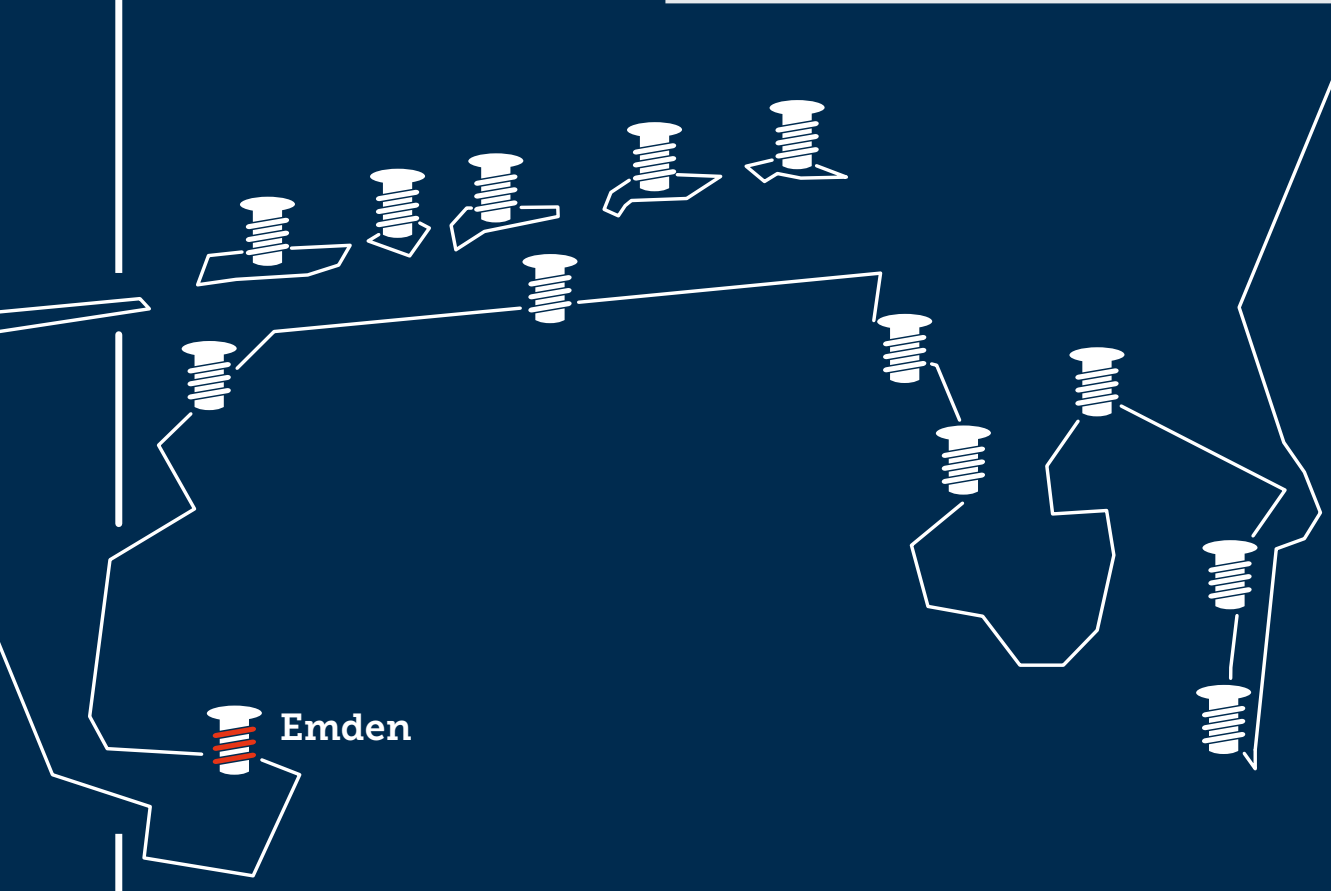
Niedersachsen Ports

Outlook Paper Port of Emden

Management Summary



Our Ports. Your Future.

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Introduction

The Port of Emden has more than 1,200 years of history to look back upon. As early as ca. 800 A.D., a Frisian trading settlement was established at the mouth of the River Elbe, and its importance as a place of trading and cargo handling steadily increased over the next centuries.

