. Stakeholder responses to the questionnaire as well as views expressed during the workshop concerning the establishment of an EU fund are reflected in the relevant parts of this note.

In addition to this brief readers' guidance, **Chapter 1** presents **overall considerations**. It summarises some of the key contextual issues, including data on ship dismantling and the main drivers for ship dismantling determining when and where to scrap a vessel. It also outlines the objective of the fund and it outlines the criteria for the ship dismantling fund.

Chapter 2 describes different potential design **scenarios for the ship dismantling fund**. It should be stressed that the descriptions of the scenarios are general and focus on the conceptual elements of the funding system and thus do not address specific details of the fund design.

The scenario descriptions begin with an introduction of the financial structure of the fund. The methods of raising finance are addressed, as is the issue of asset management. Once this is determined, we elaborate further on the details of funding and on the disbursement mechanism (how funds are transferred to the beneficiaries). Finally, the most appropriate fund scenarios are selected for further analysis.

Pros and cons of the fund scenarios are analysed in **Chapter 3**.

Chapter 4 provides a rough estimate of the funding requirement and the order of magnitude of the charge per ship calling at EU ports. The purpose of such estimates is only to indicate what would be required to ensure adequate compensation for the additional cost of the 'green' recycling of ships. The disbursement mechanisms will not be elaborated on further.

Our conclusions are presented in **Chapter 5**.

¹ Pros and cons of early transposition of the SRC have been presented in a separate note. Please see note on Early Transposition of the Ship Recycling Convention (COWI/Milieu), August 2009.

² It is the report relating to Task 3 of the study in relation to options for new initiative regarding dismantling of ships.

1.2 Background and key issues

Data on ship dismantling - worldwide and European ships

Worldwide, between 200 and 600 large end-of-life ships are dismantled every year. Most of this ship dismantling takes place on tidal beaches in South Asia (mainly Bangladesh, India and Pakistan) and under unacceptable conditions with regard to both the safety of workers and environmental protection. A fraction of total activities take place in China, where dismantling is carried out in docks, and in Turkey, an OECD country where facilities are currently being upgraded. In South Asia, in particular in Bangladesh, the rate of ship recycling related accidents is high, with many workers contracting lethal diseases. Additionally, water, soil and coastal habitats are heavily polluted by hazardous materials that derive from the dismantling of ships.

Today, the dismantling of European ships takes place nearly exclusively in South Asia. In the past few decades, the ship breaking industry for sea ships in the Member States of the European Union has almost completely disappeared. This is due to high costs in this very labour-intensive industry and also because of the lower safety standards applicable in South Asian facilities, as compared with European ones. Given that approximately 25% of merchant ships worldwide fly the flags of EU Member States and about 40% of world tonnage is owned by European companies, the situation in South Asia in relation to ship dismantling is of concern to the EU. Moreover, due to a backlog in ship scrapping and the phasing out of all single-hull oil tankers in 2010 or 2015, the number of ships that have to be dismantled will rise in coming years.

The commercial fleet under European Member State flag or ownership is, as mentioned above, approximately 40% of the total tonnage worldwide. Applied to the expected annual scrap volume of approximately 4 million light displacement tons (LDT), this amounts to 1.6 million LDT per year between 2007 – 2020.³

There is however difficulty in estimating the quantity produced worldwide and that that is attributable to Europe.

This is due to fluctuations in ship dismantling activities. For example, during a peak year of the single hulled tanker phase out the nominal total scrap volume may triple, whereas during the recent freight boom less than 1 million LDT was scrapped.⁴

The economics of ship dismantling

The economics of ship dismantling are primarily driven by market factors such as freight rates, the price of steel scrap and the costs of maintaining an ageing fleet. These are the factors taken into account when deciding when a ship will be scrapped.

The choice of the dismantling location is influenced in particular by the metal price that a facility can offer to the shipowner or to the intermediary “cashbuyer”. This price in turn depends on the demand for recycled steel in the area concerned and on the costs of the recycling operations.

The costs of ship recycling differ considerably according to the price of labour and the costs of infrastructure for workers’ safety and environmental protection. A higher price for metal can be paid if

³See COWI/DG ENV: ‘Ship Dismantling and Pre-cleaning of Ships’ (2007) p. 37ff.

⁴ According to the NGO Robin des Bois: "...288 were vessels were sold for demolition in 2007. In 2008, 456 vessels have left the ocean. This large increase of vessels to be demolished (+ 58%), follows suit with the total weight of recycled metals: 3.7 million ton in 2008 against 1.7 million in 2007, i.e. more than double." See Ship-breaking.com Information bulletins on ship demolition, # 12 - 14 from January 1st to December 31st, 2008. The latest information bulletin is dated July 2009 (coverage January to 26 June 2009) <http://www.robindesbois.org/english/shipbreaking16.pdf>

the scrap steel can be recycled “cold”, without energy-intensive (and thus expensive) re-melting in electrical furnaces.

The cash buyer pays a price in USD per light displacement ton (LDT) which is roughly equivalent to the steel weight of the ship. For years the price has been around 150 USD/LDT (with lows of around 100 USD/LDT and highs of around 200 USD/LDT). However, between 2005 - 2008 the strong demand for steel scrap in China has driven prices up to a level of 500 - 700 USD/LDT for particularly valuable vessels in India and Bangladesh. A very large crude oil tanker (VLCC) with a cargo carrying capacity of around 300.000 tonnes will have around 45.000 LDT and only last year fetched more than USD 30 million in Bangladesh. The current market price of 220 to 270 USD/LDT has seen its value drop to approximately USD 12 million.⁵

Since 2004, more than 80% of the larger (in terms of tonnage) end-of-life ships worldwide have been dismantled in India, Bangladesh and Pakistan. In these countries the “beaching” method is used, which means that the vessels are driven usually by their own steam onto sandy beaches and broken up without heavy machinery and without containment other than the hull of the ship itself. The remaining ships have been dismantled in other countries like China, Turkey and several EU Member States where capacity exists for ship dismantling.

