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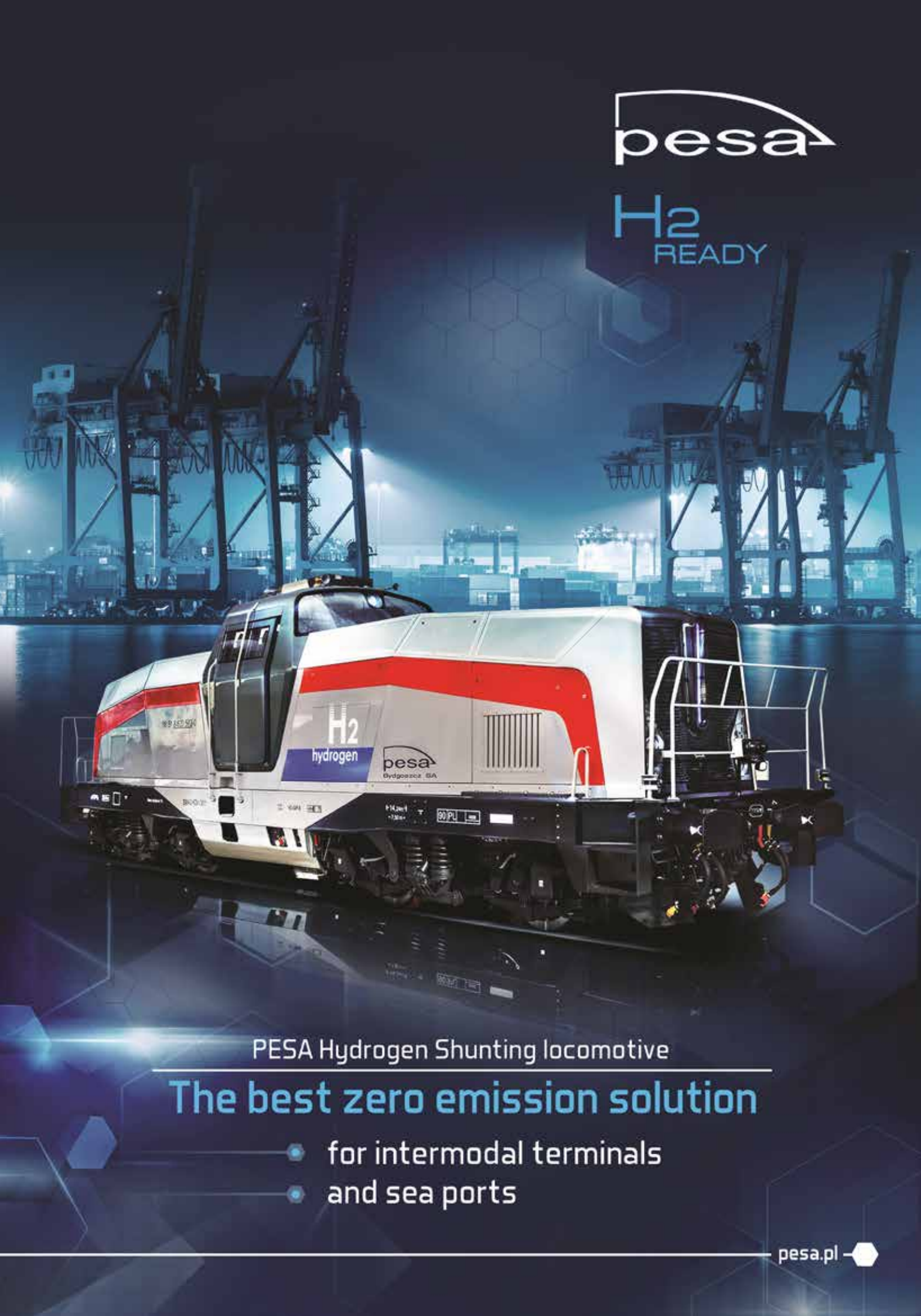
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HYDROGEN & Co.:

ALTERNATIVE FUELS FOR MOBILITY

+++ COUNTRY REPORT EUROPE  BELGIUM +++ FOCUS I: INNOTRANS 2026 +++ FOCUS II: ALTERNATIVE ENERGY +++
EVENTS: Scandinavian Rail Optimisation 2026 +++ 3rd Railway Forum Kraków 2026 +++ Fuels of the Future 2027 +++ PESA +++ SIEMENS ++
MATISA +++ LTE +++ To Zero +++ PJM +++ Plasser & Theurer +++
EUCO Rail +++ MIREO H at DB and NEB +++ VinFast +++ Biofuel Express
+++ ALSTOM +++ ELIN +++ FREIE TANKSTELLEN +++ DVF +++ Schüßler
Plan +++ Pro Bahn +++ NEEL +++ Railnova +++ UEEIV +++ VDEI +++



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H₂
READY

PESA Hydrogen Shunting locomotive

The best zero emission solution

- for intermodal terminals
- and sea ports

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EDITORIAL



Credits: CFJ

Dear readers!

The Strait of Hormuz – until recently, this term was only relevant to a small circle of geographically minded individuals and logistics professionals. This has changed dramatically in recent months. Over 20 percent of the world's crude oil supply has passed through this strait. Current military actions and political uncertainties in the region threaten this transport route – **prices on the global market for oil products such as fuels are rising rapidly.**

This demonstrates once again that the transition to alternative drive systems must continue unabated. Batteries, hydrogen, synthetic fuels, and biofuels are essential today not only for environmental reasons but also for controlling costs. We report on this in this issue of our magazine.

30 years of INNOTRANS in Berlin – this is a reason to celebrate for the world's largest trade fair for rail technology and to further focus on current needs and trends of industry and users. This is our main topic.

Belgium is also celebrating an anniversary this year. One hundred years ago, on May 5, 1835, Belgium's first railway line opened. It ran between Brussels and Malines and was also the first railway line on the European continent. We visited the country and report on it in a new issue of COUNTRY REPORT EUROPE.

Our magazine is published in media partnership with the Union of European Railway Engineers' Associations (UEEIV). Therefore, we regularly report on the activities of this union and its member associations, such as the German Association of Railway Engineers (VDEI). Other associations in the mobility sector are also regular partners of ours. In this issue, representatives of the German Transport Forum (DVF) and the passenger association Pro Bahn share their insights.

We hope you find it an inspiring read!

A handwritten signature in black ink, reading 'Hermann Schmidtendorf'.

Hermann Schmidtendorf, editor-in-chief and publisher

Low water levels on the Rhine are impacting freight transport:

"WE NEED SUSTAINABLE FUNDING FOR RAIL AND COMBINED TRANSPORT TERMINALS"

In July 2026 the German Inland Waterways Transport Cooperative (DTG) issued a warning: Due to a prolonged heat wave and the associated low rain fall, the Rhine is carrying exceptionally low water levels. As a result, inland vessels can sometimes only be loaded with a third of their regular freight capacity. More trips are needed to transport the same amount of cargo. This drives up costs, assuming the required number of vessels are even available. There is even a risk that the Rhine will no longer be navigable along its entire length – a serious burden for Europe's transport logistics, among others for the German chemical industry.



View from the left to the right bank of the Rhine with the railway line. h f s

Joachim Berends, Vice President of the Association of German Transport Companies (VDV): "The persistent low water levels on German waterways demonstrate how vulnerable key parts of the logistics chains are. We must strengthen, expand, and make the transport and supply routes in Germany and Europe resilient and redundant. Rail, in particular, offers significant potential for growth in freight transport. To achieve this, we need significantly better funding for combined transport terminals to make the German network more resilient, efficient, and reliable."

Another statement: The VDV clearly rejects current demands for increased use of long trucks. Roads are already overloaded and reaching their structural limits. More trucks with heavier loads exacerbate the problem of bridges

and roads that are already in need of repair. The German non federal freight railway association "Die Güterbahnen" supports:

"Blanket statements that rail is not usable, or only to a limited extent, as a temporary alternative, are inappropriate." Currently, the Central European north south freight rail corridor on the right bank of the

Rhine is closed for renovation work. The left bank of the Rhine serves as the main diversion route for the right bank. "However, even on the left bank, there is apparently track capacity available, which the German infrastructure company DB InfraGO is not recognising in its timetable systems."

The current subdued volume development is such that existing vehicles and personnel are not fully needed. This information was given by members of our association from all over Germany. The prerequisite: rail network operators and loading infrastructure are also involved, and reliable transport requests are initiated."

VDV MD Oliver Wolff: "The high funding requirement of over €600 million resulting from the applications for federal combined transport funding in 2025 is met by a mere €90 million allocation in the current federal budget for 2026. For 2027, only €73 million is planned. This situation must be addressed as quickly as possible."

Credits: CMA CGM



CMA CGM

With the commissioning of new large container ships, the French shipping company CMA CGM is modernising its fleet. The new vessels combine high transport capacities and alternative propulsion systems with digital assistance systems and increased energy efficiency.

On July 2nd 2026 in Le Havre, France, CMA CGM christened the CMA CGM NOTRE DAME, which had just completed its maiden voyage from Asia. With a capacity of 24,212 TEU, the 399-metre-long newbuild belongs to the Megamax class and is considered the largest LNG-powered container ship currently in operation. The lead ship of a series of ten vessels features AI-supported systems for real-time route optimisation, digital navigation solutions, and other technologies to increase energy efficiency and improve its environmental performance. The ten new ships are expected to employ 135 additional French seafarers within two years. By 2028, CMA CGM plans to expand its fleet, sailing under the French flag, from 30 to 40 ships. Worldwide, the shipping company operates more than 700 vessels and transported over 24 million TEU last year. The CMA CGM NOTRE DAME operates on a liner service between Asia and Europe, calling at ports in China, Singapore, Rotterdam, Hamburg, and Tangier Med, among others. mf/hfs

EMIRATES OFFER FLIGHT + RAIL

Credits: Emirates



Traveling through the desert on high-speed trains: On June 30, 2026, the first regular passenger train operated by Etihad Rail, the national railway

company of the United Arab Emirates (UAE), departed from Fujairah and arrived in Abu Dhabi an hour and a half later. The trains were built by the Spanish company CAF. This service marks the beginning of a national rail network that is slated for further expansion in the coming years.

On July 27, 2026, Emirates, the UAE's national airline, unveiled a new air-rail partnership. A new platform will provide members of the Emirates Skywards program with access to more than 12,000 rail destinations in

twelve European countries. National and international rail connections, high-speed trains, and various airport transfers can be booked. Bookings are made through skywardsrail.com. Members can log in with their Emirates Skywards credentials, search for connections, and select their preferred travel class and fare. Partners include over 40 major European rail operators in twelve European countries. This allows train journeys following a flight to be paid for fully or partially with accumulated frequent flyer miles. w/f/hfs

UNIFIED SINGLE EU RAIL TICKET

On May 13, 2026, the European Commission presented three proposals for simplifying the planning and booking of regional, long-distance, and cross-border rail journeys.

