

An illustration of a port scene. In the background, two large white wind turbines stand on a pier. A blue ship is docked at the pier. In the foreground, there are stacks of colorful shipping containers in shades of green, blue, orange, and yellow. A small white crane is visible on the left. The sky is blue with some clouds.

# Clean Shipping

Towards  
an integrated  
approach of  
sustainable  
shipping

Transport of passengers and goods - both within the EU and between Europe and other parts of the world - is increasing. Congestion, air pollution, energy demand and environmental and safety risks are linked to the growing demand for mobility, making the need for sustainable transport ever stronger. Shipping is often seen as a solution for those problems. This is reflected among others in the promotion of Sea Motorways. However, with this modal shift from land to sea, the focus should be on sustainable transport and not just shifting the environmental problems to the marine environment. Clean Shipping is a visionary approach aiming to develop the concept of Vessels and Ports designed, constructed and operated in an integrated manner to eliminate harmful discharges and emissions throughout their working life. Implementing the Clean Shipping approach requires commitment and support from many different stakeholders. DG Environment supports the approach wholeheartedly and wants to challenge stakeholders in the maritime industry to develop initiatives leading towards truly sustainable shipping.

Stavros Dimas  
EU Commissioner for the Environment

## Clean shipping

## Setting the course

Shipping is a crucial, but highly invisible activity in delivering all sorts of products to consumers. Most people are unaware that almost every product has been transported by sea at some stage. Ships will remain a key transport mode for moving objects and people. However, significant negative side effects of shipping should be considered. This brings in the need for a revolution in ship design, operation on board, management in ports and ship dismantling. Clean Shipping is an integrated approach towards sustainable shipping. Integrated has three meanings. First of all, it means tackling all environmental and social costs from cradle to cradle. Secondly, it means that a participatory process is needed to bring together all stakeholders involved to make this vision a reality. And thirdly, a sophisticated set of instruments is needed in order to fulfill the aim of clean ships and clean ports.

This 'sketchbook' gives you an idea what the Clean Shipping approach is about. The long-term target is zero-emission. Environmental problems are identified and directions for solutions suggested. We want to discuss this with relevant stakeholders, not just ship owners and crew, but also port managers, charter parties, cargo owners, insurers, financiers, class societies and policy makers. With their ideas about innovative technologies, stimulating incentives and possible actions that need to be included in the Clean Shipping approach, these stakeholders play a key role in sustainable shipping.

We invite you to become one of the navigators!



# Major issues

## Today's situation

Shipping causes a wide range of effects on the marine environment. Well-known disasters with tankers like Erika (1999) and Prestige (2001) come directly to mind.

These accidents only form the tip of the shipping pollution iceberg. Most of the harmful emissions come from the daily release of various substances. Intentional and unintentional discharges of oil, chemical cargo residues, garbage and cleaning agents, anti-fouling paint, exhaust and other air emissions and non-indigenous species from ballast water have an ongoing adverse impact on life in the world's seas.

Effects can be seen on land too. Exhaust emissions (SO<sub>2</sub>, NO<sub>x</sub> and PM) have detrimental effects on the environment and the health of people in coastal and harbour areas. It is estimated that the greenhouse gas emissions (CO<sub>2</sub>) of the shipping industry are 4% of the global total and double those of aviation! Since shipping is not covered by the Kyoto climate change treaty, there are no incentives under this treaty for the shipping industry to lower its emissions.

Copious amounts of waste generated on board of ships are still being thrown overboard, harming our marine environment, leaving beaches scattered with empty oil drums, jerry cans, strapping bands, industrial packaging, spray cans, plastics, paint brushes, metal scrap etc. as proof. Port Reception Facilities (PRF's) are not being used to its full potential.

And last but not least there is the problem of ship dismantling; end-of-life ships are being dumped on beaches in South Asia for dismantling.



# Solutions

## Clean Shipping

The integrated Clean Shipping approach focuses on three fronts: Ships, Ports and Cargo.

