

TURUN YLIOPISTON
MERENKULKUALAN KOULUTUS- JA TUTKIMUSKESKUKSEN JULKAISUJA

PUBLICATIONS OF THE CENTRE FOR MARITIME STUDIES
UNIVERSITY OF TURKU

A 69
2013

THE ENVIRONMENTAL STATUS OF THE PORT OF HAMINAKOTKA

Olli-Pekka Brunila



This project is co-funded by the European Union,
the Russian Federation and the Republic of Finland



TURUN YLIOPISTON
MERENKULKUALAN KOULUTUS- JA TUTKIMUSKESKUKSEN JULKAISUJA

PUBLIKATIONER AV SJÖFARTSBRANSCHENS UTBILDNINGS- OCH
FORSKNINGSCENTRAL VID ÅBO UNIVERSITET

PUBLICATIONS OF THE CENTRE FOR MARITIME STUDIES
UNIVERSITY OF TURKU

A 69
2013

THE ENVIRONMENTAL STATUS OF THE PORT OF HAMINAKOTKA

Olli-Pekka Brunila

Turku 2013

JULKAISIJA / PUBLISHER:
Turun yliopisto / University of Turku
MERENKULKUALAN KOULUTUS- JA TUTKIMUSKESKUS
CENTRE FOR MARITIME STUDIES

Käyntiosoite / Visiting address:
ICT-talo, Joukahaisenkatu 3-5 B, 4.krs, Turku

Postiosoite / Postal address:
FI-20014 TURUN YLIOPISTO

Puh. / Tel. +358 (0)2 333 51
<http://mkk.utu.fi>

Kopijyvä Oy
Kouvola 2013

ISBN 978-951-29-5532-9 (paperback)

ISBN 978-951-29-5533-6 (PDF)

ISSN 1456–1816

FOREWORD

Environmental safety and protection and ecologically sustainable development are currently among the greatest challenges faced by our society. In maritime ports and related activities, environmental issues are constantly emerging and becoming a competitive factor. According to the Baltic Sea Strategy of the European Union, the situations of the Baltic Sea states must be improved and the co-operation between the countries in the Baltic Sea region should be promoted and supported in order to develop environmental protection. The aim of this report is to present the environmental status of Finnish ports and especially the port of HaminaKotka. Another focus is to collect the legislation that affects ports and port operation in Finland.

This study has looked at the way ports and port operations are affected by Finnish legislation, EU legislation and International conventions from IMO. In addition, Finnish ports have their own environmental projects which increase the level of environmental protection in the area.

Over twenty Acts, Directives plus conventions affect port operations in Finland. A Finnish port must also have an Environmental Permit for their operation, which is not mandatory for other European ports. Environmental awareness increases the port's environmental advantage over other ports, but making money is still the most important thing, especially in the poor economic situation where we are currently living in. Nevertheless, the environmental status of the Finnish ports is very good and many environmental aspects have been taken into consideration in port operations.

This report is a part of the Ecologically Friendly Port Ust-Luga (EFP) project, which was launched in December 2012. It is funded by the CBC ENPI programme "South-East Finland-Russia" 2007-2013. The duration of the project is 24 months. The project is led by the Russian State's Hydrometeorological University (RSHU). The project consortium includes Ust-Luga Company JSC, University of Turku Centre for Maritime Studies and Kymenlaakso University of Applied Science. The project associates are Port of HaminaKotka, City of Kotka, Finnish Port Association and Administration of Leningrad Region Committee on Natural Resources.

The author would like to express his gratitude to those who participated in this study, and the sponsors and partners of EFP project. Ph.D Jani Häkkinen and M.Sc.Vappu Kunnaala are acknowledged for reviewing the report.

Kotka, 30 August 2013

Olli-Pekka Brunila
Centre for Maritime Studies
University of Turku

Ecologically Friendly Port – project sponsors



Project partners



Associated members



ABSTRACT

This study is a part of the Ecologically Friendly Port Ust-Luga (EFP) project. The purpose of this study is to examine the environmental status of the Finnish ports and, more specifically, the Port of HaminaKotka. An analysis of the environmental status is performed mainly as a literature review, because the Finnish ports must comply with Finnish and EU legislation and with the binding international regulations and conventions created by different organizations.

The International Maritime Organisation (IMO) has done groundbreaking work in the field of maritime safety and maritime environmental protection. The MARPOL convention has a great impact on decreasing pollution from international shipping and it applies to 99% of the world's merchant tonnage. Pollution prevention covers: Oil pollution, Chemical pollution, Air pollution and GHG Emissions, Dumping of Wasted and Other Matters, Garbage, Sewage, Port Reception Facilities, Special Areas under MARPOL and Particularly Sensitive Sea Areas. There is also Pollution Prevention for other treaties like anti-fouling systems used on ships, the transfer of alien species by ships' ballast water and the environmentally sound recycling of ships.

There are more than twenty different EU and international regulations that influence ports and port operations in Finland. In addition, there is also national legislation that has an effect on Finnish ports. For the most part, the legislation for ports is common in the EU area, but the biggest and most important difference between the legislation in Finland and other EU countries is due to the Act on Environmental Impact Assessment Procedure. The Act states that the environmental impact assessment procedure shall be applied to projects that may have significant adverse environmental impacts, due to the special features of Finland's nature and environment. In this Act, the term environmental impact refers to the direct and indirect effects inside and outside Finnish territory of a project or operations on human health, living conditions and amenity; soil, water, air, climate, organisms, interaction between them and biodiversity; community structure, buildings, landscape, townscape and cultural heritage; utilization of natural resources.

In Finland, the Environmental Permit requires that ports collect all necessary information concerning environmental effects and make required reports to the Finnish authorities, stakeholders and the public. Commonly, environmental reporting is public and environmental achievements are emphasized in reporting and in media. At the moment, the problem in environmental reporting is that it's difficult to compare data from different ports. There is enough data concerning the environmental effects and performance, but the manner of reporting and the quality of the data varies between ports. There are differences in the units and codes used, in some cases the information is not sufficient and it can even be rather unreliable. There are also differences regarding the subjects that are emphasized in reporting.

TIIVISTELMÄ

Tämä tutkimus on tehty osana Ecologically Friendly Port Ust - Luga (EFP) -hanketta. Tutkimuksen tarkoituksena on tutkia ja selvittää Suomen satamien sekä erityisesti HaminaKotka-sataman ympäristövalveutuneisuuden tilaa. Tutkimus on toteutettu lähinnä lainopillisena tutkimuksena, koska Suomen satamat noudattavat Suomen ja EU:n välistä lainsäädäntöä ja joissakin tapauksissa kansainvälisiä säädöksiä.

Kansainvälinen Merenkulkujärjestö (IMO) on tehnyt urauurtavaa työtä merenkulun turvallisuuden ja meriympäristön suojelussa. MARPOL-yleissopimuksella on ollut suuri vaikutus kansainvälisen laivaliikenteen aiheuttaman saastumisen vähentämisessä ja 99 % maailman laivastosta noudattaa sopimusta. Saastumisen ehkäisy kattaa öljypäästöt, kemikaalipäästöt, ilmansaasteet ja kasvihuonekaasupäästöt, jätteiden mereen laskemisen, jätteet, jätevesi, satamien jätteiden vastaanoton, MARPOL-yleissopimuksen määrittelemät erityisalueet ja erityisen herkäät merialueet. Merien pilaantumista ehkäistään myös muilla sopimuksilla koskien mm. laivojen eliönestomaaleja, alusten painolastivesien mukana kulkeutuvia tulokaslajeja sekä alusten ympäristöystävällisempää kierrätystä.

On olemassa yli kaksikymmentä eri EU- ja kansainvälistä säännöstä, jotka vaikuttavat Suomen satamiin ja satamien toimintaan. Lisäksi suomalaisten satamien tulee noudattaa myös kansallista lainsäädäntöä. Enimmäkseen lainsäädäntö on yhtäläinen EU:n alueen satamissa, mutta eroavaisuuksiakin löytyy. Näistä suurin ja tärkein perustuu lakiin ympäristövaikutusten arviointimenettelystä (YVA). Menettelyä sovelletaan hankkeisiin, joilla voi olla merkittäviä haitallisia ympäristövaikutuksia Suomen luontoon ja ympäristöön. Ympäristövaikutuksilla tarkoitetaan sellaisia suoria ja välillisiä vaikutuksia Suomen rajojen sisällä ja ulkopuolella, jotka voivat kohdistua ihmisten terveyteen, elinoloihin ja virkistyskäyttöön, maaperään, veteen, ilmaan, ilmastoon, organismeihin, luonnon monimuotoisuuteen, yhdyskuntarakenteeseen, rakennuksiin, maisemaan, kaupunkikuvaan ja kulttuuriperintöön sekä luonnonvarojen hyödyntämiseen.

Suomessa ympäristölupa edellyttää, että satamat keräävät ympäristötietoja ja raportoivat niistä luvan myöntäjille, virkamiehille, eri sidosryhmille ja kansalaisille. Yleisesti ympäristöraportointi on avointa ja ympäristötekoja painotetaan raportoinnissa ja mediassa. Tällä hetkellä suurin ongelma ympäristöä koskevassa raportoinnissa on tiedon vertailtavuus. Ympäristötietoa kerätään jo riittävästi, mutta raportointikäytännöt vaihtelevat satamien välillä. Eroja voi olla yksiköissä, jätejakeiden numeroinnissa ja joissakin tapauksissa tietoja ei ole riittävästi tai ne voivat olla jopa epäluotettavia. Eroja esiintyy myös siinä, mitä asioita raportoinnissa korostetaan.

TABLE OF CONTENTS

1	INTRODUCTION	9
1.1	General.....	9
1.2	The Ecologically Friendly Port Ust-Luga project	9
1.3	Purpose and methodology of this study.....	11
1.4	The structure of the report	11
2	PORT RELATED LEGISLATION IN the EU	13
2.1	The Bird Directive and the Habitat directive	13
2.2	The Sulphur Directive	14
2.3	Pollution from Ships and Ports.....	15
2.4	Reduction of Greenhouse Gas Emissions and the EU's Energy strategy.....	15
2.5	Port Reception Facilities.....	17
2.6	Water and Marine Strategy Framework Directives.....	17
3	NATIONAL ENVIRONMENTAL LEGISLATION IN FINLAND	19
3.1	Finnish Nature Conservation Environmental Protection and Environment Protection Decree	19
3.2	Act on Environmental Impact Assessment Procedure	20
3.3	Act on Environmental Protection in Maritime Transport.....	20
4	INTERNATIONAL ENVIRONMENTAL LEGISLATION IN THE MARITIME SECTOR	22
4.1	MARPOL convention.....	22
4.2	Oil and Chemical pollution	22
4.3	Prevention of Pollution by Garbage from Ships.....	23
4.4	Ballast Water Management	24
4.5	Energy efficiency and the reduction of GHG emissions from ships	25
4.6	Particularly Sensitive Sea Area	25
4.7	United Nations Convention on the Law of the Sea (UNCLOS)	26
4.8	Helsinki-Convention (HELCON).....	29
5	THE CURRENT ENVIRONMENTAL STATUS OF HAMINAKOTKA PORT	33
5.1	Collection of information in ports	33
5.2	Collected data and information from the Finnish ports.....	34
5.3	Other environmental impacts that are measured in port statistics	36
5.4	Noise and vibration.....	36
5.5	VAHTI - data system.....	37
6	CONCLUSIONS AND SUMMARY	41
	REFERENCES	45

1 INTRODUCTION

1.1 General

Almost 15% of the world's maritime transportation is carried out in the Baltic Sea. (HELCOM 2009) In 2010, approximately 809 Million tons of cargo was handled in the ports of the Baltic Sea. The market share of the traffic volume in the ports of the eastern Gulf of Finland (HaminaKotka, Vyborg, Vysotsk, Primorsk, St. Petersburg, Ust-Luga) covered approx. 21% of the total traffic tons in the Baltic Sea in 2010. (Holma et al 2011)

The Baltic Sea is one the busiest and most polluted seas in the world. The condition of the Baltic Sea has been studied for many years. Its oxygen level has increased slightly, but the situation is still quite severe. There are no benthic animals in the Baltic Proper, and large areas of the seabed are either suffering or dead. The condition of the coastal waters in the Gulf of Finland has improved in the outer archipelago areas since 2006. There have, unfortunately, been some serious nitrogen and phosphorus leakages, but the overall situation has not changed much in the past few years. (YLE 2013) The most common challenges of the Baltic Sea countries deal with are increasing the oxygen level and reducing eutrophication, reducing the level of nutrients, sulphur, CO₂ and GHG, and reducing pollution from agriculture and transportation.

