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MANAGEMENT OF PORTS' ENVIRONMENTAL EFFECTS

A Comparative Review

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FOREWORD

The competition between the Finnish and foreign ports is tough. Since ports and logistics have important roles in Southern Finland, it is important to contemplate different factors and discuss how the ports' competitiveness could be improved. The research need for this study originally came from one of the largest Finnish ports. It is widely known that despite the common EU legislation, environmental assessment and management processes in the ports vary greatly within the Baltic Sea region. There is no previous research regarding how environmental issues are handled and monitored in different ports.

Nowadays, incorporating environmental issues into port management is an integral part of port operations. Ports can no longer avoid environmental concerns because of the increasing amount of regulations to control port pollution, and intensified public debates. Furthermore, there is pressure to increase services, modernize development and enhance economic efficiency, so that ports can respond to the growing competition. In order to balance the competing needs, the port operations must be managed in a sustainable manner. In sustainable port management, the economic growth is balanced with environmental protection.

In addition to legislation, the ports' environmental interest can be based on social and public pressure, responsible operating culture, marketing and image enhancement strategies, or competitive interests. Nevertheless, complying with environmental regulations produces costs to the ports, as well. If those costs vary greatly from one country to another, it can have an effect on the ports' competitiveness. In addition, the environmental permit as well as assessment and management processes for ports' environmental impacts vary from one country to another. The different methods in assessing and managing ports' environmental effects can influence the ports' development and expansion plans, and also competitiveness.

The aim of this project is to enhance the competitiveness, environmental management and competence of its target groups. The gathered information regarding the management of ports' environmental effects can be used to supplement future decision making processes. In addition, by studying and learning from environmental assessment and management methods in other countries, it is possible to improve the environmental assessment and management of the Finnish ports.

Kotka, 4 August 2015

Vappu Kunnaala-Hyrkki and Olli-Pekka Brunila

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ABSTRACT

Currently, the competitive situation of ports in the Baltic Sea is tough due to, for example, the economic downturn, EU's trade sanctions against Russia and Sulphur Directive that came into force at the beginning of 2015. In addition, ports can no longer avoid environmental concerns because there are increasing amount of regulations to control port pollution, as well as intensified public debates. Legislation is one of the most significant driving forces that lead the ports to invest in environmental actions. Nevertheless, ports may also find motivation to reduce their environmental effects voluntarily by, for example, applying best practices, introducing environmental systems or standards or by engaging in corporate social responsibility. The management of environmental effects in ports varies within the Baltic Sea region. The different management practices can affect ports' daily operations, development and expansion plans, and possibly competitiveness as well.

In general, all ports that participated in this research were committed to environmental issues and complied with environmental legislation. Some of the participating ports did also voluntary environmental initiatives and applied best practices in order to improve their environmental image, increase their operation cost-effectiveness, and also purely in order to improve the state of the environment. Several of the participating ports stated that they would operate at the same environmental level even without environmental legislation. In addition, the ports have realized that they can also achieve cost savings with green solutions and best practices.

Based on the questionnaire and interview studies, it can be said that ports in the Baltic Sea area consider environmental issues to be important, and value their own environmental image. Nevertheless, when it comes to competitive advantage, other issues not related to the environment have a greater role. Ports operate on a business-to-business level, and thus environmental issues are not the most important factor or a marketing method. Factors that affect the competitiveness of the port are rather the port location and the port infrastructure, such as the depth of the waterways, road and railway connections to the port, shipping routes and connecting ocean lines, and available port facilities. These issues affect the port competitiveness more than the ports' environmental image.

In order to achieve better results in environmental protection, to support the ports' voluntary environmental initiatives and simultaneously maintain the port competitiveness and equality, all EU member countries should have a unified legislation for ports. In practice, this would mean that every EU member country should apply the same environmental legislation and procedures, and emission calculation systems. Nowadays, the different practices of different local and national authorities put the ports in different competitive positions.

TIIVISTELMÄ

Tällä hetkellä Itämeren maiden satamien kilpailutilanne on kova johtuen esimerkiksi taloudellisesta taantumasta, EU:n venäjälle asettamista kauppapakotteista sekä Rikkidirektiivin voimaantulosta vuoden 2015 alusta. Lisäksi lisääntyneestä ympäristösääntelystä ja kiivaasta julkisesta keskustelusta johtuen satamat eivät voi enää vältellä ympäristövastuutaan. Erityisesti lainsäädäntö ohjaa satamia voimakkaasti investoimaan ympäristöön. Satamat saattavat kuitenkin pyrkiä vähentämään ympäristövaikutuksiaan myös vapaaehtoisesti esimerkiksi ottamalla käyttöön parhaita käytäntöjä, ympäristöjärjestelmiä tai standardeja, tai toteuttamalla yhteiskuntavastuullista liiketoimintaa. Satamien ympäristövaikutusten hallintakeinot vaihtelevat eri Itämeren alueen maiden välillä. Erilaiset toimintatavat voivat vaikuttaa satamien päivittäiseen toimintaan, sataman kehitys- ja laajentamissuunnitelmiin sekä mahdollisesti myös satamien kilpailukykyyn.

Pääasiassa kaikki satamat, jotka osallistuvat tähän tutkimukseen ovat sitoutuneet ympäristöasioihin ja noudattavat ympäristölainsäädäntöä tarkasti. Jotkut satamat ovat lisäksi osallistuneet vapaaehtoisin ympäristön tilaa parantaviin hankkeisiin ja soveltavat toiminnassaan parhaita käytäntöjä parantaakseen omaa ympäristöimagoaan, kehittääkseen toimintansa kustannustehokkuutta sekä yksinkertaisesti parantaakseen ympäröivän ympäristönsä tilaa. Useat tutkimukseen osallistuneista satamista totesivat, että he toimisivat samalla ympäristönsuojelun tasolla, jopa ilman ympäristölainsäädännön vaatimuksia. Lisäksi satamat ovat tiedostaneet, että ekologisia ratkaisuja ja parhaita käytäntöjä soveltamalla voidaan saavuttaa myös kustannussäästöjä.

Kysely- ja haastattelututkimuksen perusteella voidaan todeta, että Itämeren satamat pitävät ympäristöasioita tärkeinä ja arvostavat omaa ympäristöimagoaan. Kuitenkin silloin, kun kyse on saavutettavasta kilpailuedusta, ympäristöasiat eivät ole kaikkein tärkeimmässä asemassa. Satamat toimivat yritysmarkkinoinnin alalla, joten sellaiset tekijät kuten sataman sijainti, infrastruktuuri, väylien syvyys, rauta- ja maantieyhteydet satamaan, laivalinjat sekä jatko-yhteydet ovat tärkeämmässä asemassa kilpailuedun kannalta kuin ympäristöseikat.

Jotta voitaisiin saavuttaa parempia tuloksia ympäristönsuojelussa, tukea satamien vapaaehtoisia ympäristötoimia sekä samanaikaisesti ylläpitää satamien kilpailukykyä ja tasavertaista asemaa, tulisi kaikilla EU:n alueen satamilla olla yhdenmukainen lainsäädäntö. Käytännössä tämä merkitsisi sitä, että jokaisen EU-jäsenmaan tulisi soveltaa samoja ympäristösäännöksiä, ympäristömenettelyjä sekä päästölaskennan järjestelmiä. Tänä päivänä eri kansallisten viranomaisten erilaiset käytännöt asettavat satamat erilaiseen kilpailuasemaan keskenään.

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1 INTRODUCTION

1.1 Background

Ports facilitate the movement of goods from one country or continent into another. However, ports are also sites of environmental pollution. Because port activities have a significant effect on the environment, environmental issues should be integrated into port management. In addition, ports can no longer avoid environmental concerns because there are increasing amount of regulations to control port pollution, as well as intensified public debates. There is also pressure to increase services, modernize development, and enhance economic efficiency, so that ports can respond to the growing competition. In order to balance the competing needs, port operations must be managed in a sustainable manner. In sustainable port management, economic growth is balanced with environmental protection (Hiranandani, 2014).

Environmental effects caused by port activities can be controlled and decreased in several ways. Legislation is one of the most significant driving forces that lead the ports to invest in environmental actions. International, regional and national legislations regulate port operations and set different kinds of economic incentives or disincentives to the operation. Nevertheless, ports may also find motivation to reduce their environmental effects voluntarily from societal pressure or from their own driving forces, in order improve the port operations or in order to gain competitive advantage (Madjidian et al. 2013). Ports can go even further in managing their environmental effects than required by law by engaging, for example, in corporate social responsibility (CSR), developing best practices and introducing certifications.

As to maritime logistics, both shipping and port operations produce emissions. However, ports produce point source pollution, whereas the shipping companies' pollution sources are the ships, which are constantly moving. In practice, the pollution from ports has a stronger effect on a single region. Thus, the social aspects of CSR and stakeholder relations are probably somewhat more important to ports. The society is expecting that ports take responsibility in environmental protection. In addition, ports are often located close to urban areas. Ports are sites of environmental pollution that can affect nearby cities and citizens. These issues have to be taken into consideration in port operations. Ports should also interact constantly with their surrounding communities in order to maintain their social licence to operate (Kunnaala-Hyrkki & Brunila, 2015).

The policy of the European Sea Ports Organization (ESPO) consists of the compliance with legislation and the achievement of good environmental standards through voluntary self-regulation. Local circumstances of an individual port are also taken into consideration (Van Breemen et al. 2008).

1.2 Research Questions

The management of environmental effects in ports varies within the Baltic Sea region. The different management practices can affect ports' daily operations, development and expansion plans, and competitiveness as well. The aims of the research are to study what kind of environmental assessment and management systems and practices are used in the ports in the Baltic Sea region, and compare those practices. The aim is also to find out how the practices differ from one port to another, and from one country to another.

The study aims to answer the following research questions:

- How do the ports aim to assess and manage their environmental impacts?
- How do the different environmental assessment and management practices affect ports' competitiveness?
- How does the EU and national legislations affect port operations?

The first research question aims to find out the different ways ports assess and manage their environmental impacts. We will gather information about different practices and, if possible, establish some best practice examples. We will also study differences between ports, and between countries. Based on the results, we will discuss whether the practices should be unified internationally.

The second research question aims to find out whether the different environmental practices and requirements affect port competitiveness. We also aim to find out whether ports have performed any voluntary environmental initiatives, and whether those initiatives can produce competitive advantages to them. Based on the results, we will discuss whether the ports' environmental practices could be made use of in marketing.

The third research question aims to find out attitudes in ports towards the EU and national legislations. In addition, we aim to find out how legislation affects the port operations, and whether the dissimilarities of different national legislations can affect port competitiveness.

