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COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT

Accompanying the document

**Proposal for a
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on ship recycling**

This report commits only the Commission's services involved in its preparation and does not prejudge the final form of any decision to be taken by the Commission.

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COMMISSION STAFF WORKING PAPER

IMPACT ASSESSMENT

Accompanying document to a legislative proposal on ship dismantling

This report commits only the Commission's services involved in its preparation and does not prejudice the final form of any decision to be taken by the Commission.

Introduction

According to the current legislation (the Waste Shipment Regulation¹), the EU flagged ships which are going for dismantling are hazardous waste and can only be dismantled within the OECD. This legislation is almost systematically circumvented by EU flagged ships². Currently, most EU controlled ships are indeed dismantled in Asia (India, Pakistan and Bangladesh), usually through "beaching" method and with significant environmental and health impacts.

This widespread non-compliance is firstly linked with the lack of recycling capacity available within the OECD in particular for the largest ships. Developing capacity within the OECD has not been feasible in particular because of the lack of economic viability. The non-compliance is also partially driven by the interest of shipowners to avoid the costs of environmentally and socially acceptable dismantling in OECD facilities, and partially by the ease with which the legislation can be avoided: EU shipowners can with limited effort maximise the profit from selling their old vessels by choosing a non-EU jurisdiction for their vessels at the end of the life of the ships.

The Commission adopted a Green Paper on better ship dismantling in 2007 and a Communication proposing an EU strategy on ship dismantling³ in 2008. This strategy proposed measures to improve ship dismantling conditions as soon as possible, including in the interim period before the entry into force of the Hong Kong Convention⁴: i.e. preparing the establishment of measures on key elements of the Convention, encouraging voluntary industry action, providing technical assistance and support to developing countries and better enforcing the current legislation. The Commission also announced that it would look at the feasibility of developing a certification and audit scheme for ship recycling facilities worldwide, addressing also navy ships and other government vessels not covered by the Hong Kong Convention and establishing a mandatory international funding system for clean ship dismantling.

¹ Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste. More information about the Basel Convention and the Waste Shipment Regulation are provided for in Annex III

² In 2009, more than 90 % of EU flagged ships have been dismantled outside the OECD mostly in South Asia.

³ Communication COM (2008) 767 final of 19 November 2008 presenting an "EU strategy for better ship dismantling, and its impact assessment in Commission Staff Working Document SEC(2008) 2846

⁴ The Hong Kong International Convention for the safe and environmentally sound recycling of ships was adopted in May 2009 by the International Maritime Organization.

The Hong Kong Convention, when it comes into force, will require Parties to the Convention (including EU Member States) to dismantle their large commercial ships only in countries that are Party to the Convention. This will include Asian countries, whose ship dismantling facilities will need to meet internationally accepted standards (higher than the current standards). These facilities will have to treat the ships coming from non-Parties to the Convention in a similar manner as ships flying the flags of the Parties to the Convention ("no more favourable treatment" clause).

The Convention was adopted in 2009 but needs to be ratified by a sufficient number of large flag and recycling states in order to enter into force and start producing effects. This is not expected to happen before 2020 at the earliest.

Broadly speaking, this Impact Assessment considers the options for the development of a regime for ship recycling which can be effectively enforced. The analysis considers the economic, social and environmental impacts of different options by examining the changes in ship dismantling behaviour. It has been prepared by the Unit for Waste Management of the Directorate General for Environment (DG ENV) and is the basis for a legislative proposal on ship recycling.

1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1. Organisation and timing

The impact assessment process was steered by the Inter-Service Group on ship dismantling which was used as an Impact Assessment Steering Group. This group was chaired by DG ENV and with members from SG and DGs COMP, DEVCO, ENTR, EMPL, MARE, REGIO, RTD, SANCO, TRADE and MOVE. Furthermore, experts of the European Maritime Safety Agency (EMSA) provided valuable input and advice for the impact assessment studies.

1.2. Consultation for the Impact Assessment

In developing this Impact Assessment, the Commission services consulted stakeholders and drew upon external expertise through a public consultation and three expert workshops.

1.2.1. Public consultation and expert workshops.

The preparation of this report has been preceded by a public consultation on a new initiative regarding dismantling of ship open from April to June 2009 in order to gather as many comments and suggestions as possible from the stakeholders concerned.

Given the complicated nature of the topic, participation was relatively large: 27 contributions were received from various stakeholders active at local, national, European and international level: EU Member States, local authorities, environmental NGOs⁵, individual companies and industry associations (shipowners, recycling facilities, P&I clubs, classification society⁶), trade unions, academia. Both public (Member States) and private shipowners (through their professional associations) have actively contributed to the public consultation as well as to the stakeholder workshops. Contributions have been received from national (France, Belgium),

⁵ The NGO Platform on Ship Breaking is a global coalition of 15 environmental, human and labour rights' organisations.

⁶ Lloyd's register

European (European Community Shipowners' Association⁷) and International associations (the International Chamber of Shipping⁸, Intertanko).

The detailed inputs received have been summarized in a report published on DG Environment's website⁹ and are addressed in a detailed manner in this report (in the sections presenting problem definition, identifying and assessing of the possible options).

Some stakeholders have asked for a continued involvement of stakeholders on a on-going basis and not only through a general public consultation. For this reason, and in order to get more detailed information to support the study undertaken to supporting this impact assessment, the Commission services also organised three expert workshops on 9 June and 23 October 2009 in Brussels and on 26 and 27 June 2011 in the European Maritime Safety Agency in Lisbon. The presentations provided during these workshops as well as a summary of the information gathered from the experts have been made available on DG Environment's website¹⁰ in order for both experts and all interested parties to further contribute. Contributions have been received in particular from recycling facilities located in Turkey and India directly or through the coordinator of the DIVEST Project¹¹ and taken into account in the studies undertaken on behalf of the Commission¹².

Most stakeholders clearly supported a prompt ratification of the Hong Kong Convention by the EU Member States in order to fulfil, to a large extent, its entry into force of provisions related to flag States¹³ whilst encouraging ratification by other States. Many stakeholders are in favour of early implementation of the Convention by the EU since they consider that waiting for entry into force of the Convention is unacceptable when ship breaking workers continue to be killed or injured at work and considerable environmental damage occurs. Some consider that the EU should not impose additional requirements that go beyond the Convention.

The main positive consequence of early implementation would be the improvement of ship recycling operations with respect to worker health and safety and environmental protection. Many stakeholders take the view that an harmonised transposition at EU level will ensure a more level playing field and reduce administrative burdens for ship owners and recycling facilities in the EU. Early transposition could also encourage the development of more ship recycling facilities. It was noted that such EU legislation should also comply with ILO conventions and recommendations. It is suggested that the Commission should promote ratification among the Member States and use its political influence to encourage recycling States to take similar action so that sufficient global ship recycling capacity is maintained.

⁷ ECSA represents all the European shipowners as it is composed of the national shipowners associations from European Member States. It represents 40 % of the shipowners worldwide.

⁸ The International Chamber of Shipping (ICS) is the principal international trade association for the shipping industry, representing all sectors and trades. ICS membership comprises national shipowners' associations whose member shipping companies operate two thirds of the world's merchant tonnage.
<http://ec.europa.eu/environment/waste/ships/pdf/summary%20of%20contributions.pdf>

⁹ <http://ec.europa.eu/environment/waste/ships/index.htm>

¹¹ DIVEST (Dismantling of Vessels with Enhanced Safety and Technology) is a Research and Technology Development collaborative project funded by the European Union as part of the 7th Framework Programme for Research, Technological Development and Demonstration (<http://www.divest-project.eu/>).

¹² COWI study for DG Environment: "Support to the impact assessment of a new legislative proposal on ship dismantling" Final report of December 2009

¹³ For more information about these provisions, see Annex IV.

The most significant negative consequence of early implementation identified by the stakeholders is the risk of reflagging of EU ships during their operational life to an "open register" , or the reflagging of ships nearing the end of their life to non-EU countries in order to avoid complying with regional measures. Reflagging would result in a reduction of the size of the EU fleet and the EU's influence with regard to maritime issues. Another risk is that implementation would be too rapid and there would not be enough recycling capacity available for EU flagged ships in view of the phasing out of single hull tankers. Finally, some stakeholders point out that since early implementation at EU level could make ratification by Member States apparently redundant and therefore discourage them to ratify the Convention thus postponing its entry into force.

The public consultation and the expert workshops met the minimum standards for consultation. The contributions received to the public consultation are available, together with the summary of the responses, on the following website: <http://ec.europa.eu/environment/waste/ships/index.htm>

1.2.2. Opinions expressed by the European institutions on the Communication.

The European Parliament, the European Economic and Social Committee and the Council debated the Communication and adopted respectively a resolution on 26 March 2009¹⁴, an opinion on the 13 May 2009¹⁵ and conclusions on 21 October 2010¹⁶ on an EU Strategy for better ship dismantling.

1.2.3. External contractor

External contractors carried out preparatory studies for this IA, that are published at: <http://ec.europa.eu/environment/waste/ships/index.htm>. Moreover, in order to update the available information about the world fleet and dismantled ships in 2008 and 2009, additional data have been provided to the Commission through a contract with one of the leading companies (IHS Fairplay) managing maritime databases.

1.2.4. Results of the consultation of the Impact Assessment Board (IAB)

Following the submission of a draft report to the Impact Assessment Board (IAB) on 27 July 2011 and a written procedure, the IAB sent its opinion on 8 September 2011. The recommendations of the IAB were duly taken into account and the main modifications were the following:

- the problem definition was revised to:
 - include more information about the dismantling capacity in the EU and the current and expected competitiveness of the ship recycling countries,
 - clarify to what extent the current problems are going to be solved by the Hong Kong Convention and describe what would be the outstanding problems which would justify the need to go beyond the requirements of this Convention,

¹⁴ <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2009-0195+0+DOC+XML+V0//EN&language=EN>

¹⁵ http://eescopinions.eesc.europa.eu/EESCopinionDocument.aspx?identifier=ces\nat\nat425\ces877-2009_ac.doc&language=EN

¹⁶ http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/110626.pdf

- More detailed information was provided about the stakeholders' positions,
- A table presenting the follow up of the actions announced in the 2008 EU Strategy on ship dismantling was introduced.
- The specific and operational objectives were reformulated so as not to pre-empt discussions on policy options,
- The content of the policy options was clarified and more explanations were introduced regarding their impacts, proportionality and effectiveness focusing in particular on compliance aspects.
- The indicators for monitoring the intended effects of the legislation were clarified and expanded in order to address employment, the state of ratification of the Hong Kong Convention and the effective enforcement of this Regulation.

2. PROBLEM DEFINITION AND IDENTIFICATION OF THE DRIVERS

Small ships and governmental vessels are usually dismantled within the European Union or in Turkey. For technical (inability to travel in high sea and impossibility to tow them) and economic reasons (travel costs) small ships are generally dismantled locally¹⁷. Some stakeholders expect the small local markets will continue to exist handling coastal, fishing and inland waterway vessels. These stakeholders consider that while these can provide models of responsible ship recycling and best practice, it is not realistic or economic to expect such facilities to handle significant volumes of larger ships, given the high labour costs and low recycled value. It is therefore more cost-effective to devote resources to improving standards and upgrading facilities in more appropriate countries, rather than creating artificial markets and subsidised facilities in high cost countries.

Large governmental vessels (including navy ships) are dismantled within the OECD because the existing recycling capacity is adequate but also to protect some sensitive technologies. The recycling demand has been estimated at 40 000 LDT per year for these ships while the existing capacity has been estimated at 250 000 LDT¹⁸.

2.1. Large commercial European ships end up in substandard dismantling facilities outside the OECD leading to negative health and environmental impacts.

The dismantling of ships is at present sustainable from a narrow economic point of view, but the costs for human health and the environment are high. It is fair to say that with regard to end-of-life ships the polluter pays principle is usually not applied. Ship owners generally make a profit from selling their obsolete ships to ship dismantling facilities or intermediate buyers, and they can maximise this profit when selling to facilities which do not follow the strictest health and safety and environmental standards.

¹⁷ See the Annex 10 of the Rapport de la Mission Interministérielle portant sur le Démantèlement des Navires civils et militaires en fin de vie

¹⁸ COWI/DHI for the European Commission, DG Environment, Study on "Ship dismantling and pre-cleaning of ships", Final report of June 2007, published on the Commission website at: <http://ec.europa.eu/environment/waste/ships//index.htm>

Ships have a normal life span of about 30 years after which they are sent for dismantling. The average dismantling age varies over time and depending on several factors¹⁹. Due to the shipping crisis and to regulatory developments (phasing out of single hull tankers in 2015), the number of ships sent for dismantling since 2008 has doubled compared to the previous yearly averages²⁰.

Ship dismantling is, in principle, a very positive activity leading to reuse and recycling of large amounts of valuable resources (steel, other scrap metal and equipment in particular). But ships also contain large amount of hazardous materials such as asbestos, PCB, heavy metals, oil, mercury, ozone depleting substances (ODS) which, if not handled, removed and disposed of in a safe and environmentally sound manner (ESM) lead to significant detrimental effects on both human health and the environment.

Member States and companies in the EU are concerned since they play a major role in international shipping (17 % of the international merchant fleet tonnage is flying EU flags and about 37 % of the tonnage belongs to EU owners). The dismantling of EU flagged ships will produce an estimated yearly average of 80 600 tonnes of hazardous waste in the period 2012-2030¹².

Most ship dismantling takes place nowadays in South Asia, on tidal beaches and under unacceptable conditions from the point of view of safety and environmental protection. This has not always be the same. Looking back, the demolition of (European) vessels has moved from the Europe and Japan during the 60's and 70's to Asian countries such as Taiwan and South Korea in the 80's where dismantling took place along piers in connection with ship building activities. As the economy grew in South Korea and Taiwan, labour costs increased making ship dismantling less attractive in these countries.

During the 1980's the method of "beaching"²¹ became the most frequent method used for demolition since expensive infrastructures like piers, sufficient depth of the harbour, cranes etc. could be replaced by a mud flat, portable equipment and a huge labour force. As shown in Figure 3 in Annex VII, the South-East Asian countries are nowadays dominating the dismantling industry²². Today, 95% of ship dismantling takes place in five countries (Bangladesh, China, India, Pakistan and Turkey)²³. In these countries ship dismantling provides for employment opportunities, and resources such as scrap metals which are important in particular for the construction sector (Pakistan, Bangladesh, India) and for ship building (China). The current practices have however significant costs in the short and in the long term for human health and the environment.

The EU and Turkey treat today almost exclusively government vessels, including navy ships, and small ships. Both EU and non-EU flagged ships are recycled in the EU.

¹⁹ Further explanations are provided for in Annex VII.

²⁰ For several years, the number of ships going for dismantling was limited to 200 to 600 per year. According to data provided by HIS Fairplay, 744 and 1299 ships have respectively been dismantled in 2008 and 2009. According to the broker N. Cotzias, 1256 ships have been sent for dismantling in 2010: http://www.cotzias.gr/reports/overcapacity/NCSCOCREP2010_%28JAN-DEC2010COMP%29.pdf.

²¹ "beaching" means that the vessels are driven — usually under their own steam — onto sandy beaches and broken up without heavy machinery and without other containment than the hull of the ship itself

²² COWI study for DG Environment: " Support to the impact assessment of a new legislative proposal on ship dismantling" Final report of December 2009

²³ Calculation made by DG ENV based on data provided by IHS Fairplay.

In 2009, 28 ships which were non-EU flagged have been recycled in the EU.

The three largest vessels were navy vessels from the United States dismantled in the UK. These vessels are not included in the scope of the Hong Kong Convention. The other vessels are all small to medium-sized (from 233 to 3470 GT) and owned by European, Norwegian, Russian or Ukrainian ship owners. These vessels are not expected to be relocated outside the EU for the following technical and economic reasons:

- these ships are usually not designed to navigate in high seas,
- the economic advantage of countries offering low labour costs and low level of mechanisation is less important when the ships are small. The fee applied for transiting through the Suez Canal would also have an important impact for these ships, in particular, as they will have difficulties to arrange for a final journey given their limited capacity and the overcapacity of the shipping market .

As a conclusion, it is expected that the ships which are currently dismantled in the EU would continue to do so and would therefore not be affected by the proposed changes.

Ship dismantling provides for hundreds of jobs but with important short term and long term impacts.

The number of jobs associated with ship dismantling depends upon the dismantling practices. It is pretty limited in the countries which uses the slipway; docking or afloat method²⁴. In countries using the beaching method, such as Bangladesh, India and Pakistan the level of mechanisation and the labour costs are low and this industry offers thousands of jobs.

But in these countries, ship dismantling involves high risks for human health both at the time of dismantling (deaths, injuries) and in the long term (asbestosis for example). This is primarily due to dangerous working practices (lack of training and of protective equipment, insufficient precautions against explosions and falling hazards...) and to the hazardous materials on board old ships.

Safety and health conditions in many South Asian facilities are known to be critical but official records are rarely kept, accidents and incidents are underreported and access to facilities by third party is often restricted²⁵. Unlike in India where the regional government has started to organise safety training for workers, no systematic accident precautions are at present visible in Bangladesh even if the situation could hopefully improve after a recent judgment from the High Court²⁶.

Workers are mainly migrant. No workers' union exists at present in Bangladesh, and although many workers believe that a union would bring improvements to their situation, most are

²⁴ See Table 4.

²⁵ The existing information has been compiled and is summarized in page 43 of the study supporting the impact assessment (see footnote 12)

²⁶ On 7 March 2011, the High Court authorized the yards to be temporarily reopened provided that a certain number of conditions are met. Requirements apparently include pre-cleaning of tanks and holds before being entered for cutting to ensure they are gas-free, a prohibition to employ children workers and the obligation for all workers to be trained at an institute that is to be set up under supervision from the Bangladesh Marine Academy. A team of engineers will be required to be onsite during the dismantling process to monitor safety and environmental conditions. No dismantling would be able to take place after dusk and yards must provide a separate rest and eating area for workers. At this stage, the judgment is not available is writing.

averse to organizing one for fear of putting their jobs at risk³⁰. In Pakistan, the Gadani workers have organized themselves into a Ship-breaking Labor Union, which in February 2009 successfully campaigned for a 40 percent wage increase, better working conditions, and improvements in medical facilities. Some reports describe a “pocket” union, composed of “loyal” workers, that has been put in place by the ship breakers to rival the official union, thus denying true worker representation³⁰.

Child labour is still a reality in Bangladesh, as children represent a cheaper work force that is easy to control and unlikely to defend its rights, and even more unlikely to organize into trade unions²⁷. The recent judgment from the Supreme Court, if implemented, might improve the situation by prohibiting the use of workers under the age of 18.

Ship dismantling is also hazardous in the long term. It is estimated that thousands of labourers contract irreversible diseases from handling and inhaling toxic substances without proper safety precautions in particular in Bangladesh where most shipbreaking workers do not even have helmets, gloves and shoes to protect themselves. According to a medical report to the Indian Supreme Court of September 2006, 16% of the workforce handling asbestos in Alang (India) showed symptoms of asbestosis and were thus at serious risk of mesothelioma.²⁸ As is known from medical research, the incidence of this form of lung cancer reaches its peak only several decades after exposure.

Ships contains large amount of hazardous materials which are not treated in an environmentally sound manner thus creating negative impacts

According to estimates from the World Bank, more than 80 000 tons of asbestos, 256 000 tons of PCB, 224 000 tons of Ozone Depleting Substances (ODS) and around 74 000 tons of heavy metals are expected to be sent in ships for dismantling to Bangladesh and Pakistan over 2010-2030. Since there are no formal waste disposal sites in these countries, the waste mainly remain in the facilities and pollutes the water, the beach sediments, the soil of the seashore and coastal habitats²⁹. A small part is sold in equipments (PCB or ODS) or sent to rerolling mills (paints)³⁰.

The dismantling of ships in South Asia takes place on sandy beaches without concrete covering or any other containment other than the hull of the ship itself. One of the traditional "cleaning" methods is the drilling of holes into the beached ship through which sea water can wash out oil-contaminated tanks at high tide. End-of-life ships are rarely pre-cleaned before their arrival. As shown in a study undertaken on behalf of the Commission³¹, pre-cleaning is indeed costly and raises particular safety concerns as a ship which is properly pre-cleaned usually has to be towed to the recycling facility. While some stakeholders (European Ship Recycling facilities, environmental NGOs) still insist on pre-cleaning prior to sending the ships for dismantling, others (academia, shipowners) consider that any "pre-cleaning" is better

²⁷ Report from International Federation of Human Rights "Childbreaking Yards – Child Labour in the Ship Recycling Industry in Bangladesh", 2008 at <http://www.fidh.org/IMG/pdf/bgukreport.pdf>

²⁸ Lloyd's List of 8 September 2006.

²⁹ Soil samplings in dismantling yards in Bangladesh and Pakistan showed large contamination notably by heavy metals. See the study from the World Bank "The Ship Breaking and Recycling Industry in Bangladesh and Pakistan", December 2010.

³⁰ Study from the World Bank "The Ship Breaking and Recycling Industry in Bangladesh and Pakistan", December 2010.

³¹ See 18.

and more economically done close to the site of eventual demolition and not in areas like the EU prior to a lengthy towing.

Whereas in Alang (India) a landfill for hazardous waste (mainly asbestos and glass wool) was built in 2005, and waste reception facilities and asbestos removal cells are in operation on some of the facilities, no such facilities exist currently in Pakistan nor in Bangladesh. In Bangladesh, asbestos is crushed and handled without protective equipment and permeates the demolition zone. In Pakistan, it is buried on-site and the locations are not marked³⁰. Waste oils are dumped into unsealed holes in the ground from where a large part of the toxic material seeps away within a few days.³²

The current and long term impacts of these unsound practices on the environment

It is often difficult to document the impact of these practices on the environment in detail. Indications exist mainly for the impacts on the marine environment rather than on land conditions or air emissions³³.

In India the responsible regional authority (Gujarat Maritime Board) conducted sampling and analysis of various parameters in coastal water in 2005, and found only "low" or "moderate" levels of hazardous substances³⁴. In the context of its recent study commissioned by the World Bank³⁰, soil samplings have been collected and analysed in Pakistan and Bangladesh. They show a widespread varying contamination of the ship dismantling facilities at Chittagong (Bangladesh) with cadmium, chromium, lead and mercury and less contamination at Gadani (Pakistan).

Significant restoration/decontamination would be required in Bangladesh to allow for any change of the land use and to prevent the loss of the pollutants in the event of sea level rise³⁵, leading to loss of biodiversity and negative impacts for other economic sectors such as fisheries, fish and shrimp farms as well as hatcheries.

2.2. What are the underlying drivers of the problems?

2.2.1. Driver 1: insufficient dismantling capacity within the OECD

According to the Waste Shipment Regulation, end of life ships are hazardous waste and should be dismantled in the OECD only³⁶.

Several stakeholders mentioned the lack of sufficient dismantling capacity (shipowners, Member States) as one of the main reasons leading to a lack of implementation of the current legislation and, consequently, as one of the main issues to resolve in any possible legislation. At the same time, trade unions also mentioned the need to maintain the existing dismantling

³² Results of investigations on site by IMO and EU experts in January 2008; cf. also Third Progress Report Identification Mission for EC support in the area of Environment and Disaster Management Bangladesh, J. Caldecott / A. Karim, 25 February 2008.

³³ For example, emission of dioxins produced by the open burning of cables or by the processing of painted metal in the re-rolling mills.

³⁴ Presentation to IMO National Workshop in Mumbai, 8-10 January 2008; data also published at: http://www.gmbports.org/env_issues.htm, Environment / Alang Sosia Shipbreaking Yard.

³⁵ The costs associated with the remediation of closed yards were estimated at 10 millions dollars for Bangladesh. See on page 83 of the Study from the World Bank "The Ship Breaking and Recycling Industry in Bangladesh and Pakistan", December 2010.

³⁶ Thoroughly cleaned ships of all hazardous materials could be legally exported to non-OECD. But this is in practice rarely happens because of the costs of pre-cleaning and towing operations (see footnote 31).

capacity and employments in the EU which is mainly devoted to small and navy ships. It is noteworthy that even the limited existing European recycling capacity is not entirely used and that a number of investment projects for green ship recycling in Europe did not materialise. A majority of ship owners indeed prefers to have ships dismantled where the revenue from selling the ships is higher, thus making the establishment of a business case in the EU extremely difficult.

The EU flagged ships represented in 2009 a volume of more than 0,81 million LDT³⁷. The existing dismantling capacity in the EU (0,2 million LDT) is sufficient to treat the fishing vessels, navy vessels and other government owned vessels but not all the EU flagged merchant ships. A total of 0,06 millions tons LDT of ships (mainly navy ships and small ships) have been dismantled in the EU in 2009 and only 44 % of these ships were EU flagged ships. During the period 2012-2030, an estimated average volume of 1,64 million LDT of EU flagged ships would need to be dismantled each year³¹. The existing capacity in the EU is therefore able to treat around 12 % of the volume of all EU flagged ships going for dismantling. The existing capacity is able to treat small ships and government owned ships (including navy ships) but not the total volume commercial EU flagged ships which are expected to be sent for dismantling in the coming years.

According to a study conducted for the Commission³⁸, the existing capacity is of 60 000 LDT/year in Belgium, 30 000 in the Netherland, 25 to 30 000 in Denmark and 150 000 in the UK while an estimated average volume of 1,64 million LDT of EU flagged ships would need to be dismantled each year during the period 2012-2030. In addition, the existing capacity in the EU is adapted to small and medium sized ships but not to very large ones like Very Large Crude Carriers and Ultra-Large Crude Carriers³⁹. In 2009, the largest EU flagged ships which have been sent for dismantling had a draught of 14,5 meters. According to the report of the French Interdepartmental Committee on the Dismantling of Civilian and Military End-of-Life Ships⁴⁰, the largest facilities located in the EU could accommodate ships only up to 10-12 meters. The dismantling capacity within the EU is therefore not able to accommodate the largest EU flagged ships.

The dismantling capacity within the EU is therefore not able to accommodate the whole range and the total volume of the commercial EU flagged ships.

Apart from Turkey, the other OECD countries tend to reserve their capacity for the dismantling of their own flagged ships. Turkey can provide for some dismantling capacity (conservatively estimated at 0,05 million LDT per year) even if the total number of facilities is not expected to increase due to geographical limitations.

It is argued that a significant dormant capacity could exist in the EU and in Turkey⁴¹. But this capacity has not really materialized since it can compete neither with environmentally sound

³⁷ The weight of a scrap ship is often expressed in light displacement tonnes (LDT) which is calculated without cargo, fuel, ballast water etc and roughly equals the steel weight of a vessel.

³⁸ See the list on page 175 of the BIO intelligence service study for DG Environment: "Feasibility of a list of "green and Safe" ship dismantling facilities and of a list of ships likely to go for dismantling". The facility located in Italy does not have a waste management license and has therefore not been retained in the calculation of the EU recycling capacity.

³⁹ See page 68 of the study referred to in footnote 31.

⁴⁰ See: http://www.sgmer.gouv.fr/IMG/pdf/Annex_3_Dismantling_site_in_Europe_and_OECD.pdf

⁴¹ See footnote 31. The indicated volume is an average. Larger volumes are expected to be sent for dismantling in particular in 2015 due to the phase-out of single hull tankers.

dismantling in countries benefiting from low labour costs nor with unfair practices of unsafe and unsound dismantling.

A significant recycling capacity exist outside the OECD in China, India, Pakistan and Bangladesh.

Responsible European shipowners have invested in safe and sound recycling facilities located in China and applying EU standards. The current existing capacity available in China (2,83 millions LDT in 2009) is already largely sufficient to treat all EU flagged ships by 2030 (the maximum yearly volume in the period 2012-2030 will be of 1,88 million LDT) and a new facility with a capacity of 1 million LDT will shortly start its activities.

2.2.1. Driver 2: An unfair competition in favour of poor quality dismantling

The current situation of the ship recycling market is characterised by fierce competition between the major recycling states Bangladesh, India and (to a lesser extent) Pakistan. According to the prices paid in 2009, the most competitive country is Bangladesh (299 \$/LDT) followed by India (273\$/LDT) and Pakistan (271\$/LDT)⁴².

Other competitors with higher technical standards are only able to occupy market niches for special types of ships like small ships and government vessels including warships⁴³ (EU and Turkey) or the fleet of committed shipowners (Turkey and China). China, Turkey and EU facilities offered respectively 251, 181 and 82 \$/LDT in 2009⁴⁴. Facilities in China, Turkey and the EU are considered to be compliant already with the standards set up in the Hong Kong Convention. Limited investment will be needed in India where facilities have improved after the Supreme Court had decided to turn some key requirements of the, at the time draft, Hong Kong Convention into domestic law. As highlighted in the study from the World Bank³⁰, significant investments in infrastructure, training and protective equipments would however be necessary in Pakistan and Bangladesh.

Contrary to other type of waste, shipowners are paid for getting their ships recycled. From a shipowner's point of view, ship recycling is beneficial and depend mainly upon the price offered by the ship recycling facility or by an intermediate (the "cash buyer").

The costs of transport for the last journey of a vessel to the recycling facility are indeed very limited and not accounted for in general. The final journey is usually relatively short, as the shipowner of, for instance, a cargo ship will often succeed in arranging a last transport of cargo from near his ships present location to a destination close to the recycling facility⁴⁵.

Ship owners do usually not sell directly the recycled materials. This task is undertaken by the ship recycling facilities themselves.

⁴² For more detailed information see Annex V and Annex VII.

⁴³ As explained in the IA supporting the EU Strategy on ship dismantling, government vessels are composed of navy ships and of state-owned ships for civilian purposes with a respective tonnage of 300 000 and 100 000 LDT over the next decade. There exist also a high number of small ships used by navies or other government services which, however, are normally scrapped near their berth.

⁴⁴ See footnote 42.

⁴⁵ See COWI study for DG Environment: " Support to the impact assessment of a new legislative proposal on ship dismantling" http://ec.europa.eu/environment/waste/ships/pdf/final_report080310.pdf

As explained in the Impact Assessment accompanying the EU Strategy for better ship dismantling⁴⁶, shipowners decide at what point in time a ship will be sent for dismantling based on an economic comparison between the costs (maintenance, renewal of certificates..) and benefits (freigh rates) of maintaining an ageing ship in operating conditions and the benefits of sending it for dismantling. According to Clarkson, the average earnings per days were of 12 674 \$ (or 380 220 \$ per month).

The choice of the dismantling location is then influenced, in particular, by the price a facility can offer to the intermediary “cashbuyer” or to the ship owner. This price in turn depends on:

- Labour costs: operators in South Asia employ many unskilled labourers at extremely low wages of about 2,5 dollar per day⁴⁷. Detailed information about the labour costs are provided in Table 14 in Annex VII.
- Costs of infrastructure for worker's safety and environmental protection which are linked with the dismantling methods employed as well as the existence and the level of implementation of national and international regulations regarding workplace safety and environmental impacts.

Table 1: Dismantling locations of large EU flagged commercial ships in terms of percentage of total recycling (GT⁴⁸ based) in 2009²³.

Dismantling location for EU flagged - ships	Main dismantling method	Dismantling fraction of total
India, Pakistan, Bangladesh	Beaching	69,81%
China	Afloat	22,75%
OECD non EU	Landing, afloat	6,36%
EU	slipway, docking	0,85%
Other		0,23%
Total		100,00%

In terms of method and infrastructure, more than 2/3 of large commercial EU flagged ships⁴⁹ (in terms of tonnage) have been dismantled in 2009 in India, Bangladesh and Pakistan in “beaching” facilities which do not require heavy machinery. According to the World Bank³⁰, there are virtually no obligations applied to ship dismantling facilities in Pakistan and Bangladesh in terms of compliance with any health or environmental standards or inspection by the authorities. So investment in permanent structures and machinery at the facilities continues to be very limited. Only India has developed some central infrastructure for hazardous waste management, workers’ training and health care⁵⁰. The Chinese government

⁴⁶ Communication COM (2008) 767 final of 19 November 2008 presenting an "EU strategy for better ship dismantling, and its impact assessment in Commission Staff Working Document SEC(2008) 2846

⁴⁷ According to the study from the World Bank "The Ship Breaking and Recycling Industry in Bangladesh and Pakistan", December 2010, the daily wage in Bangladesh is of TK 225 (2,25 €) and Rs 350 (2,78 €) in Pakistan.

⁴⁸ GT stands for gross tons which is the measure of the overall size (internal capacity) of a ship.

⁴⁹ For information about EU flagged and EU owned ships, please consult Table 11 in Annex VII.

⁵⁰ For detailed information about the waste management practices in the dismantling countries and their compliance with EU waste management requirements and with the obligation of the Hong Kong Convention see pages 47 to 61 of the COWI study for DG Environment: " Support to the impact

has prohibited beaching some years before and closed down all the existing facilities using this method. Important investments notably from European shipowners have been made in order to develop the existing facilities which are operated largely according to EU standards, to create new ones, to train the workers and regarding the handling of hazardous waste⁵¹.

Other factors affecting costs include:

- The domestic market demand for steel scrap and goods present on board ships. Scrap steel from ship is indeed a valuable raw material and higher price for metal can be paid if it can be recycled “cold”, without energy-intensive and thus expensive re-melting in electrical furnaces,
- Tariffs and duties.

The better price for steel scrap⁵² from ships are paid by operators in Bangladesh where the standards of workers’ safety and pollution prevention are the lowest⁵³, and most steel was processed without melting in re-rolling mills. India and Pakistan offer similar prices while China and Turkey offer lower prices.

There is thus a strong economic incentive for ship owners who are not willing to act responsibly to choose recycling facilities with a particularly poor social and environmental standard. Other countries like China, Turkey and several EU Member States with capacity for ship dismantling in dry docks, at piers and on hard slipways only account for a smaller fraction of the market as they are typically priced out of the market.

Current situation and likely evolution of the ship recycling market:

According to one of the major "cash buyers" (GMS), Bangladesh was the most competitive country in August 2011. It offered prices comprised between 500 and 525 US\$/LDT. India is ranking second with prices comprised between 495 and 520 US\$/LDT, followed by Pakistan (485 to 510 US\$/LDT) and finally China (450 to 465 US\$/LDT). Since large commercial vessels are currently not sent for dismantling in Europe, it is difficult to collect updated information. Using as a proxy the price recently paid by Turkey for a large navy vessels from the UK, the prices offered are in the range of about 150 \$/LDT.

Forecasting the evolution of the market and in particular the share between the different recycling countries is linked with a great uncertainty. The dismantling costs offered by the facilities are indeed fluctuating strongly since they depend upon the economic situation (evolution of the shipping market) as well as upon the legal situation in the countries (the

assessment of a new legislative proposal on ship dismantling" Final report of December 2009 and pages 31 to 33 of the World Bank study "the Ship Breaking and Recycling Industry in Bangladesh and Pakistan" of December 2010.

⁵¹ See the Annex II of the report of the French Inter-departmental Committee on the Dismantling of Civilian and Military End-of-Life Ships and BIO intelligence service study for DG Environment: "Feasibility of a list of “green and Safe” ship dismantling facilities and of a list of ships likely to go for dismantling" Final report of January 2010.

⁵² Detailed information about the dismantling prices in 2009 is provided in Annex VII.

⁵³ For detailed information about the waste management practices in the dismantling countries and their compliance with EU waste management requirements and with the obligation of the Hong Kong Convention see pages 47 to 61 of the COWI study for DG Environment: " Support to the impact assessment of a new legislative proposal on ship dismantling" Final report of December 2009 and pages 31 to 33 of the World Bank study "the Ship Breaking and Recycling Industry in Bangladesh and Pakistan" of December 2010.

dismantling facilities have, for example, been closed in Bangladesh for the last months by the High Court).

According to the latest information available:

- the facilities located in China and Turkey are already operating under the standards of the Hong Kong Convention. The ship recycling capacity in China will expand significantly since a very large recycling facility is about to start operating in Dalian. It will be able to receive 75 ships per year including the largest ships of the world fleet.

- India has already made some improvements after the judgment from its Supreme Court which included some requirements of the (at the time) draft Hong Kong Convention into domestic legislation. It has benefited during the last months from the administrative closure of the dismantling facilities in Bangladesh. A recent inspection showed however that the landfill for hazardous waste is almost full⁵⁴ and that a new one should rapidly be developed.

- Bangladesh has been closed for several months and is expected to invest in upgrading its facilities following recent judgments from its High Court which has made some of requirements of the Hong Kong Convention mandatory. From an economic perspective, the investments needed to upgrade the facilities to a level of compliance with the Hong Kong Convention are of about 10 to 11 \$/LDT⁵⁵ while the profits generated by the facilities are of 62 \$/LDT. Bangladesh is therefore expected to upgrade its facilities because:

- ship recycling is the major source of raw material for the industry,
- it will be necessary in order for the facilities to be allowed to continue their operations,
- facilities would continue to be profitable and competitive after the improvements.

- Pakistan has already benefited from technology transfer and is willing to improve its facilities. For several years, it was virtually driven out of the recycling market in particular due to its taxes and duties. Ship recycling has started again notably because of closure of the facilities in Bangladesh. Investments have been estimated at around 10 \$/LDT which is comparable with the current profit generated by the facilities. It might therefore be slightly more difficult for Pakistan than for Bangladesh to make the necessary improvements for compliance with the Hong Kong Convention while staying competitive. Facilities located in Pakistan already encounter taxes and duties which are 2,6 times more important than those located in Bangladesh.

According to a recent study conducted by the World Bank³⁰ the likelihood of seeing new countries emerging as major ship scrapping destinations once the standards and therefore the costs of existing facilities have been upgraded is limited.

Three possibilities for a relocation from the ship dismantling industry from Pakistan and Bangladesh were assessed: a relocation to another "pollution haven", a relocation back to Europe or an industrialized country and the pre-cleaning in country of ownership. The two

⁵⁴ <http://bargad.files.wordpress.com/2011/06/site-visit-report-of-smc-to-alang-on-24-1-2011.docx>
⁵⁵ For more information see Annex XI.

latest options were considered as highly unlikely for economic reasons (the lower revenue and higher costs associated with dismantling in European and industrialised countries and the importance of the additional cost induced by pre-cleaning).

The first option was studied in more details and is also considered as unlikely although it cannot be ruled out. The necessary characteristics of a potential candidate country are the following:

- Strong domestic demand for steel plate and re-bars not readily available from other sources,
- A market for equipment and consumables,
- Few, if any, enforced regulations on workers' health and safety and environmental pollution,
- Wages as low as in Bangladesh or lower. Cambodia and Myanmar both have lower wage rates than in Pakistan, whereas Bangladesh might still be able to compete with them. Hence, the risk of relocation from a wage point of view seems more threatening for Pakistan
- Natural hydrographical conditions to allow beaching (or similar capital-extensive methodology). Few states meet these requirements, and the need for a considerable tidal gauge itself is an obstacle for most of Africa or other candidate countries in the Bay of Bengal or the South China Sea (such as Myanmar or Cambodia).