The proposals aim to enable bookings across multiple railway companies using a single ticket. Passengers would be able to find, compare, and purchase services from different railway companies in a single ticket, acquired in one transaction on an independent ticketing platform or through a railway operator's ticketing service.



Credits: hfs/Al

Information would be presented in a non-discriminatory and transparent manner, taking sustainability criteria into account, including details on greenhouse gas emissions. Market-leading railway companies would be required to grant competitors access to their ticketing services. In the event of disruptions along a "single ticket" rail journey, entitlements to assistance, onward travel.

Compensation would apply to the entire journey and be guaranteed by the operator responsible for the disruption. Providers would be prohibited from artificially splitting journeys into separate bookings. To enforce the new rules, member states should establish sanctions for violations.

On July 29, 2026, an alliance of German associations, companies such as SAP and Merck, and a university called on the German Federal Government to support and expand upon the EU proposals. Thirteen of the 30 most popular rail routes in Europe are not yet definitively covered by the EU proposal. These routes should also be offered under a single EU ticket with guaranteed passenger rights. e/h/hfs



15th InnoTrans, September 22–25, 2026, in Berlin:

NEW HIGHLIGHTS IN TRANSPORT TECHNOLOGY FOR THE 30TH ANNIVERSARY

„Who can count the peoples, name the names, that came together here as guests?“ asked the German poet Friedrich Schiller in his famous poem „The Cranes of Ibycus“ in 1797. At least with regard to InnoTrans 2024, the organizing trade fair company, Messe Berlin, knows the answer. It attracted 170,000 visitors from 133 countries and featured 2,940 exhibitors from 59 countries. At the same time, it offered the largest exhibition space since InnoTrans was founded in 1996.

The founding year is significant: This year, the world’s largest trade fair for rail-bound mobility celebrates its **30th anniversary**. For this anniversary edition, the organisers have announced further expansion. This year, 2,946 exhibitors from 59 countries have registered. The Railway Technology segment remains the heart of InnoTrans and continues its

growth trajectory in 2026. At the anniversary edition of the world’s leading trade fair for transport technology, around 60 new exhibitors will be presenting their products and services, particularly in the halls along the inner ring of the radio tower at the Berlin Exhibition Grounds,



focusing on power electronics. The segment comprises more than 1,200 exhibitors in total.

The focus is on technologies that **accelerate the transition to low-emission and digitally networked rail transport**. These include high-performance battery systems, intelligent energy supply solutions, innovative thermal management systems, and robust data infrastructures for reliable and efficient rail operations. At the same time, modular, safe, and low-maintenance system solutions are gaining further importance. The focus is increasingly shifting from visionary concepts to technologies that can already be used economically in vehicles and infrastructure, explains the trade fair management.

How can the vehicle interior of the future be optimized to be comfortable, economical, and environmentally friendly? Nearly 300 exhibitors are showcasing their innovations across 15,000 square metres in the Interiors segment. The range of products and services extends from innovative seating systems and intelligent fastening solutions to digitized on-board restaurants and state-of-the-art safety technology. The International Design Forum and Hospitality are part of the supporting program. **The Railway Infrastructure and Tunnel Construction segments are also experiencing significant**

growth, with around 600 companies exhibiting in more than 32,000 square metres. This represents a 5 percent increase in exhibitors compared to the previous InnoTrans 2024. This growth is partly due to the closer integration of these sectors. From digital planning and monitoring systems to innovative construction methods and sustainable solutions for tunnel construction and infrastructure management, companies and institutions are presenting their latest developments in Berlin.

Among the largest exhibitors in the Tunnel Construction and Railway Infrastructure sectors are FOG-TEC, Orascom Construction, Vossloh, Voestalpine, Pandrol, PORR, Leonhard Weiss, Plasser & Theurer, Schwiab, Zitron, and CFT Compact Filtertechnik. “The close integration of both segments reflects the current challenges and developments in the transport sector,” says **InnoTrans Director Kerstin Schulz**. “The increasing number of exhibitors at InnoTrans underscores the importance of modern infrastructure projects worldwide.” A particular highlight of this year’s InnoTrans program is the **International Tunnel Forums**, organised by the German Research Association for Tunnel and Transportation Systems (STUVA). The forums are part of the InnoTrans Convention and address key future topics for the industry.

Our magazines rail & mobility and CARGO FREIGHT JOURNAL were also presented in the reading area at InnoTrans 2024.



Those interested can also peruse our trade journals, **rail & mobility** and **CARGO FREIGHT JOURNAL**, at InnoTrans. The trade fair organizers have set up a dedicated area in one of the halls where many of the journals supporting the fair are freely available and can be read in comfortable armchairs. In 2024, the organisers also kindly allowed us to present our journals directly in the "inner sanctum" of rail technology for the first time.



Splendid souvenirs: T-Shirts at The InnoTrans. Credits: InnoTrans.

NOT JUST FOR HEAVY METAL FANS...

The InnoTrans shop is offering a special souvenir for the trade fair's anniversary. **T-shirts with the inscription „INNOTRANS 30 YEARS“** can be purchased at several locations on the exhibition grounds.

The outdoor area is always a magnet for trade visitors at InnoTrans. Visitors can experience the latest innovations in rail transport up close on the impressive outdoor track area with 3,500 meters of track at InnoTrans. Right next to the exhibition halls, **manufacturers will be presenting over 130 vehicles** – from multiple units to high-speed trains, from road-rail vehicles to wagons. This is where they show the trade public their latest developments. Rail-bound vehicles for passenger and freight transport, dual-mode vehicles, signaling technology, and much more will be on display.

Eleven buses will also be presented in the outdoor area. In addition to the exhibition space, the bus display offers a 500-meter-long demonstration course for demonstration runs, where trade visitors can experience the vehicles in operation.

Next Stop. Recruiting. Under this motto, there is a wealth of offers for job seekers and employers. Those interested can find out more about professional profiles. With the Career Point companies may highlight their company and mark their booth on the hall plans and on InnoTrans Plus. The **Career Tour**, a guided tour, departs several times a day and takes groups of

up to 20 interested visitors to the exhibitors marked with a Career Point. The tours are offered in different languages and focus on specific topics.

MOBILITY+: RETHINKING CONNECTED MOBILITY

Modern mobility does not end at the platform: with the Mobility+ exhibition area, InnoTrans offers its own platform for supplementary mobility services – from on-demand services to shared mobility and digital booking solutions. Within the established Public Transport segment, cross-modal concepts meet an international audience of experts from transport companies, associations and municipalities. **The focus:** seamless, flexible and sustainable mobilitychains, such as shared mobility cars, bikes, scooters, Peer2Peer; mobility apps; on-demand ride systems, robotics, VTOLs.

AI MOBILITY LAB - AI FOR THE FUTURE OF MOBILITY

This is another specialized issue at InnoTrans. In the AI Mobility Lab, artificial intelligence meets real-life applications: from autonomous vehicles and smart infrastructure to robotics and cybersecurity – this is where technological pioneers present themselves right at the heart of InnoTrans, explains the trade fair management. After the brilliant start in 2024, the specialized exhibition area will be successfully continued: embedded in the established Public Transport segment, with high visibility and a clear focus on innovation.

Hermann Schmidtendorf

InnoTrans 2026

THE FUTURE OF MOBILITY

22 -25 SEPTEMBER · BERLIN

EXHIBITION GROUNDS



- | | |
|--|---|
| Railway Technology | Outdoor Display |
| Railway Infrastructure | Bus Display |
| Public Transport incl. Mobility+ | Opening Ceremony |
| AI Mobility Lab | InnoTrans Convention |
| Interiors incl. Travel Catering & Comfort Services | Speakers' Corner |
| Tunnel Construction | Business Lounge (Marshall-Haus) |
| InnoTrans Campus | Press Centre |
| | Food Court |
| | Jelbi Hub shared mobility Pickup & Drop-off for two-wheeled rental vehicles |

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MATISA:

B 66 UC TAMPERING MACHINES - VERSATILE, ECONOMICAL, ECO-FRIENDLY, EFFICIENT

Degraded ballast can compromise track geometry, leading to reduced ride comfort and increased wheel-rail contact forces. Above all, however, it entails safety risks such as the danger of derailment. These risks were taken into account during the design of the **Type B 66 UC universal tamping machines** from the Swiss manufacturer **MATISA**.

The primary tasks of a tamping machine include lifting the rail using clamps and compacting the ballast beneath the sleepers using tines. These tines are inserted simultaneously on both sides of each sleeper and perform an elliptical motion to effectively compact the ballast. By nature, a tamping machine operates discontinuously, moving from one group of sleepers to the next. To increase productivity—measured by the number of sleepers processed per hour—it is advantageous to process multiple sleepers simultaneously. However, this approach requires a heavier machine. To minimise the time between processing successive sleeper groups, a balance must be struck to avoid significantly increasing the machine’s energy consumption, which is driven by frequent start-stop movements.

One initial solution involved dividing the machine into two components: a lighter section—known as the shuttle or satellite—equipped with the controls for the start-stop movement, and a heavier section that moves at a constant speed, thereby avoiding start-stop dynamics. The shuttle forms the basis for con-

tinuous tamping operations. This MATISA solution is ingenious: the rest of the machine is built upon the shuttle. Compared to equivalent continuous-action machines on the market, this design eliminates the need for one bogie. The manufacturer emphasises that this crucial advantage reduces the CO₂ footprint by 20% and lowers operating costs. At the same time, greater controllability is achieved for precise, safe, and efficient work near turnouts, alongside higher throughput on straight track sections.