1.3 Research Methodology and Structure

This research comprises of a theory part, questionnaire, and interview studies. During this study we conducted a literature review regarding the management of ports' environmental effects. This literature review formed the background theory for this research. In the literature review, we discuss different environmental policy instruments, including legislative instruments and ports' voluntary actions.

At the same time with the literature review, we conducted an e-mail questionnaire regarding the assessment and management of ports' environmental effects. In addition to the

questionnaire, we performed in-depth interviews with some of the participating ports. During the interviews, the issues of the e-mail questionnaire were discussed in more detail.

The study comprises of five chapters. Chapter 1 includes the introduction of this research. Chapter 2 includes the literature review and forms the theory basis for the research. Chapter 3 includes the results of the e-mail questionnaire and the interview study. The chapter is followed with a summary of the questionnaire and interview results, and the discussion in chapter 4. Chapter 5 includes the conclusions of this research.

2 ENVIRONMENTAL LEGISLATION OF PORT OPERATIONS AND VOLUNTARY ACTIONS OF PORTS

2.1 Environmental Policy Instruments

Policy instruments effecting port operations can be divided, for example, based on the interests they aim to protect, such as private goods, company competitiveness, and public goods which the market would otherwise neglect. These public goods include, for example, the protection of the environment from the harmful effects of port operations. Policy instruments can be either preventive, such as a requirement for an environmental permit, or sanctions and consequences, such as financial liability. Both preventive measures and consequences can be either private or administrative (Kuronen & Tapaninen, 2010).

Usually policy instruments are divided into regulatory instruments, economic instruments and information-based guidance. Environmental effects of port activities can be controlled and decreased with each kind of the policy instruments. Regulatory instruments include, for example, jurisdiction and decrees, restrictions and licenses (Kuronen & Tapaninen, 2010). Regulatory instruments are effective and easy to enforce. Their weaknesses include their economic efficiency and public acceptance. Their implementation and enactment can also be expensive or difficult (Vieira et al. 2007). In addition, regulatory instruments may not promote changes or innovations, because they do not include any economic incentives (Klemmensen et al. 2007).

Economic instruments include for example taxes, subsidies and fees. Economic instruments can achieve environmental targets with good economic efficiency. However, they also often face acceptance difficulties, because they tend to increase prices (Kuronen & Tapaninen, 2009; Vieira et al. 2007).

Information guidance is based on the idea that information can lead to a voluntarily change in behaviour. The effectiveness of information guidance is totally dependent on the interest of the operator. Information-based guidance includes, for example, certifications that can be used in ports. While regulatory and economic instruments are usually based on legislation, with consequences for non-conformity, information guidance is completely dependent on the actors' voluntary interests (Kuronen & Tapaninen, 2010).

2.2 Port Related Legislation

2.2.1 The EU Legislation

The EU has many different regulations that influence the European ports and their management directly or indirectly. However, not all port-related EU legislation affects the environment. For example, the Birds Directive (Council Directive 79/409/EEC, on the conservation of wild birds) and the Habitats Directive (Directive 92/43/EEC, on the

conservation of natural habitats and of wild fauna and flora) and the Natura 2000 network that is based on them, can affect the ports directly. The ports can be affected by the directives for example during port development and port expansion plans.

The first environmental protection act given in the EU was the so called Birds Directive 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. The so called Habitats Directive is the centrepiece 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, 2013). The Habitats Directive together with the Birds Directive form 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, 2013).

Moreover, the Port Reception Facilities Directive (Directive 2000/59/EC, on port reception facilities for ship-generated waste and cargo residues) affects ports directly. The aim of the directive is to prevent and reduce the discharges of ship-generated waste and cargo residues into the sea. The main focus is in 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 (IMO, 2013). The EU member states must ensure that there are available port reception facilities for the needs of 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 collecting a fee from 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).

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 found 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 aquatic environment is protected and improved 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 (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 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 for 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 to improve the damaged ecosystem. The Marine Strategy Framework Directive constitutes the vital environmental components of the European 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).

The so called Sulphur Directive (Directive 2012/33/EU) is an example of a directive that can affect the ports indirectly. 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 original directive of 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 low-sulphur areas for ships, the so-called 'Sulphur Emission Control Areas' (SECAs). With this arrangement, the sulphur content of marine fuel used in these and similar areas was further reduced to 0.1 percent by 1st January, 2015. In the year 2012, the last amendments to the Sulphur Directive were adopted. The revised Sulphur Directive sets the limits regarding the sulphur content of marine fuels to 0.1 percent within the SECAs as of 1st January 2015 and to 0.5 percent elsewhere in Europe as of 2020. Because of the Sulphur Directive, the ports have to consider whether their port

reception facilities can be used to treat scrubber-generated waste. In addition, due to the directive, the ports have to consider whether they can facilitate the use of alternative fuels.

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 the Environmental Impact Assessment, that is, the 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, that is, the SEA Directive (Directive 2001/42/EC, on the assessment of the effects of certain plans and programs on the environment).

2.2.2 National Legislation

In addition to EU legislation, practically all ports are affected by national environmental regulations. Ports have to follow national environmental policies and environmental management systems. In addition, ports in Finland and Sweden, for example, have to get an environmental permit for port operations. In addition, ports in Finland have to go through an environmental impact assessment (EIA).

For example, in the Finnish legislation, there are almost 90 different laws, acts, regulations and rules that affect port operations and port construction. From the environmental protection point of view, the most significant acts are the Nature Conservation Act (1096/1996) and the Environmental Protection Act (527/2014). The aim of the Nature Conservation Act is to maintain biological diversity, conserve the beauty and scenic values of nature, promote the sustainable use of natural resources and the natural environment, and promote awareness and general interest in nature and promote scientific research. The Environmental Protection Act applies to all activities that lead or may lead to environmental pollution. The Environmental Protection Act includes the requirements of the use of the best available techniques and best environmental practices. The Act also includes the provisions related to environmental permits. A permit is required for activities that pose a threat of environmental pollution. The permits also contain necessary regulations regarding, for example, emission limit values and measures to prevent, reduce or assess pollution. Activities subject to a permit are prescribed in more detail by the Environmental Protection Decree (713/2014).

The aim of the Act on Environmental Impact Assessment Procedure (468/1994) is to further the assessment of environmental impact and consistent consideration of the impact in planning and decision making, and at the same time to increase the information level to citizens and give them the opportunity to participate in decision making. Environmental impact assessment procedure shall be applied to such projects which may have significant adverse environmental impacts, due to the special features in 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.

In the Act on Environmental Protection in Maritime Transport (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 ships. The Act defines which kind of wastes port operators must receive and have reception facilities for. Every port operator shall ensure that the 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

Additionally, according to the Act on Environmental Protection in Maritime Transport, oil terminals must have equipment to receive oily ballast waters and tank washing from tankers using the terminals. 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.

2.3 Voluntary Actions and Sustainable Operations

2.3.1 Corporate Social Responsibility

Environmental concerns practically dominate many political, practical and reputational aspects of maritime logistics. In addition, with regulations to control port pollution increasing and public debates intensifying, ports can no longer avoid environmental concerns either. There is also pressure to enhance economic efficiency in order to respond to the growing competition. In order to balance the competing needs, operations must be managed in a sustainable manner, so that both the economic and environmental factors are taken into consideration (Kunnaala-Hyrkki & Brunila, 2015).

In the corporate social responsibility concept, companies voluntarily take part in actions that contribute to a cleaner environment and a better society. This is achieved through interaction with stakeholders and by integrating any concerns into business operations, which will potentially result in economic benefits, as well (the Commission of the European Communities, 2001; Kujala, 2009). Currently the United Nations' Global Compact (UNGC) and its 10 principles is the universally accepted framework for companies committed to CSR (UNGC, 2013). In the

European Union, the framework is based on the Commission's Green Paper Promoting a European framework for Corporate Social Responsibility (COM (2001)366) (Commission of the European Communities, 2002).

There are two different conceptions concerning responsibility. Firstly, responsibility can be seen as an internal tool of the company's management. In this conception, responsibility is a tool to improve the company's operations, and therefore improve the company's financial performance. Secondly, the demand for responsibility can originate outside the company, for example, from stakeholders and legislation. In that case, the company's responsibility is more than just an internal issue (Sorsa, 2010).

Corporate social responsibility takes into account the environmental, social and economic aspects of company operations. In CSR, the aim is also to find a balance between those three factors. A socially responsible company tries to operate in a manner that causes minimal harm to the environment, and tries to reduce its environmental impacts as far as possible. The environmental aspect in corporate social responsibility can mean, for example, that a company tries to manage energy consumption, reduce waste produced, and dispose waste in a safe and legal manner. In the long run, being environmentally sustainable is beneficial for a company (Elkington, 1994).

The most significant environmental impacts caused by ports are related to construction work done in ports, water and road transportation, waste and introduction of noise and other adverse effects, such as dust and odours. Ports can use, for example, the following practices in order to reduce their environmental impacts: full life cycle assessment in port development and construction, on-shore power supplies, continuous monitoring of emission levels, waste management, renewable energy consumption, and alternative fuels. Several of these measures incorporate both environmental aspects of CSR and economic aspects in the form of potential for cost-reductions. However, in some measures, the social aspects of CSR are also taken into consideration. For example, on-shore power supplies reduce the need to use ship auxiliary engines in ports. Thus, it is possible to minimize noise and other emissions caused by the auxiliary engines. This is important especially when the harbour is situated in a city centre, close to residential areas. Unfortunately, a universal on-shore power supply plug-in system that would suit all ship types does not yet exist. Hopefully, in the future, on-shore power supplies will be further developed, especially for cargo ships (Kunnaala-Hyrkki & Brunila, 2015).

Corporate social responsibility activities are not usually taken into serious consideration in companies whose activities are in a business-to-business level, such as ports. In business-to-business operation, stakeholder pressure is not necessarily as strong as it is in business-to-consumer operation. Nevertheless, stakeholder involvement is a central part of a company's CSR activity. In addition to commercial stakeholders such as customers and partners, companies increasingly seek to identify and consult with non-financial stakeholders, such as local communities. Dialogue with stakeholders and direct involvement helps companies to identify the stakeholders' expectations (Poulovassilis & Meidanis, 2013). It should be noted that sometimes the values of the companies are the only thing that separates them from their

competitors, and a “green” company is usually associated with good quality service and innovativeness (Holmgren, 2010; Acciaro, 2012).