Given the relatively low likelihood of meeting all these conditions in other locations, the study did not consider it likely to see relocation on a large scale of ship recycling from Bangladesh and Pakistan in the immediate future. This does however not totally rule out the possibility of seeing new ship recycling countries emerging with a small share of the market. The Philippines have expressed interest during the last months in developing ship recycling and ratifying the Hong Kong Convention.

Building upon the experience gained during the last decade, the following drivers have stimulated the upgrading of ship recycling facilities:

- Political willingness from the public authorities to promote specifically the green ship recycling market (Turkey, China),
- Court cases imposing new requirements (India, Bangladesh),
- Investments and contractual requirements of committed shipowners (Turkey, China),
- Collaboration between facilities in order to jointly invest in the infrastructure (Turkey),
- Public pressure through, for example, reports from NGOs (Turkey, India, Pakistan).

A couple of years before, Chinese authorities decided to close down all their substandard facilities and to focus on the green ship recycling market. Beaching was therefore prohibited by the law. Strategic partnerships have been developed between Chinese facilities and responsible shipowners (in particular European and Japanese ones). The latter invested in the upgrading of the facilities which would reserve a certain ship recycling capacity for them in case of huge recycling demand. China continues to develop its ship recycling capacity within

its approach of a circular economy. Contrary to other recycling countries, the scrap metal is indeed used strategically to produce new ships and not for construction work.

2.2.2. *Driver 3: the regulatory failure of a legislation not well adapted to the particular characteristics of ship.*

The experience gained regarding the implementation of other waste-related legislative instruments with enforcement problems bring only limited pertinent information for ship recycling due to the specificities of ships and international shipping. Compared to electronic waste, ships can, for example, change their location since they are self-movable (thus rendering the notion of "state of export" difficult to apply) and can change their legal regime (by changing flags). Another important difference is that while a significant effort, triggered by EU legislation, is being made to develop recycling capacity for WEEE and end-of-life vehicles in the EU, the recycling capacity for ships in the EU is (and will remain) clearly insufficient.

When asked during the public consultation about the ways to improve the enforcement of the current legislation, several stakeholders (shipowners, Member States, academia) insisted that this legislation is not adapted to the particularities of ships as waste. In particular, this is due to the difficulty to identify when a ship becomes waste and the possibility to change its flag⁵⁶. Indeed, there have been very few clear-cut cases where ships became waste while being under EU jurisdiction and being in EU waters and were still send to facilities outside the OECD countries.

Identifying when ships turns into waste.

As explained before, shipowners decide to send their ships for dismantling based on an economic comparison between the costs and benefits of maintaining a ship in operating conditions and the benefits of sending it for dismantling.

If this decision is taken while the ship is in international waters or in waters under the jurisdiction of the recycling state, it is very difficult or impossible to apply the procedures of the Waste Shipment Regulation, in particular for ships which are registered under non-EU flags. Moreover, commercial ships leaving European ports and waters usually optimize their last voyage by delivering goods in Asia prior to going for dismantling. If the ship-owner does not declare the intention to dismantle its ship when leaving an EU port, the relevant authorities can in general not intervene. It is also not uncommon to sell a ship to another operator under the pretence that the ship would continue trading when it is then actually transferred directly to a ship dismantling facility.

As announced in the Communication, the Commission took steps during the last years when it was alerted that specific ships would go for dismantling. It has contacted the Member States concerned (flag state, port state and even state of nationality of the owner) in order to verify that these individual ships would not go for dismantling. However, in a certain number of cases, shipowners declared that the ships would continue to be used and that it was not intended to be sold. Since port states can not block unduly ships without justification, Member States had to release the ships based on the evidence produced by the owners. Some Member States even informed recycling states about the risk of seeing a particular EU flagged

⁵⁶ As noted by one stakeholder " Ships change hands many times in their life, moving down the 'food chain' up to a dozen times in a life that often exceeds thirty years. Ships are mobile and can re-flag easily, i.e. change nationality".

ship illegally arriving in their facilities. Recycling countries have however not required these ships to be reimported to the EU as they are entitled to do according to the Basel Convention. Most recycling countries — with the exception of Turkey — are indeed reluctant to use the Basel Convention's procedures of notification and consent for ships imported for dismantling, as it goes against their financial interests.

The possibility to change flag.

Every ship has to be registered under a flag. The flag state, as defined by the United Nations Convention on the Law of the Sea, has overall responsibility for the implementation and enforcement of international maritime regulations for all ships granted the right to fly its flag. Changing flag, which can be done with very limited effort in time and expenditure, allows the shipowners to change the legal regime for the ship.

The large majority of stakeholders (shipowners, Member States, environmental NGOs...) commented on the difficulty for enforcing legislation given the ease with which owners can change flags.

The current Waste Shipment Regulation is applicable to EU flagged ships as well as ships which are in the exclusive economic zone with regard to the protection and preservation of the marine environment within this zone. This Regulation would therefore not allow EU Member States to prohibit the export of a non-EU flagged ships (irrespective of whether they are owned or not) based on the possibility that this ship would create environmental negative impacts in third countries.

Change of flag prior to dismantling is already a reality since EU flagged ships represented 17,6 % of the active fleet⁵⁷ but only 8 % of the ships at the time of dismantling⁵⁸ in 2009 and 15,1 % in 2008. It is driven by several factors which are presented in Annex VI. Certain flags offer specific short term/single voyage registration for around 10 000 dollars (for a Panamax ships this would represent 1 \$/LDT) which is a negligible cost compared with prices offered by the recycling facilities. The difference in offer prices between facilities in OECD countries and Asian beaching facilities can amount to several hundreds of dollars depending on the actual market situation and on the type of ships⁵⁹. In addition, some shipowners prefer to sell their ships to brokers (called "cash buyers") instead of negotiating directly with ship dismantling facilities⁶⁰.

2.3. Who is affected, in what ways, and to what extent?

2.3.1. EU Member States as flag states, port states and recycling states

EU Member States have to apply the existing legislation (Waste Shipment Regulation) and are expected to become Parties to the Hong Kong Convention which will have implications on them as flag states (17% of the world fleet is EU flagged), recycling states (mainly for small ships and military vessels) and port states (for port state control).

⁵⁷ See Table 18 and Table 19 in Annex VIII.

⁵⁸ See Table 15 in Annex VII.

⁵⁹ According to Cotzias, the prices ranges of Turkey, India, Bangladesh and Pakistan were respectively in 2009 : [140-265], [106,720], [220,393], [90,340].

⁶⁰ According to data published by Cotzias, ships sold to cash buyers represented 1,3 % of all large commercial ships in 2009 and 3,5% of EU flagged ships.

2.3.2. *EU ship owners*

EU ship owners want to sell their ships at the best possible price. Faced with the lack of recycling activities in the OECD, some responsible shipowners have invested in green facilities located outside the OECD (China) to secure sufficient capacity while benefiting from low labour costs. Others are choosing their recycling facility by only taking into account the price offered for their ships by the dismantling facilities and by totally disregarding the environmental and social impacts.

The implementation of the Hong Kong Convention will imply administrative costs and reduced benefits from selling their ships for dismantling since dismantling facilities are expected to pass on the majority of the additional costs linked with the improvement of their practices.

2.3.3. *EU ship dismantling facilities*

The implementation of the Hong Kong Convention will have very limited implications since they are already complying with labour and environmental requirements which are stricter than the Hong Kong Convention. They are expected to continue to dismantle small ships which are not expected to be sent in South Asia for safety (navigation in high seas) and economic reasons. Government and navy vessels are not per se in the scope of the Hong Kong Convention but Members of the IMO have to ensure that such ships act in a manner consistent with the Convention "so far as is reasonable and practicable"⁶¹.

2.3.4. *Third countries (recycling countries)*

Ship dismantling provides for employment and is a source of raw materials and used goods but is associated with significant impact on the human health of workers in the dismantling facilities as well as on the environment of the communities (see section 2.1).

2.4. **How would the problem evolve, all things being equal?**

Large numbers of ships are expected to be sent for dismantling in the coming years as a result of an overcapacity of the world fleet which is estimated to remain for at least 5 to 10 years³⁰. Before 2008, old ships were kept in service⁶² and significant amount of ships were ordered in order to benefit from the high freight rates. As a follow-up of the financial crisis, the demand for maritime transport has decreased and the freight rates have sharply decreased. On top of sending ships for dismantling, several actions have been taken by shipowners in order to reduce the overcapacity of the world fleet: cancellation of orders for new ships (482 in 2009 and 929 in 2010)²⁰, laying up of ships (around 1000 ships¹³⁹ in January 2011) or voluntary slowing down ships ("slow steaming"). They are however insufficient as the world fleet in service has grown by 10.1 % in terms of carrying capacity in 2010 compared to 2009²⁰. In 2009 and 2010, around 3 new ships were delivered for each ship sent for dismantling. The evolution of the world fleet from 2004 to 2009 is presented in Figure 8 in Annex VIII.

⁶¹ See article 3 of the Hong Kong Convention.

⁶² The number and tonnage of ships that went for recycling in the years 2004-2007 has stayed well below the forecasts that were made in preceding years. Whereas the recycled tonnage was 10 million gross tons (GT) and more in any year between 1993 and 2003, the figures have not exceeded 5 million GT in the years since 2005. Parallel to this, the average age of a dismantled ship has risen from less than 27 years in the 1990s to more than 32 in 2006.

In addition, the coming peak in ship recycling around the phasing-out dates for single-hull tankers (2015) is expected to essentially benefit the most primitive sub-standard facilities.

The expected evolution of ship recycling in the major recycling state has been presented in section 2.2.

If the Hong Kong Convention does not enter into force and if the European legislation is not modified, it is highly probable that the current market situation and important level of non-compliance will persist. A peak in dismantling activity is bound to lead to a resurgence of lethal accidents and occupational diseases, as the new staff will be recruited among the poorest and usually inexperienced rural labourers.

Even in the scenario of a recovery of the economy - and a resorption of the world fleet's overcapacity, fewer ships will be sent for dismantling thus leading to a more fiercely competition amongst ship recycling facilities in favour of the substandards ones.

2.5. International and national policy approaches

The Hong Kong Convention was adopted in May 2009 but is not expected enter into force and to start producing effects before 2020. Conventions from the IMO usually contains entry into force provisions related to flag states only (number of states and/or, percentage of the world fleet) and take an average of 6 years to enter into force⁶³. But the Hong Kong Convention needs to be ratified by both major flags states and recycling states which will take longer. More detailed information about the entry into force requirements of the Convention is provided for in Annex IV.

According to the latest information available⁶⁴, China is expected to ratify the Hong Kong Convention in 2012 and Japan in 2013. Turkey is making good progress, but seems reluctant to be the first recycling country to ratify. India has the support of the government executive for ratification, but is facing problems with its recycling associations.

In June 2011, 11 Member States plus Norway reported on their progress towards ratification. Two countries are aiming at ratification by the end of 2011. Several Member States agreed that EU legislation would be helpful for ratification. Some countries cannot though ratify without having legislation in place.

The Council conclusions⁶⁵ adopted in 2009, encouraged strongly EU Member States to ratify the Hong Kong Convention as a matter of priority so as to facilitate its entry into force as early as possible and to generate a real and effective change on the ground.

The Hong Kong Convention applies to most privately owned and commercial ships. The Convention does not apply to small ships (less than 500 GT), warships, naval auxiliary or other state-owned or operated vessels which are used only on non-commercial service or ships used exclusively for domestic transport throughout their life. However, the Convention requires that these ships act in a manner consistent with the Convention, "as far as reasonable and practicable".

⁶³ The ratification of new IMO Conventions take time as can be seen from the table showing the state of ratification (<http://www.imo.org/About/Conventions/StatusOfConventions/Documents/status-x.xls>).

⁶⁴ Workshop organized in EMSA in June 2011.

⁶⁵ Council conclusions on an EU Strategy for better ship dismantling of 21 October 2009,

The Hong Kong Convention requires ships flying the flag of a Party ("Party ships") to be dismantled only in authorized recycling facilities located in another Party to the Convention ("Party facilities"). Party facilities would be allowed to treat also non-Party ships provided that they treat them similarly to Party ships (clause of "no more favourable treatment").

To be authorized, facilities will have to comply with the detailed requirements of the Convention regarding safety, the protection of human health and the environment and they will have to be subject to a site inspection from the authorities. The Hong Kong Convention does not contain requirements which would explicitly rule out the "beaching" method which has been controversial because of its environmental and health impacts. Ships will have to minimize and document (Inventory of Hazardous Materials) the amount of hazardous waste present on board. Based on this inventory and on its authorization, the ship recycling facility will develop a ship-specific document (Ship Recycling Plan) to describe how this particular ship will be dismantled and how the hazardous waste will be managed in the facility. The shipowner will have to inform in writing its flag state about the intention to recycle the ships and then to provide the Inventory of Hazardous Materials (IHM) and the Ship Recycling Plan (SRP) to its flag state. The latter will conduct a final survey on board the ship to verify that the IHM is complete, that the SRP properly reflects the IHM and about the maintenance of safe working conditions for workers and, finally, that the ship recycling facility is authorized. The ship recycling facility will inform its authorities of the start and the completion of the recycling. The authorities will inform back the flag state of the completion of the dismantling.

The Parties to Basel Convention have been invited to assess the equivalency between the levels of control and enforcement of the Hong Kong Convention and the Basel Convention and to transmit the outcomes of the assessment to the 10th Conference of the Parties "for consideration and action, as appropriate"⁶⁶. The assessment developed by the European Commission and the Member States has been submitted on the 15 April 2011 concludes that "as a preliminary assessment and taking into account a life cycle perspective the Hong Kong Convention provides a level of control and enforcement at least equivalent to the Basel Convention's one"⁶⁷.

Since it does not contain any geographical limitation, the Hong Kong Convention will allow ships flying the flag of Parties to be dismantled worldwide in facilities authorized by other Parties.

The Hong Kong Convention is adapted to the specificities of shipping since it relies on the system of international surveys and certification for ships during their life cycle, on port state controls. Moreover, it contains an obligation for shipowner to inform in writing and in advance their flag state of their intention to recycle their ships, thus resolving the current problem of identifying when a ship turns into waste.

Facilities located in Parties to the Hong Kong Convention will have to treat similarly ships flying the flag of Parties to the Convention and ships not flying the flag of Parties ("no more

⁶⁶ See decision IX/30 on dismantling of ships adopted during the 9th Conference of the Parties in June 2008: <http://www.basel.int/meetings/cop/cop9/docs/39e-rep.pdf#ix30>

⁶⁷ "As a preliminary assessment and taking a life cycle perspective, it can therefore be concluded that the Hong Kong Convention appears to provide a level of control and enforcement at least equivalent to that one provided by the Basel Convention for ships which are waste under the Basel Convention and for ships to which the Hong Kong Convention applies and to ships treated similarly pursuant to article 3(4) of this latter Convention".

favourable" clause) thus limiting the incentive of changing flags only in order to benefit from a more favourable legal regime. As long as the 5 major ship recycling states which represent more than 90 % of the dismantling activity are Parties to the Convention, there will be major improvements compared to the current situation. One possible problem would be faced if one or two recycling countries decides not to join the Hong Kong Convention. In this case, there will continue to be two markets competing which each other: one with substandards facilities offering better prices for shipowners and another one compliant with the Convention. And since changing flag is legal, easy and negligible⁶⁸, one can expect that some shipowners would continue to change flags in order to circumvent the legislation. In order to help countries lagging behind to improve their facilities, financial and technological support is therefore currently provided through specific programmes undertaken under the Global Programme for Sustainable Ship Recycling jointly set up by the IMO, the ILO and the Secretariat of the Basel Convention.

The development of the Hong Kong Convention has already had a positive influence on the evolution of the legislation in Bangladesh and India where the High and Supreme Court have already included some requirements of the Hong Kong Convention domestically.

However, as noted already in the Communication on better ship dismantling, the Convention rely in particular on a system of surveys and certificates for ships and on authorisations for ship recycling facilities granted by the competent authorities of recycling states. This approach reflects the high value of national sovereignty in international law.

A potential weakness of the control system is that the existing governance problems in some developing countries and the lack of a non-compliance mechanism in the Convention might reduce its effectiveness in practice. As explained in the report of a recent site visit of the Standing Monitoring Committee on Shipbreaking Yards at Alang⁶⁹, Fake certificates have been submitted by ship owners or their agent and neither the Gujarat Maritime Board nor the customs were able to verify the authenticity/genuineness of ship's registry/flag in the past in respect of some ships referred to them.

The Hong Kong Convention is applicable only to the ship recycling facility but not to the facilities involved in the downstream management of the waste. The Convention contains an obligation for the facilities to identify the facilities to which hazardous waste will be sent for treatment. It does however not ensure that the waste will actually end up in the proper facility which had been identified since no traceability is foreseen. This is problematic since some recycling countries are known for not having any facilities authorized and able to treat hazardous waste (Pakistan, Bangladesh) while the hazardous waste landfill in Alang (India) is almost full.

Another remaining issue with the Convention is that it does not explicitly address the "beaching" method which is currently used in the major recycling countries and has been criticized for its environmental and health impacts. The environmental NGOs, some associations of green recyclers and some shipowners as well as the European Parliament have called for a total ban on beaching. The Council has underlined in its conclusions, that the Hong Kong Convention represents "an important step towards phasing out unsafe and environmentally harmful working methods, including in relation to unsafe aspects of the current practise of so called beaching of end of life ships" but has not called for a prohibition on beaching. Shipowners and other stakeholders have on the other hand highlighted the fact that "beaching" is the major dismantling method.

⁶⁸ For more information about reflagging (including the costs), see Annex VI.

⁶⁹ See <http://bargad.files.wordpress.com/2011/06/site-visit-report-of-smc-to-alang-on-24-1-2011.docx>

2.6. Industry approaches

During the public consultation, the importance of voluntary actions by the shipping industry was highlighted by the shipping industry itself but also by the Member States and the European Economic and Social Committee.

The shipping industry established in 1999 an Industry Working Group on Ship Recycling which is coordinated by the International Chamber of Shipping (ICS). Its members have been actively involved in the development of the Hong Kong Convention. The industry has taken voluntary action to start implementing the Hong Kong Convention once adopted.

In October 2009, this Working Group adopted "Guidelines on transitional measures for shipowners selling ships for recycling" providing guidance for shipowners on how to voluntarily apply certain elements of the Hong Kong Convention before it enters into force. After the adoption of the Guidelines on the Inventory of Hazardous Material⁷⁰, shipowners have used them on a voluntary basis. Based on their experience, they have proposed some update and amendments of the guidelines which have been approved in July 2011.

In addition, one association (BIMCO) will adopt a new "green" ship recycling contract and a revised version of its contract for the sale of second hand vessels (SALEFORM 93) in January 2012. However, voluntary action by the Industry is limited by the facts that:

- the voluntary application of the Hong Kong Convention is not always compliant with the current legislation (for example, sending ships for recycling outside the OECD).
- some stakeholders (ship recycling facilities, environmental NGOs) have highlighted in their response to the public consultation that they do not consider non-legislative measures to be effective since they have had little impact so far. Prior to the development of the Hong Kong Convention, shipowners agreed to voluntarily develop the so-called Green Passport (the ancestor of the Inventory of Hazardous Materials). But a limited number of passports have in fact been developed. BIMCO had also previously developed ship recycling contract which have been used by a very limited number shipowners only. New voluntary measures are therefore most likely to follow a similar path.

European classification societies have been very active in the development of the Hong Kong Convention as this could represent new business opportunities for them: for the establishment of Inventories of Hazardous Materials, for certifying ships (as recognized organisations on behalf of flag states) or recycling facilities (as recognized organisations on behalf of recycling states or if asked by the facilities themselves on a voluntary basis).

2.7. The right of the EU to act

Treaty base

The EU competence to take action on ship dismantling matters comes in particular from the articles of the EU Treaty related to the protection of the environment (article 192 of the Treaty on the Functioning of the European Union, TFUE).

The "necessity test"

⁷⁰ Guidelines supporting the Hong Kong Convention.

Ship dismantling is already covered by European legislation namely the Waste Shipment Regulation. But the current legislation is not adapted to the specificities of ships and is therefore largely circumvented and therefore ineffective. The European legislation would therefore need to be modified even in the absence of the Hong Kong Convention.

Subsidiarity principle

The subsidiarity principle applies insofar as the proposal does not fall under the exclusive competence of the EU.

As a Party to the Basel Convention, the European Union has the obligation to block the export of hazardous waste in countries which are not able to treat them in an environmentally sound manner. The EU has therefore an obligation to ensure that EU flagged ships are recycled in a safe and sound manner worldwide. In addition, it would be difficult to justify that the pollution generated by the dismantling of ships flying the flag of EU Member States is exported to third countries which are not equipped to deal with it in an appropriate manner. The environmental problems generated by ship recycling are not only local since hazardous chemicals are released directly into the sea thus affecting the fishes and shrimps which are captured and exported also outside the country.

The Commission can not ratify the Hong Kong Convention since only Member of the IMO are allowed to do so and become Parties to this Convention. The EU Member States will therefore have a key role, mainly as flag states, in the ratification and fulfillment of the entry into force provisions of this Convention. As explained in Annex VI, the ratification and transposition of the Hong Kong Convention by EU Member States is likely to take place at different pace. There is a clear risk of having different legal requirements applied to large commercial EU flagged ships depending on the different Member States concerned. This situation could result in change of flags and unfair competition between the Member States acting as flag states. As highlighted by some Member States in their response to the public consultation, a harmonised transposition at the European level ensures a more level playing field and reduces administrative burdens for ship owners and recycling yards in the EU, compared to the implementation of the IMO Convention in the the European Union by 27 diverging versions of national legislation.

In addition, some Member States are not prepared to ratify the Hong Kong Convention as long as long as the current EU legislation is not modified and the risk of a duplication of requirements applicable to ship recycling is not ruled out. Member States having ratified the Hong Kong Convention could be required to apply the requirements of this Convention through their domestic legislation as well as the requirements of the Waste Shipment Regulation. These two sets of procedures are largely redundant and duplicating but also incompatible on some issues (see for example the geographic restrictions regarding the legally accessible ship recycling facilities). This would result in a very confusing situation and in increased non-compliance while none of the drivers identified in section 2.2. would be addressed.

Maintaining the current legislation would therefore not address any of the problems currently faced but could delay or block the ratification of the Hong Kong Convention in a number of Member States.

The inclusion of the Hong Kong Convention's requirements into European legislation would on the other hand promote harmonised decision-making and speed up the ratification process amongst the Member States. During a workshop organized in EMSA in June 2011, 11 Member States indicated that they are in the process of ratifying the Convention, although at

different stages. The majority of EU Member States considered that an EU legislation implementing the Hong Kong Convention would be useful for their own ratification process. A proposal for a Council decision authorising Member states to ratify or to accede to, in the interests of the European Union, the Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 will therefore be jointly presented with this proposal for a Regulation to ensure a swift and coordinated ratification of the Convention by all Member States.

In addition, early action by the EU would influence third countries much more than action by individual Member States and thus is more likely to bring the Hong Kong Recycling Convention quickly into force.

Proportionality principle

The proposal complies with the proportionality principle. The additional burdens for economic operators and national authorities are limited to those necessary to that ship recycling is undertaken in a safe and environmentally sound manner. While the proposal implies additional costs for the shipowners (development of the Inventories of Hazardous Materials and surveys), these costs are expected to be offset by the substantial social and environmental benefits obtained.

Going beyond the requirements – in a limited way - of the Hong Kong Convention is needed in order to address the limitations of the Convention presented in section 3.5 namely:

- address the current governance problems in some recycling countries,
- ensure the proper downstream management of the hazardous waste,
- introduce specific requirements to phase out the current unsafe and environmentally unsound recycling methods.

3. POLICY OBJECTIVES

3.1. General objective:

The general objective is therefore to reduce significantly and in a sustainable way by 2020 the negative impacts of ship dismantling, especially in South Asia, on human health and the environment without creating unnecessary economic burdens by facilitating the entry into force of the Hong Kong Convention.

While EU legislation can only address ships flying the flag of EU Member States, it is expected that it could have a positive effect also on ships which are EU-owned but flying flag of non-EU countries.

3.2. Specific objectives:

- SO1: reduce the human health and environmental impacts by ensuring that the EU flagged ships are dismantled only in safe and environmentally sound facilities worldwide,
- SO2: ensure the availability of sufficient and economically accessible sound and safe recycling capacity to dismantle EU flagged ships,
- SO3: strengthen the incentives to comply with the EU legislation,

3.3. Consistency of the objectives with fundamental rights

Measures designed to meet the objectives will need to be in compliance with relevant fundamental rights and principles embodied in the Charter of Fundamental Rights of the European Union. Aiming at improving the impacts on human health and on the environment of the dismantling of EU ships will have to take into account as well as the freedom of right and association (article 12), the worker's right to information and consultation with the undertaking (article 27), the right of collective bargaining and action (article 28), the right to fair and just working conditions (article 31) and the prohibition of child labour and protection of young people at work (article 32) as well as on the environmental protection (article 37).

4. DESCRIPTION OF POLICY OPTIONS

The EU Strategy on better ship dismantling³, proposed a new EU initiative consisting of a mixture of legislative as well as of the following non-legislative measures. After its publication, inputs and comments have been received from the Council, the European Parliament, the European Economic and Social Committee as well as from stakeholders during the public consultation and workshops. In addition, studies have been conducted in order to further assess the feasibility of some actions. The table below presents the follow up actions undertaken by the Commission.

Action announced in the Strategy	Actions undertaken by the Commission
Participation of the Commission, as an observer to the IMO, in the development and future implementation of the guidelines supporting the Hong Kong Convention,	<p>The Commission has participated in the development of the guidelines supporting the Hong Kong Convention.</p> <p>The Commission has actively participated to the intersessional working groups developing the guidelines and was represented during the meetings of the Maritime Environment Protection Committee which reviewed and adopted them.</p> <p>At this stage, two guidelines (dealing with the inventories of hazardous materials and with the development of ship recycling plans)⁷¹ have been adopted.</p> <p>The Commission will continue to actively participate in the further development of the others guidelines supporting the Hong Kong Convention which are currently under development⁷².</p>

⁷¹ The Guidelines for the development of the Inventory of Hazardous Materials and the Guidelines for the development of the Ship Recycling Plan are available on this website: <http://ec.europa.eu/environment/waste/ships/index.htm>

⁷² Guidelines focusing in particular on the facilities' authorization and procedures to ensure their safe and sound operations.

<p>Voluntary action by the industry prior to the entry into force of the Hong Kong Convention, notably the implementation of the Convention's technical guidelines</p>	<p>See section 3.6</p>
<p>Conducting occasional research and pilot projects to assess developments and promote better ship dismantling technologies</p>	<p>In order to assess developments and to promote ship dismantling technologies, both research and pilot projects have been launched and are currently running:</p> <ul style="list-style-type: none"> - under the 7th European Research Framework Programme, a specific project called DIVEST (Dismantling of Vessels with Enhanced Safety and Technology) is currently undertaken⁷³. Information collected during this project on the composition of ships in hazardous materials have been transmitted to and taken into account by the consultant in charge of the study supporting the Impact Assessment. - a pilot project called RECYSHIP⁷⁴, financed under the LIFE+ program in the action line of “Environment Policy and Governance”, has started in 2009 and will last until 2012. It aims at addressing the issue of ship scrapping in matters of occupational safety, health and environmental protection.
<p>Further assess:</p> <ul style="list-style-type: none"> - the option to include in the ship recycling measures, amongst others, rules for the clean dismantling of warships and other government vessels. - encourage voluntary action by the industry - improve enforcement of the current waste shipment law with regard to end-of-life ships - the feasibility of developing a certification and audit scheme for ship recycling facilities worldwide. 	<ul style="list-style-type: none"> - see option E1 in section 4, - see section 3.6 - see section 2.2.2 - see option D3 in section 4.

⁷³ The project is presented on this website <http://www.divest-project.eu/Home.aspx>. In addition, an exchange platform has been created and is accessible to the persons involved in the project as well as to the general public.

⁷⁴ Information is provided on this website: <http://www.recyship.com/>.

Additional actions have been undertaken by the Commission.

At international level, the Secretariats of the Basel Convention, of the International Maritime Organization and of the International Labour Organization are indeed working together under the "Global Programme for Sustainable Ship Recycling"⁷⁵ which aims at offering a coordinated approach in addressing the issues faced by the ship recycling industry.

Under this programme, a Ship Recycling Technology & Knowledge Transfer Workshop took place in Izmir, Turkey, in July 2010 to assist the government officials and industry of Pakistan to strengthen their regulatory, institutional, procedural and infrastructural capacity to fulfil the relevant aspects of the Basel Convention in relation to ship recycling, particularly those dealing with the downstream management of hazardous and other wastes, and the Hong Kong International Convention.

The Commission provided a grant under the Thematic Programme for the environment and sustainable management of natural resources, including energy (ENRTP) to this program with a view to provide support to the recycling countries wishing to improve their practices.

The government of Norway will provide six million dollars in bilateral aid through its development agency NORAD to Bangladesh.

Finally a pilot project is assessing the current practices for recycling of ships not covered by the Hong Kong Convention and abandoned vessels within the EU.

4.1. Option A: the baseline option

The "baseline option" is defined here as maintaining the Waste Shipment Regulation unchanged in the short (2015), medium (2020) and in the long term (2025).

As announced in the Council conclusions on better ship dismantling⁷⁶, Member States are expected to ratify and implement the Hong Kong Convention in their domestic legislation. This Convention is expected to enter into force in 2020. The first positive impacts of the Hong Kong Convention are expected to be foreseeable in 2020 where ships going for recycling will have to establish inventories of hazardous materials. But the full effect of the new international regime is not to be expected to be seen before 2025 since there are separate deadlines for compliance with the various requirements - for instance 5 years after entry into force for an Inventory of Hazardous Materials to be present in existing ships (as opposed to new ships). Some Member States explicitly mentioned in their contribution to the public consultation the need to maintain these separated deadlines.

All recycling countries where there are currently substandard facilities are expected to be able to be upgraded in order to meet the Hong Kong Convention's requirements by 2020. Since the Waste Shipment Regulation would continue to be applicable, ships flying the flag of EU Member States would however always be prohibited to be recycled outside the OECD, even if this would be authorized under the Hong Kong Convention. The legally accessible recycling capacity (within the OECD) is not expected to be substantially improved and will remain inadequate. It is this therefore foreseeable that even responsible shipowners would continue to send their ships for dismantling outside the OECD.

⁷⁵ For more information, see <http://www.basel.int/ships/gpssr/index.html>

⁷⁶ See point 9 of the Council Conclusions on an EU Strategy for better ship dismantling adopted on 21 October 2009 available at: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/110626.pdf

The level of control and enforcement from Member States is indeed expected to remain similar as today. An increased level of enforcement would indeed be costly and ineffective since ships can be expected to change their flags in order to be able to be recycled outside the OECD where the recycling capacity lies. The current situation of large circumvention of the legislation is expected to be maintained in the short, medium and long term. Like this is the case today, substandard facilities are expected to benefit more than other non-OECD ones from this situation. The assessment of the impacts of this option are therefore based on the assumption of a high level of circumvention benefiting primarily to the substandard facilities. Real improvements from an environmental and health perspective are not expected prior to 2020 where all ship recycling facilities are expected to have made the necessary investments in order to comply with the Hong Kong Convention.

4.2. Option B: implementing key elements of the Hong Kong Convention in the current European legislation.

This option was the preferred one identified in the Communication proposing an EU strategy on ship dismantling. It would a priori address partially the inadequacy of the current legislation by introducing control mechanisms specifically designed for ships. It would consist of completing the Waste Shipment Regulation by implementing some key elements of the Hong Kong Convention by 2014 :

- Survey and certificate requirements for ships, in particular, to carry an Inventory of Hazardous Materials on boards and to be certified as "ready for recycling" before going to a dismantling facility,
- Essential requirements for ship recycling facilities as established by the Hong Kong Convention,
- Communication and reporting requirements for shipowners, recycling facilities and recycling states.

In addition, the Member States would be encouraged to ratify the Hong Kong Convention by 2020 and the Convention is expected to enter into force at this date.

Similarly to option A, since the Waste Shipment Regulation will continue to constitute the core of the control mechanism covering end-of-life ships, the prohibition to dismantle EU flagged ships outside the OECD would be maintained even in facilities which would be authorized under the Hong Kong Convention.

A huge level of circumvention of the legislation is therefore to be expected which will benefit mostly to substandard facilities. The assessment of the impacts of this option are therefore based on the assumption of a high level of circumvention benefiting primarily to the substandard facilities. Real improvements from an environmental and health perspective are not expected prior to 2020 where all ship recycling facilities are expected to have made the necessary investments so as to comply with the Hong Kong Convention.

4.3. Option C: addressing the dismantling of large commercial vessels through domestic legislation of the EU Member States only

Under this option, ships covered by the scope of the Hong Kong Convention (large seagoing vessels) would be exempted from the scope of the Waste Shipment Regulation and, contrary to the options A and B, would not be covered anymore by European legislation. They would

be covered instead by the domestic legislation of Member States as they ratify and implement the Hong Kong Convention. The transposition of the Hong Kong Convention will be left entirely to European Member States.

A priori, this option has the potential to address the lack of the available recycling facilities by removing the prohibition to dismantle ships outside the OECD. Since they will not be subject to the requirements of the Waste Shipment Regulation, ships will be able to be legally dismantled worldwide prior to the entry into force of the Hong Kong Convention. For this reason, it is assumed that 50 % of the volume of ships currently dismantled in the EU, in Turkey and in China will be dismantled in India, China and Bangladesh prior to the entry into force of the Convention. Since substandard facilities would be able to legally receive more EU flagged ships, they are expected to delay their investments in order to upgrade their facilities. All recycling countries where there are currently substandard facilities are expected to be upgraded and meet the Convention's requirements by 2025 only.

In addition, in order to remain competitive and avoid reflagging to other flags (both EU and non EU ones), it is expected that the rate of ratification will be notably different amongst EU Member States.

Because of these delayed ratifications by both flag and recycling states, the Hong Kong Convention would in this scenario not enter into force before 2025. The first beneficial effects of this Convention would therefore be seen in 2025 and the full beneficial effects in 2030 (inventories of hazardous materials for all ships).

Once Member States will have developed their domestic legislation transposing the Hong Kong Convention, this option would also ensure that the legislation applicable to the dismantling of end-of-life ships is adapted to ships.

4.4. Option D: covering ship dismantling by specific rules implementing the Hong Kong Convention

Under this option, ships covered by the scope of the Hong Kong Convention (large seagoing vessels) would be exempted from the scope of the Waste Shipment Regulation. They would instead be addressed in a new ad-hoc Regulation covering the whole life cycle of ships transposing the requirements of the Hong Kong Convention while adapting and complementing them when necessary.

Since the Hong Kong Convention has not yet entered into force, some adaptations would be needed (notification and reporting by the shipowners instead of the ship recycling facility⁷⁷ and obligation to have a contract between the shipowner and the ship recycling facility⁷⁸). When the Hong Kong Convention will enter into force, these provisions will not be necessary anymore. The proposed Regulation will therefore include an invitation for the Commission to review the implementation of the Regulation and present a proposal for revision if appropriate when the conditions of the entry into force of the Hong Kong Convention are met (the Convention will effectively become applicable two years after this date).

⁷⁷ As highlighted by several stakeholders (shipowners' associations, Member States) it would be impossible to impose the whole set of reporting requirements to ship recycling facilities located in countries which are not yet Contracting Parties to the Hong Kong Convention.

⁷⁸ As explained in section 3.6, shipowners themselves are already using such contracts.

The Hong Kong Convention allows its Parties to take more stringent measures in order to protect human health and the environment. It is therefore proposed to complement the criteria included in the Hong Kong Convention for defining safe and sound recycling facilities in order to address the issues which are insufficiently addressed by the Hong Kong Convention as explained in section 3.5 (ensuring a proper containment of all hazardous waste and well as their proper management in the recycling facilities and in downstream facilities). While it is difficult to expect the current "beaching" facilities to be able to meet these requirements, it is not excluded that upgraded facilities might be able fulfill these criteria the future. These requirements would continue to be applied even after the entry into force of the Hong Kong Convention. To increase transparency, a list of ship recycling facilities meeting the Regulation's requirements would be established. It would contain facilities located in the EU designated by the Member States as well as facilities located in third countries. The latter would apply for inclusion in the list by presenting evidence that they comply with the Regulation's requirements.

Sanctions, which would be more adapted to ship recycling will be introduced in order to ensure compliance with the legislation. In order to avoid confusion, overlaps and administrative burden, ships covered by this new legislation would not be covered anymore by the EU Waste Shipment Regulation. The Hong Kong Convention is expected to enter into force at international level in 2020.

4.5. Option E: covering ship dismantling by specific rules implementing and going beyond the Hong Kong Convention:

This option consists of option D plus the following elements:

- (1) Option E1: addressing also government vessels, including navy vessels, in the new legislation instrument transposing the Hong Kong Convention.

As the option B, this option was announced in the Communication proposing an EU strategy on ship dismantling.

Including these ships under the scope of the specific Regulation transposing the Hong Kong Convention will imply that these ships would be allowed to be dismantled in facilities compliant with the Hong Kong Convention worldwide. The volume of these ships dismantled in the EU and in the OECD is therefore expected to decrease significantly. It is however not expected to see all these ships being dismantled outside the OECD notably for navy ships in order to protect certain sensitive technologies.

Not all requirements of the Hong Kong Convention would be applicable to navy ships since they benefit from specific immunities (no port state control' inspection of their inventory of hazardous materials could, for example, be foreseen).

Like for option D, the Hong Kong Convention is expected to enter into force in 2020. By this date, it is expected that all substandard facilities could be upgraded so as to meet the Convention's requirements.

- (2) Option E2: requesting EU flagged ships to be treated in facilities which are providing a level of protection of health and of the environment equivalent to EU facilities⁷⁹.

This option would consist in strengthening the option D by requiring that all ship dismantling facilities should fulfil criteria which would imply that they have impacts on human health and on the environment comparable to the European ones. Ships would be allowed to be dismantled only in the EU, in China and in Turkey (investments would be required in China and Turkey so as to reach EU standards by 2015). These requirements would continue to be applied even after the entry into force of the Hong Kong Convention which is expected to take place in 2020 similarly to option D.

This option is compatible with the Hong Kong Convention which allows its Parties to take more stringent measures in order to prevent, reduce or minimize any adverse effects on human health and on the environment.

- (3) Option E3: allowing the export of EU-flagged ships only to a list of third party audited facilities.

