

Greenports – Development and best practice

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Abstract: The importance of greenports in further port development, the role of bremen-ports GmbH & Co. KG as well as the development of the port own greenports-strategy (from environmental project management via port environmental management to a regional sustainable management strategy for port & logistics) together with some selected best practice examples (PERS, GRI, habitat & estuary management, WPCI, LNG as fuel, ESI, CO₂-reduction in logistics, climate change & climate adaptation) are presented. An outlook closes the report.

1 Ports have to cope with new demands

Modern ports are not only constructed transport facilities but important gateways for the international trade. They need to be an effective part of logistics but are restricted by the local background, historical structures and the resilience of the local community as well as the natural environment. They are the eminent basis for the job market of regions, the local income and for profitable companies. Nevertheless ports are as well the source of disturbances in their construction, their operation or their development. For effective operation ports need a lot of financial and natural resources.

“Greenports” as sustainable ports want to be able to manage these different requirements. Therefore the economic, ecologic and social dimensions of the management have to be analysed, goals have to be defined and a program to be designed. Monitoring and the review of goals are necessary to control the success and required changes. In this way the port management becomes to be more holistic and the primarily finance-orientated management of the past gets supplemented by ecologic and social management aspects and tools. It is quite obvious that a port with sustainable management has better perspectives to cope with risks and to benefit from chances. Sustainable management will convince different stakeholders (investors, sponsoring bodies) and is an early-warning system for new demands.

2 Milestones on the way to become a green port

2.1 bremenports field of work

Two cities, one centre of maritime excellence - as a location for port and logistics operations, Bremen/Bremerhaven has successfully positioned itself among Europe's leading centres of commerce and freight handling. As a result, the ports of Bremen have grown to become one of Europe's leading hubs for freight transport. The port and logistics industry is a lynchpin of the economy in Germany's smallest state - Bremen. More than 75,000 jobs in the region depend directly and indirectly on the cargo handling and logistics services performed by the River Weser.

A key feature of the twin ports is their function as universal ports with swift, professional handling of containers, automobiles, project cargo and general/ bulk cargo of all kinds. Their success derives from a distinctive division of labour - whereas Bremerhaven, only 32 nautical miles from the open sea, specialises in handling container ships, car carriers and fruit reefer ships, the terminals in Bremen, 60 kilometres further to the south, concentrate mainly on general and heavy-lift cargo and on handling bulk commodities. In recent years, the Hanseatic city has also become a kind of back office for the container terminal in Bremerhaven - a powerful and efficient network of logistics services providers has been established in Bremen that offers comprehensive value-added services in all aspects of container logistics.

Since the onset of the global economic crisis, the ports of Bremen have continued to make their mark with strong performance. Despite significant deterioration of the global economy, they still managed to achieve a new record in the total volume of cargo handled, which rose by 4.2 per cent and reached a volume of 84.0 million tonnes in 2012.

In 2012, container handling in Bremerhaven was again one of the most important growth factors. The number of boxes loaded or unloaded rose by 3.4 per cent to 6.1 million TEUs - a striking demonstration of the sheer competitive strength of the Bremerhaven container terminal.

bremenports GmbH & Co KG - founded in 2002 - is the management company for the port infrastructure in Bremen and Bremerhaven and organised as a company under private law to handle these tasks. The company and the infrastructure are both wholly owned by the Free Hanseatic City of Bremen. Some 370 employees ensure the management, the maintenance and the development of 3.164 ha port area with 70 km bank structures, 69 km roads, 176 km port railroad lines, 20 km dykes or flood barriers, 4 sea locks, 4 moveable bridges, 4 pump stations, 92 ship berths.

In addition to special assets management, the remit of bremenports also includes the regular management activities relating to the port infrastructure (such as port infrastructure operation, resources management, maintenance, marketing, construction, planning, project approval and project management, the tasks of port infrastructure owner and building principal, location marketing, strategic port development).

Tasks occurring in the course of major investment projects are referred to as "special tasks". These are individually commissioned by the Free Hanseatic City of Bremen.

2.2 Phase 1: Establishment of environmental project management

In the retrospection - our development to become a green port passed different stages. In the 90ies we started with huge expansion plans for the container terminal in Bremerhaven (sections CT III, CT IIIa & CT 4). New legal requirements by the German nature protection law and the law for environmental impact assessment required to employ environmental expert staff. Although new insights and tasks had to be solved (planning procedures took more time, got more expensive), in the end the successful licensed project raised the acceptance for new environmental tasks (e.g.: von Bargaen (2000), Filbrandt, von Bargaen & Woltering (2003), Vollstedt & von Bargaen (2006)). As the container terminal extensions are located directly at the Waddensee, as a national and international protected area, it was clear that only ambitious and persuasive compensation measures are part of the solution. At this time it was important for the self-image to demonstrate the commitment for successful measures by personal implementation. The ability to proof the own expertise changed the self-image from port-constructor to an environmentally aware port developer. This phase can be characterised with the establishment of environmental project management (von Bargaen & Woltering 2011).