Implementation of environmentally sound scrapping technologies requires only limited investment at the scrapping facility. However, operational costs increase, as the ship dismantling facility needs to train its staff, buy protective clothing and, not least, pay charges for environmentally sound waste disposal.

Today only few facilities offer safe and environmentally sound ship dismantling on a commercial basis because the costs of ship dismantling in these facilities are higher than the cost of traditional ship dismantling. Accordingly, the net revenue per ton paid to the shipowner is lower when environmentally sound ship dismantling facilities are used as compared to traditional facilities.

Entry into force of the Ship Recycling Convention by 2015 at the earliest

The Hong Kong International Convention on the Safe and Environmentally Sound Recycling of Ships (Ship Recycling Convention), adopted on May 2009 under the auspices the International Maritime Organization, is expected, at the earliest, to enter into force in 2015. The new international regime is likely to become fully effective even later (by the end of 2020 at the earliest).⁶ Furthermore this instrument leaves gaps, e.g. vis-à-vis enforcement of green ship recycling facilities.⁷

Consequently, there is increased support for the implementation of measures before the IMO Convention becomes effective (“interim measures”). The Commission is therefore proposing different policy options that aim at redressing these unacceptable conditions in a timely manner. These proposals are put forth within the framework of the Integrated Maritime Policy for the European Union of October 2007. The European Commission has stated that, duly taking into account the ongoing work at international level, it will make proposals for dismantling obsolete ships in an efficient, safe and environmentally sustainable manner.⁸

The Strategy therefore reflects the call from the European Parliament to the Commission and Member States to take urgent action on this issue to counter the fact that currently ‘on various shores in

⁵ July 2009.

⁶ See Section 2.6.1 p.17 on the conditions for entry into force of the Ship Recycling Convention

⁷ See Note on pros and cons of early transposition of the Ship Recycling Convention

⁸ COM(2007) 575 final

Southern Asia and elsewhere enormous seagoing ships are dismantled under working conditions which are environmentally damaging and humanly degrading'.⁹

The Strategy's overarching objective is to ensure that ships with a strong link to the EU in terms of flag or ownership are dismantled only in safe and environmentally sound facilities worldwide; in line with the Ship Recycling Convention. The Strategy sets out possible action areas and tools, including assessing the feasibility of the introduction of a ship dismantling fund.

1.3 Objective of the Fund

According to the EU strategy on ship dismantling, the specific objective of a ship dismantling fund is to support the overall objective of ensuring that ships with a strong link to the EU are dismantled in a safe and environmentally sound facility. A ship dismantling fund could potentially play a vital role in providing proper incentive for the stakeholders (i.e. the shipping industry and the ship scrapping industry) to ensure that ships are dismantled at a certified facility.

From an economic point of view, there is very little incentive to choose green recycling in Europe or elsewhere compared to standard ship breaking in Asia due to fact that it is more costly. Accordingly, green recycling facilities are not able to pay as high a price for the scrapped ships as the Asia recycling facilities. The fund is intended to close the financial gap between the conventional and green dismantling facilities, thus providing the incentive for the shipowners to choose a green ship recycling facility.

Further, in order to meet this objective, the funding system must be based on a stable financing source, which provides sufficient financial resources to enable the fund to provide proper incentive for shipowners to choose to dismantle ships at a safe and environmentally sound facility.

1.4 Criteria for the Fund

EU responsibility

In the EU Strategy it is pointed out that the general objective is to ensure that ships with *a strong link to the EU* are dismantled only in safe and environmentally sound facilities worldwide. It is further explained that a *strong link* relates to *flag or ownership* of the ship. However, because of the global nature of the shipping industry, where evasion of regulation is possible through the re-flagging¹⁰ of ships, it might be appropriate to operate with an alternative and more pragmatic definition of the *EU responsibility*.

Not considering ownership of vessels or flag state, the EU responsibility could be connected solely to the EU's share of *worldwide shipping services*. The *world wide shipping services* could be accounted for in various ways. The most consistent approach would be to count the shipping transport volume measured in tons/km worldwide. Another approach, and a good proxy to the method above, would be to count the number of ships calling at ports worldwide and in the EU.

Polluter-pays principle

A Fund may be financed either by tax payers or by the users, i.e. the shipping industry. The established waste policy of the EU builds on "the polluter pays principle", which points towards the

⁹ European Parliament resolution of 21 May 2008 on the Green Paper on better ship dismantling available at <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0222+0+DOC+XML+V0//EN>

¹⁰ It is commonly known that re-flagging has historically been widely used to avoid national or regional regulation in the shipping industry.

shipping industry or the consumers of shipping services as those that should pay. Additionally, concepts aimed at enhancing the responsible approach of the producers of services and products, e.g. product stewardship and sustainable business development, are firmly rooted in EU environmental policy.

Timing

It is important that the fund begins to provide incentives for existing vessels due to be phased out within the interim period before entry into force of the Convention. There is a current backlog of ship needing to be dismantled, as well as increased demand for scrapping coming from single-hull tankers. Thus, emphasis must be on a prompt accumulation of funds. Accordingly, the timeframe for the establishment of the fund is very important. It implies that the speed of the accumulation of funds is crucial when selecting the financing mechanism. It also implies that a government budget may be required for supplementary funding in the start-up phase.

