

GREEN PORT

PORT OF HAMBURG MAGAZINE

Dear Readers,



The Universal Port of Hamburg stands for some mightily impressive statistics. Around 18,000 calls by ocean-going and inland waterway vessels per year, nearly 300 berths and around 50 handling facilities specialized in clearing an enormous variety of cargoes make Hamburg Europe's third largest port. One unique fact is that Hamburg's port lies at the heart of the city. That gives port operators and service providers tremendous responsibility for protecting the environment and keeping the air pure. Handling companies, terminal operators and industrial activities based in the port have in recent years implemented comprehensive measures. That's made an impact. Statistics from the Ministry of the Environment & Energy indicate that the commitment of private port operators alone has saved 60 million kilowatts of power output and avoided over 76,000 tons of CO2 per year.

Hamburg has set itself ambitious goals on climate and assigned extraordinary priority to environmental protection. One essential project backing voluntary effort here is known as the 'UmweltPartnerschaft Hamburg', for promoting voluntary environmental protection in business & industry. Celebrating its 15th anniversary this year, this has been reconciling economic and ecological targets since 2003. Port business is involved in this commitment. Current projects aim at further improving air quality in the port, developing ecologically efficient ship propulsion systems, optimizing shore-based power supply for ships, and boosting the proportion of e-mobility at terminals.

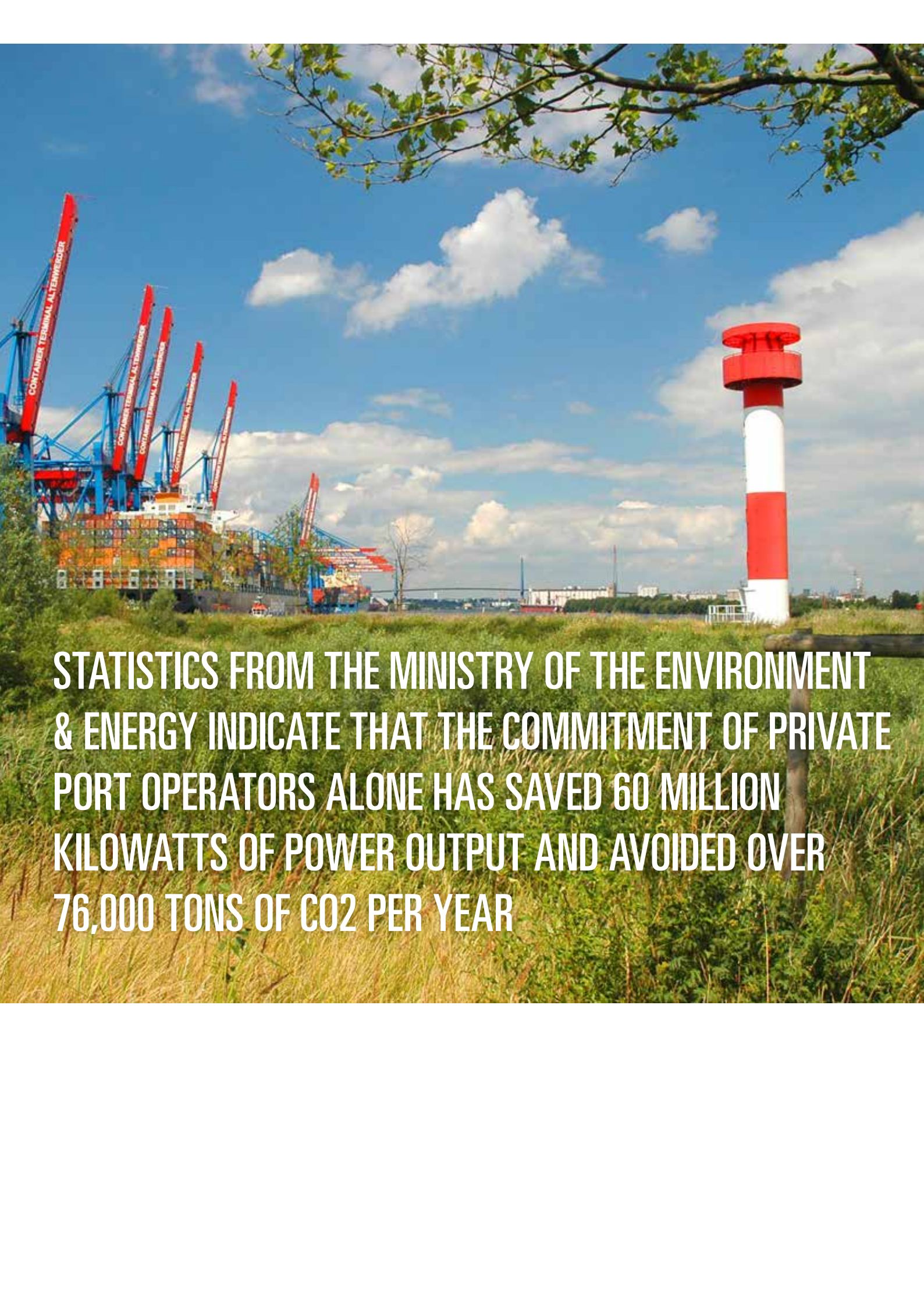
The International Maritime Organisation has also set itself ambitious targets for climate protection. In April the IMO decided that shipping would by 2050 have at least halved global CO2 emissions. Imposition of a cap on sulphur emissions from 2020 was decided back in 2016. In shipping, the new regulations are speeding up development of technical innovation and alternative fuels. They also represent an immense challenge for the entire shipping industry, one that must be mastered within a relatively short period. Yet the goal is vital. All these measures lead to a tremendous reduction in pollutant emissions. The environment and especially, the inhabitants of ports and coastal areas will profit.

This issue of 'Port of Hamburg Magazine' gives you a small glimpse of numerous climate protection projects in Hamburg and the Metropolitan Region. I trust that we have found the right mix of topics to make an enjoyable read for you.

A handwritten signature in blue ink, appearing to read 'Axel Mattern'.

Axel Mattern
Joint CEO, Port of Hamburg Marketing





STATISTICS FROM THE MINISTRY OF THE ENVIRONMENT & ENERGY INDICATE THAT THE COMMITMENT OF PRIVATE PORT OPERATORS ALONE HAS SAVED 60 MILLION KILOWATTS OF POWER OUTPUT AND AVOIDED OVER 76,000 TONS OF CO2 PER YEAR

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AS A MAJOR ENERGY CONSUMER, THE PORT OF HAMBURG – ALONG WITH THE TRANSPORT, LOGISTICS AND INDUSTRIAL COMPLEX BASED THERE – CAN CONTRIBUTE SUBSTANTIALLY TO ENERGY TRANSITION

'Energiewende' launched in the port

With its 'Energiewende' or 'energy transition', Germany has opted to discard nuclear power. The strategy also involves reducing use of fossil-based energy sources and encouraging supply from renewable sources. Immense social, political and economic efforts will be required to achieve this target. As 'Gateway to the World', the Port of Hamburg assumes special significance in implementing this transition.

Hamburg has set itself the target of covering 80 percent of its energy requirements in 2050 from climate-neutral sources. That makes it essential to shun fossil energy sources and turn to renewable energies. At an economic powerhouse like Hamburg, a variety of enterprises must be involved. One of these is the port.

The Port of Hamburg is Germany and Northern Europe's leading port and logistics centre. This status involves both immense economic potential and great responsibility. As a major energy consumer, the port – and the logistics/industrial companies based there – can contribute significantly to the Energiewende and to boosting the port.

For years, Hamburg Port Authority has been encouraging use of cutting-edge energy and environmental technology. Numerous projects have already been implemented in the Port of Hamburg to boost renewable energies, enhance energy efficiency and develop innovative mobility schemes.

'CLEANER' POWER FOR CRUISE SHIPS

HPA is running a project for supplying cruise ships with alternative power in the Port of Hamburg. A cruise ship's daily power consumption equates to that of a small town. Even during laytime in port, the required energy is usually generated from a ship's own auxiliary diesels.

As the first port operator in Europe, in April 2017 Hamburg Port Authority took into service a shore-based power plant for emission-free supply to cruise ships. The innovative concept of shore-based power

supply contributes to reducing harmful CO₂ and sound emissions, in the vicinity of its Altona passenger terminal. Ecologically-produced current from the public grid is converted at a transformer station to the 11 kV/60 Hz required by the cruise ship and fed by an automated system so that power supply is active within minutes. For 2018, 83 calls by cruise ships have been booked at Cruise Center Altona. For 22 of these – or more of than a quarter of the total, all from cruise ship operators AIDA – power supplied will be exclusively from shore-based sources. Test runs are also planned for such potential customers as Hapag-Lloyd Cruises.

Passengers, ship's crew and people living/working in Hamburg will profit from this safe and environment-friendly alternative. For HPA, the Altona shore power plant also represents a further step towards making Hamburg as a cruise port even more attractive. What's more, other ports will also gain from the Port of Hamburg's pioneering work on shore-based power. Since the start of regular operation in 2017, HPA has welcomed more than 25 expert visitor groups from all over the world at its sub-station. These included other ports and terminal operators, who briefed themselves on shore-based power supply in Hamburg.

Cruise ships calling at Cruise Center Steinwerder also have the opportunity to use low-emission power supply. Here ships whose auxiliary generators are designed for operation in port with LNG can be supplied from ashore with liquid gas from tankers. In addition, there are plans to equip HafenCity Cruise Ter-



UNIQUE IN EUROPE, THE SHORE-BASED SUB-STATION AT CRUISE CENTER ALTONA IS SCHEDULED TO PROVIDE FULL POWER SUPPLY FOR 22 CRUISE SHIP CALLS DURING 2018

© HPA/Christian Bruch

minal with a quayside sub-station similar to Altona's but supplying even more power, namely 16 instead of 12 megawatts.

ALTERNATIVE ENERGY SUPPLY FOR CONTAINERSHIPS TOO

In future, cruise ships are not to be the only vessels profiting from shore power during port lay time. Germany's largest terminal operator, Hamburger Hafen und Logistik AG (HHLA), plans to supply container-ships in port with power, using Powerpacs. In testing, these have been used on Hamburg-based shipowner Hapag-Lloyd's containerships during lay-time at HHLA Container Terminal Altenwerder (CTA).

Powerpacs are power supply units supplied by Becker Marine Systems. After a containership berths, initially two containers are hoisted on board – as the Powerpac. These house a gas-powered 1.5-megawatt generator plus a tank of liquefied natural gas. This then supplies power to the shipboard network. The ship's own auxiliary diesel can be shut down.