The rationale for introducing this option, would be to address the governance problems faced in certain ship recycling countries by involving third parties in the verification of the facilities. This would respond to one of the possible weaknesses of the Hong Kong Convention presented in section 3.5.

This option is compatible with the Hong Kong Convention which allows its Parties to take more stringent measures in order to prevent, reduce or minimize any adverse effects on human health and on the environment.

This requirement for a third party audit of facilities would continue to be applied even after the entry into force of the Hong Kong Convention which is expected to take place in 2020 similarly to option D.

5. ANALYSIS OF IMPACTS

This section provides the qualitative and quantitative assessment of the impacts of the options over the short (2015), medium (2020) and long term (2025).

5.1. Assumptions and methodology used for the quantitative assessment

The quantitative analysis provided in this Impact Assessment is based on the best available data and information collected by the Commission from stakeholders, Member States and the literature. However, data remains incomplete regarding some aspects and in particular for health and safety impacts in third countries which are either not reported or underreported.

The methodology used to estimate the environmental, social and economic impacts is based on the volume of EU flagged ships going for dismantling and on the impacts of the methods used in the different dismantling countries (beaching, landing, afloat and docking).

⁷⁹ These facilities employing on the following methods: afloat, landing, slipway of docking, and corresponding to the medium level (AA) of the theoretical and safety benchmark for accidents and facilities. These facilities would not employ children workers and would ensure that all the hazardous waste would be treated in the facility and in downstream facilities according to EU standards.

The volume of EU-flagged ships to be dismantled yearly up to 2030 has been estimated based on the age profile of the existing fleet and the life expectancy of the current fleet. The life expectancy has been updated in order to reflect the changes implied by the shipping crisis since 2008. This approach allows for comparison between different options by reflecting the overall trend in volumes. It will however not reflect e.g. the true ups and downs of the dismantling market business cycle that comes from fluctuating freight rates.

Each recycling method is associated with a certain level of quality in terms of safety and of protection of health and the environment. A specific set of data has therefore been developed in order to be able to quantify the impacts of ship dismantling based on the volume of ship dismantled in a given recycling country and depending to the recycling method. Data are based on pilot projects (ship's composition of hazardous and non hazardous waste), on ratios (CO2 emissions, value of statistical life indicated in the IA guidelines), on experts estimates (amount of hazardous waste treated in an environmentally sound manner, administrative costs for shipowners and authorities) and on theoretical benchmark based on EU statistics regarding accidents and incidents in facilities. Using the theoretically based accident data is necessary to take into account the underreporting practices in south Asian third countries. This is of course associated with a considerable uncertainty in terms of actual numbers, but is however expected acceptable for comparing the relative differences between the scenarios. More information about the data, the hypothesis and the methodology are provided in Annex V.

The environmental, social and economic impacts of the baseline scenario are developed in section 5.3. The quantitative impacts are summed up in Table 2. As recommended by the IA guidelines, the report will focus only on the additional impacts of the other options compared to the baseline scenario.

Table 2: Quantification of the additional impacts of the different scenarios compared to the baseline scenario in the short, medium and long term.

Impacts		Environmental	Social						Economic				
		Hazardous waste treated in an ESM manner ⁸⁰	Workload EU ⁸¹	Workload (protected workers) ⁸¹	Workload (not protected workers) ⁸¹	Workload (not protected children workers) ⁸¹	Fatal accidents (adults) ⁸²	Non fatal accidents (adults) ⁸²	Fatal accidents (children) ⁸²	Non fatal accidents (children) ⁸²	Social costs ⁸³	Revenues ships owners ⁸³	Administrative costs (Member States) ⁸³
Short term (2015)	B	0%	0	0	0	0	0	0	0	0	0	-1 952 011	378 604
	C	-6%	-5	189	468	159	1	184	0	29	969 792	12 540 267	0
	D	23%	0	1 423	-2 246	-764	-2	-473	-1	-133	-3 372 237	-22 019 545	356 430
	E2	30%	0	-938	-2 385	-811	-4	-1 105	-1	-148	-5 401 791	-66 349 943	356 430
	E3	23%	0	1 423	-2 246	-764	-2	-473	-1	-133	-3 372 237	-22 221 755	356 430
Medium term (2020)	B	0%	0	0	0	0	0	0	0	0	0	-112 036 486	640 117
	C	-20%	-6	-2 497	3 244	1 103	1 103	3	633	1	5 993 494	31 192 613	-436 341
	D	0%	0	0	0	0	0	0	0	0	0	-112 036 486	617 943
	E2	16%	0	-3 778	0	0	0	-2	-833	0	-2 820 429	-189 916 941	617 943
	E3	0%	0	0	0	0	0	0	0	0	0	-112 266 395	617 943
Long term (2025)	B	0%	0	0	0	0	0	0	0	0	0	149 062 972	22 174
	C	0%	0	0	0	0	0	0	0	0	0	159 369 991	-879 612
	D	0%	0	0	0	0	0	0	0	0	0	149 062 972	0
	E2	16%	0	-3 428	0	0	-2	-756	0	0	-3 114 124	63 072 738	0
	E3	0%	0	0	0	0	0	0	0	0	0	148 854 325	0

⁸⁰ Percentage of waste generated by ship recycling treated in an environmentally sound manner (ESM) for each option compared to the baseline option. In the short term, this baseline option considers that the legislation would continue to be circumvented and that ships would end up in substandard facilities located in Bangladesh and Pakistan which can not ensure the ESM of waste. In the medium and long term, facilities located in these countries are expected to have been upgraded and meet the Hong Kong Convention's requirement. A better ESM of the waste generated in these countries is therefore expected.

⁸¹ Expressed in man years

⁸² Number of persons.

⁸³ Expressed in €

5.2. The impact of options on where ships are dismantled

Options A and B consist in maintaining the current prohibition for EU flagged ships to be dismantled outside the OECD will imply that there will be a continuous gap between the need and the legally available recycling capacity for large commercial EU-flagged ships. Even responsible shipowners can therefore be expected either to not inform their flag state of their intention to dismantle their ships thus circumventing the Waste Shipment Regulation or to change their flag in favour of countries which are not Parties to the Hong Kong Convention. A larger proportion of ships could also be sold to "cash buyers". A large reflagging from EU to non-EU flag is to be expected if there is an attempt to strongly enforce the prohibition to dismantle ships outside the OECD. It is therefore expected that the current level of low enforcement of the legislation will be maintained as well as the current share of the market between the dismantling locations. Large EU-flagged ships are therefore expected to continue to be dismantled in South Asian countries (India, Pakistan and Bangladesh): in substandard facilities in the short term and in upgraded ones meeting the requirements of the Hong Kong Convention in the medium and long term. As it is currently the case, some responsible shipowners are expected to continue sending their ships to facilities located in Turkey and China. No Member State is expected to be specifically impacted as a flag state.

Large commercial EU flagged ships would not be covered anymore by European legislation under option C. These ships would therefore be allowed to be dismantled in any facility and any country of the world prior to the entry into force of the Hong Kong Convention. In the short and medium term, it is conservatively assumed that half of the volume currently dismantled within the EU, Turkey and China will be sent for dismantling in substandard facilities located in South Asian countries (India, Pakistan and Bangladesh). More Member States can therefore be expected to send their ships to South Asian countries and those which are already doing⁸⁴ so are expected to increase the volume of their ships sent in these countries. Taking into account only the difference between the dismantling prices, these ships should theoretically all be sent to South Asia. However, since a significant volume is nowadays dismantled in China, it seems reasonable to assume that part of these ships will continue to be dismantled there by responsible shipowners. The facilities located in the EU and Turkey treat mainly small and medium-sized ships which are not expected to be largely exported to South Asia either because they are not able to sail in high seas or because the costs of transport would be too important. Turkey is in a particular situation as an OECD country (thus legal recipient of EU flagged vessels for dismantling) with low labour costs compared to the EU but higher costs than non-OECD countries and is likely to lose part of its market share to non-OECD facilities. By 2025 onwards, it is expected that the facilities

⁸⁴ Mainly Malta, Cyprus, Greece, Spain and Bulgaria see

Table 12 in Annex VII.

located in South Asian countries will have invested so as to meet the requirements of the Hong Kong Convention. Under this option, it is not expected to see large number of shipowners replacing their EU flags by non-EU flags since the legally available recycling capacity will always be largely sufficient.

Under option D, ships would be allowed to go for dismantling worldwide in facilities meeting the requirements of the Hong Kong Convention. In these cases, owners would be incentivised to use upgraded facilities while accepting a lower profit from the sale. Taking into account the investments needed, Indian facilities are expected to meet the Convention's standards by 2015 while installations in Pakistan and Bangladesh would not be able to do so before 2020. Facilities located in the EU, Turkey and China are considered as already meeting the requirements of the Hong Kong Convention. In the short term (2015), it is assumed that the ships currently dismantled in South Asian countries would be dismantled in upgraded facilities in India. A limited volume of ships might however either be sent to higher standard facilities (China) or to lower standard facilities (Pakistan, Bangladesh). Reflagging is expected to be limited since the available dismantling capacity in the EU, Turkey, China and upgraded Indian facilities will be sufficient to treat all EU flagged ships. The maximum volume of EU flagged ships to be dismantled in the period 2012-2030 will be of 1,88 million LDT while the Chinese facilities alone treated 2,83 millions LDT in 2009 with an announced extension of 1 million LDT. In the short term, the Member States⁸⁵ which are currently sending a significant part of their ships to facilities located in Pakistan and Bangladesh would be affected more than the other Member States. In the medium and long term, the impacts are expected to be similar for all Member States.

Option E1 focuses on governmental vessels including navy ships. These ships are currently dismantled within the EU and Turkey only. Including them in a specific ad-hoc regulation based on the Hong Kong Convention, would allow them to be dismantled also outside the OECD. It is assumed that these ships would be dismantled in the same proportion than large commercial ships namely in the EU, Turkey, China and India in the short term and in all upgraded facilities in all recycling states worldwide the medium and long term. Since governments do usually not largely change the flags of their ships, reflagging is not expected to be a significant problem. Member States are expected to be affected in the same manner by this option.

Option E2 consists in requiring that all ship dismantling facilities should have impacts on human health and on the environment comparable to the European ones. In the short, medium and long term, large commercial EU flagged ships would be allowed to be dismantled in the EU, in China and in Turkey only. As explained before, the legally accessible recycling capacity will be largely sufficient. Responsible shipowners which are already sending their ships for dismantling in China are expected to continue to do so. Shipowners which are

⁸⁵ Malta, Cyprus, Greece, Bulgaria and the UK see

Table 12 in Annex VII.

currently sending their ships to South Asian countries might potentially reflag their ships to continue to do so, in particular, if the facilities there have been upgraded and meet the Hong Kong Convention's requirements. This option would indeed imply that EU is imposing stricter requirements than the ones agreed upon at international level. The South Asian countries might consider this as a trade barrier. The Member States which are sending their ships to India, Bangladesh and Pakistan can be expected to be affected more than those which are sending their ships in China⁸⁶.

Option E3 will have the same impacts on the dismantling locations as option D.

5.3. Baseline scenario

Option A is based on the assumption that the Hong Kong Convention will enter into force in 2020. In order to test the sensitivity of this assumption, a scenario consisting in maintaining the current legislation unchanged and considering that the Hong Kong Convention will not enter into force before 2030 has been studied in Annex X. This scenario would have the worst social and environmental impacts in the medium and long term compared all other options.

5.3.1. Environmental impacts

5.3.1.1. Generation of non-hazardous and hazardous waste

The prohibitions to use certain material on board ships contained in the Hong Kong Convention are already applicable through EU legislation⁸⁷. The impacts of the phasing out of hazardous substances like asbestos, PCB, TBT and ozone depleting substances has been taken into account in the calculation of the projected amount of hazardous and non-hazardous waste generated by ship dismantling. The amounts of hazardous and non hazardous waste generated in the short, medium and long term are the following:

	2015	2020	2025
Non hazardous waste (t)	1 197 346	1 361 366	1 235 460
Hazardous waste (t)	72 847	82 806	75 060
Total (t)	1 270 193	1 444 172	1 310 520

There will not be any substantial difference between the scenarios regarding the generation of non-hazardous and hazardous waste since they are all related to the volume of EU flagged ships going for recycling.

⁸⁶ These countries are identified in

Table 12 in Annex VII.

⁸⁷ Detailed explanations can be found in Annex X.

5.3.1.2. Management of hazardous waste

The percentage of hazardous waste which will be treated in environmentally sound manner (ESM) instead of being released directly into the environment (air, soil, water) will be of 70 % in the short term and 84 % in the medium and long term.

5.3.2. Social impacts

5.3.2.1. In the EU

Since the majority of ship dismantling is expected to take place outside the EU, the employment opportunities in the EU are expected to remain limited (respectively 10, 11 and 10 man/years in the short, medium and long term).

The health and safety requirements currently applicable in the EU are strict thus resulting in practically no fatal or non-fatal accidents for adult workers. The employment of children workers is prohibited.

5.3.2.2. In third countries

Facilities located in India, Pakistan and Bangladesh are more labour intensive than facilities in the EU, Turkey and China. The current insufficiency of proper protective measures for workers and the possibility (in Bangladesh) to employ children in facilities however implies that the workers in these facilities will suffer from high number of fatal and non-fatal accidents. The entry into force of the Hong Kong Convention in 2020 will result in the prohibition of work by unprotected workers and in a reduced number of fatal and non-fatal accidents as show in the table below.

In order to be able to do a cost-benefit comparison between the impacts of the scenarios, the costs associated by both fatal and non-fatal accidents of children and adult workers have been monetized⁸⁸.

	2015	2020	2025
Labour (man years)			
Total work load outside EU	5318	6047	5488
of which protected workers	2944	6058	5498
of which not protected workers	2385	0	0
of which children	811	0	0
Accidents (number of persons)			
Adults life	4	2	2
Adults - non-fatal accidents	1345	1106	1004
Children - life	1	0	0
Children - non-fatal accidents	148	0	0
Monetized social impacts (€)	6 101 348	3 788 139	4 182 602

⁸⁸ For more information about the methodology see Annex V

5.3.3. Economic impacts

5.3.3.1. Impacts on EU shipowners

In the short term, shipowners are subject to the administrative burden linked with the Waste Shipment Regulation. This administrative burden has been estimated at 22 174€⁸⁹ for all EU flagged ships. In the medium and long term, they will also be faced with two types of costs related to the entry into force of the Hong Kong Convention:

- administrative costs related to new obligations set out in the Hong Kong Convention which will affect new built ships and ships going for recycling first and, within 5 years, all ships,
- reduced revenues from the recycling of their ships. It is assumed that the costs resulting from an improvement of the ship dismantling facilities so that they meet the requirements of the Hong Kong convention will be passed on to the shipowners at the time of dismantling.

5.3.3.2. Administrative burden for EU Member States

Taking into account the economic dynamic of the recycling market and the current experience regarding the application of the Waste Shipment Regulation, continuing to apply the current prohibition to export ships outside the OECD would imply very substantial administrative costs for EU Member States linked with inspection, enforcement and control. The current procedures are indeed costly and difficult to apply (see for example the re-importing of EU flagged ships which are already in Asia).

Apart from these costs linked with the enforcement and control of the current legislation, the Member States will be mainly affected as flag state in the medium and long term. The Hong Kong convention indeed require the competent authorities of the EU flag states to conduct surveys on board ships to verify the existence and correctness of certificates as part of the port state control as shown in the table below:

Administrative costs (€)	2015	2020	2025	2030
Additional controls in ports		19 112	906 816	1 300 974
Issuance and verification of the certificates		417 229	507 623	617 601
Total		436 341	1 414 439	1 918 575

5.3.3.3. Impacts on small and medium sized enterprises

EU shipowners are the main businesses affected, but these are rarely small and medium sized enterprises (SME)⁹⁰ though no statistics are available. According to experts, a qualitative

⁸⁹ Based on the hypothesis that all ships dismantled in the EU and in Turkey follow the requirements of the Waste Shipment Regulation while the ships dismantled elsewhere do not. Detailed estimates about the administrative costs linked with the Waste Shipment Regulation have been provided in the context of an EU Project on baseline measurement and reduction of administrative costs (http://ec.europa.eu/enterprise/policies/better-regulation/documents/files/abs_development_reduction_recommendations_en.pdf). The administrative burden associated with a total of 507 000 shipments of waste was estimated at 124 914 800 euros.

⁹⁰ It is not unusual to have one-ship companies involved in shipping but these are usually in fact composed of a large group of shareholders with different names, legal addresses and sometimes in different countries.

assessment is that SMEs would be rarely found in liner shipping but could be more relevant for ocean-going tramp shipping (especially for older general cargo ships, some bulk carriers and possibly tanker). Taking these elements into account, it is not considered that small and medium sized enterprises would be more affected than big enterprises in the baseline and in the other scenarios

5.3.3.4. Impacts on consumers

The costs related to the implementation of the Hong Kong Convention for shipowners during the operating life of their ships is negligible (around 0.01 %) compared with the benefits generated during the life span of a ship (30 years). The costs resulting from an improvement of the ship dismantling facilities will be passed on to the shipowner at the time of dismantling. Compliance with the Hong Kong Convention would imply that the most substandard facilities located in Bangladesh and Pakistan would have to invest around 10 \$/LDT during the next 10 years which represents only a small percentage of the current prices paid by facilities to shipowners (between 450 and 525\$/LDT in June 2011). The costs linked with the implementation of the Hong Kong Convention over the lifetime of ships are negligible and no impact is therefore expected on consumers in the baseline and in the other scenarios.

5.3.3.5. EU budget

In principle, none of the options envisaged in the impact assessment report has a direct impact on the EU budget.

Option D and E3 include establishing a list of facilities and the possibility for related inspections. In both cases, the bulk of work would consist in desk work, reviewing information provided by 3rd-country facilities and checking it against publicly available information. Only in a very limited of cases will on-site inspections be necessary.

This work would be limited in scale and time, namely being significant only in year two and three after the adoption of the new regulation. During these two years, the task would be undertaken with existing resources, complemented by a service contract under the ordinary budget. After year three, only maintenance work will be needed.

5.3.4. *Impacts on the simplification of the existing legislation.*

The existing EU legislation which is not adapted to the specificities of ships will continue to be applied in the baseline scenario. Several stakeholders have strongly indicated during the public consultation as well as during expert workshops that the co-existence of two systems of control (one resulting from the Basel Convention and the other one from the Hong Kong Convention) would be very confusing and administratively burdensome⁹¹. This option will therefore have a negative impact on the simplification of the existing legislation.

5.3.5. *Compliance aspects*

In the 2008 Strategy for better ship recycling, it was proposed to enhance the effectiveness of the EU control system for waste shipments by the establishment and maintenance of a list of

⁹¹ This was also recognized by Parties to the Basel Convention when they noted that " duplication of regulatory instruments that have the same objective should be avoided" (see decision IX/30).

ships that are ready for scrapping taking into account the procedures of the Hong Kong Convention.

The public consultation contained some questions related to the criteria which could be taken into account for establishing this list and their advantages/ disadvantages in order to improve the enforcement of the legislation.

The responses received showed that most of the stakeholders (shipowners' associations, some ship recycling facilities, classification societies, Member States, European Economic and Social Committee ...) are not in favour of such a list and have thus not proposed such criteria. The arguments for this are mainly that it will be very difficult to establish objective criteria. Errors are foreseeable, would influence the negotiation process for the selling of a ship and could ultimately raise some questions of liability in case of wrongful inclusion of a vessel in the list. Almost all of these stakeholders explained for example why the age of a ship is a simple but ineffective indicator. It does not in itself reflect the level of maintenance of the ship (for example "sister ships" built at the same time but can have widely differing disposal ages due to their maintenance) nor its commercial viability, which depends on the fluctuations of the freight market.

This ex-ante approach could result in the wrongful inclusion of ships in the list which would in turn have negative economic impacts on the market price of that ship.

As explained in section 2.2, the drivers of the current problems of compliance with the existing legislation are legal, technical and economical ones. Taking into account the economic dynamic of the recycling market and the current experience regarding the application of the Waste Shipment Regulation, continuing to apply the current prohibition to export ships outside the OECD would imply very substantial administrative costs for EU Member States linked with inspection, enforcement and control. The current procedures are indeed difficult and costly to apply.

As highlighted by most of the stakeholders (shipowners' associations, classification society, Member States), the matter is more an implementation than an enforcement concern. Good enforcement mechanisms are not considered likely to be implemented if they coupled with unrealistic or unpracticable dismantling rules (current European legislation based on the Basel Convention). These stakeholders recalled that the very reason for the development of the Hong Kong Convention were the difficulties faced when trying to apply the current legislation on ships.

When asked about way to improve compliance with and enforcement of the legislation applicable to ships, some stakeholders (shipowner associations, Member States) stressed the importance of clear regulation of the entire process from cradle to grave in the ship's life cycle. They also considered that the co-existence of two systems of control would be very confusing and administratively burdensome. Member States would, for example, be requested to designate two types of competent authorities and focal points for implementing the same legislative instrument. Finally they highlighted the necessity to set up effective and deterrent sanctions.

As explained in section 5.2, large problems of compliance are expected to be faced under option A due to the lack of legally accessible recycling capacity as well as to the confusion created by the application of two sets of requirements: an European regulation based on the

Basel Convention and domestic legislations in Member States based on the Hong Kong Convention.

5.4. Option B: implementing key elements of the Hong Kong Convention in the current European legislation.

5.4.1. Environmental and social impacts:

As for option A, there will continue to be a discrepancy between the needs and the legally accessible recycling capacity for large commercial EU flagged ships. The recycling locations and conditions will be similar than the ones foreseen for option A thus leading to similar environmental and social impacts in the short, medium and long term.

5.4.2. Economic impacts:

Under this option, some key requirements of the Hong Kong Convention would become applicable at EU level prior to their entry into force at international level. This anticipation would therefore imply additional costs (administrative costs for new ships and ships going for dismantling as well reduced revenues for selling ships for dismantling) and therefore negative economic impacts for ship-owners and for EU Member States (administrative costs) in the short and medium term. In addition, and similarly to option A, continuing to apply the current prohibition to export ships outside the OECD would imply very substantial administrative costs for EU Member States linked with inspection, enforcement and control.

This option would have a positive economic impact in the long term compared to the baseline scenario, as the costs of establishing inventories of hazardous materials for all ships will be anticipated. Finally this option will have similar social costs as option A in the short, medium and long term.

5.4.3. Impacts on simplification of the existing legislation.

Similarly to option A, this option would lead to the co-existence of two systems of control at European level, which would be very confusing and administratively burdensome. This option will therefore have a negative impact on the simplification of the existing legislation.

5.4.4. Compliance aspects

As for option A and as explained in section 5.2, large problems of compliance are expected to be faced under option B by the large majority of stakeholders due to the lack of legally accessible recycling capacity as well as to the confusion created by the application of two sets of requirements regarding control and enforcement within the same regulation. Some even considered that this duplication could act as a deterrent to the ratification of the Hong Kong Convention if this Convention is not seen as the key piece of legislation related to the safe and sound recycling of ships. The environmental NGOs and the European Parliament consider that there could be an added value in keeping the current legislation and complementing it with some requirements from the Hong Kong Convention (obligation to establish and maintain an inventory of hazardous materials).

5.5. Option C: addressing the dismantling of large commercial vessels through domestic legislation of the EU Member States only

5.5.1. Environmental impacts:

This option would have significant negative environmental impacts regarding the management of hazardous waste in the short and medium term as a larger proportion of large commercial EU flagged ships would be dismantled in substandard facilities offering better prices to the shipowners but without any treatment facilities for their hazardous waste. In the long term, the management of hazardous waste is expected to be similar to the baseline scenario since all facilities worldwide are expected to meet the requirements of the Hong Kong Convention.

5.5.2. Social impacts:

As for the environmental impacts, the social impacts of option C (compared to option A) expected to be negative in the short and medium term and comparable in the long term. In the short and medium term, the diversion of half of the volume of ships currently dismantled in the EU, Turkey and China to South Asia will lead to a halving of the employment opportunities in the EU. More jobs would be created outside the EU where the industry is more labour intensive. However, since a large proportion of workers would not be sufficiently protected, this will lead to an increase in the number of deaths and accidents for both adult and children workers. In the long term, the social impacts of this scenario would be comparable to the baseline.

5.5.3. Economic impacts:

Since option C would lead to a delayed application of the requirements of the Hong Kong Convention, it will be beneficial for ship owners (administrative burden and reduced revenues from recycling) as well as for EU Member States (administrative burden) in the short and medium term. In the long term, it will have similar impacts than the baseline scenario. The EU Member States would be faced with lower administrative costs linked with inspection, enforcement and control compared to the baseline scenario. The social costs are related to the social impacts. They will therefore be important in the short and medium term and similar to the baseline scenario in the long term.

5.5.4. Impacts on simplification of the existing legislation.

The option C would have a positive impact since large commercial EU flagged ships will not be covered anymore by European legislation. This impact might be more limited in the long term if the EU Member States have diverging national legislation implementing the Hong Kong Convention.

5.5.5. Compliance aspects

No compliance problem is expected during the short and medium term since large commercial EU flagged ships would not be subject to any legal requirement. In the long term, the level of compliance will be similar to the baseline except if Member States have diverging national legislations implementing the Hong Kong Convention.

5.6. Option D: covering ship dismantling by specific rules implementing the Hong Kong Convention

5.6.1. Environmental and social impacts:

The majority of stakeholders supported the idea of complementing the requirements of the Hong Kong Convention with additional criteria (European Parliament, Community of European Shipyards' associations, environmental NGOs, Ship Recycling Facilities, classification society, Member States, trade unions) while some (shipowners' associations) considers that the criteria applicable to the facilities should not go beyond the requirements of the Convention. Their main concern is the risk of reducing the recycling capacity legally accessible.

The proposals to go beyond the Convention concerns the need to address beaching (European Parliament, Ship Recycling Facilities, environmental NGOs), to strengthen requirements targetted at workers' protection (trade unions) or to take care of the proper downstream management of hazardous waste outside the ship recycling facility (classification society, Member States, environmental NGOs)

Under this scenario, large EU commercial vessels would be dismantled worldwide in (upgraded) facilities meeting the requirements of the Hong Kong Convention in the short, medium and long term. As explained before, the legally available recycling capacity will be sufficient to treat all large EU commercial vessels. This will result in positive environmental and social impacts in the short term and to similar impacts in the medium and long term compared to the to the baseline scenario.

5.6.2. Economic impacts:

Similarly to option B, this option would anticipate the application of the requirements of the Hong Kong Convention at EU level. This would therefore imply costs and, therefore, negative impacts for ship-owners as for EU Member States in the short and medium term compared to the baseline scenario.

The EU Member states will be faced with additional administrative costs when applying the requirements of the Hong Kong Convention compared with option A in the short and medium term and with similar costs in the long term. In the short, medium and long term, they would be faced with lower administrative costs regarding inspection, enforcement and control compared to the baseline scenario. The option D would have more negative impacts for shipowners than option B because fewer ships are expected to circumvent the legislation thereby benefiting from higher revenues for ship recycling. The option D would have positive impacts in the long term compared to the baseline scenario for the same reasons as option B.

5.6.3. Impacts on simplification of the existing legislation.

The current EU legislation, which is not adapted to the specificities of ships, would be replaced under option D by an ad-hoc legislation based on the requirements of the Hong Kong Convention. No duplicating sets of requirements nor contradicting requirements related to diverging implementation by EU Member States would be encountered. This option will therefore have a more positive impact than the baseline option.

5.6.4. *Compliance aspects*

The option D would address the current problems. It will firstly ensure an adequacy between the needs and the legally accessible recycling capacity. Moreover it would also be based on a system of control adapted to the specificities of ships. The Hong Kong Convention's requirements for ship owners to inform in advance and in writing their flag state about their intention to recycle their ships will solve the current problem of determining when a ship turns into waste.

By providing the legal possibility for ships to be dismantled also outside the OECD, sufficient ship recycling capacity will become legally available at an attractive price. The price difference between facilities located in China and the rest of Asia is reasonable (50\$/LDT or 10% of the price). Moreover facilities located in China have a capacity which is sufficient to address all the EU flags ships in terms of volume and size.

Enforcement will be more effective since the number of shipowners who continue to circumvent the legislation will be significantly reduced and alternatives to ship recycling in substandard facilities will be legally available. Shipowners will indeed be legally authorized to use the upgraded facilities located in non-OECD countries in which the relevant investment have been made.

As explained in section 3.1 and has identified by the majority of stakeholders, changing a flag is cheap, easy and will constitute a serious risk of non-compliance as long as two recycling markets (one compliant and one substandard) are co-existing and competing with each other. The price difference in July 2011 between facilities located in China and beaching facilities located in India was limited (50 \$/LDT or 10%). The risks of reflagging or of selling ships to "cash buyers" would therefore be significantly reduced. all the 5 major recycling countries upgrade their facilities and are Parties to the Hong Kong Convention, they will have to treat ships flying the flag of Parties and non-Parties to the Hong Kong Convention in a similar manner. This would remove the incentives to try to circumvent the European legislation. As explained before, the likelihood of seeing new recycling countries emerging as major recycling countries is very limited.

In order to address the remaining risk of reflagging, specific sanctions will be introduced in the legislation. They will address in particular the cases where ships are sold and reflagged prior to their recycling in order to circumvent the legislation.

This option would address the current problems and contains specific requirements which will ensure compliance before recycling (obligation to inform the flag state in writing) and after (sanctions if ships are not dismantled in authorized facilities). It will therefore have a very positive impact compared to the baseline option.

5.7. Option E1: addressing also government vessels, including navy vessels, in the new legislation instrument transposing the Hong Kong Convention.

The stakeholders expressed differing views as regards the extension of the Convention requirements to warships and other government vessels on non-commercial service. Including such vessels in the scope of an EU Regulation would mainly serve as a mean of demonstrating the commitment of EU Member States in fully implementing the Convention requirements and contribute to a better image of public authorities that should play an exemplary role by ensuring clean dismantling of their vessels. It could also increase the

demand for clean recycling and contribute to the improvement of recycling conditions in these countries. Others argued that all military and government vessels should be dismantled within the EU as it could make the existence of EU dismantling facilities more economically sustainable. It was also pointed out that these vessels would automatically follow the requirements for clean dismantling without necessarily being specifically covered by the new legislative instrument.

Details about the economic, social and environmental impacts of option E1 are provided for in Annex XV. This option can not be compared directly to the option A since this later option only addresses large commercial EU flagged ships. The impacts of E1 have to be compared with the continuation of the current situation (referred to as “option E0”) where these ships are dismantled in high quality facilities located in the EU and Turkey only.

5.7.1. Environmental impacts:

The generation of non-hazardous waste (32 804 tons per year) and of hazardous waste (1996 tons per year) is linked with the volume of governmental vessels going for recycling and will be similar to option E0. The emissions of CO₂ are expected to increase since these ships would have to travel specifically for being dismantled outside the EU. This would result in an increase of the CO₂ emissions of 26.9 tons CO₂/year⁹².

The recycling will take place in facilities which are providing a level of protection of the environment compliant with the requirements of the Hong Kong Convention but lower than the one provided for by European and Turkish facilities. In the short term, recycling is expected to take place in the EU, Turkey, China and in upgraded facilities in India. So 93 % of the hazardous waste are expected to be treated in an environmentally sound manner (ESM). In the medium and long term, recycling is expected to take place also in upgraded facilities in Bangladesh and Pakistan thus resulting in an overall percentage of 84 % of hazardous waste treated in an environmentally sound manner.

Including government ships including navy ships in an ad-hoc legislation transposing the Hong Kong Convention would therefore have overall negative environmental impacts.

5.7.2. Social impacts:

The governmental ships, including navy ships, would be recycled outside the EU thus resulting in a net loss of EU jobs (29) but to a net creation of employment worldwide (117) since facilities outside the EU are more labour intensive. Since dismantling would only take place in facilities compliant with the Hong Kong Convention where children work would be prohibited and protective equipments would be provided, no fatal accident is expected. However, since the working conditions are less strict in upgraded and compliant recycling facilities located in South Asian countries than in the EU facilities, it is expected that there will be an increase of accidents (25 per year).

Including government ships and in particular navy ships in an ad-hoc legislation transposing the Hong Kong Convention would have negative impacts on EU employment, positive impacts on worldwide employment and negative impacts in terms of accidents.

⁹² For more details about the calculations, see Annex XV.

5.7.3. Economic impacts:

EU Member States, acting as ship owners, will be allowed to sell their ships for dismantling in countries offering higher recycling prices thus resulting in increased revenues. Implementing the requirements of the Hong Kong Convention would result in additional administrative burden related to the establishment of inventories of hazardous materials (which are expected to be far more expansive for existing navy ships than for commercial ships) and certifications. The administrative burden will however be limited since governmental vessels including navy ships will not be subject to port state control during their operating life as they benefit from specific immunities.

Economic impacts for EU Member States compared to the continuation of the current situation (€)	2015	2020	2025
		5 393 397	6 549 011

The overall economic impact will be positive compared to the continuation of the current situation.

5.7.4. Impacts on the simplification of the existing legislation

Including government and navy ships in an ad-hoc legislation based on the requirements of the Hong Kong Convention and not anymore under the scope of the Waste Shipment Regulation would ensure that these ships would be covered by similar requirements by all EU Member States.

5.7.5. Compliance aspects

Compared to large EU flagged ships, government vessels including navy ships have less problems of compliance with the current legislation. There is indeed enough recycling capacity in the EU to treat them and the risk of de-flagging is low for government vessels, as the action of states is much more under public scrutiny than that of private operators. The level of compliance would not be significantly modified compared to current situation.

Many stakeholders considered that including governmental including navy ships in ad-hoc legislation would mainly demonstrate the commitment of EU Member States in fully implementing the Hong Kong Convention and in ensuring that they build a level of expertise on the issue from a shipping and recycling perspective.

5.8. Option E2: requesting EU flagged ships to be treated in facilities which are providing a level of protection of health and of the environment equivalent to EU facilities.

5.8.1. Environmental impacts:

The generation of hazardous and non-hazardous waste and the CO₂ emissions will be similar to the baseline scenario. Large EU commercial vessels would be dismantled worldwide in facilities meeting higher standards than the Hong Kong Convention (namely EU standards). All hazardous waste would be treated in an ESM. This option would therefore have very positive environmental impacts compared to the baseline scenario in the short, medium and long term.

5.8.2. *Social impacts:*

Large commercial EU flagged ships would be dismantled in facilities which are less labour intensive thus diminishing the total number of jobs created by ship recycling. The employment opportunities within the EU would be maintained. All workers would be protected thus resulting in less fatal and non fatal accidents amongst adult workers (children work would be prohibited) compared to the baseline option. This option would therefore have overall positive social impacts compared to the baseline scenario in the short, medium and long term.

5.8.3. *Economic impacts:*

This option would anticipate the application of the Hong Kong Convention and would therefore imply additional administrative costs for shipowners and for Member States in the short and medium term compared to the baseline scenario. In addition, shipowners would only be allowed to use high standard facilities, which will be more expensive than facilities compliant with the Hong Kong Convention only. This will result in additional negative economic impacts for shipowners in the short, medium and long term. This option will have a positive impacts on the social costs compared to the baseline scenario in the short, medium and long term.

5.8.4. *Impacts on simplification of the existing legislation.*

For the same reasons as option D, this option will have positive impacts compared to the baseline scenario.

5.8.5. *Compliance aspects*

Since this option would be based on a system of control based on the specificities of shipping, a better level of compliance is expected compared to option A. Under this option, ships would be allowed to be dismantled also outside the OECD thus resolving the current problem of legally accessible dismantling capacity. However, it can be expected that the legally available recycling capacity would be less important than in option D, since option E2 would imply a reinforcing of the requirements applicable to facilities.

It would therefore have positive impacts compared to the baseline scenario but slightly negative compared to option D. In addition, since it would affect very negatively the revenues of ship-owners, there is a clear risk for ships to be reflagged, so as to be dismantled in other facilities and, in particular, in facilities which would be compliant with the Hong Kong Convention. Several stakeholders (academia, shipowners' associations, Member States) considered phased approaches as more desirable so as not to give a large financial incentive to non-compliance. Measures which could be regarded as excessive but escapable (e.g. by reflagging) could amount to only 'window dressing', rather than an effective process

Since all facilities located in third countries including the most advanced ones would need to be upgraded, this option might face some opposition from the recycling countries as this would largely go beyond internationally agreed standards.

5.9. Option E3: allowing the export of EU-flagged ships only to a list of third party certified and audited facilities.

This option would consist in complementing the option D in order to improve compliance with EU legislation in particular prior to the entry into force of the Hong Kong Convention.

When the Hong Kong Convention will be applicable, both flag and recycling states will have to submit annual reports in order to ensure compliance with the Convention. Lists of ships sent for recycling including information about the name and location on the recycling facility will have to be provided by flag states. Recycling states will provide a list of the ships recycling facilities compliant with the Convention as well as an annual list of ships recycled within their jurisdiction. By comparing the list of ships sent for dismantling with the list of ships recycled, it will be possible to ensure compliance with the Convention as well as to measure de-flagging. Ship recycling facilities will indeed have to report all ships dismantled wherever they will fly the flag of a Party to the Convention or not ("no more favourable treatment" clause).

However these reporting requirements will only become applicable once the Hong Kong Convention will enter into force. In the short time, shipowners, when selecting their facilities, and flag states, when conducting the final survey prior to recycling, will have to ensure that the facilities comply with the requirements set out in the EU legislation. In order to mutualise these tasks and to ensure a level playing field at European level, it is proposed to establish a list of third party audited facilities. This list will contain both information contained in the yearly reports as well as information to be compiled by the ship recycling facilities in order to be authorized under the Hong Kong Convention and which would be helpful for shipowners in order to select adequate facilities⁹³ and for EU Member States acting as flag states.

In the medium and longer term, this option would also address the potential weaknesses identified in the EU Strategy on ship dismantling which are linked with the limited non-compliance mechanism of the Convention as well as the heavy reliance of its control system on authorities of developing countries with existing governance problems.

The audit scheme contained in the Hong Kong Convention concerns only the mechanism to be put in place by Parties in order to ensure that their facilities' compliance with the Convention. It is voluntary and will be conducted by the Parties themselves (self-audit) or by organizations that recognized by them.

Stakeholders were consulted on the possible positive and negative impacts of the introducing an EU audit and certification scheme as well as on the organisations and actors which could be playing a key role in such scheme. Several stakeholders questioned the effect of a voluntary scheme and argued that the scheme should be made mandatory.

There were diverging views on the criteria which should be used to certify and audit facilities. Some considered that this scheme should only rely on the requirements of the Hong Kong Convention, other proposed additional criteria related to transparency, human health and the environment.