In Finland, the ports that are intended primarily for merchant shipping and where ships with more than 1 350 tonnes are loaded and unloaded need an Environmental permit for port operations. (The Environmental Protection Act (2000/86) and the Environmental Protection Degree (2000/169)). The majority of Finnish ports are members of the Finnish Port Association and have an environmental permit for their activities. The significant environmental impacts caused by the ports are the construction of the port, water and road transport emissions, waste management, and the introduction of noise and other adverse effects such as dust and odors resulting from the loading and unloading operations. In the port there can be a number of different players, but the port authority only requires one environmental permit. An exception to this are companies who store chemicals and oil or process oil or chemical products in the port area. These companies need their own environmental permits. The environmental permit requires a lot of close co-operation between the different actors and stakeholders and the officials that have granted the environmental permit. (Finnish Port Association 2010)

1.2 The Ecologically Friendly Port Ust-Luga project

Environmental safety and protection, as well as ecologically sustainable development, are currently among the greatest challenges faced by our society. In maritime ports and related activities, environmental issues are constantly emerging and becoming a competitive factor. According to the Baltic Sea Strategy of the EU, the situations of the Baltic Sea states must be improved and co-operation between the Baltic Sea region

countries should be promoted and supported in order to develop environmental protection.

The Ecologically Friendly Port Ust-Luga (EFP) project was launched in December 2012. It is funded by the CBC ENPI programme “South-East Finland-Russia” 2007-2013. The total budget of the project is 570 000 Euros. The duration of the project is 24 months. The project is led by the Russian State’s Hydrometeorological University (RSHU). The project consortium includes Ust-Luga Company JSC, University of Turku Centre for Maritime Studies and Kymenlaakso University of Applied Science. The project associates are Port of HaminaKotka, City of Kotka, Finnish Port Association and Administration of Leningrad Region Committee on Natural Resources.

The main objectives of the project

- Improving the environmental status of the eastern part of the Gulf of Finland
- Improving the ability of the ports to develop environmental protection and sustainable growth in the ports
- Improving the municipalities’ ability to enhance environmental safety issues.
- Increasing the awareness of citizens concerning green thinking

Establishing a close bilateral cooperation between the citizens and authorities on the basis of green values, green Economy and Ecological mentality aimed at sustainable regional development. Increasing the ecological knowledge and understanding of responsibility for the global challenge of climate change of Russian and Finnish ports and enterprises.

Increasing the knowledge and co-operation between the port authorities and port actors. Activities include implementation of several projects, namely: analyzing the environmental status of the region and developing compensatory measures, studying environmental regulations and establishing a monitoring center, co-operation with stakeholders and a social project part called “Port in the city”.

The main outputs of the project

- The results of field surveys concerning hydrometeorological, oceanological, biological and anthropogenic impacts of the Ust-Luga Bay and its coasts
- The results of a review on the environmental status of the port of HaminaKotka
- Recommendations for decreasing air emissions in the port of HaminaKotka
- Recommendations for improving energy effectiveness in the port of HaminaKotka
- Recommendations for decreasing noise levels in the port of HaminaKotka
- A description of the light and movable noise wall for the use of ports
- A report about the policy instruments and best practices in Finland
- Conference about the project results in St. Petersburg
- Eco-Monitoring center in the port of Ust-Luga

- Recommendations regarding the development of co-operation between stakeholders in the port of HaminaKotka
- Board of GREEN Business Leaders who will create Sustainable Strategy and Action Plan for the Ust-Luga area.
- Best practices of environmental management practices in ports
- A report about the factors that affect the relationship between the citizens and ports
- Environmental strategy for sustainable development of the Ust-Luga port
- “Ecologically Friendly Internet Forums” in facebook, Vkontakte and youtube
- Festival of Water in Ust-Luga
- Summer ecological camp in Ust-Luga
- Photo contest “Green mentality”, theme of the year is “Water”

1.3 Purpose and methodology of this study

The purpose of this study is to present the environmental status of the Finnish ports and especially the port of HaminaKotka. An analysis of the environmental status is performed mainly as legislation research, because Finnish ports must comply with Finnish and EU legislation and with the binding international regulations and conventions created by different organizations. In this project, both Finnish and Russian partners carry out a same kind of a survey and a current state analysis of the port and their environmental awareness.

The study focuses on Finnish national and EU legislation and different kinds of international maritime or port regulations. Because every commercial port in Finland must have an environmental permit for their operations, no significant differences between the different ports in Finland exist. Therefore, in this report only the port of HaminaKotka is examined. The legislation and regulations studied are collected from various internet sources and the VAHTI environmental system. The main sources were the EU legislation database, the Finnish legislation database, the Nature and Nurture of Northern Baltic Sea (NANNUT) project and the Organisation’s reports.

1.4 The structure of the report

The report is structured as follows. Chapter 2 contains the port related legislation at the EU level. There are a lot of different regulations, but only the most important ones are presented in this text. Chapter 3 focuses on the Finnish national legislation. The EU and Finnish legislations are mainly uniform, but in the Finnish national legislation, some special environmental protection regulations exist that are not included in the EU legislation.

In chapter 4, international legislation and regulations mainly from the International

Maritime Organisation (IMO) are presented. The chapter also includes future legislation that will enter into force in the next few years. Chapter 5 contains the environmental status of the port of HaminaKotka. The chapter presents the environmental data and information that must be collected every year for the environmental permit, for the environmental reporting and for the stakeholders and residence.

This report was written by Olli-Pekka Brunila from the University of Turku Centre for Maritime Studies, the Maritime Logistics Research unit.

2 PORT RELATED LEGISLATION IN THE EU

2.1 The Bird Directive and the Habitat directive

In EU legislation, there are over twenty acts or directives that affect ports and port related areas. The first environmental protection act given was the so called Birds Directive (Council Directive 79/409/EEC on the conservation of wild birds) that was accepted in 1979. A new codified version of the directive was approved in 2009 (Directive 2009/147/EC). The directive relates to the conservation of all species of naturally occurring birds in the wild state in the European territory of the Member States to which the treaty applies. It covers the protection, management and control of all species of wild birds and lays down rules for their exploitation. The EU member states are increasingly concerned about the declines of Europe's wild bird populations as a result of pollution, loss of habitats and unsustainable use. It was also recognized that wild birds, many of which are migratory, are a shared heritage of the Member States and that their effective conservation requires international co-operation. (Council Directive 79/409/EEC; ESPO 2012; European Commission 2013a)

The so called Habitats Directive (Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) is the centerpiece of the EU's nature and biodiversity policy. It is a piece of legislation that protects nature and animals. The Natura 2000 network that was created to preserve natural biodiversity consists of the protected sites defined in the Birds and Habitats Directives, marine environment, wilderness and different barometers and databases. (European Commission 2013a)

Natura 2000 is an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It comprises of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive. The Habitats Directive together with the Birds Directive forms the cornerstone of Europe's nature conservation policy. There are over 1,000 animal and plant species and over 200 so called "habitat types" (special types of forests, meadows, wetlands, etc.) which are protected in the directive. (European Commission 2013a)

While the network will certainly include nature reserves, most of the areas that need to be preserved are likely to continue to be privately owned and hence the emphasis will be on ensuring that future management is sustainable, both ecologically and economically. (ESPO 2012; European Commission 2013a)

The European Commission has a biodiversity strategy for the year 2020, adopted in 2012. The year 2010 was the European Year of Biodiversity. There are six main targets, and 20 actions to help Europe reach its goal. Biodiversity loss is an enormous challenge in the EU, with around one in four species currently threatened with extinction and 88% of the fish stocks over-exploited or significantly depleted.

The six targets of the EU's biodiversity strategy cover:

- Full implementation of the EU's nature legislation to protect biodiversity
- Better protection for ecosystems, and more use of green infrastructure
- More sustainable agriculture and forestry
- Better management of fish stocks
- Tighter controls on invasive alien species
- A bigger EU contribution to avert global biodiversity loss. (European Commission 2013a)

For the year 2020, the main target is to stop the loss of biodiversity and the degradation of ecosystem services in the EU. The second target is a 2050 vision: *“By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.”* (European Commission 2011; European Commission 2013a)

2.2 The Sulphur Directive

The so called Sulphur Directive (Directive 2012/33/EU) has created contradictory feelings, especially in Finland. The view in national mass media has been that the Sulphur Directive may cause unemployment, while some of the experts say that the directive can offer new opportunities and creates new business. Sulphur is, by nature, present in liquid and solid fuels such as oil and coal. Marine fuel contains a lot of sulphur compared to the fuels used in road transportation. The combustion of these fuels creates sulphur oxides (SOX) and particulate matter including primary soot particles, and secondary inorganic sulphate particles formed as a result of atmospheric oxidation of sulphur dioxide. During the combustion process, nitrogen oxides (NOx) are also formed. (ESPO 2012)

The Council directive from the year 1999 (1999/32/EC as regards the sulphur content of marine fuels) and the amending directives from the year 2005 (Directive 2005/33/EC) and 2012 (Directive 2012/33/EU) concern the sulphur content of marine fuels. The first directive from the year 1999 concerns the reduction of the sulphur content of certain liquid fuels and lays down the maximum permitted sulphur content of heavy fuel oils, gas oil, marine gas oil and marine diesel oil used in the European Union. In 2005, the content of the directive was updated to include the International Maritime Organisation's (IMO) established scheme (Annex VI of IMO Marpol Convention) to designate the North Sea, the English Channel and the Baltic Sea as a low sulphur area for ships, a so-called 'Sulphur Emission Control Area' (SECA). With this arrangement, the sulphur content of marine fuel used in these and similar areas will be further reduced to 0.1% by 1st January 2015. In the year 2012 the last amendments to the Sulphur Directive were adopted. The revised Sulphur Directive will be setting the limits

regarding the sulphur content of marine fuels to 0.1% within SECAs as of 1st January 2015 and to 0.5% elsewhere in Europe as of 2020.