Today, the Port of Emden is the third largest automobile transshipment terminal in Europe after Zeebrugge and Bremerhaven. In 2016, more than 1.33 million cars were handled in Emden.

The Port of Emden achieved a cargo handling result of around 6.1 million metric tons in 2016. Aside from the handling of motor vehicles, the transshipment focus is on forest products, project cargoes (in particular WTGS components), building materials, and chemical products.

The economic significance of the port for the city is high. To date, the port site of Emden has developed into a successful business location with some 9,400 employees that are directly and indirectly dependent on the port, working in approximately 70 companies.

In addition, the site of Emden offers ideal conditions for energy-intensive industries and commercial outfits. The regional wind farms and offshore grid connections are the basis for a sustainable energy supply. The connection to supra-regional networks ensures a high level of available energy.

For this reason, the maintenance of the port and its competitiveness is of great importance for the City of Emden and the region at large, but also for the State of Niedersachsen.

The interplay of industry, ports and energy in Emden ensures optimal framework conditions for a green tech site in the north-west of Niedersachsen. To keep it that way, the preservation and demand-driven expansion of the requisite infrastructures is of utmost importance. Port-related infrastructure is cost-intensive, durable and must be implemented under consideration of multi-layered nautical, economic, legal, environmental and social conditions within the city area. Accordingly, the long-term infrastructure planning in and around the port requires a corresponding port development plan.

The outlook paper at hand is used for the preparation of a mid- to long-term perspective (2030/2040) of the port development for a port development plan, and thus for the planning of the future infrastructure in the port.

Now and in the future, Niedersachsen Ports will - in tight collaboration with the maritime economy - develop further perspectives for the port of Emden. For the consistent and sustainable pursuit of port development and under the leadership of Niedersachsen Ports in cooperation with the City of Emden, the Chamber of Commerce and Industry, and the port industry, the formation of a permanent task force is envisioned. The establishment of a permanent committee, slated to meet on a regular basis, would ensure that we can early on meet any challenges we may encounter in connection with the need for expansion, and it can provide secure planning for a sustainable growth of the Port of Emden and ensure its competitiveness.

Objective and Approach

Initial Situation and Objectives of the Outlook Paper

› The Port of Emden ranks among the eight busiest ports on the German North Sea coast, when it comes to transshipment numbers.
› The areas in the historically grown inland waterway port (Interior Port) are almost fully utilized.
› The existing infrastructure in the Außenhafen (Outer Port) is increasingly reaching capacity limits.
› This outlook paper is intended to serve as a long-term planning basis for the successful further development of the port!

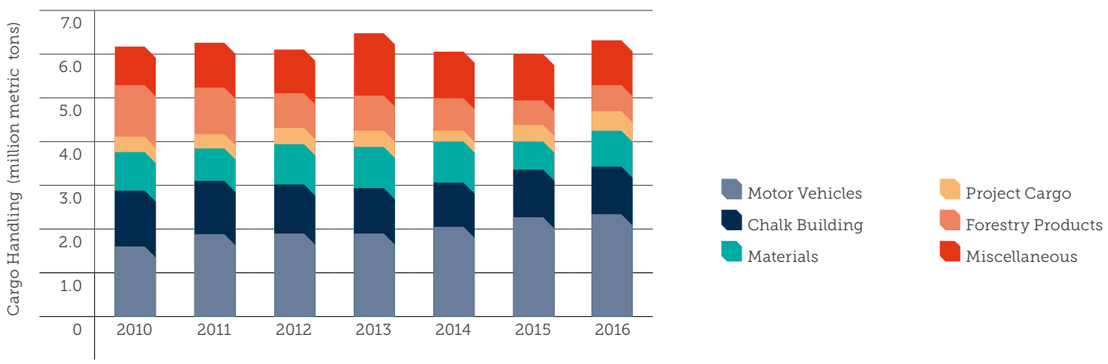
Approach and Methodology

› Analysis of the development of cargo handling by commodity group and port sections between 2010 and 2015
› Detailed description and analysis of the status quo of the individual port sections and equipment,
› Comprehensive survey to take into account the expertise of the local port industry
› Designation and analysis of essential conceptual and infrastructural framework conditions of the port
› Derivation of a cargo handling forecast as well as the potential for the seaward cargo handling up to the year 2030, including an outlook up to the year 2040
› Derivation of requirements until the year 2030/2040 as well as designation of opportunities and risks
› Derivation of development and recommendations for action