Avoid distortion of competition

Finally, it is assumed that the fund should be structured in such a way that it does not distort international competition in general. For example, it should not subsidize cost-inefficient EU ship dismantling facilities which would otherwise have been driven out of business by competition from ship dismantling facilities outside the EU. Additionally, the finance mechanism should be designed to ensure that it does not weaken the competitive advantage of the EU shipping industry compared to the non-EU shipping industry.

Potential for using the Fund Structure at global level

The fund should be EU specific at first and should then potentially be expanded into an international fund eventually. Accordingly, this note will address the question as to whether the different fund scenarios may be extended to global level.

2 Fund Design Scenarios

This section describes different potential design scenarios for the ship dismantling fund. It should be stressed that the descriptions of the scenarios are general and focus on the conceptual elements of the funding system and thus do not address specific details relating to fund design.

The section starts by introducing *the financial structure of the fund*. It describes how the financing may be raised and how the assets could be managed. Once this is determined we elaborate further on the details of *the financing mechanism* (how revenues are generated) and *the disbursement mechanism* (how funds are transferred to the beneficiaries). Finally, the most appropriate fund scenarios are selected for further analysis.

2.1 Financial structure

As described in previous work,¹¹ funds can be structured in three ways:

- 1 **Endowments**, which invest their capital and only use income from those investments to finance activities;
- 2 **Sinking Funds**, which are designed to disburse their entire capital and investment income over a fixed period of time;
- 3 **Revolving Funds** that receive resources on a regular basis - e.g. proceeds of special taxes, levies or charges - which replenish or augment the original capital of the fund and provide a continuing source of money for specific activities.

The first two types of funds would require a large initial capital investment, for instance by means of a one-time government budget grant. The alternative, the revolving fund, may be based on current charges. Given the fact that the EU wants the fund to be based on the 'polluter pays' principle from which taxes and charges could be levied, the revolving fund seems to be the most appropriate model.

A fund can always be combined with other sources of financing, for instance to cover the investment that needs to take place to allow for green scrapping. As mentioned in Section 1.2, the investment requirements at the recycling facilities themselves are rather limited. However it is important to note that the companies' ability to implement green scrapping technologies depend on whether the local authorities have established hinterland waste infrastructure capable of accepting the waste. This is not always the case, and in these areas large investment in waste infrastructure is needed. This is considered to be outside the scope of the fund, but it could be relevant for donors (for instance EuropeAid) to consider engaging in this.

2.2 Financing mechanism

Financing of the ship dismantling fund could be realised by raising contributions at the construction phase of the vessel or during the lifetime of ships.

The following three options for financing mechanisms are further analysed below:

1. Up front environmental charge for new built vessels;

¹¹ "Ship Recycling Fund - financing environmentally sound scrapping and recycling of sea-going ships", ECORYS, February 2005

2. Recurrent charges on shipping industry;
3. Charges on ships calling at EU Ports.

The first two mechanisms are based on assumptions that EU responsibility is linked to EU ships (defined as flag state), whereas the third scenario is based on the assumption that EU responsibility may be linked to European consumption of shipping services.

2.2.1 Up front environmental charge for new built vessels

This option, whereby a contribution to the ship dismantling fund is levied at the construction phase of a vessel, has similarities to the End of Life Vehicles Directive (without the fund structure).¹²

The financing mechanism links an environmental charge to the construction of the ship, thereby giving the ship-owner an incentive to choose a ship which lives up to environmental standards under the Convention. The system is also easy to administrate because the charge may be linked to the first registration of the ship (registration of the IMO number), a feature which becomes very important if a global fund is to be eventually introduced.

In the short term however, it may not be the best solution for a fund which is to meet the EU objective for the interim period. The charge will only affect new builds and not the existing ships, which is a disadvantage from the perspective of the 'polluter pays' principle. The fund will accumulate over a long period of time because it only applies to new vessels and these have a long economic life (the number of new vessels per year is low relative to fleet size).

Finally, it is a disadvantage that the charge will distort competition between EU shipping industry and non-EU flag states. Depending on the size of the charge this may lead to tax evasion and change of flagship state. However, it is important to bear in mind that the construction of ships involves high costs and that a possible charge to cover a contribution to a ship scrapping fund would probably account for a very limited share of the total construction cost (see section 4). Thus, it is very unlikely that a charge will lead to any notable distortion because other factors (such as labour costs and costs of raw materials) play a much more important role.

2.2.2 Recurrent tax on shipping industry

The option of a recurrent tax on the shipping industry in the form of an annual tax on individual vessels has similarities to the general environmental funds established in a number of (new) EU Member States and in accession countries. It is consistent with the 'polluter pays' principle as funds are raised from both old and new vessels.

This option includes fees being levied during the entire lifetime of a vessel. The fees should be linked to the tonnage of the ship.

The funding base would be much larger than in the first option, thus the size of the fund is likely to increase more rapidly.

The financing mechanism will require more complicated control mechanisms, but the complexity could be reduced by linking them to current shipping mechanisms, for instance by means of i) including the fees in the insurance premiums of the vessel or ii) levying by Flag States.

¹² Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles, OJ No. L269, 21.10.2002, p. 34

The major disadvantage of this financing mechanism is the fact that there is a risk that it will distort competition between the EU shipping industry and non-EU flag states. Depending on the size of the charge this may lead to tax evasion and change of flagship state. However, if the size of the tax only accounts for a small fraction of the total costs, it is very unlikely that there will be any notable distortion.

Furthermore, this financing mechanism may not be suitable in the long-term for the global fund, because a tax collection system is not efficient in all countries.

2.2.3 Charges on ships calling at EU ports

Under this funding system, a charge is collected on all ships calling at European ports. It is technically a service charge on 'shipping services' to be paid by the shipping companies and eventually consumers.