2.3 Pollution from Ships and Ports

Prevention of pollution from the ships was adopted on 2 November 1973 at IMO in the MARPOL convention. The Protocol of 1978 was adopted in response to a spate of tanker accidents in 1976-1977. As the 1973 MARPOL Convention had not yet entered into force, the 1978 MARPOL Protocol absorbed the parent Convention. The combined instrument entered into force on 2nd October 1983. In 1997, a Protocol was adopted to amend the Convention and a new Annex VI was added, which entered into force on 19th May 2005. MARPOL has been updated by amendments through the years. (IMO 2013)

At the EU level, the measures implementing the existing regulations and directives in the field of maritime safety were adopted by a regulatory procedure involving the Committee set up by Council Directive 93/75/EEC in 1993, concerning minimum requirements for vessels bound for or leaving Community ports and carrying dangerous or polluting goods. The same year, as a part of the common policy on safe seas, the Council approved in principle the establishment of a Committee on Safe Seas and the Prevention of Pollution from Ships (COSS). In the year 2002, the European Parliament updated the COSS regulation (Regulation (EC) No 2099/2002 establishing a Committee on Safe Seas and the Prevention of Pollution from Ships (COSS) and amending the Regulations on maritime safety and the prevention of pollution from ships). The aim of the year 2002 regulation was to develop the implementation of Community legislation on maritime safety, prevention of pollution from ships and the protection of shipboard living and working conditions (ESPO 2012).

Another directive concerning ship-source pollution is the directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements. The purpose of this Directive is to incorporate international standards for ship-source pollution into Community law and to ensure that persons responsible for discharges are subject to adequate penalties in order to improve maritime safety and to enhance the protection of the marine environment from pollution by ships. This Directive is partially based on the MARPOL Protocol. (Directive 2005/35/EC)

2.4 Reduction of Greenhouse Gas Emissions and the EU's Energy strategy

The EU's aim to reduce Greenhouse Gas emissions is part of the EU's climate and energy strategy for the year 2020. Climate-related actions have been performed since 1991 at the EU level. The first community strategy was to decrease carbon dioxide (CO₂) levels. The European Union has created an ambitious energy strategy extending to the year 2020. The aims of the strategy are to reduce emissions of greenhouse gases by 20% (compared to the 1990 levels), to increase the share of renewable energies to 20 % of the EU's final energy consumption and to increase energy efficiency by 20 %. The

aims also include increasing the share of bio fuels in the transport sector to 10%. (Finland's Ministry of the Environment 2011) This Decision is essentially applicable to the industrial sector (including power plants, oil refineries and steel mills – accounting for almost half of the Union's CO₂ emissions). Although the Decision is not directly applicable to maritime transport, it clearly states that if no agreement is reached tackling the greenhouse gas (GHG) emissions from shipping at the international level, the Commission should take regional measures during 2012 to fulfill its international commitments in abating the climate change. Such a proposal should minimize the negative impacts on the Community's competitiveness while taking into account the potential environmental benefits. The Commission started an online consultation in spring 2012, as part of an impact assessment on potential measures that can be implemented at the EU level. The results of the impact assessment are expected before the end of 2012, while a political decision on an EU approach is expected to follow in 2013. (EMSA 2012)

The EU climate and energy package includes four directives: revision and strengthening of The Emission Trading System (ETS), An "Effort Sharing Decision" and Binding national targets for renewable energy and carbon capture and storage. (European Commission 2010) EU ETS is a cornerstone of the EU's policy to combat climate change and a tool for reducing greenhouse gas emissions. (European Commission 2013b) The system works by putting a limit on overall emissions from high-emitting industry sectors, which is then reduced each year. Within this limit, companies can buy and sell emission allowances as needed. This 'cap-and-trade' approach gives companies the flexibility they need to cut their emissions in the most cost-effective way. At the moment, the EU ETS covers more than 11,000 power stations and manufacturing plants in the 27 EU member states as well as Croatia, Iceland, Liechtenstein and Norway. Flights within and between most of these countries are also covered. In total, around 45% of total EU emissions are limited by the EU ETS. (European Commission 2013b)

The ETS systems have problems as well, because they do not cover sectors such as buildings, transport, agriculture and waste. The trade has not been so successful, because the price of carbon tonnage has gone down. In the year 2011, a new record in emission trading was made. The emission trade value was over 130 trillion euros, but a year later, in the year 2012, the trade was only 80-90 trillion euros. In the year 2013, the price of carbon tonnage will be reduced by one euro and the price of carbon tonnage will be around 6.5 euros. (CO₂- report 2012)

In the year 2001, the European Commission published a White Paper (COM(2001) 370) that included the European transport policy for the year 2010. In 2011, the European Commission published a White Paper (COM(2011) 144) that is a roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. The EU's White Paper is intended to decrease the emissions from the transport sector. The European Commission adopted a roadmap of 40 concrete initiatives for the next decade to build a competitive transport system that will increase mobility, remove major barriers in key areas, fuel growth and increase employment. At the same time, the proposals will dramatically reduce Europe's dependence on imported oil and cut carbon emissions in transport by 60% by 2050. The aim of the White Paper is to reduce

emissions in aviation up 50% by 2050, emissions of ships by 40-50% and reduce road transportation emissions by 80%. (European Commission 2012)

2.5 Port Reception Facilities

The aim of the Port Reception Facilities Directive (Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues) is to prevent and reduce the discharges of ship-generated waste and cargo residues into the sea. The Community is seriously concerned about the pollution of the seas and shores of the EU Member States. The main focus is diminishing illegal discharges from ships using ports in the Community area, by improving the availability and use of port reception facilities for ship-generated waste and cargo residues and thereby enhancing the protection of the marine environment. MARPOL 73/78 was designed to protect the marine environment through the complete elimination of pollution by oil and other harmful substances and the minimization of accidental discharge of such substances. MARPOL 73/78 was ratified by all Member States. (IMO 2013)

The directive on port reception facilities is applied to all ships including fishing vessels and recreational craft irrespective of their flag, calling at, or operating within, a port of a Member State, with the exception of any warship, naval auxiliary or other ship owned or operated by the State and used, for the time being, only on government non-commercial service and to all ports of the Member States normally visited by ships falling under the scope of point. (Directive 2000/59/EC)

The EU Member states must ensure that there are available port reception facilities for the needs of the ships normally using the port without causing undue delay to ships. Every port shall have a separate waste reception and handling plan. Member States shall ensure that the costs of port reception facilities for ship-generated waste, including the treatment and disposal of the waste, shall be covered through the collection of a fee from the ships. The cost recovery systems for using port reception facilities shall provide no incentive for ships to discharge their waste into the sea. (Directive 2000/59/EC)

2.6 Water and Marine Strategy Framework Directives

The aim of the Water Framework Directive (Directive 2000/60/EC establishing a framework for the Community action in the field of water policy) is to establish a framework for the protection of inland surface waters, transnational waters, coastal waters and groundwater. The purpose is to prevent further deterioration and protect and enhance the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands, directly depending on the aquatic ecosystems. What is relevant is the sustainable use and long-term protection of water sources. The protection and improvement of the aquatic environment, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and

the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances. Mitigating the effects of floods and droughts is one aim of the directive. (Directive 2000/60/EC)

The Water Framework Directive contains a very large number of tasks in a variety of areas, including scientific/technical, information management, economic and administrative, which must be addressed by each Member State. The Directive was adopted in the year 2000, but there have been many amendments. (Marine Institute 2013)

The aim of the EU's Marine Strategy Framework Directive (Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy) is to protect the marine environment more effectively across Europe. The goal of the Marine Strategy Framework Directive is in line with the objectives of the 2000 Water Framework Directive, which concerns surface freshwater and ground water. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The goal of the Directive is to take care of the protection and maintenance of the marine environment. Other goals are to prevent deterioration and improve the damaged ecosystem. The Marine Strategy Framework Directive constitutes the vital environmental components of the Union's future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment. (Directive 2008/56/EC)

The Marine Strategy Framework Directive divides the different European Marine Regions on the basis of geographical and environmental criteria. Each Member State has to cooperate with other Member States and non-EU countries within a marine region. Countries with the same marine region are required to develop strategies for their marine waters. The marine strategies to be developed by each Member State must contain a detailed assessment of the state of the environment, a definition of "good environmental status" at regional level and the establishment of clear environmental targets and monitoring programs. The development of strategies for the marine environment takes place in different phases. By 2015, a series of measures should be developed so as to be applicable in 2016. By 2020, the measures should result in a good state for the marine environment. (Directive 2008/56/EC; ESPO 2012)

3 NATIONAL ENVIRONMENTAL LEGISLATION IN FINLAND

3.1 Finnish Nature Conservation Environmental Protection and Environment Protection Decree

In Finnish legislation there are almost 90 different, laws, acts, regulation or rules which affects to Finnish ports operation and port construction. The aim of the Nature Conservation Act (NCA, 1096/1996) is to maintain biological diversity, conserve the beauty and scenic values of nature, promote the sustainable use of natural resources and the natural environment, promote awareness and general interest in nature and promote scientific research (NCA 1 §). The Act transposes into Finnish national law the Habitats Directive (92/43/EEC), the Birds Directive and the Directive of the European Parliament and of the Council (2004/35/EC) on environmental liability with regard to the prevention and remedying of environmental damage, hereinafter the Environmental Liability Directive, unless its transposition is otherwise provided for in other legislation. (NCA 3 §)

The Environmental Protection Act (EPA, 86/2000) is to apply to all activities that lead or may lead to environmental pollution as laid down below. Environmental pollution refers to such emission or deposit of a substance, energy, noise, vibration, radiation, light, heat or odor. This Act also applies to activities that generate waste and to waste disposal. The objectives of this Act are to prevent the pollution of the environment and repair and reduce damage by pollution, to safeguard a healthy, pleasant and ecologically diverse and sustainable environment, to prevent the generation and the harmful effects of waste, to improve and integrate assessment of the impact of activities that pollute the environment, to improve citizens' opportunities to influence decisions concerning the environment, to promote sustainable use of natural resources and to combat climate change and otherwise support sustainable development. (EPA 1 §; 2.1 §)

The Environmental Protection Act does not apply to activities for which provisions are laid down in the Act of Environmental Protection in Maritime Transport (1672/2009), unless there are activities which are referred to in the Act on Protection of the Sea (1415/1994). This Act also applies to the Finnish exclusive economic zone referred to in the Act on the Finnish Exclusive Economic Zone (1058/2004). (EPA 2 §) The Environmental Protection Act does not define which industrial areas need an environmental permit. Instead, the Environmental Protection Decree (EPD, 169/2000) defines the environmental permit requirements. According to the Environmental Protection Decree, harbors or loading or unloading docks intended primarily for merchant shipping and accommodating vessels of over 1.350 tons need an environmental permit. An environmental permit shall not be required for temporary harbors, storage facilities, fuel distribution points or other comparable activities of the Defence Forces. (EPD 1 §; 4b §)

3.2 Act on Environmental Impact Assessment Procedure

The aim of the Act on Environmental Impact Assessment Procedure (AEIAP, 468/1994) is to further the assessment of environmental impact and consistent consideration of this impact in planning and decision making, and at the same time increase the information level of citizens and give them the opportunity to participate in decision making. In this Act, the term environmental impact refers to the direct and indirect effects inside and outside Finnish territory of a project or operations

- on human health, living conditions and amenity.
- impacts on soil, water, air, climate, organisms, interactions between them and biodiversity
- community structure, buildings, landscape, townscape and cultural heritage
- utilization of natural resources (AEIAP 1–2 §)

Environmental impact assessment procedure shall be applied to such projects which may have significant adverse environmental impacts, due to the special features of Finland's nature and environment. Assessment procedure shall also be applied, in individual cases, to a project that will probably have significant adverse environmental impact. (AEIAP 4 §)

The procedure of assessment shall be started at the earliest possible stage of planning. If the project may have substantial impact over a wide area or on the circumstances of several people, the coordination authority shall inform the quarters whose circumstanced or interests may be affected about the pendency of the assessment procedure, unless this can be considered unnecessary in that they have already been adequately informed in other connections (AEIAP 8–8a §).

