Nature reserve
Area of outstanding natural beauty
Natura 2000 sites
Port-related substitute sites
Port areas
Boundary Bremen – Lower Saxony
Global warming is undisputed. Climate change and rising sea levels have evolved into mega-topics that are decisive for the future of the planet. It is time to rethink our attitudes and actions. Successful management of resources, social responsibility and ecological intelligence all go hand in hand.

Marine environment protection has already played a central role at the ports of Bremen and Bremerhaven for many years. When it comes to the disposal of waste from vessels in port, for example, the two-city state has set international standards. In port development projects, qualified and sophisticated steps are taken to compensate for any unavoidable impact on the balance of nature resulting from the construction of new quays and terminals.

Readers of this bremenports brochure will find that here on the banks of the Weser, we are already well on our way to becoming a green port. Much has already been done, but plenty still lies ahead of us – tasks that face both the public and private sectors.

Marine environment protection is the common factor that links all aspects of bremenports’ work. Over the course of various major quay and lock construction projects, our port and environment planning engineers have accumulated a wealth of experience. They think in holistic terms. They create infrastructure so that people find jobs. They design valuable ecological substitute sites to promote nature conservation.

Environment protection plays an increasingly important role in our offices and workshops. We are changing over our company fleet to low-consumption vehicles. We generate our own solar energy. And we also do a great deal more to ensure that our workflows are as ecological as possible.

These efforts are backed up by many other sectors: maritime logistics, terminal operators, shipping lines. The ports of Bremen are fully committed to the greenports concept and will uphold it in all future activities. We have already made a good start.
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“Ships’ waste is disposed of on shore. This rule has applied at Bremen’s ports ever since 1988. We dispose of ships’ garbage, oil sludge and oily bilge water expertly and simply. This protects the seas for the benefit of everyone.”

Hans-Joachim Wiese, Nehlsen AG employee, at work in Neustädter Hafen.
General Framework

Economy and ecology go hand in hand

The ports speak up for environment protection

Extinction of species, climate change, rising sea levels – all buzzwords that describe a worrying trend. All over the globe, nature and the environment are at loggerheads with business interests. And all too often, this battle is fought on an uneven playing field – with well-known ecological consequences. But does nature really have to pay the price of economic development? The answer is no. People the world over are recognising their responsibility for our endangered planet. Bremen’s ports are also taking action at regional, national and international level, because the environment deserves a fair chance.

bremenports on the eco-track

In this brochure, we present initiatives and projects with which the private and public sectors in the two-city state are promoting marine environment protection. bremenports GmbH & Co. KG and its workforce of around 400 play a key part in that respect. The management company of the ports of Bremen and Bremerhaven develops, expands and maintains a complex infrastructure system of locks, quays, bridges, roads and other structures.

Ecological considerations play an increasingly important role for the hydraulic engineering and environment experts at bremenports. The planners and engineers implement many different measures for the protection of nature and the countryside – from sophisticated ecological compensation projects for quay and lock construction right through to the search for intelligent solutions for environment friendly port operations. Close consultation with experts from other ports, nature conservationists and partner institutes in Germany and abroad guarantees a constantly growing pool of experience.
Three major projects:

- In a joint project with the Senator for Economic Affairs and Ports, and the ports of Rotterdam, Antwerp, Amsterdam, Le Havre and Hamburg, bremenports is drawing up an Environment Ship Index.
- Bremen’s ports are introducing a certified environment management system, which will bundle existing activities, guarantee their implementation and serve as a control instrument to promote the reduction of carbon dioxide emissions.
- Plans to establish a carbon footprint for the ports are being investigated. This would provide proof of positive effects as well as a basis for comparison.

At local level, bremenports participated in the research project “Climate change at the Lower Weser” launched in September 2007, which investigated the risks and opportunities that forthcoming changes would entail for the city of Bremen and the surrounding region, as well as the effects on tourism and agriculture. The participants also discussed adaptation strategies (for instance establishing a network of excellence and a planning workshop on water retention).

Another research project ("Nordwest 2050") promotes the development of “climate-adapted innovation processes” in the metropolitan region of Bremen-Oldenburg. The port industry and logistics sectors will have to overcome the challenges facing them as a result of global warming. Again, bremenports is involved in this project.

Active against climate change: in search of best practice

Climate change has become the dominant topic in the public debate about environmental issues – not only internationally, but also at local level, and bremenports makes an active contribution to these discussions. The port management company is also responsible for coastal protection in Bremerhaven and consequently has great expertise in such matters. Over the next few years, bremenports will raise the height of large sections of the dyke in Bremerhaven in response to the anticipated rise in sea levels.

bremenports attended the World Ports Climate Conference in Rotterdam in July 2008, where 55 ports signed a Climate Protection Declaration aimed at reducing carbon dioxide emissions in worldwide transport and exploiting the available potential in maritime shipping, port operations and hinterland transport. They also undertook to promote the use of renewable energy sources. The ports intend to intensify the exchange of information and support best practice solutions.
Bremen’s ports are dependent on the confidence placed in them by shipowners and the shipping industry. The location profits from numerous efficient logistics companies which cooperate locally as a network of different players. The terminal operators attend to loading and discharging; they own the cranes, container gantries, straddle carriers and other equipment required for cargo handling. Large areas of the port premises are in public ownership and are rented or leased out to the port operating companies. This is where bremenports GmbH & Co. KG comes into the game. Bremen’s port management company is responsible for ongoing development of the maritime logistics centre, planning expansion of the facilities and executing any necessary construction projects. bremenports also handles maintenance of the port areas, providing modern infrastructure in which the Federal Land of Bremen has invested billions over the last few decades.

The scene at the ports is defined by ships and cargo. Shipping lines, transhipment companies and many smaller service providers – from forwarders to tug operators – all work in close cooperation with the public authorities. Harbour master, river police and customs all contribute to the success of the ports. And all of them are well aware that a world port has to function efficiently at all times.
Around the port: conservation areas, national park and many rare species

The two cities that make up the smallest Federal Land in Germany are situated next to ecologically valuable areas. Whilst the city of Bremen is surrounded by a pronounced green belt, the area at the Weser estuary has brackish water habitats as well as sensitive salt meadows, mudflats and sandbanks that form part of the Wadden Sea National Park of Lower Saxony. Classification of these areas as flora-fauna habitats (FFH) by the European Union means that nature conservation and environment protection have to satisfy even more stringent criteria than before.

Whilst the National Park has already set ecological standards for many years, so that many rare species of animals and plants already enjoy protection, large areas of the Weser have now been declared a EU protective zone for anadromous fish. Moreover, further stretches of the river between Bremen and Bremerhaven have been declared special protection areas for birds and FFH sites. Although critics claim that this restricts the economic development potential, the high legal obstacles can be overcome if there are well-founded arguments for doing so.

If new water and port projects affect or even destroy protected habitats, equivalent natural areas have to be created. The Impact Mitigation Regulation in force in Germany is a recognised and successful procedure which has successfully been practised by port construction engineers and environmental planning specialists. The compensation measures initiated by bremenports have repeatedly proved that they achieve the desired results and earned international recognition.

The planners are meanwhile confronted with a new challenge. They have to draw up “integrated management plans” which are capable of balancing the interests of the users and the demands of nature conservation. The aim is to achieve improvements for the environment without causing serious disadvantages in other sectors, for example in terms of economic interests.

This process calls for tolerance and acceptance on both sides – and the willingness to listen to each other’s concerns.
In order to improve the situation, the Senator for Economic Affairs and Ports of the Federal Land of Bremen has supported a campaign launched by the German government which advocates international regulation at IMO level. In April 2008, the IMO (International Maritime Organization) decided to enforce a progressive reduction of the sulphur content of fuel oil. The limit for the sulphur content of fuel oil is to be reduced from 4.5 to 3.5 per cent by 2012 and to 0.5 per cent by 2020. The European Union has issued a directive which stipulates far stricter ecological standards for the North Sea and Baltic, where the limit value for sulphur is to be reduced from the current 1.5 to 1 per cent by 2010. As from 2015, the maximum content will be limited to 0.1 per cent, and this figure will already apply to on-board power supply for ships at berth in ports as from 2010. New technical standards for modern ship engines are also aimed at reducing the emission of nitrogen oxide.

These regulations will lead to a substantial reduction in the emission of pollutants by ocean-going vessels in the coming years.
Modern, efficient transport infrastructure is needed to cope with the growing volumes of freight transport in Europe. The present infrastructure, however, is outdated. Despite numerous upgrading and expansion projects, the roads and railways in the hinterland of the major seaports are increasingly working at the limits of their capacities. Transport policies therefore logically promote investments to raise capacities and alleviate bottlenecks. At the same time, inland shipping is evolving into an attractive and environment-friendly alternative.