Cargo Handling Development

› Over the past few years stable handling at well over 6 million tons
› Relative and absolute increase in the importance of motor vehicles
› Forest products have been declining in recent years, but since 2016, we have been able to steadily recuperate lost transshipment volumes

Seaward Cargo Handling in the Port of Emden by Main Commodity Groups Between 2010 and 2016



Forecast

Methodology

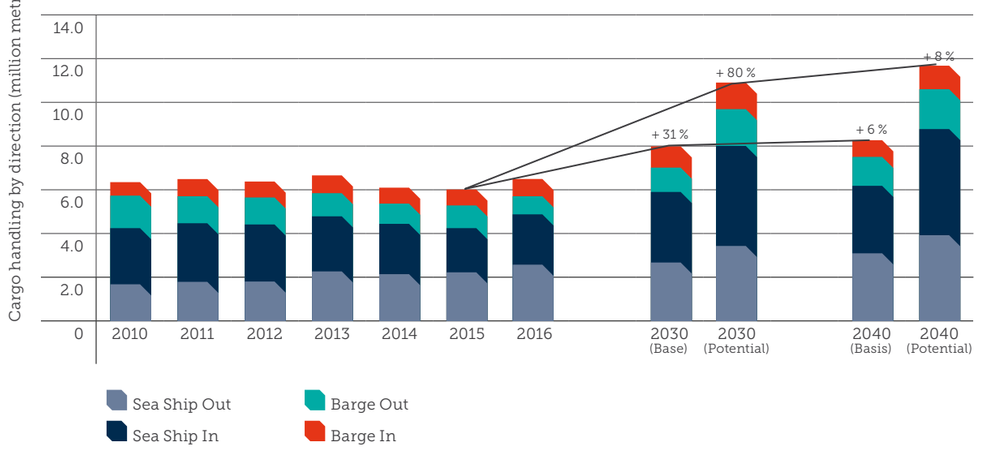
› Use of the BVWP assessments wherever possible and sensible
› Use of the CML forecast for motor vehicle handling
› Falling back on expectations of the survey participants
› Analysis of time series
› Experts' estimates in combination with BVWP and information from companies