2.3 Phase 2: Establishment of port-related environmental management

In the next decade (after 2000) especially biodiversity, air & water pollution and climate change raised to be central aspects of public awareness. At bremenports a port related environmental management was developed as an adequate reaction (von Bargaen & Woltering 2011).

2.4 Phase 3: Introduction of sustainable management

2.4.1 Publication of the greenports-strategy

As globalisation, social needs and stakeholder dialogues about the competition for extension possibilities became more and more important it became clear that environmental management must be enhanced to sustainable management. Our environmental director got the task to develop and establish the port related sustainability-strategy “greenports”.

The strategy was published in 2009 (von Bargaen & Krämer 2009) with a general framework, an inventory of successful environmental protection at bremenports and port companies and an outlook on future challenges. It left the own sphere of responsibility and addressed economic, ecologic and social responsible development in the port management by bremenports, in the port area by the network of port users, service companies and administration as well as in the port industry and logistics. All these players shall be motivated to act sustainable or to cooperate with the “greenports-initiative”. The chairman of the supervisory board and the managing director addressed the new standard, “it’s time for new thinking and action. Successful economic operation, social responsibility and ecological rationality belong together”.

A special brand (see Fig.1) was created and further website <http://www.bremenports.de/greenports/die-zukunft-gestalten> was launched. The greenports-strategy was part of a comparison with other concepts in Valencia, Long Beach & Sydney (König 2011).



Figure 1: protected brand for the greenports-initiative of the ports of Bremen/Bremerhaven

2.4.2 Environmental management with PERS-Certificate

In April 2011 the environmental management for the ports in Bremen & Bremerhaven received as the first German port from Lloyd's Register (Amsterdam) a certificate according to the ESPO-standard Port Environmental Review Statement (PERS). The certificate dignifies the common approach for environmental management of the ministry of economic affairs and ports in Bremen (SWH), the Bremenports GmbH & Co. KG and the Harbour Master Office (HBH).

The environmental report published¹ (von Bargaen, Kreß & Lampe 2011)

- a description of the ports of Bremen with their activities (own sphere and influence),
- an environmental policy statement of the senator of economic affairs and ports
- six environmental performance indicators
- a brief description of environmental management structures
- two selected examples of best practice (sustainable water-depth-management & nature compensation management)
- an overview of planned activities and
- a register of significant environmental aspects.

In the environmental policy statement the senate confessed its responsibility to harmonize economic and ecologic interests according the principle of sustainability and declares several ambitious aims. For the implementation it shall be ensured that the employees receive appropriate information and training to deliver and maintain a high standard of environment protection. Furthermore the ports of Bremen shall further endeavour to convince all shipping and port actors to implement sustainable and environmentally friendly technologies and procedures (Kreß & von Bargaen 2012).

2.4.3 How to think and act sustainable in the management company

In the same year a brochure was published (Staats & von Bargaen 2011) that informs about the progress of the greenports-strategy. Further it focuses on the increase of social competence and the concretion of aims for the management company. The protection of environment and the sustainable use of resources rose to be a company goal. Additionally working conditions for employees shall be further improved to keep the staff motivated and represent an attractive employer.

2.4.4 Sustainable management with GRI-Certificate

As sustainability should become to be part of the management, performance indicators were necessary to describe and monitor the development. Therefore an international standard

¹ <http://www.bremenports.de/en/greenports/shaping-the-future/pers-sets-high-standards>

should be used to make the results comparable and the choice led to the G3.1-standard of the Global Reporting Initiative (2011).

GRI approved the B+-application level (see Fig.1) for the first sustainability report of the management company bremenports and the public port infrastructure of the Free Hanseatic City of Bremen. For 31 indicators the correct use and reporting according GRI criteria has been stated in a business assessment by KPMG (2013).



Figure 2: GRI Statement for Application Level Check (GRI 2013)

The related sustainability report (von Bargaen et.al. 2013) disclosed strategy and profile, management approach and performance indicators for the economic, environmental and social dimensions of sustainability concerns. Responsible expense of public money, successful compensation measures to protect biodiversity, the use of renewable energy and the reduction of CO₂ and other emissions are important goals and examples of best practice, as well as attractive working conditions and awareness for other social interests.