So what does this mean for the ports in Germany’s smallest Federal Land? Upgrading the Middle Weser, which links Bremen and Bremerhaven with the Mittelland Canal, is a priority project. The Federal government has reacted and is preparing this stretch of the river for use by large self-propelled barges by 2012. This involves enlarging the locks at the Lower Weser ports of Dörverden and Minden, which can expect to reap huge benefits from the project.

Large self-propelled barges will enable new, economically competitive transport chains – an advantage that is likely to carry even more weight in view of rising costs and increasing congestion on the roads and motorways. The ports along the Mittelland Canal which play a role for Bremen’s inland waterway transports have made use of the available national aid programmes and invested in their facilities and equipment. They are also planning further expansion to cope with the anticipated growth in freight volumes – which will include cargo from Bremen and Bremerhaven.

Inland shipping – the environment-friendly alternative

Whereas maritime shipping repeatedly makes headline news, inland shipping rarely attracts public attention, despite the fact that this segment of the maritime economy plays an important role for the success of the European ports. In the Federal Land of Bremen, cargo carried by barges accounted for a volume of 5.9 million tonnes in 2008, with 7,352 arrivals in port.

Most of these inland waterway vessels are headed for harbours in the city of Bremen itself. The loading points and terminals at Hemelingen Hafen, Neustädter Hafen, Industrie Hafen, Kap-Horn and Werftshafen, Holz- and Fabrikenhafen and the grain transport terminal account for more than 70 per cent of total cargo throughput. Most of the source and destination ports are in the national hinterland.

Transhipment of the remaining inland freight is handled at Bremerhaven, on the mouth of the Weser, where containers are discharged and loaded at Stromkaje. The cargo handled at other parts of the seaport terminal involves primarily fodder, bricks, sand and other construction materials.

History of inland shipping at Bremen’s ports

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Inland shipping throughput at Bremen’s ports in 1,000 tonnes

Room for expansion: to date, inland shipping has not been able to make full use of its potential. This will change once larger vessels can use the river south of Bremen.
Weser and Hunte: access to the hinterland

The future of inland shipping in the Federal Land of Bremen will be decided on the Weser. The Middle Weser provides the link to the Mittelland Canal and to business locations such as Minden and Magdeburg, while transports heading for or coming from the west can use the Lower Weser, the Hunte and the Coastal Canal, which joins up with the Dortmund-Ems Canal and into the Rhine.

The maximum dimensions for barges leaving Bremen are 85 metres in length and 9.50 metres beam (draught: 2.50 metres), which corresponds to the dimensions of an "Europa" vessel.

### Development measures and prospects

The "Europa" barge class is meanwhile being replaced by large self-propelled barges which can carry approximately 50 per cent more cargo with the same draught. As a result, the Middle Weser’s shipping function is restricted, which is why this stretch of the river has to be developed. Ecological compensation will be made for this impact on the environment.

The Middle Weser project began in 2007. To begin with, the navigation channel will be made slightly deeper. The sluiceways then have to be refurbished and enlarged. Bends will be alleviated at 19 points along the river to give the larger vessels more room to manoeuvre. Finally, modernisation of the locks at Dörverden and Minden, which date back to the 1930s, will eliminate the last bottlenecks.

This will greatly improve the conditions for commercially viable shipping on the Middle Weser, in particular for container transports, as vessels will now be able to carry up to 186 containers (TEU) (compared with the previous 94 TEU). The river will now also be able to cope with barge and pusher tug assemblies of up to 199 metres. Bremen’s politicians and port businesses also hope that bridge headroom will later be raised, enabling vessels to carry three tiers of containers.

The recently apparent trend towards the formation of terminal networks in the seaport hinterland indicates the good opportunities for inland shipping.

### Comparison of container capacity in two-tier transport

<table>
<thead>
<tr>
<th></th>
<th>TEU</th>
<th>Length</th>
<th>Beam (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europa</td>
<td>54</td>
<td>85</td>
<td>9.50</td>
</tr>
<tr>
<td>Large self-propelled barge</td>
<td>194</td>
<td>110</td>
<td>11.45</td>
</tr>
<tr>
<td>Very large self-propelled barge</td>
<td>136</td>
<td>135</td>
<td>11.45</td>
</tr>
</tbody>
</table>

Three tiers of containers are still too high to pass under the bridges along the Middle Weser barge in front of the terminal at Bremerhaven.
When new port facilities are planned or existing facilities enlarged, the planning permission procedures are frequently complicated and time-consuming. The “Impact Mitigation Regulation”, “Environmental Impact Assessment” (EIA) and “Habitats Directive Assessment” are the instruments used to identify and assess the potential impact on the environment. While all of these instruments have clear parallels, closer examination reveals the differences between them.

### Legal framework for the construction of port facilities

#### Comparison of Impact Mitigation Regulation, EIA and Habitats Directive Assessment

<table>
<thead>
<tr>
<th></th>
<th>Impact Mitigation Regulation</th>
<th>Environmental Impact Assessment (EIA)</th>
<th>Habitats Directive Assessment (FHH)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>Preserving efficiency of the balance of nature and visual quality of the landscape</td>
<td>Identification or comparative presentation of the anticipated environmental impact of a project</td>
<td>Avoidance of substantial impairment of conservation objectives or protective objective of an FFH site</td>
</tr>
<tr>
<td><strong>Application criteria</strong></td>
<td>Suspicion of substantial or sustained impairment owing to changes in the form or use of land</td>
<td>Listed as a compulsory EIA project</td>
<td>Suspicion of substantial impairment of conservation objectives or protective objective of an FFH site</td>
</tr>
<tr>
<td><strong>Scope of assessment: subjects of protection/impairment</strong></td>
<td>Efficiency of the balance of nature (soil, water, air, climate, animals and plants)</td>
<td>Human beings (Animals, plants, soil water, air, climate)</td>
<td>The elements which are essential for the conservation objectives of an FFH site</td>
</tr>
<tr>
<td></td>
<td>Visual quality of the landscape</td>
<td>Landscape (incl. reciprocal effects)</td>
<td></td>
</tr>
<tr>
<td><strong>Responsible body</strong></td>
<td>Authority which is responsible for the administrative procedure</td>
<td>Authority which is responsible for the administrative procedure</td>
<td>Authority which is responsible for the administrative procedure</td>
</tr>
<tr>
<td><strong>Public participation</strong></td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Binding force of results</strong></td>
<td>The results have legally binding consequences and are an integral part of planning permission</td>
<td>The results are used only in preparation for the decision — they have no legally binding consequences</td>
<td>The results have legally binding consequences</td>
</tr>
</tbody>
</table>
All three procedures are based on different application principles:

The Impact Mitigation Regulation refers to the assumed or actual occurrence of a substantial impairment of the balance of nature and visual quality of the landscape that could be caused by a project. The measure must be related to a change in the form or use of sites.

The Habitats Directive Assessment (FFH) also assumes substantial impairment and examines the effects on the conservation objectives of an FFH site.

In contrast to the above procedures, the obligation to conduct an Environmental Impact Assessment (EIA) is linked directly to a specific project. An EIA is compulsory for all projects which are specified in the Annex to Paragraph 3 of the Environmental Impact Assessment Act.

All three instruments are frequently applied to port construction projects in Bremerhaven. These legislative instruments cannot be interchanged at random, but differ considerably in terms of their objectives, procedures and the consequences for the parties responsible for the project and the authorities.

The ecological compensation projects planned and implemented by bremenports on Luneplate, at the Wursten coast and in the Drepte flood plain are based primarily on the Impact Mitigation Regulation. However, measures have also been implemented in the Wadden Sea National Park of Lower Saxony to ensure the continuing and functioning coherence of the European Natura 2000 nature protection sites.
"To turn former arable farmland into grassland sites, we graze water buffalo on Luneplate. These undemanding animals eat plants that other cattle would reject. The buffaloes are the ideal landscape gardeners for our environmental sites."

Heino Runge, who looks after the substitute sites on behalf of bremenports, and water buffalo bull Valentino.
Anyone responsible for a world port has to protect institutional interests and assume public responsibility – an obligation that bremenports satisfies not only at regional level, but also on a national and international scale.

**INTERNATIONAL:**

bremenports is a member of PIANC. Port and shipping experts from all over the globe have joined forces in the International Navigation Association (formerly: Permanent International Association of Navigation Congresses). Uwe von Bargen of bremenports was a member of the Environment Committee working party which dealt with the subject of "Bird Management in Ports and Waterways". His colleague Cornelia Ebert represents Germany on the Young Professionals Commission. The port management company also cooperates with the International Association of Ports and Harbours (IAPH) and der World Ports Climate Initiative (WPCE).