The benefits gained with CSR are largely dependent on the measures taken, the costs related to them and the measured time period. Benefits can be gained in different fields, such as the environment, human resources, customer relations, innovation, reputation and financial performance. For example, in the environmental field, measures to reduce energy consumption usually lead to cost savings. Rising energy costs further increase the cost-saving potential of the measures. Companies are often concerned with the costs of CSR. It is true that engaging in CSR produces financial and time costs. However, the focus in CSR should be on obtaining long-term profits which include not only monetary profits but also social and environmental benefits, which are often challenging to measure and whose positive outcomes can be seen only after a while (Kunnaala-Hyrkki & Brunila, 2015; Poulouvassilis & Meidanis, 2013).

2.3.2 Best Practices

One key element in the competition between the Baltic Sea ports now and in the future will be their environmental status and capability to respond to the challenges of sustainable development (Brunila & Anttila, 2013). Developing best practices and sharing them allows ports to enhance their operations and helps them to choose the most cost-effective measures for decreasing their environmental impact. Thus nowadays, port operators are beginning to see the potential advantages of sharing ideas on best practice and trends. In addition, there is a possibility to learn from others’ mistakes. The term best environmental practice means the application of the most appropriate environmental control measure or measure combination that show results superior to those achieved with other means (e.g. GHD, 2013).

However, it should be recognized that the ports are not the same; each port and its surrounding area can be considered to be unique. Thus the importance of different environmental aspects depends on the characteristics of each port, and not all best practices applied in one port are directly applicable in another. Nevertheless, several environmental issues are common to all ports, and they face common environmental challenges (Hiranandani, 2014).

Because of the recent global economic recession, it can seem that reducing environmental impacts in ports is too costly. It should be noted, however, that environmental initiatives by ports can also become a strong commercial argument and a competitive advantage. In addition, implementing state-of-the-art sustainable practices can reduce costs and enhance the port’s operational efficiency (Hiranandani, 2014).

Ports utilize a range of sustainable practices. Best practices for ports have been developed in, for example, previous projects. Best practices are closely linked to the concept of the Green Port. The key elements in the Green Port concept include: long-term vision, stakeholder

participation, shift from sustainability as a legal obligation to sustainability as an economic driver, actively sharing knowledge with other ports, and continuously strive towards innovation (PIANC, 2013).

2.3.3 Systems, Standards and Certificates

The international standard ISO 26000 provides guidance to companies in the field of CSR. The standard covers the terminology and principles of CSR, stakeholder communications and other core issues of CSR. Unlike other ISO standards, the ISO 26000 is not intended as a basis for certification. Instead, it is meant as a comprehensive guidance document for public as well as private organizations of all sizes wishing to become more effective in fulfilling their social responsibility (ISO 26000:2010 Guidance on social responsibility).

Environmental management systems and standards can include good practices that ports can use in their operation. Environmental management systems also indicate the port's preparedness to actually comply with environmental legislation, and to strive for environmental improvement and sustainable development (Madjidian et al. 2013). Best practices are closely linked to environmental management systems or standards, such as the ISO 14001, the Port Environmental Review System (PERS), or the Eco-Management and Audit Scheme (EMAS).

The most common and well-known environmental system is the ISO 14001. The system is made flexible so that it is applicable in companies and organization of different sizes and types. While incorporating the environmental management system, the organization commits to the continuous improvement of its environmental protection level. In addition, the legal requirements and set goals must be complied with, and enough resources must be allocated for the incorporation of the system. The benefits that the ISO 14001 offers the companies and organizations include, for example, incorporating environmental issues as a part of the company management; cost-effectiveness; enhanced environmental knowledge; compliance with legislation and anticipation of new legislation; better control of potential environmental risks; stakeholder connections in environmental issues; and certification from an external independent party (Suomen Standardoimisliitto, 2011).

The PERS is the only port-sector specific environmental management standard, and it is developed by ports for ports. There are various instructions available regarding general environmental issues, but the system's port specific approach is really useful, because of the highly specialized nature of the environmental challenges in the port area. The PERS incorporates the main requirements of recognized environmental management standards, such as the ISO 14001. The system gives ports clear objectives at which to aim and its implementation can be certified. In addition, PERS is not too demanding in terms of resources and time (ESPO, 2015).

The EMAS is a voluntary environmental system for operators in private and public sector. The EMAS is based on the European Community regulation ((EC) No 1221/2009) on the voluntary participation by organisations in a community eco-management and audit scheme (EMAS). The ISO 14001 standard forms the basis of the EMAS, but the difference is in the compulsory environmental statement and outside environmental verifiers (Suomen ympäristökeskus, 2010). Transparency, credibility and public reporting are a central part of the EMAS. The benefits of the EMAS are largely the same as the benefits of the ISO 14001.

3 THE ASSESSMENT AND MANAGEMENT OF PORTS' ENVIRONMENTAL EFFECTS

3.1 Questionnaire Study

3.1.1 The E-mail Questionnaire

An e-mail questionnaire study was conducted during January and February of 2015. The questionnaire study was carried out in English using the web based system "Webropol" (<http://w3.webropol.com/>). Ports that are located in the Baltic Sea area were invited to answer the questionnaire. The aim was to exclude recreational ports and smaller ports, the transportation volume of which was less than 0.5 million tons per year. No other restrictions were made based on the port operations. The questionnaire was sent to 188 recipients from all countries surrounding the Baltic Sea.

The complete questionnaire is included in Appendix 1. The questionnaire comprised of a set of questions dealing with the background information of the respondents, and a set of questions regarding the assessment and management of the ports' environmental effects. The questionnaire comprised of both multiple-choice questions and open questions. The open questions (questions 14, 20–21 and 24–26) were voluntary and all other questions were mandatory.

3.1.2 The Background Information of the Respondents

The questionnaire received answers from 28 different ports. The respondents were from Denmark, Estonia, Finland, Germany, Latvia, Poland and Sweden. 16 of the respondents wished to remain anonymous. The ports which allowed the publication of their name in the questionnaire were Port of Rauma, Port of Raahel, Port of Pori and Port of Loviisa from Finland; Port of Tallinn and Port of Kunda from Estonia; Port of Visby, Port of Stockholm and Port of Skellefteå from Sweden; Port of Roenne and Copenhagen Malmö Port from Denmark; and Port of Gdynia from Poland. More than 64 percent of the responding ports belonged to the Ten-T network.

The respondents were mainly environmental or quality management personnel (8 respondents). The second largest respondent group was specialists (5 respondents). Other respondents were employees, management and middle management personnel, technical management personnel, directors, traffic management personnel, economists and deputy chief executives.

In the questionnaire, the ports were also asked what the size of the responding port was, based on annual cargo volume. The sizes of the ports varied. Almost 36 percent of the responding ports had an annual cargo volume of over 10 million tons. The largest answer group (approximately 54 % of the respondents) consisted of ports with an annual cargo

volume of 1 to 10 million tons. Only three of the responding ports (or approximately 11 % of the ports) had an annual cargo volume of less than 1 million tons.

The ports were also asked about their type of operation. The results can be seen in the figure below (figure 3.1).

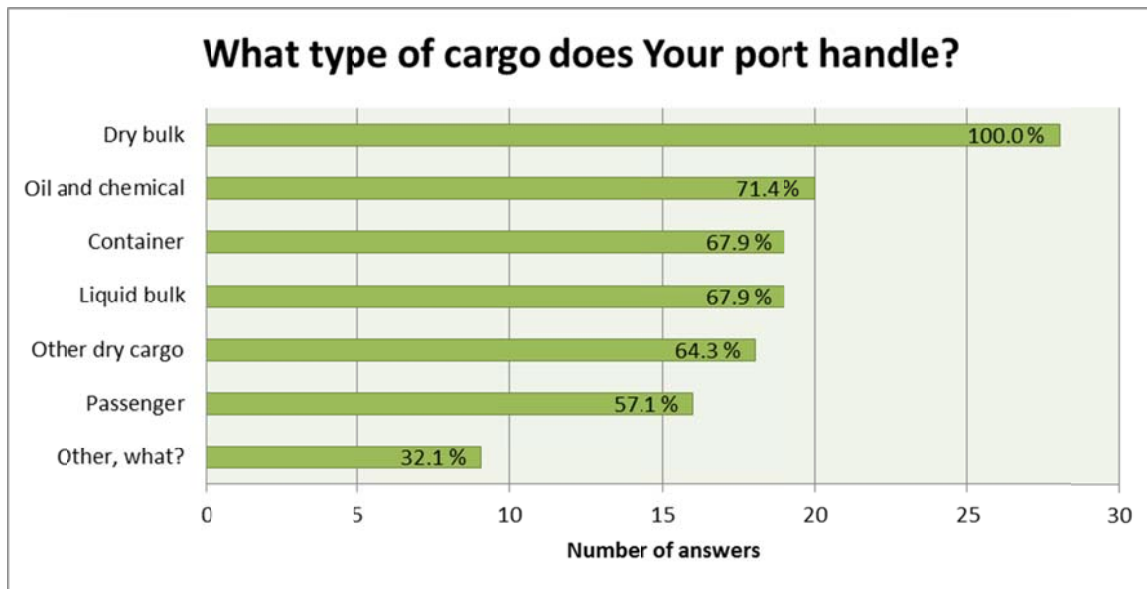


Figure 3.1 The types of cargo that the responding ports handle. More than one answer was allowed. This question received 28 answers.

The most common cargo type was dry bulk, and the second most common was oil and chemical cargo. Container cargo and liquid bulk were the third most common types of cargo. Moreover, little over a half of the responding ports operated partly as passenger ports, but none of the ports were exclusively passenger ports.

The ports also gave some answers outside the given options. According to those answers, the ports also handle, for example, ro-ro units and trailers, general cargo, project cargo, cars and railway and truck cargo. All of the responding ports handled dry bulk cargo, and all of the ports chose at least two cargo types. Half of the ports chose five to six alternatives, and two ports chose all seven options. This means that the majority of the responding ports are multi-purpose ports. For example, Port of Stockholm and Copenhagen Malmö Port chose all six given alternatives and Port of Gdynia chose all six and in addition mentioned ro-ro cargo as an extra alternative.

The types of cargo handled in the ports varied, thus we were able to gain information from different kinds of ports that are engaged in different kinds of operations. Even though the number of respondents was scarce, we were able to get good variation in the answers.

3.1.3 Assessment of Ports' Environmental Effects

During the questionnaire we asked the ports whether they measure the state of their surrounding environment. Almost 79 percent of the ports told that they measure the state of their surrounding environment. Correspondingly, five respondents told that they do not.

Measuring the state of a port's surrounding environment might be necessary, for example if a there is a nature reserve in the proximity of the port. In addition, stakeholder pressure from citizens or cities located near ports can urge the ports to perform additional, voluntary environmental actions, such as the measurement of the state of the surrounding environment.