Most challenging was to act beyond direct responsibility, to raise institutional awareness and any kind of stakeholder dialogue, to support networks and partnerships under the restrictions of staff reduction and financial saving requirements. The staff had to be motivated to supply these new demands and to develop new controlling tools.

3 Examples for best practice

3.1 Luneplate – successful habitat creation & estuary management

The Luneplate is located in the Weser estuary south of Bremerhaven. In the 20es of the last century the Luneplate changed from a Weser island to dike-protected farmland. Later plans for industrialisation by the federal states of Lower Saxony and Bremen were given up for port development in the north of Bremerhaven. The container terminal should be extended and the necessary compensation should take place on the Luneplate. Both states decided to create a concentrated compensation area and reduced the potential industrial area from 1.600 ha to 200 ha. In this way habitat development could take place on about 1.400 ha.

First compensation areas were implemented in 1991 and the last in 2012. Some areas have passed their development time of 10-15 years and gained there development aims, while others already started their development. bremenports was the whole time responsible for project management, planning, execution, site development and maintenance, but of course a lot of institutions and partners were involved and necessary for the success, which was reviewed by an independent expert advisor (WBNL). A list of publications can be found in von Bargaen, Kreß & Lampe (2011), an overview about the last changes is presented in Wieland & von Bargaen (2008), whereas the Project Luneplate was presented as a best practice example on the conference for the restoration of European estuaries in Leer (Germany) in 2013 (von Bargaen 2013).

Currently the Luneplate Natura 2000 site is in the process of being declared to be the largest national nature conservation area in the Federal State of Bremen. bremenports and the nature authority in Bremen work on an integrated management plan. The public is interested in the results and the feedback to the offers for guided tours into the area is encouraging.

3.2 Membership in World Ports Climate Initiative

In July 2008 the World Ports Climate Conference took place in Rotterdam (NL) and for the ports of Bremen/Bremerhaven the World Port Climate Declaration was signed by the ministry of the federal state of Bremen. Together with 61 other ports in the world Bremen joined the common initiative to combat global climate change and improve air quality through reduction of greenhouse gas emissions from ocean-going shipping, port operation and development and hinterland transport, through enhancement of the use of renewable energy and the development and auditing of CO₂ inventories.

WPCI offers different tools and projects to prepare joint action (see Fig. 3). The ports of Bremen/Bremerhaven are active parts for the development of the environmental ship index (ESI) and in the working group “LNG-Fuelled Vessels”.

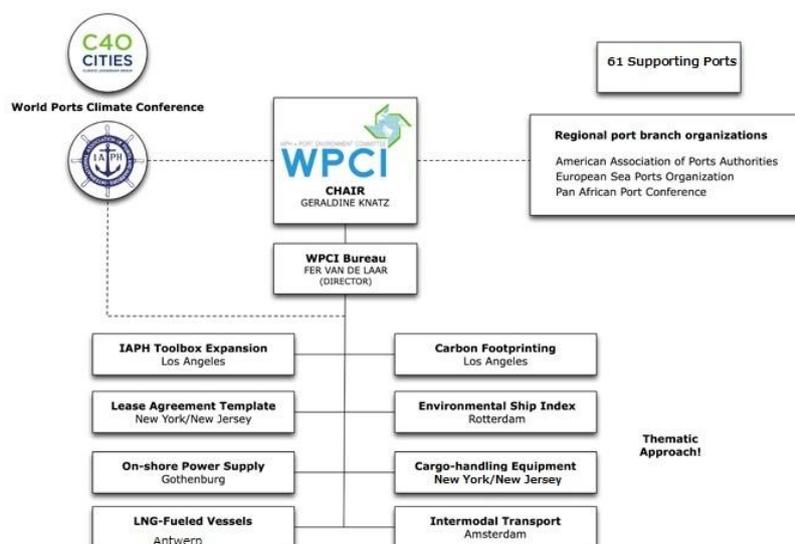


Figure 3: Organisation structure of WPCI²

3.3 Integrated Management Plan for the Weser

The river Weser is a designated European habitat site in the European Natura 2000 habitat network. The European member states are obligated to work out common management plans that should integrate the different users. This ambitious work started in 2008 and finished in 2012 with the presentation of the “Integrierter Bewirtschaftungsplan Weser für Niedersachsen und Bremen” (Remmers et al. 2012). This process was remarkable as the cooperation of the federal waterway authority, the nature authorities of Lower Saxony and Bremen and lots of different affected stakeholders was necessary to led to a presentable result; bremenports was part of this trial. Common work assisted better understanding for each other, but the long list of desirable measures will of course take a long time to be realised.

