JADEWESERPORT
WILHELMSHAVEN

PERS
–
Environmental Report 2017

JadeWeserPort Realisierungs GmbH & Co. KG (JWPR)

ESPO EUROPEAN SEA PORTS ORGANISATION ASBL / VZW
ORGANISATION DES PORTS MARITIMES EUROPEENS ASBL / VZW

ECOPORTS

Foreword

Dear Reader,

Holger Banik, Managing Director

We would like to present you with the second PERS Environmental Report for the JadeWeserPort Wilhelmshaven. In it, we continue our ongoing environmental reporting and inform you about the current, sustainable developments and progress at the JadeWeserPort.

We are happy to report an improved cargo handling development in our port for the operating years 2015 and 2016, with an increase in ships' traffic of 12% and 36% in rail traffic. Increasingly, new cargo carriers are making the JadeWeserPort a stop in their liner rotation. This goes to show that more and more ship owners are convinced about the nautical advantages of the port. And as expected, the increased ship volume did create a higher energy consumption. But relative to the increased number of ships that are processed in our port, we were still able to show environmental success. In comparison, between 2015 and 2016, the energy output per processed ship was decreased by 1.2% here at the JadeWeserPort, and we were able to improve the CO_2 output of the company's vehicle fleet by lowering it by 4.35% per ship's call.

One crucial focal point of our environmental management is the topic of energy monitoring. For this, we are using a software, which was developed by JadeWeserPort in cooperation with Niedersachsen Ports. The software is geared towards our particular port requirements and port structures and will in due course play an even stronger role in helping us manage our energy consumption.

Environmental protection remains a key factor for the sustainable alignment of the port. This topic is of utmost importance now and in the future and plays a key role as part of the management functions in our port company.

We hope you will enjoy reading this report.

Holger Banik
CEO

Silke Lüders
Environmental coordinator

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Schedule of Abbreviations

CO_2	Carbon Dioxide
DGPS	Differential Global Positioning System
DIN	Deutsches Institut für Normung (German Institute for Standardization)
DLZ	Dienstleistungszentrum (Services Center)
DLR	Deutsches Zentrum für Luft- und Raumfahrt e.V. (German Center for Aeronautics and Space Travel)
EMAS	Eco-Management and Audit Scheme
ESI	Environmental Ship Index
ESPO	European Sea Ports Organization
EU	European Union
EUROGATE	EUROGATE Container Terminal Wilhelmshaven GmbH & Co. KGaA, KG
GmbH	Limited Liability Company
GVZ	Güterverkehrszentrum (Cargo Transport Center)
IAPH	International Association of Ports and Harbors
IMO	International Maritime Organization
ISO	International Organization for Standardization
ISPS	International Ship and Port Facility Security Code
JWPM	Container Terminal Wilhelmshaven JadeWeserPort-Marketing GmbH & Co. KG
JWPR	JadeWeserPort Realisierungs GmbH & Co. KG
KG	Kommanditgesellschaft (Limited Partnership)
KV	Kombinierter Verkehr (Multimodal Transport)
kWh	Kilowatt Hour
LAT	lowest astronomical tide
LED	light-emitting diode (Light Source)
LNG	Liquefied Natural Gas
MThw	Mean High Tide
msl	Mean Sea Level
NOx	Nitrogen Oxide(s)
OPS	Onshore Power Supply
PERS	Port Environmental Review System
PO	Port Office
SECA	Sulphur Emission Control Area
SMART SC	Smart Supply Chain
SOx	Sulfur Oxide(s)
tkm	Ton Kilometers
TSC	Truck Service Center
ULCS	Ultra Large Container Ships
WPCI	World Ports Climate Initiative

1 Portrait of the JadeWeserPort

Diagram 1: OOCL Hong Kong

The JadeWeserPort in Wilhelmshaven is one of the largest infrastructure projects along the coastline of Northern Germany in recent years. Planned and built to meet the demands of a growing global trade, the port location JadeWeserPort attracts industrial, commercial, and service companies alike, due to its superior benefits and perspectives. Germany's only deepwater port provides optimal conditions for the largest container ships in the world and - with a surface area potential of 115 hectares - it offers ideal conditions for industry, commerce, logistics and service providers to open shop here.

Under the name JadeWeserPort, a tide-independent Container Port and a Güterverkehrszentrum (Cargo Transport Center) with an excellent hinterland connection was constructed in Wilhelmshaven. By now, the JadeWeserPort has grown to become Germany's third largest port.

With its short routes for ships, rail, and truck, the JadeWeserPort features an economic, time-saving infrastructure, which meets the existing and future demands of container ships through its trimodality on the one hand, and on the other hand contributes to the mandate of reducing emissions.

And even towards the water, negative economic and environmental impacts can be kept at a minimum, due to the great accessibility of the JadeWeserPort. The great water depth of 18 meters ensures that the JadeWeserPort can be utilized tide independently as final port of call or as originating port by ship operators running today's largest container vessels and generations of container vessel to come, which, when fully laden, can only be handled by a handful of European ports so far.

- Germany's third largest port
- Water depth of 18 meters
- Turn-around area of 700 meters
- Direct link-up to the European road and rail grid
- Tide independent port operation
- Short approach travel

Diagram 2: JadeWeserPort's Advantages

Another basis for the high-performance transport logistics is the dual track rail hookup of the JadeWeserPort to the rail grid of the Deutsche Bahn.