According to the results of the questionnaire, over 82 percent of the responding ports measure their environmental impacts. Only three respondents replied that their port does not measure its environmental impacts, and one respondent did not know the answer. The ports in the Baltic Sea area are often obliged to measure some of their environmental impacts. This may be based on legislation, environmental permits, or it may also be based on the certificates or standards that the ports have adopted. For example, in Finland, port's environmental permit may require regular noise level measurements, or it may include emission limits, the control of which usually requires measurements (Environmental Protection Act 527/2014). The ISO 14001 requires that the organization documents a procedure for monitoring and measuring the operations that can have a significant environmental impact (ISO 14001).

In the questionnaire, the respondents were asked what kind of measurements their port performs. The respondents were able to choose as many alternatives as they wanted. The results of the question can be seen in the figure below (figure 3.2).

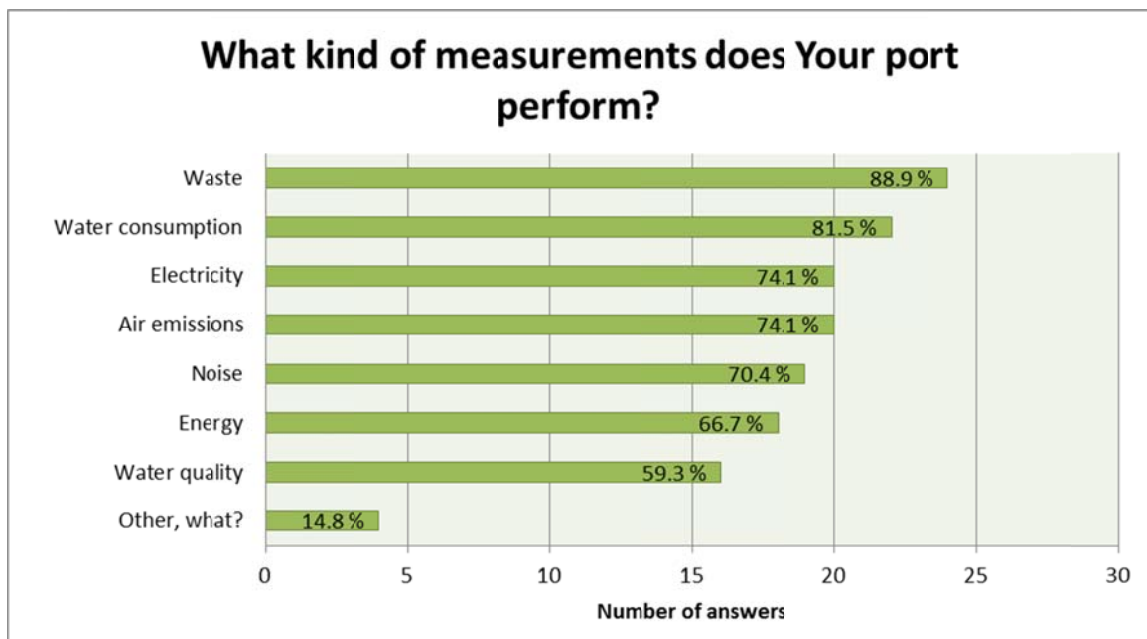


Figure 3.2 The different kinds of measurements the responding ports perform. More than one answer was allowed. This question received 27 answers.

The most common measurements the ports performed were related to waste. The most second common measurement target was water consumption, and the third most common were electricity and air emissions.

One third of the respondents chose seven alternatives. Only three respondents chose three or less alternatives. Even those three ports that in the previous question answered that they do not measure their environmental impacts chose some alternatives. However, it should be noted that, based on the answers of those ports, they usually measure their water, energy and electricity consumption and waste. It might be that the said ports do not consider those measurements in the environmental sense, but see that they are aimed at preserving resources and improving the port cost-effectiveness. The resulting environmental benefits are merely a positive side effect.

The ports also gave some answers outside the given options. According to those answers, the ports also measure soil, sediments and dumping sites. Port of Pori also told that their port takes part in a joint monitoring of water quality.

The ports were also asked, whether they have made any voluntary initiatives based on the results of the measurements. If the responding port replied yes, it was asked to describe the initiatives more specifically. Almost 60 percent of the responding ports replied that they have made voluntary initiatives and we received 16 examples of those environmental initiatives.

The most common voluntary initiatives were related to reduction of energy consumptions, electricity and water. We received eight answers regarding energy efficiency. Some ports had for example, renewed their lighting systems in the field area (Port of Pori) or gained energy savings by insulation of buildings. Waste management was the second most common voluntary initiatives. Three ports told that they have done voluntary waste management initiatives. Voluntary initiatives related to energy consumption and waste management do not necessarily benefit only the environment. Reduction of energy consumption and waste management can also affect the cost-effectiveness of the port, and thus bring monetary benefits to the port itself.

Environmentally differentiated port fees received two answers as well as port reception facilities and on-shore power supplies. Gas driven vehicles were also mentioned as an environmental initiative, as well as restrictions due to noise levels based on the proximity of residents. Port of Rauma has established an environmental program, Skellefteå Port is cleaning rainwater and snow on all new areas, and Port of Tallinn has an air emissions on-line system to inform inspectorate and oil companies. One of the responding ports replied that, in general, they minimize any pollution or damage to environment.

3.1.4 Port Related Legislation

During the questionnaire, the responding ports were asked about their views on the national and EU legislations. The first question was whether the ports consider the national legislation to be stricter than the EU legislation in their country. Over half of the respondents (approximately 54 %) replied that the national legislation is stricter in their country. Correspondingly 46 percent told that the national legislation and EU legislations are at the same level. None of the respondents saw that the national legislation was less strict than the EU legislation.

The Danish ports were unanimous in their responses as all of them considered their national legislation to be stricter than the EU legislation. Correspondingly the Polish and Latvian ports were also unanimous in their opinions that they saw their countries' national and the EU legislations to be at the same level. The majority of the Finnish and Estonian ports considered the national legislation to be stricter, even though few ports considered it to be at the same level as the EU legislation. The responses of the Swedish and German ports were divided equally.

The respondents were also asked whether they consider the EU legislation to be highly restrictive. Ten (approximately 36 %) respondents answered yes, and 18 (approximately 64 %) answered no. The respondents were also asked to elaborate their answers, and thus we received 13 arguments on the strictness of EU legislation.

Three of the respondents who considered the EU legislation to be highly restrictive referred to SO_x limitations in the Baltic Sea SECA area as an example of highly restrictive EU legislation, and thus sulphur requirements was the most common answer. The problem with the "sulphur directive" is that it is not applicable in the whole EU area. For example, Port of Tallinn stated that the sulphur directive can influence the competition between ports. Another respondent pointed out that the directive may have an opposite environmental impact than what was initially intended, as the directive might cause a modal shift from shipping to road and rail transportation, and as ship operators install scrubbers, which causes an increase in consumption of the fuel and, consequently, an undesired increase in CO₂ emissions.

The ports also pointed out that, because the EU legislation generalizes to cover all kinds of ports, it may be too restrictive for some ports. One respondent replied that, because of the EU legislation, there are too many overlapping plans and licences that are required from the ports. One respondent pointed out that environmental performance criteria are constantly becoming stricter. One port saw that the EU legislation is partly blocking the port's investments. In addition, one port replied that it is challenging to handle ships and cargoes within the required environmental limits at all times. One of the responding ports stated that even though environmental issues should be one of the top priorities in the EU legislation, and as primary concerns need to be addressed through stringent regulations, it should be noted that the legislation also has to be economically feasible, since only such legislation is actually sustainable.

Moreover, the respondents who replied that the EU legislation is not highly restrictive gave arguments on the strictness of the EU legislation. According to Port of Visby, the EU legislation is up-to-date and thus not too restrictive. Port of Roenne pointed out that they want to have a cleaner world in the future also, and thus do not consider the EU legislation highly restrictive. One of the responding ports saw that the EU legislation is not restrictive, and includes only relevant demands. Port of Pori pointed out that the Finnish national legislation is more restrictive.

In the questionnaire, the responding ports were also asked whether they consider the national legislation to be highly restrictive. 17 (approximately 61 %) respondents answered no, and 11 (approximately 39 %) responded yes. The respondents were also asked to elaborate their answers, and thus we received 15 arguments on the strictness of national legislation.

Especially the Finnish ports considered the national legislation to be highly restrictive. They considered the legal permit processes to be too long, and the conditions too strict. In addition, there are too many overlapping plans and licenses required. Because of the operational environmental permits, the ports are not able to react to new business opportunities, such as new cargo flows, as fast as they should, which can affect port competitiveness. In addition, one Finnish port claimed that the Finnish legislation includes some stricter rules than the national legislations in any other countries in the Baltic Sea area. Correspondingly, one Danish port replied that it is a challenge to handle ships and cargoes within environmental limits at all times.

Two of the three Estonian ports replied that the Estonian legislation is too focused on protective and preserving methods, and that environmental performance criteria are constantly getting stricter.

Two Swedish ports that considered the national legislation not to be highly restrictive replied that contrary to the EU legislation, the national legislation is based on local circumstances and conditions, and its demands are more relevant. In addition, Port of Tallinn pointed out that the national legislation is in accordance with environmental requirements.

In the questionnaire we also asked the ports how the EU and national legislations have affected their port operations. The question was a voluntary open question, and it received 20 answers.

One of the responding Swedish ports replied that, based on the legislation, they have legal permits that give a frame on the environmental work. Another Swedish respondent pointed out that the rules and regulations cover all parts of the port operations, such as working environment, work times, and building standards. The EU and national legislations thus affect all parts of the port. Another respondent from Sweden also mentioned annual reporting, waste handling and construction projects to reduce noise level as effects that the EU and national legislations have had on their port.

The responding ports from Finland wrote about the required environmental permits. Some ports told that a substantial amount of resources are spent because of the EU and national legislations, and that they could be otherwise used for more effective environmental activities, since all of the investments are not always justified. The ports also have to be more aware of their environmental effects and constantly follow the legislation development. Moreover, one Danish port replied that, due to the EU and national legislations, they have to invest in costly environmental protection.

One responding port from Estonia told that fortunately so far there have not been any big direct negative effects, but there is a very clear trend that in future development projects the amount of bureaucracy is increasing. Some responding Estonian ports told that the cost of services can increase as the environmental monitoring increases in different areas, and more expensive technologies have to be adopted. In addition, one Danish port also pointed out that, due to legislation, their port has to invest in, for example, noise reducing walls and equipment.

The responding Polish ports replied that environmental issues have to be taken into consideration during all port's operations. As an example of direct effects of legislation, one port wrote that due to the new sulphur rules, bunkering facilities will have to be adapted to offer low-sulphur fuel and LNG, and the refuelling infrastructure has to be reconsidered as well.