The **B 66 UC-D high-performance tamping machine** is a continuous-action, dual-head universal tamping machine suitable for both conventional and high-speed lines. The B 66 UC-D consists of a tamping satellite—supported by two bogies upon which the machine frame rests—and a drive unit located on a trailer. The shuttle/satellite features eight independent tamping units, a leveling and lining unit, and two telescopic lifting devices for diverging tracks, which support the lining unit. This machine is capable of processing both turnouts and plain track in continuous operation. The B 66 UC NEO ACTIVE is designed as a high-performance, continuous-action universal tamping machine for the maintenance of heavy-duty turnouts and track, featuring four individual tamping units mounted on a satellite system. The machine incorporates an innovative **New Energy Optimization (NEO)** architecture that significantly reduces fuel consumption. Furthermore, the machine is fully digitised. *hfs*



TECHNICAL DATA

Track gauges	1 435-1 668 mm
Minimum radius in working mode	150 m
Travelling speed in self-propelled mode	100 km/h
Machine wheelbase	15 600 mm
Standard fuel tank capacity	min 4 000 l
Tamping tools	16
Tamping unit vibration frequency	42 Hz
Tamping unit lateral reach	2 800 mm
Tamping unit longitudinal stroke	560 mm
Track lifting force	2 x 125 kN
Track slewing force	150 kN
Diverging track lifting device lateral reach	3 320 mm
Diverging track lifting device lifting force	120 kN
Max. plain line output with 1 insertion per tamping cycle	920 m/h
Processing time for a basic turnout	20-25 min
Line category (basic)	D2
Length over buffers	38 185 mm
Kinematic gauge	G1 / G12 according to EN 15273-2
Standards	4 Railway package compliant

MAIN EQUIPMENT

NEMO [®] relative optical measuring base
CATT [®] guiding computer
Central tamping cabin
Satellite with 4 individual universal tamping units
Universal lifting and lining unit
Synchronised telescopic diverging track lifting devices
Human-machine interface with joysticks and touch-screens
Switch and crossing brush with lateral conveyor
Dynamic track stabilisation
CATERPILLAR [®] main engine
Auxiliary power unit, 400 V AC, 30 kVA

OPTIONAL EQUIPMENT

Ballast removing ploughs
Fastening cleaning brushes on switch and crossing brush cover
Switch and crossing brush with lateral conveyor
Sleeper end compactor
EN 13848 compliant inertial measurement trolley
Control command signalling
Dust control system for brush and tamping unit

B 66 UC NEO ACTIVE v1.1

Illustrations and descriptions are not binding and may contain optional equipment. We reserve the right to make alterations in line with further technical developments.

PESA:

Strategic Partnership PESA BYDGOSZCZ (Poland) – Hitachi Rail (Japan)

At this year’s InnoTrans 2026 trade fair, the Polish manufacturer PESA BYDGOSZCZ will be exhibiting in Hall 4.2, Booth 420, and in the outdoor area in Sector T2/17. This time, PESA is likely to attract even greater interest than before. On June 16, 2026, PESA and the Japanese rail division of Hitachi Rail officially announced a strategic industrial alliance. The aim is the joint development and production of high-speed trains (HGV trains) for the Polish and European markets.

Based on this, the PESA–Hitachi Rail (KDP) consortium was founded, which will participate in upcoming tenders for high-speed trains in Poland. The announcement coincides with the preparatory work for the train tenders under the so-called “Line Y” project, organised by the Central Communications Port (CPK) in Poland.

The newly formed consortium is banking on the complementary strengths of PESA and Hitachi Rail. PESA Bydgoszcz possesses extensive production and assembly capabilities. Its key strategic strengths include its knowledge of the Central and Eastern European markets and the regulatory environment in Poland, as well as a network of local suppliers. Hitachi Rail is the global rail division of the Japanese company Hitachi and is known for producing the Japanese Shinkansen high-speed train and the Italian Frecciarossa 1000 high-speed train. Hitachi Rail contributes advanced technical expertise in traction systems and bogies, a proven technology platform, and experience in the approval processes of various regulatory authorities to the consortium.

QUOTE



“The collaboration with Hitachi Rail, a world leader in high-speed trains and a market leader in innovative rail technologies, is a historic moment for us. Thanks to technology transfer and the establishment of a competence centre for aluminum structures in Bydgoszcz, PESA is joining the ranks of European manufacturers of the fastest trains. This is not only a joint offering for PKP Intercity, but also the foundation for the production of modern double-decker trains at our plant in Bydgoszcz for markets throughout Central and Eastern Europe.”

Krzysztof Zdziarski, CEO PESA Bydgoszcz.



The model for the planned trains in Poland: the Italian ETR1000 from Hitachi Rail, seen here at Bologna station.

QUOTE



“This collaboration with PESA is a milestone for the development of our international activities and innovative rail solutions across Europe. By combining global expertise with strong local potential, we are actively contributing to the creation of a more integrated, efficient and sustainable mobility ecosystem – fully in line with our long-term vision for the future of rail.”

Stefano Santinelli, Senior Vice President,
Chief Government, PA & Communications
Officer Hitachi Rail.

THE FOLLOWING TECHNICAL PARAMETRES OF THE PLANNED TRAIN HAVE BEEN DISCLOSED SO FAR:

- **Minimum operating speed:**
250 km/h. Above this threshold, a vehicle is considered a high-speed train according to European standards. The aim is to produce trains with a maximum speed of ≥ 320 km/h.
- **Compatibility with existing infrastructure:**
The train supports a 3 kV DC power supply, the current standard of the Polish rail network.
- **Adaptation to target infrastructure:**
The train is designed for the 25 kV AC standard intended for new high-speed lines, as is the case with the Polish Project Y.
- **Main components:**
Traction system, bogies for dynamics and safety at speeds above 250 km/h, and an integrated ETCS/ERTMS system. The European Train Control System (ETCS) and the European Rail Traffic Management System (ERTMS) are mandatory requirements for

rail vehicles operating on the TEN-T European transport corridors.

• **Competition:**

The new train to be constructed is intended to be an alternative to the only high-speed train in Poland so far, the ED250 Pendolino (manufactured by Alstom/Alenia Ferroviaria).

The partners plan to participate in the tender issued by the Polish state-owned long-distance rail operator PKP Intercity for the delivery of trains with a maximum speed of at least 320 km/h. This includes the purchase of 20 electric high-speed trains with an option for 35 additional trains. The order also covers the technical maintenance of the vehicles for a period of 30 years. The consortium agreement also includes technology transfer and the expansion of production in Poland. According to the project, 20 trains are to be manufactured at Hitachi Rail's plants in Italy. In later project phases, PESA's invol-

vement in the production process will be gradually increased. Ultimately, some component and production work will be carried out in Poland. PESA will also assume responsibility for the technical maintenance of PKP Intercity's entire fleet. The consortium's bid will be based on a customised version of the ETR1000, which has proven successful in Italy.

Observers describe the planned production as an SKD/CKD (Semi/Completely Knocked Down) model:

The first series of trains will be assembled at the PESA plant in Bydgoszcz from components supplied by Hitachi Rail in Japan and its European factories. This is common practice in such projects. Subsequent production runs will see a gradual increase in the proportion of components manufactured in Poland. The most technologically advanced components are the bogies and traction systems. Their production in Poland is therefore an indicator of the extent of technology transfer.

Hermann Schmidtendorf/pb/ev

PESA II:

Hydrogen-powered electric multiple units to decarbonise Poland's local rail transport

PESA has been developing hydrogen technologies since 2019. The company's hydrogen-powered shunting locomotive, the SM42-6Dn Hydrogen, is already in operation with Polish companies such as KGHM and Orlen, as well as in Sweden. It has also successfully hauled a train of passenger carriages on non-electrified regional lines - for instance, to the Hel Peninsula in northern Poland. Plans call for the initial production of 25 such locomotives.

The success of this first Polish hydrogen locomotive encouraged PESA to take the next step and develop a hydrogen-powered electric multiple unit (HEMU). The unit will combine hydrogen fuel cells, batteries, and overhead line power, enabling emission-free travel on both electrified and non-electrified lines. The goal is to reduce the transportation isolation of rural and tourist areas such as Karpacz in southern Poland and the Hel Peninsula. Currently, approximately 40 percent of Poland's railway lines are not electrified.

The project is now also receiving official government support. Poland is investing €8.3 million (PLN 36 million) in PESA's first hydrogen-electric multiple unit from funds allocated through the National Reconstruction and Resilience Plan (KPO). The corresponding agreement was signed on February 13, 2026. The fund is administered by the Polish Ministry of Climate and Environment. Minister Paulina Henig-Kloska emphasised the strategic importance of the project: "We are taking another step in the development of hydrogen-powered railways in Poland. This project has global potential. We are creating space for our scientists, engineers and staff to develop solutions that we will proudly present in Europe and around the world."

The triple propulsion system, consisting of hydrogen fuel cells, battery storage, and pantograph power supply, is designed to „offer operators the efficiency that batteries alone cannot provide,” explained PESA Vice President Robert Tafiłowski. This combination



The SM42-5Dn hydrogen locomotive on a journey through rural Poland.

enables seamless operation on mixed infrastructure, thus completely avoiding CO₂ emissions. An intelligent control system developed by PESA optimises energy use and minimises hydrogen consumption by prioritising overhead line power where available. The concept aims to increase efficiency, reduce operating costs, and eliminate the need for transfers when changing routes.

Dorota Zawadzka-Stępnia, President of the National Fund for Environmental Protection and Water Management, emphasised the innovative nature of the project: "This is the first solution nationwide to combine hydrogen propulsion with the ability to draw energy from overhead lines. We are investing not only in the vehicle itself, but also in the expertise and technologies that have the potential to become a Polish specialty in the field of zero-emission transport."

Hermann Schmidtendorf



A celebratory train in a double sense: the inscription on the train commemorates the 100th anniversary of the Berlin S-Bahn in 2025 and the completion of the delivery of the "106 New Berliners"—referring to the new Berlin S-Bahn trains from Siemens and Stadler, such as the one photographed here on March 31, 2025.

Siemens Xcelerator:

Optimising operations and entertainment, reliability, and safety

On July 16, 2026, the consortium partners S-Bahn Berlin, Siemens Mobility, and Stadler Deutschland were beaming with joy. The partnership had won the contract award process for Berlin's S-Bahn network. The award became legally binding upon receipt of the official notification. As part of the project, the consortium will supply 350 four-car, open-gangway trains for the German capital's S-Bahn system, handle maintenance for a period of 30 years, and take over operations on the North-South and Stadtbahn sub-networks for 15 years. The decision had been delayed after a competitor lodged an objection against the outcome.

The vehicles currently on order represent a further development of the latest series supplied by Siemens and Stadler for the Berlin S-Bahn's Ring network. Siemens and Stadler emphasise that these

units were delivered on schedule. Since entering service, the new trains have already covered more than 120 million kilometres with a high level of technical reliability.



Digital strategy for safe operation and maintenance

A distinctive feature of the successful tender bid is the set of provisions regarding train maintenance. Throughout the entire 30-year contract term, the maintenance of the new S-Bahn trains will be managed via a central digital platform for data-driven maintenance and operations. This platform is Railigent X, part of Siemens Mobility's Xcelerator digital portfolio.

By interconnecting vehicles, infrastructure, and Train-IT systems – and continuously analysing condition data – the system enables predictive maintenance and optimised maintenance processes. The Railigent Fleet Manager monitors vehicle condition in real time, analyses operational data, and supports the creation of work orders to facilitate predictive maintenance. This allows potential faults to be detected early, reliability to be increased, and fleet availability to be sustainably improved. Maintenance processes are planned and managed digitally – covering

everything from material and asset management to workforce scheduling – thereby boosting efficiency and reducing maintenance costs. Supplementary cybersecurity services, such as software maintenance and vulnerability monitoring, ensure the secure operation of systems and vehicles.