1.1 The Structure of the JadeWeserPort

The port is under the administration of the JadeWeserPort Realisierungs GmbH & Co. KG (hereafter referred to as "JWPR") with their place of business in Wilhelmshaven. Aside from that, there is the Container Terminal Wilhelmshaven JadeWeserPort-Marketing GmbH & Co. KG (hereafter referred to as "JWPM"), which, as a 100% subsidiary of the State of Niedersachsen, is responsible for the marketing and the management of the industrial and logistics areas located inside the Güterverkehrszentrum. The port railroad and the Truck Service Center (TSC) are important performance assets of the Güterverkehrszentrum (GVZ/Cargo Transport Center) and, together with the surface areas of the Güterverkehrszentrum and other real estate of JWPM, are managed by JWPR within the realm of the Contract of Agency.

The Container Terminal is operated by EUROGATE Container Terminal Wilhelmshaven GmbH & Co. KG (hereafter referred to as "EUROGATE").

JWPR is the entity responsible for the operation of the port infrastructure and its shares are held by the States of Niedersachsen at 50.1%, and Bremen at 49.9%.

As port operator of the JadeWeserPort, JWPR takes on the typical tasks of a port infrastructure company. This entails, among other things, the levying of port usage fees, the management of the own surfaces, call for bids and award of concessions for maritime services, maintenance and monitoring of the port facilities including the nautical measuring devices, and the drafting of a ships' waste management plan. In addition, the field of tasks encompasses the rulemaking and enforcement of the rules of use in the shape of a port usage regulation, general terms of use, and an alarm and emergency plan. In the course of implementing the approval of the plans, JWPR has also established a port management plan, which delineates the port management from the authorities' standpoint and which also ensures a safe and functioning port operation.