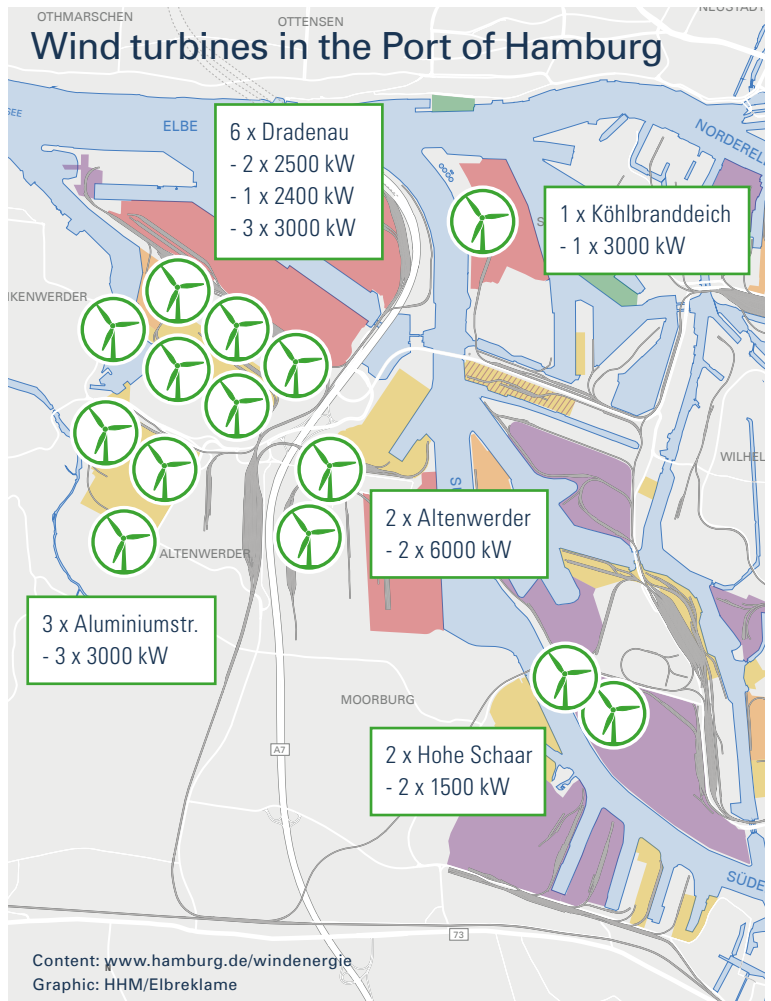
All these examples demonstrate that the Energiewende is not a revolution that can occur overnight. Developing a 'smart port' calls for bold, innovative ideas, plus perseverance. This way, the port can grow sustainably into the future, remaining a crucial economic factor for Hamburg, the Metropolitan Region and far beyond.

MORE WINDPOWER FOR/ FROM THE PORT

Windpower is just one example of renewable energy growth in the Port of Hamburg. The port feeds the city with many essential products: cof-

fee, fruit and wheat are distributed from here locally, all over Germany and into other European countries. Crude oil is delivered and then refined here, enabling engines and machinery to run smoothly. The gear that we wear and our cellphones in daily use are manufactured in the Far East and transhipped in the port. In recent years, a further product has originated here: Electricity.

More than 65 wind turbines with a total output of over 110 megawatts are meanwhile scattered around the city-state. Apart from those in outlying areas, the Port of Hamburg itself increasingly plays a major role as a site for windpower units. The port so far houses 14 rotors producing environment-friendly power. In 2017 alone, Trimet's aluminium plant and ArcelorMittal's steelworks each opened three new 3-megawatt windpower stations. Together, these six units alone can supply around 22,000 Hamburg households with 'green' power. ■



LNG terminal on Lower Elbe soon a reality?

'German LNG Terminal GmbH' is the full name of a joint venture by the LNG experts that have opted for a Brunsbüttel site. They are actively pursuing the process of gaining planning permission. Should everything go to plan, construction of Germany's first LNG terminal will commence there in 2020.

Plans for the erection of a LNG terminal are at last becoming tangible in Germany, and the gap in infrastructure for this environment-friendly fuel closed. Since the beginning of this year, German LNG Terminal has been largely responsible for driving forward the plans for realization of a German LNG terminal. The company is a joint venture between Gasunie LNG Holding of the Netherlands, Vopak LNG Holding, and Oiltanking, a subsidiary of Hamburg-based Marquard & Bahls. Their aim is to bring about construction, ownership and operation of an import terminal in Northern Ger-

many for liquefied natural gas (LNG). The focus is on Brunsbüttel as the site, which has emerged as suitable and commercially feasible. Proximity to the Port of Hamburg, as well as the industrial groups based in the region, offer an attractive economic environment. Via the Kiel Canal, the Scandinavian and Baltic countries are also very accessible.

When founded in January, German LNG Terminal kicked off an 'Open Season'. This process has involved eliciting market interest for an LNG terminal



PROXIMITY TO THE PORT OF HAMBURG AND THE MARKETS OF NORTHERN AND EASTERN EUROPE GIVES BRUNSBÜTTEL AN ATTRACTIVE COMMERCIAL ENVIRONMENT FOR GERMANY'S FIRST LNG TERMINAL

LNG is already being bunkered by road tankers in Brunsbüttel



and identifying possible customers for the facility. The results will be an important element for the joint venture's later decision on investment. The 'Open Season' was successfully concluded in May. A considerable number of companies with differing requirements have signed declarations of intent. From its regasification and feeding gas into the German gas network, to handling & distribution of LNG, wide interest exists in the services to be provided by an LNG terminal.

The next steps provide for deeper exploratory discussions with potential customers, and parallel preparation for the planning permissions procedure so that this can already commence at the end of this year. "The 'Open Season' process has indicated market acceptance for the various services to be offered by the planned import/small-scale terminal in Brunsbüttel. We regard that as confirmation that our service portfolio matched client requirements," comment German LNG Terminal sources. Once permission is received, a final decision on investment is envisaged for the end of 2019. Almost simultaneously, a start

should be made on construction. After a period of almost three years of construction, therefore, the terminal can probably enter service during 2022.

In the Elbe Port of Brunsbüttel, the largest LNG bunkering anywhere in Germany to date occurred earlier this year. Within four weeks, the hopper dredger 'Scheldt River' was on two occasions bunkered with a total of 163 tons of the environment-friendly fuel. This suction vessel was filled from two LNG road tankers in parallel. Altogether five of these delivered the required LNG to Brunsbüttel. Hamburg-based Nauticor was responsible for the operation itself. "LNG as an ecological fuel in shipping, plus its use at Brunsbüttel as an industrial and port site, is not some topic for the far-off future. It is already reality today. This underlines that the port on the Elbe today even now meets the requirements for regular bunkering of LNG," explains Frank Schnabel, Managing Director of Brunsbüttel Ports.

The planned terminal opens up many possibilities for use of the environment-friendly fuel. It will contribute



© Brunsbüttel Ports



Upcoming event

On 23 August the Elbe Port of Brunsbüttel will be the venue for a briefing event on the subject of LNG. Under the title 'A chance for the Hamburg region as Germany's LNG Base', leading figures from the worlds of politics and business will engage in a platform discussion on the future development of LNG in Germany. Joint organizers are Port of Hamburg Marketing and Brunsbüttel Ports.

toward energy diversification in Germany, boosting LNG's introduction as a more sustainable alternative fuel for marine and heavy goods transport. In addition, it will be in a position to supply energy to Brunsbüttel's heavy-consumption industry. The future terminal's location at the interface of the Lower Elbe and the Kiel Canal provides ideal conditions for distributing LNG to the Port of Hamburg and other ports.

RIISING LNG REQUIREMENTS IN THE PORT OF HAMBURG

Since 2016, Cruise Center Steinwerder has facilitated LNG fillings by truck. AIDA Cruises has taken this up. Last season, it was the 'AIDAprima' that made 45 calls here, in the current season there will be 35 by the 'AIDAprera'. The fuel is used for generating power on board, substantially reducing emissions during laytime in port.

In the ship bunkering area, a new AIDA Cruises vessel, the 'AIDAnova', signals a further requirement for LNG in the Port of Hamburg. The newbuild is the first cruise ship to be 100 percent fuelled by LNG. Her first

passengers will be embarking in Hamburg from December onwards. Rising demand for LNG as a marine fuel will then become evident from 2020, when ship-owners CMA CGM will receive their new 22,000-TEU containerhips that are to be operated using deep-frozen, liquefied natural gas. ■

LNG facts

LNG - Liquefied Natural Gas - is a natural gas, frozen down to -162°C and then turning liquid. This liquid state makes its volume 600 times smaller than for natural gas, making its storage and transport highly efficient. By comparison with conventional marine fuels, liquefied natural gas is regarded as exceptionally environment-friendly. Use of LNG significantly reduces emissions of sulphur, nitrogen and soot particles, as well as carbon dioxide.

Maritime energy transition: The present situation in shipping

Ships at present transport about 90 percent of world trade. With international exchange of goods booming, its share is tending to grow. Measured by its performance, shipping is the most environment-friendly carrier by a wide margin. Yet the aim must be to reduce pollution caused by shipping and to keep emissions low. Shipowners, shipyards and their suppliers are to implement the regulations of the International Maritime Organisation through specific operational measures and creative refitting of ships and fleets.



One question, two answers...

'Port of Hamburg Magazine' put five questions on maritime energy transition and the related future challenges to Ralf Nagel, Chief Executive Officer of the German Shipowners' Association and Malte Siegert, Head of Environmental Policy at the Hamburg regional association of NABU – Nature and Biodiversity Conservation Union.

In April the IMO - International Maritime Organisation decided that shipping should at least halve its global CO2 emissions by the year 2050. Reactions were mixed, for no firm, global solutions were agreed. Are responsible governments now to protect the climate by framing regulations that are just regionally binding? What would be the advantages and disadvantages?

Malte Siegert: Ocean shipping was not covered by the Paris Agreement which, however praiseworthy in itself, failed in that area. To that extent, the commitment from the IMO is welcome. Whether it produces anything must remain to be seen. If ships were operated as shore installations in Europe, they would need to be shut down immediately. That says a lot. We need effective emissions trading in relation

to climate gases and more regulations on atmospheric emissions; if necessary, with special solutions for Europe. Were all ports in Europe to agree, these – like those in California – could frame more regulations with transitional periods. The IMO would not be needed for that; ultimately, after all, the goods need to land somewhere. Ports need to exploit their own strengths and exert more pressure.

Ralf Nagel: The IMO climate strategy underpins ocean shipping's leading role in the battle against climate change. So reactions to the decision were wholly positive. We are actually the first industry to have internationally binding figures on CO2 reduction. The European Commission and the European Parliament have expressed satisfaction with the results. Violeta Bulc, European Transport Commissioner, has just



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Ralf Nagel
Chief Executive Officer of the German Shipowners' Association

confirmed this during a parliamentary hearing. Even the relevant NGOs recognize that the IMO has taken a giant stride towards increased climate protection. Not least, the industry itself drove the decision. That was very widely recognized, especially in the ranks of IMO member states.