The ports were also asked whether they would operate in the same environmental level without the requirements of legislation. Over 82 percent of the respondents (23 ports) told that they would operate at the same environmental level nevertheless. Only 5 respondents (18 %) told that they would not.

12 respondents established why their port would operate in the same environmental level, and half of those answers were somehow related to CSR. The ports stated, for example, that they are responsible for the workers and local residents' health and wellness, they know their role as a part of the community, they are merely using common sense as local responsible stakeholders, they want to be environmentally responsible, they need the public acceptance, and they seek to be good neighbours. These goals are related to both environmental and (local) social responsibility, since the aim of the ports is to operate in a good environmental level, and also to have good stakeholder relations. For example, Port of Raahe, Port of Loviisa and Port of Kunda had these kinds of corporate social responsibility values.

In addition to CSR, some ports, such as Port of Roenne and Ports of Stockholm, wrote about "green" ambitions and sustainability priorities. Port of Pori and Copenhagen Malmö Port replied that their ISO 14001 certificates would guarantee a high level of environmental protection even without legislation.

Furthermore, some ports replied that they would not operate at the same environmental level without legislation. Few reasons for that were also mentioned. For example, according to

those ports, some requirements, such as sulphur limits, are very strict, and those requirements would not be followed, and without legislation there would be less costs and restrictions.

In the questionnaire, the ports were also asked about their Ten-T status. We have already established in the previous chapter that more than 64 percent (or 18) of the responding ports belonged to the Ten-T network. Now we asked the Ten-T ports, whether being a part of the Ten-T network has affected their' environmental assessment and management. The question was a voluntary open question, and it received 18 answers. 13 of the responding ports replied that no such effect has come up so far, and that they do not see a direct link between Ten-T and environmental development.

One of the responding ports saw that stricter regulations from the EU level for Ten-T ports may come up later on, but only for Core ports. Another port did not see any immediate effects, but suspected that, in the long run, being a Ten-T port can make it somewhat easier to obtain financial support to infrastructure projects from governments. The Copenhagen and Malmö Ports wrote that they have conducted a study on implementing LNG in both Malmö and Copenhagen as a part of their duty as a Core Port. Another port also stated that every project, even those related to being a Ten-T port, requires an environmental permit based on national legislation.

3.1.5 Management of Ports' Environmental Effects

In the questionnaire the ports were asked whether they apply some kind of best practices and if so, what those best practices are. 18 (approximately 64 %) of the responding ports replied that they do apply best practices. Some of the best practices used in the ports are listed below as an example:

- Environmentally differentiated harbour fees (eg. Ports of Stockholm)
- Exchange of information with other Baltic Sea ports (Port of Gdynia)
- Using the latest best environmental techniques
- Best practices based on the ESPO Green Guide (Port of Tallinn, Ports of Stockholm)
- Dimming lights
- Environmental issues included in the mandatory Port Safety Training (Port of Raahe)
- Gas recuperation system in liquid chemical terminal
- Dust-free loading system of dry bulk (Port of Pori)

Furthermore, the responding ports mentioned that they have best practices in the field of air emissions, waste management, building, noise management, waste separation and waste water treatment.

In addition to best practices, the ports were also asked whether they have some kind of certificates of standards. 12 (approximately 43 %) of the ports replied that they do not have certificates or standards. Correspondingly, 16 (approximately 57 %) of the ports had acquired

some certificate or standard, or were working on getting quality and environmental certificates. The certificates and standards in use can be seen in the figure below (figure 3.3.)

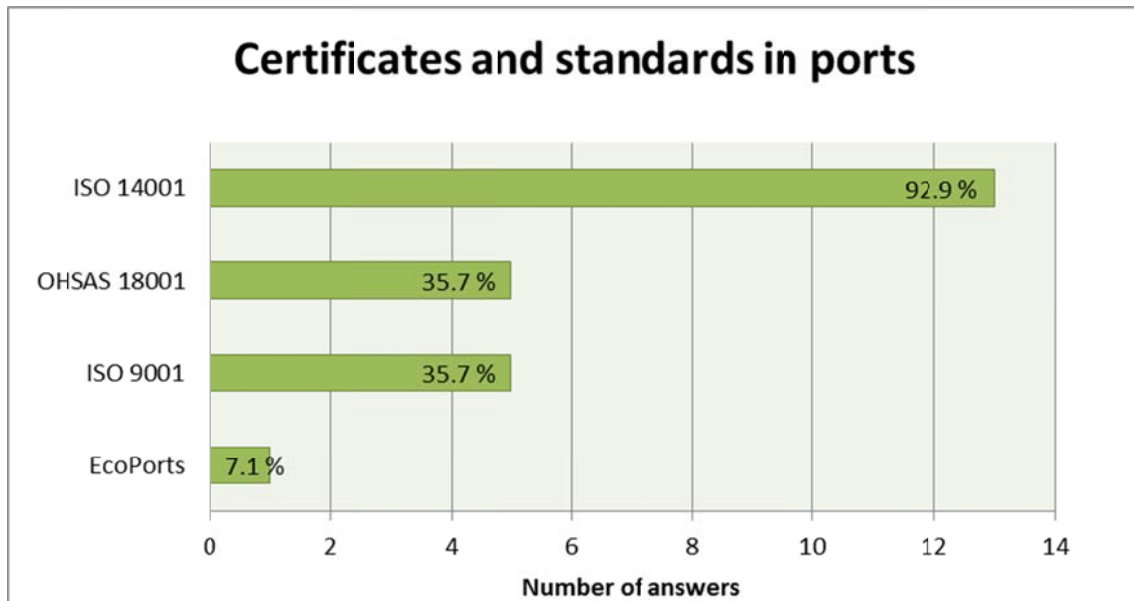


Figure 3.3 The certificates and standards in use in ports. More than one answer was allowed. This question received 14 answers.

14 ports revealed the type of the certificates and standards they have. Out of those ports 13 (approximately 93 %) had the ISO 14001 certificate. In the case of eight (approximately 57 %) of those ports, it was the only certificate they had. Five of the 14 ports had all three certificates, that is, the ISO 14001, ISO 9001 and OHSAS 18001 certificates. One of the responding ports had the “EcoPort” status.

The responding ports were also asked if they had conducted or participated in projects, the goal of which was the assessment and management of the port’s environmental effects. Half (14) of the responding ports wrote that they have conducted or participated in such projects. The named project include, for example:

- Clean Baltic Sea Shipping (eg. Port of Tallinn, Ports of Stockholm)
- LNG in Baltic Sea Ports (eg. Port of Tallinn)
- Baltic Master I and II (eg. Port of Visby, Port of Gdynia)
- Joint monitoring of the sea area (Port of Raahé)
- ECODUMP (Port of Gdynia)
- Cruise Baltic – Port Service Standards (Port of Roenne)
- New Hansa (eg. Ports of Stockholm)
- SMOCS (eg. Port of Gdynia)

In addition, the ports revealed that they have conducted or participated in projects regarding on-shore power supplies, new territories and infrastructure. In addition, Copenhagen Malmö Port replied that they have conducted workshops on how environmental legislation affects their daily work.

The ports were also asked whether they engage in corporate social responsibility. According to the answers, 12 (almost 43 %) of the responding ports are engaged in CSR. All but one of the ports that in the chapter above gave CSR related answers, while explaining why their port would operate at the same environmental level even without legislation, replied that their ports are engaged in CSR. These ports include Port of Kunda, Port of Raahe and Port of Loviisa.

In the questionnaire, the ports were asked how they take environmental issue into consideration during port development and expansion. The question was a voluntary open question, and it received 23 answers.

Several of the responding port from different countries, including Sweden, Finland, Latvia and Poland, mentioned environmental impact assessments or environmental impact assessments and related environmental permits as a way to include environmental aspects to port development. In addition, several ports wrote that the environmental aspects have to be carefully and thoroughly considered beforehand, and that the aspects have to be incorporated into the planning process.

In Germany, nature protection areas and compensation measures are incorporated in port development projects according to legislation. One of the responding ports wrote that they use environmental consultants during port development in order to guarantee that environmental aspects are taken into account. One port listed that in all planning for future expansions, for example, waste management, noise, air quality and energy consumption are considered. In addition, one port added that on-shore power supplies are included in the port expansion plans, and another pointed out that during port expansion, new and improved facilities are being installed. One port listed mapping endangered plants, protecting landfill area from the spreading of impurities, and continuous water monitoring as ways to integrate environmental aspects to port development and expansion plans. One port concluded that sustainability is an integrated part in port development projects.

During the questionnaire the ports were asked, whether they perform any other voluntary environmental actions, and whether they have any future plans regarding environmental actions. The question was a voluntary open question, and it received 22 answers.

Nine respondents replied that they do not perform any other voluntary environmental actions, but one of them added that they are preparing new actions. The other 13 respondents established their voluntary environmental actions and future actions in their answers. Here are some examples of those actions:

- Voluntary real-time air emission control and measurements of air quality
- Voluntary measures to reduce noise emissions
- Participation in different projects
- Participation in local environmental networks and cooperation with local authorities on environmental issues
- Differentiated port fees

- LNG bunkering facilities and terminals are being built
- Management of NATURA2000 sites
- Voluntary actions in the field of waste management and sorting of waste

In the questionnaire, the ports were asked to choose what kind of positive effects the voluntary actions can have. The ports were able to choose from one to three most important alternatives, or to write down their own alternatives. The results of the question are established in the figure below (figure 3.4).