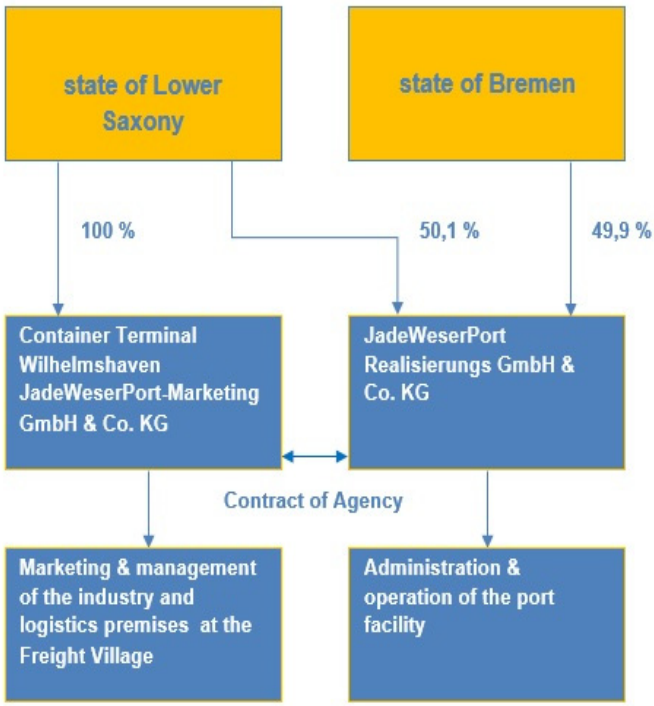


Diagram 3: Ownership Ratio of the Shareholders

1.2 Description of the Port Areas and Facilities

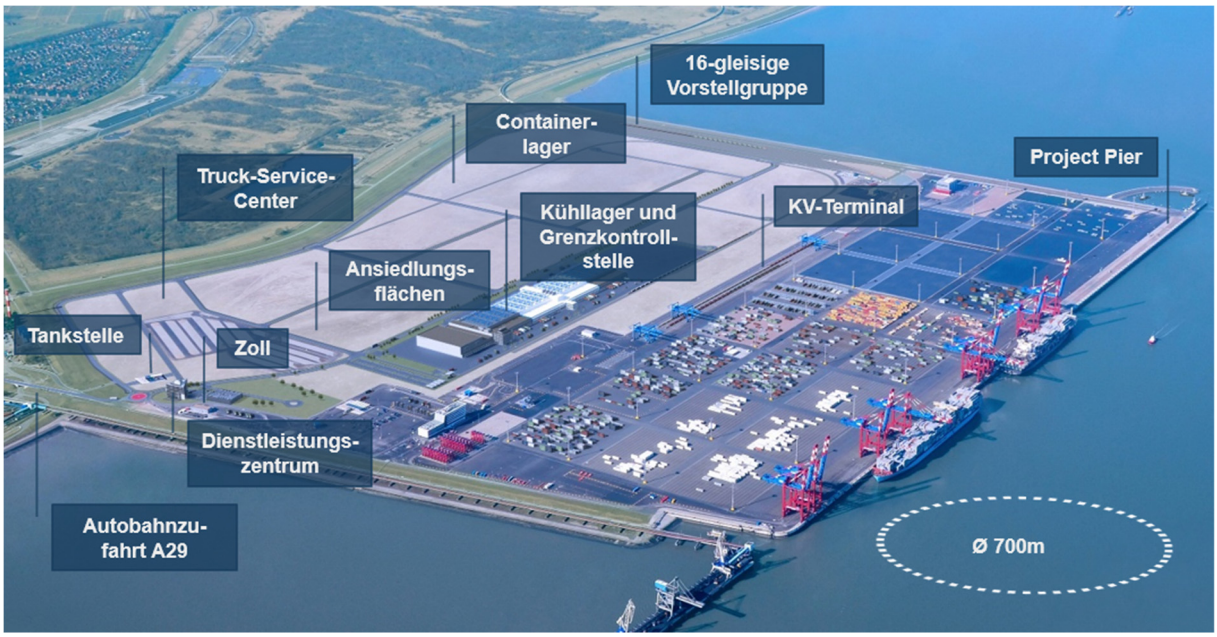
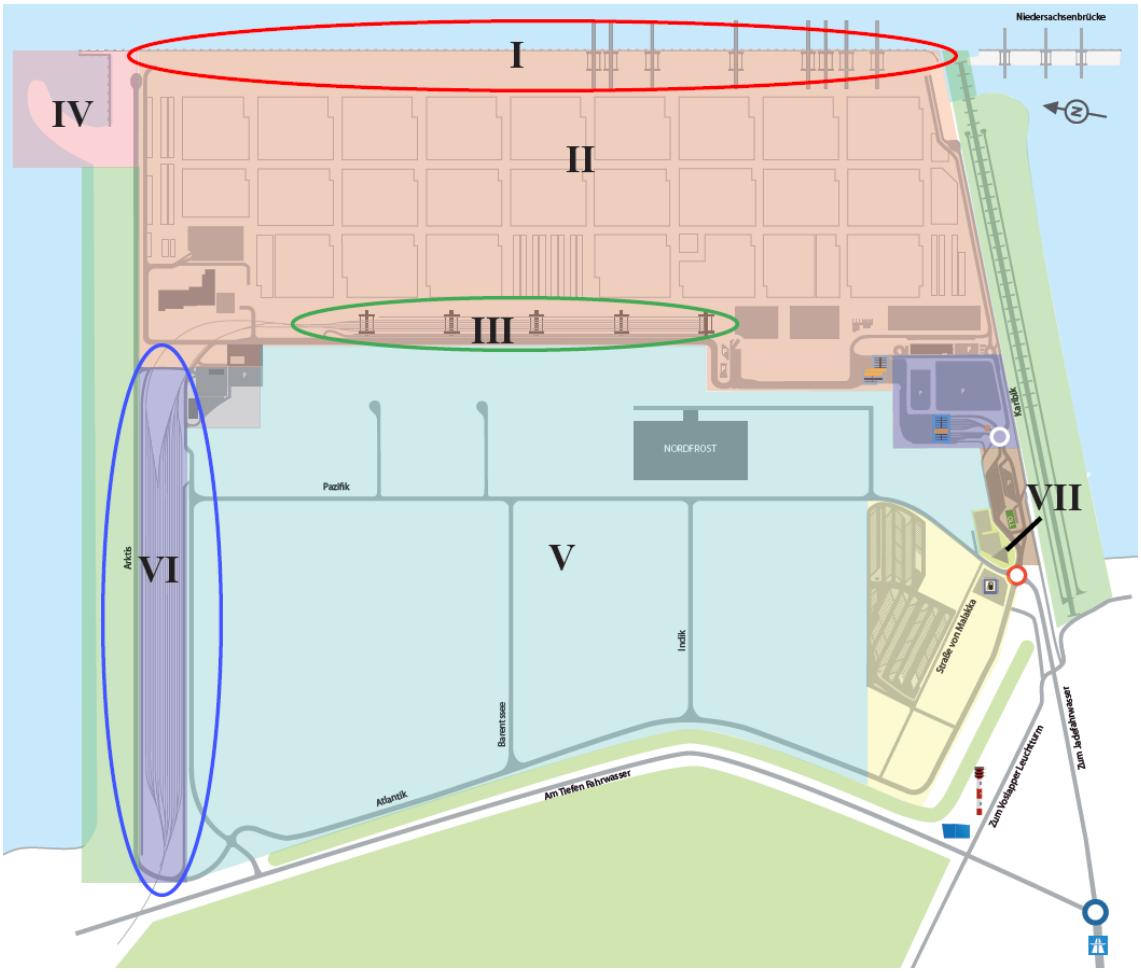


Diagram 4: Areas of JadeWeserPort

The port facilities are some of the world's most modern ones. Due to the excellent, traffic light-free connection to the freeway Autobahn 29, to the railroad infrastructure in the north of the terminal, and owing to the fact that the JWP is Germany's only deep water port, the oncarriage of containers, be it by land or sea, knows practically no boundaries. The different sections of the port ensure an efficient and friction-free operation.

Diagram 5 depicts the entire JadeWeserPort with a total area of 360 hectares of the JadeWeserPort, which still has 115 hectares of the total area within the GVZ available, which is plenty of room for additional business models.

Diagram 5: Overview of the Port Area incl. Güterverkehrszentrum (Cargo Transport Center)



I **Quay:** With a length of 1,725 meters, the quay can process four large container vessels, or a max. total of twelve feeder vessels with the help of now eight (in the final stage of construction, this number will be 16) container gantry cranes simultaneously.

II **Terminal Area**: The terminal area, where the containers are transshipped and stored, is immediately adjacent to the quay and is operated by EUROGATE.

III **Multi-Modal Facility:** For the transshipment by rail there is also a cargo handling facility at the western edge of the terminal, comprising six rail tracks and five gantry cranes for multimodal transport (KV Facility).

IV **Service Port and Project Pier:** The Service Port is located at the northern end of the port and offers multiple berths for watercrafts of nautical service providers as well as a 65 meter long Project Pier, which is designed to handle large and heavy loads and features a max. transport load capacity of 2,000 metric tons and a transshipment area of 1,200 m^2.

V **Güterverkehrszentrum:** Immediately bordering on the Container Terminal there is the trimodal Güterverkehrszentrum (GVZ/Cargo Transport Center) of the JadeWeserPort. In addition to a Truck Service Center and the Port Services Center, you will also find the 16-track staging/shunting yard and the rail Switch Control Building there.

VI **Railcar Staging/Shunting Yard:** The 16-track staging/shunting yard takes on a buffering function between the container port and the hinterland. Container trains up to the max. permissible train length of a completed container cargo train can be assembled here and picked up for their trip. The Switch Control Building is where the entire track and signaling technology is controlled.

VII **Port Services Center:** This is the primary office of JWP's administration, the Port Office and the Port Captain, among others.