This option also has similarities to environmental funds and existing funding systems, such as the financing of the environmentally safe closure of landfills under the EU Landfill Directive,¹³ where the cost of closure of the site is included in the landfill fee (paid during the operation of the landfill). It also has some similarities to the International Oil Pollution Compensation (IOPC) Funds set-up.

A tonnage based charge would link to the 'polluter pays' principle and would provide a stable funding base and quick accumulation of the fund.

The collection of port fees is an integral part of operating a port. With regard to the collection of fees for the fund the authorities would charge the ports relative to the tonnage calling at the port. It would be the relevant port's responsibility to record and submit the data on the handled tonnage and to transfer the collected revenue to the authorities. The tonnage data are already part of the port's information bank and the simple multiplication of a fixed number with the GT of the vessel to provide the amount to be added to a given vessel's port fee is not a complicated or cumbersome task. The European ports could transfer the collected charges directly to the Ship Dismantling Fund. Alternatively the charges could be transferred via national tax authorities, which already collect (national) fees and charges from the ports. From an administrative perspective, the second option could prove the least burdensome for the ports.

Some countries on the periphery of the EU are worried that additional charges on EU ports would distort competition as its ports are in constant competition with non-EU ports. Indeed, a charge may potentially result in a diversion of cargo traffic to other means of transport, but this would be relevant only for shorter voyages. However, in general, the option is unlikely to distort competition as there are only few alternatives to EU ports when goods need to be delivered to the EU. Examples of alternative ports are Istanbul in Turkey, Durres in Albania and St. Petersburg in Russia. Nevertheless, some Member States claim that taking regional action at EU level would be likely to put European ports at a disadvantage when compared to the other ports that do not apply EU environmental standards or fees. They argue for similar standards for all countries through an international forum.¹⁴

It is outside the scope of this study to analyse the potential diversion of cargo in detail, but in section 4 some insight into *the order of magnitude* of the charge to be collected is provided. The charges are

¹³ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, OJ L 182, 16.7.1999, p. 1,

¹⁴ Various attempts were made at obtaining information from Malta as regards port fees in order to estimate the extent to which these would increase following the introduction of a new charge on ships calling at Maltese ports. However, there is no publicly available document collecting the various port fees for Malta and shipping agents regard this information as commercially sensitive information which they are unwilling to distribute. It has therefore not been possible to come up with an estimated figure as to the percentage increase in port fees. In the absence of a complete list of fees, any such estimate would be highly speculative.

further compared to the existing port fees paid by shipowners for port services. This shows that a ship dismantling charge is relatively low compared to the existing charges.

The major disadvantage of this financing mechanism is the fact that it may not be suitable in the long-term for the global fund because a tax collection system is not efficient in all countries (globally).

2.2.4 Stakeholder responses and views

As mentioned above, a stakeholder workshop was held on 9 June 2009 at DG Environment. This followed the public stakeholder consultation launched on 6 April 2009 with a view to gathering stakeholder opinions on the options for new EU initiatives regarding the dismantling of ships, including the establishment of an EU fund.¹⁵

Many stakeholders expressed scepticism with regard to the general idea of an EU fund and emphasized the need for global action for a global problem. Some stakeholders question the practicality of a fund and are consequently opposed to any of the options put forward, while others also express concern about the proposed methods for collecting funds, finding them to be administratively complex and difficult to enforce. However, others believed that a fund, combined with mandatory regulations, would provide ship breakers and ship breaking countries worldwide with real incentive to invest in best-practice facilities. They further argue that costs are manageable for the industry. The majority of stakeholders seemed to agree that whatever option or combination of options is used, they should be applied evenly and transparency should be ensured. Other stakeholders raised the issue as to whether an EU charge could distort competition between EU ports and ports outside the EU (for example, in the Mediterranean).

The stakeholders expressed differing views as regards the most appropriate option. Some favoured the first option (environmental charge up front for newly built vessels) as the most straightforward in terms of implementation. However, others pointed to the fact that this option only affects new ships and is thus problematic as the old vessels are the ones up for scrapping and those that cause the most problems in terms of clean dismantling. Others stressed that this option would likely only work for European ship building facilities and/or European owners. With the significant majority of new building taking place outside Europe, it would be difficult to implement and enforce. Others point out that such a tax would discriminate against the owners of EU flagged vessels, leading to a distortion of competition and the re-flagging of ships.

Other stakeholders favour the second option (recurrent tax on the shipping industry in the form of an annual tax on individual vessels) because it is an individualised charging system allowing for differentiation between older vessels and newer ships containing less hazardous substances. However, others find it problematic, as an independent body would have to oversee the levy and its application. This option is also sometimes seen as unfair as it would only apply to EU flagged or operated vessels.

Several stakeholders favour the third option (European port-based funding system), an option similar to environmental funds and existing funding systems such as the International Oil Pollution Compensation (IOPC) Funds. It would apply to all vessels regardless of ownership and would be in line with the 'polluter pays' principle. It would be easier to collect and administer than any of the other options. This charge should also be based on a tonnage charge which again would link to the 'polluter pays' principle. The use of a port funding system would give a stable funding base.

Finally some stakeholders are of the opinion that a combination of the proposed options might be the best way forward.

Certain stakeholders propose that the charges are based not only on the tonnage of the ships, but also on the toxicity of the ship: ships with higher quantities of hazardous materials contained in their structure should be obliged to pay a higher charge. Others state that use of a port by a vessel has no

¹⁵ See Report on the public consultation on new initiative regarding dismantling of ships and Report on stakeholder workshop concerning new initiative regarding dismantling of ships

significance on the cost of recycling the vessel and are concerned that levy or port dues would likely be distorted between vessel types and trading patterns

Some stakeholders expressed concern about the proposed method for collecting funds and found it too bureaucratic. Some stakeholders consider that a fund could distort competition between shipowners. Several stakeholders therefore called for a more in-depth study of the impacts of a ship dismantling fund outlining the exact objectives of the fund and including a cost-benefit analysis.