**EUROPEAN:**

The Senator for Economic Affairs and Ports is a member of the European Sea Ports Organisation (ESPO) and the Ecoports Foundation. In these organisations, bremenports participates in the exchange of information and the opinion-forming process at European level. At the same time, there are close contacts between the major seaports of Le Havre, Antwerp, Rotterdam, Bremen/Bremerhaven and Hamburg, providing forums for the intensive discussion of marine environment protection topics.

**NATIONAL:**

bremenports is an active member of the HTG (German Port Technology Association).

**REGIONAL:**

When planning major development projects, Bremen’s ports also consult institutes and partners in the neighbouring Federal Land of Lower Saxony, owing to the direct or indirect effects of port construction such as the extension of Container Terminal 4 to the north and the resulting compensation measures. In such cases, bremenports works in close cooperation with Küstenökologische Forschungsgesellschaft (KÜFOG – a team of applied biology and landscape planning experts). When designing the ecological compensation for the Container Terminal III Project, assistance was provided by Wissenschaftliche Beratung für Naturschutz und Landschaftsplanung (WBNL – a scientific consulting group for nature conservation and landscape planning).

Partnerships with various natural and environment protection associations as well as the management board of the Wadden Sea National Park of Lower Saxony also play an important role. Conflicts of interest mean that an intensive exchange of opinions is vital. Cooperation raises mutual trust and this in turn facilitates joint activities. In that respect, the management board of the Wadden Sea National Park of Lower Saxony plays a special role, as it is the authority responsible for the national park which is adjacent to the northern border of the port in Bremerhaven.

Other organisations such as chambers of commerce and Wirtschaftsverband Weser (Weser economic development association) repeatedly investigate environmental aspects, analysing and assessing legal developments and plans which could pose a risk for essential interests of the ports.

Closely linked and well informed: the environment experts at bremenports maintain close contact with partners in Germany and abroad.
Environment management in port construction

Compensation and substitute sites

What the environment loses when port facilities are built has to be restored elsewhere. In 1997, the planning engineers proved on Tegeler Plate that impact on the environment can be successfully balanced. This area beside the Weser was chosen as the central substitute site for the huge Container Terminal III project in Bremerhaven.

The environmental engineers had an extensive tidal area created in the marsh, where water flows in and out of the tidal channels of this man-made ecological paradise in the rhythm of the tides. The roughly 280-hectare site used to be intensively farmed, but the effects of the tides now allow natural and near-natural habitats to develop. The landscape is defined by reed beds, tidal channels and ponds. At higher levels, there are barren areas that are now used for extensive farming.

The compensation measures for the construction of the latest port expansion project, Container Terminal 4, posed a particularly difficult challenge for the planning engineers. Habitats and sanctuaries of international standing are being developed on Grosse Luneplate and along the Wursten coast and are protected by long-term agreements.

The central substitute site for the new terminal is located on Luneplate. The environment planners used heavy-duty machinery to construct a 220-hectare tidal polder near the village of Dedesdorf in Lower Saxony. From 2010 onwards, water from the Weser will flow into the intricate system of tidal channels, creating new mudflats and reed beds which will provide a refuge for rare species. At low tide, most of the polder will dry out again. bremenports has had a flood barrier built in the Weser dyke to ensure the necessary protection against high tides. A new tidal pumping station will control water intake and drainage, while a roughly three-and-a-half-metre high earth wall will serve as a boundary between the polder and the hinterland. The adjoining 290 hectares of grassland and ditches will provide a new refuge where rare species of birds can rest and breed.
To the north of Bremerhaven, along the Wursten coast, bremenports is also setting new green standards in the ecological compensation for Container Terminal 4. The summer dyke, a low earth wall in the foreland of the main dyke, has been opened up at eleven points.

Since summer 2007, the incoming tides of the North Sea flow into two roughly 75-hectare large grassland areas, improving the living conditions for many species of seabirds and migrant birds in search of food, breeding and resting places at the coast.

As compensation for the impact on nature caused by port projects such as the construction of the new Kaiserschleuse lock, bremenports has developed a substitute pool beside the Drepte, a tributary of the Weser. The 32-hectare site lies within the boundaries of Hagen local authority. Earth walls will be opened up and relocated along the banks of the Drepte to create a flood plain with wetland zones and a new shallow pool with highly diverse bank structures.

The advantages of this pool are not only ecological. The Drepte site simultaneously enables compensation for several port construction projects, which substantially lowers the costs and takes the pressure off the port investment budget. Moreover, the fact that the substitute pool is already available means that the individual projects can be approved faster, saving time and therefore money.
Ecological compensation on Luneplate

The changing face of a landscape beside the Weser: a habitat of 650 hectares for numerous endangered species of animals and plants.

A Grassland
Area: 290 hectares. Arable and grazing land that used to be intensively farmed has been converted into extensive wet grassland for plants and animals (breeding and resting birds). Installation of ditches, wind turbines and dams.

B Tidal polder
Area: 220 hectares. Construction of an extensive tidal polder with an intricate system of new tidal channels bordered by reeds. Valuable habitats will be created for rare and in many cases endangered species of animals and plants around the mudflats and reed beds.

C Flood barrier
Construction of a 35-metre wide flood barrier in the dyke. As from 2010, water from the Weser will flow through two 13-metre wide chambers into the tidal polder. The gates will be closed only at extremely high tides or storm tides.

D Tidal pump station
Construction of a tidal pump station to regulate water levels in an area of almost 30 square kilometres in Dedesdorf marsh. Two pumps will enable additional drainage of 5,200 litres per second.

E Alte Weser
Area: 140 hectares. The environmental engineers are planning diversely structured habitats on an old arm of the Weser with ponds, alluvial trees and shrubs, reed beds and grassland areas (extensive farming).
Nature conservation in practice: extensive breeding and resting areas for birds

There are valuable bird habitats in and around Bremen and Bremerhaven, such as the tidal landscape of the Wadden Sea, or the vast grassland and ditch zones of the North German marsh. Innumerable migrant birds rest on these sites before setting off to breed or overwinter in other regions. The high-water resting sites are particularly important, as they provide a refuge at high tide for birds which search for food in the mudflat and shallow water zones of the southern North Sea.

Constructing a port on the coast of the German Bight without any negative consequences for the bird kingdom is virtually inconceivable. When planning the compensation measures for the impact caused by the major CT III and CT 4 terminal projects, the engineers had the chance to design new refuges for many species on Luneplate and along the Wursten coast. Diverse sites in the south of Bremerhaven were prepared and developed between 1992 and 1998. Broad-billed sandpipers (a plover-like wader) and other resting birds could later be observed on Luneplate.

The reed beds, ditches and ponds that make up the wilderness of Tegeler Plate are meanwhile dominated by extensive sedge growth and barren land, ditches, tidal pools and channels that are bordered by mudflats. More than 100 pairs of warblers – especially Eurasian reed warblers and sedge warblers – have found a new home here. Rare song-birds such as bluethroat and bearded tit have also been observed. The number of birds breeding in the reed beds has increased tenfold since this site was redesigned and there are meanwhile around 200 pairs.
Valuable high-tide resting places were lost when terminal expansion CT III was built in Bremerhaven. Substitute measures were implemented on a former deposit site for harbour sediment in the dyke foreland area of Luneplate in 1992 and 1993.

When the back-up surveys were completed ten years later, the new ecological zone had evolved into an impressive breeding area. In 2001, almost 100 pairs of birds were counted. Reed breeders accounted for the dominant share of 66 per cent. Although the substitute site has an area of only 15 hectares, the experts found a remarkable correlation with the breeding birds on the former CT III site.

The compensation measures planned and implemented by bremenports in recent years have proved highly successful, so that environmentalists and the authorities have every confidence in the current ecological projects on Luneplate and along the Wursten coast.

To satisfy the compensation requirements for maritime construction projects (Terminals CT IIIa and CT 4, the turning basin for ships in the Weser), port maintenance (Luneort trial deposit site) and industrial parks (Carl-Schurz site in Luneort), the environment planning engineers have created a coherent habitat area of almost 1000 hectares on Luneplate.

These figures are far higher during the migratory season, when ornithologists counted more than 300 greylag geese and 700 white-fronted geese, more than 1000 mallards as well as 3700 wigeon and almost 1300 teal. Waders such as the common snipe, pied avocet and redshank also appreciate this bird sanctuary.

In 1995, 50 hectares of arable land inside the dyke on Luneplate were converted into wet grassland. When the ornithologists and environmental planning engineers took stock ten years later, the results were impressive: eleven endangered species had settled here, primarily meadow breeders, but also ducks, sedge warblers, ringed plover and curlews.