2 The Environmental Strategy of JadeWeserPort

With their sustainability strategy, the European Union charts a clear and unmistakable environmental policy course. There are directives packages and standards, e.g. for increasing the energy efficiency or for the reduction of emissions, which outline a definite scope of action, which must be followed. In order to meet these requirements and to support the global implementation of goals, the JadeWeserPort has derived their own environmental goals from the EU's four environmental policy focal points below:

- **Climate Protection**
- **Nature and Biological Diversity**
- **Environment and Health**
- **Natural Resources and Wastes**

Devising the environmental goals and their active implementation occurs within JWPR's own realm of influence throughout every corporate area. For JadeWeserPort sustainability means harmonizing ecological, economic and social interests. During the course of this environmental report, the company's own environmental goals will be discussed in detail. The below Policy Statement is meant as a first orientation in this context:

Policy Statement of JadeWeserPort Realisierungs GmbH & Co. KG

We, the JadeWeserPort Realisierungs GmbH & Co. KG (JWPRs), commit to avoiding damage to the environment and to act in any and all areas of the company guided by the principle of sustainability. With this in mind, our environmental policies have already been implemented in all business areas of our company and are practiced by our employees in their respective job fields.

As a port operator, JadeWeserPort Realisierungs GmbH & Co. KG's primary focus is on the port management and on the management of planning and development. On behalf of the Container Terminal Wilhelmshaven JadeWeserPort-Marketing GmbH & Co. KG we are performing business services, including, but not limited to the implementation of the environmental compensation measures and the operational activity areas rail, Truck Service Center, and Güterverkehrszentrum (GVZ/Cargo Transport Center).

In order to minimize the burden on the environment and to improve the quality of the environment, we take the following steps:

1. Efficient utilization of our local advantages, such as the short approach travel from sea and the direct and uncomplicated hinterland connection

2. Introduction of environmental controlling to gain information, so that we can continually improve the environmental protection and increase the energy efficiency

3. Dedication to the development of innovative and environmentally friendly solutions in the maritime navigation industry, with a focus on saving resources and energy, and on reducing emissions

4. Avoidance of wastes and practicing conscientious handling of generated wastes, which is governed by our ships waste management plan

5. Informing about and adhering to the latest and most relevant environmental laws and standards and taking steps to maintain such compliance and putting an emphasis on making the protection of nature a key indicator for the operation of the port and its development.

6. Ensuring a high security standard through a Port Office, which is manned 24/7, and though an alarm and emergency plan to minimize the risk of an incident and its potential consequences for the environment, but also to ensure safe port operation; proper maintenance of the port facilities for the same, aforementioned reasons

7. Publication of an Environmental Report, which transparently documents the long-term progress and developments of the port with the help of designated defined performance indicators, and updating of this report and the information contained therein on a regular basis

8. Expansion and solidification of the networks with cooperating partners, such as Niedersachsen Ports GmbH & GmbH & Co. KG and bremenports GmbH & Co. KG

9. Ensuring the availability of necessary resources for the realization of this Policy Statement.

Furthermore, JadeWeserPort is dedicated to the implementation and the ongoing development of the environmental strategy with subsequent environmental goals, focusing on emission reduction and the management of green spaces, which was conceptualized in cooperation with Niedersachsen Ports GmbH & Co. KG (NPorts). NPorts manages the state-owned Seaports of Niedersachsen.

Table 1: Environmental Goals of the JadeWeserPort

Business area	Goal	Implementation
Operation	Reduction of CO2-emissions	ESI, electrical connections for reefers (refrig. containers), prep work for LNG, Onshore Power Supply (OPS), vehicle fleet, IT solutions
Planning and Development	Planning and operation of new and existing infrastructure facilities, while keeping ecological aspects in mind	Avoidance and reduction of traffic routes, efficient utilization of the infrastructure
	Management of green spaces	Long-term planning of coherence and compensation measures
Cooperation	Collaboration with stakeholders of the port economy for environmental protection	Consideration of ecological aspects during the cooperation with partners
Marketing	Environmental protection inside and outside of the company	Communicating the environmental protection measures with internal and external stakeholders in the form of environmental reports, brochures, and employee training
Finance	Environmental controlling	Generating input/output balance sheets to obtain information for better environmental protection.

Holger Banik
CEO

Silke Lüders
Environmental coordinator

Beyond that, the continued certification of the port pursuant to the Environmental Management System PERS is part of our Environmental Strategy. One of the aspects of the certification is to investigate the ecological effects of the JadeWeserPort and to reduce the environmental impact through environmental management and thus obtain a measuring basis for reaching the environmental goals. Here, the identification of substantial environmental aspects is a key step to discovering the impact on the environment and to formulate environmental goals and solutions. Of utmost importance at the JadeWeserPort are the following environmental aspects, which are included as an integral part of the port's environmental strategy:

- **Emission of Airborne Pollutants**
- **Water Emission and Water Quality**
- **Waste Management**
- **Soil Contamination**
- **Effects on Habitats and Biotopes**
- **Noise Emission**

3 Environmental Measures Within the Port

The aspects of environmental protection and sustainable planning were key factors early on in the planning, construction and operation stages of the JadeWeserPort. And even the port's current measures contribute to the protection of the climate. We will showcase a few examples hereafter.

3.1 Streamlining the Port Processes through the Use of Software

The worldwide growing volume of cargo also requires an onshore streamlining within the supply chain. Each process within a port operation and within the container transport must be planned and monitored thoroughly to guarantee a friction-free flow and to warrant an uncomplicated and swift oncarriage of the cargo volumes, even under tight deadlines and time slots. Software can be a valuable asset when it comes to streamlining logistics chains and to help reduce greenhouse gases.