At the EU level, there are also provisions concerning environmental assessment; that is, a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made. Environmental assessment can be undertaken for individual projects, such as a dam, motorway, airport or factory, on the basis of Environmental Impact Assessment of EIA Directive (Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment) or for public plans or programs on the basis of the Strategic Environmental Assessment of SEA (Directive 2001/42/EC on the assessment of the effects of certain plans and programs on the environment). (European Commission 2013c)

3.3 Act on Environmental Protection in Maritime Transport

In the Act on Environmental Protection in Maritime Transport (EPMT, 1672/2009), the aim is to prevent the environmental pollution from ships' normal activities by prohibiting discharges and emissions of noxious substances into water and air, or by setting limits on discharges and emissions into water and air. The purpose is also to organize the reception of waste in ports for the ships. This Act lays down the provisions for the national implementation of international commitments and EU legislation binding Finland. (EPMT Chapter 1, 1 §)

The Act shall apply to ships that sail in the Finnish waters or within Finland's exclusive economic zone and to Finnish ships also when sailing outside the Finnish waters and/or outside Finland's exclusive economic zone (EPMT Chapter 1, 3 §). By the Act, it is prohibited to discharge oil or oily mixtures from ships as set out in Annex I to the MARPOL 73/78 Convention, in Helsinki Convention, or in other international commitments binding Finland, or in European Community legal instruments. In the Act, there are some exceptional circumstances when oil or oily mixtures can be discharged to sea. These circumstances are: if it is necessary for the purpose of securing the safety of the ship or saving life at sea or the discharge of oil into water results from damage to the ship or its equipment and all reasonable precautions have been taken after the occurrence of the damage; or if with discharge can be prevent or minimize damage or larger pollution. Of course each case is individual concerning the use of the substance. (EPTM Chapter 2, 1–2§)

If a violation happens and oil or oily mixtures are discharged in Finland's territorial waters or Finland's exclusive economic zone, then a monetary penalty fee shall be imposed, unless the discharge is deemed minor in amount and impact. An oil discharge fee can also be imposed on foreign ships in transit if the discharge causes considerable damage or risk of damage to Finland's shoreline or the natural resources in the Finnish sea or economic zone. The oil discharge fee shall be imposed to a natural person or a legal person who owns the vessel. The fee cannot be imposed on the owner if it can be proved that the manager, operator or bareboat character has been operating the ship in the owner's stead. (EPTM Chapter 3, 1 §)

The Act provides what kind of wastes port operators must receive and have reception facilities for. Every port operator shall ensure that port has sufficient facilities for reception of the following waste materials:

- *Oily waste*
- *Waste containing noxious liquid substances*
- *Sewage*
- *Garbage*
- *Exhaust gas cleaning residues, whose emission is prohibited in accordance with Annex VI to MARPOL 73/78 Convention*
- *Cargo residues.* (EPTM Chapter 9, 1 §)

Additionally, oil terminals must have equipment to receive oily ballast waters and tank washing from tankers using the terminals (EPTM Chapter 9, 1 §).

Before receiving waste from the ships, the port operator shall draw up a waste reception and management plan in order to organize the management of the ship-generated waste referred to. During planning, the port operator must take into consideration for example the following things: waste reception, collection, storage, treatment and recovery. The size and type of the port and size and types of ships define the specific requirements (EPTM Chapter 9, 3 §).

4 INTERNATIONAL ENVIRONMENTAL LEGISLATION IN THE MARITIME SECTOR

4.1 MARPOL convention

In 1973 IMO adopted the International Convention for the Prevention of Pollution from Ships, which is known universally as the MARPOL convention. It has been amended by the Protocols of 1978 and 1997 and the convention has also been updated with other relevant amendments. MARPOL has had a great impact on decreasing pollution from international shipping and applies to 99% of the world's merchant tonnage. Pollution prevention is also addressed by other treaties like anti-fouling systems used on ships, the transfer of alien species by ships' ballast water and the environmentally sound recycling of ships. Pollution prevention covers;

- Oil pollution
- Chemical pollution
- Air pollution and GHG Emissions
- Dumping of Wasted and Other Matters
- Garbage
- Sewage
- Port Reception Facilities
- Special Areas Under MARPOL
- Particularly Sensitive Sea Areas.

4.2 Oil and Chemical pollution

Requirements specified in MARPOL 1973, Annex I, are presented for the continuous monitoring of oily water discharges including the requirement for Governments to provide shore reception and treatment facilities at oil terminals and ports. Also in Annex I are categorized Special Areas, in which more stringent discharge standards are applicable, including the Mediterranean, Red Sea and Gulf, and Baltic Sea. An important regulation in Annex I was Regulation 13, which required segregated ballast tanks on new tankers over 70,000 deadweight tonnes. (MARPOL 1973 Annex I)

In 1978, the requirements for segregated ballast tanks for all new crude oil tankers of 20,000 dwt and above and all new product carriers of 30,000 dwt and above were added to the convention. The new Protocol also required segregated ballast tanks to be protectively located. The ships must minimize the possibility and amount of oil outflow from cargo tanks after a collision or grounding. New tankers over 20,000 dwt were required to be fitted with a crude oil washing system. Crude oil washing, or COW, is the cleaning or washing of cargo tanks with high-pressure jets of crude oil. This reduces the quantity of oil remaining on board after discharge. (MARPOL Protocol 1978)

Double hull amendments entered into force in 1993. Tankers of 5,000 dwt and above must be fitted with double bottoms and wing tanks extending the full depth of the ship's side. The regulation allows mid-deck height tankers with double-sided hulls as an

alternative to double hull construction. Oil tankers of 600 dwt and above, but less than 5,000 dwt, must be fitted with double bottom tanks and the capacity of each cargo tank is limited to 700 cubic meters, unless they are fitted with double hulls. (MARPOL amendment 1993)

MARPOL Annex II includes regulations for the control of pollution by noxious liquid substances in bulk transportation. Liquid chemicals are categorized in four groups. Category X contains the noxious liquid substances which cause major hazard to marine resources or to human health if a discharge happens during tank cleaning or deballasting operations. Category Y contains the noxious substances which, during tank cleaning or deballasting, cause a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment. Category Z also contains noxious liquid substances which can cause a minor hazard to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment. Other substances are chemicals or substances which are left out of previous categories (X, Y or Z). These substances do not cause harm to marine resources, human health, amenities or other legitimate uses of the sea when discharged into sea. (MARPOL Annex II)

Annex II also includes a number of other requirements reflecting modern stripping techniques. For ships constructed on or after 1st January 2007 the maximum permitted residue in the tank and its associated piping left after discharge is set at a maximum of 75 liters for products in categories X, Y and Z, compared with previous limits which set a maximum of 100 or 300 liters, depending on the product category. A Hazard Profile indexes the substance according to its bio-accumulation, bio-degradation, acute toxicity, chronic toxicity, long-term health effects, and effects on marine wildlife and benthic habitats. (MARPOL Annex II)

4.3 Prevention of Pollution by Garbage from Ships

In the IMO's MARPOL convention, Annex V regulates the prevention of pollution by garbage from ships. According to IMO reports, the experts have discovered that garbage, mainly plastic, is as dangerous and deadly for animals as oil and chemicals. Plastic can float in the sea for years. Fish and marine mammals can get trapped in plastic ropes, nets, bags, and plastic can rings. In many cases, when plastics have been in the water for several years, they disintegrate into microscopic particles and end up as food for fishes and later end up in humans through the food chain. (IMO 2013)

Most of the garbage washes up to shore, but ships are not the only polluters that throw garbage into the water. In the beach area, there are holiday-makers who leave rubbish on the beach. Fishermen throw unwanted refuse back into the water and citizens throw rubbish and garbage into rivers or into the sea. But in some sea areas most of the rubbish found comes from passing ships, which find it convenient to throw rubbish overboard rather than dispose of it in ports. (IMO 2013)

In the MARPOL Convention Annex V, garbage includes all kinds of food, domestic and operational waste, excluding fresh fish, generated during the normal operation of the vessel. Conviction prohibits of the disposal of plastic anywhere into the sea. There are also “Special areas” including the Baltic Sea and Gulf areas where it is restricted to discharge of other waste and garbage. (MARPOL Annex V)

4.4 Ballast Water Management

Ballast water is essential to the safety of modern ship operations, but it may pose serious ecological, economic and health problems due to the multitude of marine species carried in a ship’s ballast water tanks. In ballast waters there might be bacteria, microbes, small invertebrates, eggs, cysts and larvae of various species. Despite the ultraviolet disinfection, the transferred species may survive to establish a reproductive population in the host environment, becoming invasive, out-competing native species and multiplying into pest proportions. (IMO 2013)

In 1997, the IMO adopted the Guidelines for the Control and Management of Ships’ Ballast Water to Minimize the Transfer of Harmful Aquatic Organism and Pathogens (IMO Resolution A.868 (20)). This newer version replaced an earlier version from the year 1993. In 1973, in the international MARPOL conference, the ballast water problem was brought to attention. The new management and control measures recommended in the version included:

- Minimizing the uptake of organism during ballasting the ships
- Cleaning ballast tanks from mud, sediments etc.
- Avoiding unnecessary discharge of ballast
- Undertaking ballast water management procedures including
 - Exchange ballast water at open sea
 - Non release or minimal release of ballast water
 - Discharge to onshore reception and treatment facilities (GloBallast Partnership 2013)

The IMO, the United Nations Developing Programme (UNDP) and the Global Environment Facility (GEF) have a joint initiative, which addresses the issue of invasive species in ships’ ballast waters. This co-operation follows the original Global Ballast Water Management project. The full title of this new project is “Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships’ Ballast Water”. Shorter and simpler version is GloBallast Partnerships (GBP). GBP’s main aim is to assist developing countries to reduce the risk of aquatic bio-invasions mediated by ships’ ballast water and sediments. With the help of tools developed and lessons learned from the pilot project, GBP is working to:

- expand government and port management capacities;
- instigate legal, policy and institutional reforms at national level;
- develop mechanisms for sustainability; and
- drive regional coordination and co-operation. (IMO 2013)

At the moment, the Ballast Water Management (BWM) convention will enter into force during the next 12 months after ratification by 30 States, representing 35% of world merchant shipping tonnage. As of 19th March 2013, 36 States have ratified the Convention, representing 29.07% of the world merchant fleet tonnage. (IMO 2013)

4.5 Energy efficiency and the reduction of GHG emissions from ships

New energy efficiency amendments were introduced to the IMO's MARPOL Annex VI in 1st January 2013. Originally, Annex VI was added to the MARPOL convention in 1997. The regulations are aimed to prevent and minimize airborne emission (Sox, NOx, ODS and VOC) from ships. The IMO adopted GHG emissions reduction mandatory for technical and operational energy efficiency to reduce CO2 emissions from international shipping. (IMO 2013)

In Chapter 4 in Annex VI, the main goal is to reduce and prevent air pollution from ships. According to the regulations of Annex VI, the Ship Energy Efficiency Design Index (EEDI) is mandatory to ships. Ships that are under construction and new ships also have to have a Ship's Energy Efficiency Management Plan (SEEMP). (IMO 2013)

Ships are the most fuel-efficient mode of bulk transportation. The IMO's study shows that the most significant potential for improvements in energy efficiency is to use already existing technologies, such as more efficient engines and propulsion systems, improved hull designs and larger ships. With EEDI, a minimum energy efficiency level for new ships can be measured by stimulating continued technical development of all the components influencing the fuel efficiency of a ship and by separating the technical and design-based measures from the operational and commercial ones. It is already being used to enable a comparison between the energy efficiency of individual ships with similar ships of the same size that could have undertaken the same transport work. (IMO 2012)