In winter, the area is deliberately flooded. The shallow water zone provides an attractive roost for geese at night, while ducks and other species can find a place to rest at high tide. It also offers enough food for migrant waders. The numbers of bar-tailed godwits resting here – roughly 10,000 in 2006/2007 – clearly demonstrate the international importance of these sites.
Environmentally compatible dredging

Heavy-duty machinery at work: this photo shows a shovel dredger at work...

An environment friendly alternative: a water-injection dredger flushes up fresh deposits from the bottom and keeps them suspended. This all takes place under water. “Hol Blank” demonstrates the principle for the photographer.

Substantial reduction in silt quantities

When bremenports engineers plan new port facilities, they pay keen attention to currents to ensure that the quantities of silt and mud that have to be dredged and disposed of are kept as low as possible. Ideally, the suspended particles are carried onwards by the current and do not sink to the harbour bottom as sediment. Two special vessels are also in use: the modern technology of the water-injection dredgers “Hol Blank” and “Hol Deep” flushes up fresh deposits from the bottom and keeps them suspended, so that the material is carried off with the outgoing tide.

The Fischereihafen and Überseehafen harbours in Bremerhaven, which are separated from the river by locks, are designed to maintain certain water levels which are higher than the mean level of water in the Weser. Consequently, water has to be added to compensate for any loss of water in the harbour basins. This is done by a free-flow canal which went into operation in early 2001.

The 240-metre long and seven-metre wide canal ensures that surface water from the Weser with a low content of suspended particles can flow into the basin of Kaisenhafen I – this accounts for an impressive 150,000 cubic metres per tide and greatly reduces the volumes of dredged material. Compared with the figure of 800,000 cubic metres in Bremerhaven around 20 years ago, the average annual sediment quantity has meanwhile dropped to just 200,000 cubic metres.

Less sediment also occurs in Bremen-City than before, as a water-injection dredger is used there regularly.

- and this is a large bucket ladder dredger, removing sediment from the bottom of the harbour.

Shipowners and ships’ captains have to know that they can rely on adequate water depths for their ships. On the Weser, this is the responsibility of the Federal Waterways and Shipping Administration; inside the harbours, this is handled by bremenports, which orders the dredgers into action as soon as insufficient depths become apparent. Clean sand from the mooring basins in front of Stromkaje at Bremerhaven is used for construction projects or dumped at sea, contaminated silt is disposed of in accordance with the relevant regulations.

In the brackish water zone, where fresh and saltwater meet, micro-organisms die and the particles sink to the bottom of the outer harbours and harbour basins. Bremen makes great efforts to keep the cost of sounding the water depths, dredging and waste disposal within limits. The international ban on the use of tributyl tin (TBT), a pollutant that was contained in paint products for ships, was an important step towards reducing pollution of the harbour sediment. The water authorities at Bremen’s ports are also sensitive to this topic and ensure that shipyards use their plant and equipment in conformity with the regulations.

An environment friendly alternative: a water-injection dredger flushes up fresh deposits from the bottom and keeps them suspended. This all takes place under water. “Hol Blank” demonstrates the principle for the photographer.
Every year, 270,000 cubic metres of sediment have to be dredged so that the ports in Bremen and Bremerhaven can guarantee their shipping customers sufficient water depths. Contaminated silt is treated and dumped with minimum impact on the environment. In 1990, a concept for the integrated disposal of dredged material was developed and implemented on the right bank of the Weser in Bremen-Seehausen.

Harbour sediment has meanwhile been disposed of at Seehausen for a decade and a half. The site has an area of roughly 127 hectares, and consists of the dewatering fields, a landfill, a drainage polder and a biological sewage treatment plant. The overall plant has a capacity of around four million cubic metres and was originally designed to cope with silt only from the harbours in Bremen-City. However, as the silt from Bremerhaven is contaminated with TBT and may no longer be dumped in the Outer Weser, the entire dredged material from the twin ports has been deposited at the Bremen treatment plant since 2001.

Each of the 16 dewatering fields is 200 metres long and 100 metres wide. The silt and water mixture is flushed in at heights of up to 2.80 metres. After just a short time, sedimentation processes ensure that almost clear water comes to the surface and is then drained off through shutters. A layer of dry solids, up to 1.40 metres thick, remains on the dewatering field. Gravity and evaporation ensure that the remaining silt gradually dries out.

On the western border of the site, there is a 32-hectare landfill, designed as a hill which will have a maximum height of 50 metres after its reclamations. To minimise the ecological impact of the dredged material, the landfill has an upper and lower sealing layer of selected dredged sediment.

The seepage water of the landfill is captured in a drainage system, fed into a ring ditch and then through two pumping stations into the biological sewage treatment plant. This consists of a preliminary filter and two filter beds, each of which is 180 metres long, 35 metres wide and designed to cope with 150 cubic metres per hour.

Between the Weser and the dewatering fields there is a polder which can store 75,000 cubic metres of excess and seepage water. The water from the dewatering fields and the landfill is channelled through pumping stations and pipes and flows into the polder through a cascade drop.

Care has been taken to minimise the nuisance for the residents of Seehausen. A green belt and a planted noise barrier separate the deposit site from the residential area. Once again, the compensation measures were effected professionally: compensation for the impact on the balance of nature is spread over five sites with a total area of 124 hectares.

The ecological experts at the ports have conducted a three-year pilot project beside the River Lune in Bremerhaven to examine the behaviour of organic contaminants in deposit sites. A total of 290,000 cubic metres of wet dredged material was deposited on a 17-hectare site between September 1999 and April 2000 and analyses conducted on the degradation of organic tin compounds under the influence of sun and air. The experts also examined the extent to which technical methods can accelerate that process.

During the pilot project, the dredged material was deposited in separate fields and given different treatment. It became clear that oxygen is required for any noticeable degradation of TBT. Moreover, tributyl tin is biologically degradable with micro-organisms from the sediments, which practically eliminates the possibility of its entering the food chain. Nor is it necessary to give the dredged material any special treatment to reduce TBT. No significant adverse environmental impact could be ascertained.
Dredged material for dyke construction...

Making sensible (and ecologically sustainable) use of dredged material is the order of the day in Bremen. The port management company uses the material for dyke construction and this has proved successful.

A few years ago, the experts suggested using dried harbour silt from the pilot plant at Bremerhaven-Luneort for the core of the 900-metre long outer dyke at the north of Container Terminal 4. They convinced the authorities that it is technically feasible to use dredged material instead of sand without any environmental risk. By the year 2009, a total of 185,000 cubic metres of dredged material had been used for dyke construction in the seaport.

bremenports is also constantly on the lookout for other sensible alternative uses for the dried silt – from the production of bricks and expanded clay pellets or for use as a sealant. The dredged material has already proved successful as a base or surface sealant in landfill construction.

... and filling in harbour basins

A few years ago, the Free Hanseatic City of Bremen had some parts of the Osthafen filled in to provide new berths for car carriers and new operating areas on land at Bremerhaven’s Überseehafen. This resulted in a 6.1-hectare site made of steel sheet piling, sand and silt.

The basin in front of the new quay had to be deepened, and this provided around 145,000 cubic metres of silty dredged material, which was used to fill in the separate area behind the new sheet piling. To ensure that the water content of the silt would not increase by more than 10 per cent after installation, the wet material was dredged using an environmental closed grab dredger (for minimum water content).

A geotextile separating layer of sand mats was then installed in two crosswise layers. The individual sheets were either sewn together or overlaid. Several layers of sand were then irrigated onto the construction site by a hopper dredger.

Vertical drainage systems were installed and linked up to accelerate the dehydration process and a vacuum pump installed to facilitate additional drainage of the site. Trucks then delivered sand to create thick layers of up to two and a half metres in height. The rest of the sand was again supplied by a hopper dredger.

Taking stock, bremenports rated this system positively. Managing Director Dr. Stefan Woltering commented, “This method meant that the quantity of harbour silt which had to be dumped was lower, relieving the environment and also reducing the costs.”
Important individual measures

Noise protection in Weddewarden

The new Container Terminal 4 means that the port now reaches as far as the village of Weddewarden in the north of Bremerhaven. As work at the port goes on right round the clock, seven days a week, the noise level has increased substantially for the residents of Weddewarden and the neighbouring village of Imsum in Lower Saxony. Bremenports has implemented comprehensive noise protection measures to improve the quality of life for the port’s neighbours.

Before the 450-million-euro project CT 4 was approved, Bremerhaven city council had issued a long-term guarantee to the residents. The terminal operators also undertook to provide active noise protection, which means that noise emission is limited at source. At the same time, Bremen’s government agreed to equip numerous houses and flats in Weddewarden and parts of Imsum with passive noise protection and to assume the cost of these measures.