HASY

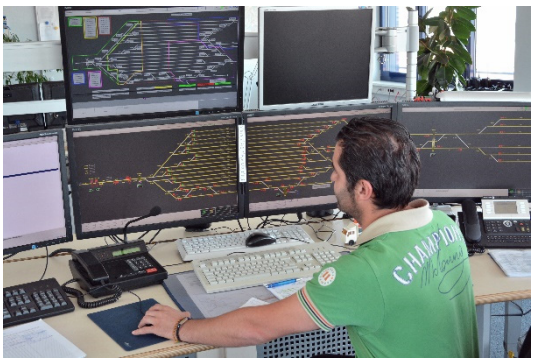


Diagram 6: Interlocking control station

The Hafenbahnsystem (Port Railroad System) HASY allows for a streamlined timing of the container trains by the Switch Control Center. The inbound registration of the trains occurs exclusively on an electronic basis, thus ensuring a swift and friction-free processing through analysis of any transport and billing-related data.

SMART SC

In order to improve the capacity utilization of the cargo containments and modes of transportation as well as the capacity of the terminal, a holistic solution for the processing of electronic communication processes was planned and implemented in cooperation with the Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) at the JadeWeserPort. The so-called SMART Supply Chain streamlines the planning processes along the entire transportation chain.

In doing so, the system not only documents all processes, but also controls and connects them. The constant reconciling of target-performance data enables us to immediately make recommendations for action to ensure an ideal flow of goods, to prevent congestions and to improve the efficiency of cargo handling overall.

Diagram 7: DLZ with a truck in front of it, source: Kurierdienst Löffler

The system connects all the actors within the logistics chain and ensures that any necessary information they need is available anytime and in an updated manner. This enables these stakeholders to react to

changes in the processes without losing any valuable time due to missing information. Consignees are able to make new arrangements on short notice. For truck drivers, this means that they can access the order and any data associated with it via a mobile app on their smart phones at any given time.

Not only is this increased efficiency more economical, but it also brings about benefits for the environment, because unnecessary trips, detours, traffic jams and other delays are avoided or at least kept to a minimum, and so is the CO_2 output, which goes along with these traffic problems.

3.2 Climate Protection Through Minimizing Energy Consumptions

In order to successfully root sustainability within the company, great energy management is indispensable. Consumptions are monitored, energy saving potentials are gauged, and - wherever feasible - intelligent solutions are deployed. And when it's time for making purchases or investments in a new infrastructure or superstructure, a particular focus is put on sustainability. This section will showcase examples for implemented energy efficiency measures.

Table 2: Overall Energy Consumption

	2015	2016	Change
Number of Ships' Calls	387	491	+26.87%
Total Energy Consumption in kWh	641,267	799,006	+24.60%
CO_2 Total (in metric tons)	335.50	420.42	+25.31%
Energy in kWh per Ship's Call	1,657	1,627	-1.80%
CO_2 (in metric tons) per Ship's Call	0.87	0.86	-1.15%

Sustainability in IT

Whenever new equipment is purchased, energy efficiency is one major concern. We put a strong emphasis on great environmental standards when it comes to computer screens and printers. Most of the devices we are running are "Energy Star"-rated. These devices use about 10% less power than any standard model. We were also able to cut back on our use of hardware by utilizing virtual servers.

Most work stations no longer feature individual printers. Those were replaced by network printers and multi-functional devices. This step improves the energy balance and saves costs and space. In addition, a state-of-the-art printer concept ensures reduced paper and toner consumption.

Mobility

The JadeWeserPort is banking on car-sharing. The company's fleet vehicles are available to any employee and may be reserved online. The vehicles are used for travel to appointments at customers and service providers, and for other purposes.

Mobility is very important for the team, but at the same time, we do not lose sight of the environmental factor. There is a conjoint effort to avoid travel by individuals and to run the company vehicles at full capacity, whenever possible. Another important aspect is the fact that the fleet cars were purchased with environmental aspects in mind and they feature a reduced CO_2 output and fuel consumption.

Table 3: The Fleet's CO_2 Consumption (Output) in Metric Tons

	2015	2016	Change
Driven Kilometers	58,424	65,733	+12.51%
CO_2 Output (t CO_2)	9.06	10.57	+16.67%
CO_2 (t CO2) / Number of Ships Processed	0.023	0.022	-4.35%

Climate-friendly Lighting

The lighting of the Güterverkehrszentrum is made possible by particularly energy saving LED-technology, which on the one hand offers much longer life cycles than the conventional high-pressure sodium vapor lamps and which on the other hand uses much less energy, therefore reducing consumption of electrical power by simple means. For JadeWeserPort, another argument for the use of LEDs was the great recycling ratio of the lamps, which can do without harmful substances like mercury or lead, which makes them easy to dispose of. And every new project is planned with LED-technology right from the start.

Energy Monitoring System

In order to capture the flow of energy within the port and to gauge the potential for streamlining, JadeWeserPort - in collaboration with Niedersachsen Ports - has begun to assemble and maintain a database, which is in tune with the needs of a port infrastructure company and which captures the individual consumers on a very detailed level. Its setup is logical and it allows for a simple and structured capturing of the energy data. Thanks to the software and the algorithms contained therein, all the user has to do is capture and input the energy data. Any other data are automatically calculated and documented by the software.

Both the input data and the data that was generated by the software are stored in a central database. The centralized data storage on an SQL database server further ensures that multiple users can work with the system at the same time.

The very detailed structure ensures that almost all of the consumers are captured. This takes into account real estate, mobile work equipment, heating facilities, vehicles, port infrastructure facilities (rail structures, pumping facilities, sea locks, etc.) and the port superstructure (cranes, lighting facilities, etc.). The energy database captures any energy sources that are deployed at the JadeWeserPort. This covers electric power, natural gas, and diesel. By documenting this with an exact address, images of the locations, facilities and meters, each consumer is always identifiable.