Results

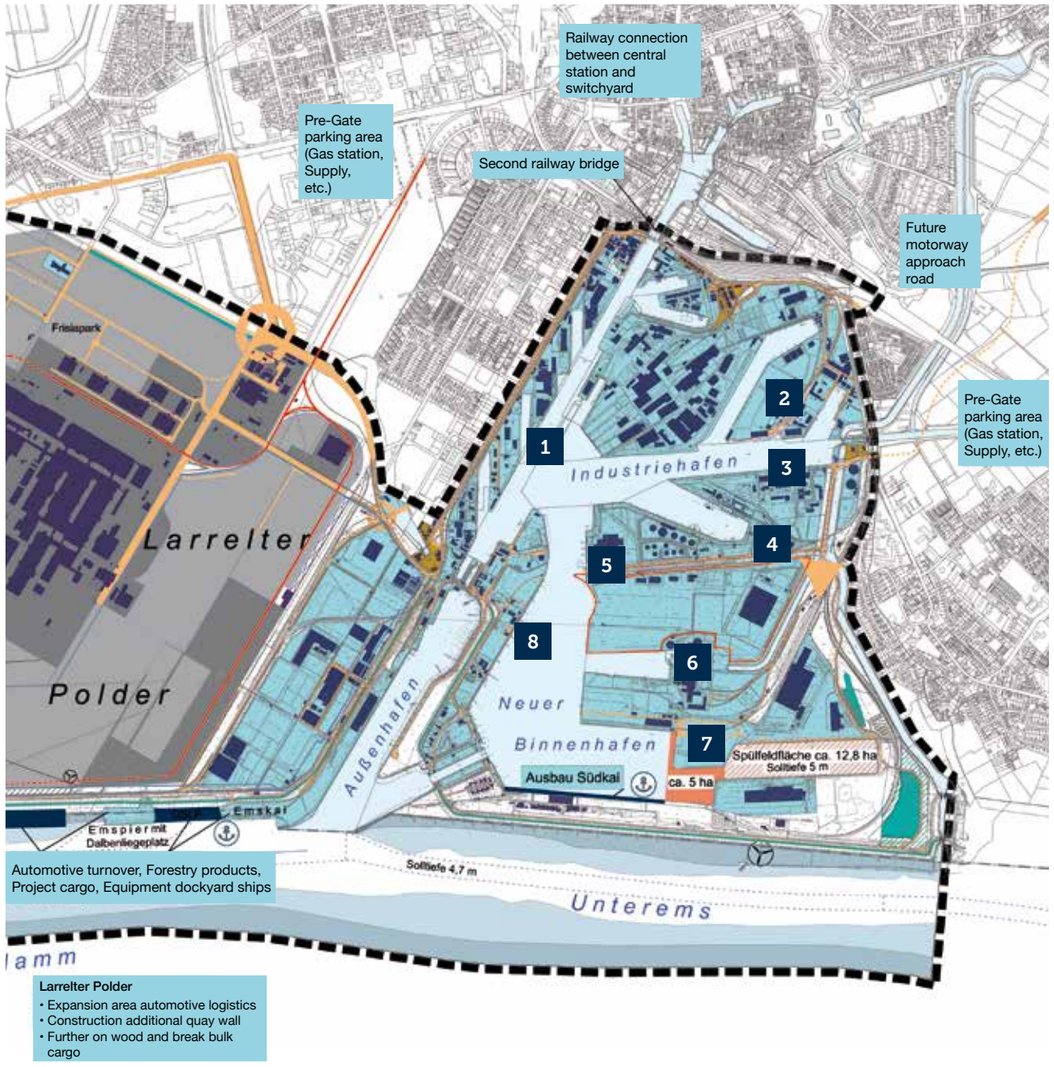
› Cargo handling expectation 2030: ~ 8.0 million metric tons
› Additional potentials 2013 ~ 2.9 million metric tons
→ **Overall Potential 2030: 10.9 million metric tons**
› Cargo handling expectation 2040: ~ 8.4 million metric tons
› Additional potential for 2040 ~ 3.3 million metric tons
→ **Overall Potential 2040: 11.7 million metric tons**

› To safeguard the status quo and to capture this potential, a forward-looking infrastructure planning is required. Select measures & actions are presented below.

Seaward Cargo Handling in the Port of Emden by Ship Type and Direction between 2010 and 2040



Select Actions and Recommendations



Larrelter Polder
- Expansion area automotive logistics
- Construction additional quay wall
- Further on wood and break bulk cargo

No.	of Port Section	Development Focus
1	Shipping channel Emden (incl. port basins 1 through 3)	Preserving and maintaining existing structures and developing new infrastructure (Duty of Care) Concept creation with users and the city of Emden for a sustainable development
2	Spur canal and Borssum Harbor	Preserving and maintaining existing structures and developing new infrastructures (Duty of Care) Concept creation with users and the city of Emden for a sustainable development
3	Industrial Port	Preserving and maintaining existing structures and developing new infrastructure (Duty of Care) Concept creation with users and the city of Emden for a sustainable development
4	Ölhafen (Oil Port)	Marketing of the port section as a chemical cluster. Development/rental of free areas within the spirit of current focus on use. Possible construction of an additional quay, incl.discharge jetty (depending on the development of the cargo handling)
5	Motor vehicle and logistics terminal	Development/rental of free surface areas within the spirit of current focus on use
6	Basins for barges	Strengthening of the current focus on use
7	Nordkai (North Quay), Jarssum Harbor, and Südkai (South Quay)	Marketing of the port sections as large components or building material cluster(s) If warranted, construction of a quay closure between North and South Quay. If warranted, backfilling of the Jarssum Harbor and upgrading of filled in areas within the spirit and intent of current focus on use. Development/rental of free surface areas within the spirit and intent of current focus on use. Demand driven construction of additional jetties
8	Small water craft berths	Development and rental of free surface areas for utilization focuses without intense pressure burdens to the areas and no heavy road transport volume