The sulphur ceilings already set by the IMO boost development of technical innovations, but put tremendous pressure on the industry. To fulfil the regulations on climate protection, ships must be re-equipped or run on costly diesel fuel. That's a problem for shipowners, shipyards and the marine supplies industry, for cost pressure in the industry is high. How do you assess the situation?

Malte Siegert: The problem for climate protection is less the sulphur, but above all the soot from ocean shipping. This can drift up to 400 kilometres and deposit itself on Arctic ice. Sunlight is not reflected then, but absorbed. Soot emissions from shipping are meanwhile the second greatest driver for the climate after CO₂. But sulphur dioxide and nitrogen oxide make people ill and damage the environment. Externalizing of internal costs must stop. Naturally, pressure on costs in the industry is high. Yet if a smartphone can be shifted halfway around the globe for ten cents, or a t-shirt for just 0.1 cents, there is scope for increasing the share of transport costs to achieve more in terms of avoiding atmospheric pollutants. Shipowners cannot do so alone.

„We are open-minded on technology, because just now we cannot predict which systems will gain acceptance.“

Here producers have tremendous responsibility, but also the customers at the end of the chain.

Ralf Nagel: Equipping vessels with filter technology and the use of alternative fuels involve enormous costs for ocean shipping. Our trade association, the International Chamber of Shipping (ICS) estimates that the introduction of stringent worldwide sulphur ceilings from 2020 is the costliest-ever environmental measure in ocean shipping. Together with further extra costs, e.g. for the installation of ballast water treatment equipment, ICS puts the total figure for the world merchant fleet at 50 billion US dollars per year.

Against this background, we need uniform worldwide application and control of the regulations, especially on the sulphur ceiling. We want to see fair competition, namely. The shipping sector accordingly advocated that carriage of heavy oil as a fuel should no longer be permitted. The IMO aims to accept the call this autumn. That will mean the end for conventional heavy oil. Shipping will become even cleaner. Availability of sufficient low-sulphur fuel in all ports is equally important. Refineries and suppliers of bunkers need to ensure this.

The key to climate-friendly, maritime energy transition lies in more efficient engines and filters. Shipping requires greener propulsion systems. Hydrogen fuel cells, hybrid propulsion systems and gas-fuelled engines represent highly promising developments that are already even in use. Which technologies will gain long-term acceptance in the various areas of shipping?

Malte Siegert: There will be no 'one-fits-all' solution for shipping. On the longer trade routes between Asia and Europe, LNG vessels for the container segment of the kind now ordered by CMA CGM, will in future tend to be the exception. With cruise ships, progress could be more rapid. However, of a world

cruise fleet comprising around 400 ships, even by 2025 only around 15 will be LNG-fuelled. In recent years the major container lines have put into service or ordered numerous vessels with traditional propulsion systems.

These will operate in the long term on heavy oil plus scrubbers, or with diesel distillates with a sulphur content of under 0.5 percent. In short-sea shipping, development and use of other systems, whether LNG or fuel-cell, could proceed more quickly. Electro-hybrid or fully electronic solutions, as with some ferry operators on the Baltic, could gain ground for shorter distanc-

es. All the same, the answer should tend to be to banish negative repercussions by optimizing the existing fleet. For the roads, the European Commission has recognized the threat and regulated the situation by introducing appropriate norms covering diesel particle filters, nitrogen oxide catalysators and fuel that is one hundred times cleaner. The same regime must apply to diesel engines in ocean shipping, and also for waterways like the Elbe, where many people to the left and right of the river are affected. A renaissance of sail is desirable. At least, however, more widespread utilization of such proven support systems as Flettner rotors or kites.

Ralf Nagel: We are open-minded on technology, because just now we cannot predict which systems will gain acceptance. It is clear though that a total decarbonisation of shipping – as demanded in the IMO's CO2 strategy – can only occur using zero-carbon fuels, i.e. those causing no CO2 emissions. For international sea traffic and large ship main engines, such fuels and technologies are as yet non-existent. We are therefore anticipating such temporary answers as LNG. Electric propulsion will tend to be feasible for short routes, e.g. ferry links between

two ports, but not for Atlantic voyages. There we shall continue to need high-energy fuels. Yet these could in future be derived from regenerative energy sources – for example power-to-gas/liquid. It's obvious that we need a technological revolution and state support for research & development. This is not a trip that shipping can make alone!

From 2020, CMA CGM will be the world's first shipowner to operate mega-containerships with liquefied natural gas - LNG. Cruise ship operator AIDA are also going for LNG in future. However, many experts regard gas-fuelled engines simply as a bridging solution on the way to climate-neutral shipping. LNG scores with top figures on atmospheric emissions, but on CO2 values, is only among the also-rans. Hydrogen, by contrast, does not emit CO2 or fine dust or sulphur. Is the ocean shipping industry backing the wrong horse?

Malte Siegert: The problem with the fuel cell remains the high energy input required to gain hydrogen. Otherwise, car manufacturers would long ago have taken this technology further. LNG must remain a bridging technology. For all its good atmos-





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pheric emission figures, LNG remains a fossil fuel and is especially objectionable when generated by fracking, as in the United States. Besides, we are still in the dark on the actual outcome of methane slip, which is around thirty times more aggressive than CO₂. The gain on atmospheric pollutants could in certain circumstances be lost on climate. Transport is never good, but simply less bad.

Ralf Nagel: In the medium term, we see LNG as a sensible alternative, especially for substantially reducing atmospheric pollutants in ports and near the coast. The technology has long been tested and the international regulatory regime is up-to-date. Numerous ships already run on LNG. Many international ports, especially in Asia, are currently installing infrastructure for LNG bunkering.

Hydrogen has not yet progressed any further than pilot projects. There what we need is the already cited technology offensive. Meanwhile, LNG can be a good interim solution. In addition, even CO₂-neutral LNG can be produced using with renewable energies – infrastructure on land and on ships can also meet the IMO’s ambitious goals.

The working life of large containerhips and cruise vessels extends over several decades. Natural fleet replacement will not suffice for implementing the maritime energy transition – there is a demand for retrofit solutions involving installation of more eco-friendly propulsion systems. Conversion to lower-sulphur diesel fuel in combination with soot particle filters and SCR catalysators would cut emissions of greenhouse gas and atmospheric pollutant emissions by up to 99 percent. Is any continuous re-equipment of the world merchant fleet already apparent?

Malte Siegart: Only a few shipping companies are currently doing more than is legally required, since for various reasons corporate social responsibility certainly plays a part for many companies. Shipping companies really wishing to do more must be assisted with incentive programs. Norway is doing so with the NO_x Fund. I ask myself what are we waiting for. Those who are inactive need to feel by way of port dues that investment pays. Here too, away from the IMO, there is the chance of a level playing field for European seaports. And as I said, the customer must make a contribution.

Ralf Nagel: Greenhouse gases can only be avoided with non-fossil fuels. Air pollutants, by contrast,



Malte Siegart
Head of Environmental Policy at the Hamburg regional association of NABU

tend to be a local problem in heavily populated port cities. Here introduction of the stringent 0.1 % cap in the North Sea and the Baltic has already massively reduced sulphur emissions. In addition, stiff rules for ship newbuilds are ensuring a noticeable fall in nitrogen oxides.

Basically, retrofitting of propulsion technology or costly filter systems presents a special problem for shipping. The necessary investments, for instance for the conversion of a traditional ship propulsion system to LNG, can exceed the actual value of a vessel. In today’s markets, a shipping company cannot manage these alone. Here the public sector needs to offer incentives and assistance. Very sluggish planning procedures in the ports often hamper the use of new fuels. Lack of such permissions is among the reasons that there are still no LNG bunker barges in German ports. Shipping is naturally adapting itself to the new 2020 sulphur cap.

„Shipping companies really wishing to do more must be assisted with incentive programs. Norway is doing so with the NO_x Fund. I ask myself what are we waiting for.“

As in recent years, we shall also be reducing our CO₂ emissions. We are hoping here for assistance from the ports, especially in massively reducing waiting times before entry. Similarly, states are asked for their backing on research & development, also on the use of new technologies and fuels. Only by acting together shall we able to master this massive task. ■

Future containerships setting course for optimal environment balance

Sea trade is considered to be especially climate friendly. Breaking down consumption to each transported container, today's mega-vessels need less and less fuel and the emission of carbon dioxide seems slight too. A simple example: If we were to have our flat-screen TVs from China transported by truck, it would be a climatic catastrophe: one ton carried by ship only emits some 15g of CO₂ per kilometre – by contrast, a truck would emit 238g of CO₂. However, air pollutant

emissions in the shipping industry are substantial. Shipping lines, shipyards and the supplier industry are therefore called upon to implement IMO - International Maritime Organisation directives by refitting their ships and fleets to achieve climate neutral shipping. With technical and operational measures, such as optimized ship design, optimized propellers and optimized routes and speed, according to the IMO these can be optimally combined to reduce CO₂ emissions by up to 75%.



Shore-based power

Ships are already being equipped for shore-based power during quayside cargo handling.

Ballast water treatment on board

Today, state-of-the-art treatment systems, using special filter units and UV irradiation mean that water is so treated that it is absolutely pure and free of organisms, before it is re-

leased again. This ensures that there is neither contamination of the seawater by chemical products, nor uncontrolled introduction of alien species into the local ecological system.

Technical improvements leading to fuel and resulting CO₂ savings

Lighter shipbuilding materials

Improved propulsion

The latest engine generations, e.g. with electronic injection systems, reduce fuel consumption considerably.

Bulbous bow and hull configurations

With a slimmer bulbous bow and optimized hull configuration, the resistance to water flow is reduced and fuel consumption too.

Air resistance/Hull surface

Friction-reduced ship coatings, e.g. modelled on shark's skin, may serve to reduce fuel consumption.

Optimizing propeller/rudder

A 'twisted fin' in front of the rudder leads to a significant improvement in the performance of the ship's screw. Additionally, the water flow is improved and energy consumption reduced, cutting down on CO₂ emissions.

Shipowners are turning to alternative fuels to reduce sulphur emissions:

🚛 Liquefied natural gas (LNG)

🚛 Heavy fuel oil (HFO) plus scrubber

🚛 Heavy fuel oil (HFO) with less than 0.5% sulphur content

🚛 Marine diesel (MO/MDO)



DB freight cars whispering brakes

The majority of freight trains frequently criss-cross the country during the low-traffic night hours, causing noise and disturbing many citizens' rest.