The EEDI is not applicable to all ships. It is not suitable for passenger ships or propulsion systems (e.g. ships with diesel-electric, turbine or hybrid propulsion systems) that will need additional correction factors. As a conclusion, it is assessed that with this EEDI formula 45-50 million tons of CO2 emissions from new ships can be removed from the atmosphere annually by 2020. (IMO 2012)

4.6 Particularly Sensitive Sea Area

New conventions and legislation concerning the maritime environment are constantly being developed. These regulations come from the IMO and some are created at the EU level or national level, but it can be said that most of these come from the IMO. IMO's Particularly Sensitive Sea Area (PSSA) has been launched in the year 2013. The IMO has designated special sea areas which require protection. The Baltic Sea area (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Sweden) is one of 14

special sea areas. PSSAs are areas that need special protection through actions by the IMO because of their significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities. Guidelines include criteria which define the PSSA areas (Resolution A.982(24), revised guidelines for the identification and designation of Particularly Sensitive Sea Areas (PSSAs). If areas fulfill a number of criteria, including ecological criteria, such as unique or rare ecosystem, diversity of the ecosystem or vulnerability to degradation by natural events or human activities; social, cultural and economic criteria, such as significance of the area for recreation or tourism; and scientific and educational criteria, such as biological research or historical value, they can be designated as PSSAs. (IMO 2013; Giercke et al. 2004)

4.7 United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea has 436 articles and it is a very important and extensive multilateral contract. It replaces the four Geneva law conventions from the year 1958 and gives regulations on almost all areas of the international marine law (the definition of the different zones of the seas, namely coastal waters, connecting areas, straits, archipelago waters, exclusive economic zones, continental shelf, high sea; use of these areas by shipping, flying over, laying cables, fishing and scientific marine research, protection of the marine environment, development and of marine technology; regulation of seabed mining; settling of arguments, especially the introduction of the international marine court of law). (United Nations 1982)

Convention Part XII concentrates on the protection and preservation of the marine environment. In this part there are 11 sections, the most important of which will be presented next:

General provisions

In this section, the most important Article is 192 “Measures to prevent, reduce and control pollution of the marine environment”, where all states shall take actions individually or jointly as appropriate to prevent, reduce and control pollution of the marine environment from any source and using the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection. Also one key element is to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life. (United Nations 1982)

States commit to minimize and prevent the following emission sources:

- (a) release of toxic, harmful or noxious substances,
- (b) pollution from vessels

(c) pollution from installations and devices used in exploration or exploitation of the natural resources of the seabed and subsoil

(d) pollution from other installations and devices operating in the marine environment.
(United Nations 1982)

Global and regional co-operation

In this section, there are five Articles (197-202). All states shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations. The state must follow, formulate and elaborate international rules, standards and recommended best practices and procedures and also take a part in programs of scientific research and encourage the exchange of information and data acquired about pollution of the marine environment. States shall with this co-operation prevent or eliminate the effects of pollution and preventing or minimize the damages.
(United Nations 1982)

Technical assistance

In this section, the main focus is on co-operation and giving technical assistance to each other directly or through competent international organizations. States shall promote scientific, educational and technical programs and give assistance to developing States for the protection and preservation of the marine environment and the prevention, reduction and control of marine pollution. Developing countries must also provide appropriate assistance for the minimization of the effects of major incidents, which may cause serious pollution of the marine environment. (United Nations 1982)

Monitoring and environmental assessment

States must survey the effects of any activities that they permit or in which they engage in order to determine, whether these activities are likely to pollute the marine environment. Consistently with the rights of other States, they must also endeavor, as far as practicable, directly or through the competent international organizations, to observe, measure, evaluate and analyze, by recognized scientific methods, the risks or effects of pollution of the marine environment. (United Nations 1982)

If states have reason to believe that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall publish the results in reports to competent international organizations. (United Nations 1982)

International rules and national legislation to prevent, reduce and control pollution of the marine environment

This is important section and it has six Articles. The rules and legislation concentrate on

pollution from land-based sources, pollution from seabed activities, pollution from activities in the Area, pollution by dumping, pollution from vessels and pollution through the atmosphere. In land-based, seabed and other activities, which may cause pollution, and in dumping, all of the articles are almost similar. The common message is that states shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures. States shall also harmonize their policies and take other measures as may be necessary to prevent, reduce and control such pollution. (United Nations 1982)

States, with international organizations, shall establish international rules and standards to prevent, reduce and control pollution of the marine environment from vessels and promote the adoption, in the same manner, wherever appropriate, of routing systems designed to minimize the threat of accidents which might cause pollution of the marine environment, including the coastline, and pollution damage to the related interests of coastal State. (United Nations 1982)

Laws and regulations for the prevention, reduction and control of pollution of the marine environment from vessels should obligate every state, independent of on the ships' flag or country where ships are registered. Such laws and regulations shall at least have the same effect as that of generally accepted international rules and standards, established through competent international organizations or general diplomatic conferences. (United Nations 1982)

Enforcement

In this section there are ten Articles, but the most interesting Article is enforcement by port States. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may undertake investigations and, where the evidence so warrants, institute proceedings in respect of any discharge from that vessel outside the internal waters, territorial sea or exclusive economic zone of that State in violation of applicable international rules and standards established through the competent international organization or general diplomatic conference. (United Nations 1982)

Ice-covered areas

In this section, coastal states have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. (United Nations 1982)

Responsibility and liability

States are responsible for the fulfillment of their international obligations concerning the protection and preservation of the marine environment. Also they must ensure that there are resources available, in accordance with their legal systems, for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment. (United Nations 1982)

States shall co-operate in the implementation of existing international law and the further development of international law relating to responsibility and liability for the assessment of and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for payment of adequate compensation, such as compulsory insurance or compensation funds. (United Nations 1982)

Sovereign immunity

There are certain provisions of this Convention. The protection and preservation of the marine environment does not apply to any warship, naval auxiliary, other vessels or aircraft owned or operated by a State and used, for the time being, only on government non-commercial service. States shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such vessels or aircraft owned or operated by it, that such vessels or aircraft act in a manner consistent, so far as is reasonable and practicable, with this Convention. (United Nations 1982)

4.8 Helsinki-Convention (HELCON)

The Helsinki Convention is from the year 1992 and its purpose is to protect the marine environment in the Baltic Sea area. The convention entered into force on January 2000. Additionally, the Convention requires the contracting partners (Denmark, Germany, EU, Estonia, Finland, Latvia, Lithuania, Poland, Russia and Sweden) to take all measures, individually and together, to conserve, look after and develop natural living space, natural processes and the biological variety of the ecological system in the Baltic, including the coastal areas. Until now, the Convention has mainly been active with questions relating to the protection of the marine environment. (HELCOM 2013)

In the Convention there are 28 articles, but the most important and port related articles are: Article 7 – Environmental impact assessment, Article 8 - Prevention of pollution from ships, Article 11 – Prevention of dumping, Article 12 – Exploration and exploitation of the seabed and its subsoil, Article 13 – Notification and consultation on pollution incidents and Article 14 – Co-operation in combating marine pollution

Article 7 – Environmental impact assessment

In Article 7 it is stated that an environmental impact assessment of a proposed activity that is likely to cause a significant adverse impact on the marine environment of the Baltic Sea Area is required by international law or supra-national regulations applicable to the Contracting Party of origin, that Contracting Party shall notify the Commission

and any Contracting Party which may be affected by a transboundary impact on the Baltic Sea Area. (HELCOM 2008)

The Contracting Partners shall also enter into consultations with any Contracting Party which is likely to be affected by such transboundary impact, whenever consultations are required by international law or supra-national regulations applicable to the Contracting Party of origin. If two or more Contracting Parties share transboundary waters within the catchment area of the Baltic Sea, these Parties shall cooperate and prevent that potential pollution impacts on the marine environment of the Baltic Sea Area. (HELCOM 2008)

Article 8 - Prevention of pollution from ships

This article is about protecting the Baltic Sea Area from pollution from ships. The Contracting Parties shall co-operate within the IMO and follow fundamental principles and obligations, use Best Available Technology and Best Environment Practices. In this article it is also mentioned that Parties shall assist each other as appropriate in investigating violations of the existing legislation on antipollution measures, which have occurred or are suspected to have occurred within the Baltic Sea Area. This assistance may include but is not limited to inspection, by the competent authorities, of oil record books, cargo record books, log books and engine log books and taking oil samples for analytical identification purposes. (HELCOM 2008).

Article 11 – Prevention of dumping

This Article prohibits dumping in the Baltic Sea. Dumping shall not apply to the disposal at sea of dredged materials, provided that harmful substances are contained:

- heavy metals and their compounds
- organic halogen compounds
- organic compounds of phosphorus and tin
- pesticides, such as fungicides, herbicides, insecticides, slimicides and chemicals used for the preservation of wood, timber, wood pulp, cellulose, paper, hides and textiles
- oils and hydrocarbons of petroleum origin
- other organic compounds especially harmful to the marine environment
- nitrogen and phosphorus compounds
- radioactive substances, including wastes
- persistent materials which may float, remain in suspension or sink
- substances which cause serious effects on taste and/or smell of products for human consumption from the sea, or effects on taste, smell, color, transparency or other characteristics of the water. (HELCOM 2008)

In some cases, the dumping is carried out under a prior special permit issued by the appropriate national authority, either within the area of internal waters and the territorial

sea of the Contracting Party or outside the area of internal waters and the territorial sea, whenever necessary, after prior consultations in the Commission. (HELCOM 2008)

Article 12 – Exploration and exploitation of the seabed and its subsoil

In this Article the main focus is to prevent pollution of the marine environment of the Baltic Sea Area resulting from exploration or exploitation of its part of the seabed and the subsoil thereof or from any associated activities thereon as well as to ensure that adequate preparedness is maintained for immediate response actions against pollution incidents caused by such activities. In this article exploration includes any drilling activity but not seismic investigations and exploitation includes any production, well testing or stimulation activity. (HELCOM 2008)

The use of oil-based drilling mud or muds containing other harmful substances shall be restricted to cases where it is necessary for geological, technical or safety reasons and only after prior authorization by the appropriate national authority. Oil-based drilling muds should also not discharge in the Baltic Sea area, but can be transported to land to final treatment. All chemicals and materials shall be taken ashore and may be discharged only exceptionally after obtaining permission from the appropriate national authority in each individual operation. In some cases if oil or chemical content is below the approved limit, it might be possible discharge into water. (HELCOM 2008)

Article 13 – Notification and consultation on pollution incidents and Article 14 – Co-operation in combating marine pollution

If a pollution incident takes place in the territory of a Contracting Party and is very likely to cause pollution to the marine environment of the Baltic Sea Area outside its territory and adjacent maritime area in which it exercises sovereign rights and jurisdiction according to international law, this Contracting Party shall notify without delay such Contracting Parties whose interests are affected or likely to be affected. (HELCOM 2008)

All Parties shall individually and jointly take, as set, all appropriate measures to maintain adequate ability and to respond to pollution incidents in order to eliminate or minimize the consequences of these incidents to the marine environment of the Baltic Sea Area. Each shall provide information to the other Contracting Parties and the Commission about:

- its organization for dealing with spillages at sea of oil and other harmful substances
- its regulations and other matters which have a direct bearing on preparedness and response to pollution at sea by oil and other harmful substances
- the competent authority responsible for receiving and dispatching reports of pollution at sea by oil and other harmful substances
- the competent authorities for dealing with questions concerning measures for mutual assistance, information and co-operation between the Contracting Parties (HELCOM 2008)