Through regular input of the incoming invoices for each energy consumer and of the outgoing invoices, we are able to constantly monitor the energy consumptions, compare them with the standard values and take the appropriate measures, if something is way out of line.

Advantages of Data Capturing:

- Errors can be caught much quicker
- Any consumption is presented transparently and concisely
- Previous year data allow for a quick comparison
- Consumptions can be managed in a focused fashion
- The ideal energy efficiency measures can be deducted

Diagram 8: Energy Monitoring System - Example Overview Energy Portal

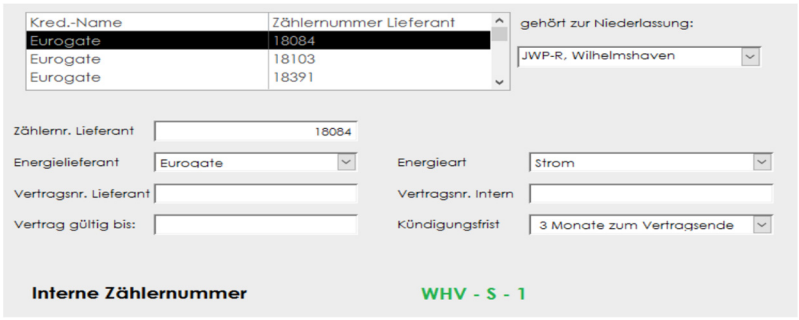


Diagram 9: Energy Monitoring System - Example Assigning of Internal Numbers for Meters

3.3 Environmentally Friendly Garbage Disposal of Ships' Wastes

Incoming ships are, subject to JadeWeserPort General Terms of Use, required to pay a waste disposal lumpsum. Only when they actually dispose of their waste via the Port Receptacle Facilities do they receive a pro-rata refund of their waste disposal lumpsum upon request. This is JadeWeserPort way of giving an incentive to the ships, not to just dump the ships' waste on the open ocean, but to hand it over to a certified and professional company at the port.

The removal must be reported at port and happens under supervision of the authorities. The local removal and recycling companies in Wilhelmshaven and the surrounding areas have sufficient capacities in form of tank trucks, containers and other receptacle facilities to accept ships' wastes.

Ships' wastes pursuant to MARPOL Annex I (oil), are typically received shoreside by a tank truck or seaside by specialized vessel and disposed of in an orderly fashion. Ships' wastes pursuant to MARPOL Annex V (e.g. household trash) are typically picked up from the ship through a container service.

The ships' waste management plan is strictly monitored and is redrafted by JadeWeserPort every two years. In 2015 5.94 tons of waste were handed in at the JadeWeserPort and in the following year this number was 0.84 tons.

3.4 Incentives Towards Customers for the Reduction of Air and Ocean Pollution

At the JadeWeserPort, the responsibility towards the environment in view of the growing container port is practiced by supporting the ships' owners in their efforts to reduce the ships' emissions. This will be explained in detail hereafter.

Discount on Harbor Dues for Environmentally Friendly Ships

In order to improve the ecological balance sheet of maritime shipping, new initiatives for the protection of the climate and the preservation of cleanliness of the oceans are in demand, because the pollution from burning heavy oils is still much too high.

Since the startup of operations in 2012, the JadeWeserPort has been granting an ESI (Environmental Ship Index) discount for ships with particularly low-emission. The index informs about the environmental performance of ships in terms of air polluting emissions (NOx and SOx) and CO□. Ports and other nautical service providers worldwide can call up the index for rewarding vessels and in doing so, they contribute to the sustainability in maritime shipping.

ESI determines, which ships show better emission values than required by the IMO (International Maritime Organization) for statutory limits for nitrogen oxides and sulfur oxides. The rating (ESI points) is then assigned by the determined values.

This way, 5 ships received a 5% discount on the harbor dues in 2015 and in the following year that number increased to 35 ships (see Diagram 10).

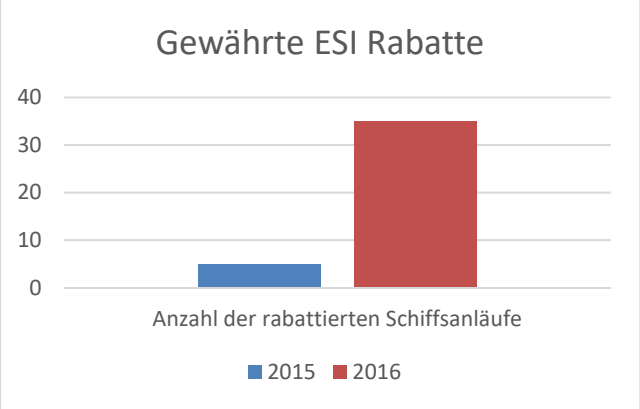


Diagram 10: Granted ESI Discounts

Discounts for Environmentally Friendly Trains

The train only takes a few hours to reach the most populated regions of Germany, for example to North Rhine-Westphalia or into the neighboring European countries. Particularly eco-friendly trains enjoy discounts on the use of the infrastructure and this is another way, in which we are contributing to the sustainability and climate protection. Aside from a discount for diesel locomotives with exhaust filters, trains equipped with composite material brakes (so-called 'whisper brakes') also enjoy a reduced rate.

Liquefied Natural Gas (LNG)

Given the background of making maritime navigation more environmentally friendly, LNG plays an important role, since through the use of LNG, compared to Diesel, the exhaust output of nitrogen oxide can be reduced by almost 90% and the carbon dioxide output by up to 20%. There are almost no sulfur dioxide or fine particulate emissions when LNG is used as fuel.