Almost all stakeholders agreed that the national authorities and/or the classification societies/accreditation organisations would have a key role to play in such an audit and certification scheme. It was suggested that this should be done by an independent supervision and control organisation, while the State's role would be to control implementation. Such an

⁹³ Recycling capacity in terms of ship's size (length, breadth, lightweight), maximum authorized recycling capacity, information about the management of hazardous waste in and outside of the recycling facility.

organisation must be independent from the construction and demolition sector. Two of the stakeholders specifically mention the European Maritime Safety Organisation (EMSA) as having a key role to play within such system as its inspectors are indeed already visiting third countries to verify their compliance with the training education and certification system under the STCW Convention⁹⁴. One stakeholder proposes that local trade unions should play a key role in auditing and improving standards and ‘giving voice to workers’.

At the same time, some stakeholders argued that an EU specific third party certification and audit scheme could have a counterproductive effect given some recycling States' insistence on sovereignty rights during the negotiations of the Hong Kong Convention. However, during the workshop organized in EMSA, it was also mentioned that such audits would open up to the EU market and would work as an incentive for ship recycling facilities to upgrade their facilities. Finally, a few stakeholders argued that such EU rules could result in the reflagging of EU ships as a result of lack of compliant recycling capacity.

It is proposed to request the recycling facilities to be audited and certified by private European and non-European companies (classification societies) recognized by the EU⁹⁵. This will ensure that potential governance issues are addressed while respecting as much as possible sovereignty's concerns.

5.9.1. Environmental and social impacts

In principle the environmental and social impacts will be similar to option D and therefore positive in the short and medium term compared to the baseline scenario.

5.9.2. Economic impacts

The additional auditing of performance indicators and the classification would produce costs for recycling facilities in the range of 20,000-40,000 € plus internal personnel costs of 1-2 man years⁹⁶ (2160-4320 €). These costs would be passed over to shipowners through a reduced price offered for their ships.

A study undertaken on behalf of the Commission¹²⁵ developed a list of criteria based on the Hong Kong Convention as well as a first list of 25 facilities with a total dismantling capacity of 2,4 million LDT. Considering that during the 5 years in which they will be certified, these facilities will treat an yearly average of 1,6 million LDT of EU-flagged ships, the auditing cost would represent 0.139 €/LDT and is therefore considered as negligible compared to the current dismantling prices. It is therefore not expected to have a noticeable impact on shipowners' revenues, on transport costs or on consumers. In June and July 2011, the average dismantling prices offered by ship recycling facilities was indeed comprised between 450 (China) and 525 (Bangladesh, India) €/LDT.

5.9.3. Impacts on the simplification of the existing legislation.

The impacts are expected to be similar to the ones of option D and therefore a positive impact compared to the baseline scenario.

⁹⁴ The international Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) has been adopted in 1978 by the IMO and sets the standards of competence for seafarers internationally. .

⁹⁵ See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:131:0047:0056:EN:PDF>

⁹⁶ Costs have been estimated based on the labour costs in China see Table 14 in Annex VII

5.9.4. *Compliance aspects*

Several other stakeholders (environmental NGOs, European Dredging Association, some ship recycling companies, trade unions,...) insisted on the need for third Party audit and increased transparency for an effective implementation of the legislation applicable on ship recycling facilities. By applying this scheme the EU would increase transparency and compliance by providing a tool to monitor that the facilities to which EU-flagged vessels are sent for recycling comply with the applicable standards and rules on safe and environmentally sound recycling of ships. The participating facilities themselves would have a better control of operations and of their compliance with international standards namely the rules of the Hong Kong Convention. Moreover there would be an economical incentive for these facilities to be in the scheme so as to be legally authorized to receive EU flagged ships. The certificate would give them an incentive to improve environmental and safety performance. Certified facilities would serve as a benchmark for the industry and for national competent authorities.

Several stakeholders (shipowners' associations, Member States) however highlighted that the establishment of an international audit scheme was strongly rejected by some recycling states during the development of the Hong Kong Convention. Some regretted it but all considered that this would render this option potentially difficult from a diplomatic perspective and lead to legal and operational implications. This could hinder the acceptability of third party audit of ship recycling facilities by the Asian recycling countries.

This option is therefore expected to have less positive impacts on compliance than option D taking into account a possible lower level of support from third countries due to sovereignty issues.

6. COMPARING THE OPTIONS

The options will be assessed against the following criteria:

- **effectiveness** – the extent to which options achieve the objectives of the proposal;
- **efficiency** – the extent to which objectives can be achieved at least cost;
- **coherence** – the extent to which options are coherent with the overarching objectives of EU policy, and the extent to which policy options are likely to limit trade-offs across the economic, social, and environmental domain.

This will be done based on a partial cost-benefit analysis since the environmental impacts have been quantified but not monetized. The summary of the quantified impacts of the different options is shown in the table 2.

6.1. Effectiveness

Option B has a neutral impact on the achievement of the Specific Objective 1 (improve the human health and environmental impacts) while options C and E1 have a clear negative impact. Options D and E3 have a positive impact in the short term and a neutral impact in the medium and long term. Option E2 has a high effectiveness in achieving this Specific Objective.

Option B would have a negative impact on the achievement of the Specific Objective 2 since large commercial EU flagged ships would still be prohibited to be recycled within the OECD. The level of non-compliance with the EU legislation can therefore be expected to continue to be very important. The option E1 has a neutral impact on the achievement of the Specific Objective 2. Option C would have a positive impact in the short and medium term since all the dismantling facilities worldwide could be used by EU-flagged ships during this period of time. Options D and E3 would have a very positive impact since they would allow open the possibility for EU flagged ships to be dismantled in facilities compliant with the Hong Kong Convention worldwide. Option E2 would have a positive impact since it would open the possibility for EU flagged ships to be dismantled worldwide. The impact will however be less positive than for options D and E3 since only EU equivalent facilities could be used by EU flagged ships.

Since the current legislation, which is not adapted to the specificities of ships, would be maintained in option B, this option will have a negative impact on the achievement of the Specific Objective 3. The option C would have a positive impact insofar as all EU Member States effectively ratify and implement the Hong Kong Convention. The options D, E2 and E3 will have positive impacts as they would replace the current legislation by another one more adapted to the specificities of ships and introduce sanctions specifically designed to address the current problem linked with the circumvention of the legislation by changing flag shortly prior to recycling. Option E1 would have a slightly positive impact.

6.2. Efficiency

Due to the very nature of the ship recycling market (90 % of recycling is undertaken in 5 major countries), the expected environmental and health benefits will be encountered in a limited number of third countries.

The option B would globally have a negative efficiency. By implementing key elements of the Hong Kong Convention in the EU legislation it would decrease the revenues of EU shipowners and increase the administrative costs of Member States. In addition, EU Member States would be faced with higher administrative costs linked with control and enforcement. And since the current problem of the lack of legally accessible dismantling capacity will not be solved, the Regulation would continue to be largely circumvented thus resulting in environmental and social impacts similar to the baseline scenario.

Option C would have positive impacts on the revenues of ship owners as well as on the administrative costs for EU Member States during the period considered but they will be offset by important negative environmental and social costs in the short and medium term.

Option D contains effective measures accompanied by limited implementation and administrative costs. It contributes therefore efficiently to all specific objectives.

Option E1 would have a globally negative effectiveness regarding the specific objectives. It would have positive economic impacts for EU Member States but negative environmental and social impacts in the short, medium and long term.

Option E2 implies very substantial costs for shipowners mainly related to the obligation for ships to be dismantled in high standard and more costly facilities than what would be required internationally. They are partially offset by the important benefits in terms of social costs resulting from the reduction of fatal and non-fatal accidents of adults and children.

Option E3 will not bring substantial additional costs for shipowners but would significantly improve the compliance with the legislation proposed under option D. It contributes therefore efficiently to all specific objectives.

6.3. Coherence

Only options D, E2 and E3 are coherent with all the overarching objectives of EU policy.

The analysis seems to indicate that option E3 and to a lesser extent option E2 presents a limited trade-off between the different types of impacts and an increased level of compliance with EU legislation. Option E2 presents an important trade-off between: firstly, the positive impacts on human health and on the environment on; and, secondly, the negative impacts on the revenues of ship owners. It presents a higher risk of non-compliance than the options D and E3.

6.4. Recommended option

From an effectiveness point of view, the option D seems the most attractive. Indeed, it offers the highest potential level of achievement of all specific goals and a higher level of compliance than option E3.

Moreover, as shown by the analysis of coherence, even if option D presents some trade-offs between the positive environmental and social impacts on the one hand side, and the economic impacts on the other, the trade-offs are lower than for option E2. In terms of coherence, option D therefore ranks highest.

In view of the above the option D is the recommended option.

The table below summarizes the comparison between the options in terms of effectiveness, efficiency and coherence.

Option	B	C	D	E1	E2	E3
Effectiveness						
SO1	negative	negative	positive in the short term and neutral in the long term	negative	positive	positive
SO2	negative	very positive	very positive	neutral	positive	very positive
SO3	negative	positive	positive	slightly negative	positive	positive
Efficiency	negative	negative	very positive	negative	positive	very positive
Coherence	no	no	Yes with limited trade off	no	Yes but with important trade off and risk of non compliance	Yes with limited trade off but with risks of non-compliance
Conclusion			Recommended option			

7. MONITORING AND EVALUATION.

Given the existing compliance problems, progress should be monitored to check the implementation and effectiveness of the EU legislation and its contribution to the objectives.

Indicators of the progress in this context could be in particular:

- the number of ship recycling facilities that are fulfilling the criteria of the Regulation;

- the number and percentage of EU-flagged ships dismantled in such facilities compared to the worldwide number and percentage;
- the state of ratification of the Hong Kong Convention by the major flag and recycling states;
- data on the type of employments in ship recycling facilities (typology of employment, accidents, occupational diseases) as well as data on the environmental pollution associated with ship recycling, as available.

Taking these indicators into account, it is necessary to review the EU policy concerning ship recycling on a regular basis and to submit regular implementation/progress reports to the European Parliament and the Council.

The mandatory annual reports of Member States on ship recycling facilities and recycled ships will be the main source of information. It could be completed by the purchase of detailed data about the world and EU flagged ships as well as about ship dismantled worldwide. In view of probable delays, gaps and inaccuracies it is highly recommended to contract a study for the preparation of each policy review.

Should compliance problems continue, further actions could be undertaken at EU level like the setting up of an EU ship dismantling fund.

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Annex I : Glossary of terms

Basel Convention	The Basel Convention on the on the Control of Transboundary Movements of Hazardous Wastes and their Disposal adopted in 1989 and in force since 1992
COP	Conference of the Parties
CSR	Corporate Social Responsibility
ECSA	European EU Shipowners' Associations
EMAS	European Union's Eco-Management and Audit Scheme
EMSA	European Maritime Safety Agency
EU	European Union
GT	Gross tons
HBCDD	Hexabromocyclododecane
Hong Kong Convention	The Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships adopted by the IMO in May 2009
IA	Impact Assessment
ICS	International Chamber of Shipping
IHM	Inventory of Hazardous Materials
ILO	International Labour Organisation
IMO	International Maritime Organisation
ISO	International Organization for Standardization
LDT	Light Displacement Tonnes
MEPC	Marine Environment Protection Committee
MIDN	Report of the French Inter-departmental Committee on the Dismantling of Civilian and Military End-of-Life Ships
OECD	Organisation for Economic Co-operation and Development
OJ	Official Journal (of the European Union)

PCBs

Polychlorinated biphenyls

PFOs

Perfluorooctanes

TBBPA

Tetrabromobisphenol A

TBT

Tributyl tin

TFS

TransFrontier Shipment of Waste

WSR

Waste Shipment Regulation

UNEP

United Nations Environment Programme

Annex II: Bibliography

European Community legislation and documents

- (1) Communication COM (2010) 88 final presenting "An assessment of the link between the IMO Hong Kong Convention for the safe and environmentally sound recycling of ships, the Basel Convention and the EU waste shipment regulation". Available at: <http://ec.europa.eu/environment/waste/ships/pdf/report0310.pdf>
- (2) Council Conclusions on an EU Strategy for better ship dismantling http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/110626.pdf
- (3) Results of the stakeholders' workshop organised on the 9 June 2009 and on the 23 October 2009 http://circa.europa.eu/Public/irc/env/cons_ship_dis/library
- (4) Results of the stakeholders' consultation on the EU Strategy for better ship dismantling (April- June 2009) <http://ec.europa.eu/environment/waste/ships/pdf/summary%20of%20contributions.pdf>
- (5) European Parliament resolution of 26 March 2009 on an EU strategy for better ship dismantling <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2009-0195+0+DOC+XML+V0//EN&language=EN>
- (6) Communication COM (2008) 767 final of 19 November 2008 presenting an "EU strategy for better ship dismantling, and its impact assessment in Commission Staff Working Document SEC(2008) 2846.
- (7) European Parliament Resolution of 21 May 2008 on Commission's Green Paper on better ship dismantling <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0222+0+DOC+XML+V0//EN&language=EN>.
- (8) Results of the stakeholders' consultation on the Green Paper on better ship dismantling http://ec.europa.eu/environment/waste/ships/pdf/report_consultation.pdf.
- (9) Green Paper of 22 May 2007 on better ship dismantling COM (2007) 269 final, with Annex and references in Commission Staff Working Document SEC (2007) 645.
- (10) Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste, OJ L 190, 12.7.2006, p. 1 ("Waste Shipment Regulation").
- (11) Commission Regulation (EC) No 1418/2007 of 29 November 2007 concerning the export for recovery of certain waste listed in Annex III or IIIA to Regulation (EC) No 1013/2006 of the European Parliament and of the Council to certain countries to which the OECD Decision on the control of transboundary movements of wastes does not apply
- (12) Commission Regulation (EC) No 740/2008 of 29 July 2008 amending Regulation (EC) No 1418/2007 as regards the procedures to be followed for export of waste to certain countries

Commission's studies and research projects

- (1) BIO intelligence service study for DG Environment: " Feasibility of a list of "green and Safe" ship dismantling facilities and of a list of ships likely to go for dismantling" Final report of January 2010, published on the Commission website at http://ec.europa.eu/environment/waste/ships/pdf/bio_ship%20dismantling.pdf
- (2) COWI study for DG Environment: " Support to the impact assessment of a new legislative proposal on ship dismantling" Final report of December 2009, published on the Commission website at http://ec.europa.eu/environment/waste/ships/pdf/final_report080310.pdf
- (3) Milieu/COWI for DG Environment " Study in relation to options for new initiatives regarding dismantling of ships " Final report of October 2009: published on the Commission website at <http://ec.europa.eu/environment/waste/ships/index.htm>
- (4) COWI/Litehauz study for EMSA, 'Certification of Ship Recycling Facilities', 2008.
- (5) COWI/DHI for the European Commission, DG Environment, Study on "Ship dismantling and pre-cleaning of ships", Final report of June 2007, published on the Commission website at <http://ec.europa.eu/environment/waste/ships/index.htm>.
- (6) COWI for the European Commission, DG Transport and Energy, Study on "Oil Tanker Phase Out and the Ship Scrapping Industry", 2004, published at: http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/2004_06_scrapping_study_en.pdf
- (7) DNV/Appledore (for DG III/Enterprise), study on 'Technological and Economic Feasibility Study of Ship Scrapping in Europe', 2001, published at : http://ec.europa.eu/enterprise/maritime/maritime_industrial/ship_scrapping_study/ship_scrapping_study_21feb01.pdf
- (8) SHIPDISMANTL Cost-effective and environmentally sound dismantling of obsolete vessels, 6th European Research Framework Programme (FP6).
- (9) SHIPMATES Shiprepair to maintain transport which is environmentally sustainable, 6th European Research Framework Programme (FP6)
- (10) DIVEST Dismantling of Vessels with Enhanced Safety and Technology, 7th European Research Framework Programme (FP7).
- (11) RECYSHIP (Reference: LIFE07 ENV/E/000787) ; pilot project for the dismantling and decontamination of end of life ships
- (12) BOATCYCLE Management, recycling and recovery of wastes of recreational boat scrapping (Reference LIFE08 ENV/E/000158)

International Maritime Organisation (IMO)

- (1) Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships adopted 19 May 2009 available at: <http://ec.europa.eu/environment/waste/ships/pdf/Convention.pdf>

- (2) Existing guidelines on ship dismantling⁹⁷
- IMO, 2003, Resolution A. 962(23), Guidelines on Ship Recycling International Maritime Organisation (IMO)
 - IMO, 2004, Guidelines for the Development of the Ship Recycling Plan (MEPC/Circ.419)
 - IMO, 2005, Resolution A.980(24), Amendments to the IMO Guidelines on Ship Recycling
 - IMO, 2005, Implementation of the IMO Guidelines on Ship Recycling: 'Gas-free-for-hot-work' certification (MEPC/Circ.466)
 - IMO, 2005, Promotion of the Implementation of the IMO Guidelines on Ship Recycling (MEPC/Circ.467)
 - IMO, 2009, Guidelines for the development of the Inventory of Hazardous Materials. Available at: http://www5.imo.org/SharePoint/blastDataOnly.asp/data_id=26464/179%2859%29.pdf

Basel Convention

- (1) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, concluded 22 March 1989, entered into force 5 May 1992, 1673 UNTS 126
- (2) Basel Convention, 'Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships', Basel Convention series/SBC No 2003/2, ISBN 92-1-158620-8, 2003
- (3) Comments received from Parties pursuant to the decision taken by the ninth meeting of the Conference of the Parties on the Dismantling of Ships :
 - European Union: "Submission by the European Community and its Member States related to decision IX/30 on Dismantling of Ships", January 2009
 - European Union; "Preliminary assessment pursuant to decision OEWG-VII/12 (Environmentally sound dismantling of ships)", April 2011.
- (4) European Union: Submission by the European Community and its Member States of an "EU Assessment on ship dismantling with particular reference to the levels of control and enforcement established by the Basel Convention and the expected level of control and enforcement to be provided by the draft Ship Recycling Convention in their entirety" , January 2008
- (5) Decisions of meetings of the Parties to the Basel Convention on ship dismantling:
 - Decision V/28: Dismantling of ships

⁹⁷ A list of the guidelines supporting the Hong Kong Convention is provided for in Annex IV.

- Decision VI/24: Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships
- Decision VII/25: Joint Working Group of the International Labour Organization, the International Maritime Organization and the Basel Convention on Ship Scrapping
- Decision VII/26: Environmentally sound management of ship dismantling
- Decision VII/27: Abandonment of ships
- Decision VIII/11: Environmentally sound management of ship dismantling
- Decision VIII/12: Joint Working Group of the International Labour Organization, the International Maritime Organization and the Basel Convention on Ship Scrapping
- Decision VIII/13: Abandonment of ships on land or in ports
- Decision IX/30: Dismantling of ships
- Decision OEWG-II/4: Legal aspects of the full and partial dismantling of ships
- Decision OEWG-III/3: Legal aspects of the full and partial dismantling of ships
- Decision OEWG-IV/5: Environmentally sound management of ship dismantling
- Decision OEWG-IV/6: Abandonment of ships
- Decision OEWG-V/7: Abandonment of ships
- Decision OEWG-V/8: Environmentally sound management of ship dismantling
- Decision VI/17: Environmentally sound management of ship dismantling and the abandonment of ships on land or in ports
- Decision OEWG-VII/12: Environmentally sound dismantling of ships

International Labour Organization (ILO)

- (1) 'Safety and Health in Ship Breaking – Guidelines for Asian Countries and Turkey' International Labour Organisation, ISBN 92-2-115289-8, 2004

Other international conventions, guidelines and initiatives

- (1) United Nations Convention on the Law of the Sea, concluded 10 December 1982, entered into force 16 November 1994, 1833 UNTS 3
- (2) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention) and 1996 Protocol Thereto
- (3) International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001

- (4) Joint ILO/IMO/Basel Convention Working Group on Ship Scrapping, 2005 and 2008 and sessions (<http://www.basel.int/ships/jimbwg.html>; <http://www.basel.int/ships/ilo-imo-bc-WG3Report.pdf>; <http://www.basel.int/ships/ilo-imo-bc-WG3Report.pdf>)
- (5) Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, concluded 10 September 1998, entered into force 24 February 2004, 38 ILM 1 (1999)

National ship recycling strategies and reports

• United Kingdom

- (1) DEFRA: UK Ship Recycling Strategy, February 2007 (<http://www.defra.gov.uk/environment/waste/strategy/ship.htm>)
- (2) DEFRA study on "Potential Transitional Technology Solutions For Environmentally Sound Ship Recycling In Developing Countries" 2009, (<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=15944&FromSearch=Y&Publisher=1&SearchText=WR1110&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>)

• France

- (1) Report of the French Inter-departmental Committee on the Dismantling of Civilian and Military End-of-Life Ships ("MIDN report"); French original (with annexes) and English translation published at: http://www.sgmer.gouv.fr/article.php3?id_article=52
- (2) Report of the Inter-ministerial mission on ship dismantling, April 2007 (http://www.sgmer.gouv.fr/article.php3?id_article=52)
- (3) Parliamentary report on the dismantling of warships, January 2007 (<http://www.assemblee-nationale.fr/12/rap-info/i3609.asp>)
- (4) Parliamentary report on the dismantling of ships, June 2010

Voluntary action by industry

- (1) Industry Working Group on Ship Recycling "Guidelines on Transitional Measures for Shipowners Selling Ships for Recycling, October 2009" available at: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_117945.pdf
- (2) Industry Working Group on Ship Recycling recommendation concerning 'Interim Measures for Shipowners Intending to Sell Ships for Recycling', July 2007
- (3) International Chamber of Shipping, Industry Code of Practice on Ship Recycling, 2001
- (4) Standard contract for the sale of vessels for recycling: http://www.bimco.org/Corporate%20Area/Documents/Document_samples/Sundry_Other_Forms/DEMOLISHCON.aspx

Other studies, publications and information sources

- (1) COWI for Danish EPA 'Project Identification Note – Options for Demonstration Projects on Green Ship Recycling', February – September 2007.
- (2) ECORYS, 'The ship recycling fund. Financing environmentally sound scrapping and recycling of sea-going ships', February 2006.
- (3) EMSA, Workshop Report: 'Ship Recycling – the draft IMO Convention on the safe and environmentally sound recycling of ships', Lisbon, 24 April 2007.
- (4) Knapp S, Kumar S, Bobo Remijn A., 'Econometric analysis of the ship demolition market', Vol 32 Marine Policy (Elsevier), November 2008.
- (5) Mikelis N., 'Developments and Issues on Recycling of Ships', East Asian Seas Congress, Haikou City, Hainan Province, PR China, December 2006.
- (6) Mikelis N., 'A statistical overview of ship recycling', International symposium on maritime safety, security and environmental protection, Athens, September 2007.
- (7) Ormond T., 'Enforcing EU environmental law outside Europe? The case of ship dismantling' Environmental Law Network International No. 1/2009
- (8) Andersen AB, 'Worker safety in the ship-breaking industries. An issue paper' Geneva, ILO, 2001:
<http://www.ilo.org/public/english/dialogue/sector/papers/shpbreak/wp-167.pdf>
- (9) Danish Environmental Protection Agency 'Shipbreaking on OECD' Working Report No. 17, 2003:
http://www.mst.dk/homepage/default.asp?Sub=http://www.mst.dk/udgiv/publications/2003/87-7972-588-0/html/kap01_eng.htm
- (10) Det Norske Veritas, 'Decommissioning Guidelines the GUEDEC Approach' DNV Report No 2000 3156 and 'Third Party Environmental Verification Ship Decommissioning (ENVER)' Report No 2000 3157.
- (11) Det Norske Veritas, 'Ship recycling: Industry concern, industry response: The way forward, challenges, DNV response', 2000:
http://www.skibstekniskelskab.dk/download/F2005_DNVShipRecycling.pdf#search='ship%20recycling%202001'
- (12) Environment Canada, Environmental Protection Branch, Pacific and Yukon Region: 'Cleanup Standards for Ocean Disposal of Vessels' and 'Cleanup Guidelines for Ocean Disposal of Vessels', February 1998:
http://www.artificialreef.bc.ca/AResources/cleanup_guidelines.html and
http://www.artificialreef.bc.ca/AResources/cleanup_standards.html
- (13) Environment, Food and Rural Affairs Committee (UK), 'Dismantling defunct ships in the UK, 11 November 2004:
<http://www.publications.parliament.uk/pa/cm200304/cmselect/cmenvfru/834/83402.htm>

- (14) Environmental Protection Agency (EPA) (USA), 'A guide for ship scrappers: Tips for regulatory compliance', Washington, D.C, EPA, 2000: <http://www.epa.gov/Compliance/resources/publications/civil/federal/shipscrapguide.pdf>
- (15) Greenpeace International, 'Destination unknown: European singlehull oil tankers: No place to go', December 2004: <http://www.greenpeaceweb.org/shipbreak/destination.pdf>
- (16) International Chamber of Shipping (ICS), 'Industry code of practice on ship recycling': <http://www.marisec.org/recycling/>
- (17) International Organization for Standardization (ISO), 'Ships and marine technology: Ship recycling management systems: Specifications for management systems for safe and environmentally sound ship recycling facilities' Geneva, ISO, 2008 (ISO/PAS 3000).
- (18) Occupational Safety and Health Administration (OSHA) (USA), 'OSHA fact Sheet on shipbreaking', US Department of Labor - Occupational Safety and Health Administration, 2001: http://www.ilo.org/pubcgi/links_ext.pl?http://www.osha.gov/OshDoc/data_MaritimeFacts/shipbreakingfactsheet.pdf
- (19) Rahman A/ Ullah AT, 'Ship breaking: A background paper prepared for the ILO's Sectoral Activities Programme. Dhaka, 1999 : <http://www.ilo.org/public/english/protection/safework/sectors/shipbrk/shpbreak.htm>
- (20) Sawyer, JF, 'Shipbreaking and the North-South debate: Economic development or environmental and labor catastrophe?' Penn State International Law Review, Vol. 20/No. 3, pp 535-562, 2002.
- (21) US Environmental Protection Agency, Office of Enforcement and Compliance Assurance: 'A Guide for Ship Scrappers – Tips for Regulatory Compliance', EPA 315-B-00-001, Summer 2000: <http://es.epa.gov/oeca/fedfac/scrap.pdf>
- (22) US Department of Transportation – Maritime Administration (MARAD): 'Environmental Assessment of the sale of national defence reserve fleet vessels for scrapping', Report No. MAENV-820-96003, July 1997 (including Appendix D: Sampling and analysis, Appendix E: Survey of ships and materials, and Appendix F: The markets, cost and benefits of ship breaking/ recycling in the United States).
- (23) US Department of Transportation - Report to Congress on the progress of ship disposal, 2005 http://www.marad.dot.gov/Publications/Fy%2006/ReportToCongress11_05%20Final%20ver%202-21-2006.pdf
- (24) United Nations Environment Programme (UNEP) - Technical Working Group of the Basel Convention, 16th Session 3-5 April 2000 – Dismantling of ships. Geneva, UNEP, 2000 (UNEP/CHW/TWG/16/3 & UNEP/CHW/TWG/16/3/Add.1): http://www.basel.int/meetings/twg/twg16/predocs/twg16_3.pdf & http://www.basel.int/meetings/twg/twg16/predocs/twg16_3a1.pdf

Annex III: The Basel Convention on the control of transboundary movements of hazardous waste and their disposal.

The Basel Convention on the control of transboundary movements of hazardous wastes and their disposal was adopted in 1989. All individual Member States and the EU are Parties to the Basel Convention.

The Basel Convention to regulate the movements of hazardous waste across international frontiers. The overall goal of the Convention is to protect human health and the environment against adverse effects which may result from the generation, management, transboundary movements, and disposal of hazardous wastes.

The Convention applies to hazardous wastes and certain other wastes (mixed waste collected from households and residues arising from the incineration of household waste). In decision VII/26, Parties to the Basel Convention noted that a ship may become waste as defined in Article 2 of the Convention while at the same time being defined as a ship under other international rules. Due to their content of hazardous materials, when ships are waste, they have to be considered as hazardous wastes. The Basel Convention thus applies to all ships which are "waste" as defined by the Convention.

In 1995, an amendment to the Convention, the so-called "Basel Ban" was adopted. It prohibits all shipments of hazardous waste from a group of countries (European Union, OECD countries and Lichtenstein) to countries which do not belong to this group.

The European Union transposed the provisions of this amendment in the EU Waste Shipment Regulation⁹⁸. However, internationally the Ban amendment has not yet entered into force due to an insufficient number of ratification by Parties to the Basel Convention.

In order to break the deadlock, Indonesia and Switzerland have launched an initiative with key Parties to the Basel convention and will propose a draft decision for consideration and adoption at the next Conference of the Parties to the Basel Convention⁹⁹.

Faced with the difficulties to implement the Basel Convention to ships and in order to cover the whole life cycle of ships, the Parties to the Basel Convention welcomed the intention of the International Maritime Organisation (IMO) has developed an ad-hoc Convention. The Hong Kong Convention for the Safe and Environmentally Sound Recycling of Ships (thereafter referred to as the Hong Kong Convention) provides a system of control and enforcement over a ship's lifetime from design, through construction, operation and up to the recycling stage. Parties to the Basel Convention welcomed its adoption in May 2009.

During the negotiation of the Hong Kong Convention, Parties to the Basel Convention invited the International Maritime Organization to ensure that the new Convention to be adopted by it would establish an equivalent level of control as that established under the Basel Convention, noting that the duplication of regulatory instruments that have the same objective should be avoided¹⁰⁰. During the ninth Conference of the Parties to the Basel Convention, it was decided¹⁰¹ to carry out a preliminary assessment on whether the Hong Kong Convention as

⁹⁸ Regulation (EC) no 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

⁹⁹ COP 10 will take place from 17 to 21 October 2011 in Colombia.

¹⁰⁰ See decision VII/26 : <http://www.basel.int/meetings/cop/cop8/docs/16e.pdf#viii11>

¹⁰¹ See decision IX/30: <http://www.basel.int/meetings/cop/cop9/docs/39e-rep.pdf#ix30>

adopted, establishes an equivalent level of control and enforcement as that established under the Basel Convention, in their entirety, after having developed the criteria necessary. The EU has submitted criteria in January 2009¹⁰² and a set of criteria and a methodology have been agreed upon during the 7th Open Ended Working Group of the Basel Convention¹⁰³. On this basis, Parties and stakeholders have been invited to conduct their assessment and to transmit the results to the eleventh Conference of the Parties to the Basel Convention "for consideration and action, as appropriate".

The EU has completed its assessment in April 2009 (see: <http://www.basel.int/ships/oewg-vii12-comments/comments/eu.doc>) and concluded that the Hong Kong Convention appears to provide a level of control and enforcement at least equivalent to that one provided by the Basel Convention for ships which are waste under the Basel Convention and for ships to which the Hong Kong Convention applies and to ships treated similarly pursuant to article 3(4) of this latter Convention.

In addition, the system of control and enforcement for transboundary movements of hazardous waste through the Prior Informed Consent Procedure of the Basel Convention is considered as strict and functioning relatively well for most hazardous wastes, but as difficult to enforce in relation to end-of-life ships. The Hong Kong Convention takes a rather different approach to control and contains other elements of control and enforcement which are more adapted to the specificities of the maritime world.

¹⁰² See <http://www.basel.int/ships/ix30-comments/comments/eu-2009-01-30.doc>.

¹⁰³ See decision OEWG VII/12: <http://www.basel.int/meetings/oewg/oewg7/docs/21e.pdf#vii12>

Annex IV: The Hong Kong Convention.

General presentation of the Hong Kong Convention:

The International Convention for the Safe and Environmentally Sound Recycling of Ships¹⁰⁴ aims at addressing in a legally binding instrument, the environmental, occupational health and safety risks related to ship recycling, taking into account the particular characteristics of maritime transport and the need to secure the smooth withdrawal of ships that have reached the end of their operating lives. To this end, it regulates:

- The design, construction, operation and preparation of ships so as to facilitate safe and environmentally sound recycling without compromising their safety and operational efficiency;
- The operation of ship recycling facilities in a safe and environmentally sound manner; and
- The establishment of an appropriate enforcement mechanism for ship recycling (certification/reporting requirements).

The Hong Kong Convention basically requires ships flying the flags of Parties to the Convention to be recycled only in recycling facilities authorized by other Parties to the Convention.

Structure of the Ship Recycling Convention

The Convention is divided into the main text containing 21 Articles and an Annex which forms an integral part of the Convention. Articles provide for general requirements while the Regulations contained in the Annex contain more detailed requirements. If there is a need for the Convention to evolve (for example to add new prohibitions to use certain hazardous substances on board), it will be easier to modify the Regulation than the Articles of the Convention.

Article 1	General obligations
Article 2	Definitions
Article 3	Application
Article 4	Controls related to ship recycling
Article 5	Survey and certification of ships
Article 6	Authorization of Ship Recycling Facilities
Article 7	Exchange of information
Article 8	Inspection of ships
Article 9	Detection of violations

¹⁰⁴ IMO Hong Kong International Convention for the safe and environmentally sound recycling of ships, 2009, (SR/CONF/45) adopted 19 May 2009.

Article 10	Violations
Article 11	Undue delay or detention of ships
Article 12	Communication of information
Article 13	Technical assistance and cooperation
Article 14	Dispute settlement
Article 15	Relationship with international law and other international agreements
Article 16	Signature, ratification, acceptance, approval and accession
Article 17	Entry into force
Article 18	Amendments
Article 19	Denunciation
Article 20	Depositary
Article 21	Languages

Annex: Regulations for Safe and Environmentally Sound Recycling of Ships	
Chapter 1 (General Provisions)	
Regulation 1	Definitions
Regulation 2	General applicability
Regulation 3	Relationship with other standards, recommendations and guidance
Chapter 2 (Requirements for Ships)	
Part A - Design, construction and maintenance of ships	
Regulation 4	Controls of ships' Hazardous Materials
Regulation 5	Inventory of Hazardous Materials
Regulation 6	Procedure for proposing amendments to Appendices 1 and 2
Regulation 7	Technical Groups
Part B – Preparation for Ship Recycling	
Regulation 8	General requirements
Regulation 9	Ship Recycling Plan
Part C – Surveys and certification	

Regulation 10	Surveys
Regulation 11	Issuance and endorsement of certificates
Regulation 12	Issuance or endorsement of a certificate by another Party
Regulation 13	Form of the certificates
Regulation 14	Duration and validity of the certificates
Chapter 3 (Requirements for Ship Recycling Facilities)	
Regulation 15	Controls on Ship Recycling Facilities
Regulation 16	Authorization of Ship Recycling Facilities
Regulation 17	General requirements
Regulation 18	Ship Recycling Facility Plan
Regulation 19	Prevention of adverse effects on human health and the environment
Regulation 20	Safe and environmentally sound management of Hazardous Materials
Regulation 21	Emergency preparedness and response
Regulation 22	Worker safety and training
Regulation 23	Reporting on incidents, accidents, occupational diseases and chronic effects
Chapter 4 (Reporting requirements)	
Regulation 24	Initial notification and reporting requirements
Regulation 25	Reporting upon completion
Appendices	
Appendix 1	Controls of Hazardous Materials
Appendix 2	Minimum List of Items for the Inventory of Hazardous Materials
Appendix 3	Form of the International Certificate on Inventory of Hazardous Materials
Appendix 4	Form of the International Ready for Recycling Certificate
Appendix 5	Form of the Authorization of Ship Recycling Facilities
Appendix 6	Form of Report of Planned Start of Ship Recycling
Appendix 7	Form of the Statement of Completion of Ship Recycling

The Convention is supplemented by the following IMO guidelines providing clarifications, interpretations, and uniform procedures for technical issues arising from the provisions of the Convention.

Existing guidelines
<p>Guidelines on Ship Recycling</p> <p>Guidelines for the Development of the Ship Recycling Plan</p> <p>Amendments to the IMO Guidelines on Ship Recycling</p> <p>Implementation of the IMO Guidelines on Ship Recycling: 'Gas-free-for-hot-work' certification</p> <p>Promotion of the Implementation of the IMO Guidelines on Ship Recycling</p> <p>Guidelines for the development of the Inventory of Hazardous Materials</p>
Guidelines supporting the Hong Kong Convention
<p>Guidelines for the development of the Inventory of Hazardous Materials (adopted in July 2009)</p> <p>Guidelines for survey and certification;</p> <p>Guidelines for inspection of ships;</p> <p>Guidelines for the authorization of Ship Recycling Facilities (expected date of adoption July 2011);</p> <p>Guidelines for safe and environmentally sound ship recycling (expected date of adoption July 2011);</p> <p>Guidelines for the development of the Ship Recycling Plan (expected date of adoption July 2011);</p> <p>Other guidelines or circulars as may be identified by the Marine Environment Protection Committee of the IMO</p>

Entry into force requirements of the Hong Kong Convention¹⁰⁵ (article 17):

In order to enter into force and to start producing effects, the Hong Kong Convention needs to be ratified by both major flag states and recycling states.

As of May 2011, no IMO Member has ratified the Hong Kong Convention. This Convention has been open for signature subject to ratification from 1 September 2009 to 31 August 2010. In that time, France, the Netherlands, Italy, Turkey and Saint Kitts & Nevis signed the Convention subject to ratification.

"This Convention shall enter into force 24 months after the date on which the following conditions are met:

.1 not less than 15 States have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with Article 16;

¹⁰⁵ The text of the Hong Kong Convention is available here: <http://ec.europa.eu/environment/waste/ships/pdf/Convention.pdf>

.2 the combined merchant fleets of the States mentioned in paragraph 1.1 constitute not less than 40 per cent of the gross tonnage of the world's merchant shipping;

and

.3 the combined maximum annual ship recycling volume of the States mentioned in paragraph 1.1 during the preceding 10 years constitutes not less than 3 per cent of the gross tonnage of the combined merchant shipping of the same States."

First criteria: number of States.

This criterion will be relatively easy to meet since the ratification of EU Member States alone would be sufficient to reach it. Since the European Union is not a Member but only an observer to the IMO, only EU Member States can ratify the Hong Kong Convention.

Second criteria: fleet.

In 2009, the world merchant's shipping of ships under 500 GT is of 993 404 439 GT²³. To meet the criteria, ratifying states will need to provide for at least 397 361 776 GT.

The EU flagged ships above 500 GT represent 165 507 822 GT²³ or 16,66 % of the world fleet. Ratification by major flag states outside the EU will therefore be necessary to meet this criteria.

Third criteria: combined recycling capacity.

Based on the world merchant fleet above 500 GT in 2009, this means that countries ratifying the Convention should represent 11 920 853 millions GT.

As shown in Figure 1, this implies that ratification by the most advanced recycling countries (China and OECD) would not be sufficient. Ratification by India, Pakistan or Bangladesh would be required for this Convention to enter into force.

The figure below shows the maximum recycled volume of the major recycling states during the last ten years.