Information on research and development programs that help to decrease pollution by oil and other harmful substances at sea must be shared with all partners. Experiences in surveillance activities and data must also be shared. A good level of co-operation will be ensured through joint operational combating exercises as well as alarm exercises organized on a regular basis. (HELCOM 2008)

5 THE CURRENT ENVIRONMENTAL STATUS OF HAMINAKOTKA PORT

5.1 Collection of information in ports

Every port in Finland must have an Environmental Permit and go through an Environmental Impact Assessment (EIA) procedure. Finnish ports are driven by the official requirements, such as the environmental permits for port operations, but also by their voluntary commitments for their operations. Environmental information about operations must be collected regularly. There are mandatory and optional indicators that are collected to define the level of the environmental protection. Optional environmental and quality management systems are also widely used. With the optional information, indicators and environmental management systems, the level of clarity, sincerity and comparability of the compiled information can be increased. (Port of HaminaKotka 2013)

In Finland there are different kinds of regulations, from national level to the EU level, which regulate the ports' operations. In chapters 2, 3 and 4 above, the legislation, which has an effect to ports and their activities, is presented more specifically. Environmental management systems are not mandatory, but many companies including the port of HaminaKotka use for example ISO 14001 and ISO 9001 standards. Environmental labels and statements, life cycle analysis and for example the ports' own environmental projects also increase the environmental status of the ports. (Port of HaminaKotka 2013)

When environmental information is collected, the basic principles for all the collected data are comparability, balance between problematic questions and opportunities, continuity, clarity and understandability. It must be noticed that the comparison of information must be possible so that the changes in the level of the environmental protection can be established. When compiling the environmental information that is common to all port operators, they are improving the level of environmental protection by reporting. (Kujala 2010)

When improving the level of environmental protection it is necessary that the existing raw data and information can be converted into an easily understandable form, so that every stakeholder and target group can understand the information that is presented. In the reports the existing information should also be present in a compressed form, with a few lines. Continuous data collection makes it easier to define the level of environmental protection and to report about it. With updated information it is more efficient to control the environmental aspects and impacts. If something exceptional happens, for example an emission leakage, it is much easier to solve the situation, because the existing data shows what the level of the emission output has been before or during the previous year. With updated and easily understandable information, the data can be presented to a wider audience and it will reveal the level of environmental protection honestly.

Environmental protection is very important to all stakeholders who are connected to the port or are positioned nearby the port activities. To get the necessary environmental information the ports have to measure their emissions, use calculation models and different kinds of other computing systems, from which it is not free to get the parameters for reporting. Sometimes it is expensive and time consuming. When the environmental information is compiled, used and collected, cost effectiveness and the size and type of the organization must be taken into consideration. It is important to collect all the necessary data and fulfill the existing obligations of the environmental permits.

In producing data for reports, officials, stakeholders or open information to a wider audience, it is important to cover the impacts that are the most meaningful and the most influential or affect operation, management, taken actions, products and services. Results must be sensitive enough that the most important information is presented reliably for the target groups.

5.2 Collected data and information from the Finnish ports

The Finnish ports collect a huge amount of different kinds of data from different sources. Other European ports, for example in Germany, collect the same kind of environmental data and calculate emissions as the Finnish ports, but the difference is that other European ports do not need an environmental permit for their operations. (Giercke et al., 2004) In Finland, the environmental permit obligates the port to collect environmental data. Every Finnish port must collect the following information, because it is defined in the ports' environmental permits. In operational monitoring, the details regarding vessel traffic are collected. From the national system or the port's own system, information about the type of the ship, nationality of the ship, cargo type and volume of the ship, total traffic of port or vessels per year, dangerous amounts (kg per year) and types according to IMDG –classification, ships arrival and departure time, average delay % and where ships comes from and where is the next port, can be collected. (Kujala 2010)

In cargo handling, the following data is collected: how many tons of goods are handled per month or per year; the volumes of exported and imported tons per month or per year; in percentage value which cargo handling system has been used in each cargo types and in which quay site; from the cargo handling machines the yearly fuel consumption (light, diesel oil, gas) in liters and used lubricating oil liters per year. Cargo handling machines are well maintained, because the working hours are measured as well as the degree of use in 24 hours. (Kujala 2010)

In the ports' waste management systems, all different waste fractions from the ports (kg per year) and from the ships (kg per year) have been categorized as defined in the environmental permit. The separation wells that collect oily products, sand and other particles from wastewater are also emptied a certain number of times annually. Clean water is vital, and in the future the lack of clean fresh water might be a huge problem. In the ports, water consumption, grey water and black water figures are recorded as well as

how much waste water vessels produce. Water consumption is measured in cubic meters per year. Energy consumption has been calculated in straight electric energy in kWh/year and in onsite power supply in kWh/year. (Kujala 2010)

The environmental permit requires detailed information about how the waste management is taken care of. Waste from the ports is measured (kg per year) and categorized as follows:

- Paper and carton
- Glass
- Metal
- Combustion waste
- Biowaste
- Assorted landfill waste
- Hazardous waste

From the ships the environmental permit defines that the following waste fractions must be collected and measured (kg per year):

- Oily mixture
- Bilge water
- Waste oils
- Chemical waste
- Ballast water and washing
- IMO -classified waste and international food waste
- Recycled waste kg/year and %
- Energy recovered waste kg/year and %
- Final disposed waste kg/year and % (Kujala 2010)

Possibly the most important measured and calculated parameters are emissions to air. Emissions to air are the most important factor that increases the greenhouse effect and climate change. The main reason is exhaust gases from combustion engines, which are used in marine, road and partially in train traffic and working machines in the port area. In land-based transportation, the most common fuel is diesel. Diesel combustion exhaust gas composition as a percentage is as follows: nitrogen (N₂) 66% carbon dioxide (CO₂) 13%, water (H₂O) 11% and oxygen (O₂) 9%. In addition, there are other combinations of combustion, oxides of nitrogen (NO_x), particulate matter, carbon monoxide (CO), hydrocarbons (HC), sulphur dioxide (SO₂) in one per cent. (Kalenaja & Kallberg 2005)

In ship traffic, the most significant emissions are emissions of sulphur dioxide (SO₂), nitrogen oxides (NO_x), carbon dioxide (CO₂) and particulate matter. Up to 96% of the total transport emissions of sulphur, 50 % of nitrogen oxides and 22% of carbon dioxide is caused by water transport. In the fuel, sulphur is converted almost completely to sulphur oxides. In factories and power plants the sulphur can be removed almost completely. but in ships it is more difficult to clean the exhaust gases. Sulphur scrubbers are still in development and at this time the scrubbers are still quite expensive. (Lahtinen 2009)

Diesel and petrol fuel are almost sulphur-free (0.01%), but for the bunker that ships use the sulphur content is (1.1% in 2009) (VTT 2009). Sulphur dioxide reacts readily with water to form a chemical change after the acid rain. Acid rain corrodes metals and buildings. In addition, acid rain is found to be harmful to human health and other organisms too. In the event of an acid rain, sulphur causes respiratory irritation to mucous membranes and respiratory diseases. (U.S. Environmental Protection Agency 2007)

The main emission sources to air are port operations and vessel traffic. In vessel traffic, the measurements are taken in the quay area and the measured unit is kg per year. The following emissions are measured from the ships: nitrogen oxides (NO_x), carbon dioxide (CO₂), sulphur dioxide (SO₂), hydrocarbons (HC), methane (CH₄) and particular matters such as soot (CO) and other small particulates (PM 2.5 and PM 10). Also the consumption of Heavy Fuel Oil, Marine Diesel Oil and Gasoil are calculated. Especially until 2015, a lot of sulphur dioxide emissions come from vessels exhaust engines. The vessels' sulphur dioxide emissions also depend on fuel type used. In port-related road transportation, the used diesel fuel does not contain any sulphur. (Kujala 2010 & Port of Helsinki 2009)

5.3 Other environmental impacts that are measured in port statistics

Ports and port related areas are large and lots of traffic occurs inside the ports, and port-related traffic is huge as well. Annual environmental permits also include the emission from the working machines, road transport, train traffic and heating. In wintertime, office buildings and some warehouses must be warmed.

Train transportation differs partially from road and maritime transportation, because trains mainly use electricity and the electricity comes from the national power grid. In modal comparison, electric rail emissions are calculated as indirect emissions from power generators (power plants). Exceptions are diesel locomotives, commonly used in Finland, that carry out the exchange work in railway yards and also in port areas. Diesel trains use the same fuel as trucks and working machines, so the emissions, i.e. carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), particulate matter, methane (CH₄), nitrous oxide (N₂O), sulphur dioxide (SO₂) and carbon dioxide (CO₂), are the same as in road transportation. (Mäkelä et al. 2010)

5.4 Noise and vibration

With regard to the noise, the Government (Government decision (993/1992 valtioneuvoston päätös melutason ohjearvoista)) has given the limited values for both outside and indoors noise, as well as limited values in a variety of other areas such as nature reserves. In residential habitats and outside nearby residential areas at daytime, 07:00 to 22:00, the maximum noise value is 55 dB and during night time, 22:00 to 07:00, 45-50 dB. These noise levels shall not apply in industrial areas, motorways or

highways. (Government decision 993/1992) Ports, especially in Kotka, are in the town or near to the town. A lot of residence is near the port. The Port of HaminaKotka has done a lot of work to keep the level of noise at a tolerable level, especially in the night time when the noise level must be quite low. (Government decision (993/1992))

In our environment, there are a lot of different kinds of sources of noise. The main source in Finland is considered to be traffic. As an example, despite the maximum values of noise, in 2003 the survey showed that 750.000 people in Finland live in areas where there is constant noise over 55 dB. (Ministry of Environment 2009) In railway transportation, the greatest environmental damage is caused by noise and vibration. Another survey showed that almost 45.000 people live near railways where the constant noise level is over 55 dB. (Ratahallintokeskus 2008)

Land and train transportation also causes vibration. The VTT Technical Research Center of Finland estimated that 100.000 to 200.000 people in Finland are exposed to vibration. One third of vibration comes from road transportation and the rest from railway transportation. (Ratahallintokeskus 2008) The vibration is found to affect people in several ways: it causes a decline in living comfort and concentration as well as sleep disturbance. Vibration can cause structural changes or damage to buildings. There is vibration especially in the routes of road and train transportation. One type of area where there is vibration is ports and port related areas. In contrast to noise, there are no set limit values for vibration in Finland. (Ministry of Environment 2011)

5.5 VAHTI - data system

The HaminaKotka port uses the VAHTI compliance data system for reporting their monitoring. The data system contains information on the environmental permits for clients and the generated waste, discharges into water and emissions to air. This collected data is used by the Centers for Economic Development, Transport and the Environment and by other interested parties. VAHTI contains information about environmental regulations and how to comply with regulations. There are around 200 active users of the system in the state's environmental administration and over 4.000 industrial users. The systems collect feedback and reputation as an effective tool in the everyday work of the environmental administration. Moreover, the data system already provides substantial reports for the diverse needs of the administration and for other interested parties needing information. (Ministry of Environment 2013)


In the VAHTI system, for example the following data parameters can be reported:

- *Identification*
- *Contact persons*
- *Respective authorities*
- *Licence conditions*
- *Environmental insurance*
- *Loading points, such as stacks and sewers*
- *Emission control equipment*
- *Treatment plans*

- *Boilers and fuel used*
- *Landfills*
- *Emissions to air, discharges to water and wastes*
- *Energy production*
- *Raw materials*
- *Production*
- *Water consumption*
- *Fish farming*
- *Peat production*
- *Animal shelters*
- *Analyses*

Most of the parameters which are included in the VAHTI data system are measured and collected in the Port of HaminaKotka's VAHTI system. (Ministry of Environment 2013).