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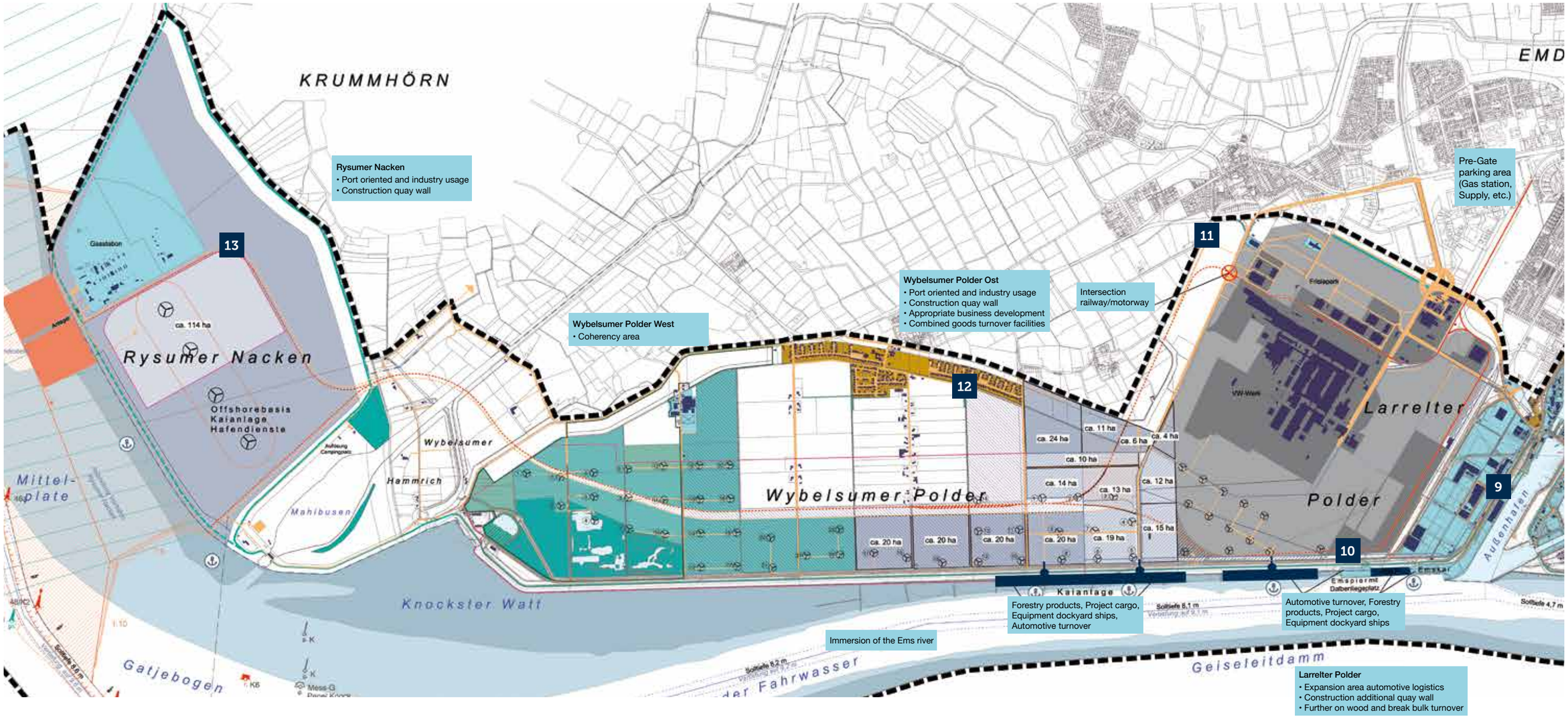
Select Recommendations and Actions