To begin with, external experts assessed the noise levels that were to be expected at the houses once CT 4 went into operation. The construction work required for each individual building was then decided. As a result of these surveys, roughly 65 houses were fitted with top-quality sound-proof windows with an insulation factor of 42 dB(A). The measures also involved installing modern ventilation systems and replacing doors.

Extensive grazing with water buffalo and galloways all year round

The vegetation on extensively used grassland areas often consists of grasses and herbaceous plants that are unsuitable for high-yield cattle. Accordingly, the environment planning engineers at bremenports opted for a tough breed that does not require high-quality grazing and that can remain outside all year round.

The cattle prevent woody plants from spreading on the site, because they eat these plants when the meadows do not provide enough green fodder in winter.

In the Drepte flood plain, for example, bremenports has introduced fjell cattle, an endangered domestic breed from Sweden. In this case, the animals come from Nordhorn zoo.

Water buffalo have been kept on the sites inside the dyke on Luneplate since August 2005. These four-legged “landscape gardeners” have played a crucial role in converting former arable land into prime ecological grassland. 14 animals currently make up the herd and there are plans to introduce water buffaloes to neighbouring sites in future.

Another grazing project is in progress in the north of Tegeler Plate. A sand deposit site that was created when the Weser was deepened has been left to develop naturally. The use of galloway cattle has proved successful here, as the areas are gradually changing their structure and developing vegetation-free zones which are specifically welcomed. The galloways are helping to create valuable habitats for rare species of animals and plants.
The historic Simon Loschen lighthouse in Bremerhaven is one of the most beautiful seamarks in Germany. The lighting engineers installed lens wallwashers to illuminate the neo-Gothic façade at night. The upper part is illuminated by beamer spotlights with sculpture lenses. Halogen metal vapour lamps emit a warm light which enhances the red of the bricks. The lamps have been so precisely placed that they require a connected load of only 1200 watt. This successful light design, coupled with the low power consumption, convinced the North American International Interior Design Association, which awarded the project its “IIDA Award of Excellence” in 2006 in the Energy and Environmental Design category.

There are countless dolphins for mooring ships in the harbours of Bremen and Bremerhaven. They are installed a few metres away from the shore and have coloured markings, and many also have lamps. For some years now, bremenports has used solar LED lamps by Carmanah Technologies Corporation, which come in a sturdy water- and gas-proof aluminium casing. They use solar cells and consequently do not require current from the public grid. The lamps have a working life of approx. 100,000 hours and the batteries last for at least five years. They are switched on and off by means of a light sensor.
Lighthouse at Wursten coast

From 1887 until 1923, Eversand Oberfeuer lighthouse guided shipping traffic through the Wursten arm of the Outer Weser. Then, when the main fairway was re-routed through the Fedderwarden arm, the lighthouse was no longer needed and served as a refuge beacon until the winter of 1994/1995. By that time, the base of the former lighthouse had been severely damaged by floating ice, but had not been repaired because of the high costs. The management board of the Wadden Sea National Park of Lower Saxony came up with the brilliant idea of relocating the lighthouse to the Wursten coast for use as an information centre about marine nature conservation. The project was achieved in cooperation with bremenports as ecological compensation for the harbour silt from the harbours in Bremerhaven which had been dumped in the Wursten arm of the Weser for many years. In March 2003 the lighthouse was moved to Dorum-Neufeld, creating a new tourist attraction on the coast.

A soft spot for seals

In June 2007, two young seals were found on the outskirts of the Container Terminal 4 construction site. The helpless pups had lost their mother. bremenports employees contacted the seal rescue station in Norddeich, where Paula and Pauline were nursed back to health again. The two young seals are meanwhile back in the North Sea.
The port management company makes use of diverse opportunities to pass on its ecological know-how. The environment experts give lectures, show visitors from Germany and abroad around the substitute sites, write articles for trade journals and take part in platform discussions.

They also work in close cooperation with further education institutes, colleges and universities. Cooperation partners include Internationale Weiterbildung und Entwicklung gGmbH (InWent), an organisation concerned with advanced training, education and development on an international scale. The parties discuss subjects such as the question of sustainability in connection with port development and provide information about the stringent ecological standards that apply when planning maritime investment projects. Environment Director Uwe von Bargen and his colleagues also compile comprehensive facts and data and contribute to various research projects.

Environment-conscious actions already have a long tradition at Bremen’s ports. In the mid-1980s, on the initiative of the Senator for Economic Affairs and Ports, the Federal Land of Bremen introduced regulations for the correct disposal of ships’ waste, assuming a pioneering role in marine environment protection.

bremenports meanwhile markets the expertise it has acquired over the course of the decades all over the world. The company was responsible for the environmental aspects of consultancy for an expansion project on the Cape Verde islands. In Shanghai, bremenports advised Chinese partners on upgrading inland waterways, where the ecological advice from Bremerhaven was equally appreciated as it was in a project for dealing with shipwrecks in the Lithuanian port of Klaipeda.
Support for research projects

In December 2000, the Institute for Infrastructure, Environment and Innovation in Brussels recommended that Bremen’s ports take part in the research project “Paralia Nature”. Rotterdam, Antwerp and various locations in the United Kingdom also agreed to participate. The project objective is to investigate whether and to what extent nature conservation issues are taken into account when European ports are expanded.

The first phase of the survey was completed in 2002 and bremenports was no longer involved in the follow-up project. Nevertheless, its contributions up to that time played a significant part in establishing the good international reputation of Bremen’s ports in matters of conservation.

bremenports is also involved in the “Climate Change at the Lower Weser” initiative, which is supported by the Federal Ministry of Education and Research. After the roll-out in September 2007, various groups met until mid-2008 to identify the risks and opportunities of climate change for the region and define the necessary adjustment measures.

Safeguarding and monitoring results

The “Impact Mitigation Regulation” (for more information see Page 24 ff) has proved a successful instrument for compensating impact on the balance of nature in Germany. Monitoring surveys review the effects of impact and improve the quality of the ecological compensation measures.

Although the analyses conducted in connection with the Container Terminal III expansion project involved immense work and expense, they yielded positive results. For example, analyses of the sand withdrawal and dumping sites provided information that proved valuable in subsequent planning and approval procedures. They facilitated objective evaluation of the projects, reduced the assessment risk and accelerated the planning and approval process.

Conducting ex post reviews has proved extremely effective for substantiating the success of measures implemented to compensate for port construction work in the Federal Land of Bremen. To do so, the former status has to be documented to enable comparison with the situation after implementation.

To avoid jeopardising the compensation measures, dams and pumping stations are installed to control the water levels in the ditches and grassland areas. The port management company also documents agricultural use in the ecological zones.

Moreover, bremenports proactively seeks advice from external experts – this is a vital step to ensure that the conservation targets are achieved and the surveys accepted by the public. This policy ensures that the required measures can be implemented at relatively low cost and avoids the need for expensive subsequent alterations.

* “Paralia” is Greek for “near the coast” and covers both marine life and commercial activities.
More and more business enterprises are contributing towards environment protection. This is also true of bremenports and its 400 employees. Eight years after its formation, the company's carbon footprint is impressive. Even apparently minor steps pay off. The following are a few examples:

- Optimum control of current consumption at the workshops and offices
- Energy-saving ceiling spotlights in the repair shed
- Photovoltaic plant in the central workshop for the terminal
- Energy-saving workshop technology and IT
- Modern LED technology for lock signalling systems and dolphin lighting (solar cells)
- Low-impact equipment for dyke maintenance
- Environment friendly lubricants for technical operations and working vessels

There are binding regulations in force at bremenports governing the separation of waste. Several employees have attended special training courses to qualify as waste management officers. They make sure that household waste, defective lights, redundant machine parts and equipment, as well as oil and paint residues are properly disposed of. They also keep records of the disposal processes.

The railway at the terminal has long since discovered the importance of ecology. "Older sleepers are recycled," explains Henry Behrends, head of the competent department at bremenports. "When laying new tracks, the workers use only sleepers made of untreated oak."

The planners and engineers at bremenports are constantly coming up with new ideas to relieve the environment (and the public purse). Kaiserschleuse lock is a good example: it was planned so as to keep water losses during lock operation to a minimum.

**Green IT**

Two thirds of the employees at bremenports have computer workplaces. When it is time to buy new models, energy efficiency is a key consideration and highly efficient power supply units are therefore used. The company has meanwhile begun to replace its stationary computers with thin clients, which provide the same performance but require just a fifth of the energy.