The next figure is a snap shot from the VAHTI data system. In the picture, the snap shot is from the Port of Kokkola (Kaarleby) from the year 2009. The picture presents the emissions to the air, in tons, that originate in one part of the port. Parameters in the snap shot are carbon monoxide, nitrogen oxides, particular matters, methane, sulphur oxides and carbon dioxide. In the snap shot, it can be noticed that emissions are at the level that is defined in the environmental permit, because the annual limit has not exceeded. The Finnish word "ylitys" means exceeded, "Arvo" is volume. With this kind of a system it is very easy to monitor the emission levels to air and the necessary details are quick to get if it is needed, for example, for the officials.



ILMAAN JOHDETTU KUORMITUS

Asiakkaan nimi **Liikelaitos Kokkolan Satama, Syväsatama**

Piste **Kokkolan Satama, Syväsatama / Päästöt ilmaan**

Vertailujakso **< Ei jaksoa >** **< Ei jaksoa >** **< Ei jaksoa >**

Päivitä vertailutiedot

Täytettävä jakso **2009**

Parametri	Ylitys	Arvo	V1	V2	V3	Ominaispäästöt mg/MJpe	Pitoisuus mg/Nm3	Ylitysten määrä
Hiilimonoksidi (CO) (t)		3.80						
Typen oksidit (Nox/NO2) (t)		54.26						
Hiukkaset (PM10) (t)		0.57						
Metaani (CH4) (kg)		0.21						
Rikin oksidit (SOx/SO2) (t)		5.32						
Hiilidioksidi, FOSS (t)		272.90						

Käytä ilmoitusta uuden pohjana **Palaa tiedonsiirtosivulle**

Figure 5.1 Emission to the air in VAHTI data system. (Kujala 2010)

Another example from the VAHTI data system is waste, waste management and waste disposal. In the first row is the type of waste, identification number, total weight, dry contain, origin, type, disposal, receiver, municipality and country. Waste types include: combustible waste, bio waste, recycled paper, recycled cardboard, recycled metal, recycled glass, sorted landfill waste, bagged dry waste, data protection papers, international food waste, used car batteries, unsorted batteries, electronic waste, barrels, fluorescent tubes, solid land and oil waste, solid oily waste, oily waste from ships and bilge water, used lubricate oils, liquid oily waste, bilge water. (Kujala 2010)



JÄTTEET JA JÄTEHUOLTO

Toiminnassa syntyvät jätteet (jotka toimitetaan muualle käsiteltäväksi / hyödynnettäväksi)

Asiakkaan nimi **Liikelaivos Pietarsaaren Satama**Piste **Pietarsaaren Satamalaivos**Vertailujakso Päivitä vertailutiedot

Täytettävä jakso 2009

Jätelaji	Numerotunnus	Kok.paino (t/a)	Kok.paino (t/a) vertailujaksolla	Kuiva-aine %	Kuiva-aine % vertailujaksolla	Alkuperä	Tyyppi	Sijoitus	Sijoitus 2	Vastaanottaja	Kunta	Maa	Kunnan nimi
Palava jäte	200199	25.36	0.00	100.00	0.00	1.0	1	R031		Lassila&Tikanoja	598	FIN	
Biojäte	200108	11.05	0.00	50.00	0.00	1.0	1	R033		Lassila&Tikanoja	598	FIN	
Keräyspaperi	200101	1.10	0.00	100.00	0.00	1.0	1	R031		Lassila&Tikanoja	598	FIN	
Keräyspahvi	200101	0.00	0.00	100.00	0.00	1.0	1	R031		Lassila&Tikanoja	598	FIN	
Keräysmetalli	200140	3.06	0.00	100.00	0.00	1.0	1	R042		Lassila&Tikanoja	598	FIN	
Keräyslasi	200102	6.75	0.00	100.00	0.00	1.0	1	R052		Lassila&Tikanoja	598	FIN	
Lajiteltu kaatopaikkajäte	200301	41.81	0.00	50.00	0.00	1.0	2	D01		Lassila&Tikanoja	598	FIN	
Bio/kuivajäte (pussitettu)	200399	0.00	0.00	50.00	0.00	1.0	1	R01		Lassila&Tikanoja	598	FIN	
Tietosuojapaperi	200101	0.00	0.00	100.00	0.00	1.0	1	R01		Lassila&Tikanoja	598	FIN	
Kansainvälinen ruokajäte	200108	0.00	0.00	50.00	0.00	1.0	3	D01		Lassila&Tikanoja	598	FIN	
Käytetyt lyijyakut	160801	0.00	0.00	100.00	0.00	1.0	3	R051		Lassila&Tikanoja	598	FIN	
Lajitteleman paristojäte	160803	0.00	0.00	100.00	0.00	1.0	3	R051		Lassila&Tikanoja	598	FIN	
Sekalainen elektroniikkaromu	200136	0.00	0.00	100.00	0.00	1.0	3	R041		Lassila&Tikanoja	598	FIN	
200 litran tynnyrit	150110	0.00	0.00	100.00	0.00	1.0	2	R042		Lassila&Tikanoja	598	FIN	
200 litran kierrätettävät tynnyrit	150110	0.02	0.00	100.00	0.00	1.0	1	R042		Lassila&Tikanoja	598	FIN	
Loisteputket	200121	0.00	0.00	100.00	0.00	1.0	3	R042		Lassila&Tikanoja	598	FIN	
Kiinteät maa-, öljy- ja liimajätteet	080112	1.04	0.00	50.00	0.00	1.0	3	R031		Lassila&Tikanoja	598	FIN	
Kiinteä öljyinen jäte	160107	2.46	0.00	50.00	0.00	1.0	3	D01		Lassila&Tikanoja	598	FIN	
Laivoöljyt ja piilivedet	130701	579.73	0.00	0.00	0.00	1.0	3	R031		Lassila&Tikanoja	598	FIN	
Käytetty voiteluöljy, vp alle 10 %	130205	31.34	0.00	90.00	0.00	1.0	3	R031		Lassila&Tikanoja	598	FIN	
Nestemäinen öljyinen muu jäte	130208	5.00	0.00	50.00	0.00	1.0	3	D01		Lassila&Tikanoja	598	FIN	
Pilssivesi	130403	235.07	0.00	0.00	0.00	1.0	3	D01		Lassila&Tikanoja	598	FIN	

Käytä ilmoitusta uuden pohjana

Palaa pääsivulle

Figure 5.2 Waste and waste disposal in ports. (Kujala 2010)

6 CONCLUSIONS AND SUMMARY

This report was written as a part of the Ecologically Friendly Port Ust-Luga (EFP) project. The purpose of this study is to provide information on what kind of legislation the ports in Finland and EU level must follow. The environmental status and the development of environmental issues in the port of HaminaKotka is the main focus in the report.

The main conclusion in this survey was that environmental issues in the EU and especially in Finland are very well handled and followed. An environmental permit is needed in Finnish ports and in Swedish ports, but not in central European ports. Large EU ports need permits only for dredging and deposition of sediment, but the calculation of the emissions is at same level as in Finland. In Finland, almost every operation needs some kind of a permit. In some cases this “authorization jungle” may twist the competition between European ports and the ports of the Baltic Sea.

Even though a lot of environmental data is collected for the environmental permit and for the different stakeholders, the biggest problem in Finland is the comparison and comparability of said data. The amount of environmental information is sufficient, but reporting methods vary between ports. There are differences in units and codes and in some cases the information is not sufficient and can be even unreliable. Differences exist also regarding which subjects are emphasized in reporting. In some cases, not so relevant emissions are highlighted in reporting.

The solution for this problem is unifying the reporting practices. With unifying, the quality and quantity of information and reporting will increase. All target groups could receive harmonized information that is comparable to each other. With correct and unified reporting, a stable image of the ports can be achieved and it can be established how port operations affect various environmental aspects. One key element with unifying is increasing the level of environmental knowledge and environmental communication. (Kujala 2010)

There are a lot of different regulations in the European Union that influence the functioning and management of the European ports. All of the legislation does not affect the field of the environment. Especially in Finland, all ports have strict environmental regulations. Ports have to follow the environmental policy, environmental permits and Environmental Impact Assessment (EIA) and many ports have voluntary environmental management systems. Many Finnish ports also have different kinds of environmental projects, which boost the ports’ environmental status.

There are over 20 acts, directives and protocols that are related to the marine environment and especially to ports and port operations. Most of the acts or directives increase the protection level of the marine environment. According to ESPO, the most important provisions are the Birds and Habitats Directives, Pollution from Ships (MARPOL), Greenhouse Gas Emissions, Marine Framework Strategy and Water Framework Directive. The most burning issue especially in Finland is still the so called

Sulphur Directive. The sulphur directive affects maritime transport and foreign trade. What will be the next steps in the future; LNG, scrubbers, new fuels or what?

In the Finnish legislation the Finnish Nature Conservation Act (1096/1996), Environmental Protection Act (86/2000) and Environment Protection Decree (169/2000) are the most important acts. The most interesting act, however, is the Environmental Impact Assessment Procedure (468/1994). The EIA procedure is required in Finnish and Swedish ports but not in other European ports, or if it is required the scale is not as extensive as in Finland. In Central Europe a permit is needed only for dredging and the deposition of sediments. This sets Finnish ports in an advantaged position when ecological matters are examined. Yet the EIA permit procedure twists the competition between ports, especially from an economic point of view.

The International Maritime Organisation (IMO) has done groundbreaking work in the field of maritime safety and maritime environment protection. The United Nations Convention on the Law of the Sea (UNCLOS) also gives regulations on almost all areas of the international marine law (the definition of the different zones of the seas, namely coastal waters, connecting areas, straits, archipelago waters, exclusive economic zones, continental shelf, high sea; use of these areas by shipping, flying over, laying cables, fishing and scientific marine research, protection of the marine environment, development and of marine technology; regulation of seabed mining; settling of arguments, especially the introduction of the international marine court of law).

The IMO's most important convention was the International Convention for Prevention of Pollution from Ships (MARPOL) from the year 1973, and the amending protocol of the year 1978. The protocol covers accidental and operational oil pollution but also pollution by chemicals, goods in packaged form, sewage, garbage and air pollution. Pollution Prevention also extended to other treaties like anti-fouling systems used on ships, the transfer of alien species by ships' ballast water and the environmentally sound recycling of ships.

The main emission sources to air are port operations and vessel traffic. In vessel traffic, the measurements are taken in the quay area and the measured unit is kg per year. The following emissions are measured from the ships; nitrogen oxides (NO_x), carbon dioxide (CO₂), sulphur dioxide (SO₂), hydrocarbons (HC), methane (CH₄) and particular matters such as soot (CO) and other small particulates (PM 2.5 and PM 10). The consumptions of Heavy Fuel Oil, Marine Diesel Oil and Gasoil are also calculated. Especially until 2015, a lot of sulphur dioxide emissions come from the vessels' exhaust engines. The vessels' sulphur dioxide emissions depend on the fuel type used. In port related road transportation, the diesel fuel used does not contain any sulphur.

Every port in Finland must have an Environmental Permit and perform an Environmental Impact Assessment (EIA), so Finnish Ports are driven by official requirements, such as the environmental permits for port operations, but also voluntary commitments for their operations. Environmental information about operations must be collected regularly. There are mandatory and optional indicators which are collected to

define the level of environmental protection. Optional environmental and quality management systems like ISO 14001 or EMAS are also widely used.