2.3 Disbursement mechanisms

The purpose of a ship dismantling fund is to support the overall objective of ensuring that ships with a strong link to the EU are dismantled in a safe and environmentally sound facility. This goal may be attained in three alternative ways:

1. Compensation for "EU ships", when they use environmentally sound recycling facilities;
2. Subsidizing environmentally sound recycling facilities (EU or non-EU) which are in conformity with EU standards; or
3. Frame agreements with a limited number of certified recycling facilities and voucher system.

2.3.1 Compensation for "EU ships", when they use environmentally sound recycling facilities

The disbursement mechanism implies that the fund will give financial compensation to EU ships to cover the loss in the net revenue from scrapping the ships in environmentally sound facilities compared to traditional scrapping facilities.

This disbursement mechanism is in principle a very effective way of reaching the goal, because the money will be disbursed only by presentation of a certificate from the green ship dismantling facility.

The disbursement mechanism is only effective if there are sufficient environmentally sound scrapping facilities. It is however assessed that the industry is capable and willing to deliver the necessary capacity as soon as they see the demand. The scrapping industry in Asia responds quickly to new market conditions.

There is already green recycling capacity available in Asia (and other places around the world) and there are a number of green recycling facilities under establishment.¹⁶ The existing green capacity would most likely not be sufficient to comply with demand if a regulation calling for safe and environmentally sound dismantling of ships with a strong link to the EU was implemented. However, there is a huge potential for upgrading existing conventional scrapping facilities in Asia into green facilities and that investments needed are relatively limited. There are no technical constraints for establishing green capacity. Consequently, it is assessed that if a stable demand for safe and environmentally sound dismantling is created the industry will establish sufficient capacity to meet the demand either in Asia or elsewhere in the world.

The ship recycling market has for the last decade been entirely restricted by the supply side, i.e. the tonnage offered for scrapping. The volatility of the market is reflected in the price for scrap vessels which have risen from 100 USD per ton at the turn of the Millennium to 750 USD per ton in the first

¹⁶ COWI/DG ENV, 2007 p. 68 ff

half of 2008 as the recycled tonnage dropped from six to less than two million tons annually.

During this time the international freight rates have been driven up by world economic growth, in particular by the dramatic growth rates in Asia, and very few vessels were sent for dismantling. The demand side of steel recycling, i.e. primarily the domestic construction sector in recycling countries, is connected to the economic growth rate and once the general market conditions start reversing, as was seen in the second part of 2008, the cooling of the construction sector leads to a decreasing demand for scrap steel. Obviously, scrap prices will fall in consequence and prices have dropped from 750 USD per ton in March to 550 USD per ton in early October 2008 and are hitting the 250 USD per ton mark in April 2009.

The financing mechanism may be structured in two different ways: (i) either the charge may be earmarked for the ship or group of ships (for instance by flag state) that paid the fee; or (ii) alternatively, the disbursement mechanism may be based on a solidarity system, where contributors to the mechanism pay jointly to cover environmentally sound scrapping of the oldest and most environmentally hazardous ships. Due to the timing constraint we consider the solidarity system to be best, because it allows the funds to be disbursed immediately to give priority to the oldest and most polluting ships. In the earmarked system, the fund will only disburse an amount corresponding to the payments made by the particular recipient.

2.3.2 Subsidizing environmentally sound recycling facilities (EU or non-EU)

If a large investment is needed to change work processes in order to deliver environmentally sound ship scrapping, the ship recycling companies may need a subsidy to construct the facility. This disbursement mechanism may be structured in two different ways: (i) an up-front grant; or (ii) a contract guaranteeing a minimum amount of scrapping contracts at a guaranteed price.¹⁷ An up-front grant will ensure that the facility is constructed, but it does not guarantee that the ships will use it. Alternatively, the ship scrapping facility may be given a contract guaranteeing a minimum amount of ship scrapping contracts at a guaranteed price in order to get them to enter the business. The contractual guarantee will ensure that green scrapping is delivered continuously and at the same time it will allow the ship scrapping company to get commercial loan financing for the investment based on the guarantee. However, the implementation of environmentally sound scrapping technologies requires only limited investments at the ship scrapping facilities. Therefore this disbursement mechanism is considered to be less relevant for the ship dismantling fund.

2.3.3. Frame agreements with a limited number of certified recycling facilities and voucher system

The key incentive for ship recycling facilities to build capacity for environmentally sound ship dismantling is if they can see a market. A third option would be to use the fund to support development of the market for these services. One way is to supplement the compensation scheme (as described above) with the establishment of a framework agreement with a limited number of certified recycling facilities. The framework agreements should be put out for tender to ensure that they are awarded to the recycling facilities which place the most economical solution for environmentally sound scrapping. All ships using these certified recycling facilities would receive a voucher covering the difference between the scrap value at a traditional recycling facility and the certified recycling facility. Subsequently the shipowner may be reimbursed from the Fund.

¹⁷ The guaranteed price should cover the marginal cost of the environmentally sound scrapping. It is NOT as guaranteed price for the steel.

2.4 The scenarios

Due to constraints of time, and the fact that the fund should be based on the ‘polluter pays’ principle, we recommend that the fund should be structured as a Revolving Fund, which receives financial resources from charges on a regular basis.

The first financing mechanism links an environmental charge to the construction of the ship, which is positive because it gives the shipowner incentives to choose ships which live up to environmental standards. In addition, the mechanism is easy to administrate, which makes it suitable for global fund. The disadvantage in the EU context is that the fund will take a long time to accumulate and it is likely to distort competition. Consequently, we recommend that only financing mechanisms 2 (recurrent tax on EU ships) and 3 (charges on ships calling at EU ports) are analysed further.