The JadeWeserPort supports an initiative of the WPCI, which exchanges and develops information and gives concrete examples for the provision of LNG in ports (www.lngbunkering.org).

In addition, the JadeWeserPort is a member in the LNG-workgroup at the Maritimes Kompetenzzentrum (Maritime Competence Center) in Leer. On another note, a study in the summer of 2013 had already analyzed the possibilities of refueling (bunkering) of ships with LNG in the Seaport of Wilhelmshaven. It is expected that on a global scale the fleet of LNG-operated ships will increase to 1,500. However, the refueling of ships with LNG requires a special infrastructure, which many ports are still lacking.

In cooperation with other ports, the JadeWeserPort is evaluating, which contribution can be made for the construction of an infrastructure for the loading of LNG-vessels at each location by the individual port operator.

Onshore Power Supply - OPS

Feeding onshore power into the board grid can eliminate the emission of air pollutants and noise, and the output of carbon dioxide can be reduced. On the quay and on board, electrical connectors and transformers must be installed, which will provide power with the voltages and frequencies required throughout the ship's grid.

From the port's perspective, subsidizing onshore power to reduce the impact from emissions can be a good decision. The effectiveness of a certain emission reduction had already been researched in Long Beach. From 15 characteristic ships' types, the feasibility for onshore power supply was deemed as effective for five of them – with a cruise ship in the lead, followed by a reefer vessel, a reefer container vessel, a container ship and a specialty tanker. Things these ships had in common were the clearly above average power consumption, longer port lay times (when viewing the total number of calls), and a relatively high frequency of port calls, which made these types of ships ideal candidates for the use of onshore power.

Currently, the container vessels in Europe are not yet equipped to accept onshore power. However at the JadeWeserPort all necessary planning steps were put in place and preparatory construction measures were undertaken so that shore power can be made available on short notice, should the demand from the ship owners warrant such a supply.

3.5 Gentle Waterway Maintenance

As a port infrastructure company, JadeWeserPort is responsible for the maintenance of the waters located in their physical area of competence and for the creation of reliable conditions. At the JadeWeserPort, this area of responsibility encompasses the Service Port and the approach and berth area by the quay. The total area that needs to be maintained measures about 130 hectares.

The investigations conducted in conjunction with the approval of the plans basically showed that sedimentation is to be expected, but that this sedimentation would be much less severe due to the turbulence created by ships and that it would be largely neutralized by being carried away by natural currents in the area of the new shipping channel and in the approach area. We are not expecting extensive maintenance dredging at this location.

The ebb and flow of the tidal current in the Jade is already stripping much of the dredge spoil as it is. During the tide cycle, almost the entire water amount of the Jade Bight flows in through the shipping channel during high tide and out during low tide, which already washes away a portion of the sand deposits.

For the determination of sufficient draft in the shipping channel, JWPR conducts sonar measurements on a regular basis. To carry out necessary work as gently as possible, we primarily use the so-called water injection process at the JadeWeserPort. During it, water is injected into the bed of the body of water, where it can penetrate cavities within the sediment and loosen sediment particles. The particles mix with the water and on the bed of the body of water, a suspension layer forms, which is carried off by the natural currents. Compared to dredging with hopper dredgers, this represents a more economical and at the same time a gentler process for the environment, since the intrusions are kept to a necessary minimum.

3.6 Compensation and Green Areas

What is taken from the environment when port facilities are built, must be given back to it at a different location. For the functional compensation of intrusions into nature, JWPR, on behalf of JWPM - during the course of business management - creates so-called compensation areas to compensate for changes in other areas, which creates substitute areas of similar quality. Unavoidable intrusions into the natural balance through construction projects have been successfully compensated and we were able to prove an environmental upgrade of areas. We will introduce hereafter some interesting compensation and coherence projects.

Warnsath and Möns

To compensate for the suffered loss of land caused by the construction of the railroad bed, an area of 64 hectares was acquired in Warnsath and Möns. The goal of the compensation measure is to create substitute habitats for meadow-nesting birds on the one hand, and to develop a wet biotope with landscape-typical water-logged surface structures on the other hand, which are largely unencumbered by agricultural utilization. To accomplish this, previously intensively used plowed fields and cattle grazing land was extensified and turned into wetland - with a positive impact on the biodiversity, which is typical for this geographic location.

Table 4: Development of Species in Möns and Warnsath

Compensation Area	Special Area Character	Positive Development of Flora and Fauna
Möns	Bogs and Swamps	Common cottongras, pennywort, common sedge, and the purple moor grass
		Pewit, bluethroat, skylark, grasshopper warbler, yellowhammer, garden warbler, chiffchaff, European willow warbler, and chaffinch
Warnsath	Nutrient-poor grassland	Sweet vernal grass, crested dog's tail, common self-heal, and the narrow-leaved rattle
		Skylark, pewit, quail, and meadow pipit

The conservation foundation Friesland-Wittmund-Wilhelmshaven looks after the areas and conducts regular monitoring.

Langwarder Groden

The Langwarder Groden is an area of about 140 hectares, which is bordered towards the mainland by the main seawall and towards the sea by a summer dyke. By partially opening the summer dyke, one area of the Langwarder Groden was exposed again to the tidal flow. This is where a valuable salt marsh landscape is scheduled to develop. The construction of a 5 kilometer looped trail with a lookout platform and observation shelters also allows nature lovers to explore this nature experience park without disrupting the plants and animals. In 2015 the project was awarded the Silver Port Environment Award by the IAPH.