3.4 LNG & ESI – Steps to reduce ship emissions

The reduction of ship emissions is a worldwide common goal to combat global climate change and improve air quality (see 3.2). So a support for maritime sustainability was given by the provision of the Environmental Ship Index (ESI)³ for the calculation of the harbour dues. Since 2012 shippers can receive a reduction, when they come with particularly low-emission ships to the ports of Bremen & Bremerhaven.

On the global scale it is necessary to substitute heavy fuel oil in shipping. In the short- and mid-term the use of liquefied natural gas (LNG) as a low-emission fuel represents for years an important bridging technology to emission-free fuels. On adopting its "greenports" philosophy, bremenports together with the Bremen Ministries of Economic Affairs, Ports and Environment have considered to promote the availability and supply of LNG in the Ports of Bremen. A steering group was established, involving the Ministry of Economic, the Ministry of Environment, Construction and Transport, Harbour Master and bremenports, to facilitate pro-

² <http://wpci.iaphworldports.org/about-us/structure.html>

³ <http://esi.wpci.nl/Public/Home>

spective LNG infrastructure projects in Bremen and Bremerhaven. This means, for instance, support for applying for funding (TEN-T), technical expertise, tailoring of legislation and safety standards as well as addressing of potential supplier and customers of LNG.

bremenports is member of national and international working groups, which develops standards for bunker procedures and safety regulations. The Harbour Master went ahead and specified safety regulations for bunker procedures and terminal filling itself, as it this the Ministry defining the handling of dangerous goods in the Ports of Bremen. In the beginning it will grant exceptional permits, before adjusting port regulations finally.

In addition to facilitating shore side infrastructure bremenports will equip its own ships, especially the hopper barges, with LNG fuelled propulsion systems to be one of the first LNG-consumers in 2015, and to demonstrate the safe and cost effective operation of LNG-driven ships (König 2012; Howe, König & Stadel 2013).



Figure 4: LNG-Klappschute für bremenports

3.5 Via Bremen – Innovation in logistics through sustainability and CO₂-reduction

The VIA BREMEN brand represents the port and logistics industry in the state of Bremen and the aim to make the regional cluster known in national and international competition to profile and thus strengthen each individual actor. A special Innovation Circle is working on the development of an information kit about carbon footprint. Through various channels of information, such as Events, workshops, printed information and concept papers companies are offered guidance on the topic “Sustainability/CO₂-reduction”.

Involved parties are convinced that a common approach is necessary for required innovation in logistics. Knowledge exchange and networking creates a good basis.

3.6 Climate Change & Climate Adaptation

For years climate change became to be one of the most important societal topics. All parts of society are required to reduce their greenhouse gas emissions. The Ports of Bremen took different measures from more efficient lights, an own solar energy facility or solar thermal facilities to the use of renewable energy and vehicle fleet management. The measures and the resulting greenhouse gas emissions for 2012 are reported in the sustainability report (von Bargen U. et. al. 2013). Shifting to renewable energies reduced the total greenhouse gas emission by more than one third.

Harbours with long-lasting infrastructure facilities (e.g. quays, locks, cranes, bridges, docks, etc.) have to be aware for future demands (von Bargen 2009). For the North Sea area climate

change is expected to cause a rise of the mean sea level, an increase of extreme weather conditions (storms, heavy rainfall, heat and dryness). The consequences, possible reactions to cope with risks and benefit from chances are topics in a R&D-project about resilient port structures (Meincke 2011; Meincke, Nibbe & Osthorst 2013) that is embedded in the project “nordwest 2050 - Prospects for Climate-Adapted Innovation Processes in the Model Region Bremen-Oldenburg in North Western Germany”⁴. Outcomes of this project will be used to work out climate adaption concepts for port & logistics in the region (von Bargaen 2011).

Stakeholder cooperation led to another R&D-project related to climate adaptation. Together with farmers and environmentalists the project “Klimaanpassung an der Unterweser durch einen Tidepolder im Bereich der Drepteniederung” was submitted for regional funding. New adaptation strategies for coastal rural regions are discussed and prepared for further studies. The documentation can be found in the internet: <http://www.studie-tidepolder-drepte.de/>.

Climate change stimulates plans to use arctic shipping routes through highly sensitive areas. bremenports is a partner for the Finnafjord-project in Iceland where the protection of natural resources and the environment will be key features of the agreed cooperation. The first stage will be to asses which examinations are needed to identify the feasibility and future viability of the new port. The second phase will involve analysis of the location, its geological features, environmental aspects as well as diverse legal and political questions. This will be followed by a market analysis and cost estimate (see: <http://www.bremenports.de/en/company/press/press-releases/vorstellung-islandprojekt>).