## Clean Ship

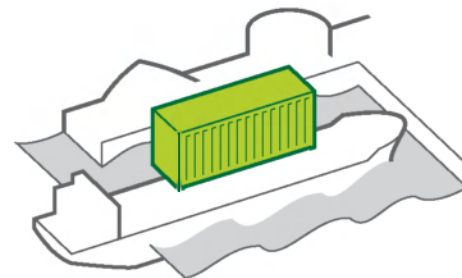
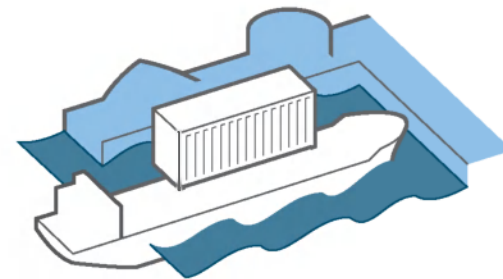
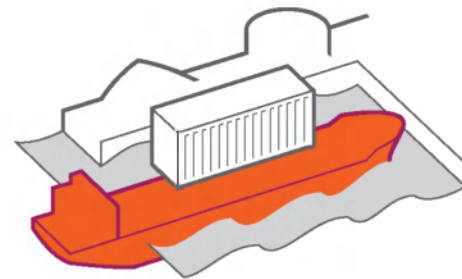
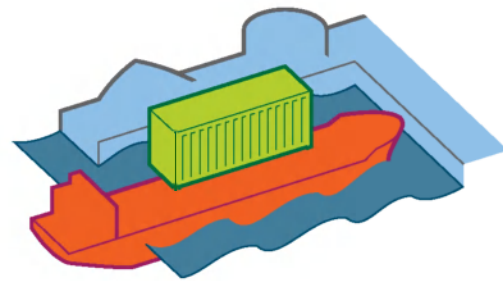
A state of the art ship that is welcome in every port, causing no negative effects to the environment. The long term target is zero emission.

## Clean Port

A highly efficient port with excellent environmental services and strong incentives to facilitate and encourage Clean Shipping.

## Clean Cargo

To improve their corporate footprint, cargo owners include environmental issues in their decision making process when contracting carriers.



## Stimulating innovation

Technology may show the way out of some persistent environmental problems. Stimulating innovation in the maritime sector is crucial, keeping in mind that a technical solution to one problem should not lead to others. There is a cross-link between innovation and environmental policy: once technologies are available, this allows more ambitious policy instruments.

## Education and public awareness

Most ships' officers are well trained: they know everything about operating their ship. For them, the sea is like a road, but they are unaware of the valuable marine ecosystem under water. Environmental awareness of the crew is of vital importance to stimulate Clean Shipping. Educating stakeholders not directly involved in operating a ship may also help the implementation of environmental measures.

## Financial instruments

Port authorities and governments can create strong incentives like reduced harbour dues for clean and efficient ships and install fines for polluters, in line with the polluter pays principle. Port dues together with environmental services like Port Reception Facilities stimulate shipping companies to optimise their environmental performance.

## Influencing logistic chains

Many actors are involved in distributing goods, from producer to consumer, with a wide range of stakeholders in between. Cargo owners, for instance, may demand environmental requirements of their ocean carriers that are more ambitious than current legislation. Investors like banks and pension funds are on the top of the chain and can play a significant role by exclusively investing in Clean Shipping. The public opinion is of decisive importance in Corporate Social Responsibility (CSR) policies.

## Regulation

Existing IMO rules (Marpol) are the bottom line for shipping, new rules should make it more difficult for offenders to stay in business. Strengthened enforcement remains important: if polluters do not get caught or if the fines are too low, environmental offences will remain a minor business risk. New regulation should encourage innovation, not only setting a standard for now, but also one for the near future.

