

# Port of Hamburg: smartPORT



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The port and the city of Hamburg are closely intertwined – and not just physically. The healthy development of the port ensures the growth and prosperity of the city and the entire metropolitan region. But how we promote sustainable growth and how much can a port grow if it only has limited space for expansion are the key questions this paper addresses.

We realised early on that the future of the port is not only tied to spatial development, but also to new, smarter approaches. It is clear in our vision that the various traffic and information flows must be merged to ensure efficient port operations. Efficiency may well be the most important differentiator for the Port of Hamburg when it comes to energy resources, infrastructure facilities, traffic control, and property management.

## smartPORT energy

The smartPORT energy project was initiated at the Port of Hamburg jointly by the Hamburg Port Authority (HPA), the Hamburg Ministry of Urban Development and Environment and the Hamburg Ministry of Economic Affairs, Transport and Innovation. A course has been set for a sustainable energy future. The aim is to make the Port of Hamburg a 'flagship port' for renewable energy. The port and the city, as well as the whole of the port industry, will benefit from the project in more ways than one. Therefore, we defined three primary project aims for smartPORT energy:

- Reduce dependency on conventionally generated energy
- Reduce energy consumption and energy costs
- Reduce emissions

These three aims are joined by three project pillars:

- New innovative technologies
- Increased energy efficiency
- New innovative mobility concepts

## Shore power: clean electricity

Normally vessels use auxiliary diesel engines to power their electrical onboard systems while docking in port. The innovative concept of shore power lowers carbon dioxide and fine particulate matter emissions as well as reducing noise pollution in the vicinity of terminals.

A converter substation converts electricity supplied from an electrical grid to 11 kV, 60 Hz electricity – the voltage/frequency required by cruise ships – and feeds it to the ship automatically. Power is available within minutes.

Passengers, crew members and the people who live and work in Hamburg will all benefit from this safe and environmentally friendly alternative. For us, the shore power facility in Altona is another milestone in the development of Hamburg as an attractive cruise ship destination.

## Shore power station

- Converter substation: four transformers, one voltage converter
- Input voltage/frequency (power from the electrical grid): 10kV/50Hz
- Output voltage/frequency: 11kV/60Hz and 6.6kV/60Hz
- Maximum output: 12MVA

## smartPORT logistics

In view of its rising cargo and traffic volumes, and its status as an important link in the supply

chain, the efficiency of a modern port must be improved. That is the aim of the smartPORT logistics strategy.

Under this strategy, we are developing intelligent traffic and trade flow solutions that take account of both economic and ecological requirements. The overarching aims of the initiative are:

- Managing and utilising existing infrastructure in an efficient manner
- Establish an intelligent new

infrastructure in the port area

- Optimise the flow of information to efficiently manage trade flows

## Accelerating trade

An average day in Hamburg's port sees more than 40,000 journeys made by lorries across the port area. Almost ten million standard containers were transhipped in the port in 2014.

Freight companies, port operators, port management and staff involved in logistics have one common goal: to get goods through the port as quickly and reliably as possible.

While transshipment volumes are growing constantly – current forecasts predict an increase in containers to 18,000 TEU by 2030 – the necessary expansion of port infrastructure is

hardly possible from a construction perspective. To coordinate the growing flows of traffic and goods in the port even more efficiently in future, we have developed the smart-PORT logistics concept (SPL). SPL connects all parties involved in the logistics chain for their mutual benefit, which means that transport business can be better planned and coordinated more effectively. In this way, SPL supports the development of the port into a smartPORT and helps to preserve its competitiveness, ensuring that it remains an economic powerhouse.

## Visibility provides foresight

SPL is differentiated from the existing communication and information systems of stakeholders in the port in four main ways:

- Integration of all stakeholders: SPL connects all those involved in the transport chain and enables the precise planning/timing of consignments
- Overarching view in real time: SPL visualises traffic flows and car-park



### About the author

After completing his studies in Computer Science and the supplementary subject of economics at the University of Hamburg, Jens Meier started his professional career at Software Design & Management AG with the Ernst & Young group. Since 2008, Jens Meier has been serving as CEO of the Hamburg Port Authority.

### About the organisation



The Hamburg Port Authority AöR (HPA) has been providing future-oriented port management services offering one face to the customer since 2005. To ensure efficient, safe and economic processes in the Port of Hamburg and meet the demands of a growing port, the HPA relies on intelligent and innovative solutions. The HPA is responsible for resource-efficient, sustainable planning and the implementation of infrastructure projects in the port. It is the contact point for all kinds of questions concerning the waterside and landside infrastructure, the navigational safety of vessel traffic, port railway facilities, port property management and business conditions in the port. The HPA ensures the provision of land as required, carries out all statutory duties placed on it and provides port industry services. It markets port-specific technical knowledge and represents the interests of the Port of Hamburg at a national and international level.

### Enquiries

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traffic and offers users a precise, up-to-date foundation for decision-making

- Planning certainty: SPL offers an insight into the traffic situation in the port for the next 60 minutes, enabling users to react flexibly
- Interfaces for additional data: SPL offers interfaces for the integration of additional sources of information serving user-specific adaptations and expansions

SPL collates all traffic and logistics data for the port centrally and in real time as a 'cloud service for everyone'. This allows companies to take an active role in the exchange of information, optimising communication between one another and sustainably increasing their own productivity.

### Future port railway: transPORT

Hamburg is Europe's largest port-rail hub. It is instrumental in ensuring efficient freight operations. One train carries the equivalent of 50 truckloads of freight. Rail transport is also more environmentally friendly and easier to plan. Providing efficient port infrastructure that's conducive to railway undertakings (RUs) is the responsibility of the HPA, as is the scheduling.

On an average day, 200 trains with more than 5,000 wagons are using the tracks of the port railway. In 2014, trains moved over 45 million tonnes of goods and 2.2 million standard containers

on the port railway network. To accommodate the projected trade growth in the future, the efficiency of port railway operations must be improved.

The port railway's brand new transPORT rail system is one of the most modern rail-telematic systems in Europe. It merges all wagon-related and freight-related information and transport data for the RUs, the HPA and the terminals.

The system facilitates the exchange of data and communication between all parties involved in rail transport in the port. Train movements can now be optimally scheduled, which improves overall operational efficiency. Users of transPORT rail have a dedicated data interface. Web-based access to the system is possible via an online portal, which also serves mobile and tablet devices.

### Efficiency is the future

'Smart' port development requires a certain amount of courage and a great deal of innovative thinking. If you strive for sustainable development, you have to overcome boundaries in geographical terms as well as in terms of conventional attitudes. We have to think of new ideas in order to create a future-oriented port. The holistic smartPORT concept has been developed for exactly this reason. 'smartPORT' is more than just a word; it is a long-term strategy that showed us that the development of the Port of Hamburg is going in the right direction.