The goal: 100% system availability

So, a portion of the digital management system that Siemens Mobility is also showcasing as the centerpiece of its trade fair presence at InnoTrans 2026 is set to be deployed at the Berlin S-Bahn. Siemens describes it as follows: „Operators benefit from full flexibility through advanced visualisation and geo-redundancy. Additionally, significant cost savings are achieved by consolidating locations and reducing installation costs and maintenance activities. Know your rail system is always running – thanks to more efficient maintenance, prevention of unplanned downtime and fewer unnecessary transfers to the depot.“

Railigent X brings together asset operations and condition data and helps organisations to tackle challenges such as detecting faults, streamlining maintenance, and supporting staff decision-making. By integrating data from trains and signaling systems, Railigent X optimises maintenance and service reliability, and helps to improve operations and passenger satisfaction. Depending on whether a customer needs dedicated data or AI services or complete end-to-end applications, he may choose from Foundation, Insights, and Workflow offerings.



The offerings deliver standardised and secure asset data for on-premise and cloud systems and applications. They are provided via API and can optionally be augmented with data from Siemens partners, the company explains:

- **Rolling stock:** train data services – enabling near real-time monitoring of key vehicle data in your systems
- **Rail infrastructure:** signaling data services – enabling near real-time remote monitoring of track assets

„How are your assets performing? Our offerings provide decision support, help you to maximise the value of every asset, and predict issues before they arise. You can access insights and AI models developed by Siemens, as well as those from Railigent X ecosystem partners, and integrate them into your own systems and applications.“

This also applies to other issues:

- **Rolling stock:** Maintenance Optimiser – insights from root cause analyses and the remaining useful time to optimised maintenance intervals.
- **Rail infrastructure:** ETCS performance and signaling performance – smart health status analyses and failure predictions for point machines and ETCS components.

Siemens provides an example of its system in action. The company maintains the Rhein-Ruhr-Express (RRX) train fleet – which was also manufactured by Siemens – at a state-of-the-art depot in Dortmund. Siemens sought a way to prevent operational disruptions and extend maintenance intervals for the trains' couplers, aiming to ensure maximum availability while simultaneously reducing lifecycle costs. To this end, Siemens Mobility and the coupler supplier, Voith, developed improved overhaul strategies for the automatic couplers on 84 Siemens RRX trains; this included Voith developing an algorithm for the digital condition monitoring of the couplers. The benefits include reduced downtime and lower total lifecycle costs, savings on coupler overhauls, extended component service life, and optimised component design.

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Vectron X – optimised lifecycle cost

Reduce running costs across the entire service operation for more than 30 years – this is the base for another project, the digitised Vectron locomotive. Equipping trains with built-in connectivity for Digital Train Solutions helps to reduce costs, manage trains seamlessly from the wayside, and prevent disruptions with live monitoring and remote configuration, Siemens underlines: „Powered by Siemens Xcelerator, Vectron X combines the proven locomotive platform with advanced digital capabilities and an open ecosystem. By connecting people, places and portfolios, Vectron X meets your needs even better than before – from traction to data insights.“

„Vectron X evolves the proven Vectron platform into a digitally connected locomotive. Advanced digital capabilities and seamless connectivity help you optimise performance and efficiency while supporting long-term operability. Designed to adapt over

time, Vectron X allows you to integrate new digital functions and solutions as your requirements change, creating lasting value across the entire lifecycle. Vectron X marks a fundamental shift: from a proven platform to a truly connected locomotive. Connectivity in Vectron X is not an add-on. It is designed into the architecture, from the locomotive itself to the surrounding digital ecosystem. The result is capability: the ability to scale rail operations over the entire lifecycle, integrate new digital capabilities over time and continuously adapt operations to changing requirements – without redesigning the locomotive itself. Vectron Eco Cruise is one example. As a connected Driver Advisory System, it supports energyefficient driving by turning realtime data into system-executed action – improving efficiency and sustainability in daily operations.“

Siemens is confident that these digital solutions may „achieve enormous efficiency gains and reduce maintenance costs by 30%.“ hfs

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CARGO FREIGHT JOURNAL | 19



STADLER RAIL:

High order volumes, increased revenue, higher EBIT margin

A company's earnings conference is no place for flights of rhetorical fancy; the figures for the preceding period are presented in a dry, matter-of-fact style. At the half-year conference held by train manufacturer Stadler Rail on August 26 in Bussnang, Switzerland, Group CEO Markus Bernsteiner and Group CFO Raphael Widmer presented encouragingly positive key figures. Yet there was one topic on which Bernsteiner went into detail without citing numbers. For the past three years, his company has been scrutinizing the terms of tenders very closely, participating in them only selectively. They evaluate not only financial conditions but also other parameters, „such as unlimited liability.“ Some tenders even require the contractor to remove graffiti: „We are naturally very sensitive about that. In such cases, we take a firm stand and say: No, we won't do it, because the risk profile is too high!“



A new metro train from Stadler for Berlin.

Stadler continued to see positive business performance during the first half of 2026. Key performance indicators are trending very positively. Revenue rose significantly by 40 percent to CHF 2.0 billion, up from CHF 1.4 billion in the first half of 2025. The EBIT margin increased by 1.4 percentage points to 4.0 percent, compared to 2.6 percent in the first half of 2025. Order intake was also very strong at CHF 2.7 billion, and the order backlog reached a record high of CHF 33.3 billion. Against this backdrop – and given the higher volume of vehicle deliveries typically seen in the second half of the year – Stadler confirms its outlook. For the 2026 financial year, Stadler expects revenue well in excess of CHF 5 billion and an EBIT margin of over 5 percent.

Technological independence is a key pillar of the growth strategy. The newly established „Stadler Digital Lab“ already employs 130 specialists, while the signaling division in Wallisellen has grown to a workforce of 800. The goal is to integrate proprietary ETCS (European Train Control System) solutions and autonomous train operation (ATO) systems into Stadler's trains, thereby increasing the depth of value creation. At the same time, Stadler is stepping up investment in training its own skilled workforce to meet the long-term demand for specialised rolling stock engineers and technicians. The workforce grew from approximately 17,100 (at the start of 2026) toward a budgeted target of 18,900 employees. As part of its efforts to foster young talent, Stadler increased the number of apprentices from 300 to 350. As of June 30, 2026, Stadler had recorded sales of 13,113 vehicle units worldwide.

Certain conditions surrounding the execution of orders in Germany have created difficulties. A major contract for new Berlin S-Bahn trains was held up by

protracted legal challenges from competitors, resulting in a “state of indecision“. Stadler's Berlin plant kept capacity reserved for five years, leading to financial strain. However, the efficiency improvement program launched in Berlin in 2025 is now yielding results. Productivity has risen thanks to process optimisations and a new forward-looking collective agreement with the IG Metall union, which includes increasing the work week from 38 to 40 hours.

Management has also filled key leadership roles with new personnel. The goal for the Berlin site is to reach the break-even point at the EBIT level by 2027. Unfavorable payment terms with major clients like Deutsche Bahn also pose a challenge; in these cases, Stadler effectively acts as a financier. As Bernsteiner explains: „When we win contracts there, we function more like a bank; we only get paid at the very end – partly due to our conservative accounting practices. In effect, we build the vehicles using our own capital.“

The locomotive manufacturing plant in Valencia, Spain, has performed impressively well. In 2024, the facility was hit hard by environmental disasters on several occasions. Reconstruction is scheduled for completion in 2027, by which time the financial losses should also be recovered. An order for 22 new trams from the regional government of Valencia is providing a welcome boost; the investment volume for the Valencia site totals 140 million euros. The units in the 4500 series accommodate 285 passengers. This increases capacity by 87 seats compared to the existing vehicles. Delivery of the first units is scheduled for the summer of 2026, with further batches to follow by 2028. The order is part of a major fleet overhaul for which the region is providing a total of more than 840 million euros.

Hermann Schmidtendorf

THE CHALLENGE OF SAFE SHIP RECYCLING:

At least 500 ships are ready for the scrapyard

According to the international shipping association BIMCO (Baltic and International Maritime Council), there was a recycling overhang of at least 1.8 million TEU in October 2025. Analysts expect around 15,000 ships to be scrapped worldwide in the coming years. The Leibniz Centre for Tropical Marine Research in Bremen projects an annual volume of approximately 20 million tonnes of steel scrap from ship recycling starting in 2033.

There is currently no significant ship-scraping capacity within Europe. However, scrapping old vessels entails more than just the risk of severe environmental damage if the process is carried out improperly; it also represents a potentially lucrative business opportunity. Against this backdrop, the Maritime Cluster Northern Germany industry association identified the recycling of cargo and passenger ships—as well as offshore wind turbines—as a profitable field of activity for the German maritime industry several years ago.

With the entry into force of the International Maritime Organization's (IMO) Hong Kong Convention, international regulations governing ship recycling have been in effect since June 2025. However, in addition to this new framework and the EU Ship Recycling Regulation (EU SRR)—which has required full implementation since 2020—other regulations also apply. Consequently, the Maritime Cluster Northern Germany, together

with the GreenShipping Lower Saxony Competence Center, has published an "Overview of Ship Recycling Regulations from an Owner's Perspective." This study outlines the key aspects of the relevant regulations for shipping companies, ship managers, and potential operators of recycling facilities. The author is Henning Gramann, whose company, GSR Services GmbH, supports recycling facilities and ship owners worldwide in ensuring professional and environmentally sound ship recycling.

The new regulations take effect long before a ship makes its final voyage for scrapping. For new vessels, the shipyard itself must compile an inventory of hazardous materials regarding the components installed on board. During the ship's operational life, the owner must continuously maintain this "Inventory of Hazardous Materials" (IHM) and have it recertified every few years. Going forward, the IHM may be subject to inspection during port state control checks and serves as an essential prerequisite for the



A ship being dismantled. Credit: GSR Services GmbH

legal and safe recycling of a vessel. Ships flying the flag of an EU member state, as well as those registered outside the EU that begin their final voyage from an EU port, may only be dismantled at a facility certified and registered under EU law.

The legal situation is further complicated by the fact that, once the decision to recycle has been made, ships are classified as waste and become subject to both international and national waste legislation applicable in any port visited during the voyage. "If a ship is partially dismantled for conversion or repair, this is covered by the existing operating permit," explained Dr. Susanne Neumann, head of the MCN's Lower Saxony office in Elsfleth. "However, if complete dismantling is involved, a separate permit under waste management law is required." The necessary permitting process can be highly complex: "Given the importance of this new field of activity for the maritime industry—and for the recovery of vital resources—we at MCN will continue to advocate for dialogue between permitting authorities and businesses. Our goal is to foster mutual understanding and, wherever possible, simplify approval requirements—without compromising the high environmental and occupational safety standards in force in Germany."