This is why Deutsche Bahn or German Rail is investing major resources to considerably reduce rail traffic noise caused by its freight cars. What is pleasing is that DB Cargo – German Rail's freight specialist, with its approximately 64,000 freight cars, already sends out a good 70 percent of them on the tracks with "whispering wheels". Added to this are the 1,700 kilometres of track – equalling more than one-third of the 3,700 kms of particularly affected track – that have also been fitted with sound abatement measures. This includes equipping more than 58,000 homes with passive noise-emission protection, such as sound-resistant windows. For Manuela Herbort, German Rail's decision-maker for the federal states of Hamburg and Schleswig-Holstein, quiet rail freight traffic is one of the pre-conditions for seaport hinterland traffic switching from road to 'green' rail and continuing to make re-

al progress. Rail freight transport reduces damaging CO2 emissions and contributes towards climate protection.

"We are making great strides towards our goal of cutting sound emissions in rail freight traffic. Reducing noise directly at the source has an impact on the entire rail network. The application of quiet-brake technologies is the most important noise abatement measure in rail freight traffic," explains Manuela Herbort. Fitting what we call 'whispering brakes' prevents the wheels from becoming roughed up, which otherwise makes them louder.

By the end of 2020, DB Cargo will only be deploying quiet cars in Germany. At the end of 2017, roughly two-thirds of all freight cars were quiet. By 2020, the company's own fleet of freight cars will have been converted to the LL composite brake shoe. Since 2001, new

By the end of this year, the number of quiet freight cars in DB Cargo Germany's fleet will have grown to over 50,000. By the end of 2020, the entire active fleet will be on the move with a low noise level



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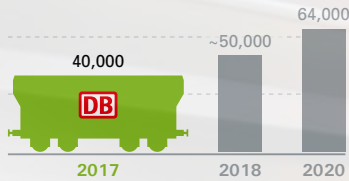
Rail noise abatement is making progress

By the end of 2017, around 1,700 kms of track with noise abatement and 40,000 freight cars upgraded

Noise abatement track in kms

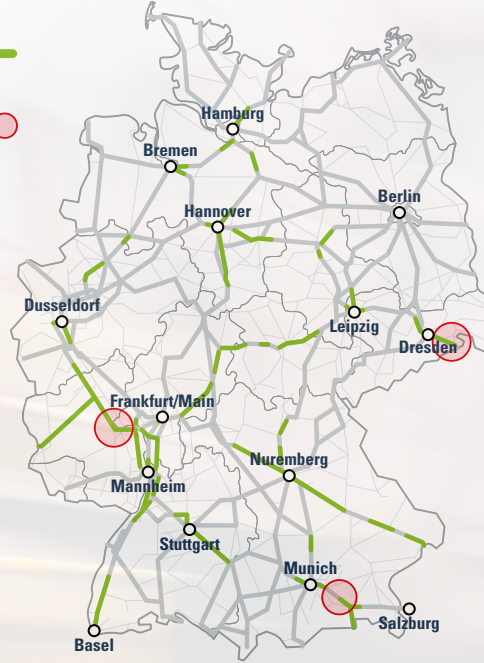


Upgraded DB freight cars:



Status at end of April 2018
44,000 freight cars with whispering brake shoes

Focal points for noise abatement —
Feasibility studies for additional measures in noise pollution focal points ○



© Deutsche Bahn AG

Source: DB Noise Report 2017

© Deutsche Bahn AG/Lothar Mantel

UP TO NOW THE FEDERAL GOVERNMENT AND DB HAVE INVESTED 1.4BN EUROS IN UPGRADING EXISTING TRACK. BY 2020, SEVERAL HUNDRED MILLION MORE EUROS WILL HAVE BEEN SPENT ON RE-EQUIPPING, UPGRADING TRACK AND ADDITIONAL MEASURES TO ALLEVIATE NOISE POLLUTION FOCAL POINTS IN THREE VALLEYS: THE MID-RHINE, UPPER ELBE AND INN

cars have already been purchased with quiet brake shoes. In the period covering 2014 to the end of 2020, the company is investing in excess of 200 million euros to re-equip freight cars. DB Cargo expects that the other freight car entities, such as fleet rental companies, will follow our example.

“Since 1999, we have been implementing the voluntary programme set up by the federal government for ‘noise abatement on existing federal rail tracks’. Along 3,700 kms of severely affected track in Germany, soundproof walls are being built and homes being fitted, for example, with soundproof windows. By 2020, a total of 2,000 kms should benefit from noise abatement. In Hamburg more than 43.6 million euros of federal funds have gone into the building of 25 kms of soundproof walls, as well as passive noise abatement in more than 1,800 homes,” adds Manuela Herbort.

Her colleague Andreas Gehlhaar is Environment and Noise Abatement Officer in the DB Group. It is clear for him too that DB will bring more traffic on to green

rail, as an active contribution to climate protection. “To achieve this, we need acceptance from both the commercial world and the residents on the spot. For this reason too, we shall keep our promise to reduce rail noise by half, by 2020,” says Andreas Gehlhaar. The DB Environment and Noise Abatement Officer’s Report creates transparency and provides comprehensive information, setting out the most important noise abatement measures. This is a two-prong approach, upgrading both freight cars and noise abatement along tracks with protective walls and soundproof windows. Parallel to this, new technologies are being developed for vehicles and tracks that, going forward, will provide even better protection against railway noise. To quote Andreas Gehlhaar, “Our twin strategy is working: We are reducing noise at its source by upgrading the cars with whispering brakes. And we are lowering noise pollution on the tracks with sound-proof walls and innovative noise abatement.” ■



Greenliner avoids heavy traffic in port – sustainable transport by water

At peak times in the Port of Hamburg, trucks nose to tail, progress at snail’s pace then Greenliner is in the overtaking lane. The inland-waterway shuttles run by logistics provider Rhenus Midgard and barge operator Walter Lauk connect the terminals in the Port and shortcut the heavy traffic. And there are other advantages: Firstly, good environmental balance due to low energy consumption and reduced harmful emissions, a considerable advance on road traffic. Greenliner is a sustainable and at the same time economical transport solution. Primary energy consumption of a truck is at 4.1 litres of diesel per ton kilometre, the inland-waterway vessels need only 1.3 litres of fuel. They emit only 20 percent of the carbon dioxide the trucks produce. The push boats on the Greenliners can be linked to three lighters, each with a loading capacity of 60 TEU. This means that one Greenliner can replace 180 truck movements.

The shuttle leaves from the Rhenus Midgard Terminal on Dradenau. “Greenliner has developed very well

and demand is constantly increasing. At the beginning it moved once or twice a week. Nowadays the port shuttles move every working day,” reported Helge Behrend, CEO for Rhenus Midgard in Hamburg.

The success of the inland-waterway shuttle can be measured over its ten years in operation. In 2017 alone, it was in action more than 250 times. The barges with a capacity of 1,400 tons transport not only containers but also flat racks, breakbulk and high & heavy cargo. “The slot booking and fee dues for late arrivals introduced last year have made the Greenliner even more attractive. The goods are delivered in good time to the Rhenus Terminal and then handled just in time, resulting in no delays,” explains Behrend.

In addition the authorization procedures for goods handling in the port area is less time consuming than for road traffic. It takes about one hour for Greenliner to get moving. In contrast to trucks, Greenliner can also function without limitations on every day of the week. ■

THE 'GREENLINER' INLAND WATERWAY SHUTTLE USED BY LOGISTICS PROVIDER RHENUS MIDGARD AND WALTER LAUK EWERFÜHREREI TO LINK TERMINALS IN THE HANSEATIC PORT FACES NO TRAFFIC JAMS



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Together for sustainable development of Tidal Elbe

The position of the Port of Hamburg in the heart of the city and a dynamic metropolitan region acts as a big plus for its economic, social and ecological development. It facilitates the economic, environment friendly mode of transport – sea-going ships - to come close to the markets. The environmental impact on a port is nonetheless both complex and challenging. Setting course for the ‘Green Port’, the main focus is on the Elbe as the ‘lifeline’ for the Port of Hamburg. Reconciling interests between forward-looking economic development and environmentally compatible measures is often beset by conflict. The Elbe Habitat Foundation has performed a balancing act, bringing representatives from the most varied of interests to work constructively around the same table.

The Elbe is among the most significant river systems in Europe. The Tidal Elbe, stretching some 150 kms between the weir at Geesthacht and the river mouth near Cuxhaven, has been cultivated by man for centuries. Through dyke building, floodplains were made usable for agriculture. Other economic and social uses such as fishing, local recreation and tourism are closely linked to the Tidal Elbe. Today, the Lower Elbe is also an important industrial location for aircraft manufacture and ship-

building, production of metals and steel, and chemical plants. And: The Tidal Elbe connects the Port of Hamburg, Germany's major seaport, to the world. The Port is the economic heartbeat for the Free and Hanseatic City of Hamburg. It depends on secure access and sufficient draft on the Elbe for the shipping traffic. The tidal areas of the Elbe are equally of great ecological significance. It is this tidal dynamic that creates such a rarely found habitat for rare plants and animals.

It is no secret that these really diverse requirements and interests are frequently difficult to bring under one roof. This is why the Free and Hanseatic City of Hamburg pursued an innovative path, giving the 'Stiftung Lebensraum Elbe' or 'Elbe Habitat Foundation' a legal basis. This is a good example of business & industry, nature protection and city-state, despite all their differences, singing from the same hymn-sheet.

The Elbe Habitat Foundation was endorsed in May 2010 by the Hamburg city-state parliament, either to implement its own projects for the improvement of the ecological condition of the Tidal Elbe, or to promote external projects. On the eleven-member Foundation board, for the first time representatives from business & industry, the City-State, and the environmental associations, jointly work out solutions for the Elbe tidal habitat. Some three million euros are available to the foundation annually to im-

plement measures and projects. The bulk of the funds are generated by five percent of port dues collected in Hamburg that are made available to the Foundation.

Dr. Elisabeth Klocke, Managing Director of the Foundation, is convinced of the value of its work: "With the Elbe Habitat Foundation, the City-State parliament brought a trend-setting project into being: stakeholders, whose interests could hardly be further apart but, who are committed to the Elbe habitat and economic area like no other, work together on pro-

"Stakeholders, whose interests could hardly be further apart, work together on projects."

Dr. Elisabeth Klocke, Foundation MD

jects." In the meantime, seventy of them have been tackled, or promoted by the Foundation, from removal of riverbank revetments, setting up tide-ways in the dyke forelands, educational activities for school classes and upgrading Elbe tributaries. "In 2018, there will be some 15 new projects," states this doctor of chemistry.