4 Outlook

To become a sustainable port and to integrate sustainability in existing management structures are relative new and very ambitious missions. Privatisation of the port management set the general condition. Although some competences were split off flexibility grew. Still cost and staff reduction standards set strong limitations to organise this new tasks in the requested way and requires perseverance and patience.

References

- [1] Filbrandt U., von Bargaen U. & Woltering S. (2003): Environmental impacts and compensation of container port extension, Bremerhaven, Germany. COPEDEC VI. Colombo, Sri Lanka. Paper No. 176, 9 pages
- [2] Howe R., König B. & Stadel D. (2013): Baggergut-Schuten als LNG-Projekt. *Binnenschifffahrt ZfB Nr. 2, p. 33*
- [3] König B. (2011): Sustainable port management. Assessment of the conferment possibilities of bremenports’ “greenports” concept on other ports. Master Thesis, Hochschule Wismar.

⁴ http://www.nordwest2050.de/index_nw2050.php

- [4] König B. (2012): Liquefied Natural Gas. Green Guide Annex 1 (Good practice examples). ESPO (Version 1).
- [5] Kreß J. & von Bargaen U. (2012): Bremische Häfen erhalten Umweltsiegel. *HANSA International Maritime Journal*, 149.Jg. Nr. 12, p. 77-80.
- [6] KPMG (2013): Unabhängige Prüfbescheinigung bzgl. der betriebswirtschaftlichen Prüfung ausgewählter Angaben und Kennzahlen im Nachhaltigkeitsbericht2012. Published in von Bargaen et al (2013)
- [7] Meincke A. (2011): Projekt „Resiliente Hafenstrukturen“. 14. Werkstattbericht im Rahmen des Forschungsverbundes nordwest 2050. Bremen.
- [8] Meincke A., Nibbe J. & Osthorst W. (2013): Climate Adaptation of Ports as an Issue of Regional Development: The case of nordwest 2050, Germany. *Coastal & Marine Vol. 22 No.1. p.10-11.*
- [9] Staats R. & von Bargaen U. (2011): greenports: nachhaltig denken und handeln 2010/2011 – aktuelle Entwicklungen bei der Hafengesellschaft bremenports. Brochure published by bremenports
- [10] Vollstedt H-W. & von Bargaen U. (2006): CT 4 - Extension of the container terminal in Bremerhaven. *PIANC Magazine No.122, p. 45-58.*
- [11] von Bargaen U. (2000): Enforcement of compensatory measures in Germany. Documentation of the Congress „Vogel- en habitatrichtlijn“ at Nederlands Studie Centrum Driebergen-Zeist.
- [12] von Bargaen U. (2009): Meeresspiegelanstieg: Glück oder Fluch für die Häfen. Klimaanpassung Küstenregion – Regionalkonferenz des Bundes und der norddeutschen Küstenländer. Dokumentation. P.71.
- [13] von Bargaen U. (2011): Strategische Ansätze für eine Hafeninfrastrukturgesellschaft. 21. Bremer Universitätsgespräche Dokumentation „Mensch und Küste – eine Schicksalsgemeinschaft und der Meeresspiegelanstieg“. P.54-60.
- [14] von Bargaen U. (2013): Project Luneplate at the Weser estuary. Documentation of the “Conference for the restoration of European estuaries“ at Leer (Germany).
- [15] von Bargaen U. et. al. (2013): Nachhaltigkeitsbericht 2012 für die bremenports GmbH & Co. KG und das Sondervermögen Hafen. Publisher: bremenports
- [16] von Bargaen U., Krämer I. & Staats R. (2009): greenports: sustainable management – successful performance. Brochure published by bremenports
- [17] von Bargaen U., Kreß J. & Lampe C. (2011): Environmental Report 2010 – Ports of Bremen/Bremerhaven. Publisher: Der Senator für Wirtschaft und Häfen, Bremen
- [18] von Bargaen U. & Woltering S. (2011): “greenports”-Strategie der bremischen Häfen. *HANSA International Maritime Journal*, 148.Jg. Nr. 2, p. 68-71.

- [19] Wieland T. & von Bargaen U. (2008): Großräumige Kompensation an der Unterweser. *Naturschutz und Landschaftsplanung*, 40 (12), p. 393-402.
- [20] Global Reporting Initiative (2011): Sustainability Reporting Guidelines Version 3.1, Amsterdam
- [21] Global Reporting Initiative (2013): Application Level Check. Published in von Bargaen et al (2013)

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