When choosing monitors and printers, attention is paid to environmental standards. Most of the IT equipment in use at bremenports bears the "Energy Star" seal and consumes roughly 20 per cent less electricity than standard models. Many workplaces no longer have their own printers, which have been replaced by network printers and multifunction appliances. This not only improves the company's carbon footprint, but also saves money and space.
En route to a green company fleet

The bremenports company fleet consists of highly diverse special-purpose vehicles. There are snow ploughs for use in winter, track repair vehicles and workshop vans, as well as heavy goods vehicles for use in storm tides or for transporting heavy lock and bridge parts. The company has also purchased pick-ups that are suitable for use on the rough terrain outside the dykes – and, of course, also has ordinary cars which engineers and other employees can use on business trips.

The port management company promotes the principle of car sharing. Its cars are available for use by all the employees and can be reserved quickly and easily online. The cars are needed when employees have to visit service providers or customers, inspect locks or when the bremenports safety officers are called out on duty.

Although mobility is crucial for the team, due attention is paid to the environment factor. Every effort is made to avoid individual trips and to make optimum use of the company cars. Employees are also encouraged to drive in such a way as to keep petrol consumption to a minimum.

Over the next few years, the company plans to replace around 30 leased vehicles with environment-friendly models. The exhausts of many of these new vehicles will emit only around 100 grams of carbon dioxide into the atmosphere per kilometre.

Cycling to work

An increasing number of bremenports employees now hop on their bikes to head for work in the mornings. During the summer months, every tenth member of staff now cycles to work. The employer encourages this trend and offers parking facilities for bikes.

For some time now, the port management company has also had a number of company bikes so that employees visiting nearby customers or building sites do not have to use a car. These bikes round off the corporate fleet and can also be booked online.

Eco-current from the workshop roof

At the end of 2008, the skilled craftsmen and technical employees at bremenports moved into a new workshop building in Brückenstrasse in Bremerhaven. This now serves as the centre for all the different trades and crafts, compared with the previous situation when port maintenance, hydraulic and electrical workshops, mechanical engineering and other sectors were located at five different addresses in the seaport. The new system means shorter, direct routes, which in turn means less expense and less impact on the environment.

And talking of the environment: a photovoltaic system with an area of more than 1000 square metres was installed on the roof of the new building, allowing bremenports to feed around 30,000 kilowatt-hours into the grid every year.
"Protecting the environment and our natural resources enjoys top priority at Eurogate. We cannot afford to waste precious resources, such as drinking water, oil and wood, neither from the economic nor the ecological point of view. These will be needed in future more than ever before."

Hanna Pötter, Environmental Officer at Eurogate GmbH & Co. KGaA, KG at Bremerhaven Container Terminal
Ecology is not an unknown concept for the maritime economy in Bremen and Bremerhaven. Numerous transhipment and logistics companies and firms in many other sectors are not only committed to the economic success of Bremen’s ports, but are also increasingly active in matters of environment protection.

The following are a few examples of such activities by the firms and shipyards at the port:

**Active and passive noise protection**

The Container Terminal on the Weser estuary is one of the largest and most efficient port facilities in Europe. Between 1968 and 2008, the Free and Hanseatic City of Bremen implemented six expansion projects, extending the quay to a total length of almost five kilometres. As a result, the terminal has gradually moved closer and closer to the district of Weddewarden in the north of Bremerhaven. That period also saw a sharp increase in cargo throughput (2008: 5.5 million standard containers, TEU). To reduce noise levels for the people who live beside the fourth-largest container terminal in Europe, the public authorities and terminal operators invested vast sums in noise protection.

Back in the 1990s, when project approval was obtained for the construction of Container Terminal III, the planning authorities imposed an obligation on the operators to work as quietly as possible and use state-of-the-art plant and equipment (active noise protection). bremenports, the port management company, later had some 65 houses in Weddewarden fitted with top quality soundproof windows (passive noise protection). Although these windows guarantee that the residents can enjoy a good night’s sleep, they have to be kept shut to function properly. Accordingly, the buildings were also fitted with modern electric ventilation systems.

On the approx. 300-hectare Container Terminal site, the operators implement both technical and organisational steps which substantially reduce the noise level. The straddle carriers used to transport the containers inside the terminal have encapsulated engines, transmission units and generators. Multiple disk and wet brake systems also keep the noise down. The employees are given regular training in noise protection. Moreover, noise emission is permanently documented using modern measurement techniques.
Shipyards keep paint mist within limits

Over the course of a voyage, shells, barnacles and other creatures attach themselves to the hull of vessels, as unwanted passengers which increase fuel consumption. The ships have to be blasted and washed to get rid of these deposits. The vessels are then coated with paint which is intended to prevent renewed fouling. This work is repeated regularly and is part and parcel of the shipyards’ daily work. When applying paint to the primed hull, the workers normally use the airless spray method, which also helps to avoid the formation of large quantities of paint mist.

These days, the yards use special paint spraying systems which include a warning system for high wind speeds to lessen overspray.

Cleaning waste water from the docks

When fouling and rust are removed from the walls and superstructures of a vessel in the dock, this is done at high water pressure or by slurry blasting*. These processes generate huge quantities of waste water which may not be disposed of in the harbour basin. The washing water from dock operations is collected and treated in the shipyard’s own plant. The yards also conduct emergency drills to ensure that they are prepared to cope with any unforeseen incidents.

CT 4: special lighting protects sensitive insects

Operations at a large port continue 24/7. The use of conventional lighting at night can pose a risk to insects and birds, causing them to lose their bearings. The operator of Container Terminal 4 is therefore obliged to use special lamps with a light spectrum which exerts only a low attraction on insects. As added protection, the lights also have special screens.

* Slurry blasting is a form of sandblasting in which copper slag is added to a liquid [water] to act as abrasive.
BLG Logistics Group considers the environment

To the BLG Logistics Group, environment protection is a permanent task that has to be an integral part of the working routine of each and every employee. The company is not only aiming to optimise the ecological aspects of its plant and processes, but expects every employee to make a contribution.

The principal company at the ports attaches prime importance to the responsible use of natural resources. It consequently opts for an efficient energy mix with low emission values. The company provides regular training for the workforce, such as courses for plant operators and truck drivers which teach them how environment friendly driving patterns can save fuel.

The waste water systems at BLG Logistics Group are also under continuous supervision. The logistics company makes sure that fuels and other operating fluids that contaminate the water cannot penetrate into the soil. There are alarm and hazard control plans to ensure that the necessary action can be initiated immediately in case of emergencies.

BLG obtains its water requirements from the public network. Over the last five years, consumption has been reduced by approx. ten per cent – despite a higher number of employees and a wider remit.

Disposal of ships’ waste

After the days of free waste disposal had ended in the other German Laender at the North Sea Coast, shipowners now also have to pay for these services in the Federal Land of Bremen. The twin ports have assumed a pioneering role in this sector: they put international conventions into practice and help to ensure that less waste pollutes the oceans.

Ships are obliged to notify the port of the waste that is to be disposed of and pay for the service. The disposal process is monitored by the authorities. The level of the charges depends on the vessel’s size and range of voyage, in some cases also on the type of vessel. Private firms take over the waste and ensure professional and proper disposal.

Waste disposal pursuant to MARPOL, Annex I, was available at Bremen’s ports as early as 1988. An ongoing research project was conducted to analyse the results up to 1991. After the other German Laender at the North Sea Coast introduced charges for waste disposal, Bremen also changed over to a fee-based system.
For port companies Eurogate, North Sea Terminal Bremerhaven and MSC Gate, the subjects of economy and ecology are virtually inseparable. For many years, Eurogate has fed electric current back into the grid when operating its container gantries at the Bremerhaven terminal. Moreover, Europe’s leading terminal operator is intensely concerned with how it can increase the cost effectiveness of gantry crane drive systems. The use of frequency converters improves performance, reducing energy consumption and costs. The electric and machinery casings on the gantries are enclosed so that they generate less noise.

New straddle carriers are no longer as loud as previous models. Modern diesel-electric drive units ensure that these long-legged working vehicles require less fuel.

Since 2007, a heating system fuelled with wood chips made from waste wood has heated Gatehouse V and the technical repair shop at the Container Terminal. Some of the electricity also comes from an environment friendly co-generation power station.
Sailing along and saving fuel – the SkySails innovation

Banal but true: wind is cheaper than oil and at sea, it is the least expensive but most environment friendly source of energy. An innovation from Bremen and Hamburg now systematically exploits that source.

The SkySails company from Hamburg has designed the only wind propulsion system to date that satisfies the requirements of modern shipping. Since 2007/2008, the system has been used by Beluga SkySails, a heavy cargo vessel operated by Beluga Shipping GmbH, a Bremen-based project and heavy cargo shipping company.