Claudia Flecken, responsible for upstream infrastructure on the Hamburg Port Authority (HPA) board of management, and a Foundation board member, is also convinced of their work: "The Elbe Habitat Foundation is a great success – from our point of view too, i.e., from the port angle. A healthy Tidal Elbe is also more robust when coping with human activity." What is more, by cooperating on the foundation board, cooperation and trust between the players on the Tidal Elbe have been strengthened. "This is in our interest, since we understand very well that maintaining a system-compatible depth of water long-term, will only be possible with the support or acceptance of other legitimate interests on the Tidal Elbe."

Without question, HPA's main focus of attention is safeguarding accessibility to the Port of Hamburg for the long term. "We are pursuing

a clear economic interest – for the prosperity of people in our region," says Claudia Flecken. "In the process, we have also learned that we can, again and again, pursue common aims with other interest groups. For example, river model measures such as giving the river back more space, serves both to maintain water depth and protect nature and water bodies." In this connection Elisabeth Klocke points out another project: "A di-

alogue process promoted by the Elbe Habitat Foundation, the 'Tidal Elbe Forum', is preparing the way so that in future even major projects, such as creating tidal capacity by moving back dykes, or restoring connections to old tributaries of the Tidal Elbe, can be implemented." The Tidal Elbe Forum is the platform for a structured, objective dialogue between the neighbouring federal states of Hamburg, Lower Saxony, Schleswig-Holstein, the federal ministries, plus the counties, local authorities, associations and organisations from the region. The overriding aim is to identify and prioritize river-model measures that will promote sustainable development of the Tidal Elbe.

The Elbe Habitat Foundation is unique across Germany, demonstrating that it is possible for representatives from the most diverse viewpoints to work constructively and trustingly together. In the meantime, it is serving as a role model, send-

ing out a clear message, well beyond Hamburg's city limits. Through interaction and dialogue, the prospects for ongoing economically worthwhile, and equally sustainable, development of the Tidal Elbe are more than promising. ■

For further information on the organisation and work of the Elbe Habitat Foundation and the Tidal Elbe Forum: www.stiftung-lebensraum-elbe.de and www.forum-tideelbe.de.

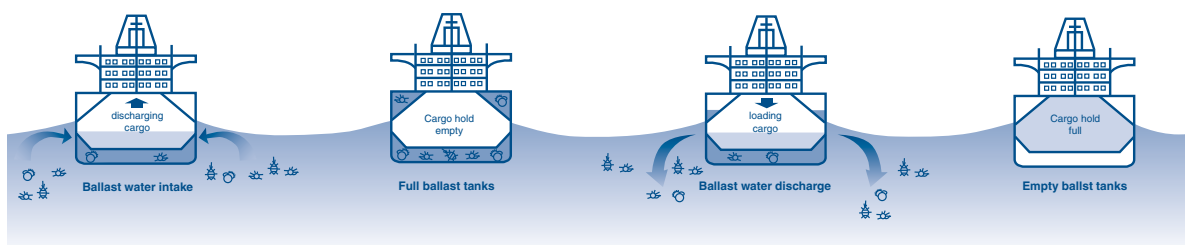
"The Elbe Habitat Foundation is a great success – from our point of view too, i.e., from the port angle."

Claudia Flecken – HPA and Foundation board member



ONE OF A TOTAL OF 70 FOUNDATION PROJECTS: DISMANTLING RIVERBANK REVETMENTS AND UPGRADING DYKE FORELANDS, SUCH AS HERE AT WRAUSTER BOGEN, PROVIDE SUITABLE HABITATS FOR ANIMALS AND PLANTS

© Johannes Arit



Organisms can be carried into other regions in ballast water. Some of these can be invasive types that can adversely affect ecosystems in their new environment

Ballast Water Convention: a milestone in marine environmental protection

Worldwide transport of freight of all kinds by ocean-going ships also causes organisms to be transported with the ballast water in the ship's tank. These are not listed on bills of lading. They also land such stowaways at points on earth that cannot be numbered among their natural habitats.

What scientists have established in this context is truly astounding: The process of taking on and disposing of ballast water so indispensable for shipping is one of the main causes of the global transfer of species. Ballast water is used to ensure a ship's stability, which can be affected by weight alterations depending on the status of the cargo, for instance during loading or discharge. In Germany a widely known example of 'illegal' immigration of this kind is the Chinese mitten crab, which was already brought from Asia early in the 20th century in merchant ships' ballast water and has meanwhile spread far and wide. Living conditions for this crab in Europe are so favourable that it is already found there in rivers too. Algae, mussels, fish and other groups of organisms also appear with ballast water in habitats they have not so far not used, and correspondingly alter these.

To restrict, and if possible prevent, this uncontrolled transfer of alien species on board ocean-going ships in future, back in 2004 the International Maritime Organisation – IMO – drafted the International Convention for the Control and Management of Ships' Ballast Water and Sediments. After 13 years, and numerous negotiations among IMO member countries, at the beginning of September 2017 the Convention fortunately came into force. Among other measures, it lays down the conditions for discharge of ballast water and thus puts a stop to its hitherto uncontrolled disposal. In the long term, most vessels will install ballast water treatment systems, for handling this appropriately before its release into the marine environment. That involves the use of both physical processes, for example irradiation with ultra-violet light, and chemical ones, amongst them the use of ozone or chlorine, to destroy the organisms contained in ballast water. In addition, mechanical cleaning, for instance with filters, is often activated prior to use of the treatment system itself.

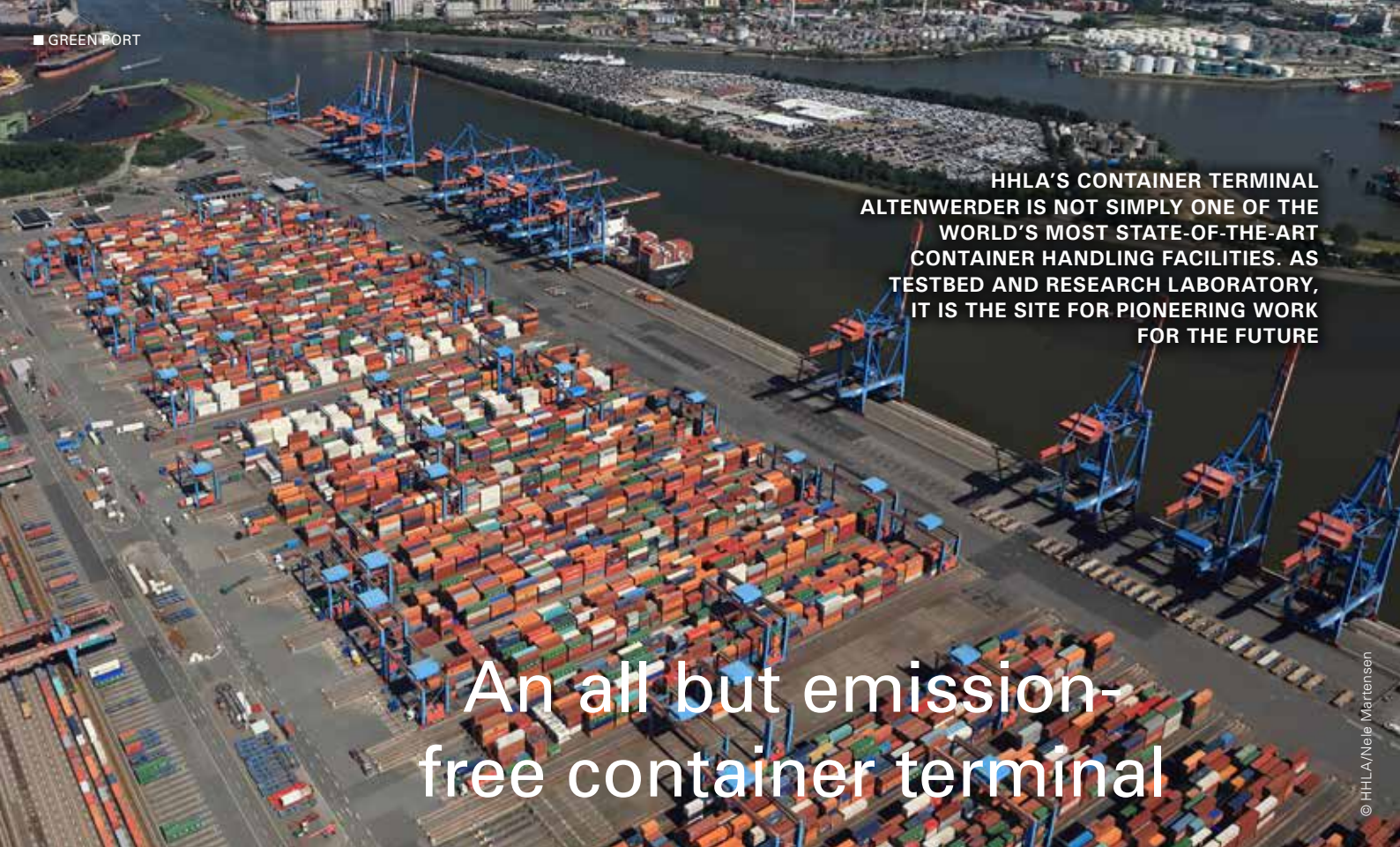
For Monika Breuch-Moritz, President of the German Maritime and Hydrographic Agency (BSH), the Ballast Water Convention is a milestone in maritime environmental protection. "Organisms can be carried into other regions in ballast water. Some of these can be invasive types that can adversely affect eco-systems in their new environment. The Ballast Water Convention regulates control and treatment of ballast water in shipping, to minimize or to banish spread of harmful water organ-



The Chinese mitten crab was already carried from Asia to Europe early in the 20th century

isms and pathogens," explains Monika Breuch-Moritz. The rules in force since September 2017 lay down that before being released into the marine environment, ballast water is only acceptable provided that it meets the standard prescribed for the ship concerned. Even if a transitional period is still provided for meeting the strict D-2 standard, all ship newbuilds must observe this. In Germany, the International Ballast Water Convention has already been implemented through the Ballast Water Act and the Maritime Environment Order. ■

Detailed data is available at: www.deutsche-flagge.de/de/faq/umweltschutz.



HHLA'S CONTAINER TERMINAL ALTENWERDER IS NOT SIMPLY ONE OF THE WORLD'S MOST STATE-OF-THE-ART CONTAINER HANDLING FACILITIES. AS TESTBED AND RESEARCH LABORATORY, IT IS THE SITE FOR PIONEERING WORK FOR THE FUTURE

An all but emission-free container terminal

© HHLA/Nele Martensen

Electric propulsion is the mobility system of the future. So far, Germany has not exactly shone as a pioneer in this area. Its automotive industry for a long time overlooked the trend. Now it is striving to catch up. Yet here in “drivers’ paradise” the proportion of electric vehicles remains absolutely tiny. Not the least reason is shortage of infrastructure, or dearth of charging stations. It’s all the more gratifying that a Hamburg-based port enterprise is among the leaders on electro-mobility. Hafen Hamburg und Logistik (HHLA) is well on the way towards making an existing facility the world’s first zero-emission terminal. The aim is complete electrification of the site, with all operations running entirely on eco-power.