Diagram 11: Langwarder Groden, Juni 2014

Proactive Protection of the Environment

In order to afford the development of the port with the space needed in the long run and to address the growing logistical demands, JadeWeserPort is already now proactively creating additional compensation areas, which - should the demand arise in the future - will be available to serve as coherence areas.
The main goal is the preservation of the Natura 2000 conservation area network within the EU and an early start on near-natural preparation of the areas. For this purpose around 100 hectares of land were purchased, which is gradually returned to its natural state. This includes for instance a former clay pit in Elsfleth, in which endangered species such as the common lady's mantle and the flowering rush, but also the bittern were able to reestablish themselves successfully.

All measures are accompanied by regular monitoring so that the development of the areas can be documented. The areas are also maintained so that the compensation within the qualitative context of the "Natura 2000" network can be met.

4 The Port as a Sustainable Employer

4.1 Balancing Job and Family

It is Niedersachsen JadeWeserPort's declared goal to actively support their employees in their quest to balance their job with family responsibilities and needs in an ideal way. Our staff is represented by all professional age groups: young professionals, starting their career, tried-and-true professionals, and colleagues already at the end of their career. It comes naturally for us to offer them a work/life balance, i.e. the reconciliation of work and family life. However, this cannot be administered in a cookie-cutter fashion, since the individual needs of our male and female employees are very different.

We want to meet the needs of parents with infants as much as the needs of a large family or of those with relatives or a grandchild in need of care. Therefore, we are working out with each individual a customized concept, tailored to their personal circumstances. Possibilities range from a step-by-step reintroduction into the job after a maternal (or paternal) break, to flexible working hours, and to part-time schemes, tailored to the individual needs. Even male employees are increasingly taking advantage of these opportunities.

In order to meet the needs resulting from changes in the personal circumstances of each individual, we stay in constant communication with our employees, because we want to keep developing and optimizing the work/life balance.

4.2 Training and Continuing Education

The company puts special emphasis on the support of training and continuing education of its employees. As an example, it actively promotes and sponsors the further education in conjunction with professional courses and extra-occupational training. The continued education of the employees is tailored to the individual needs of the areas of deployment and usually takes place in-house. This ensures that the qualifications and deployability for different jobs or functions of the employees continually increases.

Furthermore, JadeWeserPort offers students the opportunity to gain insight into our daily activities through internships, where they can also complete their Bachelors or Masters Dissertation within the company and where they can make contacts and develop practically relevant references through the thesis. The importance of the community of employees goes without saying for JadeWeserPort.

4.3 Health Management

In 2015, the JadeWeserPort companies, in collaboration with the branch offices of Niedersachsen Ports and in cooperation with the health insurer Schwenninger Krankenkasse, introduced a Company Health Management (CHM), which helps keep our employees healthy. The primary goal of the Company Health Management lies in the general information on health-relevant topics and in sensitizing all employees and motivate them to actively partake in health improvement steps.

Through the supra-regional "Arbeitskreis Gesundheit" (Work Group 'Health'), we are designing offers to promote health-conscious behavior of our employees. We are trying to keep the individual needs of various corporate groups of professionals in mind, in order to create customized concepts and to offer a broad palette of health benefits.

5 Cooperations and Partnerships

To be successful as a container port, you need strong partners and great local and global relationships. Not only do the JadeWeserPort companies stand behind the Container Port and Cargo Transport Center project on a regional level, but also on a national and international level.

Because integral results can be best accomplished through cooperation, we at JadeWeserPort, together with NiedersachsenPorts GmbH & Co. KG and with the Seaports of Niedersachsen GmbH have joined in creating the sustainability project hafen⁺. hafen⁺ stands for a joint environmental strategy of the Ports of Niedersachsen, which bundles the environmental activities of the port companies and generates new food for thought.

The JadeWeserPort is an active member of the International Association of Ports and Harbours (IAPH), and of the World Ports Climate Initiative (WPCI) and is also a member of the Ecoports Foundation.

Germany's only deep water port took the challenge to continually improve and transparently document their contributions to the protection of the environment beyond regulatory directives. With the help of the EcoPorts Tool, the port on the Jade is on its way to introduce a sustainable environmental management.

And other organizations, such as the Chambers of Commerce and Industry or the Wirtschaftsverband Weser, continue to take up environmental issues again and again. In doing so they typically analyze and assess legal developments and planning that could lead to imperil fundamental port interest.
The regional cooperation is also important for the JadeWeserPort. As an example, future-relevant and sustainable lighting technologies are investigated and tested in a collaborative project with Niedersachsen Ports, bremenports, and locally established lighting companies. Among other things, these tests concern themselves with the comparison of conventional sodium vapor lamps vs. LEDs and LEPs (plasma lamps).

6 Outlook

It is our goal to promote the dialogue with ship owners, shippers and freight forwarders in order to highlight the special advantages that the JadeWeserPort can offer its customers to streamline their supply chains so that the sustainable use of the port can be strengthened through new volumes of transport. In the future JWPR is committed to further intensify the sustainable port management. This means that the JadeWeserPort must comprehensively work on comparing their own contributions to the benchmarks of doing business in an environmentally friendly and sustainable way and to adapt accordingly.

It is also important to us to continue the sustainable work we have begun in the area of compensation and coherence and to environmentally upgrade areas early on (before it becomes a statutory necessity).

One focal point will be the continued implementation of the energy monitoring database and the port energy management resulting from it. During the next step, we will focus on utilizing the collected data to deduct the optimal energy efficiency measures. The continuation and further development of the Environmental Management is also a key focus area for the coming years.
In addition, the started projects need to continue and be fortified. At the same time, we are intensifying the dialogue with partners and stakeholders of JadeWeserPort in order to step up the environmental topics and to increase the sustainable development of the location in a joint effort. The initiative hafen^{+} serves here as a multiplier for the environmental activities of all standalone brands of port within Niedersachsen. After all, the increased cooperation with the other Niedersachsen ports promises added values for all participants.

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