No.	of Port Section	Development Focus
9	Außenhafen (Outer Port)	Creation of a feasibility study for the deepening of the VW berths A and B within the Außenhafen (Outer Port)
10	River quays on the River Ems	Construction of a large vessel berth. Initiation of a plan revision procedure for the deepening of the berth seabed at the Ems Pier (in preparation). Execution of a variant investigation for an additional deepening of the berth seabed in the Ems Quay area
11	Larrelter Polder	Potential enlargement of the surface areas along the coast line for staging, prepping and transshipment of motor vehicles. Demand-oriented construction of an additional jetty
12	Wybelsumer Polder	Demand-oriented construction of additional jetties, incl. seaward pre-stowage areas. Development of backward areas for port-related industrial and commercial settlements. Determination of the potential demand for coherence areas for the future construction of additional large vessel ship berths and the possibilities for implementation in the western Wybelsumer Polder
13	Rysumer Nacken	Marketing of the port expansion area in the context of settlement requests with considerable space requirements. Demand-oriented advancement of partial planning or permits for perspective uses. The development as an industrial area (areas in 2nd and 3rd row) must be evaluated

Further Recommendations

Deepening of the Outer Ems River

The deepening of the outer Ems River is a central project for the further development of the Port of Emden and must be implemented without undue delay, in order to:

› Remove current and potential future bottlenecks in the seaward accessibility,
› To secure development opportunities for the local companies and on the potential port expansion areas,
› Maintain the competitiveness of the port economy of Emden within the international context.

Large Vessel Berths

According to the basic forecast, the port location of Emden can achieve a motor vehicle turnover volume of approx. 2.7 million metric tons by 2030. In an ideal situation, that year's potential may be as high as 3.3 million tons, which corresponds to approximately 2.1 million motor vehicles. This would mean that in 2030, just with the basic assumption alone, the existing annual cargo handling capacities of the Port of Emden (incl. the pile mooring berth on the Ems Pier that was completed in December of 2015) of up to 1.6. million motor vehicles, would be completely exhausted. Even today and without this high annual amount, we are sometimes experiencing bottlenecks due to simultaneous ships' calls. In view of the total of both of these potential cargo handling volume scenarios, the currently available capacities can only be called insufficient. Without an expansion of these capacities, it can be assumed that the projected volume growth in the automotive segment will shift to other port locations along the North Sea coast.

As a consequence, we can only recommend that the large vessel berth between Ems Quay and Ems Pier be implemented as quickly as possible so that the Port of Emden can maintain and expand its competitive edge and realize it future cargo handling potential.

With this large vessel berth, the handling capacity of the port, including all available surface areas at such time, can be increased to some 2.0 million motor vehicles annually, which means on the one hand that the port of Emden can profit from the increase in motor vehicle handling in the long run, as outlined in the basic scenario, and, on the other hand, Emden can remove any bottlenecks and may potentially be able to avoid the internal competitive pressure from the cargo segments 'motor vehicles', 'project cargo', and 'forest products'. There is a good potential for regaining lost transport volumes and maintaining additional growth within the latter segment. This may only be achieved, if corresponding appropriate cargo handling equipment and surfaces are provided. This measure is in direct relation to the perspective development of the Wybelsumer Polder as a logistics area.

In addition, we would like to point out that even during the current planning process of the gap closure between the Ems Pier and the Ems Quay, a port-economic demand for another berth in the Außenhafen (Outer Port) for the handling of motor vehicles is being outlined, which in turn highlights the necessity for a timely implementation of this measure. Additional cargo handling facilities must be planned with foresight in a demand-oriented manner according to the outlined development on the expansion areas of the Larrelter and the Wybelsumer Polders.

Furthermore, and in view of the potentially restrictive impact of the water depths at the Ems Pier and the Ems Quay, dredging of the berths' sea beds there should be pursued. While for the Ems Pier the initiation of a plan revision procedure is indicated, for the Ems Quay, implementation of a variant analysis is recommended, in order to determine the technical feasibility.

Large Sea Lock

The Large Sea Lock is the main artery for the Interior Port. For a large portion of the Interior Port-based cargo handling and industrial companies that make a great contribution to the value-added chain and employ a large number of people, the lock can be described as system relevant or existential.