Ever since opening in 2002, HHLA’s Container Terminal Altenwerder (CTA) has been among the world’s most state-of-the-art facilities. With its automated, software-based processes, and even then a high degree of electrification and highly productive use of space, from the start CTA was seen as a milestone in terminal development. Reason to sit back? No Way! With its innovations, HHLA is constantly taking its CTA further into the future. In short, the facility is now a testbed and research lab doing pioneering work for tomorrow and beyond. From the start, its biggest achievement was deployment of driverless AGVs - Automated Guided Vehicles - to transport containers as if by magic from the waterside to block storage. The first diesel-powered vehicles were followed by low-emission diesel-electric AGVs. First battery-powered heavy-load vehicles with lead batteries entered service in 2011. In autumn 2016, the prototype of an AGV using modern lithium-ion technology then transported containers across CTA for the first time. Tests of operation using an automated charging station proved successful. In April 2018, HHLA announced the acquisition of 25 of these AGVs powered by ion-lithium batteries. These should enter service at CTA before the end

of the year. By the end of 2022, the fleet of almost 100 AGVs here should have been completely converted to using lithium-ion batteries. In addition, twelve charging stations will have been installed to reinforce the present six. The new e-vehicles score, not just for sustainability, but are attractively economical. With the ratio of energy used to actual propulsion output of diesel AGVs, they are three times more efficient than their first-generation diesel-powered predecessors. Additional advantages of lithium-ion batteries are a charging time of around one and a half hours, and longer working life. In addition, they weigh just four tons, compared to twelve for lead batteries. Unlike those, they even require no maintenance. That cuts costs and reduces workshop downtime. “Commercial success and sustainable operations are not mutually exclusive,” said HHLA’s CEO Angela Titzrath during a presentation of these innovative transport vehicles. “In the past, AGVs were CTA’s heaviest fuel consumers,” explains Jan Hendrik Pietsch, HHLA’s Sustainability and Energy Management Officer. “We had been consuming five million litres of diesel here every year, so our sustainability strivings at CTA are focussed on the AGV.” With some suc-

New AGVs charge their lithium-ion batteries automatically at one of the charging stations.



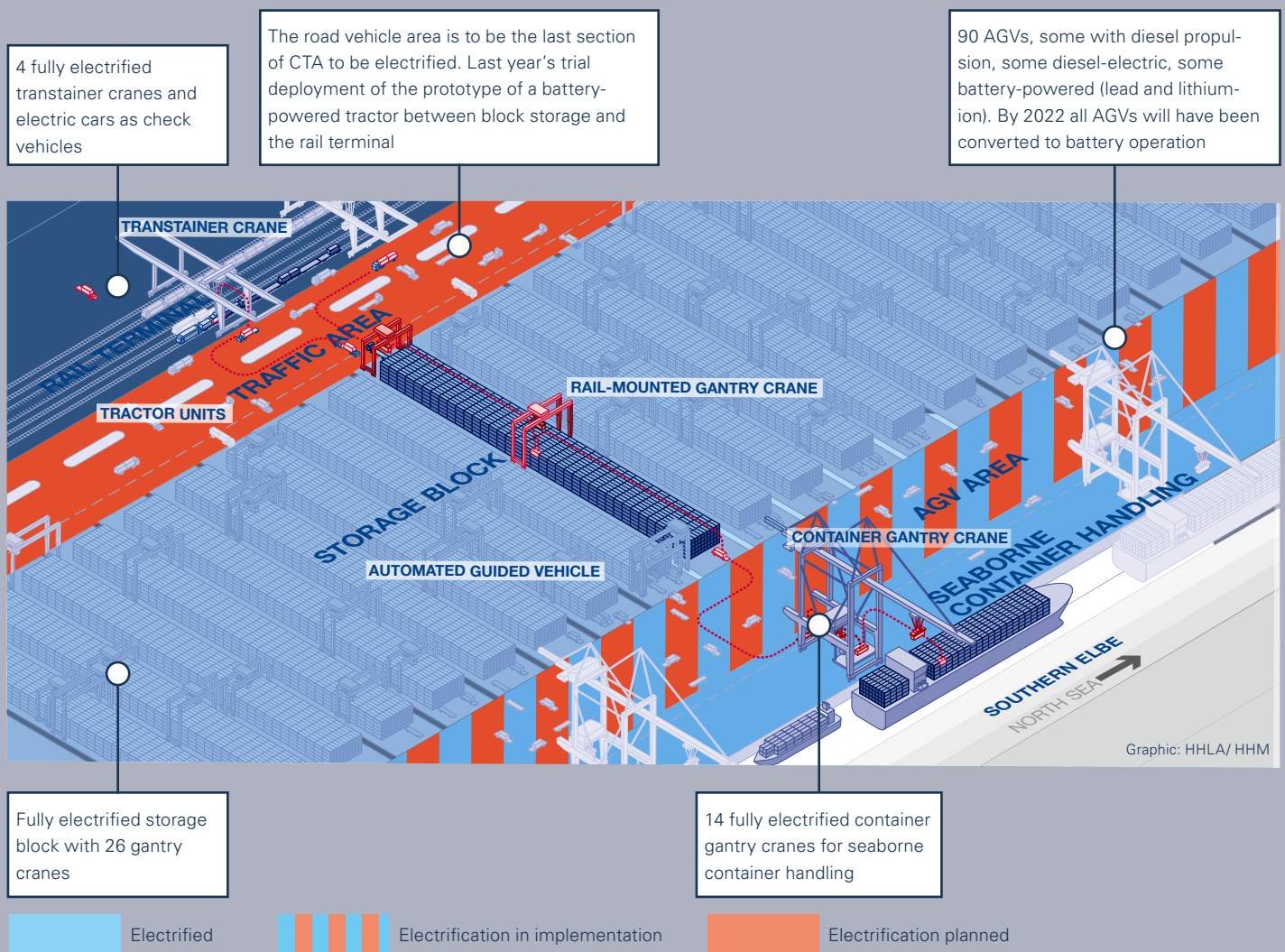
© HHLA/Nele Martensen

cess, since the new eco-power AGVs will in future produce annual savings of around 15,500 tons of CO2 and 118 tons of nitrogen oxide. "We are therefore very close to our aim of an emission-free container terminal," said Pietsch.

As the last section of the terminal, diesel-powered vehicles are only still in use for transporting containers between electrified block storage and the container rail terminal. "Yet there too we are already planning for the future," said the ecology expert. "At the end of 2017 we successfully completed a research project into operation of tractors powered by ion-lithium batteries." Along with Konecranes, the prototype of an electric tractor plus a container with a charger has been developed and exhaustively tested with CTA as the testbed. Just when the tractors can be converted to battery power, however, is still not clear. Pietsch: "So far, no series production facility exists. And without this, nothing goes. We are not manufacturers. In addition, we shall require functioning maintenance,

service and spare-part infrastructure. We are seemingly a step ahead of development." All the same, he is convinced that the next few years will bring further progress on the market, enabling these last diesel-powered vehicles to be converted to electric operation. Then the world's first totally emission-free container terminal world actually become reality. ■

Electrification of HHLA's Container Terminal Altenwerder (CTA) in Hamburg



Graphic: HHLA/ HHM

Recycling specialists for ship's waste

Ships calling in the Port of Hamburg can dispose of waste of all types generated while on voyage: These include ship's waste, wastewater, oil residues/mixtures, as well as remnants from cleaning equipment, in unlimited quantities. Around 18,000 calls by ocean-going and inland waterway vessels produce a substantial quantity of waste, whether originating from cargoes or operations.

Green Ports (Hamburg) is one of the biggest waste disposal companies in the Port of Hamburg. On Kattwyk peninsula at the centre of the Port of Hamburg, since 2015 this company with Greek origins has operated the most cutting-edge facility for the disposal and recycling of oil-bearing, liquid marine, industrial and commercial waste. Over three years ago, its Piraeus-based parent company H.E.C. Europe Limited expanded into the German market and acquired the traditional base of HÖG - Hamburger Ölverwertungs-Gesellschaft. H.E.C. Europe Limited was immediately committed to environmental protection, possessing as it does many years of experience in creating tailor-made, state-of-the-art services for all aspects of the oil waste sector. In January 2016 a further branch, Green Ports (Gibraltar), was opened.

"The acquisition in Hamburg enabled us to successfully expand our international network and establish a facility

for maritime and industrial waste water disposal in the centre of Northern Europe. We meanwhile employ 55 people in Hamburg and in the process are continually modernizing our plant and fleet," explains CEO Captain Dimitrios Melidis. Green Ports (Hamburg) operates a separation plant for treating oil-water mixtures that includes a 26,500 cubic metre tank farm, a plant for processing emulsion mixtures from industry and two units for handling sludge. A wastewater cleaning unit is also on-site.

These facilities collect and handle all waste caused by ship operations, as defined in the provisions of the MARPOL Convention – including ship waste water, oil residues/mixtures and remnants from cleaning equipment. Total volume: Up to 120,000 tons per year. The oil/water mixtures are collected by special tankers/barges with capacities of between 150 and 3000 tons, and



CHEMICAL & PHYSICAL PROCESSES CONVERT THE OIL/WATER MIXTURES IN THE SEPARATING UNIT INTO THREE BY-PRODUCTS: HIGH-GRADE HEATING OIL, WATER AND DRY SOLIDS

© Green Ports (Hamburg)

delivered either via the company's own handling equipment or by special tankers. Other waste disposal companies operating in Hamburg also use the plant to dispose of collections of ship's waste.

The process of treating ship's waste in the plant is truly fascinating. Chemical & physical processes convert the oil/water mixtures in the separating unit into three by-products: High-grade heating oil, water and dry solids. "We sell the oil recovered to local industry or export it. The dry solids are ecologically disposed of in special units, and the purified water is fed into the Elbe," explains

Captain Melidis. One serious challenge is that the collected wastes are not always of identical quality, and therefore need to be handled and treated completely differently – a technologically very elaborate process consuming a great deal of energy. "We run extremely strict quality controls. We also cooperate with a renowned, certified external laboratory that conducts the essential chemical analyses to ensure fulfilment of all the criteria laid down by the Ministry of the Environment & Energy, and our customers. The water that results from treatment is so pure that it meets the official requirements for being fed directly into public waters," explains Captain Melidis. ■

Disposal of Ship's Waste

The International Convention for the Prevention of Marine Pollution by Ships, or MARPOL for short, is the most important body of regulations on environmental protection in deepsea shipping. With only a few exceptions, disposal of ship's waste of all types at sea is forbidden. In the EU the MARPOL Convention is supplemented by Directive 2000/59/EU on Port Reception Facilities for Waste from Ships and Cargo Residues. The Directive aims to promote shore-based disposal of waste

from ships. Appropriate reception facilities are readily available in the ports. In addition, the Directive obliges ocean-going ships, at latest 24 hours before calling at an EU port, to report via a central system on the type and quantity of ship's waste and cargo residues to be unloaded and/or remain on board. The port police of coastal states conduct regular inspections of ships. These include checks on the oil, cargo and waste record books prescribed by MARPOL. The ship's crew must completely document waste disposal and be able to display the corresponding disposal receipts.