The first disbursement mechanism (compensation to the EU ships) is simple and effective provided that there is a sufficient certified environmental scrapping capacity, which is considered to be the case. Some stakeholders are likely to favour a system where the disbursement is linked to payments (earmarked system), but due to the time constraint we recommend a solution which allows the fund to disburse finances based on solidarity, i.e. where contributors to the mechanism pay jointly to cover environmentally sound scrapping of the oldest and most environmentally hazardous ships.

This results in 2 scenarios:

	Financing mechanism	Disbursement mechanism
Scenario A	Recurrent charges on EU ships	Compensation for loss of revenues by using green ship scrapping facilities compared to conventional ones.
Scenario B	Recurrent charges on ships calling at EU ports	Compensation for loss of revenues by using green ship scrapping facilities compared to conventional ones.

3 Pros and Cons of the selected scenarios

This section analyses the pro and cons of the selected scenarios based on a well established evaluation framework, which is used for assessment of design, implementation and result of international donor programmes.¹⁸ The analysis mainly focuses on the *relevance*, *effectiveness* and *efficiency* of the selected finding scenarios whilst also considering their impact and sustainability. On this basis it concludes by suggesting which scenario should be investigated further as part of the feasibility assessment.

3.1 Relevance

Relevance concerns whether the rationale of an intervention is in keeping with priorities and policies of the owner and with the priorities and needs of the recipient. This raises the question:

- Is there really a need to establish a fund in order to ensure that ships with a strong link to the EU act according to new requirements?

The challenge of introducing EU requirements for green ship recycling facilities (including certification and audition schemes) in the present situation is the fact that shipowners have no economic incentive to follow the rules. Operating costs of green recycling are higher, and this implies that the net revenue which the shipowner gets from environmentally sound scrapping is lower than traditional scrapping. Establishing a fund that can compensate for the loss incurred by the shipowners when they use green scrapping will provide them with an economic incentive which supports the law.

3.2 Effectiveness

Effectiveness can be assessed against the extent to which the fund ensures that ships with a strong link to the EU are dismantled in safe and environmentally sound facilities.

Both the suggested financing mechanisms are in line with the ‘polluter pays’ principle. However, the choice should reflect how the EU’s responsibility is defined. If EU responsibility is defined as the ships sailing under EU flag states, the fund should be financed by a recurrent charge on EU ships. On the other hand, if EU responsibility is defined as the EU’s share of worldwide shipping services, the fund should be financed by charges on ships calling at EU ports.

The disbursement mechanism is considered to be in line with the need of the recipient because the financial compensation will cover the shipowner’s marginal loss in net-revenues by choosing environmentally sound scrapping facilities.

3.3 Efficiency

Efficiency is a measure on how economical inputs (funds, expertise, time, etc) are converted into outputs. This brings two questions to mind:

- What is the fastest and cheapest way to collect revenues for the fund?
- Will the disbursement mechanism maximize the number of ships being scrapped in environmentally sound facilities?

¹⁸ The evaluation framework has been used by OECD, DAC (The Development Assistance Committee) and a number of other international organisations for more than a decade.

The first question is linked to the costs of collecting revenues and the risk of tax evasion. The recurrent charge on EU ships should be collected by the flag state. They have registers of all ships, so it should be fairly easy for them to collect the charge. The disadvantage of this approach is the risk of tax evasion, i.e. re-flagging. The recurrent charge on ships calling at ports needs to be collected by national tax authorities. They will put the charge on the ports, which will then pass the charge on to the ships entering the port. One obvious way of avoiding this added cost is to call a port outside of the EU and to land there the cargo ultimately destined for the EU for further transport. There are only few suitable ports connected by land to the EU (for example, Istanbul in Turkey, Durrës in Albania and St. Petersburg in Russia), and the investments to both develop the ports and the rail and road links to facilitate large scale cargo transport by land do not seem economically justified. In another scenario, transport into the EU by sea from a transshipment hub could relocate from, for example, Malta to a port on the North African coast provided the cost of longer voyage is less than the extra charge in the EU Member States. Excluding the investments in infrastructure needed to accommodate this trade in the ports, the costs may be in the same range.

The second question addresses the issue of how to optimize the benefit of the fund. In order to maximize the number of ships being scrapped in an environmentally sound way, the level of compensation must be identified which, at a given point in time, clears the market. The subsidy should be sufficient to make green dismantling competitive, yet it should not be so high that green facilities would become more attractive for the world's shipowners. If the subsidy is too low, dismantling at conventional sites in Asia will continue to prevail. On the other hand, if the subsidy is too high it could lead to an adverse problem of the world fleet being re-flagged to EU flags to enjoy high end-of-life ship values for scrapping at a green facility. This issue needs to be investigated further in order to ensure optimal use of the fund.

3.4 Impact

While the effectiveness and efficiency criteria are used to assess achievements against planned goals and purposes, impact goes beyond this. Impact includes effects - negative, positive and unintended - from a technical, economic and environmental perspective. This topic will be investigated further in task 3 - Feasibility of the dismantling fund.

In general, the investment needs for upgrading a facility do not entail any advanced technology or investments beyond various permanent structures such as houses, storage, containment and training facilities, mechanised lifting and transport equipment, and investments in training of staff. It is, however, important that downstream services such as appropriate landfills or incineration are available.

From an economic perspective, it is important to analyse whether the finance and disbursement mechanism will result in market distortions. Environmental charges on EU ships mean that non-EU ships gain competitive advantage, whereas environmental charges on ships calling at EU ports will impact all ships equally.