When environmental information is collected, the basic principles for the collected data are comparability, balance between problematic questions and opportunities, continuity, clarity and understandability. It must be noticed that a comparison of the information must be possible and the changes in the level of environmental protection must be able to be established. When compiling the environmental information that is common to all port operators, they are improving the level of environmental protection by reporting.

The environmental permit requires detailed information on how the waste management is taken care of. Waste from the ports is measured in (kg per year) and categorized as follows:

- Paper and carton
- Glass
- Metal
- Combustion waste
- Biowaste
- Assorted landfill waste
- Hazardous waste

From the ships the environmental permit defines that the following waste fractions must be collected and measured (kg per year):

- Oily mixture
- Bilge water
- Waste oils
- Chemical waste
- Ballast water and washing
- IMO – classified waste and international food waste
- Recycled waste kg/year and %
- Energy recovered waste kg/year and %
- Final disposed waste kg/year and %

Ports and port related areas are large, lots of traffic occurs inside the ports and the port-related traffic is also huge. Annual environmental permits also include emissions from the working machines, road transport, train traffic and heating. In wintertime, office buildings and some warehouses must be warmed. One very relevant emission source is noise. In our environment there are a lot of different kinds of noise sources. The main source in Finland is considered to be traffic.

With regards to the noise, the Finnish Government (993/1992) has given the limited values for both outside and indoors noise, as well as limited values in a variety of areas such as nature reserves. Ports, especially in Kotka, are in the town or near the town. A lot of residence is near the port. The port of HaminaKotka has done a lot of work to keep the level of noise at a tolerable level, especially in the night time when the noise level must be quite low. In residential habitats and outside nearby residential areas at

daytime, 07:00 to 22:00, the maximum noise value is 55 dB and in night time, 22:00 to 07:00, 45-50 dB. These noise levels shall not apply to industrial areas, motorways or highways.

On the basis of this study, the general environmental status is good, but there is still a lot to do for saving the Baltic Sea. New regulations improve environmental protection, but in many cases the regulation may twist the competition and impair the competition between Finnish and other ports. Compared to other European ports, Finland's geographical situation is not the best and volumes are not at the same level as for example in the ports in Russia. Emissions are very well measured and best practices are used to decrease the emissions. Still, the biggest threat might be a large tanker accident, which might pollute the entire coast line.

REFERENCES

Act on Environmental Protection in Maritime Transport (EPMT). (19672/2009). Available at URL:< <http://www.finlex.fi/en/laki/kaannokset/2009/en20091672.pdf>>

Act on Environmental Impact Assessment Procedure (AEIAP). (468/1994). Available at URL:< <http://www.finlex.fi/en/laki/kaannokset/1994/19940468> >

CO2-report (2012), Emission trade value drops one third. (EU:n päästökaupan arvo laski kolmanneksen tänä vuonna. Available at URL:< http://www.co2-raportti.fi/?page=ilmastouutisia&news_id=3665>

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds. Available at URL: < <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31979L0409:en:HTML> >

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Available at URL:< <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31992L0043:EN:NOT>>

Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues - Commission declaration. Available at URL:< <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0059:EN:HTML>>

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Available at URL:< <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF>>

Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements. Available at URL:< <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:255:0011:0021:EN:PDF>>

Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008. Establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) Available at URL:< <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:164:0019:0040:EN:PDF>>

ESPO (2012). Green Guide. Annex 2. Legislation influencing European ports. Available at URL: < http://www.espo.be/images/stories/Publications/codes_of_practice/annex%202_legislations_version%201_october2012.pdf >

European Commission (2010a). Climate Action. The EU climate and energy package.

Available at URL: < http://ec.europa.eu/clima/policies/package/index_en.htm>

European Commission (2010b). Climate Action. Effort Sharing Decision. Available at URL: < http://ec.europa.eu/clima/policies/effort/index_en.htm >

European Commission (2010c). Carbon Capture and Geological Storage. Available at URL:< http://ec.europa.eu/clima/policies/lowcarbon/ccs/index_en.htm>

European Commission (2010d). Emission Trading Scheme (EU ETS). Available at URL:< http://ec.europa.eu/clima/policies/ets/index_en.htm>

European Commission (2011). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. Our life insurance, our natural capital: an EU biodiversity strategy to 2020. Available at URL: < http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5b1%5d.pdf >

European Commission (2012). European Strategies. White Paper. Available at URL:< http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm>

European Commission (2013a). Environment. Available at URL:< http://ec.europa.eu/environment/index_en.htm >

European Commission (2013b). The EU Emission Trading System (EU ETS)
Finland's Ministry of the Environment (2011). EU's climate- and energy packet.
Available at URL: < <http://www.ymparisto.fi/default.asp?node=22013&lan=fi>>

European Commission (2013c). Environment Assessment. Available at URL:< <http://ec.europa.eu/environment/eia/> >

Environmental Protection Act (EPA). (86/2000), amendments up to 728/2011 included.
Available at URL: < <http://www.finlex.fi/en/laki/kaannokset/2000/en20000086.pdf>>

Environmental Protection Decree (EPD). (169/2000). Available at URL: < <http://www.finlex.fi/en/laki/kaannokset/2000/en20000169.pdf>>

Finnish Port Association (2010). Port operations and environment. (Only in Finnish).
Available at URL:< <http://www.finnports.com/fin/tietopankki/ymparisto/>>

Giercke, R., Schulz-Streeck, H. and Bahlke, C. (2004) Implementation of Agenda 21 in European Seaports on the Example of Lübeck-Travemünde. A publication of Stadtwerke Lübeck GmbH in co-operation with GAUSS mbH. 217 p. Available at URL:< <http://www.umweltdaten.de/publikationen/fpdf-l/3003.pdf>>

Government decision (1992/993). Valtioneuvoston päätös melutason ohjearvosta. Act of level of noise in Finland) FINLEX – Valti- on säädöstietopankki. Available at URL:

<<http://www.finlex.fi/fi/laki/alkup/1992/19920993?search%5Btype%5D=pika&search%5Bpika%5D=993%2F1992>>

HELCOM (2009). Overview of the shipping traffic in the Baltic Sea. Available at URL: <http://www.helcom.fi/stc/files/shipping/Overview%20of%20ships%20traffic_updateApril2009.pdf>.

Holma, E., Heikkilä, A., Helminen, R. & Kajander, S. (2011). Baltic Port List 2011 – Annual cargo statistics of ports in the Baltic Sea Region. A publication from the Centre for Maritime Studies, University of Turku. 180 p.

IMO (2012). EEDI – rational, safe and effective. Available at URL: <<http://www.imo.org/MediaCentre/HotTopics/GHG/Pages/EEDI.aspx>>

IMO (2013). International Maritime Organization. International Convention for the Prevention of Pollution from Ships (MARPOL). Available at URL: <[http://www.imo.org/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-\(marpol\).aspx](http://www.imo.org/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx)>

Kalenoja, H. & Kallberg, H. (2005). Liikenteen ympäristövaikutukset (Environmental effect of traffic). Tampereen teknillinen yliopisto. (Tampere University of Technology). Liikenne- ja kuljetustekniikka. Opetusmoniste 37. (Only in finnish)

Kujala, N. (2010) Ports and environmental indicators room for cooperation? Power point presentation.

Lahtinen, J. (2009). Rikkipesurit puhdistuvat laivojen pakokaasuja. (Sulphur scrubber clean emissions from ships) Vaasan yliopisto.(University of Wasa). Available at URL: <http://www.uwasa.fi/midcom-serveattachmentguid-d2158d1e26a0d64f717e2d910aaf540b/su0911_artikkeli_lahtinen.pdf>

Marine Institute (2013). The Water Frame Work Directive. Available at URL:<<http://www.marine.ie/home/services/advisoryservices/The+Water+Framework+Directive.htm>>

MARPOL Protocol 1978. Protocol of 1978 relating to the international convention for the prevention of pollution from ships. Available at URL:<<http://www.ecolex.org/server2.php/libcat/docs/TRE/Full/En/TRE000112.txt>>

MARPOL 1973 convention. International Convention for prevention of pollution from ships. Available at URL:<<http://www.ecolex.org/server2.php/libcat/docs/TRE/Full/En/TRE000113.txt>>

MARPOL Annex I. Prevention of Pollution by Oil. Available at URL:<<http://www.imo.org/OurWork/Environment/PollutionPrevention/OilPollution/Pages/Default.aspx>>

MARPOL Annex II. Regulations for the control of pollution by noxious liquid substances in bulk. Available at URL:<
<http://www.imo.org/OurWork/Environment/PollutionPrevention/ChemicalPollution/Pages/Default.aspx#2>>

MARPOL Annex V. Regulations for the Prevention of pollution by garbage from ships. Available at URL:<
<http://www.imo.org/OurWork/Environment/PollutionPrevention/Garbage/Pages/Default.aspx>>

MARPOL amendment 1993. The "double hull" requirements for tankers. Available at URL:<
<http://www.imo.org/KnowledgeCentre/ReferencesAndArchives/HistoryofMARPOL/Documents/MARPOL%2073-78%20Brief%20History%20-%20List%20of%20amendments%20and%20how%20to%20find%20them.htm>>

Ministry of Environment (2011). Liikenteen ympäristöhaitat. (Environmental effect of traffic). Available at URL:
<<http://www.ymparisto.fi/default.asp?node=10620&lan=fi#a1>>

Ministry of Environment (2009). Liikenteen melu ja värinä. (Noise and vibration of traffic). Available at URL:
<http://www.ymparisto.fi/default.asp?contentid=139310&lan=fi>

Ministry of Environment (2013). The Compliance Monitoring Data system – VAHTI. Available at URL:< <http://www.ymparisto.fi/default.asp?contentid=374022&lan=EN>>

Mäkelä, K., Auvinen, H., Tuominen, A. & Pääkkönen, E. (2010). Suomen rautatieliikenteen päästöjen laskentajärjestelmä RAILI 2009. (Finnish railway emission calculation system RAILI). VTT research report Nro VTT-R- 06150-10. Espoo. p. 38. Available at URL: <http://lipasto.vtt.fi/raili/raili2009raportti.pdf>

Nature Conservation Act (NCA). (1096/1996). Available at URL:<
<http://www.finlex.fi/en/laki/kaannokset/1996/en19961096.pdf>>

Ratahallintokeskus (2008). Ympäristöraportti 2008. (Environmental Report 2008). Ratahallintokeskus, Helsinki. Available at URL: http://rhk-fi-bin.directo.fi/@Bin/e7084fda90b3738b0ad6379425136021/1300084063/application/pdf/2941830/RHK_ympeC3%A4ristC3%B6raportti_2008.pdf

Regulation (EC) No 2099/2002 of the European Parliament and of the council. Available at URL:< <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:324:0001:0005:EN:PDF>>
U.S. Environmental Protection Agency (EPA) (2007). Acid Rain. Available at URL: <http://www.epa.gov/acidrain/what/index.html>

VTT (2009). LIPASTO 2009 calculation system. Available at URL:<
http://lipasto.vtt.fi/lipasto_lask_tulokset.htm>

White Book COM (2011). 144 Final. Available at URL: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:FI:PDF>

YLE (2013). Fosforivuoto oli megaluokan päästö – Syken arvio oli tarkoituksellisen varovainen. Phosphorous leakage was mega size emission – Finnish Environmental Institute made first very carefully estimation about leakage. (Only in Finnish). Available at URL: < http://yle.fi/uutiset/fosforivuoto_oli_megaluokan_paasto_-_syken_arvio_oli_tarkoituksellisen_varovainen/6679655 >



University of Turku
CENTRE FOR MARITIME STUDIES

FI-20014 TURUN YLIOPISTO

<http://mkk.utu.fi>



Turun yliopisto
University of Turku