# Incentives





Windmill

Kite technology

Clean Fuels

Cargo handling

Cargo Owners

Ballast-free design

Advanced propulsion

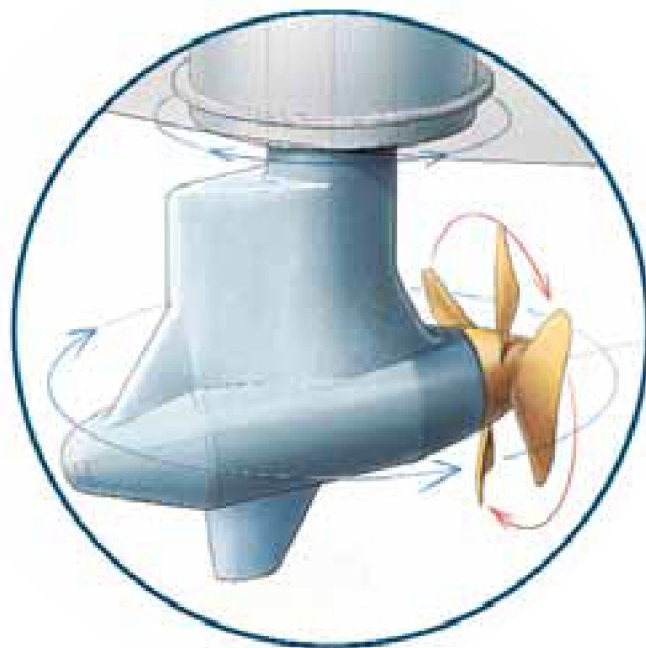
Fuel cells

Non-friction paint

Shore Power

Port Reception Facility





## Fuel and Propulsion

Today's engines are able to burn any kind of hydrocarbons - the fuel does not even have to be fluid at room temperature -. Bunker fuels (HDMO) contain many polluting substances as they are the remains of the refineries. An important first step to reduce air emissions is the introduction of cleaner fuels like MDO and LNG. A cleaner method of propulsion is wind energy. Sails are used since ages, and new options are in development such as the revolutionary kite technology.

## Logistics

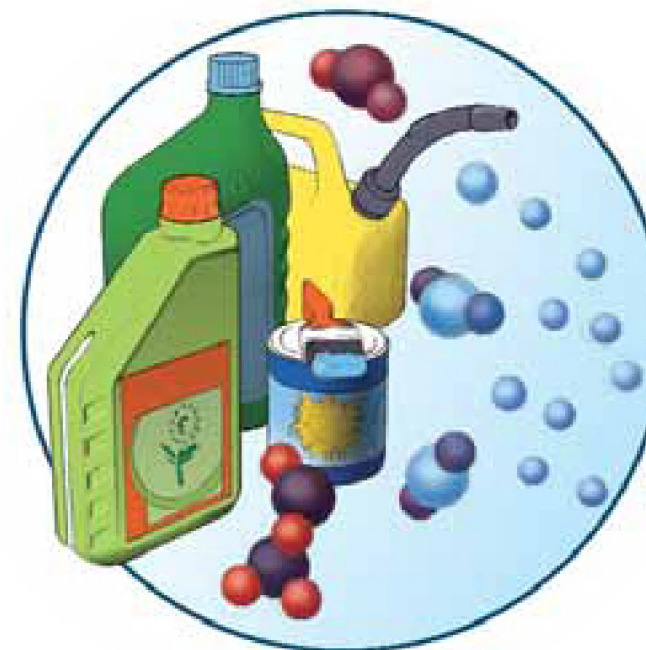
Optimised logistics operations often lead to lower emissions. A lot of products are being 'over-transported': from a to b, further on to c, and, sometimes back to a again. Another element is adjusting the ship's speed according to weather (weather routing) and implementing timeslots. By adjusting to optimal speed and decreasing port waiting times, great profits can be gained from both an economic as well as an environmental perspective.

## Lubricants and cleaning agents

Lubricants and cleaning agents have a detrimental effect on the environment, whilst well-functioning alternatives are available. Biodegradable stern tube oils with a low toxic profile and no negative environmental effects should replace conventional lubricants. Environmentally adapted cleaning agents should not be harmful to the environment, affect the bilge water treatment system or be hazardous to health.

## Ballastwater

The introduction of exotic species is threatening ecosystems. Once introduced, opportunistic expansion can often not be reversed. Ballast water is therefore a top priority. Current solutions like electrochemical disinfection and enroute ballast water exchange systems are all focus on the treatment and management of ballast water. The ultimate solution is however to develop ballast-water-free ships.





## Human awareness

Crucial to Clean Shipping is commitment of officers and crew on board; they have to act with respect for the environment. Waste should be avoided and not be thrown over board. Investing in the human factor is an essential element in achieving sustainable shipping. A first step is to train officers and crew members about the marine environment. Educating other stakeholders in the maritime transport industry is an additional step.