Three of them have large recycling capacities: China, India and Bangladesh. Pakistan has a medium and Turkey a small capacity.

Ratification by two large recycling capacity countries is presently more than sufficient to fulfill the Convention's entry into force requirements. With an average annual increase of the world fleet by 4 %, ratification by two large recycling capacity countries should be sufficient until 2015 or even beyond.

If there is an increase in recycled volumes in 2011 or in 2012, it might become possible to the recycling criterion to be met with ratifications by one large, one medium and one small recycling capacity countries.

Dismantling country	Maximum recycling volume (millions GT) for the period 2000-2010
Bangladesh	6 608 531
China	7 737 730
India	7 561 258

Pakistan	2 351 964
Turkey	645 150
Rest of the world	472 221

*Figure 1: World disposal by dismantling country 2000-2009*¹⁰⁶

¹⁰⁶ Data provided by the International Maritime Organisation based on data from ISH Fairplay.

Annex V: Data used in the Impact Assessment and general methodology.

The analysis provided in this Impact Assessment is based on the best available data and information collected by the Commission from stakeholders and the literature.

Publicly available data on all aspects of ship dismantling is rather limited in particular since the majority of ship dismantling takes place in non-EU countries. A specific methodology was developed to complete and update the existing information as well as to assess the quantitative impacts of different options in a dedicated study undertaken on behalf of the Commission¹² which has been published on Internet¹⁰⁷.

A great number of representatives of industry, national and international authorities, NGOs and other stakeholders have been interviewed and contributed information to this study. The methodology, main base data and the preliminary results were presented at the stakeholder workshop held on 23 October 2009 in Brussels. Views and specific comments expressed during and after the workshop are reflected in the relevant parts of the study.

Sources:

The above-mentioned study drawn on existing studies on ship dismantling.

EMSA had also provided an extensive amount of data for instance updates on ship dismantling and distribution of flags at the time of dismantling and during operation, which has been used for address the size of reflagging. Further data and information have been provided by stakeholders following the expert workshop on the 23 October 2009 and by DG ENV.

A number of representatives of industry, national and international authorities and other stakeholders have been contacted in relation to contribute information to the study. The contacted representatives include:

- International Ship Recycling Association, ISRA
- International Chamber of Shipping
- European Ship Recycling Facilities such as Van Heygen Recycling S.A., Belgium and Scheepssloperij Nederland B.V., the Netherlands,
- Turkish Ship Breakers Association
- International Labour Organization, ILO (safety and health statistics)
- Gujarat Maritime Board.

While comments and specific data submitted by stakeholders have been reflected in the analyses to further qualify the estimates and support the findings, the estimates, including the base data are best estimates subject to some uncertainty, given that publicly available data on various aspects of ship dismantling data is rather limited.

¹⁰⁷ <http://ec.europa.eu/environment/waste/ships/index.htm>

The analyses of impacts have been carried out using a dedicated Excel model and a base data set¹⁰⁸ for assessing the impacts of each of the scenarios. This Excel model is available at this address: http://ec.europa.eu/environment/waste/ships/pdf/Appendix_A.xls

In order to reflect the impacts of the shipping crisis in 2008, the data set was enriched and updated on the basis of two additional sets of data identified below.

Updates and improvement based on new sets of data

In 2011, DG Environment brought some specific data about the age profile of the world fleet, of the EU fleet and detailed information about ships sent for dismantling in 2008 and 2009. For the world fleet and for the EU flagged ships, the number of ships and GT of ships above 100 GT have been provided for the following age ranges: [0-9 years]; [10-14 years]; [15-19 years]; [20-22 years]; [23-25 years]; [26-28 years]; [29-30 years]; more than 31 years.

Regarding ship dismantling, the following information have been provided: ship's unique IMO's Ship Identification Number; ship name; GT; the type of ship, the date of built, the flag at the time of dismantling, the nationality of the owner at the time of dismantling, the date of arrival in the dismantling yard, the date when the dismantling started, the date when the dismantling was completed, the dismantling country and location.

In addition, data about ship dismantling published by one prominent shipbroker, Cotzias, have been used in the context of this report. Each month, this broker publishes a list of all the ships sold for dismantling with the following information: ship's unique IMO's Ship Identification Number, Ship name, type of ship, date of built, DWT, LDT, price paid by the dismantling facility (in dollars per LDT), dismantling country. The owners of certain ships do not sell them directly to the dismantling facilities but use the services of so-called "cash-buyers". In the database published by Cotzias, the dismantling country of these ships is therefore not indicated since it is not known at the time of selling. The words "as is" are indicated instead¹⁰⁹. Finally, this database focuses mainly on large seagoing vessels going to the largest dismantling countries. Information about dismantling in the EU or in the OECD (with the exception of Turkey) is pretty limited.

On the basis of this two set of data, it was possible to make detailed estimations in particular about the volume of ships and the price paid by the major dismantling countries in 2009. For some ships, there was no information about the LDT and/or the price in the information published by Cotzias. Estimations were therefore made by DG Environment.

In order to estimate the missing LDT¹¹⁰, a ratio between the GT and LDT was calculated for each type of the ships dismantled in 2009. These ratios are presented in the table below. The LDT of each of these ships was then estimated by dividing their GT by the relevant ratio.

¹⁰⁸ Study on the "Recovery of small vessels not used in the fishing trade" undertaken by COWI for DG Environment.

¹⁰⁹ For more explanations about the signification of the word "as if", see the part of this report dealing with change of flag.

¹¹⁰ 571 ships out of 1299 dismantled in 2009

Table 3: ratio GT/LDT per type of ships dismantled in 2009.

Type of ships	Average GT/LDT	Number of ships on which the calculation was made
Bulkers	2,562925079	182
Containers	2,21126458	159
Gas Carriers	1,934994284	19
General Cargo	1,967171755	143
Navy Ships	2,563676705	3
Offshore	2,962036788	4
Other Tankers	1,713076923	1
Passenger Ships (cruise ships, ferries)	1,225658922	4
Ro-Ro Ships	3,204804212	76
Specialised Cargo Ships	1,597326529	26
Tankers (oil, chemical)	2,672323709	96
Average for all ships	2,389772035	713

In order to estimate the missing prices¹¹¹, the LDT (provided by Cotzias or calculated as explained before) was multiplied by the average price per LDT paid in each dismantling country in 2009. In the cases where the dismantling country was not known or in the cases where there was no average price, a conservative approach was taken and the estimate from COWI for ships dismantled in the EU was used (81,6 euros/LDT) was used.

Methodology for determining future dismantling projections:

An important input for the impact assessment is the expected future dismantling volumes and countries of EU flagged ships. Due to the fluctuations in the ship dismantling activities and in the world fleet, it is difficult to project dismantled volumes.

Dismantling volumes of EU flagged ships

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 dismantling volumes. In 2005-2007 when freight rates were high almost no dismantling took place. Since 2008, with the low freight rates, dismantling volumes are rising. However, conditions can change quickly and therefore the projected yearly dismantling volumes should be interpreted with care.

The dismantling volumes are calculated and presented in Light Displacement Tons (LDT). The volumes are historical volumes up till year 2009 and projection from hereon until 2030.

The projections of future dismantling volumes have been made based on a simple assessment of the age profile of the fleet¹¹² and the lifetime expectancy¹¹³. The projections have been made following this procedure:

- (1) The *age profile* of the existing fleet for each vessel type is estimated.

¹¹¹ 763 ships out of 1299 dismantled in 2009

¹¹² See Annex VIII.

¹¹³ In the projections of the future dismantling volumes, the calculated average lifetimes for 2008 and 2009 have been applied (See Table 7 in Annex VII). The calculated average lifetimes of the various vessels types are assumed constant during the forecast period.

- (4) A *decommissioning frequency function*, which shows the share of vessels scrapped at a certain age, has been estimated. A decommissioning frequency function from the COWI/DHI (2007)³¹ study has been used. The frequency function was established based on historical scrapings of all ship types.
- (5) The *conditional decommissioning frequency function* has been estimated on the basis of the *decommissioning frequency function*. The conditional decommissioning function expresses the probability that a vessel is scrapped in the following year conditional on being in operation at the beginning of the year.
- (6) Combining the estimated age profile and the conditional decommissioning frequency function for vessel, estimates of the future dismantling volumes are obtained.
- (7) By adding the dismantling volumes for all type, the aggregate estimates of future volumes of dismantling are reached.

It should be noted that by applying the approach described above of estimating the future decommissioning volumes by year (e.g. when ships are scrapped), the projections will only reflect the overall trend in volumes. Moreover, the projections will not reflect e.g. the true ups and downs of the dismantling market business cycle that comes from fluctuating freight rates and future political initiatives. However, using the estimated age profile and the fitted conditional decommissioning frequency function to estimate the future decommissioning volumes the trend in the medium and long term will be reflected.

The Table 21 in the Annex VIII shows the projected future volumes of dismantling of vessels not covered by the Hong Kong Convention by year of scrap in terms of number of ships and total volume in GT as the total of all ship types.

Dismantling countries of EU flagged ships

The longer historical trend for the last 30 years period within recycling location are seen for the last 30 years trends (1978 - 2009) in the Figure 3 in the Annex VII. Ship dismantling in South Asia started in 1912 in India, in 1947 in Pakistan and in 1960 in Bangladesh. But these South-East Asian countries together with China only took over around the mid 1980's and have since completely dominated the recycling business. This pattern within dismantling locations is anticipated maintained for the projections of the impact assessment.

For the dismantling projections, the dismantling locations are grouped according to the dismantling methods applied and geography like shown in the Table 1. The dismantling percentages are calculated from the dismantling data for 2009 for the world fleet received from IHS Fairplay by summing up the percentages for the individual countries.

Methodology for assessing the impacts of the different options:

General methodology:

An approach based on the dismantling method was used in order to make projections about the potential impacts and the different compliance level for dismantling facilities. The active dismantling countries are generally be characterised by the recycling method applied, as defined in the Table below for the four overall recycling methods: beaching, landing, afloat and docking.

Table 4: Recycling methods applied in present recycling countries

Recycling method	Recycling countries
Docking	Few places in Europe
Afloat	China, Europe and US
Landing	Turkey
Beaching	South-east Asia: Bangladesh, India and Pakistan

Each of the four different dismantling methods is associated with a certain Health, Safety and Environment (HSE) quality level, which is used as basis for assessing the HSE impacts of the different policy scenarios. The quality levels of the present beaching facilities are below the proposed Convention standards, whereas the three other methods in general characterise three different compliant levels.

The three-levelled compliance system, as proposed in the 2008 EMSA study¹¹⁴, forms input to the generation of data for the impact assessment where no historical statistics exist. This three-levelled system operates with three quality levels A, AA and AAA where an A level indicates implementation of IMO minimum levels – in the adopted Convention text and guidelines this includes beaching – and two more compliant levels: the top level (AAA) is indicative of the full standard with double containment in dry dock facilities and the medium level (AA) comprising the existing pier and slipway breaking such as carried out in Europe and in China, and represent the ultimate (innovative) upgrading possibility for beaching and landing facilities.

The environmental, health and safety impacts of the different EU policy scenarios are estimated by means of a base data set for HSE performance for the different dismantling methods and locations which can be found in the Worksheet entitled "Baseline Case HSE + Costs" of the Excel-sheet model¹¹⁵.

As explained before, these impacts are estimated per volume of ship recycled. The percentages of protected workers (including child workers) has been estimated per dismantling location and method as show in the table below:

Labour	Unit	AAA EU	AA EU	AA China etc.	A Turkey	A Upgraded India	Substandard India	A Upgraded Pakistan and Bangladesh	Substandard Bangladesh, Pakistan
Workers needed per	Nb	73	73	138	138	455	455	455	455

¹¹⁴ Study by COWI/Litehauz for EMSA on the Certification of Ship Recycling Facilities. September 2008. https://extranet.emsa.europa.eu/index.php?option=com_docman&task=doc_download&gid=620&Itemid=193

¹¹⁵ Available at: http://ec.europa.eu/environment/waste/ships/pdf/Appendix_A.xls.

100.000 LDT									
of which protected workers	%	100	100	100	100	100	100	100	50
not protected workers	%	0	0	0	0	0	0	0	50
children	%	0	0	0	0	0	0	0	17

The number of accidents (both fatal and non fatal) for adult and children workers has been estimated per man-years involved in the recycling of ships as shown in the table below.

Accident	Unit	AAA EU	AA EU	AA China etc.	A Turkey	A Upgraded India	Substandard India	A Upgraded Pakistan and Bangladesh	Substandard Bangladesh, Pakistan
Adults life	Nb of persons/100000 man-years	13	13	26	39	39	39	39	112,88
Adults - non-fatal accidents	Nb of persons/100000 man-years	6000	6000	12000	18000	18000	18000	18000	31450
Children - life	Nb of persons	0	0	0	0	0	0	0	23,12
Children - non-fatal accidents	Nb of persons	0	0	0	0	0	0	0	5347

Finally, the economic impacts of accidents have been estimated based on the average duration of an accident and the cost of a worker per day as show below:

Economic impacts	Accident/ million LDT	Days/accident	Costs (€)/day	Costs (€)/million LDT
EU facilities				
AAA	43,8	21,9	154,3	148 242
AA	43,8	21,9	154,3	148 242
A				
Substandard facilities not meeting Convention's criteria				
Non EU OECD facilities				
AAA				
AA	165,6	21,9	13,3	48 270
A	248,4	21,9	13,3	72 405
Substandard facilities not meeting Convention's criteria				

Other facilities				
AAA				
AA	165,6	21,9	7,5	27 298
Upgraded India	819,0	21,9	6,9	124 228
Upgraded Pakistan + Bangladesh	819,0	21,9	2,5	44 557
Substandard India	819,0	21,9	6,9	124 228
Substandard Pakistan + Bangladesh	1674,2	21,9	2,5	91 087

Environmental impacts:

The amounts of hazardous and non hazardous waste generated from recycling of EU-ships up to 2030 are calculated by multiplying the predicted recycling amounts (LDT) within the different countries with the base data set on different material amounts per LDT within ships. The calculations are done by use of the Excel-sheet model where can also be seen the detailed results of the analyses.

The base data set on materials within ships are presented in the Worksheet entitled "Baseline Case HSE + Costs". The base data set are split between merchant and navy vessels.

The base data set for merchant vessels are primarily based on data from the 1999 Norwegian study¹¹⁶ supplemented with on oily sludge provided by the DIVEST project in Turkey. Data for navy vessels are based on data from Clemenceau¹¹⁷ supplemented with the merchant vessel data for copper, non-ferrous and heavy metals, TBT and ODS.

The phasing out of asbestos, PCB, TBT and ozone depleting substances have been taken into account in the projections of the generation of hazardous waste.

The proportion of each of the hazardous waste treated in an environmentally sound manner for the facilities located in the different dismantling countries are provided for in the Worksheet entitled "Baseline Case HSE + Costs".

Detailed information about the waste management practices in the dismantling countries and their compliance with EU waste management requirements and with the obligation of the Hong Kong Convention can be found on pages 47 to 61 of the COWI study for DG Environment¹² as well as on pages 31 to 33 of the World Bank study³⁰.

Social impacts

In the study commissioned by the Commission to support this Impact Assessment¹², it was noted that it is very difficult to obtain quantitative information on the health and safety performance, i.e. the number of fatal and non-fatal accidents, at the different recycling facilities. For almost all recycling facilities and nations, these data are neither collected by national authorities nor publicly available.

¹¹⁶ Norwegian Ministry of the Environment, 1999. Decommissioning of Ships. Environmental Protection and Ship Demolition Practices. Norwegian Ministry of the Environment and Norwegian Shipowners Association. Technical Report. Report No 99-3065 Revision No. 03.

¹¹⁷ Notification received by the DG Environment for the transboundary movement of the Clemenceau.

Even when data is available a comparison between the different sources having reported some data on the number of accidents, fatal and non-fatal has been made. It helped in highlight an additional problem linked with the different practices applied in for classifying an incident as an accident in Europe and in Asia.

As highlighted in table 3-9 of this study the calculated accident rates for India are lower than the once for Turkey, which are again lower than the rates for EU. This is opposite to what is expected based on reports on the general safety culture and recycling practises on the different recycling locations. This trend obviously illustrates a mismatch, which is most likely related to different definitions and classifications of non-fatal accidents between the recycling sites where more also smaller accidents and incidents are registered in EU than in India. This will lead to an underestimation of the total accidents in India

In order to not underestimate the number of injuries and deaths associated with ship dismantling and in view of the quality of the available quantifiable data and the general information on the health and safety status and performance of the different ship recycling locations, the approach retained for the impact assessment was to apply the theoretical health and safety benchmarks as described in a study commissioned by EMSA¹¹⁴.

This benchmark is based on EU accident statistics from the most dangerous occupations (agriculture and construction) and an assumption that the combination of geography and recycling method results in that accident rates increase from EU facilities to afloat facilities in China and again to Turkey's landing facilities and finally to beaching facilities in South-East Asia. For the impact assessment, it has thus been assumed that the Indian facilities at present have a better health and safety performance than the facilities in Bangladesh and Pakistan.

Using the mostly theoretically based accident data are of course associated with a considerable uncertainty in terms of actual numbers, but is however expected acceptable for comparison of the relative differences between the scenarios.

The ratios used are indicated in the Worksheet "Accidents" of the Excel model (http://ec.europa.eu/environment/waste/ships/pdf/Appendix_A.xls).

The following information are calculated for each scenario: the workload required in the EU and outside the EU, the number of protected and unprotected workers, the number of children workers. In terms of accidents, the number of fatal and non non-fatal accidents are provided both for adult and for children workers.

Economic impacts

The assessment of the economic impacts been carried out by estimating the extra cost and benefit related to the change in the different scenarios as a result of implementation of the Hong Kong Convention. The timeframe for the analysis is 2000 to 2030.

The analysis focuses mostly on the cost and benefits directly related to Europe. However some benefits are also included even if they do not have direct impact on Europe, e.g. CO₂-emissions in Asia.

Costs are expressed as the cost in the year presented by applying a discount rate of 4% p.a.

The calculation is based on calculated unit costs, e.g. per ship, per death, per unit saved CO2 etc. Details on the unit costs are described in pages 64 to 69 of the study supporting the Impact Assessment¹².

The main costs identified and included in the economic analyses are the following costs for ships in operation:

- (1) Establishing Inventory of Hazardous Materials (IHM)
- (2) Issuing and checking of certificates based on the IHM
- (3) Port state control of certificates for ships calling EU ports
- (4) Flag-state control for EU Member State flags
- (5) Checking of IHM certificates for ships calling European ports.

Costs for preparing ships for recycling:

- (6) Update of the IHM's
- (7) Issuing and checking of the Ready to recycle certificates
- (8) Issuing and checking of ship recycling plans from EU recycling facilities
- (9) Costs (loss of net revenue) for selling a ship for recycling at a facility with a certain minimum HSE standard.

Costs for EU recycling facilities:

- (10) Preparation and issuing of ship recycling facility management plan and emergency preparedness and response plans for EU ship recycling facilities
- (11) Authorisation of EU ship recycling facilities
- (12) Issuing and checking of Statement of completion.

The benefits identified are the following:

- (1) Reduced emissions of CO2
- (2) Fewer accidents¹¹⁸ at the ship recycling facilities
- (3) Fewer death¹¹⁹ directly related to work activities at recycling facilities

¹¹⁸ For accidents the number of days where the worker is not able to work will be calculated as lost earning those days, which is a cost to the society. The calculations do not include medical cost related to the accidents etc., as these are not available. The effects of leaving out these costs are however estimated insignificant.

¹¹⁹ It is expected that the extra requirements for the dismantling facilities will lead to a reduction in the relative number of fatal accidents at the recycling facilities. These deaths will be valued by using the unit cost from the Impact Assessment. There are two main approaches to value life. The Value of

7.1.1.1. Distribution of cost and benefits

The analyses undertaken in the study supporting the Impact Assessment¹² include estimation of the distribution of the costs between the ships owners and the public administration. More specifically, the following elements are provided: the cost revenue for EU shipowners when selling their ships, the administrative burden for shipowners and for the Member States, the benefits resulting from limited number of accidents and deaths.

The costs for the ships owners are linked with the administrative burden induced by the requirements of the Hong Kong Convention. In order to avoid double-counting, the additional direct costs for the recycling facilities have not been included in the analysis. The cost effect for the recycling facilities is indeed captured by the lower price paid for the ships when being dismantled at a facility that fulfils the higher requirements.

The administrative costs are borne by the public authorities and consist of the costs of administrating, validating and checking of inventories and certificates.

The external costs and benefits can, for example, be in the form of environmental improvements or less use of child labour. These costs and benefits will not be valued (monetised) in this study. If one were to undertake a valuation of the environmental impacts, this would call for a mapping off the affected areas and the related changes that would occur as a result of the dismantling process.

Statistical Life (VSL) method estimates what the willingness to pay for a life is, whereas the Value of Life Year (VOLY) method estimates the value of living one year longer. When using VSL the value of a life is the same in the entire world whereas using VOLY combined with local information of life expectancies, one will achieve variation over the world. Here the VSL method is applied. However as the majority of accidents occur in the lower income regions in Asia, the VSL value of 980 000 EUR is applied in the analyses. This corresponds to the median VSL value indicated in the European Commission Impact Assessment Guidelines 15 January 2009, SEC(2009) 92.

Annex VI: Flags .

Every ship has to be register under a certain flag. The flag state, as defined by the United Nations Convention on the Law of the Sea (UNCLOS), has overall responsibility for the implementation and enforcement of international maritime regulations for all ships granted the right to fly its flag. Changing flag allows the shipowners to change the legal regime for the ship.

The challenge that represent the possibility to change flag for the effectiveness of any legislation at national, European and International level covering the dismantling of ships was mentioned by the large majority of the stakeholders (shipowners, Member States, environmental NGOs...).

It was therefore carefully assessed in the study undertaken on behalf the Commission to support this impact assessment¹². The impact on the flag state regime is especially important when evaluating a regional regulatory approach, e.g. a different regime at EU and international level, which could lead to a reflagging of ships, whereby ships would simply change their flag and exploit the available legal loopholes outside EU for instance. It is equally relevant to address the reflagging issue in which case ratification and transposition of the Hong Kong Convention by EU Member States is likely to take place at different pace. EU flagged ships could have an incentive to change flag to another EU Member State not (yet) Party to the Convention or to non EU flag states.

The current state of play in terms of reflagging.

Table 5: Comparison between the percentages of ships EU owned an EU flagged in the active fleet and at the time of dismantling (in 2009).

Percentage (in GT)	of EU owned ships	of EU flagged ships	EU owned – EU flagged
In the active fleet	37	16,7 ¹²⁰	20,3
At the time of dismantling in 2008	33,1	15,1	18
At the time of dismantling in 2009	32,6 ¹²⁰	8,0 ¹²⁰	24,6

As shown in the table below, the part of ships flying an EU flag was slightly lower at the time of dismantling than in the active fleet in 2008 but significantly lower in 2009.

At the time of dismantling	Volume (GT)			Number of ships		
	2008	2009	evolution 2009/2008	2008	2009	evolution 2009/2008
EU owned	2 718 956	7 834 033	288%	139	349	251%

¹²⁰ See Table 16 in Annex VII

EU flagged	1 269 298	1 965 361	155%	70	197	281%
Total volume	8 242 348	24 015 087	291%	549	1 299	237%

Looking at the number of ships going for dismantling, the evolution of EU-flagged ships is similar to the evolution of EU-owned ships and of the entirety of the fleet going for dismantling. Looking at the volumes sent for dismantling, it is however clear that the volume of EU flagged ships going for dismantling has increased but largely less than the volume of EU-owned ships or of the global volume of ships worldwide.

Drivers behind the change of flag.

The first factor is that changing of flag is a natural part of a ship's life.

When a ship is sold to foreign owner it is often associated with a change of flag. The difference between the part of the active fleet and the part of the fleet at the time of dismantling which is EU-owned is of 4,2 %.

Moreover the option chosen by the shipowner to sell its ships also has an impact on the flag at the time of dismantling. Ships are indeed committed on one of the two terms – "delivered" or "as is"¹²¹.

On a delivery basis, a owner typically sails a vessel to the port at which it has been organised to be dismantled within and the ship is anchored. Once the vessel changes hands from the owner at the recycling yard, it must be deregistered, as is the case with any change in vessel ownership.

Short-term registration, on the other hand, most commonly comes into play when ships are sold on an "as is" basis. In this case, cash buyer, acting as a middle man between owners and dismantlers takes ownership of vessels at common pick up points such as Fujairah and Singapore. They are then required to deflag the ship for one last voyage to the major dismantling nations¹²¹.

St Kitts-Nevis, Kiribati, Mongolia and Tuvalu are ones of the handfuls of states that offer single-voyage registration to owners. Some of these flags had been identified by some environmental NGOs in their response to the public consultation. While St Kitts-Nevis, one of the signatories of the Hong Kong Convention, openly advertises short-term registration ranging from one to three months, Mongolia, Kiribati and Tuvalu are less open about their offers. The pricing structure of these flags is not openly available¹²¹ but, according to experts, the cost for a ship to change flag is estimated at about \$ 10 000 (7190 €) or less, which represents a negligible cost for many shipowners¹²².

¹²¹ In Lloyd's List dated 8 December 2009 "Last rites of passage" and "Short-term registration looks set for bumper year"

¹²² Mikelis, Nikos, 2009, "Entry into force conditions of the Hong Kong Convention", Workshop on Ship recycling and the Hong Kong Convention, 23-24 October 2009 [Available online: www.denizcilik.gov.tr/dm/dosyalar/IMO%20Mr%20Mikelis.pdf]

A study ¹² comparing the 25 major flag states in the global fleet and the 25 major flag states at the time of dismantling in 2008¹² and 2009¹²³, has showed an overrepresentation of flags such as Tuvalu, St. Kitts-Nevis St. Vincent & Grenadines, Mongolia, Comoros or Cambodia. An updated comparison is available in Table 13.

The flag is also linked with the age of the ship. Certain shipowners choose to change the flag of their when they reach a certain age for economic reasons (maintenance cost, surveys and other). As shown in Figure 6 in Annex VIII, EU flagged ships are usually younger than the global fleet.

The second main reason to change flag is to evade certain legal obligations that certain flag States may fall under. In the case of the Waste Shipment Regulation, two main reasons can be identified as explained before: the lack of dismantling capacity in the OECD and the loss in net revenue depending on the dismantling practices and locations.

Table 6: Calculated reflagging in 2009 depending on the main dismantling locations.

Dismantling country	EU owned	EU flagged	Reflagging ¹²⁴
China	22,0%	5,8%	4,2%
India	32,6%	12,1%	-0,2%
Bangladesh	40,2%	4,1%	-15,7%
Pakistan	46,2%	11,0%	-14,8%
Turkey	52,3%	23,6%	-8,3%
Average for all dismantling locations	32,6%	8,0%	-4,2%

This table shows that there are no real reflagging in China and India while Bangladesh and Pakistan are characterized by a large reflagging.

As a conclusion, reflagging before dismantling is already a reality. It differs depending on the year considered and is driven by several factors notably the lack of sufficient dismantling capacity as well as by the difference of costs between substandard and acceptable dismantling facilities. The reflagging rates are different depending on the dismantling countries.

The expected evolution of reflagging.

The extent of reflagging of ships to evade a future EU legal dismantling regime, or that of individual Member States having transposed the Hong Kong Convention, will depend on the availability of sufficient safe and sound dismantling capacity as well as on the eventual loss in net revenue from dismantling the ships in environmentally sound dismantling facilities in accordance with the Convention requirements compared to traditional substandard facilities.

Faced with more stringent legislation, shipowners would have three main possibilities:

¹²³ See Table 13 in Annex VII.

¹²⁴ Calculated as the difference between the percentages of EU owned and EU flagged ships at the time of dismantling in the dismantling country compared to the difference between the percentages of EU owned and EU flagged ships of the active fleet.

- Sell their ships to non-EU owners including to cash buyers is legal but relatively costly,
- Continue to hide their intention to send the ship for dismantling when leaving EU ports. This option is illegal and would be more risky in the future than it is today since the Hong Kong Convention explicitly obliges shipowners to inform their flag state of their intention to dismantle their ships in advance and in writing.
- Change flag to a flag which is not a Party to the Hong Kong Convention and in particular to flags allowing single-voyage registration. This option would be legal and relatively inexpensive as explained before as long as the ship is not going to call anymore at European Ports. However, the flags which are overrepresented at the time of dismantling are all targeted by Port State Controls¹²⁵. Changing a flag "prematurely" before going for dismantling, could lead to additional operational costs for the shipowners as their ships would be blocked more frequently in port for port state control.

Even after the entry into force of the Hong Kong Convention, it is likely that some reflagging will take place as long as some dismantling countries are not Party to the Convention and therefore as long as two markets, one compliant with the Convention and one non-compliant, are competing with each other. The co-existence of these markets is likely to happen if the countries practicing substandard dismantling do not make the necessary investments to be compliant with the Hong Kong Convention (Bangladesh³⁰), if they can not remain competitive after making these investments (Pakistan³⁰) or if the industry relocates in other countries.

The possibility of relocation from the ship dismantling industry from Pakistan and Bangladesh has been assessed in the study from the World Bank³⁰. Three options have been studied: the relocation to another "pollution haven", the relocation back to Europe or an industrialized country and the pre-cleaning in country of ownership. The two latest options were considered as highly unlikely for economic reasons (the lower revenue and higher costs associated with dismantling in European and industrialised countries and the importance of the additional cost induced by pre-cleaning).

The first option was studied in more details and is also considered as unlikely although it cannot be ruled out. The necessary characteristics of a potential candidate country are the following:

- Strong domestic demand for steel plate and re-bars not readily available from other sources,
- A market for equipment and consumables,
- Few, if any, enforced regulations on workers' health and safety and environmental pollution,
- Wages as low as in Bangladesh or lower,
- Natural hydrographical conditions to allow beaching (or similar capital-extensive methodology). Few states meet these requirements, and the need for a considerable

tidal gauge itself is an obstacle for most of Africa or other candidate countries in the Bay of Bengal or the South China Sea (such as Myanmar or Cambodia).

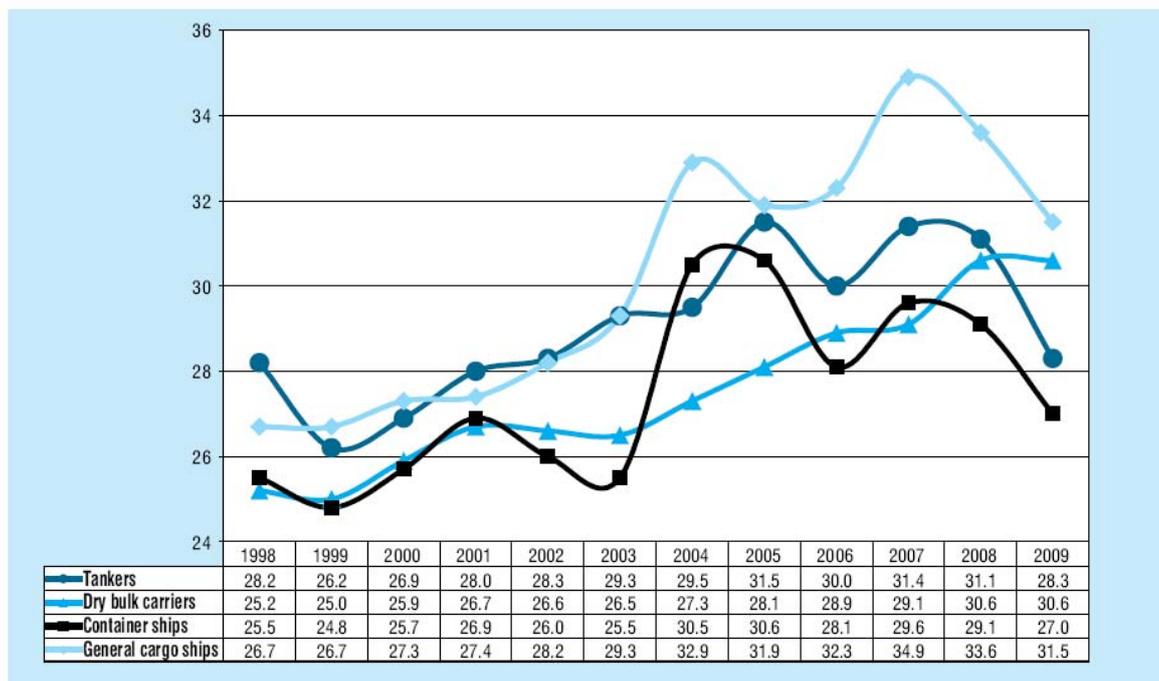
Regarding the wages, the information indicates that Cambodia, for instance, and especially Myanmar both have lower wage rates than in Pakistan, whereas Bangladesh might still be able to compete on wages. Hence, the risk of relocation from a wage point of view seems more threatening for Pakistan.

Annex VII: Detailed information about ship dismantling

Evolution of the average age of dismantling from 1998 to 2009.

Ships have a normal life span of about 30 to 40 years after which they are sent for dismantling. The average dismantling age varies over time (it increased slowly from 2000 to 2008 and decreased since then as show in Figure 2 below) and depending on the type of ships and on their size¹²⁵.

Figure 2: Average age of dismantling per type of ship 1998 - 2009¹²⁶



Source: Compiled by the UNCTAD secretariat, on the basis of data from the *Shipping Statistics and Market Review* produced by the Institute of Shipping Economics and Logistics. Volume 52, no. 1/2 – 2010, table 2.2.

^a Ships of 300 GT and over.

On the basis of data on the vessels dismantled during 2008-2009, the average lifetime for all ship types have been calculated and are presented in the table below.

Table 7: Dismantling volumes in 2008 and 2009 by size - number of ships and total volume in GT

Ship type	Average lifetime (years)
Bulkers	31,1
Containers	27,3
Gas Carriers	30,4
General Cargo	33,9
Navy Ships	48,2

¹²⁵ BIO intelligence service study for DG Environment: "Feasibility of a list of "green and Safe" ship dismantling facilities and of a list of ships likely to go for dismantling" Final report of January 2010

¹²⁶ United Nation Conference on Trade and Development, Review of Maritime Transport 2010 available at http://www.unctad.org/en/docs/rmt2010_en.pdf

Offshore	35,4
Other Tankers	35,0
Passenger Ships (cruise ships, ferries)	37,9
Ro-Ro Ships	32,3
Service Ships	34,3
Specialised Cargo Ships	31,4
Tankers (oil, chemical)	28,8
Tugs	44,5
(blank)	31,7
Grand total	31,7

The table shows that the calculated average lifetime for vessels scrapped in 2008 and 2009 varies between 27 and 47 years depending on the type of ship. These lifetimes are high compared to the historical lifetimes estimated in previous studies¹²⁷ undertaken for the Commission. This is partly due to the fact that the high freight rates encountered in 2007 and 2008 make it attractive for shipowner to keep as many ships as possible in operation including the oldest ones.

In 2009, the average dismantling age of EU flagged ships (30,0 years) was slightly lower than the dismantling age of non-EU flagged ships (30,6 years)¹²⁸. In 2010, the average age of dismantling was 31 years¹²⁹.

Dismantling in 2008 and 2009:

Table 8 : Dismantling volumes in 2008 and 2009 by size - number of ships and total volume in GT
Note: Large ships are ships of 500 GT and above. Small ships are ships of 500 GT and below (ships down to 100 GT).

Dismantling year	Total number of ships			Gross Tonnage		
	Large	Small	Total	Large	Small	Total
2008	549	195	744	8 191 256	51 092	8 242 348
2009	1 155	144	1 299	23 977 722	37 365	24 015 087
Grand total	1 704	339	2 043	32 168 978	88 457	32 257 435

The Table 8 shows that only few large vessels were scrapped in 2008. This should be seen in the light of high freight rates in 2007 and most of 2008. The dismantling volume almost increased by 200% in 2009 reflecting the dramatic drop in freight rates following the world wide financial crises that began in the end of 2008.

Table 9: Dismantling volumes in 2008 and 2009 by vessel type - number of ships and total volume in GT (for all ships)

Ship type	Total number of ships			Gross Tonnage		
	Large	Small	Total	Large	Small	Total
Bulkers	312	1	313	8 179 359	169	8 179 528
Containers	252	0	252	6 669 265	0	6 669 265

¹²⁷ COWI for the European Commission, DG Transport and Energy, Study on "Oil Tanker Phase Out and the Ship Dismantling Industry", 2004, published at: http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/2004_06_dismantling_study_en.pdf

¹²⁸ Calculations from DG ENV based on data provided by IHS Fairplay LTD, January 2011.

¹²⁹ Robin de Bois, January 18, 2011, Information and analysis bulletin on ship demolition #22 From October 16th to December 31th [Available online: <http://www.robindexbois.org/english/shipbreaking22.pdf>]

Gas Carriers	54	0	54	1 142 758	0	1 142 758
General Cargo	390	41	431	3 125 288	14 908	3 140 196
Navy Ships	13	0	13	160 327		160 327
Offshore	17	7	24	1 060 180	2 760	1 062 940
Other Tankers	11	2	13	59 483	571	60 054
Passenger Ships (cruise ships, ferries)	15	21	36	177 459	4 322	181 781
Ro-Ro Ships	177	7	184	3 987 886	1 877	3 989 763
Service Ships	6	10	16	7 743	2 805	10 548
Specialised Cargo Ships	75	5	80	614 882	1 766	616 648
Tankers (oil, chemical)	251	3	254	6 700 168	851	6 701 019
Tugs	2	38	40	3 284	7 823	11 107
(blank)	129	204	333	280 896	50 605	331 501
Grand total	1 704	339	2 043	32 168 978	88 457	32 257 435

The table shows that Bulkers, Tankers and Containers account for largest share of the dismantling volumes of large ships. For small ships the largest share are for General Cargo ships and Tugs.