The study can be obtained from MCN: Maritimes Cluster Norddeutschland e. V., Wexstraße 7, 20355 Hamburg. hfs

BATTERY-POWERED BUSES FROM TO ZERO:

Ecological, production-ready, cost-saving

The Bus2Bus 2026 trade fair took place on April 15th and 16th, 2026, at the Berlin Exhibition Grounds. Among the exhibitors was the company To Zero, which converts second-hand diesel buses to battery power. The managing director Andreas Pfeffer also participated in a discussion with industry professionals on one of the presentation stages. Our editorial team spoke with him about the present and future of bus conversion from diesel to electric drive.

? rail & mobility: Mr. Pfeffer, at the Bus2Bus trade fair in Berlin I had the impression that you looked very satisfied?

Andreas Pfeffer: The closure of the Strait of Hormuz by Iran was driving diesel prices up significantly. This, of course, generated extremely high demand at our booth. We brought along a beautiful Setra 516, which we had already converted and presented last year. This bus was a real crowd-pleaser. With the slogan: „Diesel, the most expensive way to drive a bus,” the bus was, of course, somewhat provocative. But that gets to the heart of the matter today: bus journeys with a diesel bus simply cost between 50 and 60 euros per 100 kilometres. In contrast, with this battery-powered bus, if everything is done correctly, you can travel 100 kilometres for around 20 euros or even less.

Net, we simply pay more for fossil fuels today. And that is directly reflected in inflation and in the operating costs of buses. Instead of buying a new articulated bus for 900,000 euros, you retrofit an existing one. That simply cuts the investment costs into thirds.

For example, questions are asked about the vehicle's charging speed. Now the next question is: can the battery-powered bus also operate on long-distance, intercity routes? And we can answer that quite simply in the affirmative. One thing is certain: many coach journeys are not long-distance, but rather company shuttles or school transport, so the answer there is definitely a resounding yes.

? But you often need to recharge the battery while on the go. Isn't that inconvenient?

For long-distance travel, we simply have to get more creative. I was on stage at Bus2Bus and mentioned that in Schleswig-Holstein there's a restaurant called Iron Horse that serves fantastic spare ribs. If a busload of passengers arrives, and only a third of them eat at the restaurant, the driver can have the bus batteries charged for free. These kinds of concepts need to be developed because tour buses simply need to be able to recharge at attractive destinations. I don't want to be stuck parking among 40 trucks and have to charge without coffee or a toilet. That's not a viable concept. You have to think these things through

Non-stop discussions: the TO ZERO specialists at BUS2BUS in front of the SETRA coach with founders CEO Andreas Pfeffer (2nd from right) and CFO Hans-Georg Herb (r.). Credit: hfs



from start to finish. And that means finding attractive locations. Spare rib trips, factory outlets... If a tour bus arrives at a factory outlet, hallelujah! There's a €5 shopping voucher included, or at least a voucher for the bus driver. Then he stops there and charges. We talked about this quite a bit during those two days at the trade fair.

? How long does it take to recharge such a Setra long-distance bus?

The rule of thumb is to achieve 80 percent of the charging capacity in one hour. There will have to be a company, an app, that shows me how attractive a stop is for a coach – whether I can get a great coffee there, a decent slice of butter cake, so I can have a pleasant stay with decent restrooms, sanitary facilities, and maybe even a smoking lounge. But with these diesel prices, driving a diesel bus is the most expensive way to operate it.

The coach has far too long a range. The driver is only allowed to drive for four hours at a time, then he has to take a break. Our experience is also that if you have

more than three people in the vehicle, one of them will need to smoke, drink a coffee, or take a coffee to the toilet. Therefore, journeys longer than four hours are somewhat risky anyway. And even after a break to recharge, the vehicle's range is far from zero, making it difficult to then replenish for another 400 kilometers. That's relatively quick to do.

? What do you explain to people who might say, "Well, it's just a one-off. You can never replicate two identical ones." And, "A bus like that certainly isn't as durable, stable, and safe as an original product?"

That's a good point. But at the end of the day, not everything at BMW or Mercedes is manufactured by the company itself. The cables, for example, are sourced from other suppliers. If we were still in the world of combustion engines, I'd say, indeed, a young company shouldn't start developing engines. But the electric motor is a very simple device. It has a winding inside. We drove over the Brenner Pass. If the business owner then says, "I need a bit more punch between 50 and 60 km/h," we use a software booster, and ►



As if it had just rolled off the assembly line: The SETRA 516 coach, converted to a battery-powered bus by TO ZERO, at the BUS2BUS trade fair.

the motor simply receives more power in that range. That means it develops more torque and drives completely differently. With a combustion engine, I would have had to change the turbocharger geometry, the intake geometry, maybe even add a fifth valve to the combustion chamber. None of that is necessary now; we're doing it with software, generating a bit more power. It's actually such a simple technology that this argument is completely irrelevant.

So: We can retrofit it! Our vehicles are in no way inferior to standard vehicles. VW doesn't have expertise in electric motor development; they don't have that

competence. But Voith, for example, whose motors we use here, or the battery manufacturer, that's their core competency. They are beyond reproach and, in my view, the benchmark in what we do. And that's why we were able to use these products without any problems.

! Mr. Pfeffer, thank you for this interview!

Interview conducted by Hermann Schmidtendorf



STOCKHOLM | 4TH NOVEMBER 2026

WHEN INNOVATION CREATES ADDED VALUE: OPTIMISING THE DIGITAL TRENDS THAT ARE REVOLUTIONISING SCANDINAVIAN RAIL

Returning for its fourth edition, Scandinavian Rail Optimisation has firmly established itself as the trusted meeting place for Infrastructure Managers and Rail Operators across the Scandinavian region. The event provides an unparalleled platform to explore how the speed of innovation and the adoption of new intelligent technologies are critical to ensuring the future success of rail operations.

This unique gathering will unite leading rail experts from Sweden, Norway, Denmark, Finland, and the Baltic states to discuss how they are harnessing the latest digital trends to increase capacity, improve reliability, enhance availability, and drive down maintenance costs. The conference will go beyond theory, addressing proven concepts, lessons learned, and the importance of leveraging IoT and data to develop smarter, more intelligent infrastructure, as well as improving fleet management efficiency and rolling stock availability across the region.

For organisations committed to driving long-term value in the Scandinavian rail market, this is the stage that matters. It is here that the industry's foremost leaders, strategists, technologists and visionaries come together to shape the future of Scandinavian rail.

Position your company at the forefront of Scandinavian rail innovation. Contact **Ben Holliday** ben.holliday@rotaiamedia.com about speaking, exhibiting, and sponsorship opportunities.

NEEL:

Wildlife Protection as an Element of Risk Management

At the interface between railways and nature, there has long been an issue the significance of which has remained marginalised. It is the problem of wild animals entering railway tracks and related animal-train incidents. Railway infrastructure runs through animal habitats and migration routes, making such conflicts unavoidable. Animals that find themselves in the path of a train while crossing the tracks can cause collisions, delays and vehicle damage, and in the most serious cases may pose a risk to human health and life. Therefore, preventing collisions is not only a matter of nature conservation, but also an element of safety, reliability and efficient railway transport management.

For a long time, this issue remained a niche area of interest. Recently, however, the situation has begun to change. The international railway sector is increasingly recognising the relationship between infrastructure, train operations and the natural environment as an issue requiring a system approach, reliable data and proven methods of action.

The Scale of the Problem

A good example of this change is the work of the International Union of Railways (UIC). As part of the PAWS project – Preventing rAilway Wildlife CollisionS – work was initiated to improve understanding of the causes and consequences of wild-life-train collisions and ways of reducing them. The project examined, among other things, where collisions occur, the associated costs and delays, and the solutions already in use. UIC considered both infrastructure measures, such as fencing and wildlife crossings, and automated detection systems and acoustic deterrents.

The next step is to collect and organise data. The UIC Safety Report 2025 includes the “Animals on Tracks” study, based on data from 20 infrastructure managers. The analysis covered the number of incidents, their seasonal distribution, time of day, animal species, infrastructure characteristics and operational consequences. Around 58% of the reported consequences of these incidents were delays, while approximately 41% involved train damage. Derailments were also noted.

UIC points to shortcomings in the current reporting system: in around half of the reported incidents, the animal species was not identified. This has considerable practical significance: when data are incomplete or collected according to different criteria, it becomes more difficult to determine where the actual risk lies, which solution should be applied and whether it has delivered the desired result.

From Individual Solutions to a System Approach

UIC is now moving towards a more system approach to risk management. The ability to correctly identify the problem and select the appropriate measure is becoming increasingly important. Depending on local conditions, different measures may be effective: appropriate infrastructure design, fencing and wildlife crossings, hazard detection systems, or active devices that warn animals of an approaching train.

The next stage is the standardisation of knowledge. Since 2026, UIC has been developing, as part of the ACORN initiative, an approach that includes managing the relationship between railways and wildlife. The UIC report identifies the need for harmonised guidelines, a catalogue of measures to reduce collisions, standardised KPIs and monitoring frameworks. Data from different network operators should be comparable.



A close-up view: an acoustic warning station from the company NEEL.

Technological Development Creates a Need for Reliable Measurement of Effectiveness

The change in approach is also reflected in the market. New technologies are emerging to reduce the risk of collisions – including both stationary devices installed alongside the track and solutions that detect hazards directly from trains. Systems using different methods of detecting animals, warning them or influencing their behaviour are being developed.

The more technologies become available, the more important it is to ask how effective they actually are under operational conditions. Simply claiming the use of advanced sensors or algorithms does not answer the question of whether a solution genuinely reduces the number of collisions.

More Than 20 Years of Operational Experience

In Poland, practical experience with active wildlife protection alongside railway tracks goes back much further than the current wave of interest in this issue. At NEEL company, the UOZ-1 wildlife protection system was developed as early as 2003, and the first installation was completed in 2004 during the modernisation of the E20 railway line between Mińsk Mazowiecki and Siedlce. Since then, the system has been further developed and deployed on other sections of railway infrastructure, both in Poland and abroad.

From the outset, the concept behind the solution was simple and combined railway expertise and experience with knowledge of wild animals. Rather than physically separating animals from the tracks and increasing habitat fragmentation, the UOZ-1 system warns animals of an approaching train sufficiently early for them to leave the danger zone in time. UOZ-1 uses sequences of recorded natural warning sounds that act on the self-preservation instinct of large herbivorous mammals (like wild boar, roe deer, deer, moose).



A railway line operated by the Polish state railway PKP PLK, featuring acoustic warning stations from the company NEEL to protect migrating animals from trains.

When there is no danger, animals can continue to move freely in the vicinity of the railway line. Warning is activated only when the actual threat – an approaching train – occurs.