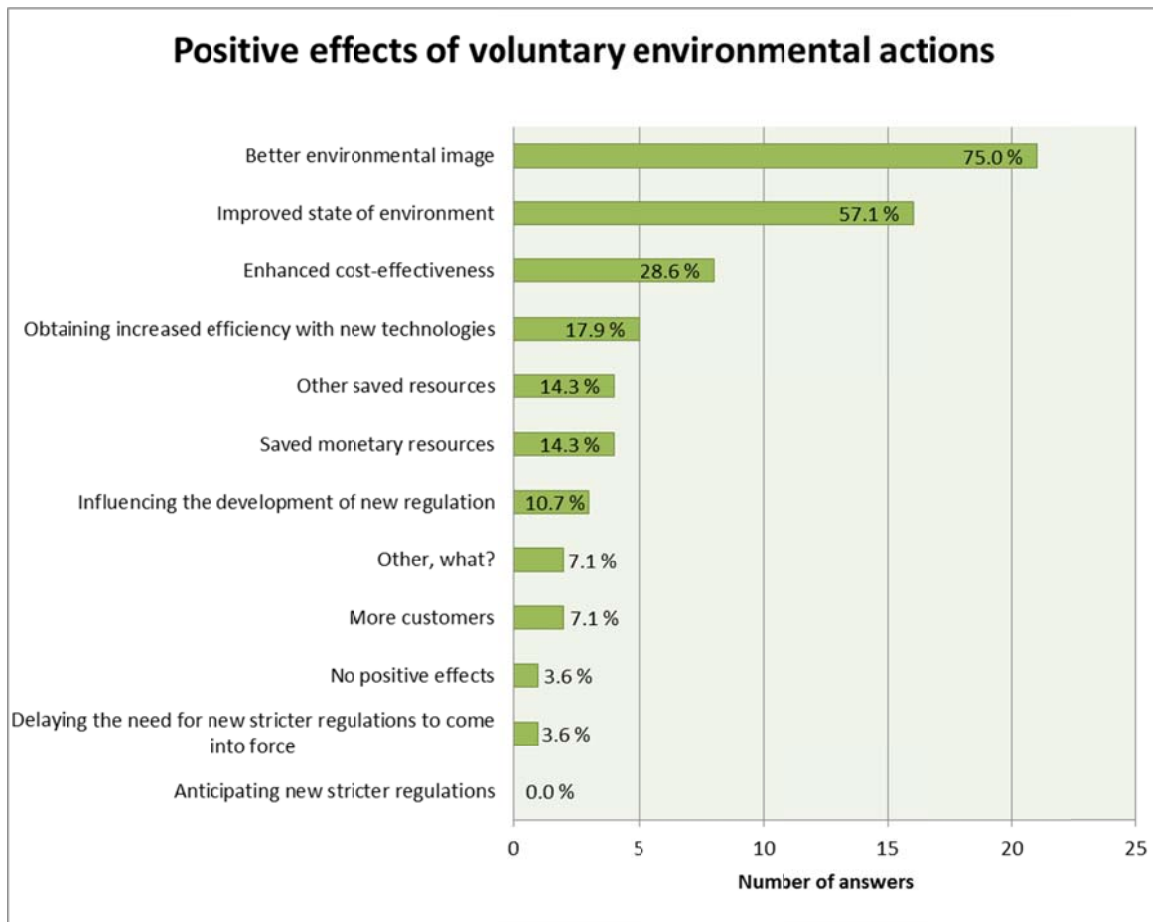


Figure 3.4 The positive effects that the voluntary actions of ports can have. The respondents were able to choose 1-3 most important alternatives.

The most common answer was *better environmental image*: 21 of the respondents chose that alternative. Thus it can be said that the ports do care about their environmental image and consider the improvement of their image a positive change. The second most common answer was *improved state of the environment*, which was chosen by 16 respondents. That can be seen as an ethical positive effect, and it is related to environmental responsibility. In addition, if the environment is considered a common good of the community, improving the state of the environment can also be seen as a part of social responsibility.

The third and fourth most common answers were *enhanced cost-effectiveness* and *obtaining increased efficiency with new technologies*. Thus it can be said that the ports are starting to

realize the direct benefits they can gain with different kinds of environmental actions. Environmental actions do not only improve the state of the environment and decrease emissions, they can also result in cost savings in the form of energy efficiency, for example, when ports renew their lighting systems.

Half of the responding ports chose the maximum amount of alternatives. Nine (approximately 32 %) of the ports chose only two alternatives. In that case, the two alternatives were most commonly *better environmental image* and *improved state of the environment*. Five (approximately 18 %) respondents chose only one alternative. Two of those ports chose *better environmental image*, one chose *improved state of the environment*, one chose *enhanced cost-effectiveness*, and one replied that there are no positive effects.

In addition to the given alternatives, two open answers were given. One port wrote that they can gain better public acceptance through informing the public, and another replied that the voluntary actions of ports can lead to better occupational health.

Correspondingly, the ports were also asked to choose what kind of negative effects can result from the voluntary actions they perform. The ports were able to choose from one to three most important alternatives, or to write down their own alternatives. The results of the question are established in the figure below (figure 3.5).

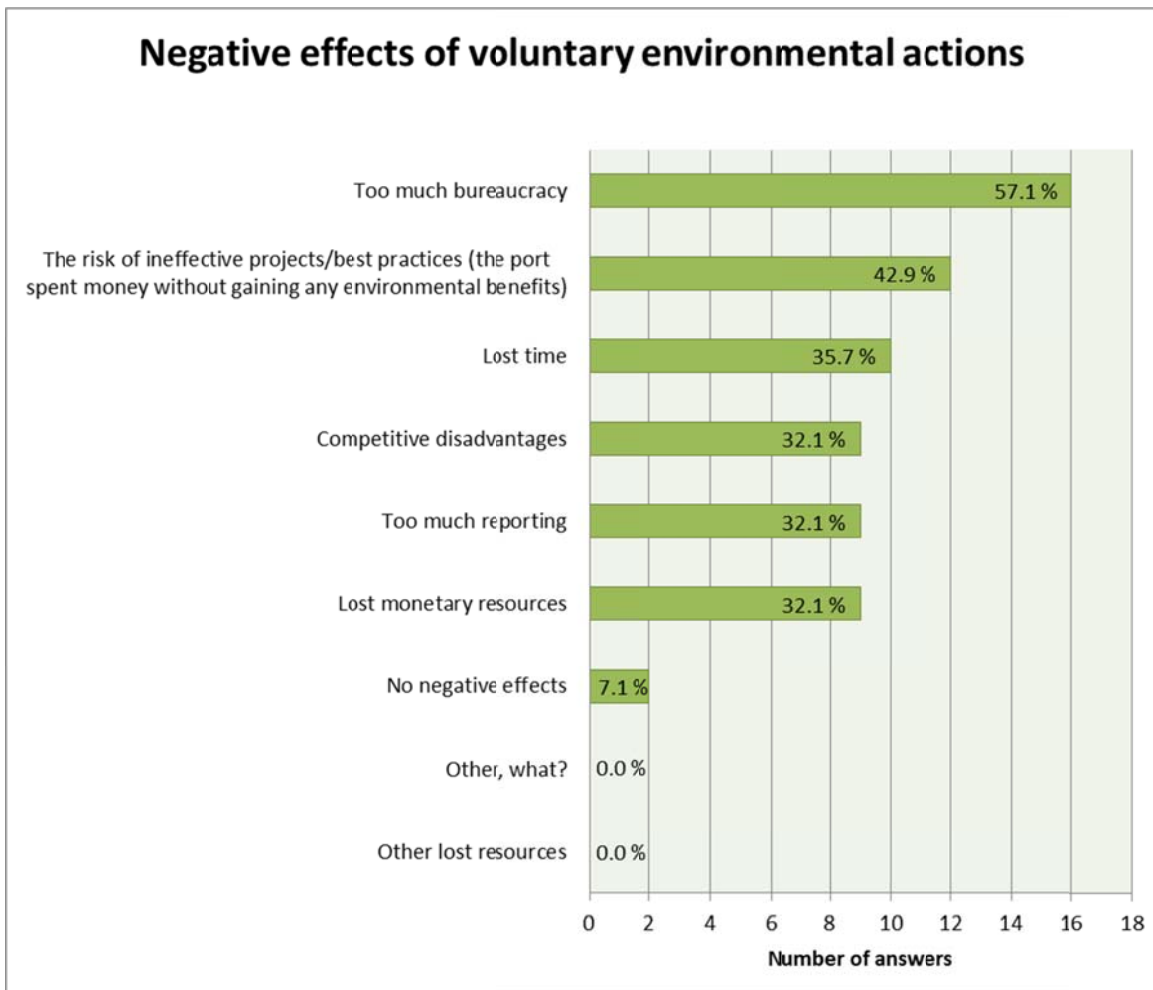


Figure 3.5 The negative effects that the voluntary actions of ports can have. The respondents were able to choose 1-3 most important alternatives.

The most common answer was *too much bureaucracy*. 16 of the respondents chose that alternative. The second most common answer was *the risk of ineffective projects or best practices* that could potentially lead to a situation in which the port has spent money without gaining any environmental benefits. That alternative was chosen by 12 respondents. Thus, it might be said that the ports are afraid that environmental voluntary actions do not necessarily benefit the environment or the port, but merely increase the port's work load.

The third, fourth and fifth most common answers were *too much reporting*, *lost monetary resources* and *competitive disadvantages*. All of those alternatives were chosen by 9 respondents.

Less than half (approximately 46 %) of the responding port chose the maximum amount of alternatives. Nine (approximately 32 %) of the ports chose only two alternatives. Six (approximately 21 %) respondents chose only one alternative. Two of those ports replied that there are no negative effects in voluntary actions. Other two ports replied that there is too much bureaucracy; one replied that voluntary actions cause time losses; and one chose the alternative related to ineffective projects.

The port that in the previous question replied that no positive effects can come from voluntary actions chose *lost monetary resources, too much bureaucracy, and too much reporting* as the three most important negative effects.

3.2 Interview Study

3.2.1 The Interviewed Ports

In the e-mail questionnaire, the respondents were also asked, whether they would want to further explicate their environmental management; whether it would be possible for them to host a visit in their port for the researchers of this study. Based on the answers four of the responding ports were visited during the study. The interview study was performed during the months of April and June, 2015. The interview questions were related to the questions of the e-mail questionnaire, and the aim of the interviews was to discuss the issues in the questionnaire in more depth and detail.

One of the interviewed ports wished to participate in the interview study anonymously. Since the interviewed port could possibly be identified from the answers, its interview results are not presented in this study. The other three ports that were interviewed were Port of Kunda from Estonia, and Port of Pori and Port of Loviisa from Finland.

3.2.2 Port of Pori

Port of Pori is located in the west coast of Finland. The port is a general port handling all kinds of cargoes, yet, dry bulk handling has an important role. The port is divided into two different parts, Mäntyluoto and Tahkoluoto. In addition, Tahkoluoto is divided into deep harbour, which handles dry bulk, and chemical harbour, which handles liquid bulk. Mäntyluoto harbour concentrates on timber, project cargo, break bulk cargo and dry bulk. The annual cargo volumes of the port are around 4.1 million tonnes, and during the year 2014 the port had 664 ship calls. In addition, an LNG terminal is being built in the port and will begin its operation in the year 2016.

Port of Pori measures the state of its surrounding environment through a co-monitoring system in cooperation with surrounding heavy industry companies. The measurement requirements given to the port in the port's environmental permit are partly met through this co-monitoring system. In addition, the port performs noise measurements and modelling. Some stakeholders have criticized the co-monitoring system and questioned whether the port should be a part of it. Nevertheless, Port of Pori sees that at least some of the information gathered during the monitoring can benefit the port also, and Port of Pori sees that the port's involvement in the emission measurements is a good environmental action.