From an environmental perspective, there will be a large positive effect, but there may also be negative side-effects, as charges on ships calling at EU ports may result in a diversion of cargo traffic to other means of transport.

3.5 Sustainability

Sustainability is seen as the likelihood that the positive effect of the Ship Dismantling Fund (such as assets, skills, facilities or improved services) will persist for an extended period.

As argued earlier, recurrent charges are the most effective in the short term and in the interim period, when a large number of old and polluting ships need to be scrapped in environmentally sound facilities within a short period of time. However, this system might be subject to tax evasion, and in the long run it will be more operational to link the environmental charge to the construction of the ship, thereby giving shipowners an incentive to choose a ship, which conforms to the environmental standards behind the Convention.

++ very positive + positive 0 neutral - negative -- very negative ? impossible to assess	A. Recurrent charge on EU ships	B. Recurrent charge on ships calling at EU ports
Relevance	+	+
Effectiveness	+	+
Efficiency	+	++
Impact - technical		
Impact - economic	-	0
Impact- Environmental	++	+(+)
Sustainability	?	?

3.6 In sum

It is concluded that, should it, in an EU context, be decided to establish a ship dismantling fund to finance ship recycling in safe and environmentally sound facilities, an EU revolving fund based on recurrent charges on ships calling at ports would probably be the most feasible option, until the entry into force of the Ship Recycling Convention. Compensation should be disbursed to shipowners presenting evidence for scrapping a ship at a green facility. The compensation should cover the loss in net revenue from scrapping the ship in environmentally sound facilities compared to conventional scrapping facilities.

4 Funding requirements and charge per call at EU ports

This section provides a rough estimate of the funding requirements and the charge per ship calling at EU ports. The purpose of the exercise has been to provide insight into *the order of magnitude* of the financing need and the charge to be collected. The estimate is based on readily available and general data and thus it only provides a good indication and not exact results.¹⁹

The funding scenario

An exact definition of the funding mechanism is needed to estimate the funding requirements and the charge. Thus, it is assumed that the fund is structured as recommended which means that the ship dismantling fund is based on *recurrent charges on ships calling at EU ports* because this was assessed to be the most feasible option. Further, the disbursement of the funds is based on a solidarity principle, which means that all ships are eligible to apply for funds to cover the financial gap between conventional scrapping and environmentally sound scrapping. Hence, the fund would compensate for loss of revenues by using green ship scrapping facilities compared to conventional ones for all ship-owners not considering ownership or flag state.

The sum of the compensation paid to ship-owners using green ship scrapping facilities should be covered by financing from the ship dismantling fund on a yearly basis.

Scrapping volume

In order to calculate the total funding requirements on a yearly basis, an estimate of the expected annual scrapping volume of vessels with *a strong link to the EU* is needed. In the COWI 2007 report it was estimated that in the period from 2007 to 2010 the expected annual scrapping volume of vessels flying an EU flag would, on average, amount to 1.6 million LDT per year.

It is difficult to estimate scrap volumes, since the decision to dismantle a ship depends heavily on current market conditions, in particular, on the freight market. As freight rates fluctuate heavily so do the scrapping volumes. With the current low freight rates, scrapping volumes are rising. However, conditions can change quickly and therefore the average estimate of the scrapping volume from the COWI 2007 report is used in this report.²⁰

Costs of green recycling

In the COWI 2007 report it was further estimated that the additional costs of green recycling compared to conventional recycling would amount to approximately 150 USD/LDT. This estimate applied for Turkey compared to conventional recycling. However, green recycling in Asia will most likely be a cheaper option as labour costs are much lower in Asia compared to Turkey. In fact, in the COWI 2004 report the costs of green recycling (e.g. pre-cleaning and disposal of hazardous waste at facilities) was estimated to be around 25 - 50 USD/LDT in Asia. This estimate of the extra cost for performing green recycling was based on information from several industry stakeholders but considered to be associated with considerable uncertainty. On this basis, a central estimate of additional costs of 100 USD/LDT of green recycling compared to conventional recycling is used in this study, see table below.

¹⁹ No general data for Malta is publicly available.

²⁰ The most recent public data set on ship dismantling is available are from the DG ENV report by COWI/DHI from 2007. Thus, the most recent data are 2006 data and a new data search in commercial data bases would yield 2007 data and at least the first half of the 2008 data. During this period the freight market was booming and very few vessels were scrapped. The reports directly from the main scrap areas suggest that only slowly in November and December 2008 did scrapping pick up, and in the early part of 2009 the recycling beaches were seeing considerable business again. This surge in 2009 will not be reflected in the demolition databases for some time and a renewed data search will not clarify the picture with respect to the most interesting phase shift regarding supply and demand in ship recycling.

Table 1 *Estimated additional costs of green recycling compared to conventional recycling (USD per LDT)*

Low estimate	Central estimate	High estimate
25	100	150

Funding requirements

Based on the central estimate of the additional cost of green recycling, the total funding requirements per year to close the financial gap between conventional and green recycling can be calculated at USD 160 million (1.6 million LDT times 100 USD). With these financial means, support to close the gap can be paid to ships up to 1.6 million LDT which is equivalent to the expected scrapping volume of ships flying EU flags which again is assumed to be the *EU responsibility*. With the low and high estimate the funding requirements amount to approximately USD 50 million and USD 300 million respectively.

The size of the charge

In order to estimate the size of the charge, data on the number of ships calling at EU ports on a yearly basis is needed (preferable split by ship categories). However, these data do not seem to be directly available for the EU as a whole. Instead, the number of ships calling EU ports has been estimated based on data on the gross weight of goods handled in all EU ports combined with national statistics from Denmark on the number of ships calling at Danish ports.