Operational experience is just as important in this case as the technology itself. The system has been operating on the PKP PLK railway network for more than 20 years, under conditions of changing traffic volumes and high train speeds, as well as changing climatic and environmental conditions. NEEL also shares the results of long-term monitoring studies and scientific opinions concerning the system's effectiveness, its environmental impact and its cooperation with railway traffic control equipment.

Experience Shapes the Future of Railways

The development of technologies for protecting animals alongside railway tracks is necessary, but no technology can solve the problem without a proper understanding of the situation and the boundary conditions for its application. **An approach based on data, operational experience and the ability to select the appropriate measure for a specific risk will therefore become increasingly important.**

For the railway sector, this means greater scope for rational risk management. For nature, it offers a chance to reduce animal mortality while better preserving habitat connectivity. For technology providers, it means the need for continued development and increasingly robust documentation of results.

A problem that until recently might have seemed niche is therefore becoming part of the broader discussion about railway safety, reliability and sustainable development. More than 20 years of UOZ-1 operation on the PKP PLK railway network demonstrate how much can be learned from real-world deployments. The next step is to use this knowledge to further improve the matching of solutions to specific conditions and to assess their effectiveness objectively. *hfs/dbm*



The Alstom Coradia iLint hydrogen train at Wiesbaden main station.

ALSTOM:

Bringing hydrogen fuel cell capacities in-house

In 2015, Alstom selected the company Hydrogenics, in the meantime part of U.S. company Cummins, as a key partner to develop and implement hydrogen fuel cells for Alstom's Coradia iLint hydrogen-powered electric multiple unit (HEMU). On 2 April 2026, Alstom announced the acquisition of the hydrogen fuel cell activities dedicated to rail of Cummins. The move aims to strengthen maintenance and development for Alstom's hydrogen-powered train fleets.

Alstom states that by bringing these hydrogen capacities in-house, the manufacturer "secures development work more efficiently and efforts to support the performance, durability and energy-management needs of existing fleets and meet our commitments to our customers in Germany, Italy, and France". The deal includes "the engineering, product and support capabilities used in Alstom's hydrogen train fleets".

"Bringing these hydrogen fuel cell activities into Alstom gives us the capabilities we need to support reliability growth and maintenance for our installed fleet and to conclude the development of our contracted programs. Our approach is focused and

disciplined, with a clear priority on what matters most. We want to remain closely aligned with our customers' operational needs and provide the support they expect as they move toward greener traction solutions," said Danny Di Perna, Executive Vice President and Chief Operating Officer, Alstom.

Earlier, in March 2022, Cummins announced the commissioning of its new hydrogen fuel cell system manufacturing facility in Herten, Germany. The facility has an initial production capacity of 10 MW per year for the development and assembly of fuel cell systems. The new Herten site complements Cummins' existing alternative powertrain facilities in the UK, Belgium, and Germany. *hfs/rt/as*

PLASSER & THEURER I:

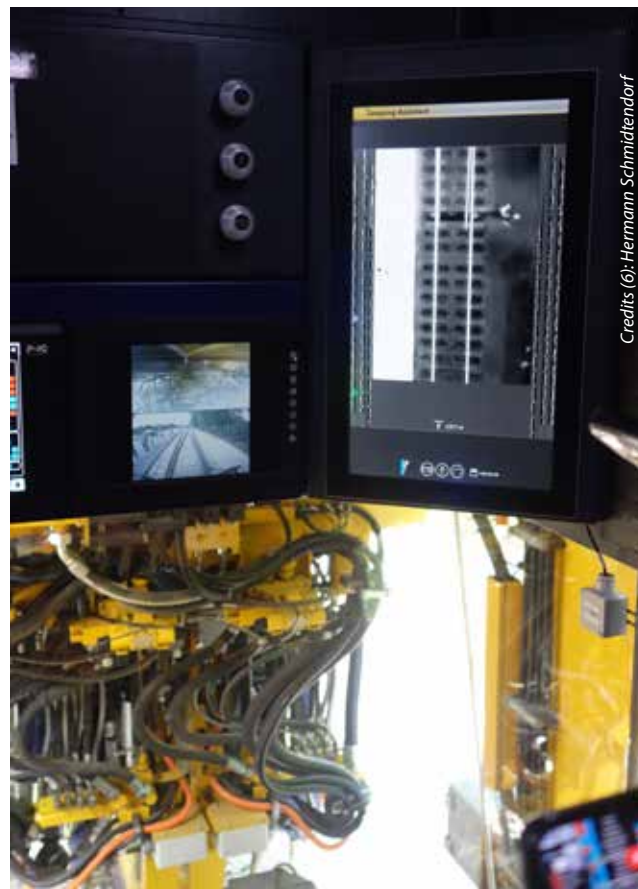
Automatic track tamping – the state of the art

At the 2025 iaf international trade fair in Münster, Westphalia, technology leader Plasser & Theurer presented the first autonomous track maintenance machine Unimat 09-4x4/4S E³. Our editor-in-chief was one of three lucky individuals who were allowed during the presentation to observe the unmanned machine at work from up close in the main cabin, sincere thanks!.

It is certainly an unusual sight. We guests are the only ones in the control cabin; there is no staff. The rams carry out their program entirely on their own—disciplined and precise, calm and quiet. Of course, the entire operation and the area around the tracks can be monitored from all angles on the screens, but—much like at the cinema—we can simply sit back and relax. After all, the work happens all by itself.

The Unimat 09-4x4/4S E³ performed all the steps involved in turnout tamping in an entirely automated way. At a speed of up to 80 km/h, the integrated measuring system recorded the track geometry along with the reference points. QR markers are essential for pre-measuring. They were mounted on the catenary masts found along the line and guaranteed exact positioning.

„The next step is to have the machine create a 3D image of the track section using a laser system“, informs Plasser & Theurer. „The machine’s artificial intelligence then calculates specific suggestions for tamping cycles based on the pre-measuring data and these 3D track data. All the operator has to do



Details of the monitoring screens during operation.

Credits (6): Hermann Schmidendorf

is confirm these suggestions. As a hybrid machine of the latest generation, it is no surprise that the Unimat 09-4x4/4S E³ features electric tamping units. Not only do they work far more quietly and with less fuel, they also perform filling and compaction control automatically. The result of this tamping work is a sturdy sleeper bed under every sleeper and a sustainable track geometry. Finally, the stereo camera system used for pre-measuring records the data of the new track geometry. The data is compiled into a report stored in the cloud.“

Machine operating companies benefit from this end-to-end solution in several ways: increased worksite safety; quiet, environmentally friendly, and sensing electric tamping units; and the report on the new track geometry, which provides exact documentation of the quality of the work performed. In addition, it is easier to make use of existing staff resources. Infrastructure managers benefit from the fact that no track possession is needed because the machine performs pre-measuring

itself. What stands out in particular is the detailed report on all the maintenance steps that are part of this high-quality tamping work. **Automation also helps address staffing issues.** Increasingly complex machines require highly qualified personnel; given the general shortage of skilled workers, such a machine helps get the job done. *Hermann Schmidendorf/p*



No hands involved: The control cabin with absolutely no manual controls.



Precision work automated: the tamping units at work.

PLASSER & THEURER II:

“The market potential right now is enormous!”

At the 2025 iaf international trade fair in Münster, Westphalia, Dr. Florian Auer, Director of Technology and Innovation at Plasser & Theurer, presented the autonomous track maintenance machine Unimat 09-4x4/4S E³. We present a few interesting statements.

Dr. Florian Auer: “The function of a tamping machine is to correct settlement in the ballast bed caused by heavy traffic and operational loads. Simply put: before the tamping machine passes, the track is uneven; afterwards, it is perfectly straight. As Plasser & Theurer, we are a long-established, family-run company based in Linz, Upper Austria; we have been technology leaders in this field for 70 years and have sold approximately 17,000 machines over that period.”

“What currently gives us the biggest headache is the requirement—stemming from the Fourth Railway Package and the Technical Specifications for Interoperability (TSI Loc & Pas)—to certify such maintenance rail vehicles like locomotives. For the initial authorisation of a new rail vehicle type, we have to submit around ten thousand pages of type-examination documentation. In contrast, ten years ago, our main concerns were questions like: How do we automate these processes? How can we successfully implement digitalisation?”

“The market potential right now is enormous. We have the largest order backlog in our history, with €1.4 billion in incoming orders. Back in 2017, we demonstrated an AI system here online for the first

time—the so-called Tamping Assistance System. The machine features a 360-degree surveying laser positioned at the front—you can see it up there. This is used to determine the vertical profile of the turnout. The process is fully automated. And today, we are able to demonstrate that this machine operates autonomously.”

“Cabin 2 is already empty. Cabin 3—the main tamping cabin—is where Reinhard Rüsselberger is currently located. Reinhard is now leaving the main tamping cabin. The main tamping cabin is now empty. He is moving to the front to take over the position of the front-unit operator. He is now responsible for everything happening here. This means he has to input the data—specifically the target track geometry data—into the system, into the master computer. Naturally, he also monitors the system at the rear via his screens and can operate the emergency stop. We anticipate that won’t be necessary, however; instead, we will process the entire turnout. The correction parameters are set; the auxiliary tamping cabin is empty, the main tamping cabin is empty, and the machine is now ready to operate automatically.”

Hermann Schmidtendorf recorded the details of the demonstration.



P&T expert Dr. Florian Auer with the autonomous ballast tamping machine and during the presentation.

EUCO Rail-BAHNDEPOTS IN LANGWEID AM LECH NEAR AUGSBURG, ESSINGEN NEAR AALEN AND GERSTHOFEN:

“Stay as flexible as possible – we want to delve into the depths of the value chain!”

EUCO Rail operates three railway depots in southern Germany. The Langweid facility offers state-of-the-art infrastructure across 9,000 m², including a tandem underfloor wheelset lathe, eight tracks in three halls, and elevated and pit tracks for various maintenance tasks. The Essingen facility focuses on predictive maintenance, thus complementing the range of services. Both locations are strategically situated. Langweid’s direct connection to the mainline railway provides excellent access to the European transport network. **In Gersthofen, the company’s most recent investment is a state-of-the-art components centre located in a high-end business park.** This centre handles the maintenance, overhaul, and storage of various railway components. EUCO Rail is certified according to all relevant standards ECM 1, ECM 2, ECM 3, and ECM 4, enabling it to offer a full range of services for the monitoring, maintenance, and overhaul of railway vehicles of various types and manufacturers. **Contact:** <https://www.eucorail.com/>

CARGO FREIGHT JOURNAL/rail & mobility visited the workshops and spoke with CEO Jörg Ernst about the requirements for modern workshop operations, personnel, machinery, and the philosophy behind flexibility, optimised planning processes, digitalisation, and adherence to deadlines.

Here is part 2 of the interview.

A MIX OF OLD AND YOUNG STAFF, MOBILE AND WORKSHOP

? **CARGO FREIGHT JOURNAL/rail & mobility:** Mr. Ernst, your company also offers on-site repair services. How do you approach such assignments?