The technology consists of a towing kite with a rope, a launch and recovery system, and a control system for automatic operation. Initial measurements during the pilot project revealed that the annual fuel costs of a vessel can be reduced by an average of between 10 and 35 per cent.

SkySails offers towing kite propulsion systems with an effective load of 8 to 16 tonnes (as from 2011: up to 32 tonnes). The planned product programme also includes systems with a load of up to 130 tonnes. The technology is suitably for virtually all kinds of ships.

SkySails not only enables a substantial reduction in fuel costs, but also has a second essential advantage: consistent worldwide use of this new propulsion technology could enable the emission of harmful carbon dioxide to be reduced by more than 150 million tonnes per annum.
"Ecological topics will decide on the future of our planet. At bremenports, we are committed to environment protection in all aspects of port operations and shipping."

Uwe von Bargen, Environment Director of bremenports on a visit to Tegeler Plate eco-zone
The Weser estuary and Lower Weser are of considerable economic importance for the region in the north-west of Germany. However, there are also valuable and sensitive natural landscapes in this region. The governments of Bremen and Lower Saxony have therefore registered large parts of the estuary as an "area of special conservation" pursuant to the EU Wild Birds Directive and the Fauna-Flora-Habitat Directive. They form part of the Natura 2000 European network of protected areas which is intended to preserve biological diversity in the member states of the European Union. They also have to comply with the provisions of the Water Framework Directive (WRRL).

The tidal stretch of the Weser is a busy waterway that plays a key role for industry, trade and the transport business – for example for the companies located in the port and logistics hub of Bremen/Bremerhaven, which directly and indirectly account for around 85,000 jobs in the region. Tourism, agriculture and fishing businesses beside the Weser also wish to protect their own interests.

The objective of the integrated management plan is to reconcile these conflicting demands so that different targets can be achieved on a co-ordinated basis. Another important aspect is to reduce the relatively long planning and approval processes. Working parties in both Bremen and Lower Saxony are developing concepts which will later be amalgamated to form one coherent approach.

The success of these efforts will depend on how well the different actors cooperate and the joint solutions they come up with. The crucial factor for bremenports is to ensure that port development is not obstructed. This also ties in with the strategy pursued by the European Union, which is aimed at making more intensive use of the sea, whilst satisfying the need for sustainability.
Valuable habitats are now being created for rare animals and plants on Grosse Luneplate in the south of Bremerhaven. The countryside in front of and behind the dyke enjoys special protection.

The mudflats in the bend of the river at Blexen and the sites inside and outside the dyke form part of the 4600-hectare Lower Weser European bird protection zone. Other areas of the Weser and Wadden Sea and the dyke foreland are included in the Lower Weser FFH site, which has an area of 4100 hectares.

Port ecologists and nature conservationists follow the – legally prescribed – objective of preserving these protected habitats and species. This is to be achieved by means of a so-called “ban on degradation” and by prescribing impact assessments for all plans and projects. A management and maintenance plan is also being developed for Luneplate in consultation with farmers, hunters, anglers and other users.

In its capacity as port management company, bremenports is responsible for the upkeep and development of these extensive substitute sites. Tasks which fall within the remit of the environment authority (European maintenance, monitoring and reporting obligations) are also integrated in the management and maintenance plan.
Ship emissions are a significant source of pollutants, especially as the quality of fuels is far lower than the standards which apply on land. Sulphur and carbon dioxide, nitrous oxides and soot particulates not only have a local impact, but also disperse over large areas, contributing to climate change and promoting the increase of nutrients in rivers and lakes as well as soil acidification.

Various regulations, such as Annex VI of the MARPOL Convention, are concerned with air pollution caused by shipping. The regulations in force for the North Sea and Baltic are stricter than in other sea territories, and specify that vessels have to use fuels with lower sulphur contents and special exhaust gas filter systems. The standards that apply when the ships are in port are even more stringent. As from 2010, the limit value for sulphur will be just 0.1 per cent (this will apply in the North Sea and Baltic as from 2015).

Another topic of debate amongst maritime experts is the supply of shore-to-ship power. This became the focus of attention owing to a recommendation issued by the EU Commission and as a result of pilot projects in ports in which exhaust gases from ships have a particularly adverse effect.

Shore-to-ship power supply gives rise to many questions:

- Legal problems (ships under foreign flags, questions of competence, liability and warranties, for example in case of power cuts or current surges)
- Cost effectiveness of plant and operations (ships with short lay times), apportionment of external costs (for instance health and occupational safety)
- Technical issues (lack of standards for power connections, different voltages and frequencies on board the vessels, constantly changing requirements)

Supplying the vessels with power from shore could reduce fuel consumption and lead to a reduction in emissions at the ports. Some ferry terminals and ro-ro ports lead the field in this respect and have established the necessary connections for modern vessels which repeatedly moor at the same berth. However, shore-to-ship power supply is not a reasonable alternative for quay facilities in tidal areas which are constantly used by different vessels and which have no fixed berth allocations. Each new project has to be examined on its own merits – a view that is also shared by the other North Range ports.

The authorities at Bremen’s ports are now considering how shore-to-ship power supply can be improved for inland waterway vessels. A new concept could make use of the existing shore current connections for tugs and port auxiliary services in Bremerhaven and for pleasure vessels in Bremen.
Shipowners and port operators repeatedly point out that ocean freight transport is a comparatively environment friendly alternative, a claim which is meanwhile acknowledged by the general public. However, ships still have to improve their carbon footprint, which is why new campaigns are called for to protect the climate and keep the oceans clean. The emission of pollutants from the combustion of heavy oil is still too high.

In 2008, the North Range ports of Le Havre, Antwerp, Rotterdam, Bremen/Bremerhaven and Hamburg decided to prepare an Environment Ship Index. The system is to be kept simple and transparent. The plans envisage documentation of the environment standard of a ship in the form of certification issued by an independent institute. The criteria are to be specified for a prescribed period of time so that ongoing developments can subsequently be taken into account.

The ports still have divergent ideas about how the Environment Ship Index is to be used. The aim is ultimately to reward those who use environment friendly vessels. The initiative attracted great attention at the World Ports Climate Conference (WPCC) in Rotterdam. If these efforts are successful, the results could be copied by other port locations and serve as international standards.

Relocation concepts for sand from the fairway and mooring basin

The objectives of Integrated Coastal Zone Management (ICZM) are to preserve the quality of the environment and avoid conflicts in the region. The sand which accumulates in the Weser fairway and the mooring basin in front of the quay in Bremerhaven plays a key role in that respect.

Huge suction dredgers with drag heads and powerful pumps go into action when the required water depths in the river or mooring basin have to be restored. The water and sand mixture is removed from the river bed and taken to dumping sites.

The target is to keep the sand inside the Weser estuary and dump it where it can support – or at least not hinder – construction work on the river. Unlike the silt from the harbours, the Weser sand does not contain any contaminants.

The experts are concerned with how the sandbanks off the Wursten coast are changing and how they can be protected. In recent years, there has been a marked reduction in those areas of Grosse Knechtsand which are not flooded at high tide.

The coastal research department has suggested rainbowing the dredged material onto the foreshore at Eversand. The current would later carry the material into the centre of the Wadden Sea where it would gradually accumulate to form new sandbanks, which could be used by seals and birds as resting places.
Inland shipping is an environment friendly transport alternative. In competition with rail and road, however, this transport sector lags behind. bremenports consequently drew up a master plan to investigate the potential of this transport mode and find out how Bremen’s ports could increase cargo throughput from inland waterway vessels. The plan was not purely a theoretical exercise on the drawing board, but was drawn up in consultation with shipowners, terminal operators and transport associations.

The port industry hopes that the Middle Weser upgrading project will be implemented swiftly. By 2012, the stretch of the river between Bremen and Minden will be enlarged so that it can be used by large self-propelled barges, attracting more freight onto Germany’s inland waterways.

When drawing up the master plan on behalf of the Senator for Economic Affairs and Ports, bremenports conducted thorough research into this subject. Are there enough berths for barges in Bremen and Bremerhaven? Where could new berths be provided if necessary? Amongst other things, the package of eleven potential measures presented by the port management company revealed where the infrastructure for this segment could be put to better use.

The master plan concludes that barges could be more involved in automotive and waste disposal logistics. Moreover, the barge owners could tap into a new business segment by offering the transport of components for the wind power industry. Establishing terminal networks in the hinterland would enable better integration in the seaports’ logistics concepts.