During the interview, Port of Pori was asked about stakeholder pressure related to environmental measurements. According to the port, the residents surrounding the port's dry port area (Mäntyluoto) have been very active. Correspondingly, there is no residency near the other part of the port, Tahkoluoto. The aim of the city of Pori is to ensure by proper community planning that in the future the area will be reserved for industry use only and no new resident settlements will be built.

During loading and unloading processes it is possible that some noise and smell emission can be produced. In addition, meteorological conditions affect the diffusion and transmission of smell. According to the interview, Port of Pori has built noise walls in order to decrease noise emissions near resident settlements. However, some residents were against the building of the noise wall, because they wanted to see the ships, and they were comfortable and used to the noises that came from the port.

According to the interview, Port of Pori considers its most significant environmental effects to be emissions to sea, and dust and dry bulk materials spread by wind. To this day, no serious pollution cases have occurred in the port or in the proximity. The port has made initiatives regarding accident response and performs annual exercises in order to prevent accidents. The port also mentioned that the truck parks and the auxiliary machines cause emissions. According to the port, if you consider all ports in the Baltic Sea area, the most significant environmental effects from ports would be emissions to sea, and serious oil or chemical spills. Port of Pori is satisfied with its current situation and environmental status. The port mentioned that it is hard to say, whether there are any other environmental impacts that should be measured.

During the interview, the port was also asked about its accident preparedness and how it shares information related to accidents. According to the interview, the citizens living in the proximity of Port of Pori are handed out a newsheet regarding dangerous substances. In addition, twice a year Port of Pori performs accident exercises with surrounding companies. Moreover, smaller workgroups meet relatively often during the year, and once a year a large chemical response exercise involving the fire and rescue department and other relevant officials is performed. Internal communications in emergency situations in the port area are handled by the managers in watch. They use, for example, group SMS's and e-mails, but there are also other means of communication. According to the port, a typical accident is a small fire on board, or air emission of bulk cargo in the open port field due to wind conditions. If an accident occurs, a deviation report is made, and it is treated in the management level.

When it comes to voluntary measures, Port of Pori has updated its lighting systems, the main goal of which was to save energy and money. The first investment was done 5 years ago and the second 2 years ago, and they have already paid for themselves. Thus, the port has been very satisfied with the lighting investments. Another voluntary action example is a dust-free loading system for bulk cargoes that started to operate in the year 2006. Before the dust-free loading system, the port had huge problems with spreading dry bulk cargoes. Dredging

materials have also been used for landfill during the expansion of the port area. For the last few years, landfill materials have also been used in the building of the new LNG terminal.

Port of Pori applies the ISO 14000 system and, according to the interview, it has brought benefits to the port. Applying the system causes additional workload to the organization, but it also allows the port to cooperate with its customers smoothly. In addition, customers, especially Americans, often ask the port whether they have a certification and, if the port does not have it, it can lead to big problems.

Port of Pori has taken environmental issues into consideration in their port construction and expansion work. For example, a noise wall was constructed in order to decrease noise emissions from the port. Furthermore, ash from the nearby power plant has been used as landfill material during the construction of new areas such as the LNG terminal.

In the questionnaire, Port of Pori replied that voluntary environmental actions can produce cost-efficiency and better environmental image, as well as improved health and working conditions. The issue was further discussed during the interview. According to the port, the environmental investments done by the port have ensured the continuation of port operations, and it is believed that without the investments operating would be very difficult. According to the port, competitive advantage has not necessarily increased, but at least it has stayed at the same level. Voluntary environmental actions can also increase the skills and competence of workers. The port also conducts customer satisfaction questionnaires, and so far there have not been any complaints. Port of Pori has also experienced negative affects from voluntary actions and projects. According to the port, sometimes one has to try and make investments, and test new things regardless of whether the final outcome is a success or a failure.

Port of Pori belongs to the Ten-T Network, yet it is not a part of the so-called core network. According to the port, there has previously been a belief that belonging to the core network would not be worth it, since Port of Pori is relatively small compared to other core network ports. Lately there has not been any more discussion regarding the matter. According to the port, a more important matter to discuss is the possibility of getting electrical railways from the city of Pori to the port.

Other relevant issues that came up during the interviews were related to, for example, land-use planning and emissions. According to the port, land-use planning has a key role in the port operations in the future. It is important that the ports' operating potential is kept in mind during land-use planning, and that the focus of the planning is farsighted enough. The port also pointed out that it should be noted that a port is a transportation node, yet does not produce all emissions in a certain area. Most of the resulting emissions come from ships and loading/unloading machines, thus not from the port itself, but from the operators within the ports. According to Port of Pori, noise emissions can sometimes be easily minimized. For example, after the port changed a couple of their forklifts, the noise modelling showed a decrease of one decibel in the port's noise emissions. Nevertheless, it should be noted that the

sound of the sea can also easily reach 40 decibels in the port area, and thus increase the noise average and make the measurement process more difficult.

3.2.3 Port of Loviisa

The Port of Loviisa is a relatively small port located in southern Finland. Port of Loviisa specialises in forest industry products and dry cargo. The port's environmental permit requires noise measurements because of the residency in the proximity of the port. Nevertheless, no complaints regarding noise emissions have been made by the nearby residents. In addition to noise measurements, dust and water quality measurements are performed in the port because of a coal field storage area that is located within the port area. The requirement for those measurements comes from the environmental permit of the energy company that owns the coal field storage and the measurements are performed by the energy company.

According to Port of Loviisa, the most significant environmental effects from their port are related to noise and possibly lighting, if it is not correctly aligned. Altogether, the effects from the port are really small. In a larger scale, the port considered the most significant environmental impacts from the ports in the Baltic Sea area to be related to accidental emissions, since in a normal situation all emissions are carefully controlled and monitored. All of the measurements done by the port are defined by the port's environmental permit. The measurements take a lot of the small port's resources, since the port has to perform the same measurements as larger ports.

The port has an oil response container, and also other response material to be used in the case of an accident. If an accident would happen, the local authorities take over the control of the situation. If something abnormal is detected during regular measurements, the port reacts instantly and proceeds to find out the cause of the abnormality. After the cause is found, the port performs the necessary corrective measures. For example, if abnormal noise levels are detected, new noise walls can be built. The cause of the abnormality may also be fairly simple, such as a wrong working practice, and thus it can be easily corrected or changed.

Port of Loviisa aims to operate in an ecologically friendly matter, and it would operate at the same environmental level even without regulation and the requirements of the environmental permit. Environmental responsibility is one of the basic values of the port. Port of Loviisa does not actively advertise its value basis, but environmental responsibility issues are sometimes discussed during customer meetings. According to the port, ethical values do not necessarily bring competitive advantages in a business-to-business level, but they can benefit stakeholder communications, for example, with local residents.

According to the port, participating in environmental projects can bring positive publicity to the port. Currently Port of Loviisa takes part in a project which aims to increase ports' eco- and energy-efficiency. Port of Loviisa wants to be recognized as the small, environmentally responsible port it is.

3.2.4 Port of Kunda

Port of Kunda is only 20 years old, and it is situated between the ports of Muuga and Sillamäe. Ports of Muuga and Sillamäe ports are mostly dedicated to transit activities, and correspondingly Port of Kunda is more focused on regional industry. The port is historically famous for cement industry operations, and during the mid-nineties the focus was more on forest industry. Kunda is a private port and works as a part of the local cement factory exporting cement and clinker, and importing mainly coal. In the Kunda region, agricultural products, such as peat, are important, and the port also exports peat. There is also a liquid chemical terminal in the port.

The town of Kunda is located approximately 3 km from the port, and some of the local residences are located in the close proximity of the port. Thus the port is tightly connected to the local citizens. After the dissolution of the Soviet Union, the main goal has been in improving the state of the local environment, which was strongly polluted during the Soviet era. Due to the cleaner environment, the local population is satisfied, and only a few complaints have been made. The complaints are mainly related to noise emissions, but also to nature preservation and transport risks. According to Port of Kunda, stakeholder communications with the local residents and municipality are important to the port. Thus they release an annual report regarding the port operations and future plans, and also organize open days, during which the port can be visited. In addition, the port performs annual customer satisfaction questionnaires.

Port of Kunda measures air emissions, water quality, and waste and water consumption mainly because of legal requirements. When the port started its operations, there were no specified obligations, and the monitoring was done merely by assessing pollution that was visible to the naked eye. Since the port is relatively small and each measurement costs money the port does not perform any extra measurements. Nevertheless, the compulsory measurements are performed regularly and with care. The port has also agreed to commit to measure environmental impacts in order to reduce them. The Estonian government has supported the port by creating new laws and rules. In addition, the port has received environmental financing from the EU.

Environmental impact measurements are focused mainly on sea water quality. The port also requires a certificate for its loading operations. The certificate includes the specific requirements for the operation, including the required measurements, emission limits and reporting requirements. Port of Kunda is also prepared for oil spills and equipped with oil spill response equipment. The port has implemented the ISO 14001, ISO 18001 and ISO 9001 standards, and according to the port, it is much easier to work and operate when everything is standardized and systemized, even though it can be costly. In addition, standardized operations can create a positive image to the port.

According to the questionnaire and the interview, Port of Kunda has conducted projects, the goal of which has been the assessment and management of the port's environmental effects, in developing new territories and infrastructure. The projects were related to new land areas

of the port. It took 2.5 years to design the new area, and a substantial amount of investigation was done related to possible impacts on the environment and also to impacts on sea life. The port is also planning on starting research regarding additional new areas. There are also larger regional development plans handled by the Estonian government. Another ambitious plan is to develop the Kotka-Kunda connection. According to the market researcher, there is potential in creating a new route between the two ports.

Voluntary actions can also cause negative effects to the port. According to Port of Kunda, the possible negative effects of voluntary actions are excessive bureaucracy and reporting, and competitive disadvantages. Nevertheless, Port of Kunda sees a better environmental image undoubtedly as a competitive advantage. Nevertheless, the biggest negative impact in everyday operations is the increasing operating costs. Dedication to the environmental protection requires monetary investments from the port. According to the port, not all private ports are as dedicated to the environment as Port of Kunda.

Port of Kunda is a former Ten-T network member. During the interview, the port was asked whether that has caused any effects to the port. According to Port of Kunda, being a part of the Ten-T network was close to an emotional experience. Port of Kunda was a small player in a big group of Ten-T ports. During the development of the Ten-T network, there was discussion regarding the size of the ports, and somewhere during the development process the issue was re-evaluated, but Port of Kunda was never informed about it. Then one year, Port of Kunda was told that they cannot be a part of the network. According to the port, the issue was a communication fiasco, and the result came as a big surprise to the port. Port of Kunda received some financing from the Ten-T Network, so now they have to find new financing programmes. Nowadays the Ten-T network is focused on bigger ports. The port concluded that being a part of the Ten-T network was ultimately a negative experience for the small port. The times are hard, and it is really difficult for a private port to get finances for new investments and operations.