Jörg Ernst: You need mobile teams with several people and diverse training. No one is allowed to perform tasks they aren’t trained for. Before dispatching to the site, we clarify: Which senior employee has which training, which younger colleague has which training, and what issues need to be addressed?

First, the operators provide information. They might say, for example, “I’m leaving the train at Munich Central Station this evening. The train is operational and has the following faults.” Then we first ask ourselves: Can I even fix these faults on-site? If so, we bring the necessary materials, tools are in the vehicle, and we put people with the required training on board. It’s helpful that our employees are flexibly trained so they can handle more than one train.

On-site, we often find simple damage in addition to the reported issues, some of which are safety-relevant. Especially after football matches, armrests are often loose, tables have fallen off, bins have been torn off, and toilet doors are broken. Seals are broken, and emergency hammers are either stolen



Access to the train from above, below, and the side: a modern, ergonomic workstation at EUCO Rail in Langweid. Credits (6): Hermann Schmidtendorf

or ripped off. If fire extinguishers are missing, the train cannot continue its journey. Similarly, if two toilets are out of order, the train cannot run. So, we try to repair the damage overnight to the point where the train is operational. Then, we schedule when the train will be brought into our workshop.

We have the ECM 3 fleet management system here. This allows us to handle all standard tasks as well as special projects. We determine when and how each task will be scheduled, how quickly it needs to be completed, and whether the work resulting from the damage can be combined with routine maintenance that was already planned when the train was due to arrive. Then, we implement the necessary measures. Since we support our customers’ transport contracts with technical and maintenance services, we are, of course, obligated to keep vehicles operational. Our goal must be to achieve the highest possible vehicle availability.

Accordingly, we strive to plan both planned and

unplanned issues thoroughly so that the customer, and ultimately the person on the platform, doesn’t have to experience a train cancellation. Through coordinated planning, our customers can prepare a replacement vehicle if necessary, or we can handle smaller tasks in the evening, overnight, with mobile teams, or in our workshops, ensuring the train returns to the regular timetable in time. We rely heavily on digital information and digital twins. We see three digital pillars in our work.

? **What does that mean in practice?**

The vehicle transmits thousands of data points every day. These are sent back to the operator or to us. Together, we have the opportunity to digitally record vehicle experiences. We incorporate this data into our analysis to determine the necessary maintenance plans. As part of the ECM2 maintenance certification, we provide maintenance engineering services ▶

for our clients with large transport contracts. We compare the vehicles' digital information with our own experience, the vehicle's history, and the binding requirements of the maintenance standard. When creating work orders, we try to adapt maintenance plans as part of the engineering process. Can tasks be combined? That makes sense—to do more with the same effort. For example, if a train comes into the workshop for an axle replacement, I can also service the air conditioning. Combining tasks is one thing. But I can also estimate: If I travel 1.2 million kilometres on one wheel, I would have to change it at 1.4 million kilometres, but I can hardly see any wear yet. So I can predict how much longer the vehicle can continue to operate. There are maximum values, and there are calculated values. This allows me to adjust the maintenance interval.

The trick lies in determining, across three different service topics, what is the mandatory point and what comes before it? With years and kilometres of experience, plus vehicle data, I can confidently combine maintenance cycles or elements thereof. Of course, you must never exceed the limits. But through these millions of kilometres over which data is collected, you can use engineering to draw clear conclusions and say: We can still handle this, or we can no longer handle this in a single appointment.



View of a multiple unit train from above.

Part of our digital tools is that we have digitally stored the train's maintenance requirements, based on manuals, experience, and specifications. Employees walk around the company with iPads; a maintenance order is sent to employees with the appropriate training—otherwise, they wouldn't be allowed to do it. Then the work steps are recorded, and you have to complete them. **You do your work manually, but you report the work digitally.** Everything is then processed together, both the standard tasks and the special issues.

The third digital branch comprises operational elements. For example, we have a fairly large and modern underfloor lathe that can process two axes simultaneously. The machine measures profiles, runout, and diameter, and the data is automatically fed back into our tool to tell us what was done, when it was done, and which serial numbers are involved. We can then derive insights from this as well.

CYBERSECURITY

Anyone who uses digital technology needs to think about cybersecurity. I place great emphasis on prevention. We have our own IT department, our own systems, and our own firewalls. We work with the major cloud providers, with reputable companies. We haven't yet been certified according to one of the most critical standards for data security, the Information Security Management standard ISO/IEC 27001:2022. Certification is a significant undertaking, and we'll do it when it becomes mandatory. But we already operate in a de facto manner in all our processes, following the guidelines of this standard. Because we want to do all our work with care and quality.

PASSENGER COACHES

Some people are surprised that we maintain not only locomotives but also passenger carriages. That has a history. When we started, we had to prove our competence step by step to win over customers. Today, I can say with great pleasure that we have a good influx of clients, our brand awareness has increased, and we don't have to worry too much about orders. But of course, it

was different at the beginning. That's why I'm very glad that Mr. Tobias Richter from TRI Train Rental GmbH contacted us back then. We were just looking for additional options when Mr. Richter said he was having trouble finding space for his vehicles everywhere. He was satisfied with our work, so we already had a good reference. That's also why I was pleased that we received a volume of passenger cars for maintenance in our last contract. Some of the vehicles were older than I am. But **it's also good to show our employees that if you're talking about digital technology, you should also be able to handle the analog stuff, you should understand the hardware. Today, you need people who can read the computer data in the cab, and at the same time, someone else has to tighten a screw with the correct torque to ensure the train holds together.**

? Do you want employees who think outside the box in railway technology, who have cross-sectional knowledge?

Absolutely! I remember my grandfather. Train rides with Grandpa were always incredibly exciting for me, especially in those old carriages with headrests, wide seats, and fold-down tables. Later, I learned in mechanics that window panes are screwed in, not glued. These are all things you can still repair today, which is why these trains are still running. The issue isn't obsolescence or the type of adhesive used.

I think every good mechanic working on a modern train these days has to learn how the mechanics were developed and how they work. These days, diesel engines are often criticised, but we all grew up with diesel vehicles, and our employees can still make certain adjustments to an engine. Only for major repairs do we need to bring in external engine experts, who are becoming increasingly rare, especially with diesel engines. We can do everything else ourselves. It's simply a mix. We won't spread ourselves too thin; instead, we carefully consider which platforms we adopt. **Diesel traction in the Augsburg area will still have a certain presence until 2040. That's why this investment has paid off. But we are also very keen to embrace new technologies, to have a mix of different platforms to also teach people what other vehicles look like.** A certain degree of complexity is really exciting. ►



EUCO Rail CEO Jörg Ernst.

THE CREW

The Hegenscheidt underfloor lathe



"It's also great to see the drive of the employees who come to us to take on more and more responsibility. They don't just want to do the same thing all the time; they want to try different things. As a small, medium-sized company, we thrive on the fact that our employees have more than one skill set."

"The variety of topics and problems is vast, especially with modern vehicles. When you have error patterns, it takes time to find the cause—it's not just "the indicator is red," but where is it coming from? So you have to measure cables, measure connections. Often, it's simply in the details. That means you actually need specialists: electrical, electronic, all the way to metalworkers and mechanics. And **bringing this combination of people and skills to the vehicle, ensuring they have the training and are allowed to do it, that is an art."**

WORKSHOPS LIKE SHOE BOXES

Today we operate at three locations. The Langweid site was initially a burden: it's large. I like to use the shoebox analogy. When a transport contract is tendered, say for 45 vehicles, a depot is usually built just large enough to accommodate 45 vehicles for maintenance. In a sense, it's built for a shoe size of 38. But then no more trains fit.

We deliberately built larger so that more trains could fit. We have a mix of transport contracts and individual clients with specific needs. It's good that we can accommodate more than just the few shoes from the initial contract. We can proceed differently, and I believe that's exactly what the market needs. Because if a state, as the contracting authority for rail services, says, "I have higher traffic volumes and I'm ordering more trains," then I have to reorganise fleets. But I can't reorganise a fleet if the location can't handle diesel, if it can't handle electric trains, if its halls and tracks aren't long enough. Today, the trend is also toward longer trains. Looking at the depot landscape in Germany, the depots are typically 80 metres long, maybe 100 metres at times. The new ones are being built at 150 metres. Here in Langweid am Lech, we have 200 metres.

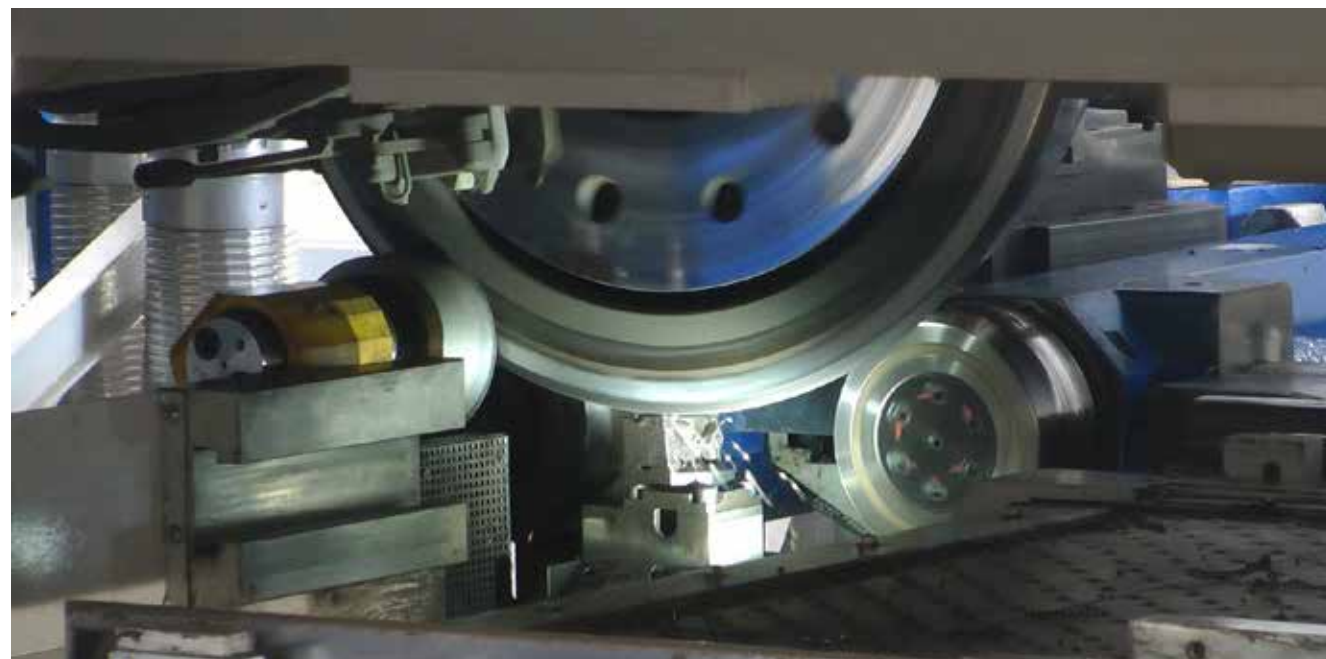
In Essingen near Aalen, we have two tracks, each 150 to 160 metres long. The depot was originally built for the initial 66 vehicles. Now we can fit another 28 vehicles into this compact space. Through optimisation, learning, and the intelligent interplay of optimised maintenance processes, we can service more vehicles than initially planned. **That's depot productivity – achieving this with the same number of people working in three shifts. That's the key: understanding the underlying principles, optimising processes, possessing the engineering expertise, and maximising fleet availability through digital input.** Then, you can fit more than just two vehicles in the box!