Therefore, a prerequisite for the competitiveness of the Emden Interior Port with its current utilization is the sustainable preservation of the reliability and performance capability of the sluice system through required maintenance and repair measures. In particular, against the backdrop of the new construction of the Nesserlander Lock, which is slated for completion by 2017/2018, there will continue to be a high frequency by any size vessel through the 100+ year-old Large Sea Lock. The Large Sea Lock currently operates at the edge of its capacity, which contributes to extremely high costs of maintenance. Based on recently conducted building tests, the concrete volume of measures for this facility is currently being determined and made part of the holistic repair and maintenance concept for the Large Sea Lock to ensure access to the Interior Port by seagoing vessels for the coming years.

In addition to the basic preservation of the competitiveness of the entire Interior Port of Emden, the Large Sea Lock continues to be an option for existing businesses or businesses that may settle here in the future, who could basically handle their ship traffic though the Nesserlander Lock as well, but may be dependent in the future on the Large Sea Lock, should individual business segments require the use of larger ships.

Wybelsumer Polder

In the not too distant future, not just due to its spatial proximity to the port areas of the Outer Port and the Interior Port, the Wybelsumer Polder will be one of the most important areas for the commercial port development of the Port of Emden. The zoning plans D 133 and D 87 represent some legally effective plans for the development of the majority of 105 of 550 hectares – NPorts is already marketing these areas under a European constant negotiated procedure. Due to the spatial proximity to the Interior and the Outer Port of Emden, these areas on the Wybelsumer Polder explicitly represent an attractive alternative to the Rysumer Nacken. The development of the Wybelsumer Polder also comes with a close attachment to the transport connection of the Volkswagen AG via the Wolfsburger Straße and in terms of the construction of the large vessel berth and potentially additional berths for the handling of motor vehicles. This generally results from the location of the areas of the Wybelsumer Polder in the rear space behind the coast line or to the west of the Larelter Polder, and in connection with a transport connection to the quay facilities yet to be built.

It is therefore - already in the current situation - considered a necessity to get measures underway that will make the establishment of the Wybelsumer Polder as logistics and industrial area or as development area of the Port of Emden a reality.

This includes in particular

› Avoiding to endanger perspective port economic uses of the the surface areas on the Wybelsumer Polder by other mid- or long-term utilization contracts, such as for WTGS as new constructions,
› Execution of a study to identify alternative sites for WTGS in the areas of the Wybelsumer Polder and the Rysumer Nacken against the background of the port development and the existing WTGS utilization,
› The use of the Wybelsumer Polder as a dredge deposit field for any potential dredging measures aimed at creating the necessary height level for commercial settlements,
› The promotion of the development of the area for the technical aspects of traffic, supply and disposal, which are necessary for settlements (which are, vis-à-vis the Rysumer Nacken, comparatively inexpensive) through a line determination procedure, in order to be able to identify any resistance during th the planning process as early as possible,
› The proactive elimination of existing transport bottlenecks through a four-lane expansion of the road access from the Larrelter Straße (intersection of Kopernikusstrße / Thüringer Straße / Larrelter Straße) up to the Wolfsburger Straße (Western approach towards the plant of the Volkswagen AG), as well as
› The execution of a feasibility study for the determination of a possible seaward access to surface areas at the Wybelsumer Polder-East.

Railway Drawbridge

Of particular importance for the logistics industry and the resident industrial companies in the Port of Emden is the railway drawbridge across the Interior Port of Emden, which is not only utilized by the regional commuter and passenger railway towards the main train station in Emden, towards Norden and the island ferries, but also by the

› Volkswagen AG towards their plant on the Larrelter Polder and by
› Enercon GmbH towards production sites in Aurich and Georgsheil.

This should result in an increase in the number of trains until 2040 (compared to 2015) of up to 120%. Against the background of the described capacity situation and quantity expectations, the dual track expansion of the rail route section between Emden Regional Station (Rbf) and Emden Main Station (incl. extension of the railroad bridge in the Interior Port of Emden) is a priority measure, that will help facilitate a further increase in the transshipment of motor vehicles, but also of other commodities.
In consideration of the high importance of efficient rail infrastructure and a dependable railway cargo transport for the Port of Emden, it is recommended to push for the erection of a second railway crossing across the Interior Port and for the construction of a dual track system between Emden Regional Station (Rbf) and Emden's Main Train Station (Hbf).