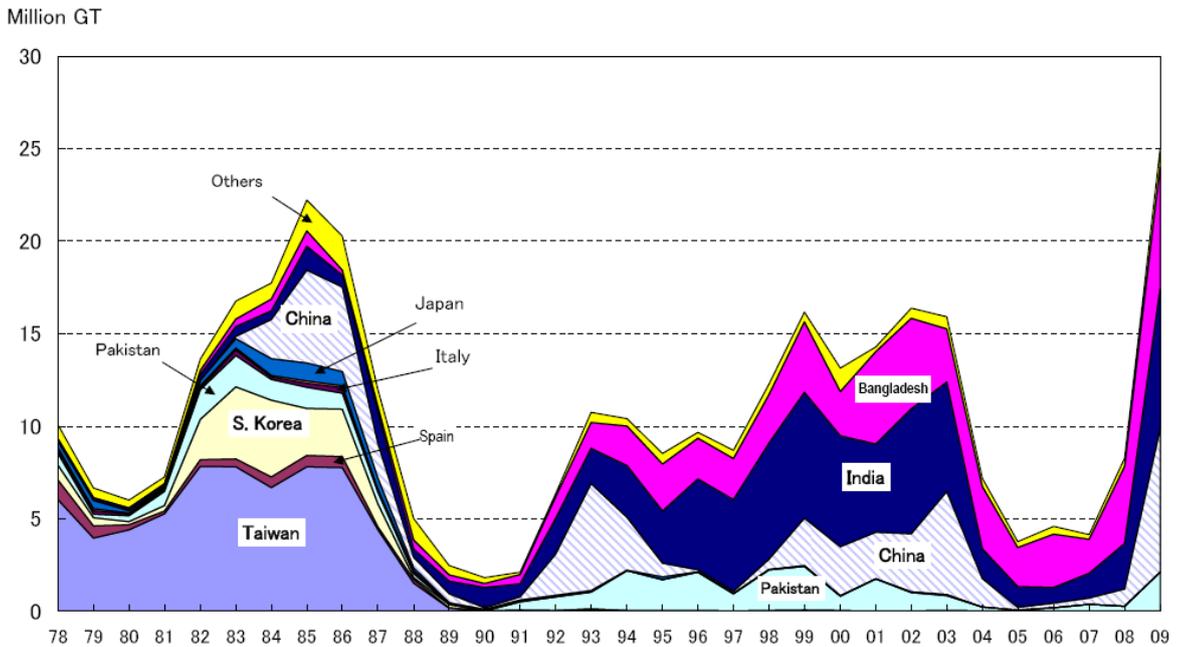
Table 10: Dismantling volumes in 2009 by dismantling location - number of ships and total volume in GT (for all ships)

Dismantling location	Total number of ships			Gross Tonnage		
	Large	Small	Total	Large	Small	Total
Bangladesh	184	0	184	6 471 508	0	6 471 508
India	375	1	376	6 922 965	468	6 923 433
China	284	0	284	7 474 511	0	7 474 511
Pakistan	96	1	97	2 155 345	398	2 155 743
Turkey	108	4	112	515 509	1 506	517 015
Other OECD	13	9	22	69 813	2 480	72 293
Unknown	35	58	93	188 755	14 847	203 602
EU	35	61	96	121 848	15 146	136 994
Other	25	10	35	57 468	2 520	59 988
Grand total	1 155	144	1 299	23 977 722	37 365	24 015 087

Bangladesh, India, China and Pakistan accounted for more than 95% of the total volume of large ships scrapped (GT) in 2009. However, the same countries only accounted of less than 3 of the total volume of small ships scrapped (GT). EU countries accounted for approximately 41 of the dismantling of small vessels in 2009. This share is significantly higher than the share of EU flagged small vessels (12%). Spain, and Belgium is by far the three largest countries of dismantling of small ship in EU and in the world as a whole.

Evolution of the dismantling locations from 1978 to 2009

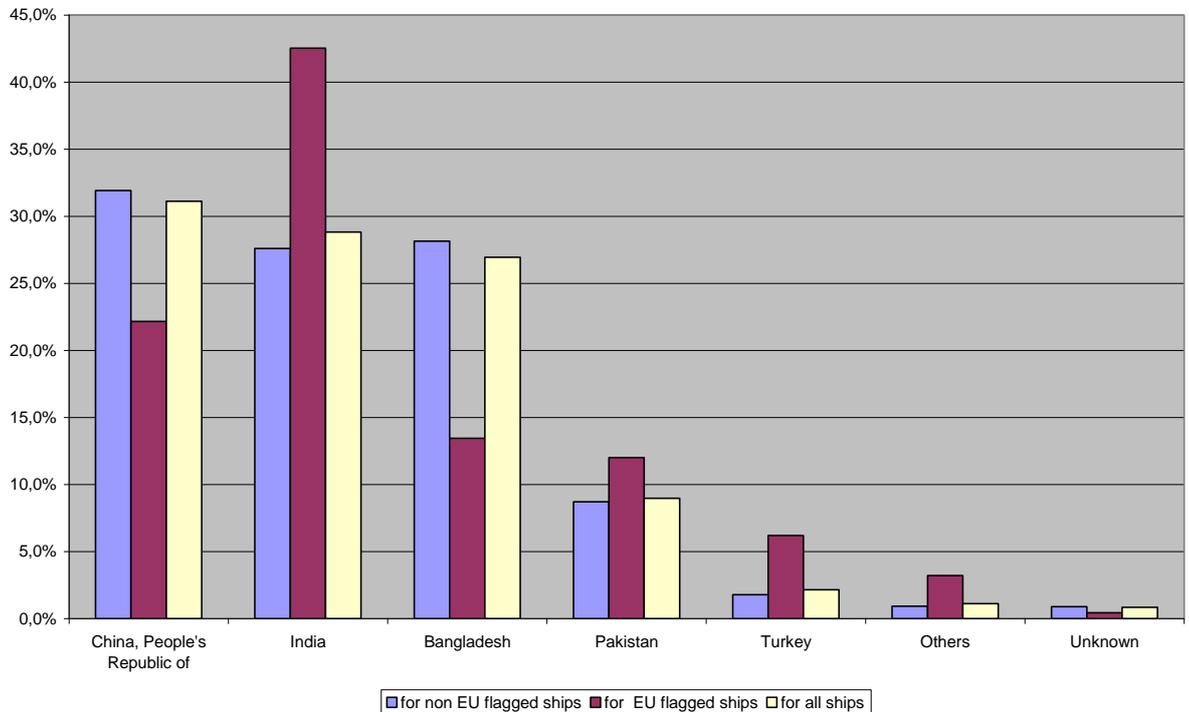
Figure 3: World disposal by dismantling country 1978-2009 ¹³⁰



(Note) 1. Data Source : IHS (Former Lloyd's Register).
2. Ship Size Coverage : 100 Gross Tonnage and over.

Dismantling countries in 2009 depending for EU flagged and non-EU flagged ships:

Figure 4: Dismantling countries in 2009 depending on the flag (in Gross Tonnage) ²³.

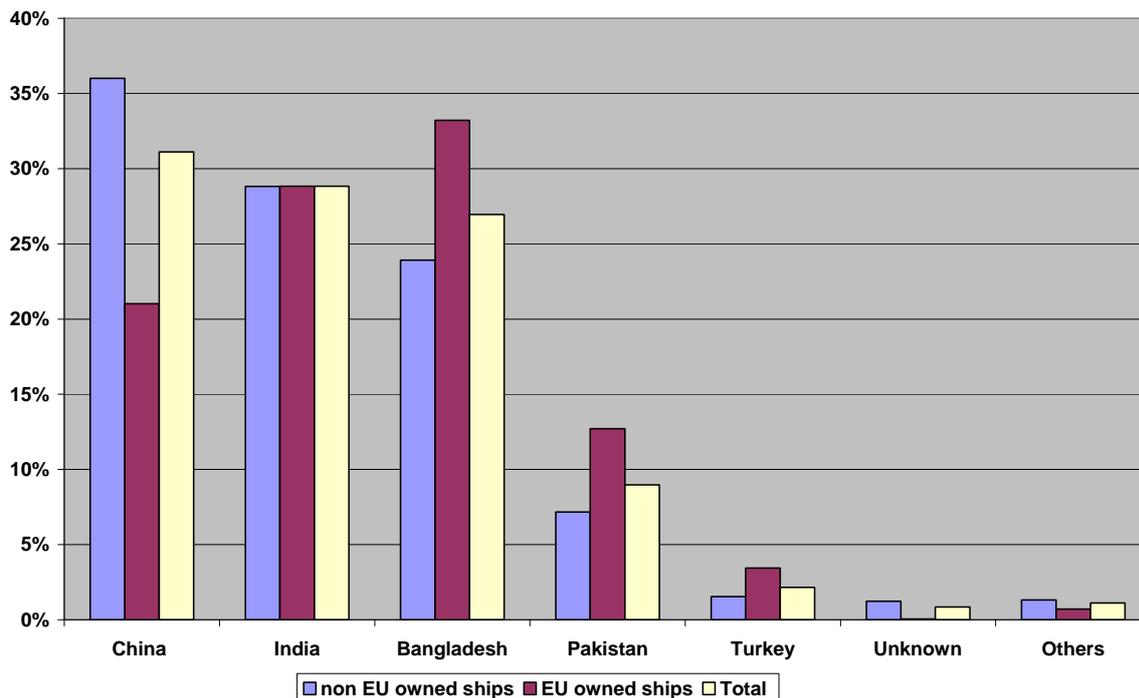


¹³⁰

The Shipbuilders' Association of Japan, Shipbuilding Statistics, March 2011

The proportion of EU-flagged ships dismantled in India, Pakistan and Turkey is higher than the proportion of non-EU flagged ships.

Figure 5: Dismantling countries in 2009 depending on the ownership (in Gross Tonnage)²³.



The proportion of EU-owned ships dismantled in Bangladesh, Pakistan and Turkey is higher than the proportion of non-EU owned ships.

Table 11: Dismantling locations of large EU flagged and EU owned commercial ships in terms of percentage of total recycling (GT¹³¹ based) in 2009²³.

Dismantling location for EU flagged or EU controlled ships	Main dismantling method	Dismantling fraction of total
India, Pakistan, Bangladesh	Beaching	73,91%
China	Afloat	21,89%
OECD non EU	Landing, afloat	3,44%
EU	slipway, docking	0,71%
Other		0,05%
Total		100,00%

¹³¹ GT stands for gross tons which is the measure of the overall size (internal capacity) of a ship.

Table 12: Total volume (GT¹³¹ based) of ships dismantled in non-OECD countries per Member State in 2009²³.

Member State	China	India	Pakistan	Bangladesh	Others
Malta	140 729	366 360	167 736	171 617	0
Cyprus	86 316	238 518	52 140	47 292	677
Greece	43 595	170 748			0
United Kingdom	108 629			45 256	0
Bulgaria	23 363	23 363	16 166		0
Spain		37 049			1 309
Italy	32 861				1 022
Estonia					1 305

Table 13: Comparison of top 25 flag states by dismantling and operation in 2009.

Country Flag	Gross Tonnage (GT)	Number of ships	Percentage of world total (GT) ²³	Cumulative percentage (GT)	Top flag states by tonnage ¹³²	Number of ships ¹³²	Percentage of world total (DWT) ¹³²	Cumulative percentage (DWT) ¹³²
Panama	8 452 753	364	35,2%	35,2%	Panama	8 065	23,0%	23,0%
Liberia	2 826 278	94	11,8%	47,0%	Liberia	2 306	10,6%	33,5%
Bahamas	1 084 148	36	4,5%	51,5%	Marshall Islands	1 265	5,7%	39,3%
Singapore	1 020 227	21	4,2%	55,7%	Hong Kong, China	1 371	5,4%	44,7%
Marshall Islands	995 886	30	4,1%	59,9%	Greece	1 498	5,3%	50,0%
Malta	849 681	38	3,5%	63,4%	Bahamas	1 446	5,2%	55,2%
Tuvalu	725 200	18	3,0%	66,4%	Singapore	2 451	5,1%	60,3%
St Kitts & Nevis	700 157	39	2,9%	69,3%	Malta	1 532	4,2%	64,5%
Norway	677 745	24	2,8%	72,2%	China	3 916	3,4%	67,9%
Hong Kong, China	582 472	22	2,4%	74,6%	Cyprus	1 016	2,6%	70,5%
St Vincent & The Grenadines	521 503	39	2,2%	76,8%	Republic of Korea	3 001	1,9%	72,4%
Cyprus	432 761	23	1,8%	78,6%	Norway (NIS)	601	1,7%	74,1%
India	321 412	13	1,3%	79,9%	Germany	961	1,5%	75,6%
Sierra Leone	317 693	14	1,3%	81,2%	United Kingdom	1 676	1,3%	76,9%
Korea, South	265 978	15	1,1%	82,3%	Japan	6 316	1,3%	78,2%

¹³²

UNCTAD, review of Review of Maritime Transport 2009. Situation as of the 1 January 2009

United States Of America	261 135	20	1,1%	83,4%	India	1 460	1,3%	79,5%
China, People's Republic Of	237 600	16	1,0%	84,4%	Isle of Man	345	1,2%	80,7%
Greece	230 468	17	1,0%	85,4%	Italy	1 588	1,2%	81,9%
Unknown	216 820	20	0,9%	86,3%	Denmark (DIS)	470	1,0%	83,0%
<i>Mongolia</i>	216 246	12	0,9%	87,2%	Antigua and Barbuda	1 195	1,0%	84,0%
Cambodia	196 710	43	0,8%	88,0%	United States	6 435	1,0%	85,0%
United Kingdom	191 116	13	0,8%	88,8%	Bermuda	153	0,9%	85,9%
Vanuatu	189 223	5	0,8%	89,6%	Malaysia	1 238	0,8%	86,7%
Philippines	179 638	7	0,7%	90,3%	Turkey	1 301	0,6%	87,3%
Chinese Taipei	163 662	5	0,7%	91,0%	Saint Vincent & the Grenadines	1 009	0,6%	87,9%

The states identified in italics in the Table 13 are states which offer single-voyage registration to owners.

Table 14: Labour costs in dismantling countries in 2009¹³⁶

Country	Sector /comments	Monthly wage	Yearly wage
Europe ¹³³	Average labour cost	3.704 euro	44.449 euro
Turkey ¹³³	Minimum wage	319 euro	3.828 euro
India ¹³⁴	Basic metal, wage	113 euro	1.357 euro
Bangladesh ¹³⁵	Ship dismantling	54 euro	648 euro
Pakistan ¹³⁵	Ship dismantling	66 euro	792 euro
China ¹³³	Construction, wage	180 euro	2.160 euro

Impacts of the dismantling of EU flagged ships in 2009.

¹³³ Source: Eurostat, ILO

¹³⁴ Source: Study "Ship dismantling: a status report on South Asia" published in the context of the EU-India Action Plan Support Facility (environment), 2001 available at: http://www.apsfenvironment.in/images/stories/APSf_ship_dismantling_report.pdf

¹³⁵ Source see footnote 30

¹³⁶ Note: it has been considered than there are 24 working days per month

In 2009, almost 200 EU flagged ships have been sent for dismantling representing 8,2% of the total volume of ships sent for dismantling. Detailed information about the volume and number of ships dismantled by individual Member States are provided for in Table 15.

Table 15: Proportion of EU flagged ships for ships dismantled in 2009²³.

EU flag	Gross Tonnage	Number of ships	Percentage of the world volume (Gross Tonnage)
Malta	849 681	38	3,5%
Cyprus	432 761	23	1,8%
Greece	230 468	17	1,0%
United Kingdom	191 116	13	0,8%
Bulgaria	88 968	6	0,4%
Spain	78 525	36	0,3%
Italy	43 093	6	0,2%
Portugal	17 873	5	0,1%
Latvia	13 730	1	0,1%
Slovakia	4 043	1	0,0%
France	3 958	21	0,0%
Belgium	2 972	10	0,0%
Denmark	2 802	8	0,0%
Netherlands	2 495	3	0,0%
Estonia	1 544	3	0,0%
Sweden	650	3	0,0%
Ireland	301	1	0,0%
Germany	238	1	0,0%
Poland	143	1	0,0%
Total	1 965 361	197	8,2%

In 2009, EU owned ships represented 32,6 % of the volume of ships (expressed in Gross Tonnage) dismantled worldwide as shown in Table 16.

Table 16: Ownership and flag states of ships dismantled in 2009²³ for all ships).

Ownership	Flag	Gross Tonnage	Number of ships
Non EU owned	Non EU flagged	15 672 352	850
	EU flagged	508 702	100
	Total	16 181 054	950
EU owned	Non EU flagged	6 377 374	252
	EU flagged	1 456 659	97
	Total	7 834 033	349
Grand Total		24 015 087	1 299

Environmental impacts

Generation of non-hazardous waste:

Non hazardous waste (t)	
Steel	602 672
Copper	81
Non-ferrous metals	65 154
Total	667 907

Generation of hazardous waste and part treated according in an environmentally sound manner (ESM):

Hazardous wastes	Not treated in ESM manner	Treated in ESM manner	Total
Asbestos (t)	87,24	63,84	151,08
PCB (kg)	0,21	0,09	0,30
Heavy metals (kg)	0,97	4,65	5,62
Oil (t)	0,00	6 806,11	6 806,11
Oil sludges (t)	11 504,44	21 884,04	33 388,48
Tri butyl tin (t)	17,85	8,05	25,90
Mercury (kg)	0,22	0,10	0,32
Ozone Depleting Substances (t)	13,39	6,04	19,42
Total (t)	11 624	28 772,73	40 396,61

Social impacts:

Employment:

Labour (Man years)	2009
Workers load required	2 867
Work load EU	20
Work load outside EU	2 846
of which protected workers	1 598
of which not protected workers	1 269
of which children	431

Accidents:

Accidents	Non fatal	Fatal	Total
Adult	615	2	617
Children	48	1	49
Total	663	3	666

Economic impacts:

The requirements of the Hong Kong Convention (inventories, certifications...) are neither legally binding nor in place. They do not bring any cost for shipowners and the administration. Table 17: Revenues generated by the selling of ships for dismantling in 2009

Dismantling country	Average dismantling in 2009 (dollars per LDT) ¹³⁷	Total volume (LDT)	Volume of EU flagged ships (LDT) ¹³⁸	Volume of non-EU flagged ships (LDT) ¹³⁸	Total shipowners' revenue (euros)	Shipowners' revenue for EU flagged ships (euros)	Shipowners' revenue for non-EU flagged ships (euros)
China	251	2 831 564	170 101	2 661 463	511 009 561	30 608 264	480 311 636
India	273	3 080 131	360 741	2 719 390	604 589 696	70 601 994	533 780 889
Bangladesh	299	2 242 527	106 675	2 135 852	482 100 661	22 866 133	459 167 546
Turkey	181	244 849	53 062	191 787	31 864 437	6 885 311	24 958 958
Pakistan	271	858 659	89 032	769 627	167 308 843	17 297 143	149 961 032
Others	82	202 462	29 741	172 721	11 936 742	1 748 330	10 183 290
Total	255	9 460 192	809 352	8 650 840	1 734 478 933	147 957 269	1 586 088 256

The fatal and non fatal accidents represented a social cost of 1 978 603 €

¹³⁷ Source: N. Cotzias Shipping Group, S&P monthly report December 2009 except for "Others" for which, conservatively, the dismantling price proposed for EU in the COWI study for DG Environment: " Support to the impact assessment of a new legislative proposal on ship dismantling" Final report of December 2009

¹³⁸ Volume calculated by DG Environment following methodology explained in Annex V

Annex VIII: Detailed information about the fleet and its evolution.

Table 18: The world fleet of small vessels not covered by the Hong Kong Convention (500 GT and below) by type - number of ships and total volume in GT

	Total Number of Ships		Total Volume (GT)	
	All	EU flagged	All	EU flagged
Bulkers	394	10	150 601	2 472
Containers	17	0	6 531	0
Gas Carriers	45	4	17 331	1 290
General Cargo	4 739	198	1 586 783	56 867
Offshore	1 205	99	379 429	26 750
Other Tankers	145	23	41 492	6 611
Passenger Ships	2 732	641	648 597	150 604
Recreational Boats	1 123	441	323 406	111 741
Ro-Ro Ships	1 458	191	447 623	60 255
Service Ships	1 806	343	421 907	78 816
Specialised Cargo Ships	1 091	39	291 966	7 660
Tankers (oil,chemical)	2 465	145	799 385	47 397
Tugs	12 856	1 672	3 018 250	422 204
Navy Ships	68	39	16 103	8 627
Grand Total	30 144	3 845	8 149 404	981 294

The Table 18 shows EU flagged ships account of approximately 13% of all small vessels not covered by the Hong Kong Convention (measures by GT). The share varies with the ship type. It is highest for Navy ships, Recreational Boats and Passenger Ships and lowest for Containers, Bulkers and Specialised Cargo Ships and Tankers (oil, chemical).

The table below shows the world fleet of large vessels covered by the Hong Kong Convention (500 GT and above) by type in terms of the number of ships and total volume in gross tonnage.

Table 19: The world fleet of large vessels covered by the Hong Kong Convention (500 GT and above) by type - number of ships and total volume in GT

	Total Number of Ships		Total Volume (GT)	
	All	EU flagged	All	EU flagged
Bulkers	8 571	778	294 470 965	31 929 263
Containers	4 882	954	158 589 939	39 732 381
Gas Carriers	1 524	178	49 119 204	6 034 917
General Cargo	12 172	1 245	56 592 532	5 913 765
Offshore	4 575	511	34 637 567	2 299 465
Other Tankers	248	30	791 068	79 449

Passenger Ships (cruise ships,ferries)	959	178	17 326 379	3 481 945
Ro-Ro Ships	3 890	93	59 706 547	95 008
Service Ships	1 098	1 021	3 595 384	17 756 592
Specialised Cargo Ships	2 285	228	14 858 202	674 967
Tankers (oil,chemical)	12 742	120	298 188 122	991 710
Tugs	766	1 651	766 137	55 962 046
Navy Ships	160	107	4 133 251	141 469
Recreational Boats	438	34	629 142	414 845
Grand Total	54 310	7 128	993 404 439	165 507 822

The Table 19 shows EU flagged ships account of approximately 17% of all large vessels covered by the Hong Kong Convention (measures by GT). The highest is for Ro-Ro Ships, Containers and Passenger Ships. The lowest share is for Offshore, Specialised Cargo Ships and Other Tankers.

Table 20: Projected future volumes of dismantling of vessels not covered by the Hong Kong Convention (500 GT and below) by flag state and year of scrap - number of ships and total volume in GT

Year	Total Number of Ships		Total Volume (GT)	
	All	EU flagged	All	EU flagged
2011	2 011	307	514 857	69 906
2012	1 455	216	373 967	49 645
2013	1 104	158	285 719	36 891
2014	878	120	229 057	28 739
2015	720	94	189 562	23 036
2016	635	80	168 639	19 927
2017	598	73	159 937	18 403
2018	585	69	157 069	17 662
2019	588	67	158 539	17 377
2020	600	65	162 182	17 140
2021	620	64	168 274	16 912
2022	641	63	174 158	16 724
2023	653	62	177 682	16 603
2024	658	61	179 225	16 597
2025	653	61	177 931	16 841
Grand Total	12 399	1 560	3 276 798	382 403
Average per year	827	104	218 453	25 494

The Table 20 shows that dismantling volumes in 2011 to 2013 are high compared to the average volume per year from 2011 to 2025. This reflects the fact that the average age of small vessels is high. More than 35% are 31 years or older. This means that there is a large backlog of small vessels for dismantling if the assumed expected lifetimes holds true. The approach applied consequently project that the old vessels will be dismantled in the first years to come.

However, it should be stressed that if the expected lifetimes do not hold true for the small vessels then there might not be a backlog. In this case, the estimated average volume of 220,000 GT (or 825 ships) per year is a better estimate of the expected volume of dismantling of small vessels.

The table also shows that the EU share of the future expected dismantling volumes are in line with the estimated share of ships flying EU flags.

The table below shows the projected future volumes of dismantling of vessels covered by the Hong Kong Convention by year of scrap in terms of number of ships and total volume in GT as the total of all ship types.

Table 21: Projected future volumes of dismantling of vessels covered by the Hong Kong Convention (500 GT and above) by flag state and year of scrap - number of ships and total volume in GT

Year	Total Number of Ships		Total Volume (GT)	
	All	EU flagged	All	EU flagged
2011	2 432	185	16 797 322	1 226 626
2012	1 976	147	15 299 574	1 120 831
2013	1 716	126	14 815 968	1 092 456
2014	1 510	112	14 262 342	1 059 575
2015	1 331	100	13 719 386	1 025 190
2016	1 203	95	13 436 167	1 022 313
2017	1 131	94	13 594 890	1 097 820
2018	1 076	97	13 925 593	1 215 671
2019	1 042	102	14 524 801	1 390 370
2020	1 036	108	15 500 369	1 627 742
2021	1 055	115	16 952 215	1 954 519
2022	1 080	124	18 616 769	2 356 147
2023	1 098	131	19 826 292	2 662 886
2024	1 115	139	21 055 142	3 020 968
2025	1 138	153	22 572 195	3 523 800
Grand Total	19 939	1 828	244 899 025	25 396 914
Average per year	1 329	122	16 326 602	1 693 128

The Table 21 shows that on average 1325 vessels accounting to 16,3 million GT will be dismantling per year in the period from 2011 to 2025. The EU flagged ships only account of approximately 10% of the expected average volume in the period even through they account of 17% of the world fleet of large vessels. This is due to the fact that the EU flagged vessels are much younger than the average vessels. The vast majority of EU flagged vessels are below 15 years.

Overall, the average age of large vessels is much lower than the average age of small vessels - especially the large vessels. Consequently, the backlog volume of large vessels for dismantling is not as high as for small vessels.

The table also shows that the total dismantling volume will increase steadily from 2020 to 2025. This reflects the fact more approximately 80% of the vessels (measured in GT) are under 20 years old. A large proportion of these vessels are expected to be dismantled 10 to 15 years from today.

Age profile of the fleet

Figure 6: Age profiles of the world fleet and of the fleet registered under EU flags (percentages expressed in Gross Tonnage)

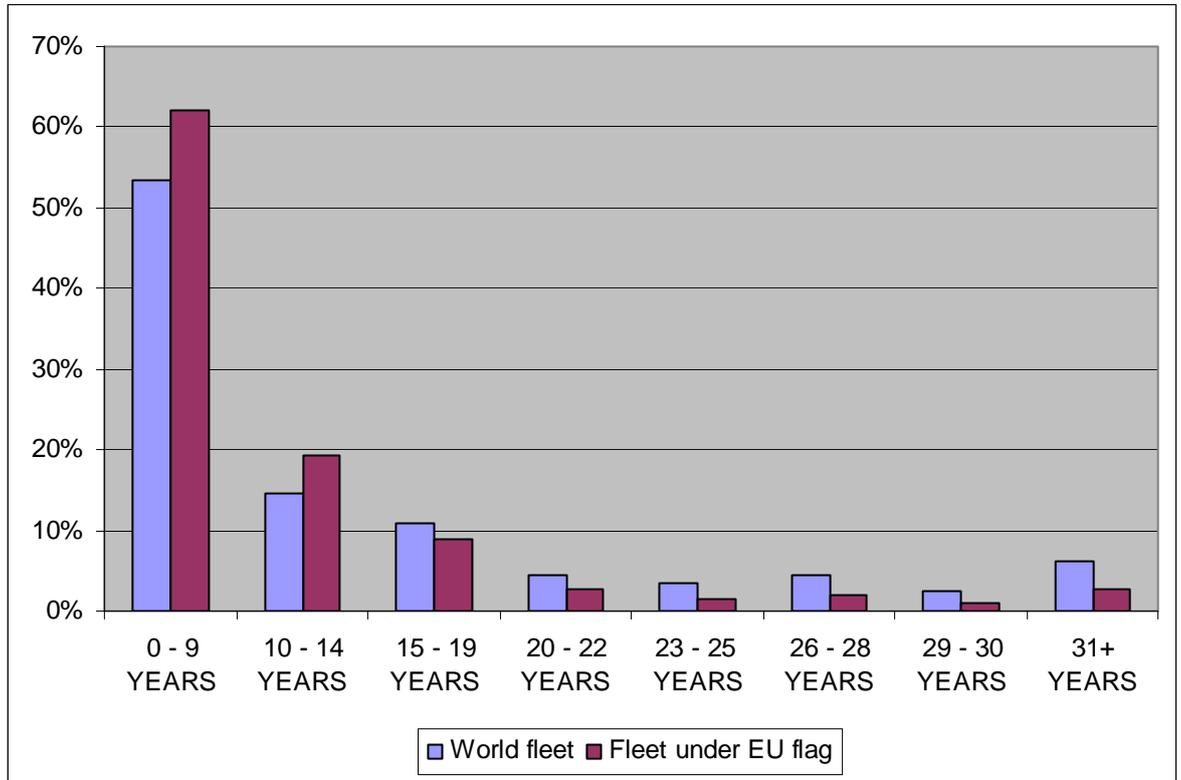
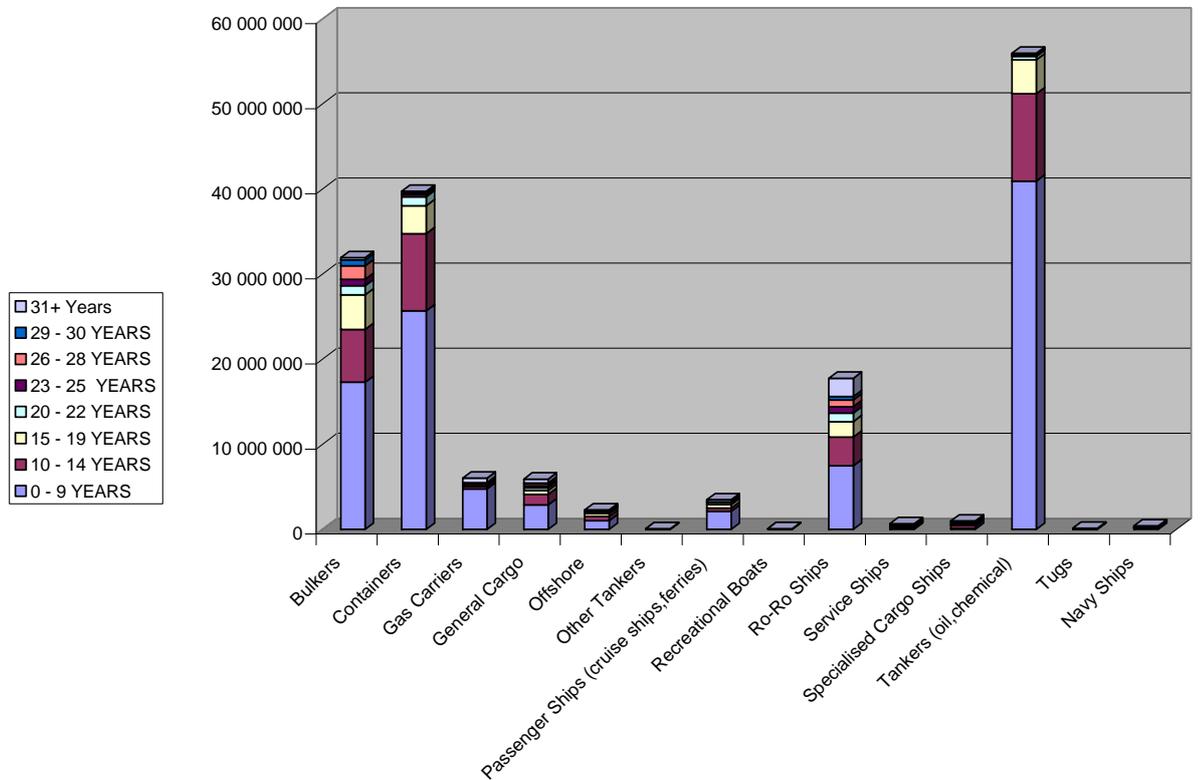
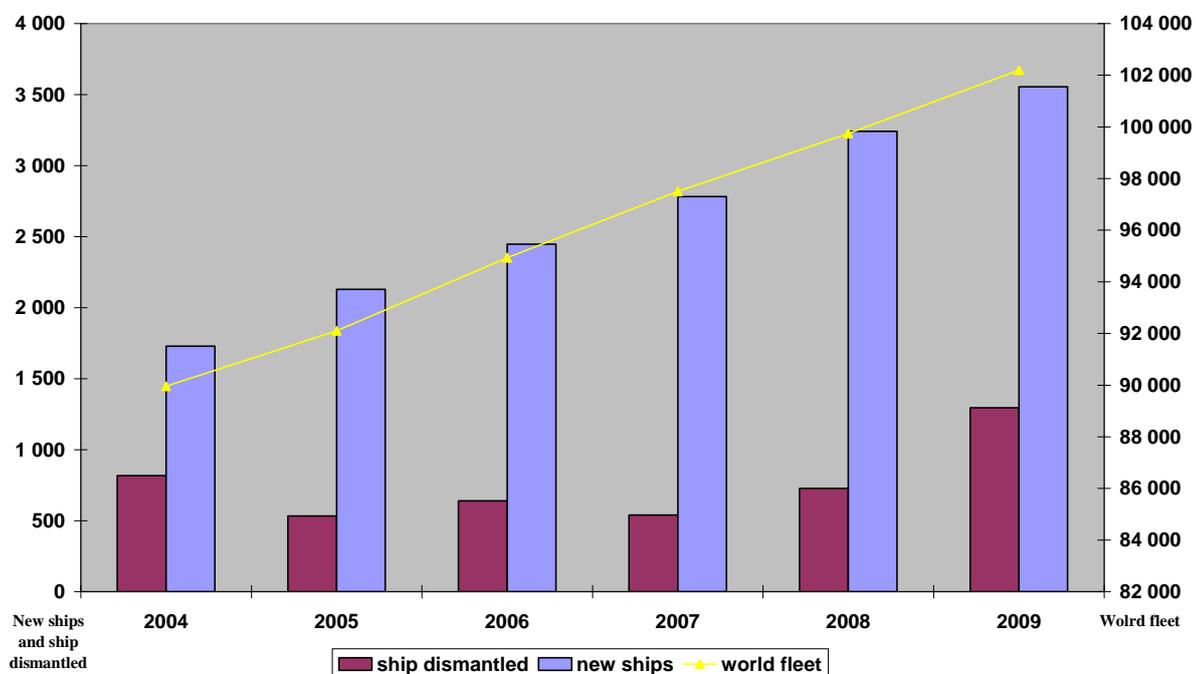


Figure 7: Age profile of EU flagged ships in 2010 (Gross Tonnage) ²³



Evolution of the world fleet: comparison between the number of new ships delivered and the number of number of ships dismantled from 2004 to 2009.

Figure 8: Increasing capacity of the world fleet 2004-2009 (in GT)¹³⁹.



¹³⁹

Sources: The Shipbuilders' Association of Japan, Shipbuilding Statistics, March 2011 and IHS Fairplay.

Annex IX: Options rejected after a first screening.

Options already rejected in the previous impact assessment:

Some options proposed by stakeholders had already been discarded in the impact assessment supporting the EU Strategy on better ship dismantling for their lack of effectiveness. They have therefore not been further assessed in this impact assessment:

- Complementing the Waste Shipment Regulation by introducing a stricter pre-cleaning obligation for EU-flagged ships,
- Complementing the Waste Shipment Regulation by introducing a ban on beaching for EU-flagged ships,
- Option for a purely voluntary approach.

Options rejected after a first screening of the options:

Extending the provisions of the Hong Kong Convention to small ships in the short term.

The majority of stakeholders agree that extending the scope to ships of less than 500 GT is unlikely to have a noticeable effect on the recycling habits of the EU's smallest vessels as these are already recycled under acceptable conditions in Europe. If the scope is extended to such ships, this is seen as a mid-term measure.

Such vessels are mostly pilotage ships and offshore supply vessels. Additional requirements would disadvantage them in terms of international competition or would be an incentive for them to register under non EU-flags. The potential impact of such an extension would most likely fall on fishing vessels and smaller coastal vessels. It would lead to additional administrative costs for owners of smaller fishing vessels without clear environmental gain. Should the scope be extended, a lower limit would need to be set for vessels such as yachts, pleasure crafts and canoes. Another proposed solution is to develop a less stringent system for these ships e.g. one that does not include a certification system.

The dismantling of these small ships is not considered as creating significant negative impacts on human health and on the environment since they are dismantled within the EU. Imposing additional requirements on them would on the other hand create negative economic impacts and administrative burden. This option has therefore been rejected after a first pre-screening.

Ensuring sustainable funding.

The Communication proposing an EU strategy on ship dismantling, proposed to assess the feasibility of establishing a "ship dismantling fund". Setting up a mandatory fund was seen as a possible option to be put in place in the future, if the implementation of the Hong Kong Convention and the reactions by market participants do not deliver the desired results.

At international level, the option of setting up a fund at international level was discussed but not further pursued during the negotiations of the Hong Kong Convention.

The International Maritime Organization established instead in May 2006 a multi-donor trust fund, the International Ship Recycling Trust (ISRT) Fund as a dedicated source of financial

support for technical co-operation activities on ship recycling and, in particular, for encouraging developing nations towards safe and environmentally sound management of ship recycling.

It was envisaged that the resources of the ISRT Fund will be used for the development and implementation of technical co-operation activities directly related to the enhancement of safe and environmentally sound ship recycling capacity in developing countries, thereby providing a financial mechanism to support national initiatives with respect to legal, administrative and operational matters aimed at strengthening their capacity for safe and environmentally sound ship recycling.

A study was undertaken on behalf of the Commission to assess the feasibility of setting up a mandatory EU ship dismantling fund which could further on be turned into global fund.

Three scenarios were assessed: an up front environmental charge for new built vessels, a recurrent tax on shipping and a revolving fund based on recurrent charges on ships calling at EU ports. The latest was supported as the preferred option and the study provided further information about the funding requirements and charge per call at EU ports. Calculations were conducted regarding the funding requirements (115 million €), the size of the charge which would have to be paid by shipowners when calling at EU ports (0.03 /GT) which would represent between 7 and 10 % of the port fees.

A majority of stakeholders (ship owners, Member States, some NGOs) expressed their scepticisms with regard to the general idea of an EU fund either because they emphasized the need for global action for a global problem or because they consider that this would go against the "polluter-pays" principle. The idea of setting up an EU fund was, in particular, strongly opposed by shipowners. Others NGOs 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.

This feasibility study was not intended to provide a fully developed proposal for a ship dismantling fund and information is lacking notably regarding the administrative burden that it would entail. The currently available information is not sufficient regarding the economic, social and environmental impacts of setting up a mandatory fund at EU level to allow for a complete assessment of these impacts. The option has therefore not been further considered in this impact assessment.

Annex X: Estimate of impacts if the EU legislation is not modified and the Hong Kong Convention does not enter into force before 2030.

General consideration.

The assessment is based on the volumes of EU flagged ships subject to the Hong Kong Convention (above 500 GT). Under this scenario, the current legislation at European and international level would remain unchanged.

Taking no additional action at EU level would mean that, until the Hong Kong Convention enters into force and transposed by Member States, the current trends in ship dismantling would continue unabated.

Since the Waste Shipment Regulation would continue to be applicable, end of life ships would continue to be required to be dismantled in the OECD while the recycling capacity will remain insufficient in this geographic area. As explained in the impact assessment, this is one of the drivers for the non-compliance with the current legislation. The ship dismantling locations would remain the same as of today and only very limited is foreseen to take place in the sub-standards facilities located in South Asia which would not be encouraged to reach the Hong Kong Convention's levels in terms of protection of the human health and of the environment.