In 2004, Denmark's share of the gross weight of goods handled in all EU ports amounted to approximately 2.9%.²¹ In 2006, data from Statistics Denmark shows that 22,775 ships larger than 500 Gross Tonnage (GT) called at a port in Denmark (excluding ferries).²² On this basis, the number of ships calling at EU ports has been estimated at 780,000 per year (22,775/2.9%).

Based on the estimated funding requirements and the number of ships calling at EU ports per year, the size of the charge can be estimated to approximately 200 USD per call (150 EUR per call) using the central estimate of the additional costs of green recycling. This is an average charge for all ships. Of course, the charge could be differentiated according to the size of the ship so that larger ships pay a higher charge than smaller ships.

The total gross tonnage of ships calling at EU ports has been estimated based on data from Statistics Denmark and from ESPO. It is approximately 3.7 billion GT per year (average size of ships of 4,700 GT). The size of the charge differentiated according to size can now be estimated at approximately USD 0.04 per GT of ships calling a port (EUR 0.03). The table below shows the estimated charge with the low, central and high estimate of the additional costs of green recycling.

²¹ Source: European Sea Port Organisation - ESPO.
[http://www.espo.be/EU_Ports_\\$26\\$Facts/Statistics.aspx#Statistics_toolkit](http://www.espo.be/EU_Ports_26Facts/Statistics.aspx#Statistics_toolkit)

²² Source: Statistics Denmark (<http://www.dst.dk/>) -
<http://www.statistikbanken.dk/statbank5a/default.asp?w=1280>) - SKIB22.

Table 2 Estimated charge (USD) with the low, central and high estimate of the additional costs of green recycling

	Low estimate	Central estimate	High estimate
Average charge per call for all ships (USD per call)	50	200	300
Charge (USD per GT per call)	0,01	0,04	0,06

Comparison to port fees

To relate the charge to other expenses paid by shipowners, the charge could be compared to the port fee paid by shipowners for port services.²³ The fee varies across the European ports and is differentiated by ship type and size. The fee typically ranges from EUR/GT 0.25-2.00. For example, in the port of Tallinn tankers pay EUR/GT 1.66 while cruise ships and container ships pay EUR/GT 0.46.²⁴ In Rotterdam, the sea harbour rates are differentiated by ship type and service and are charged per loaded or discarded ton.²⁵ For container ships the average fee is estimated at EUR/GT 0.30.²⁶

Thus, a medium size container ship of 22,000 GT would have to pay approximately EUR 10,000 for calling a port call in Tallinn. The ship dismantling fund charge would be approximately EUR 700 which is equal to 7% of the fee paid today. In Rotterdam the same ship would have to pay EUR 6,500, and therefore the fund charge would equal approximately 10% of the harbour fee paid in Rotterdam.

²³ Include waste fee; mooring charge; passenger fee; vehicle cargo charge; electricity supply, communication services and water supply charges; fee for the use of port's auxiliary vessels; pilotage charge; lighthouse charge; navigation fee.

²⁴ Port of Tallinn: Port Charges and Fees, valid from 01.01.09.

²⁵ Port of Rotterdam: General Terms and Conditions 2009.

²⁶ Special rates and discounts apply which makes it impossible to calculate the charge per GT exactly.

5 Conclusion

In conclusion, if the EU opts for early transposition of the Ship Recycling Convention, ensuring sustainable funding is important to providing proper incentives to ensure that ships are dismantled in a safe and environmentally sound/certified facility. Without a funding mechanism there is a real risk of circumvention given that there is very little incentive, from an economic point of view, to choose green recycling in Europe or elsewhere compared to standard ship breaking in Asia due to the fact that it is more costly. Green recycling facilities are thus not able to pay as high a price for the scrapped ships as the conventional (Asian) recycling facilities.

The fund is intended to close the financial gap between conventional and green dismantling facilities to provide proper incentive for shipowners to choose a green ship recycling facility. Further, in order to meet this objective the funding system must be based on a stable financing source, which provides sufficient funds to enable the Fund to provide proper incentive for shipowners to choose to dismantle ships at a safe and environmentally sound facility.

Although many stakeholders during the public consultation process expressed their scepticism with regard to the general idea of an EU fund, it is concluded that, should it, in an EU context, be decided to establish a ship dismantling fund to finance ship recycling in safe and environmentally sound facilities, an EU revolving fund based on recurrent charges on ships calling at ports would probably be the most feasible option, until the entry into force of the Ship Recycling Convention. Compensation should be disbursed to shipowners presenting evidence for scrapping their ship at a green facility. The compensation should cover the loss in net revenue from scrapping the ship in environmentally sound facilities compared to conventional scrapping facilities. The compensation should be sufficient to make green dismantling competitive, yet it should not be so high that green facilities would become much more profitable for the world's shipowners than conventional scrapping.

The fund would be an additional *interim measure* to make early transposition effective. Depending on the entry into force of an EU instrument, it could play an important role in ensuring safe and environmentally sound dismantling of the single hull oil tankers being phased out in 2010 and 2015 as well as tackling part of the backlog in ship scrapping.

The purpose of this note has been to outline potential design scenarios for an EU ship dismantling fund and to analyse the pros and cons of three options for establishing such a fund. It should be stressed that the descriptions of the scenarios are general and focus on the conceptual elements of the funding system and thus do not address specific details of the fund design. The ship dismantling fund is only one possible option for a financial mechanism. Others could be further considered, as discussed during the stakeholder workshop concerning new initiatives regarding dismantling of ships held at DG Environment on 9 June 2009. Depending on which option the Commission wishes to pursue, if any, it may be necessary to undertake further study on the EU ship dismantling fund. This would be in order to analyse *inter alia* the possibility of being able to differentiate the contribution depending on the hazardous contents of the ship and the specific structuring of the financing and disbursement mechanism.