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Technology and environmental specialists man fire station

The Port of Hamburg annually handles about 25 million tons of hazardous cargoes. Strict safety regulations apply to transporting and storing these. Should an incident nevertheless arise that involves dangerous substances, then Hamburg Fire Brigade's Station 32 is called out. Manned by technical and environmental specialists, the post ensures that risks for human lives and environmental damage are averted.

Hamburg Fire Brigade's Station 32 – Technology & the Environment – and its staffing & equipment are unique in Germany. The post on Neuhöfer Brückenstrasse lies in the middle of the Port of Hamburg and specializes in environmental protection, a professional approach to hazardous substances and rendering technical assistance. The area covered embraces not simply the port, but also the entire urban expanse of the Free and Hanseatic City of Hamburg. "We assist all 17 fire and rescue stations plus the 86 voluntary fire brigades in Hamburg," explains Ullrich Scholz, the station's Measurement Coordinator. "Whenever indefinable smells are noticed, or liquids start leaking, then our specialists in technology and environmental protection from Station 32 rally round," adds Werner Nölken, press spokesman for Hamburg Fire Brigade. The specialized station in the Port of Hamburg was set up almost three decades ago. The location was well chosen, at the time calls about dangerous cargoes in the port occurred almost daily. The challenges became more and more complex and one-off, no longer being such as to be covered by the range of training of a 'normal' fireman. Analysis and measurement technology, environmental service, remote sensing, radiation protection, fire-fighting and coun-

ter-measures are just a few of the main tasks now undertaken by the specialists of Station 32. "With requirements changing all the time, we undergo further education and training throughout our working lives," says Scholz, himself a graduate environmental technologist and laboratory chemist. When the LNG barge entered service in the Port of Hamburg, for example, fire brigade members from Station 32 received comprehensive relevant training. Meanwhile, however, the main deployment area for members of the station has shifted from the port to the city generally. Every year, the 90 staff of Station 32 here respond to about 1500 calls, yet only a tiny proportion of their sorties are in the port. "Strict rules apply to handling dangerous goods in the port and these are very effectively implemented by companies there. And packing of materials has improved greatly in recent decades," confirms Nölken. So barely any assignments come up in the port. "And even if something is dripping out of a container, the box is usually in a hazardous goods tank by the time we arrive." Where needed, fire-fighting tenders of the Hamburg Fire Brigade can support Station 32 from the water-side. The fleet anticipates growth plus renewal in the next few years. A new, state-of-the-art fire-fighting

To modernize its fleet and cater for the rising number of mega-ships in the Port of Hamburg, this year the Hamburg Fire Brigade will receive a new, state-of-the-art fire-fighting boat

boat is due to be delivered by Fassmer shipyard in Berne in August and is expected to enter service before the end of the year, this in response to ever larger ships. Since this 43-metre newbuild can no longer be deployed in narrow canals, in 2019/2020 two smaller, 16-metre craft will replace the fire tenders still in use. Then Hamburg will have one of the world's most modern fleet of fire-fighting craft. ■



© Hamburg Port Authority

“Protecting environment has always played a major role”

UMCO Academy’s training programme comprehensively integrates the topics of sustainability and environment-conscious action. Especially in the chemical field, the implementation of the latest standard has always been top priority. Companies and handling operators in the port put their faith in safety and ‘green chemicals’.

Founded more than 35 years ago, and for more than 20 years in the hands of three managing partners, UMCO has developed into one of the leading international consulting houses in the fields of chemicals, pharmaceuticals and logistics. With 70 staff the Hamburg company takes care of some 1,000 firms worldwide when it comes to environment and safety at work, plant security and handling dangerous goods. UMCO feels a special proximity to the port in its home city, knowing through many years of experience and ongoing consulting for many port operators, about the permanently changing challenges for port players.

“Environment-conscious action has always been a topic for us. Not only we, but the law too, have grown



Ulf Christoph Inzelmann,
managing associate of
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with the multi-faceted challenges in the chemical field. The products, their handling, warehousing, all the way to chemical management call for precision and sensibility. This involves safety, minimising risks and being accepted by the general public,” explains Ulf Christoph Inzelmann, managing partner at UMCO. Seen like this, environmental protection resonates throughout a range of courses and in the consultancy business. Sustainability is no trend for UMCO, but just commonplace – the expected standard. Fundamentally, in training and consultancy, environment protection breaks down into three aspects: Avoiding environmental impact when handling chemicals, implementing measures to improve emission levels and preparing for possible effects

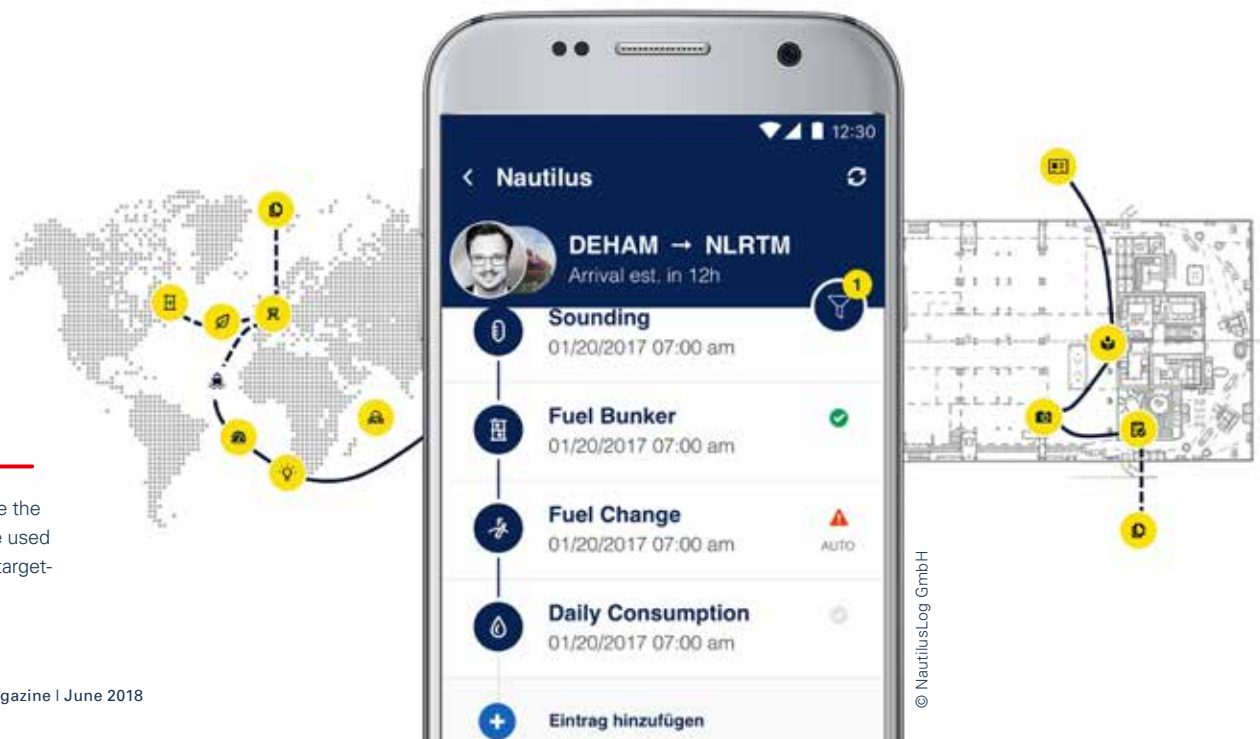
of foreseeable climate change. The gathering impact of climate change present the port world with new challenges. How can sites and plant be secured against ongoing periods of frost or thawing. High water or increased precipitation? What does this mean for handling materials that are hazardous to water? These are sample questions worked out by the UMCO team and included in their training courses. The range of training courses grow organically, oriented equally to new laws and customer needs. UMCO itself tries to set a good example and is the environment partner of the city-state of Hamburg and a member of the clean air ‘Luftgütepartnerschaft’ partnership. ■

Using apps for environmental protection and sustainability

Startups can be found where there is space for innovation. Especially where innovation is really needed. Shipping faces great challenges, to align economic efficiency and environmental protection.

EU Directive 2015/757 (MRV) already came into force on 1 July 2015. The aim of the MRV directive - Measuring, Reporting & Verification - is to improve insights into fuel consumption and CO2 emissions in the shipping industry in the European Union. Since 1 January 2018 operators of seagoing vessels with gross tonnage of over 5,000 are now obliged to document

their CO2 emissions on voyages between EU ports, including during lay time. A Hamburg startup has taken on the challenge. NautilusLog GmbH offers seagoing vessel operators an app to monitor their fleet’s CO2 emissions. A digital logbook for shipping that can be used on a smartphone directly from the bridge or from the office. Ot-



Using a smartphone the Nautilus app can be used on board to call up targeted data and tasks

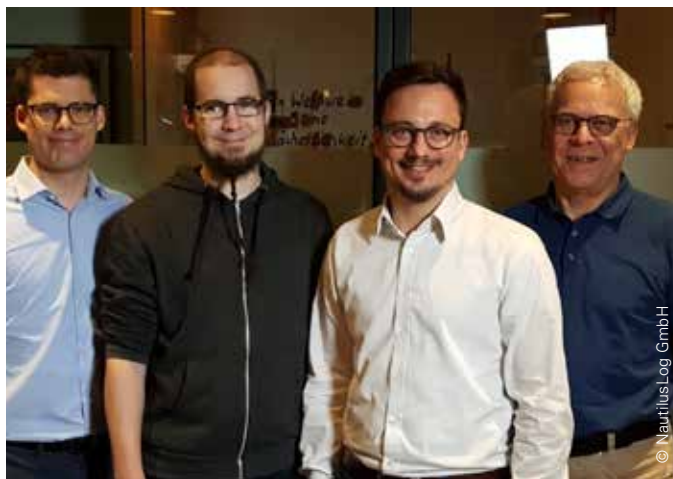
to, Ingo and Moritz Klemke as well as Sven Hamer are the founders behind Nautilus. The idea for the app came in response to very slow digitalization in the shipping industry. "New regulations increasingly spurred the need for digitalization in the maritime sector", says Otto Klemke, head of products and sales at Nautilus.