Rysumer Nacken

The Rysumer Nacken continues to play an important role in the development of the Port of Emden. Due to the higher development costs here (compared to the Wybelsumer Polder), the focus for the port development of the Rysumer Nacken should primarily (though not exclusively) be put on users with a demand for a relatively large amount of space. It is recommended that the long-term development and utilization of the Rysumer Nacken be aligned with this premise to keep the option to also have commercial settlements represented in the future that require vast amounts of land. The development of this space as an industrial area should also be perused; particularly the areas in the 2nd or 3rd row would be ideal for such development.
The implementation of the deepening of the Outer Ems River must be considered crucial in this context, a competitive water depth is elementary in order to stay competitive. In addition, we are encouraging an investigation of different variants for the deepening of the shipping channel in the area of the Rysumer Nacken and at the landing jetty Knock, since a powerful seaward connection of the surface areas would dramatically increase the marketability of this port section.

It should also be conceivable to already advance partial plans or permits for various perspectively possible utilizations, such as for the offshore segment. This way, we could get a head start and meet any adverse, long-lasting delays head on that would otherwise postpone commencement of operation, and the port development areas of the Rysumer Nacken could be accessible for potential investors in a short amount of time. This also includes the expansion and the streamlining of any infrastructure connections. At least for the transport mode "Road", we should implement a powerful variant based on the already completed evaluation and comparison of different concepts for connecting to the public road grid, which also should aid in the development of the Wybelsumer Polder, but should not lead to a curtailment of development possibilities for the planned industrial and commercial campus Frisia.
At this point it should be noted that, analogously to the procedure at the Wybelsumer Polder, the Rysumer Nacken should be investigated for the not too distant future as an alternative site for the construction of additional WTGS, however without limiting the possibilities of port development unduly.

Sustainability

Through the implementation of measures for sustainability within the company and the company's own ports, NPorts becomes a role model for the local businesses in the Port of Emden. In cooperation with public relations, the sustainability strategy can also contribute to a wider acceptance of the port in the population. Although the generic term of sustainability encompasses economic, ecological and social aspects that deserve to be considered, it is generally the ecological measures of a sustainable port operation that take center stage in the external perception. These include, among other things:

› Measures for climate protection and energy efficiency (in particular, reduction of energy consumption and CO2 emissions),
› Measures for protection against harmful environmental effects due to air pollutants, noise and vibration,
› The consideration of nature conservation technical aspects in expansion and extension projects,
› The use of sustainable means of transport in the hinterland, and
› The introduction of environmental management systems to the port operation.

Due to statutory requirements, part of the measures for sustainability must be implemented in expansion and extension projects within the framework of the approval processes (including protection against harmful environmental effects from air pollutants, noise and vibration, taking into account environmental protection technical aspects). Within this context, the topic of provisioning compensation areas is of special importance.

Any additional measures for a sustainable port operation must be evaluated on a case-by-case basis for their implementability against the background of economic feasibility, but should - from a planner's point of view - be initiated immediately. For the Port of Emden, the following recommendations for action in relation to sustainability can be formulated:

› Expansion of the functions of an offshore large component port (installation and production port) as a contribution to the energy revolution
› Implementation of the latest low-energy standards in technical building equipment (equipping buildings with heat and cold storage units, use of residual, long-distance or ground heat)
› Use of solar energy
› Deployment of electric vehicles in the port area, conversion to diesel-electric propulsion systems
› Reduction of dust pollution through low emission cargo handling techniques (absorber, aspiration and compressor systems, special treatment of certain goods such as the covering of coal piles)
› The reduction of noise emissions by encapsulating units, or the use of modern propulsion systems
› Smart control of the port lighting, using energy-saving lamps, conversion of the port lighting to LED/LEP technology
› Shifting of freight transport from road to rail, expansion of the railway as an environmentally-friendly mode of transport.

Transport Connections

All roads lead to Emden, be it by water, road, or rail: Through the cargo train stations »Emden« and »Emden Außenhafen«, the port facilities in Emden are enjoying a great tri-modal hinterland connection, there is also a link to the Federal Freeway Autobahn A31, and a direct connection into the waterway network via the River Ems.

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