On-board treatment of ballast water

20 million tonnes of water from ships’ ballast tanks flow into the North Sea and Baltic year in, year out. This water introduces creatures into our climes that have no business being here: small fish, crabs, shells and micro-organisms which come from wherever the ship took the ballast water on board. Often, they have travelled halfway around the world. Introduced into other eco-systems, however, these intruders canoust indigenous species and cause great damage.

Some years ago, the International Maritime Organization adopted a Ballast Water Convention which states that treatment plant for ballast water is to be mandatory on all vessels as from 2016. However, the Convention cannot enter into force until it has been ratified by 30 nations.

ttz, a provider of research services in Bremerhaven, has developed an on-board system which, according to the experts, can clean ballast water reliably and inexpensively. The project participants have designed an electro-chemical generator which is powered by seawater. It disinfects the water using CME technology (cell membrane electrolysis). The combination of modern filter and UV technology has yielded highly promising results in tests, according to ttz, and the product is expected to perform well in the market, as it offers an environment friendly alternative to methods which use disinfecting chemicals such as chlorine.
Business and climate change – "NordWest 2050" identifies strategies

"NordWest 2050" is the name of a project coordinated by the Research Centre for Sustainability Studies (artec) at Bremen University. "The target is to develop innovations which help the region to cope better with the effects of climate change," reports Uwe von Bargen, Environment Director at bremenports. "The initiative is aimed primarily at the key players in the coast industry," he explains, "for instance at the port and logistics companies, but is also interesting for other sectors such as the energy, food and beverages industries."

bremenports is also involved in the project, contributing its experience in the planning of port facilities. The project investigates the effects of climate change and rising sea levels on the maritime logistics centres at the coast, how susceptible trade and industry is to these changes and the investments that could become necessary owing to changes in the world climate.

The project has both economic and ecological aspects and the findings are to be taken into account in a regional development plan. Issues such as better hinterland connections for the ports in the Bremen-Oldeburg metropolitan region are just as important as plans to increase the share of goods processed locally. It is important that recognised environmental standards are not jeopardised by escalating competition between the different locations.
Wind power adds new impetus to Bremerhaven’s economy

A fresh breeze has blown into Bremerhaven’s economy as a new industry strengthens the seaport’s industrial base. The large factory buildings that are appearing at the south of Fischereihafen are symbolic of this new optimistic mood. This is where the wind power industry is embarking on a flourishing future and where hundreds of new jobs already clearly indicate the shape of things to come.

Companies located around the deep-water harbour, such as Multibrid Areva, REpower Systems, PowerBlades and Weserwind Offshore Construction Georgsmarienhütte, produce nacelles, rotor blades, tower segments and foundation elements for the huge wind farms that will generate electricity at sea. Bremerhaven is pinning its hopes on these wind power companies and consequently offers them good conditions. The port is evolving into the leading centre of excellence for this industry.

This positive situation is also thanks to Bremerhaven/Bremen Wind Energy Agency, which has a network of more than 170 member companies. Bremerhaven University of Applied Sciences offers a degree course in wind energy and other further education institutes also promote the development of this sector with courses designed to meet the requirements of the companies in this field.

In June 2009, a new heavy cargo terminal was inaugurated at Labradorkaje in Fischereihafen, where components can be loaded and discharged regardless of the tide. However, the huge chamber of Fischereihafen lock is still too narrow to cope with some elements. An interesting alternative would be to build a new harbour directly on the Weser.

That project would give Bremerhaven a great opportunity to assume the role of key national port for offshore wind energy. Ralf Nagel, Senator for Economic Affairs and Ports, approves of the plans: “We have to be strong enough to take the next development step,” comments the Chairman of bremenports Supervisory Board, and adds, “It goes without saying that adequate compensation would be made for the environmental impact caused by construction of the new harbour.”
Bremen supports the development of an EU Integrated Maritime Policy

IMO defines standards for marine environment protection

Clear-cut rules are essential to avoid pollution of the oceans. The International Maritime Organization (IMO) set up by the United Nations Marine Environment Protection Committee (MEPC) is closely concerned with the ecological effects of global shipping.

The MARPOL Convention was initially adopted around 35 years ago and has since been fleshed out with further specific regulations. These are generally applicable as internationally recognised regulations and standards (Annexes I and II) or alternatively have to be accepted by the Contracting States (Annexes III to VI). For example, the Convention stipulates whether and under what circumstances oil residue, chemicals, waste water from shipping and household waste may be discharged into the sea. Ships are obliged to keep an oil log book of oil residue, a cargo log for chemicals and a waste log for shipboard waste.

The Convention prohibits the discharge of oily waste or sludge resulting from the use of heavy oil in the engine room. Oily bilge water and cargo residue from tankers may be discharged into the sea only in extremely small quantities and subject to extremely stringent conditions. Oily residues and residual quantities from chemical tankers have to be handed over to collecting points at the port.

The treatment of shipboard waste is also clearly specified: in special areas such as the North Sea and Baltic, it must not be thrown overboard. There are also provisions governing technical standards, such as the ship’s construction.

The port authorities – in the Federal Land of Bremen this is the public port authority “Hansestadt Bremisches Hafenamt” – provide professional support in enforcing the MARPOL standards. They are authorised to conduct inspections and impose penalties in case of infringements.

To reduce emissions even further, the IMO has drawn up a design index for shipbuilding. It is also planning the introduction of management concepts for ship command and a control index to monitor fuel consumption by larger vessels in the interests of improving energy efficiency.
Ecology as corporate target

Responsible treatment of the environment and our natural resources is an essential criterion for intelligent business action. bremenports endorses that view and has therefore named environment protection as one of its corporate targets.

The course was already set years ago, when the demands of the Impact Mitigation Regulation and the Environment Impact Assessment influenced the planning of Container Terminal III in Bremerhaven. That was the first time that the effects on man, nature and the landscape, as well as the impact on soil, water, air, climate, cultural and material assets were comprehensively identified, assessed and – wherever possible – avoided. Compensation had to be made for any unavoidable adverse impact.

Back in 1993, an independent environment management department was set up at the public port authority, Hansestadt Bremerhavens Hafenamt, which was responsible at that time. Over the course of the years, that department has steadily expanded. The specialists in Bremen and Bremerhaven are now no longer concerned only with ecological compensation for construction projects, but also with the environmental aspects of dredging the mooring basins and the disposal of silt from the harbours.

After the formation of bremenports GmbH & Co. KG, the ecological expertise which had been accumulated over the years was also made available to external customers from 2002 onwards and an independent business unit gradually developed.

In March 2008, the department was divided into separate management and operational sectors. As Environment Director of bremenports, Uwe von Bargen reports directly to the Board of Management.
Just like any other business enterprise, the ports also have to consider the question of how best to organise their environment management activities. It is far more difficult to structure environment management at maritime locations like Bremen and Bremerhaven, which not only extend over a wide geographical area, but also have a complex division of labour, than it is at smaller ports.

PERS (Port Environmental Review System), the certification system developed by the Ecoports Foundation, is tailored to the needs of port locations and can serve as a basis for certification pursuant to EMAS or ISO 14001.

In spring 2008, the port of Rotterdam completed the above certification procedure. The ports of Bremen and Bremerhaven are currently preparing to do so. As this involves many different actors, from the various business enterprises in the maritime logistics sector right through to the harbour master, the Senator for Economic Affairs and Ports has assumed responsibility for coordination of the overall process.

Certification of port-related environment management

Anyone who wants to know the ecological status of the ports and the companies that work there needs access to the relevant information. In future, bremenports plans to publish annual environment and sustainability reports. These will be available to the general public and will be distributed to political parties, professional associations and representatives of other ports.

The environment reports will focus on marine nature conservation and ecologically compatible action. The sustainability reports will illuminate the aspects of ecology, economy and social affairs. The reports will also analyse whether the ports’ own activities satisfy the current requirements and whether they are designed to ensure that they do not restrict the scope of future generations.

Reports prepared by bremenports to date have dealt with individual projects and been published as required. Nature and the environment have long since been a central element of the port management company’s public relations work and topics such as ecological compensation for port construction projects have repeatedly been covered by the media.

Online information about greenports Bremen/Bremerhaven

bremenports is currently preparing a website about greenports Bremen/Bremerhaven which will deal specifically with marine environment protection at the ports and business enterprises.
The greenports brochure is printed on ECF paper produced from recycled timber/fibres from sustainably managed forests. The origins are monitored and certified by an independent third party. The printing company is certified under the Forest Stewardship Council (FSC) scheme.
Nature reserve
Areas of outstanding natural beauty
Natura 2000 sites
Port-related substitute sites
Port areas
Boundary Bremen – Lower Saxony

Bremen

Lower Saxony

Bremerhaven

Bremen
Sustainable Management – Successful Performance

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