Some Member States and some recycling countries would ratify the Hong Kong Convention but the entry into force provisions of the Hong Kong Convention would not be met before 2030.

Dismantling locations and volumes (million LDT)	2015	2020	2025	2030
EU facilities				
AAA	0,0009	0,0010	0,0009	0,0011
AA	0,0129	0,0147	0,0133	0,0163
A	0	0	0	0
Substandard facilities not meeting Convention's criteria	0	0	0	0
Non EU OECD facilities				
AAA	0	0	0	0
AA	0	0	0	0
A	0,0737	0,0838	0,0760	0,0929
Substandard facilities not meeting Convention's criteria	0	1	2	3
Other facilities				
AAA	0	0	0	0
AA	0,3244	0,3688	0,3347	0,4091
Upgraded India	0,0000	0,0000	0,0000	0,0000
Upgraded Pakistan + Bangladesh	0,0000	0,0000	0,0000	0,0000
Substandard India	0	1	0	1
Substandard Pakistan + Bangladesh	1	1	1	1

Environmental impacts:

The environmental concerns of non-environmentally sound ship dismantling are primarily related to the harmful substances in the ships and the lack of containment of these during the dismantling processes, storage and transport, which allows the toxic compounds to enter the environment.

Generation of non hazardous waste:

Below is shown the amount of materials generated from dismantling of EU-ships in the period 2015 - 2030. The amounts are calculated by multiplying the predicted dismantling amounts (LDT) within the different countries with the base data set on different material amounts per LDT within ships. The calculations and the detailed results of the analyses can be found in the study supporting the Impact Assessment¹².

The following table presents the amounts of non-hazardous waste generated from recycling of EU flagged ships for the period 2015-2030.

Table 22: Amounts of non hazardous waste generated from recycling of merchant EU-ships

Non-hazardous waste (tons)	2015	2020	2025	2030
Steel	1 080 400	1 228 400	1 114 792	1 362 728
Copper	146	166	151	184
Non-ferrous metals	116 800	132 800	120 518	147 322

Generation of hazardous waste:

The negative effects of various materials on board ships for the aquatic environment and for climate are to continue, in so far as they are not already banned by other legal instruments. Such a ban is in place within the EU for PCBs through the Stockholm Convention and Regulation (EC) No 850/2004¹⁴⁰, for organotin compounds (from 17 September 2008 also on foreign-flagged ships entering the EU) through the Anti-Fouling Systems - AFS - Convention and Regulation (EC) No 782/2003¹⁴¹ and for the production and use of ozone-depleting substances through Regulation (EC) No 2037/2000¹⁴². Similarly, prohibitions with certain exemptions exist in the EU for perfluorooctane sulfonates (PFOS) as from June 2008 by virtue of Directive 2006/122/EC¹⁴³ and for trichlorobenzene (TCB) since June 2007 on account of Directive 2005/59/EC.

Treatment of hazardous-waste:

The following table presents the amounts of hazardous waste generated from recycling of EU flagged ships for the period 2015-2030. The total amount is split between the amounts managed according to and not according to environmental sound procedures.

¹⁴⁰ Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC, OJ L 229, 29.6.2004, p. 5.

¹⁴¹ Regulation (EC) No 782/2003 of the European Parliament and of the Council of 14 April 2003 on the prohibition of organotin compounds on ships, OJ L 115, 9.5.2003, p. 1.

¹⁴² Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer, OJ L 244, 29.9.2000, p. 1.

¹⁴³ Directive 2006/122/EC of the European Parliament and of the Council of 12 December 2006 amending for the 30th time Council Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (perfluorooctane sulfonates), OJ L 372, 27.12.2006, p. 32.

The table below presents the amount of hazardous materials generated as a result of dismantling of EU-ships.

Hazardous waste	Units	2015	2020	2025	2030
Asbestos	t not according to ESM	175,11	199,10	135,52	110,44
	t according to ESM	97,42	110,76	75,39	61,44
PCB	kg not according to ESM	0,27	0,24	0,16	0,12
	kg according to ESM	0,11	0,10	0,06	0,05
Heavy metals	t not according to ESM	1,82	2,07	1,88	2,30
	t according to ESM	8,32	9,46	8,58	10,49
Oil	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	12 277,61	13 959,48	12 668,44	15 485,97
Oil sludges	t not according to ESM	21 620,17	24 581,84	22 308,40	27 269,91
	t according to ESM	38 609,63	43 898,62	39 838,67	48 699,01
Tri butyl tin	t not according to ESM	18,45	15,25	8,65	4,23
	t according to ESM	7,25	5,99	3,40	1,66
Mercury	kg not according to ESM	0,42	0,48	0,43	0,53
	kg according to ESM	0,16	0,19	0,17	0,21
Ozone Depleting Substances	t not according to ESM	22,64	17,16	7,79	0,00
	t according to ESM	8,90	6,74	3,06	0,00
Total	not according to ESM	21 838,20	24 815,43	22 462,23	27 386,87
	according to ESM	51 009,13	57 991,06	52 597,55	64 258,58

The continuation of substandard practices of waste management will result in the pollution of water, soil and habitats in South Asia which would at least remain unchanged and increase during peaks of ship scrapping (follow up of shipping crisis and phasing out of single-hull oil tankers around 2015).

The accumulation of hazardous substances in the environment would lead to a further loss of biodiversity and to negative impacts for other economic sectors such as fisheries, fish and shrimp farms as well as hatcheries. The costs for the restoration/decontamination of the soil which would be required in Bangladesh or Pakistan to allow for any change of the land use and to prevent the loss of the pollutants in the event of sea level rise would also increase.

The likeliness of natural disasters might increase due to the further destruction of coastal mangrove forests in Bangladesh.

Atmospheric emissions

The dismantling of EU flagged ships will lead to atmospheric emissions of CO₂ and other pollutants. These emissions will result from both the actual dismantling process, e.g. energy consumption for transportation, crane operation etc. and from the following energy

consumption for reprocessing the metals generated from the dismantling process. The emissions related to the reprocessing of the metals are the most significant.

The following table shows the calculated CO₂-emissions from recycling of the steel generated from dismantling of the EU-flagged vessels. As all steel generated from the ship dismantling industry is reused the recycling of metals from the ships replaces the need for production of new steel from virgin ore material, which is associated with considerably higher CO₂-emissions. The "savings" in CO₂-emissions from generation of steel from scrap steel compared to from virgin material are also presented in the table. As no detailed information on emissions from steel generation within the different countries are available, the calculation of emissions are instead based on average emissions factors of CO₂ from primary (ore based) and secondary (scrap based) production of steel¹⁴⁴.

Table 23: CO₂-emissions from recycling of steel generated from EU-flagged ships including the "savings" in CO₂-emissions stemming from use of scrap instead of metal ore for generation of steel

Reduced use of virgin material (tons CO₂)	2 015	2 020	2 025	2 030
Direct emissions	1 105 249	1 256 653	1 140 432	1 394 070
Savings from use of scrap metal compared to virgin material	688 215	782 491	710 122	868 057

CO₂-emissions from transportation of ships to the dismantling facility - the final journey of a vessel to the dismantling facility, e.g. from EU to a ship dismantling facility in South-East Asia - are not accounted for here, as they are deemed negligible because the final journey is most often relatively short. For example, the ship owner of a cargo ship will often succeed in arranging a last transport of cargo from near his ships present location to a destination close to the dismantling. The above figures of the direct emissions show the emission of CO₂ as a result of generation of new steel from the steel scrap from the vessels. Recycling of the steel from the ships is replacing an amount of metal ore for generation of an equivalent amount of the steel. Steel generation from metal ore is more energy consuming than scrap based steel generation wherefore the recycling of steel results in "savings" of CO₂-emissions as indicated in the lower row of the table.

Social impacts:

EU ship recycling activities

Employment in the EU recycling sector would remain at the current low level.

Third countries:

The high safety hazards and accident rates for workers in South Asian shipbreaking facilities would remain unchanged and increase in peak times, as more inexperienced labourers are then employed. Apart if the Supreme Court judgement is effectively implemented, child labour would continue in Bangladesh, with sometimes fatal consequences.

¹⁴⁴ Data from the Danish Building Research Institute' PC tool (BEAT) for performing environmental assessment of products, building elements and buildings

The existing criminal structures in part of the Asian shipbreaking industry are not likely to change. The low or medium safety hazards associated with dangerous substances on board for shipyard workers and seafarers worldwide might slowly decrease in so far as vessels built until the 1980s with asbestos as flame retardant are increasingly being decommissioned. As for the substances mentioned above in the environmental context, the use of asbestos in shipbuilding is already today prohibited under the IMO SOLAS Convention and in the EU since 2005 for all types of asbestos (including chrysotile)¹⁴⁵. There is however some indication that asbestos might continue to be used on board¹⁴⁶.

The estimated workload (man-years) of adults involved in dismantling of EU-flagged ships including annual numbers of fatalities and non-fatal accidents amongst these is shown in the following table for each fifth year in the period 2015 - 2030.

Table 24: Workload (man-years) of adults involved in dismantling of EU-flagged ships including numbers of fatalities and incident amongst these

Labour (Man years)	2015	2020	2025	2030
Workers load required	5329	6058	5498	6721
Work load EU	10	11	10	13
Work load outside EU	5318	6047	5488	6708
of which protected workers	2944	3347	3038	3713
of which not protected workers	2385	2711	2460	3008
of which children	811	922	837	1023

Additional social impacts of the baseline scenario are the existence of child labour in the South-East Asian dismantling facilities. The number of children (man-years) involved in dismantling of the EU-flagged ships are calculated and presented in the table below together with estimated numbers of accidents and deaths amongst these¹⁴⁷.

Table 25 : Children (man-years) involved in dismantling of EU-flagged ships including numbers of fatalities and incident amongst these

Accidents (number of persons)	2015	2020	2025	2030
Adults fatal accidents	4	5	4	5
Adults - non-fatal accidents	1345	1529	1388	1697
Children - fatal accidents	1	1	1	1
Children - non-fatal accidents	148	168	153	187

Finally some studies and reports are also addressing the poor working conditions of the workers at the ship dismantling facilities and reports high instances of sexual transmitted diseases AIDS amongst the labourers.

¹⁴⁵ On account of various EU directives, most recently Commission Directive 1999/77/EC of 26 July 1999 adapting to technical progress for the sixth time Annex I to Council Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (asbestos), OJ L 207, 6.8.1999, p. 18.

¹⁴⁶ See the article "Netherlands warns IMO of asbestos in newbuildings" in Lloyd's List of 20/07/2010.

¹⁴⁷ Assuming similar incident rates for children and adults

Economic impacts:

EU ship recycling activities

The competitive disadvantages of EU recycling facilities are certain to continue, with the large cost and price disparity to Asian facilities allowing them to occupy only niches in the market.

The revenues of *EU shipowners* for the sale of scrap ships would continue to be high, depending on developments on the freight and steel markets.

Revenues - ship owner (€)	2015	2020	2025	2030
Total (+/-)	376 906 056	521 380 813	575 672 781	856 165 415

Their operating costs would remain largely unaffected, as would transport and consumer prices, administrative costs and intellectual property rights in the EU. Some shipowners might invest early and create business and job opportunities in classification societies by anticipating the Hong Kong Convention's requirements on certificates and inventories of hazardous materials.

Administrative burden for EU Member States will continue to be limited as the existing legislation will continue to be largely circumvented.

The supply of steel scrap and used ship equipment for the South Asian economies of *third countries*, the revenues of shipbreaking yard owners and the job opportunities for workers would stay at the current level or increase in peak times. The social costs associated with fatal and non fatal injuries of workers will remain important.

Social costs (€)	2015	2020	2025	2030
Total	6 101 348	8 440 102	9 318 979	13 859 588

Local fishing and agriculture would continue to lose in quality and quantity, especially in Bangladesh.

Annex XI: Estimate of impacts for option A (baseline option).

General consideration.

The assessment is based on the volumes of EU flagged ships subject to the Hong Kong Convention (above 500 GT). Under this scenario, the current legislation at European and would remain unchanged.

The EU Member States are expected to ratify the Hong Kong Convention which is expected to enter into force in 2020. All recycling countries where there are currently substandard facilities are expected to have upgraded them so as to be able to reach the minimum quality criteria (A level) of this Convention.

The Hong Kong Convention contains separate deadlines for compliance with the various requirements - for instance 5 years after entry into force for an Inventory of Hazardous Materials to be present in existing ships (as opposed to new ships) - the full effect of the new international regime is not to be expected before 2025.

Taking no additional action at EU level would mean that, until the Hong Kong Convention enters into force and transposed by Member States, the current trends in ship dismantling would continue unabated.

Since the Waste Shipment Regulation would continue to be applicable, end of life ships would continue to be required to be dismantled in the OECD while the recycling capacity will remain insufficient in this geographic area. Continuing circumvention of the Waste Shipment Regulation is therefore expected.

The dismantling locations and volumes are indicated in the table below.

Dismantling locations and volumes (million LDT)		2015	2020	2025	2030
EU facilities					
	AAA	0,0009	0,0010	0,0009	0,0011
	AA	0,0129	0,0147	0,0133	0,0163
	A	0	0	0	0
Substandard facilities not meeting Convention's criteria		0	0	0	0
Non EU OECD facilities					
	AAA	0	0	0	0
	AA	0	0	0	0
	A	0,07	0,08	0,08	0,09
Substandard facilities not meeting Convention's criteria		0			
Other facilities					
	AAA	0	0	0	0
	AA	0,32	0,37	0,33	0,41
	Upgraded India	-	0,50	0,45	0,56
	Upgraded Pakistan + Bangladesh	0	0,69	0,63	0,77
	Substandard India	0,44	-	-	-
	Substandard Pakistan + Bangladesh	0,61	-	-	-

In the short term (2015), all the impacts will be similar than in the scenario presented in Annex X.

In the medium and long term, the impacts will be the following:

Environmental impacts:

The main environmental concerns of the current ship dismantling are primarily related to the harmful substances in the ships and the lack of containment of these during the dismantling processes, storage and transport, which allows the toxic compounds to enter the environment.

Generation of non-hazardous waste:

The generation of non-hazardous waste will not be affected by the entry into force of the Hong Kong Convention. It can be found in Table 22.

Generation of hazardous waste (prohibition to use certain hazardous material on board ships):

The Hong Kong Convention's prohibition to use certain hazardous material on board ships will be the first to be applicable. It is however expected to have limited impacts in the time frame considered. The Hong Kong Convention prohibits the use of certain hazardous materials (asbestos, ozone-depleting substances, PCBs and organotin compounds) on ships directly after its entry into force. Improvements would be limited here to ships produced in or flying the flags of countries that do not yet have relevant legislation in place (unlike the EU).

This prohibition will indeed have positive environmental impacts in so far as countries that are not yet Parties to other relevant international agreements like the Stockholm (POPs) Convention or the AFS Convention decide to bind themselves for the first time with the Hong Kong Convention. The number of such countries is not likely to be very high. For ozone-depleting substances the Hong Kong Convention would hardly make any difference, as similar obligations have been accepted already by the 191 Parties of the Montreal Protocol. In essence, the Convention's provisions on hazardous materials alone would lead only minor substantial improvements for the environment during the operating life of ships.

The obligation to carry an Inventory of Hazardous Materials (IHM) would in parallel become applicable for new ships which are defined as ships for which the building contract is placed after that point in time or for which the delivery is 30 months later. For existing ships, the IHM requirement would become mandatory not later than 5 years after the Convention's entry into force.

Treatment of hazardous waste (requirements for ship recycling facilities):

The Hong Kong Convention¹⁴⁸ contains in its Annex a broad set of requirements for ships and ship recycling facilities. The leading principle is that ships flying the flag of one Party to the Convention can only be recycled in facilities located in another Party to the Convention.

The Convention requires ship dismantling facilities to be authorised. This mandatory authorisation is to be given after inspection by the Party or a responsible organisation to facilities managed in compliance with the national implementation of the Convention and its Guidelines.

¹⁴⁸ A detailed presentation of the structure of the Hong Kong Convention is provided for in Annex IV.

Further requirements include the preparation of a Recycling Facility Management Plan and the utilisation of procedures for accident prevention, safe removal of hazardous materials, emergency response, workers' training and reporting of incidents and occupational diseases.

The possibilities for the facilities, the shipowners and other stakeholders to assess and follow the performance of the ship dismantling facilities are prepared for in the Convention, which states that a facility must have: "A system for (regular) monitoring of the performance of the ship recycling operations". The issue of monitoring of the facilities is addressed in the guidelines supporting the Hong Kong Convention dealing specifically with the Recycling Facility Management Plan. This plan has to be prepared by the dismantling facility to specify the manner in which each ship will be recycled, depending on its particulars and its inventory.

The new elements of the Convention for operators, including the Recycling Facility Management Plan, could improve compliance of an operator with environmental and safety rules, as it is supposed to be ship specific and be based on details on the specific hazards related to dismantling of that ship, e.g. IHM data as incorporated in the Ship Recycling Plan.

Impacts on EU facilities

The requirement for ship dismantling facilities to obtain a permit from the competent authority is already covered under national legislation in EU 27 transposing EU legislation. A recycling facility management plan does not however exist as a legal obligation under existing national or EU law.

As strict requirements for water protection and waste management are already in place for dismantling facilities in EU 27, transposition of the specific Convention requirement would not substantially alter the environmental conditions for these facilities in the EU.

The only new element of the Convention for EU operators is the requirement of a Recycling Facility Management Plan, insofar as they do not follow a similar procedure already under country-specific rules, EMAS or ISO standards. This management plan could improve compliance of an operator with environmental and safety rules.

Impacts on third countries:

The Convention's requirements for ship recycling facilities will become applicable when the Convention will enter into force.

The ship recycling facilities located in Turkey and China are already managed in a manner which is considered as meeting the requirements of the Hong Kong Convention.

In South Asia, since the Convention does not prohibit the beaching method as such, improvements would also be limited and depend on the strict implementation of its provisions on environmentally sound management by recycling states, taking into account also the guidelines supporting the Hong Kong Convention¹⁴⁹.

In the case of India, the Convention apparently has some anticipatory effects on account of a Supreme Court decision of September 2007 which obliged shipbreaking facilities to meet certain environmental and safety requirements modelled on the draft Convention. India's

¹⁴⁹ The complete list of the guidelines can be found in Annex IV.

government is of the opinion that the industry in Alang complies today already with 90% of the Convention requirements¹⁵⁰.

India has already improved the management of its facilities and is expected to be able to meet the Convention's requirements by 2015 if necessary. Operators in India would need some additional investment in environmental and safety equipment, for example asbestos removal installations and equipment (concrete covering, strong pumps) to contain oil spills. In addition, it should be ensured that the capacity of the only existing landfill for hazardous waste is extended.

Pakistan and Bangladesh will have to invest and develop infrastructure (in particular to manage the hazardous waste) and are not expected to meet the requirements of the Convention before 2020.

The study from the World Bank about ship dismantling in Pakistan and Bangladesh³⁰, lists and quantify the actions and investments¹⁵¹ needed in order to ensure compliance with the Hong Kong Convention within 10 years. These investments would cover the costs of setting up of hazardous waste treatment facilities, waste reception facilities in ports, access roads and infrastructure, of developing laboratory facilities for environmental monitoring, technical training programmes for occupational safety and health, health care, management of hazardous waste, investment in on-site equipment (weighbridge, impermeable surfaces, drainage, hazardous waste storage).

The higher range of the total investments costs have been evaluated at 53.5 millions \$ in Bangladesh, and 43 millions in Pakistan. The World Bank had estimated the price per LDT based on the respective volumes dismantled by the two countries. But in 2010, Pakistan recycled 81% of the volume of ships dismantled in Bangladesh. The investments needs will be higher in Bangladesh but the country is expected to recycle more ships than Pakistan. Taking these elements into account, the average costs of the measures necessary to achieve compliance has been estimated at 10 \$ (7 €) per LDT for both countries.

The same study showed that facilities located in Bangladesh are currently making a profit estimated at 62 \$ (44,6 €) per LDT while in Pakistan, the profit is only of 11 \$ (7,9 €) per LDT. The facilities located in Bangladesh could therefore easily make the necessary improvements to be able to meet the Hong Kong Convention's within 10 years while this might be slightly more difficult to remain competitive for Pakistan.

Actions to help these countries have already been undertaken with the organisation by the Secretariat of the Basel Convention of a Ship Recycling Technology & Knowledge Transfer Workshop in Turkey for Pakistanis authorities and recyclers. More than 5 millions dollars of bilateral aid will be provided to Bangladesh in order to improve the current situation.

Impacts in terms of environmentally sound management of the hazardous waste generated by EU flagged ships:

¹⁵⁰ Gujarat Maritime Board, presentation to IMO National Workshop on the IMO Ship Recycling Convention, Mumbai, 8-10 January 2008.

¹⁵¹

The table below presents the amount of hazardous materials generated as a result of dismantling of EU-ships. The total amount of materials is split between the amounts managed in environmentally sound manner (ESM) or those which are not.

Table 26: Amounts of hazardous waste generated from dismantling of EU-flagged ships split between amounts managed in environmentally sound manner (ESM) or those which are not.

Hazardous waste	Units	2015	2020	2025	2030
Asbestos	t not according to ESM	175,11	108,45	73,81	60,15
	t according to ESM	97,42	201,42	137,09	111,72
PCB	kg not according to ESM	0,27	0,16	0,10	0,08
	kg according to ESM	0,11	0,18	0,12	0,09
Heavy metals	t not according to ESM	1,82	2,07	1,88	2,30
	t according to ESM	8,32	9,46	8,58	10,49
Oil	t not according to ESM	-	-	-	-
	t according to ESM	12 277,61	13 959,48	12 668,44	15 485,97
Oil sludges	t not according to ESM	21 620,17	13 274,19	12 046,53	14 725,75
	t according to ESM	38 609,63	55 206,27	50 100,54	61 243,17
Tri butyl tin	t not according to ESM	18,45	15,25	8,65	4,23
	t according to ESM	7,25	5,99	3,40	1,66
Mercury	kg not according to ESM	0,42	0,23	0,21	0,26
	kg according to ESM	0,16	0,43	0,39	0,48
Ozone Depleting Substances	t not according to ESM	22,64	11,69	5,30	-
	t according to ESM	8,90	12,21	5,54	-
Total	not according to ESM	21 838,20	13 411,66	12 136,18	14 792,43
	according to ESM	51 009,13	69 394,83	62 923,59	76 853,02

Atmospheric emissions:

End of life ships going for dismantling are expected to continue to load goods for their final voyage before going for dismantling. The atmospheric emissions would therefore mainly be linked with recycling of steel and therefore be similar to the baseline scenario (see Table 23).

Social impacts:

Impacts in the EU

In principle, no impacts of the Hong Kong Convention is to be expected for the working conditions in EU dismantling facilities, due to the more stringent provisions in existing EU directives on workers' health and safety at work and protection against exposure to asbestos which the Member States have to respect.

The new surveys and certificates would have a limited job effect particularly for classification societies. In order to deal with the approximately 54,000 ships of the world fleet (of which about 7,000 are EU-flagged), it is estimated that the major 5 or 6 European societies would each require about 100 additional staff (mainly engineers and chemists) in the first 5 years and about half of this on a more permanent basis.

Impacts in third countries:

For the same reasons as for the EU installations, limited positive impacts are expected in facilities in other OECD countries (including Turkey) and China.

In the other Asian ship dismantling countries, depending on strict implementation of the Convention's safety requirements by recycling facilities and competent authorities, accident rates and occupational health hazards for workers are expected to go down. The quality of implementation, however, would in turn depend on awareness, public attention and effective sanctions in case of non-compliance. The weak position of trade unions and the tendency of certain governments in Asia to refuse access of the media and independent observers to the facilities favour implementation deficits.

Structures of organised crime which are reported to exist in part of the shipbreaking industry in South Asia would probably recede with the increasing regulation and higher operating costs in those countries that implement the Convention.

The occupational health hazards for shipyard workers and seafarers are altogether expected to diminish over the next decades, provided that at least the major flag states implement the Convention and order the substitution of hazardous materials on board ships by less dangerous substances. However, the effect would be limited particularly in the EU, as all relevant materials in the Convention are already covered by prohibitions under other EU legislation.

The Inventory of Hazardous Materials (IHM) would in general raise awareness and open the way for realistic risk assessments and better precautions for shipyard workers, seafarers and labourers in recycling facilities. On the basis of the inventories, informed decisions can be taken by shipowners and flag states on the choice of a suitable recycling facility and the need for prior decontamination, and by the scrapping facility and the recycling state on necessary waste management measures.

For the baseline scenario the estimated workload (man-years) of adults involved in dismantling of EU-flagged ships including annual numbers of fatalities and non-fatal accidents amongst these is shown in the following table for each fifth year in the period 2015 - 2030.

Table 27: Workload (man-years) of adults involved in dismantling of EU-flagged ships including numbers of fatalities and incident amongst these

Labour (Man years)	2015	2020	2025	2030
Workers load required	5329	6058	5498	6721
Work load EU	10	11	10	13
Work load outside EU	5318	6047	5488	6708
of which protected workers	2944	6058	5498	6721
of which not protected workers	2385	0	0	0

of which children	811	0	0	0
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Additional social impacts of the baseline scenario are the existence of child labour in the South-East Asian dismantling facilities. The number of children (man-years) involved in dismantling of the EU-flagged ships are calculated and presented in the table below together with estimated numbers of accidents and deaths amongst these¹⁵². The entry into force of the Hong Kong Convention will imply that all workers are protected and that child labour is effectively prohibited thereby diminishing the number of accidents for adult workers and stopping them for children workers.

In Bangladesh, the Supreme Court has required improvements in the industry including the prohibition for child labour. This judgment is unfortunately not available in writing and it remains to be seen how far it will be implemented in practice.

Table 28 : Children (man-years) involved in dismantling of EU-flagged ships including numbers of fatalities and incident amongst these

Accidents (number of persons)	2015	2020	2025	2030
Adults fatal accidents	4	2	2	3
Adults - non-fatal accidents	1345	1106	1004	1227
Children - fatal accidents	1	0	0	0
Children - non-fatal accidents	148	0	0	0

Economic impacts:

EU ship recycling facilities

The competitive disadvantages of EU recycling facilities in relation to facilities in Asia will most likely remain also in the longer term, due to the much higher labour costs in Europe and in spite of the fact that EU facilities would not need significant investments in order to comply with the requirements of the Convention. The national ship recycling policies of the UK and France might secure a niche for EU or environmentally sound OECD facilities in relation to the government vessels of these two Member States. Apart from this, employment and business opportunities in the EU recycling sector would not rise from the current low level. Administration costs to Member States in relation to Convention requirements for EU recycling facilities are very limited and are left out of the analyses.

Administrative burden for EU Member States

The competent authorities of the flag states will need to conduct surveys on board ships and to issue certificates. All these administrative costs are reflected in the table below.

EU shipowners

Shipowners would be required to develop, maintain and renew Inventories of Hazardous Materials during the life span of their ships as well as prior to dismantling. They will also

¹⁵² Assuming similar incident rates for children and adults

have to undertake surveys in order to receive the necessary certifications from their flag states. Detailed information about these costs is provided in the table below.

In order to meet the Hong Kong Convention, sub-standard ship dismantling facilities will have to invest in infrastructures, protective equipments, trainings. This translates into a loss for the ship owner, which is realised when he sells the ship for dismantling, as the price obtained will be correspondingly lower to cover up for the increased costs. In general only costs for upgrade of existing South-Asian facilities from a non-compliant to a compliant Convention facility level are included in the analyses (including increased waste management costs).

Considering a life span of 30 years, a visible impact on transport and consumer prices is unlikely.

The total costs related to the establishment and the update of the inventory of hazardous materials (including the update prior to dismantling) as well as the costs for obtaining the necessary certificates from the flag state administration would indeed be of 14 200 € for new ships and of 18 000 € for existing ships.

Considering a ship of 9 220 LDT (the average LDT of large EU flagged dismantled in 2009), this would represent respectively 1,54 and 1,96 € per LDT. Considering also that the costs for improving recycling facilities in order to comply with the Hong Kong Convention will be passed over the ship owners, the total costs for shipowners would respectively be of 11,54 and 11,96 € per LDT. In June 2011, the average dismantling prices offered by ship recycling facilities was comprised between 450 (China) and 525 (Bangladesh) €/LDT.

Costs	Who is affected	Unit cost ¹
Preparing and renewing the Inventory of hazardous materials	Shipowner	<ul style="list-style-type: none"> For merchant ships: 1.830 euro for new ships, 9.505 euro for existing ships and 318 euro each five years for renewal For navy ships 21.133 euro per ship
Obtaining the International Certificate on the Inventory of Hazardous Materials	Shipowner	<ul style="list-style-type: none"> 2.956 €for new-ship and 2.519 € for existing ship Recertification each five years: 1.680 €ship
Administrative costs in relation to the checking of the existence and the correctness of the certificates as part of flag state control.	Shipowner	<ul style="list-style-type: none"> Cost for having the certificates checked. First five years 271.024 €/year and later 542.073 €/year (total for Europe)¹⁵³
Administrative costs in relation to the checking of the existence and the correctness of the certificates as part of flag state control.	EU Member States	<ul style="list-style-type: none"> Cost for checking the certificates. 271.024€/year (total for Europe)
Update of the inventory of hazardous materials just before dismantling (ship owners)	Shipowner	769 €/per ship
Ready to recycle certificate (ship owners)	Shipowner	<ul style="list-style-type: none"> First five years 3.360 €ship¹⁵³ Later 6.719 €ship
Dismantling in more environmentally sound and safe recycling facilities	Shipowner	<p>Income from selling to an:</p> <ul style="list-style-type: none"> existing beaching facility in India, Bangladesh or Pakistan: 218 €LDT upgraded beaching facility in India: 212 €LDT upgraded beaching facility in

¹⁵³ Costs increase after five years as existing ships must then also certify for the materials in Table B/Appendix II

		Bangladesh or Pakistan: 211 €LDT <ul style="list-style-type: none"> • landing facility in Turkey: 184 €LDT • berthing facility in China: 170 €LDT • EU slipway/dock facility: 82 €LDT
Administrative costs related to the checking of the existence and the correctness of the inventories.	EU Member States	<ul style="list-style-type: none"> • 32,5 €ship calling European ports in administration

Taking into account the costs indicated in the table below, the costs related to the implementation of the Hong Kong Convention requirements for the period 2020-2030 have been estimated. The costs that fall on the ships owners and those which fall on the public authorities have been distinguished.

Table 29 presents the total cost for the ships owners in the base line scenario with entry into force by 2020. As it can be seen, the ships owners would begin experiencing increasing costs as from 2020 where the requirements become binding. Also, the revenues are affected as they decline as a result of lower prices paid for ships to be dismantled.

Table 29: Cost and revenues for the ship owners in €

Costs and revenues for ship owners (€)	2015	2020	2025	2030
Costs				
Inventories new ships	0	465 195	513 636	763 902
Inventories existing ships	0	0	106 690 059	2 220 031
Certificates	0	751 430	52 095 411	11 728 464
Ready for recycling certificate	0	1 009 243	2 020 865	3 005 517
Costs for checking certificates	0	417 229	1 015 293	1 235 259
Revenues				
Selling ships for recycling	376 906 056	510 178 469	563 303 925	837 769 918
Total (+/-)	376 906 056	507 535 372	400 968 662	818 816 746

In Table 30 the administrative costs for the public authorities are shown. The table clearly illustrates that these administrative costs increase substantially once the requirements also come to cover existing ships.

Table 30: Administrative cost for Member states authorities in €

Administrative costs - Member States ()	2015	2020	2025	2030
Additional controls in the Ports	0	19 112	906 816	1 300 974
Certificates	0	417 229	507 623	617 601
Total	0	436 341	1 414 439	1 918 575

Non-action by the EU is, in addition, expected create additional administrative and legal costs for industry due to the diverging national legislation and implementation by Member States. Especially delays and different timelines in the introduction of the Inventories of Hazardous Materials might lead to incoherent control standards and an uneven playing field for shipping companies and facilities in different parts of the EU. This could result in unsound competition amongst Member States in favour of the flags of Member States which would not have ratified the Hong Kong Convention.

Third countries:

As explained above, significant investments will be necessary in Pakistan and Bangladesh in order to meet the Hong Kong Convention's requirements.

Less accidents (both fatal and non fatal) are expected in the dismantling facilities due to the improvement of the working practices. This will result in decreasing social costs.

Table 31 : Social costs in € - accidents and deaths

Social costs (€)	2015	2020	2025	2030
Total	6 101 348	3 788 139	4 182 602	6 220 546

Other impacts

The Hong Kong Convention potentially raises problems of capacity. If 54,000 larger ships worldwide have to be surveyed and certified within a few years, a shortage of qualified staff in classification societies is probable.

Annex XII: Option B.

General considerations (and assumptions)

The assessment is based on the volumes of EU flagged ships subject to the Hong Kong Convention (above 500 GT).

Under this scenario, some requirements of the Hong Kong Convention would be transposed in 2013 in the current Waste Shipment Regulation as well an invitation for the EU Member States to ratify the Hong Kong Convention by 2020.

All recycling countries where there are currently substandard facilities are expected to have upgraded them so as to be able to reach the minimum quality criteria (A level) of the Convention by 2020.

Since the Waste Shipment Regulation will continue to constitute the core of the control mechanism covering end-of-life ships, the prohibition to dismantle EU flagged ships outside the OECD would be maintained.

As explained in the Impact Assessment, the dismantling capacity within this geographic zone would not be sufficient to treat all EU-flagged ships. In this therefore foreseeable that even responsible shipowners would continue to send their ships for dismantling outside the OECD.

The assessment of the quantitative impacts of this scenario is based on the assumption that the Waste Shipment Regulation complemented by key requirements of the Hong Kong Convention would continue to be largely circumvented. The dismantling locations would therefore be the following.

Dismantling locations and volumes (million LDT)	2015	2020	2025	2030
EU facilities				
AAA	0,000869	0,000988	0,000896	0,001096
AA	0,012933	0,014704	0,013344	0,016312
A	0	0	0	0
Substandard facilities not meeting Convention's criteria	0	0	0	0
Non EU OECD facilities				
AAA	0	0	0	0
AA	0	0	0	0
A	0,07367	0,083762	0,076015	0,092921
Substandard facilities not meeting Convention's criteria	0	1	2	3
Other facilities				
AAA	0	0	0	0
AA	0,324361	0,368794	0,334686	0,409122
Upgraded India	0	0,500535	0,454243	0,55527
Upgraded Pakistan + Bangladesh	0	0,691215	0,627288	0,766801
Substandard India	0,44023	0	0	0
Substandard Pakistan + Bangladesh	0,607936	0	0	0

Impacts

Taking into account the continued circumvention of the legislation driven by the lack of legally available dismantling capacity, the environmental and social impacts of this option will be similar to the baseline scenario (option A) as well as the social costs.

An early implementation of the key elements of the Hong Kong Convention at EU level would create additional costs for ship owners as it obliges them to pay for surveys and certificates some years in advance. Early movers might, however, benefit from avoiding bottlenecks of survey and certification capacity and being able to use certificates as a marketing argument.

Costs and revenues - ship owner (€)	2015	2020	2025	2030
Costs (€)				
Inventories new ships	336289,4814	465 195	513 636	763 902
Inventories existing ships	0	74 951 663	1 547 425	2 220 031
Certificates	543208,583	36 597 952	8 175 073	11 728 464
Ready for recycling certificate				
	729581,3727	1 830 276	2 020 865	3 005 517
Costs for checking certificates				
	342 932	834 496	1 015 293	1 235 259
Revenues				
Selling ships for recycling	376 906 056	510 178 469	563 303 925	837 769 918
Total (+/-)	374 954 045	395 498 886	550 031 634	818 816 746

Similarly to shipowners, EU Member States would have to face additional administrative costs in advance.

Administrative costs - Member States (€)	2015	2020	2025	2030
Additional controls in the Ports				
	13 498	637 054	906 816	1 300 974
Certificates	342 932	417 229	507 623	617 601
Total	356 430	1 054 283	1 414 439	1 918 575

Additional risk of non-compliance and reflagging.

The Hong Kong Convention introduces an obligation for shipowners to inform their flag states in writing of their intention to discard their ships. With this written proof of the intention to discard ships, EU Member States will have, according to the Waste Shipment Regulation, to ensure that these ships have to be dismantled within the OECD. Otherwise, there might be a clear risk to be faced by numerous infringement procedures to be launched by the Commission.

Shipowners as well as EU Member States (as flagged states) considered that the proposal from the Commission to include elements of two different control systems for ships (one coming from the Hong Kong Convention and one from the Basel Convention) would be very confusing and administratively burdensome. It would not send a strong political message toward EU's commitment to support the entry into force of the Hong Kong Convention. The

ability of the EU to convince other countries to ratify the Hong Kong Convention would be strongly reduced.

The most probable scenario is therefore that EU shipowners would change flag in order to be allowed to dismantle their ships outside the EU. This would in turn have an impact of the EU Member States' importance for the fulfilment of the entry into force requirements of the Hong Kong Convention and might therefore postpone or deter its entry into force.

Should EU shipowners decide to massively change their flags to non-EU flags, it is expected that the amount hazardous waste not treated in an environmentally sound manner (ESM) will increase. As shown in Figure 4, the proportion of non-EU flagged ships going to substandard facilities located in Pakistan and Bangladesh is indeed higher than the proportion of EU flagged ships.

Annex XIII: Option C

General considerations and assumptions:

The assessment is based on the volumes of EU flagged ships subject to the Hong Kong Convention (above 500 GT).

Under this scenario, ships which are covered by the Hong Kong Convention would be excluded from the scope of the Waste Shipment Regulation. The transposition of the Hong Kong Convention will be left entirely to European Member States.

Since they will not be subject to the requirements of the Waste Shipment Regulation, ships will be able to be legally dismantled worldwide prior to the entry into force of the Hong Kong Convention. For this reason, it is assumed that 50 % of the volume of ships currently dismantled in the EU, in Turkey and in China will be dismantled in India, China and Bangladesh prior to the entry into force of the Convention.

Since substandard facilities will receive legally more EU flagged ships, they are expected to delay their investments in order to upgrade their facilities. All recycling countries where there are currently substandard facilities are expected to have upgraded them so as to be able to reach the minimum quality criteria (A level) of the Convention by 2025 only.

In order to remain competitive and avoid reflagging to other flags (both EU and non EU ones), it is expected that the rate of ratification will be notably different amongst EU Member States.

The Hong Kong Convention would in this scenario not enter into force before 2025.

The dismantling locations and volumes of EU flagged ships are therefore expected to be the following.