4 DISCUSSION

During the questionnaire study, 28 ports replied to the e-mail questionnaire. Out of those 28 ports, four ports were also interviewed in order to find out more about the assessment and management of the ports' environmental effects.

Some environmental protection work has been done practically in all of the participating ports. Generally, all of the ports have taken environmentally friendly initiatives or strived to act responsibly. Investments to the environment are done mainly because of requirements in legislation or environmental permits. Environmental permits and/or legislation affect all Baltic Sea ports to some extent. Even though port operators are not necessarily required to have environmental permits for port operations in all of the countries, certain operations or certain operators in the ports may require a permit. In addition, if there are changes in operations or new cargo the environmental permits must usually be updated.

Almost 79 percent of the ports that replied to the questionnaire told that they measure the state of their surrounding environment. Correspondingly, five respondents told that they do not. Measuring the state of a port's surrounding environment might be necessary, for example if there is a nature reserve in the proximity of the port. In addition, stakeholder pressure from citizens or cities located near ports can urge the ports to perform additional, voluntary environmental actions, such as the measurement of the state of the surrounding environment. In addition, over 82 percent of the responding ports told that they measure their environmental impacts. Only three respondents replied that their port does not measure its environmental impacts, and one respondent did not know the answer. In most cases, the ports in the Baltic Sea area are obliged to measure some of their environmental impacts. This may be based on legislation, environmental permits, or the certificates and standards that the ports have adopted.

The most common measurements the ports performed were related to waste, water consumption, electricity, and air emissions. Sometimes ports may not consider that, for example, water, energy and electricity consumption measurements are related to the environment. Instead, they might see that the measurements are aimed at preserving resources and improving the port cost-effectiveness. The resulting environmental benefits are merely a positive side effect.

The ports saw that some obligatory measurements are futile, since the results of the measurements do not change, if nothing has changed in the port operations. In addition, sometimes the ports are required to measure emissions that the ports do not even produce. Authorities were also criticized, since they do not always seem to understand the whole port operation processes. It should also be noted that often the ports act only as landlords, and the private companies that operate in the port area produce the majority of the port emissions.

In the questionnaire, the ports were also asked, whether they have made any voluntary initiatives based on the results of the measurements. If the responding port replied yes, they were asked to describe the initiatives more specifically. Almost 60 percent of the responding ports replied that they have made voluntary initiatives. The most common voluntary initiatives were related to reduction of energy consumptions, electricity and water. Some ports had, for example, renewed their lighting systems or gained energy savings by insulation of buildings.

According to the interviews, some voluntary actions have concretely improved the state of the surround sea or land areas, but usually the improvements are focused on increasing the efficiency of port operations or loading/unloading processes. All of the interviewed ports saw that even if there was no environmental legislation or environmental permits, they would still operate at the same environmental level as nowadays. The ports strive to be environmentally friendly and they have also realized that environmentally friendly actions can result in cost savings. In addition, the payback time has usually been relatively short in environmental investments. According to the questionnaire, the voluntary actions performed by the ports include, for example, real-time air emission control and measurements of air quality, measures to reduce noise emissions, participation in different projects, actions in the field of waste management, and sorting of waste.

The most significant positive effect of voluntary environmental initiatives, according to the questionnaire, is a better environmental image. Thus it can be said that the ports do care about their environmental image and consider the improvement of their image a positive change. In addition, the improved state of the environment was considered to be an important effect of voluntary initiatives. That can be seen as an ethical positive effect, and it is related to environmental responsibility. In addition, if the environment is considered a common good of the community, improving the state of the environment can also be seen as a part of social responsibility. The most significant negative effects of voluntary environmental initiatives were considered to be excessive bureaucracy and the risk of ineffective projects or best practices that could potentially lead to a situation in which the port has spent money without gaining any environmental benefits. Thus, it can be noted that the ports are afraid that environmental voluntary actions do not necessarily benefit the environment or the port, but merely increase the port's work load.

In the questionnaire, the responding ports were asked whether they consider the national legislation to be highly restrictive. 17 (approximately 61 %) respondents answered no, and 11 (approximately 39 %) responded yes. Especially the Finnish ports considered the national legislation to be highly restrictive. They considered the legal permit processes to be too long, and the conditions too strict. In addition, there are too many overlapping plans and licenses required. Because of the operational environmental permits, the ports are not able to react to new business opportunities, such as new cargo flows, as fast as they should, which can affect the port competitiveness. Thus, it would be more rational to define general operating instructions, rules and limits in the environmental permits instead of defining the specific

cargo types that can be handled. It is important to keep in mind that there would be no negative environmental effects in handling new cargo types if the working methods, processes and limitations were defined in advance and followed carefully. Not all cargo types require their own set of rules. In that case, introducing new cargoes would be easier as the environmental permits would not have to be changed first. In addition, if the ports could react to new cargo handling opportunities more quickly, it would also bring employment opportunities to nearby cities.

One Finnish port that replied the questionnaire claimed that the Finnish legislation includes some stricter rules than other national legislations in other countries in the Baltic Sea area. Altogether, the Finnish ports see that it would benefit the ports and authorities, if decision making was more centralized, and one authority would make all the decisions regarding ports' environmental permits in Finland. That way all of the ports would be treated equally. In addition, according to the ports, there is no need for localized decision making, since the legislation is the same to all ports. Nowadays, the different practices of different local authorities put the ports in different competitive positions. Correspondingly in Estonia, the ports see that too much effort is put to preserving nature values. In addition, the legislation is too focused on preserving and maintaining the current state. These rules complicate the foundation of new businesses in the port sector.

Moreover, the EU legislation was also discussed during the interviews and in the questionnaire. The ports considered that the EU legislation can distort competition between ports. For example, the so called Sulphur Directive brings costs for the Baltic Sea ports, and there have already been some reported losses even though the directive came into force only the first of January, 2015. One of the interviewed ports mentioned that already one ship line has discontinued its operations because of the Sulphur Directive. This can also mean that more and more of the cargo transportation are being transferred to roads or rails. The interviewed ports pointed out that even though the Sulphur Directive is a good thing for the environment, legislation and directives should nevertheless treat everyone equally.

In the questionnaire, the ports were asked how they take environmental issues into consideration during port development and expansion. Several of the responding ports from different countries, including Sweden, Finland, Latvia and Poland, mentioned environmental impact assessments or environmental impact assessments and related environmental permits as ways to include environmental aspects to port development. In addition, several ports wrote that environmental aspects have to be carefully and thoroughly considered beforehand, and incorporated into the planning process.

The ports that replied to the questionnaire also mentioned some of the best practices they apply. These best practices include, for example, environmentally differentiated harbour fees, exchange of information with other Baltic Sea ports, and using the latest best environmental techniques. In addition to best practices, the ports were also asked whether they have some kind of certificates of standards. 16 (approximately 57 %) of the ports had acquired some

certificate or standard, or were working on getting quality and environmental certificates. The most common certificate was the ISO 14001 certificate. In addition, 12 (almost 43 %) of the responding ports told that are engaged in corporate social responsibility.

5 CONCLUSION

A port operator needs an environmental permit in the Finnish and Swedish ports, but not in the Central European ports. The large EU ports need permits for certain operations, such as, dredging and deposition of sediment, and some operators within the ports might need permits. However, the requirements for the measurement of emissions are generally at same level. In some cases this “authorization jungle” may twist the competition between the European ports and the ports of the Baltic Sea.

Even though a lot of environmental data is collected, for example, for the environmental permits and the different stakeholders, the biggest problem is the comparability of the collected data. There are no systems or instruments with which emissions could be compared between ports. The amount of environmental information is sufficient, yet reporting methods vary between ports. There are differences in units and codes, and in some cases the information is insufficient and even at some points unreliable.

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. Continuous data collecting 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 previously. 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. In order to get the necessary environmental information, the ports have to measure their emissions and use calculation models and different kinds of other computing systems. It is not free to get the parameters for reporting from these systems; 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.

Based on the questionnaire and interview studies, it can be said that ports in the Baltic Sea area consider environmental issues to be important, and value their own environmental image. Nevertheless, when it comes to competitive advantage, other issues not related to the environment have a greater role. Ports operate on a business-to-business level, and thus environmental issues are not the most important factor or a marketing method. Factors that affect the competitiveness of the port are rather the port location and the port infrastructure, such as the depth of the waterways, road and railway connections to the port, shipping routes

and connecting ocean lines, and available port facilities. These issues affect the port competitiveness more than the ports' environmental image.

However, in general, all ports that participated in this research were committed to environmental issues and complied with environmental legislation. Some of the participating ports did also voluntary environmental initiatives and applied best practices in order to improve their environmental image, increase their operation cost-effectiveness, and also purely in order to improve the state of the environment. Several of the participating ports stated that they would operate at the same environmental level even without environmental legislation. The common goal of the ports was to strive for cleaner ports and a clean Baltic Sea. The ports want to be environmentally friendly and they have also realized that they can usually also achieve cost savings with green solutions and best practices.

In practice, environmental permits and legislation affect all Baltic Sea ports to some extent. Even though port operators are not necessarily required to have environmental permits in all of the countries, certain operations or certain operators in the ports may require a permit. In addition, if there are changes in operations or new cargo, the environmental permits must usually be updated. Because of the operational environmental permits, the ports are not able to react to new business opportunities, such as new cargo flows, as fast as they should, which can affect the ports' competitiveness. Thus, it would be more rational to define general operating instructions, rules and limits in the environmental permits instead of defining the specific cargo types that can be handled. Since some port operators are required to go through strict environmental permit processes, it is possible that the permit processes distort the competition between ports. For example, in Finland it can take months or even years to get an environmental permit regarding a certain transported cargo. Correspondingly, another port might be able to start to handle and transport the cargo almost immediately if the port's facilities and infrastructure are in order. Thus, environmental permit processes may harm the port, since for the ports every single customer and load is important.

In order to achieve better results in environmental protection, to support the ports' voluntary environmental initiatives and simultaneously maintain the port competitiveness and equality, all EU member countries should have a unified legislation for ports. In practice, this would mean that every EU member country should apply the same environmental legislation and procedures, and emission calculation systems. The unit for emission measurements could be cargo volume tonne per produced emissions tonne. This would also enable the comparison of emission levels between ports. In addition, especially the Finnish ports see that it would benefit the ports and authorities, if decision making was more centralized. That way all of the ports were treated equally. In addition, there would not necessarily be any need for localized decision making, if the legislation was the same to all ports. Nowadays, the different practices of different local and national authorities put the ports in different competitive positions.

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