## Port Reception Facilities (PRF's)

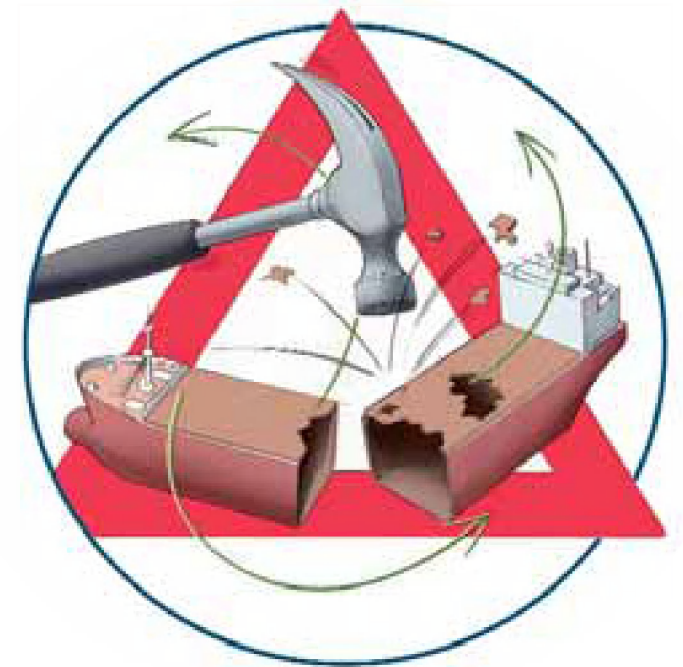
Efficient and easily accessible PRF's play an essential role in waste management of shipping. The only right place for a ship to dispose of waste is the Port Reception Facility; therefore an efficient PRF is essential for a Clean Port. Ports should have a clear policy on garbage and sludge disposal. Communication about environmental services to port-entering ships is of major importance.

## Corporate Social Responsibility (CSR)

Cargo owners can play an important role in stimulating innovations in the shipping industry, by requiring best practices and Best Available Techniques from their providers of logistic service. A benefit of a good environmental attitude towards ocean transport is that it tightens customer relationships and can result in long-term contracts. The push for standards on vessels will reduce the cost of developing new techniques. Innovations will become cheaper by creating higher demand. Banks will choose to invest in Clean Shipping because of their CSR policy.

## Ship Dismantling

The current practice where a majority of the end-of-life vessels are being dismantled on South Asian beaches under extremely dangerous and environmentally damaging conditions is not acceptable. Dismantling should be done in a contained area, such as a dry-dock, and in accordance to international safety and occupational health standards. To achieve this, strong regulation is needed as well as Corporate Social Responsibility within the maritime sector. A funding system based on polluter pays/producer responsibility would be an important step towards clean and safe dismantling of ships.