Dismantling locations and volumes (million LDT)		2015	2020	2025	2030
EU facilities					
AAA		0,00043435	0,00049385	0,000896353	0,001095707
AA		0,00646634	0,00735214	0,013344359	0,016312218
A		0	0	0	0
Substandard facilities not meeting Convention's criteria		0	0	0	0
Non EU OECD facilities					
AAA		0	0	0	0
AA		0	0	0	0
A		0,03683507	0,04188097	0,076015242	0,092921448
Substandard facilities not meeting Convention's criteria		0	1	2	3
Other facilities					
AAA		0	0	0	0
AA		0,16218045	0,18439695	0,334686106	0,40912213
Upgraded India		0	0	0,454243368	0,555269582
Upgraded Pakistan + Bangladesh		0	0	0,627288461	0,766800852
Substandard India		0,526714732	0,598867435	0	0

Substandard Pakistan + Bangladesh	0,727367963	0,82700741	0	0
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Environmental impacts:

Generation of waste and waste management:

The generation of non hazardous will be the same as for option A and can be found in Table 22.

The amount of hazardous waste generated are similar than in option A but less hazardous waste will be managed in an environmentally sound manner. The situation will be particularly problematic before 2025 since nothing would prevent the ships of EU Member States which would not have ratified nor implemented the Hong Kong Convention to dismantle their ships in substandard facilities.

Hazardous waste	Units	2015	2020	2025	2030
Asbestos	t not according to ESM	209,52	238,22	73,81	60,15
	t according to ESM	63,02	71,65	137,09	111,72
PCB	kg not according to ESM	0,33	0,29	0,10	0,08
	kg according to ESM	0,05	0,05	0,12	0,09
Heavy metals	t not according to ESM	2,18	2,48	1,88	2,30
	t according to ESM	7,96	9,05	8,58	10,49
Oil	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	12 277,62	13 959,48	12 668,44	485,97
Oil sludges	t not according to ESM	25 867,55	29 411,05	12 046,53	14
	t according to ESM	34 362,28	39 069,44	50 100,54	725,75
Tri butyl tin	t not according to ESM	22,07	18,25	8,65	4,23
	t according to ESM	3,62	3,00	3,40	1,66
Mercury	kg not according to ESM	0,50	0,57	0,21	0,26
	kg according to ESM	0,08	0,09	0,39	0,48
Ozone Depleting Substances	t not according to ESM	27,09	20,53	5,30	0,00
	t according to ESM	4,45	3,37	5,54	0,00
Total	not according to ESM	26 128,40	29 690,52	12 136,18	14
	according to ESM	46 718,94	53 115,99	62 923,59	792,43
					76
					853,02

Atmospheric emissions

The atmospheric emissions will be the same as the ones in option A and can be found in Table 23.

Social impacts:

This option will have negative impacts on the number of employment opportunities in the EU in the period 2012-2025. The number of jobs will increase globally as ship dismantling is expected to take place in labour intensive countries.

Labour (Man years)	2015	2020	2025	2030
Workers load required	5986	6806	5498	6721
Work load EU	5	6	10	13
Work load outside EU	5981	6800	5488	6708
of which protected workers	3133	3562	5498	6721
of which not protected workers	2853	3244	0	0
of which children	970	1103	0	0

However the working conditions in these countries will also lead to an increased number of both fatal and non-fatal accidents will be particularly negative prior to the entry into force of the Hong Kong Convention.

Accidents (number of persons)	2015	2020	2025	2030
Adults fatal accidents	5	5	2	3
Adults - non-fatal accidents	1530	1739	1004	1227
Children - fatal accidents	1	1	0	0
Children - non-fatal accidents	177	201	0	0

Economic impacts:

This option would be particularly beneficial for EU shipowners prior to 2025 since they would be able to sell their ships to the substandard facilities which offer the best prices as they do not protect the environment and the human health.

Shipowners and Member States will be faced with increasing costs when the Hong Kong Convention will enter into force in 2025.

Costs and revenues - ship owner (€)	2015	2020	2025	2030
Costs (€)				
Inventories new ships	0	0	513 636	763 902
Inventories existing ships	0	0	0	153 064 130
Certificates	0	0	829 677	74 739 286
Ready for recycling certificate	0	0	1 114 336	3 005 517
Costs for checking certificates	0	0	507 623	1 235 259
Revenues				
Selling ships for recycling	389 446 323	538 727 985	563 303 925	837 769 918

Total (+/-)	389 446 323	538 727 985	560 338 652	604 961 824
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Administrative costs - Member States (€)	2015	2020	2025	2030
Additional controls in the Ports	0	0	27 204	1 300 974
Certificates	0	0	507 623	617 601
Total	0	0	534 827	1 918 575

Since fatal and non-fatal accidents will be important prior to 2015, this option will have particularly high social costs.

Social costs (€)	2015	2020	2025	2030
Total	7 071 139	9 781 632	4 182 602	6 220 546

Annex XIV: Option D

Assumptions:

The assessment is based on the volumes of EU flagged ships subject to the Hong Kong Convention (above 500 GT).

Under this scenario, ships which are covered by the Hong Kong Convention would be excluded from the scope of the Waste Shipment Regulation. These ships will be covered by a specific Regulation (Ship Recycling Regulation) transposing the Hong Kong Convention.

The Hong Kong Convention is expected to enter into force in 2020. Indian facilities are expected to be able to be upgraded so as to meet the Convention's standards by 2015 while installations in Pakistan and Bangladesh would not be able to do so before 2020. The maximum volume of EU flagged ships to be dismantled in the period 2012-2030 will be of 1,88 million LDT. The Chinese facilities alone treated 2,83 millions LDT in 2009. The recycling capacity available in the EU, Turkey, China and upgrade Indian facilities will be largely sufficient to treat all EU flagged ships.

The Hong Kong Convention requires that waste resulting from the recycling of a ship be transferred only to waste facilities authorised to deal with its treatment and disposal in a safe and environmentally sound manner and requires that waste management and disposal sites are identified for this purpose. Like the Basel Convention, the Hong Kong Convention does not establish any system of control for such waste in the recycling state once it leaves the Ship Recycling Facility.

Similarly to what has been done with the Waste Shipment Regulation, the Ship Recycling Regulation will complement the requirements of the Hong Kong Convention so as to ensure that all the waste produced in the ship recycling facilities are treated in an environmentally sound manner not only in the dismantling facility but also in other facilities which can be used for further processing or disposing the waste. Specific criteria have been developed in this respect in on study undertaken by the Commission¹²⁵.

The dismantling volumes and locations are the following ones:

Dismantling locations and volumes (million LDT)	2015	2020	2025	2030
EU facilities				
AAA	0,0009	0,0010	0,0009	0,0011
AA	0,0129	0,0147	0,0133	0,0163
A	0	0	0	0
Substandard facilities not meeting Convention's criteria	0	0	0	0
Non EU OECD facilities				
AAA	0	0	0	0
AA	0	0	0	0
A	0,0737	0,0838	0,0760	0,0929
Substandard facilities not meeting Convention's criteria	0	1	2	3
Other facilities				
AAA	0	0	0	0

AA	0,3244	0,3688	0,3347	0,4091
Upgraded India	1,0482	0,5005	0,4542	0,5553
Upgraded Pakistan + Bangladesh	0,0000	0,6912	0,6273	0,7668
Substandard India	0	0	0	0
Substandard Pakistan + Bangladesh	0	0	0	0

Overall, it is expected that there would be positive environmental, social and economic impacts of implementing the Hong Kong Convention into EU legislation. In particular with respect to the baseline option, the following positive impacts are to be expected:

- A coherent approach, for example ensuring uniform controls across the EU in ports and facilities,
- Faster potential for legislation to take effect and speeding up information processes such as on recycling facilities in Member States,
- Greater certainty and level playing field for operators in the EU,
- Reduction of administrative burden for both Member States and EU operators

Each of these in turn would benefit workers safety and the state of the environment. Specific aspects of implementing the Hong Kong Convention into EU law are dealt below.

An EU Ship Recycling Regulation that transposes the Hong Kong Convention would be able to harmonise implementation EU-wide. Differences between Member States concerning the point in time when the Convention requirements take legal effect would be annulled.

Transposition of Convention elements into the Ship Recycling legislative instrument would not be necessary where existing EU legislation already covers the issue and provides for a higher standard of safety or environmental protection. This is the case particularly for the ban on hazardous materials on board ships or the environmental and workers' health and safety requirements in recycling facilities. Here a reference to the relevant provisions of EU law (for the latter e.g. Directive 2008/98/EC on waste, Directive 89/391/EEC on measures to encourage improvements in the safety and health of workers at work, and Directive 83/477/EEC on the protection of workers from the risks related to the exposure to asbestos at work, as amended) would be sufficient.

The most important elements of a Ship Recycling Regulation to implement the Hong Kong Convention would be the following:

- Introduction of a mandatory Inventory of Hazardous Materials (IHM) on board ships, of the "Ready for Recycling" certificate, and the surveys necessary for them;
- Specification of the key requirements for ship recycling facilities, including an obligation to prepare a Recycling Facility Management Plan;
- Obligations on Member States to communicate relevant information (especially on ship recycling facilities, competent authorities, recycled ships, violations and actions taken) to the IMO, as well as directly to other Member States and the Commission;

- Reporting requirements for shipowners and recycling facilities which would replace the existing requirements of the EC Waste Shipment Regulation for notification and prior informed consent.

As requested by the Impact Assessment Board when assessing the Impact Assessment supporting the EU strategy on better ship dismantling, a detailed comparison of the legal provisions of the Hong Kong Convention and of the existing EU legislation has been undertaken in one specific study¹⁵⁴. This study identified the gaps on inconsistencies between the existing EU legislation and the Convention and proposed draft legal provisions to address them. Regarding ships, the Ship Recycling Convention would, in particular, need to:

- adjust some definitions and introduce new definitions,
- introduce into EU legislation requirements linked with the establishment, maintenance and survey of the inventory of hazardous materials as well as with the obligation to obtain certificates,

Inventory of Hazardous Materials, surveys and certificates

The environmental, social and economic impacts of the new survey and certificate system have been described already in the context of the Hong Kong Convention (see above in Annex XI).

Harmonization of standards and procedures for surveys and certificates by an EU legislative instrument would establish a level playing field for operators in the EU and reduce administrative and legal costs as well as the drivers for reflagging between Member States. It would also increase the effectiveness of EU controls in ports and facilities which in turn benefits health and safety of seafarers and workers. This effect could be strengthened by incorporating references to the guidelines supporting the Hong Kong Convention into the set of binding rules.

Requirements for ship recycling facilities

The Convention requirements for ship recycling facilities have been outlined (see above in Annex XI). Current EU legislation does not regulate such facilities explicitly, but as performing an operation for the recycling of metals they fall under the permit requirement of Directive 2008/98/EC on waste. A recycling facility management plan does not exist as a legal obligation under EU law. Other substantial requirements for the protection of workers' health and safety, however, are essentially contained in relevant EU directives.

Transposing the relevant provisions of the Convention into an Ship Recycling Regulation would therefore not introduce new elements - apart from the management plan - but rather clarify the legal situation, further specify the requirements applicable to ship dismantling facilities (a Regulation contains more precise requirements than a Directive).

¹⁵⁴ Milieu/COWI for DG Environment " Study in relation to options for new initiatives regarding dismantling of ships " Final report of October 2009: published on the Commission website at <http://ec.europa.eu/environment/waste/ships/index.htm>

EU rules on the Recycling Facility Management Plan would cause no additional administrative costs in relation to the baseline scenario but could reduce such costs by preventing different standards in Member States.

Information duties of recycling states

The Hong Kong Convention requires flag states to report annually the list of ships which have received an International Ready for Recycling Certificate and the location of the Ship Recycling Facility.

It requires recycling states to report to the IMO various relevant data, e.g. a list of authorized ship recycling facilities and an annual list of ships recycled within the jurisdiction of that state.

Such obligations are useful tools to ensure transparency and contribute to an effective implementation of the Convention, provided the lists contain sufficient information and are regularly updated and disseminated to all interested parties and the public.

EU legislation would have the positive effect of harmonising implementation and ensuring a minimum standard of communication. The additional obligation on Member States to communicate the information directly to other Member States and the Commission (instead of waiting for the IMO to disseminate it) would simplify and speed up the process and enhance its effectiveness in the EU. The information on recycling facilities, recycled ships, violations of the Convention and action taken would be important for the implementation the EU legislation on ship dismantling.

The administrative burden for Member States' authorities and the recycling facilities would not be substantially increased in relation to what is required by the Convention (baseline scenario). However in the short term, since the recycling facilities would not yet be legally required to report about their authorized facilities, EU Member States would have to verify that the expected dismantling facility will be able to reach the levels of protection provided for by the Hong Kong Convention when conducting the final survey prior to dismantling.

In addition, recycling facilities will be required under the Convention to report on incidents, accidents, occupational diseases and chronic effects. The EU legislation would not go beyond these reporting requirements of the baseline scenario and thus not create additional administrative burden.

Environmental impacts:

Generation of waste and waste management:

The generation of non hazardous waste for option D is similar to the generation for option A and can be found in Table 22.

The same amount of hazardous waste is generated than in the baseline scenario (Option A) but more hazardous waste will be managed in an environmentally sound manner.

Hazardous waste	Units	2015	2020	2025	2030
Asbestos	t not according to ESM	24,46	108,45	73,81	60,15
	t according to ESM	248,08	201,42	137,09	111,72

PCB	kg not according to ESM	0,14	0,16	0,10	0,08
	kg according to ESM	0,24	0,18	0,12	0,09
Heavy metals	t not according to ESM	1,82	2,07	1,88	2,30
	t according to ESM	8,32	9,46	8,58	10,49
Oil	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	12 277,61	13 959,48	12 668,44	15 485,97
Oil sludges	t not according to ESM	5 405,04	13 274,19	12 046,53	14 725,75
	t according to ESM	54 824,76	55 206,27	50 100,54	61 243,17
Tri butyl tin	t not according to ESM	18,45	15,25	8,65	4,23
	t according to ESM	7,25	5,99	3,40	1,66
Mercury	kg not according to ESM	0,05	0,23	0,21	0,26
	kg according to ESM	0,53	0,43	0,39	0,48
Ozone Depleting Substances	t not according to ESM	11,32	11,69	5,30	0,00
	t according to ESM	20,22	12,21	5,54	0,00
Total	not according to ESM	5 461,09	13 411,66	12 136,18	14 792,43
	according to ESM	67 386,24	69 394,83	62 923,59	76 853,02

Atmospheric emissions

The atmospheric emissions will be the same as the ones in option A and can be found in Table 23.

Social impacts:

The social impacts on the EU will be similar to the ones in the baseline scenario.

The social impacts in third countries will be lower than in the baseline scenario in the short term since ships would only be dismantled in facilities which are not employing children or unprotected workers. There would be a clear incentive for the substandard facilities located in Pakistan and in Bangladesh India to invest in order to meet the Convention's requirements as soon as possible.

Labour (Man years)	2015	2020	2025	2030
Workers load required	5329	6058	5498	6721
Work load EU	10	11	10	13
Work load outside EU	5318	6047	5488	6708
of which protected workers	5329	6058	5498	6721
of which not protected workers	0	0	0	0
of which children	0	0	0	0

The number of accidents (both fatal and non fatal) of children workers would decrease by 2013 onwards. The number of accidents of adult workers will decrease in the short term but is expected to increase in the medium and long term. Upgraded facilities in Pakistan and Bangladesh are indeed expected to continue to be more dangerous than facilities located in China and in the OECD.

Accidents (number of persons)	2015	2020	2025	2030
Adults fatal accidents	2	2	2	3
Adults - non-fatal accidents	973	1106	1004	1227
Children - fatal accidents	0	0	0	0
Children - non-fatal accidents	0	0	0	0

Economic impacts:

As for option B, ship owners and Member States would be faced with additional costs linked with the implementation of the requirements of the Hong Kong Convention more rapidly than in the baseline scenario.

Costs and revenues - ship owner (€)	2015	2020	2025	2030
Costs (€)				
Inventories new ships	336 289	465 195	513 636	763 902
Inventories existing ships	0	74 951 663	1 547 425	2 220 031
Certificates	543 209	36 597 952	8 175 073	11 728 464
Ready for recycling certificate	729 581	1 830 276	2 020 865	3 005 517
Costs for checking certificates	342 932	834 496	1 015 293	1 235 259
Revenues				
Selling ships for recycling	369 346 348	510 178 469	563 303 925	837 769 918
Total (+/-)	367 394 337	395 498 886	550 031 634	818 816 746

Administrative costs - Member States (€)	2015	2020	2025	2030
Additional controls in the Ports	13 498	637 054	906 816	1 300 974
Certificates	342 932	417 229	507 623	617 601
Total	356 430	1 054 283	1 414 439	1 918 575

Since there would be less fatal and non-fatal accidents from 2013 onwards, the social costs are expected to decrease.

Social costs (€)	2015	2020	2025	2030
Total	2 799 730	3 788 139	4 182 602	6 220 546

Annex XV: Option E1

This option would consist in completing the option D by covering also the EU governmental vessels including navy vessels in the specific Regulation transposing the Hong Kong Convention.

The expected volume of government vessels including navy ships until 2030 has been estimated at 0,4 million tons per year.

Maintaining the "business as usual" situation for these ships until 2030 would mean that all the ships are dismantled within the EU (0,2 million tons per year will be treated in AA facilities and the rest in AAA facilities) while the current prohibition to export these ships outside the OECD will be maintained. This option can therefore not be compared directly to the baseline scenario (option A) since this scenario excludes EU governmental vessels from its scope.

Including these ships under the scope of the specific Regulation transposing the Hong Kong Convention will imply that these ships would be allowed to be dismantled in facilities compliant with the Hong Kong Convention worldwide. The volume of these ships dismantled in the EU and in the OECD is expected to decrease significantly. It is however not expected to see all these ships being dismantled outside the OECD notably to protect certain technologies.

The stakeholders expressed differing views as regards the extension of the Convention requirements to warships and other government vessels on non-commercial service. Including such vessels in the scope of an EU regulation, provided that they are allowed to use certified facilities in third countries, would increase the demand for clean recycling and contribute to the improvement of recycling conditions in these countries. Others argued that all military and government vessels should be dismantled within the EU as it could make the existence of EU dismantling facilities more economically sustainable. It was also pointed out that these vessels would automatically follow the requirements for clean dismantling without necessarily being specifically covered by the requirements. However, many stakeholders believed that specific inclusion of these vessels would serve as a means of demonstrating the commitment of EU Member States in fully implementing the Convention requirements and ensuring that they build a level of expertise on the issue from a shipping and recycling perspective. Inclusion would avoid possible discrimination between private and State-owned vessels and consequently contribute to a better image of public authorities that should play an exemplary role by ensuring clean dismantling of their vessels.

Like for option D, the Hong Kong Convention is expected to enter into force in 2020. Indian facilities are expected to be able to be upgraded so as to meet the Convention's standards by 2015 while installations in Pakistan and Bangladesh would not be able to do so before 2020.

Dismantling locations and volumes of governmental vessels (million LDT)	2015	2020	2025	2030
EU facilities				
AAA	0,0000	0,0000	0,0000	0,0000
AA	0,0004	0,0004	0,0004	0,0004
A	0	0	0	0
Substandard facilities not meeting Convention's criteria	0	0	0	0
Non EU OECD facilities				
AAA	0	0	0	0

	AA	0	0	0	0
	A	0,0020	0,0020	0,0020	0,0020
	Substandard facilities not meeting Convention's criteria	0	1	2	3
Other facilities					
	AAA	0	0	0	0
	AA	0,0089	0,0089	0,0089	0,0089
	Upgraded India	0,0287	0,0121	0,0121	0,0121
	Upgraded Pakistan + Bangladesh	0,0000	0,0167	0,0167	0,0167
	Substandard India	0	0	0	0
	Substandard Pakistan + Bangladesh	0	0	0	0

Environmental impacts:

The dismantling of EU governmental vessels including navy vessels will produce an average of almost 33 000 tons of non-hazardous waste during the period 2010-2030.

Generation of waste and waste management:

Non-hazardous waste (tons)	Yearly average (2010-2030)
Steel	29 600
Copper	4
Non-ferrous metals	3 200
Total	32 804

The global volume of navy and governmental vessels is limited but these ships usually contain larger quantities of hazardous waste than commercial vessels.

Hazardous waste	Units	2015	2020	2025	2030
Asbestos	t not according to ESM	0,67	2,61	1,96	1,31
	t according to ESM	6,80	4,85	3,64	2,43
PCB	kg not according to ESM	0,00	0,00	0,00	0,00
	kg according to ESM	0,01	0,00	0,00	0,00
Heavy metals	t not according to ESM	0,05	0,05	0,05	0,05
	t according to ESM	0,23	0,23	0,23	0,23
Oil	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	336,37	336,37	336,37	336,37
Oil sludges	t not according to ESM	148,08	319,86	319,86	319,86
	t according to ESM	1 502,05	1 330,27	1 330,27	1 330,27
Tri butyl tin	t not according to ESM	0,51	0,37	0,23	0,09
	t according to ESM	0,20	0,14	0,09	0,04
Mercury	kg not according to ESM	0,00	0,01	0,01	0,01

Ozone Depleting Substances	kg according to ESM	0,01	0,01	0,01	0,01
	t not according to ESM	0,31	0,28	0,14	0,00
	t according to ESM	0,55	0,29	0,15	0,00
Total	not according to ESM	149,62	323,17	322,24	321,31
	according to ESM	1 846,20	1 672,16	1 670,75	1 669,34

Atmospheric emissions

The redirection of EU Member States navy and government owned vessels from EU recycling facilities to upgraded Asian facilities would further result in an extra CO₂-emission from the extra transport of these ships the long way from EU waters to the Asian ship recycling facility and transportation of the steel the opposite direction.

The extra CO₂-emissions from sailing the EU Member State navy and government vessels to Asia for recycling and afterwards sailing the resulting steel the opposite way is estimated at **26,9 tons CO₂/year**, based on the following estimates:

- Average of 25 ships transported per year,
- Emission from navy vessels and government owned ships: 124,3 g CO₂ ship/nautical mile (assuming these ships are equal to smaller complex ships like refrigerated cargo; average size of 9.850 GT,¹⁵⁵
- Steel returned to Europe in three shipments in bulk carriers with an emission of 7,6 g CO₂ ship/nautical mile (assuming bulk dry carriers; average size of 81.519 GT,¹⁵⁶
- The sailing distance, e.g. London - Alang, is 8.540 nautical miles (average distance of route via the Suez Channel and around the Cape)¹⁵⁷.

Social impacts:

Labour (Man years)	2015	2020	2025	2030
Workers load required	146	146	146	146
Work load EU	0	0	0	0
Work load outside EU	146	146	146	146
of which protected workers	146	146	146	146
of which not protected workers	0	0	0	0
of which children	0	0	0	0

¹⁵⁵ Greenhouse Gas Emissions for Shipping and Implementation Guidance for the Marine Fuel Sulphur Directive. CE Delft, Germanischer Lloyd, Marintek and Det Norske Veritas. December 2006. Publication No. 06.4103.6)

¹⁵⁶ Greenhouse Gas Emissions for Shipping and Implementation Guidance for the Marine Fuel Sulphur Directive. CE Delft, Germanischer Lloyd, Marintek and Det Norske Veritas. December 2006. Publication No. 06.4103.6).

¹⁵⁷ COWI/DHI DG ENV 2007 study. Ship Dismantling and Pre-cleaning of Ships, June 2007

Accidents (number of persons)	2015	2020	2025	2030
Adults fatal accidents	0	0	0	0
Adults - non-fatal accidents	27	27	27	27
Children - fatal accidents	0	0	0	0
Children - non-fatal accidents	0	0	0	0

Economic impacts:

Member States would be affected as ship owners as well as flag states.

Member States acting as ship owners would be subject to the obligation to establish and maintain inventories of hazardous materials and to obtain the necessary certification. As shown in Annex XII, the cost of establishing an Inventory of Hazardous Material would be significantly higher than in the case of commercial vessels as navy vessels usually contains more hazardous waste. On the other hand, Member States would also be allowed to send their ships for dismantling outside the OECD thus benefiting from lower labour costs and best prices for getting their ships dismantled.

The administrative burden would be less important for Member States as flag states. Navy vessels have indeed specific immunities which imply that they are not subject to the Port State Control requirements.

Costs and revenues - ship owner (€)	2015	2020	2025	2030
Costs (€)				
Inventories for ships	58 143	70 740	86 065	104 712
Certificates	28 175	29 212	23 703	28 839
Ready for recycling certificate	509 362	619 717	801 373	974 992
Revenues				
Selling ships for recycling	10 119 078	12 293 457	14 956 870	18 197 320
Total (+/-)	9 523 398	11 573 789	14 045 729	17 088 777

Social costs (€)	2015	2020	2025	2030
Total	76 705	91 280	111 057	135 117

Annex XVI: Option E2

The assessment is based on the volumes of EU flagged ships subject to the Hong Kong Convention (above 500 GT).

This option would consist in strengthening the option D by requiring that all ship dismantling facilities should have impacts on human health and on the environment comparable to the European ones. This implies that ships would be allowed to be dismantled in the EU, in China and in Turkey (investments would be needed for the facilities of this country so as to reach EU standards by 2015).

Dismantling locations and volumes (million LDT)		2015	2020	2025	2030
EU facilities					
	AAA	0,0009	0,0010	0,0009	0,0011
	AA	0,0129	0,0147	0,0133	0,0163
	A	0	0	0	0
	Substandard facilities not meeting Convention's criteria	0	0	0	0
Non EU OECD facilities					
	AAA	0	0	0	0
	AA	0,08376194	0,07601524	0,09292145	0
	A	0,0000	0,0000	0,0000	0,0000
	Substandard facilities not meeting Convention's criteria	0	1	2	3
Other facilities					
	AAA	0	0	0	0
	AA	1,3725	1,5605	1,4162	1,7312
	Upgraded India	0,0000	0,0000	0,0000	0,0000
	Upgraded Pakistan + Bangladesh	0,0000	0,0000	0,0000	0,0000
	Substandard India	0	0	0	0
	Substandard Pakistan + Bangladesh	0	0	0	0

Environmental impacts:

Generation of waste and waste management:

The generation of non hazardous will be the same as for option A and can be found in Table 22.

The amount of hazardous waste generated are similar than in option A but less hazardous waste will be managed in an environmentally sound manner.

Hazardous waste	Units	2015	2020	2025	2030
Asbestos	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	272,53	309,87	210,91	171,88
PCB	kg not according to ESM	0,00	0,00	0,00	0,00
	kg according to ESM	0,38	0,34	0,22	0,17

Heavy metals	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	10,14	11,53	10,46	12,79
Oil	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	12 277,61	13 959,48	12 668,44	15 485,97
Oil sludges	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	60 229,81	68 480,46	62 147,07	75 968,92
Tri butyl tin	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	25,70	21,25	12,05	5,89
Mercury	kg not according to ESM	0,00	0,00	0,00	0,00
	kg according to ESM	0,58	0,66	0,60	0,74
Ozone Depleting Substances	t not according to ESM	0,00	0,00	0,00	0,00
	t according to ESM	31,54	23,90	10,85	0,00
Total	not according to ESM	0,00	0,00	0,00	0,00
	according to ESM	72 847,33	82 806,49	75 059,78	91 645,45

Atmospheric emissions

The atmospheric emissions will be the same as the ones in option A and can be found in Table 23.

Other environmental impacts

Social impacts:

Labour (Man years)	2015	2020	2025	2030
Workers load required	2006	2281	2070	2530
Work load EU	10	11	10	13
Work load outside EU	1996	2269	2059	2517
of which protected workers	2006	2281	2070	2530
of which not protected workers	0	0	0	0
of which children	0	0	0	0

Accidents (number of persons)	2015	2020	2025	2030
Adults fatal accidents	1	1	1	1
Adults - non-fatal accidents	240	273	248	303
Children - fatal accidents	0	0	0	0
Children - non-fatal accidents	0	0	0	0

Economic impacts:

As for option D, option E2 would imply an early implementation of the Convention rules at EU level for ships flying EU flags. It would create additional costs for ship owners and administration in the short and medium term.

Option E2 would have a significant impact on the revenues of the shipowners since their ships would only be allowed to be dismantling in facilities equivalent to the EU ones.

Costs and revenues - ship owner (€)	2015	2020	2025	2030
Costs (€)				
Inventories new ships	336 289	465 195	513 636	763 902
Inventories existing ships	0	74 951 663	1 547 425	2 220 031
Certificates	543 209	36 597 952	8 175 073	11 728 464
Ready for recycling certificate	729 581	1 830 276	2 020 865	3 005 517
Costs for checking certificates	342 932	834 496	1 015 293	1 235 259
Revenues				
Selling ships for recycling	312 508 124	432 298 014	477 313 691	709 881 530
Total (+/-)	310 556 113	317 618 431	464 041 400	690 928 357

Administrative costs - Member States (€)	2015	2020	2025	2030
Additional controls in the Ports	13 498	637 054	906 816	1 300 974
Certificates	342 932	417 229	507 623	617 601
Total	356 430	1 054 283	1 414 439	1 918 575

Since the number of accidents will be significantly reduced, thereby limiting strongly the social costs.

Social costs (€)	2015	2020	2025	2030
Total	699 557	967 709	1 068 478	1 589 086

Annex XVII: Option E3 list of certified facilities

General considerations:

The *Communication proposing an EU Strategy on ship dismantling* identified that the (at the time draft) Hong Kong Convention will rely in particular on a system of surveys and certificates for ships and on authorisations for ship recycling facilities granted by the competent authorities of recycling states. It highlighted a potential weakness of the control system linked with existing governance problems in some developing countries and the limited non-compliance mechanism in the Hong Kong Convention.

Depending on the final provisions on auditing and certification included in the Hong Kong Convention, the Commission announced that it would further assess the feasibility of developing a certification and audit scheme for ship recycling facilities worldwide and would evaluate how it can be ensured that a maximum number of ships, including ships flying the flags of Member States go for dismantling to facilities certified and audited

The Communication also proposed to provide guidance to shipowners with the publication of a list of "green" ship dismantling facilities worldwide could fill remaining knowledge gaps and provide benchmarks.

The *Hong Kong Convention*, as adopted, contains a voluntary audit mechanism but no compliance mechanism per se. According to Regulation 15(3), Parties have to establish a mechanism for ensuring that Ship Recycling Facilities comply with the requirements of the Convention including the establishment and effective use of inspection, monitoring and enforcement provisions, including powers of entry and sampling. A Party can voluntarily decide to have its mechanism audited either by its authorities (self-audit) or by an organization recognized by itself, taking into account guidelines developed by the Organization. The results of these audits should be communicated to the IMO. The existence of an audit is positive but does not resolve all the potential concerns related to governance concerns since the audit will be voluntary and mainly under the control of the recycling countries.

Public consultation and expert workshops:

Stakeholders were consulted on the possible positive and negative impacts of the introducing an EU audit and certification scheme as well as on the organisations and actors which could be playing a key role in such scheme.

In the Communication, the Commission referred to a study undertaken on behalf of EMSA which proposed an EU business-to-business voluntary certification and audit scheme. Several stakeholders questioned the effect of a voluntary scheme and argued that the scheme should be made mandatory.

There were diverging views on the criteria which should be used to certify and audit facilities. Some considered that this scheme should rely on the requirements of the Hong Kong Convention only. Others proposed to introduce additional criteria related to transparency, human health and the environment. The same responses were received regarding the establishment of a list of green and safe facilities.

Almost all stakeholders agreed that the national authorities and/or the classification societies/accreditation organisations would have a key role to play in such an audit and certification scheme. It was suggested that this should be done by an independent supervision and control organisation, while the State's role would be to control implementation. Such an organisation must be independent from the construction and demolition sector. Two of the stakeholders specifically mention the European Maritime Safety Organisation (EMSA) as

having a key role to play within such system. One stakeholder proposes that local trade unions should play a key role in auditing and improving standards and ‘giving voice to workers’. At the same time, some stakeholders argued that an EU specific third party certification and audit scheme could have a counterproductive effect given some recycling States' insistence on sovereignty rights during the negotiations of the Hong Kong Convention. Finally, a few stakeholders argue that such EU rules could result in the reflagging of EU ships as a result of lack of compliant recycling capacity.

Ensuring that ships are going to authorized and upgraded facilities only in the short and medium term.

As explained in Annex XIII, opening the possibility for ships to be dismantled worldwide prior to the entry into force of the Hong Kong Convention without controlling where they are going would imply significant negative environmental and health impacts. This option therefore aims at ensuring that EU ships are directed to facilities which are authorized by their authorities and able to respect the requirements of the Hong Kong Convention in terms of protection of the human health and the environment.

In 2010, all dismantling facilities were closed in Bangladesh because none of them had received the necessary authorization ("environmental clearance") from the Ministry of Environment. Nowadays, all recycling countries request their facilities to be authorized in order to operate.

However, as explained before, investments will be needed in facilities located in India, Pakistan and Bangladesh in order for their facilities to be upgraded so as to be compliant with the Hong Kong Convention.

Improving transparency in the short, medium and long term

As explained in Annex XIV ship recycling countries which will be Party to the Hong Kong Convention will have to provide each year to the Secretariat of the IMO:

- a list of the ship recycling facilities authorized in accordance with the Convention and operating under their jurisdiction,
- an annual list of the ships recycled within the jurisdiction of that Party,
- actions taken towards ship recycling facilities under the jurisdiction of that Party.

This obligation would however only be applicable after the entry into force of the Hong Kong Convention.

Moreover the above mentioned information is limited and does not provide for a certain number of data which are important for shipowners when selecting their dismantling facilities as well as for flag state during the final survey before allowing the ship to go for dismantling:

- (a) the capability of the ship recycling facility in terms of size of ship (length, breadth, lightweight),
- (b) the maximum authorized dismantling capacity,

- (c) the ability of the facility to deal with hazardous materials present on board ships: authorization to manage these waste, process used in the facility or in downstream facilities.

These elements would be necessary in order to allow the shipowners to make an informed decision and to avoid problems at the time of delivery. For example, if a facility is not authorized to deal with some type of hazardous waste contained in the ship (as reflected in the Inventory of Hazardous Materials), the ship will need to be pre-cleaned before being delivered to the yard.

There will not be any additional costs for the recycling facilities to compile this information compared with the baseline scenario since they have to be provided to their competent authorities in the document of authorization to conduct ship recycling (see Appendix 5 of the Hong Kong Convention).

They would also be needed by flag states when conducting their final survey prior to dismantling. During this survey, the flag state will have to verify:

- (1) that the IHM is in accordance with the requirement of the Convention taking into account the guidelines,
- (2) whether the Ship Recycling Plan developed by the Ship Recycling Facility corresponds to the IHM and contains information about safe for entry and safe for hot work conditions
- (3) whether the facility is authorized in accordance with the Convention.

Taking into account these comments and the relevant studies, the audit and certification scheme should:

- Be mandatory otherwise there would be little incentive to use certified and audited facilities,
- Involve third party auditing¹⁵⁸ while respecting sovereignty rights as much as possible,
- Might include additional requirements compared to the Hong Kong Convention while ensuring the availability of sufficient recycling capacity,
- Be performance based¹⁵⁹ and not procedure based only so as to secure an effective improvement of the human health and environmental impacts of ship dismantling,
- Improve transparency with the publication of a list of certified ship dismantling facilities operating worldwide,

¹⁵⁸ Self-auditing by the facilities themselves is not considered as feasible at this stage since ship dismantling is a highly competitive market where substandard facilities have a competitive advantage as explained in the Impact Assessment.

¹⁵⁹ Contrary to existing ISO and OHSAS standards. For further explanations, see the COWI/Litehauz study for EMSA, 'Certification of Ship Recycling Facilities', 2008.

- Be undertaken by people with a strong expertise on health and the environment and about ship recycling practices.

Introducing an obligation for EU flagged ships to be dismantled in a list of audited and certified facilities worldwide only.

EU flagged ships would be allowed to be dismantled only in a list of audited and certified ship dismantling facilities. This list would be compiled by the European Commission and would contain the data and information indicated above regarding ship dismantling facilities.

In order to be added on this list, ship dismantling facilities would have to:

- be audited by EU's recognized organisations and receive a "document of compliance" ensuring the facility's compliance with the requirements concerning ship recycling facilities contained in the Ship Recycling Regulation,
- transmit the information requested by the Hong Kong Convention to the Commission as well as relevant information regarding any limitation regarding the type of ships and/or hazardous materials that they can accept (see above).

In order to ensure the expertise of the EU recognized organisation about ship recycling, the Ship Recycling Regulation would contain a provision amending the Annex to the council directive 94/57/EC containing the minimum criteria for recognized organizations in order to add references to expertise on ship dismantling and its human health and environmental impacts.

Environmental and social impacts

The quantitative environmental and social impacts will be similar to the ones of option D. By applying this scheme the EU would increase transparency and compliance by providing a tool to monitor that the facilities to which EU-flagged vessels are sent for dismantling comply with the applicable standards and rules on safe and environmentally sound recycling of ships. The participating facilities themselves would have a better control of operations and of their compliance with international standards, the rules of the Hong Kong Convention and also national legislation. Moreover there would be an economical incentive for these facilities to be in the scheme so as to be legally authorized to receive EU flagged ships.

The certificate would give them an incentive to improve environmental and safety performance. Certified facilities would serve as a benchmark for the industry and for national competent authorities.

Significant impacts on the environment and social conditions in the EU are not likely.

Economic impacts

All economic impacts but the ones of shipowners will be similar to the ones of option D.

The additional auditing of performance indicators and the classification would produce costs for recycling facilities in the range of 20,000-40,000 € plus internal personnel costs of 1-2 man years (2160-4320 €).

A study undertaken on behalf of the Commission¹²⁵ developed a list of criteria based on the Hong Kong Convention as well as a first list of 25 facilities with a total dismantling capacity of 2,4 million LDT. This capacity will be largely sufficient to treat all EU flagged ships (the maximum volume of EU flagged ships to be dismantled in the period 2012-2030 is of 1,88 million LDT).

Considering that during the 5 years during which they will be certified, these facilities will treat a yearly average of 1,6 million LDT of EU-flagged ships. The auditing cost would

represent 0.139 €LDT so negligible compared to the current dismantling prices. It is therefore not expected to have a noticeable impact on transport costs or on consumers

Costs and revenues - ship owner (€)	2015	2020	2025	2030
Costs (€)				
Inventories new ships	336 289	465 195	513 636	763 902
Inventories existing ships	0	74 951 663	1 547 425	2 220 031
Certificates	543 209	36 597 952	8 175 073	11 728 464
Ready for recycling certificate	729 581	1 830 276	2 020 865	3 005 517
Costs for checking certificates	342 932	834 496	1 015 293	1 235 259
Audit and certification	202 210	229 910	208 647	255 051
Revenues				
Selling ships for recycling	356 838 522	510 178 469	563 303 925	837 769 918
Total (+/-)	354 684 301	395 268 977	549 822 987	549 776 583