The app offers many advantages and relieves management on land, the crew on board, as well as external service providers. Data that in the past was collated by hand on paper can now be captured and used fully automatically by the app. Crew members are informed by the app what jobs are to be done, for example a reminder to switch fuel before reaching an environmental zone, meeting the regulations in force. Numerous information reports can be generated at a click by the new app. The app is easy to set up and use: Everything you need is already on board. Most MRV relevant data can be captured automatically, for example via GPS sensors.

The new Nautilus app is at present in the pilot phase with shipping lines and maritime

service providers: The integration of external expertise has high priority in the further development process. "Anyone interested can get in touch with us, by all means to influence specific topics and further develop the app," explains Otto Klemke.

Nautilus supports digitalizing environmental protection, especially environmental awareness in shipping. This sector has real potential going forward for further innovation, especially for startups. ■



The founders of NautilusLog GmbH: Moritz Klemke, Sven Hamer, Otto Klemke and Ingo Klemke (from l.)

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LOGISTICS



Zippel lays foundation/ cornerstone for CO2 optimized transport chains

They have vision and are acting in a pioneering role. The Zippel Group has made environmental protection its goal. They have a model transport solution in place between Leipzig and Hamburg showing how CO2 emissions can be almost completely avoided – effective across all modes of transport. Today customers come specifically to Zippel Group asking for eco-friendly transport. The CEOs Axel Kröger and Axel Plaß reported to Port of Hamburg Magazine in an interview.

Customers explicitly request environment-friendly solutions - Is that a new trend?

Axel Plaß: The mood in the market has changed. Sustainability has gained in importance, so that today we hear our customers say, "It can cost a few cents more." In other words they will accept higher prices more easily when they are linked to CO2 optimized transport. The companies profit with a smaller carbon footprint and gain a much better public image through eco-friendly action.

What measures have you carried out to improve CO2 in the transport chains?

Axel Kröger: Since February this year we have transported automotive parts for BMW from Leipzig to Hamburg, before they are shipped to China. Contai-

ner transport between the BMW packing station in Leipzig and our intermodal terminal in Schkopau is carried out using a total of four Scania CNG trucks. They are fuelled by locally produced biomethane and eliminate almost all CO2 and fine particle emissions.

Plaß: In Schkopau we load onto the already environmentally-friendly railway. In addition our locomotive is fuelled by Norwegian eco-power. This is hydroelectric power from a maximum 10-year old power plant.

In concrete terms, what advantages do you get from the CNG trucks?

Kröger: Technically speaking biogas saves up to 94% of CO2, up to 95% fine particles, and up to 80% nitrogen oxide, over a conventional diesel engine. Noise

Biogas-powered trucks from Scania ensure clean transports



Axel Kröger

Managing Partner, Konrad Zippel Spediteur GmbH & Co. KG



Axel Plaß

Managing Partner, Konrad Zippel Spediteur GmbH & Co. KG

can be reduced up to 90%. A case in point is our trucking in Leipzig, taking the transport route and amount of cargo from the customer into consideration we can save about 423 tons of CO2 a year.

Do you have further plans to expand use of environmentally-friendly transport?

Kröger: Our aim in the long-run is to achieve entirely CO2 neutral intermodal traffic. We have a long way to go, but we are already thinking in concrete terms about getting 10 more gas trucks.

Does such a pioneering spirit bring risks along with it?

Plaß: We are breaking new ground by taking on CNG trucks. Leasing them was not possible as the repurchase value is still unknown. So from that standpoint you could talk about a risky investment. But on the other hand there are the positive aspects, environmental support, customer retention and winning new customers. We're backing biogas.

How do you come up with the outstanding ideas that you actually realize?

Plaß: We both have the motivation to improve continually. We want to offer the best. That means being close to the customer, observing the sector closely and always being in dialogue with our team. We are involved in associations and maintain political links.

Kröger: Things happen in our office. Every day we meet our managers there for strategic and operative planning. This is how we get our ideas onto the roads and tracks. ■

One more interesting factor is that our drivers are really impressed by the new trucks. They are proud to drive the environmentally-friendly semi-trailer tractors, which do not differ much in handling to the diesel trucks. They are also happy not to smell of diesel every day any more, and to be quieter on the roads.

Plaß: It should also be pointed out that if a ban on diesel comes, we will still be on the road. This is a plus for all forwarders and truckers as well as customers, who can rely one hundred percent on our deliveries.

You use environmentally-friendly power all the way to Hamburg. How do you cover the last few metres before loading onto the ship?

Plaß: In the Port of Hamburg shunting is still done using diesel. But we are pushing for change and plan to buy a hybrid locomotive. This would contribute greatly to reducing fine particle emissions. From an economic standpoint, one very attractive factor for us is that Hamburg Port Authority rewards those who take environmental protection measures with favourable conditions.



Write to me at: facebook.com/ppickhuben

PETER PICKHUBEN'S PINBOARD

Water data always available in Hamburg

Those who pursue watersports might want to know the water quality of the Bille, Alster etc. No problem: The water data Hamburg app issued by the Institute for Hygiene and Environment in Hamburg is always up to date. It is continually fed with values such as chlorophyll content, water temperature and algae development. Data is updated hourly, as the various monitoring stations in Hamburg's waters, a total of ten check and provide data every hour. A map function in the app shows the exact locations of the monitoring stations. Individual values have long been available on the Institute's webpage but the app makes it easier for all anglers, water sports fans and hobby biologists to access. The monitoring data is shown in easy to see graphs or lists. In addition, a web service makes it possible to export the data or to show it on other webpages or apps.

Hamburg is the first German federal state to have an app of this kind. A free download is available from Google (Android) or Apple (iOS).



© Institute for Hygiene and the Environment

PORT BEES

Why are bees so important? It is easy to answer the question. They are the world's third most significant working animal, pollinating almost 80 percent of all the farmed and wild plants used by humankind. Their importance has only become apparent to many in the last few years, as we have seen whole bee colonies wiped out by pesticides and other harmful substances. This is why HHLA, Hamburger Hafen und Logistik AG, launched a project in 2015 and has since then kept eight beehives at their Container Terminal Altenwerder (CTA). Almost 320,000 bees show clearly that despite the around 18,000 ships calling annually in the port nature and vessels can co-exist happily. During the last three summers, many honey lovers among the employees of HHLA have bought the 'hafengold' brand of honey, which is only available for HHLA employees. Beekeeper Stephan Iblher is very pleased with the product. He always dreamed of making a port honey. The purity of the honey is checked regularly by a renowned international foodstuff institute. They have found no traces of lead, glyphosate or polycyclic aromatic hydrocarbons. Iblher describes last year's harvest as a typical summer honey, minty fresh and flowery, with a dominant taste of linden. In Hamburg HHLA is joined by BEEsharing to sustain the bees. The network established in Hamburg, rents out the buzzing helpers to fruit growers in the Elbe region and oversees professional operations for these flying employees. On the one hand, this is important to improve the harvest and on the other, it helps to maintain a natural habitat for the bees. From 2018 BEEsharing will be presented in a bee promotion container at the Hamburg wholesale market where young and old can obtain information on the importance of bees.



© HHLA



© Maritime Circle Line

PROTECTING THE ENVIRONMENT BY CUTTING SHIPS' EMISSIONS

Everybody enjoys breathing clean air. At the end of 2016, Hamburg Port Shipping Association – Hamburger Hafenschiffahrtsverband – launched a pilot project to make the air in the Port of Hamburg cleaner and to cut emissions. Several medium-sized operators with a total of 20 vessels operated for a trial period of four months with GTL – Gas-to-Liquids –, i.e., liquefied gas. At the time, monitoring indicated lower discharge of soot particles, nitrogen oxides and carbon dioxide. After this trial, the company Maritime Circle Line, one provider of harbour boat trips, opted for continued use of the synthetic diesel fuel. The 'new' fuel is not simply low-sulphur, but completely 'sulphur-free'. "So our staff, and above all, our guests, are no longer exposed to harmful sulphurous gases," says Gregor Mogi, CEO of Maritime Circle Line. He is totally convinced by the product and also accepts that it is somewhat more expensive than normal fuel. The engine is also not quite so powerful, but the guests can be happy about that: their port round trip lasts a little longer. An additional positive side-effect is that the engine is quieter. Nor does this form of environmental protection require any rebuilding of the engine.

Hamburg to host ITS Congress in 2021

Higher, faster, farther – these are maxims pursued especially by the technology and mobility sectors. The City of Hamburg also observes them. In 2021 it is to host the ITS Congress, which rotates annually between America, Asia and Europe. The Hanseatic City aims to demonstrate how new ways of networking between mobility as well as IT and communications technologies can be harnessed to boost the efficiency and sustainability of transport. Especially in the light of restricted space and economic capacities in cities, this is something essential. Even now, Hamburg is acting as a pioneer. In the wake of Hamburg Port Authority (HPA)'s smartPort project, an intelligent road has been developed in the Port of Hamburg. This collects a variety of data that facilitate improved conclusions, for example on the maintenance of infrastructure. Yet digitalization has also reached roads outside the port: Traffic flow there is controlled with the aid of road traffic cameras that enable regulatory measures to be implemented more quickly. In the event of accidents, the system can also alert rescuers with minimum delay. The city's car parking systems are also networked, enabling display panels or mobile units to notify drivers in real time of a suitable parking opportunity with a space free. 'switchh' also intermeshes local public transport and car-sharing providers. Once registered with 'switchh', a customer can use the Hamburg Public Transport Association (HVV)'s app to make purchases, orders, bookings or reservations for public transport, various car-sharing providers and rental bikes (StadtRÄDERN) in Hamburg, as required, and then switch back, e.g. from bike to car to public transport.



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Port of Hamburg Marketing goes for green mobility

In Hamburg much is done for love of our environment: e-mobility, environment-friendly fuel for shop operation – the list is long. For many companies operating in this port & logistics region, sustainability and environmental protection top their agenda. The Executive Board of Port of Hamburg Marketing is also all for green mobility: For twelve months now, Axel Mattern has been driving a plug-in hybrid, a car with hybrid propulsion. It can be loaded from the mains, through both its accumulator and its internal combustion engine.

“Especially for customer appointments in Hamburg and the Metropolitan Region, the car is first choice, because it can cover more than 50 kilometres on electricity – ideal for short distances and in urban traffic,” says Mattern. The vehicle is naturally received a ‘green’ charge, with power from a household socket. Axel Mattern has so far not regretted the change: “Whenever it makes sense, I should like to see more of my colleagues in the sector switching to e-mobility to achieve an improved CO2 balance.”

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Credits

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