## What ideas do you have?

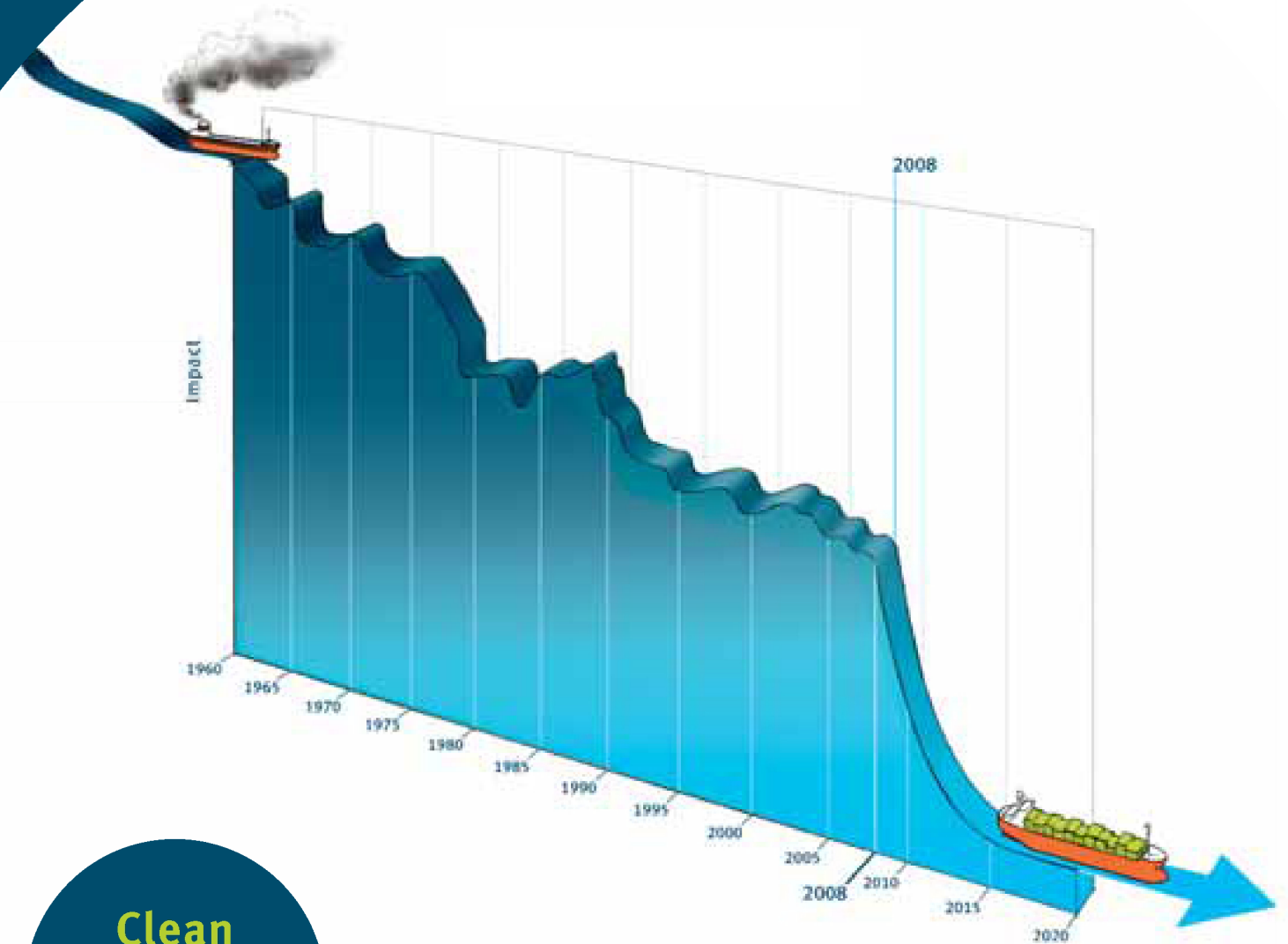
This 'sketchbook' is not a blue print dictating how future shipping must look like, but an invitation to participate and co-design. We are interested to hear your ideas on eco-efficient technologies and best practices; which technologies are not only environmentally preferable but also generate added-value for the maritime industry?

Are you aware of any smart ideas or technologies from other sectors that can be applied in the maritime industry? Do you have suggestions for incentives to stimulate stakeholders involved in the sea transport chain to invest pro-actively in the future of Sustainable Shipping?

We have given some of our ideas in this sketchbook and are interested to hear your suggestions.

Please, let us realise a sustainable future in shipping!

**Clean  
Shipping  
Concept**





# Clean Shipping

**Towards  
an integrated  
approach of  
sustainable  
shipping**



North Sea Foundation  
Drieharingstraat 25  
NL 3511 BH Utrecht  
The Netherlands  
+31 30 2340016

info@noordzee.nl  
www.noordzee.nl

The North Sea Foundation is a Dutch professional environmental NGO that stands up for the North Sea. The North Sea Foundation chooses for a constructive approach and open dialogue that enables us to influence marine environmental policies, politicians and important user groups. When required, action is taken, whether that be legal, media pressure or public awareness raising.

This sketchbook is produced by the North Sea Foundation (Utrecht, the Netherlands). Text: Eelco Leemans, Esther Luiten, Jeroen Dagevos, Merijn Hougee.  
Illustrations: Paul Maas/Eric van Rootselaar illustratoren Design: Ster design © 2008 Stichting De Noordzee, Utrecht