In Langweid, we even have a track overflow. This means that a train can extend 25 metres out of the 200-metre-long hall. This allows us to turn the wheels of an entire train in a single operation, without uncoupling or separating the train. This eliminates logistical effort, as the machine is located at our facility. It is one of the few tandem lathes in Germany.

GERSTHOFEN CREATES SELF-SUSTAINABILITY

Our latest investment is in Gersthofen. There, we have a machine park that includes spring-loaded pressure testing machines and paint shops. This

Sparks are flying here: Two wheels are profiled simultaneously on the underfloor lathe.



Gersthofen: a complete production line for wheelset replacement and machining, spring pressure stands and painting systems

latest investment is for the overhaul of components. This service centre is only eight minutes by truck from Langweid. These days, it's fashionable to say everything is so expensive. We'll just go to Romania, Serbia, wherever. Austria isn't cheap, but many people go there. There are a few centres of excellence for bogies. But from the moment you remove axles from a vehicle, you're essentially on the road for a week each way to the foreign workshop.

We save these ten to fourteen days for transport. Customs duties and border formalities are also eliminated.

Speed is important to me – and to our customers too! This allows us to promise: We are faster, and at the same time, we completely control the quality of our work ourselves. We have so many opportunities to do things ourselves and take full responsibility for them. **We want to delve into the depths of the value chain!**

When setting up the service centre in Gersthofen, I drew on experience from my previous career. I've had the opportunity to plan factories before, or at least been involved in the planning process. Often, the actual work in those factories turned out diffe-

rently than planned. **The key takeaway: You have to be flexible.**

In Gersthofen, I installed almost every machine, including the paint booth, so that it can operate without a foundation. The paint booth has an exhaust system, so I would move it last in the hall. Otherwise, I can quickly reposition the machines because, despite the forces at play, they simply stand on the floor and are only lightly anchored. If necessary, we can essentially juggle the machines. In Gersthofen, we use a relatively new industrial building on a long-term lease—a large hall with two wings. We currently use one wing for the many materials and bogies we keep as spares. The other wing is the production area. Should we grow in the future, which is both foreseeable and desirable, I can simply move the materials elsewhere and equip the second wing in the same way. Then we have double the capacity.

Today we're working one shift, soon it will be two, and we'd have the option of adding a third. So we're pretty well prepared for all eventualities. **That's our philosophy: We want to remain as flexible as possible.**

The interview was conducted by Hermann Schmidtendorf

CONFERENCE „FUELS OF THE FUTURE”
IN BERLIN, JANUARY 18-19, 2027:

Sustainable, ecological, social

Ethanol, also known as ethyl alcohol or simply alcohol, is a colourless, pungent-smelling, volatile, and highly flammable liquid with the chemical formula C₂H₅OH. Highly purified alcohol, free of odor and taste, is called neutral alcohol. This is explained by the German Bioethanol Industry Association (BDBe) on its website: <https://www.bdbe.de/>. Bioethanol is produced from renewable agricultural raw materials such as grain and sugar beets, as well as from waste and residues like straw. Synthetic ethanol is obtained through acid-catalysed hydrolysis of petroleum-derived ethene. Worldwide, almost exclusively bioethanol is used today; synthetic ethanol now accounts for only 2% of ethanol production.

Sustainability and regionality

At the international conference “Fuels of the Future” in Berlin on January 18-19, 2027, which the BDBe is co-organising, various aspects of bioethanol as an alternative fuel for mobility will be addressed. The association emphasises the importance of using only sustainably sourced biomass in bioethanol production. Current needs should be met in a resource-efficient manner, ensuring that the natural foundations for future generations are preserved. Sustainability goals are an integral part of the European Union’s political program. This is important to the ecofuel industry. Therefore, it points to key regulations for biofuel production that must be adhered to:

- Renewable Energy Directive (EU) 2018/2001 (RED II)
- Delegated Regulation (EU) 2019/807 on the identification of raw materials with a high risk of indirect land-use change (ILUC).



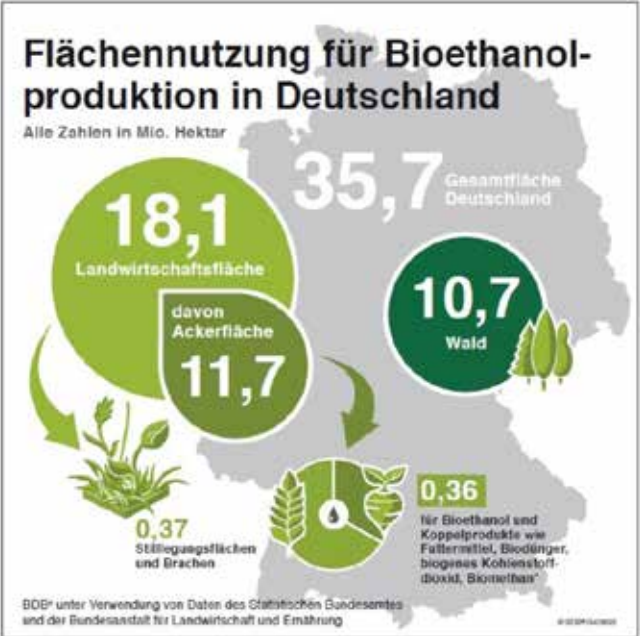
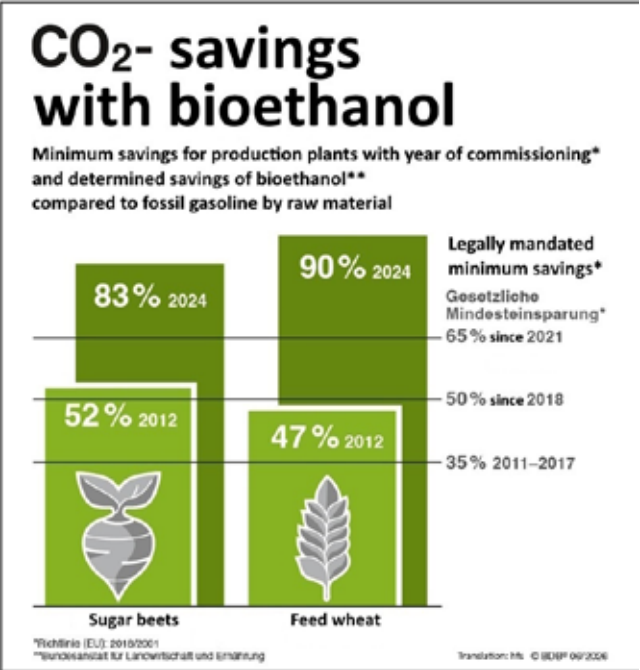
Biofuel is available here around the clock.

According to the assessment method, palm oil is defined as a raw material with a high ILUC risk. In contrast, **cereals, maize, and sugar beets show only a low ILUC risk as raw materials for bioethanol production. Domestic producers use exclusively European raw materials for bioethanol production, processing a broad mix of feed grains** – typically two-thirds various feed grains and one-third sugar beets. To comply with crop rotation, different plants

with varying requirements are cultivated on the same land each year. „Good Agricultural Practice” has been the standard in German agriculture for decades. In addition, the regulations of European „Cross Compliance” within the framework of the European Common Agricultural Policy (CAP) apply.

German bioethanol producers require only 3.3 percent of Germany’s total arable land for their production. At the international level, the United Nations (UNIDO) recommends the development of a bioethanol-based value chain, as

bioethanol is a renewable energy source that can play a crucial role in economic and environmental sustainability in developing countries. According to a UN study („Unlocking the Bioethanol Economy”), the ethanol industry has the potential to alleviate rural poverty, increase agricultural productivity, stimulate economic growth at the local and national levels, create jobs, improve lives through sustainable, „clean cooking” for households, promote equality, and significantly reduce greenhouse gas emissions.



Land use for bioethanol production in Germany.

Social responsibility

The German bioethanol industry also practices sustainability by assuming social responsibility, emphasises the BDBe. According to the Renewable Energy Directive (RED II), the European Commission is obligated to report to the European Parliament and the Council every two years on the social consequences of increased demand for biofuels. If necessary, the Commission can propose amendments to the legal regulations for biofuels to the European Parliament and the member states. With regard to the social consequences of EU biofuel policy in Europe and in third countries, the Commission reports on the availability of food at affordable prices, particularly for people in developing countries, and on broader development policy aspects. The protection of land use rights must also be addressed. Furthermore, for third countries and member states that represent a significant source of raw materials for biofuels consumed within the EU, it is ensured that the country in question has ratified and implemented all of the following conventions of the International Labour Organisation (ILO).

Jobs

The German bioethanol industry also contributes to sustainability as an employer, according to the BDBe. Bioethanol production in Germany secures jobs, particularly in rural areas, and promotes investment in structurally weak regions. Globally, the number of jobs in the renewable energy sector is rising, according to IRENA (International Renewable Energy Agency), reaching approximately 12.7 million in 2021. This represents an increase of around 700,000 employees compared to the previous year. Of these, 2.4 million people worldwide worked in the biofuels sector (bioethanol, biodiesel, vegetable oil, biomethane). The current IRENA study estimates the total employment impact of renewable energy production in the EU at approximately 1.24 million people. According to the research report „Economic Indicators of the Energy System,“ a total of 23,800 people were employed in the biofuels technology sector in 2016. For the bioenergy sector, i.e., biofuels and electricity from biomass and biogas, IRENA reports 113,700 people employed in Germany. Information on the 2027 congress: <https://www.fuels-of-the-future.com/en/conference/hfs/bd>



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24th International Conference
on Renewable Mobility

SHAPING THE TRANSITION—FULL STEAM AHEAD FOR RENEWABLES

18—19 January 2027
CityCube Berlin



SESSION 1: ROOM A6 10:00 – 12:45 Shaping transformation – Full steam ahead for renewables • Part I: National perspectives on the transport energy transition Including round table • Part II: European perspectives on the transport energy transition Including round table	SESSIONS 4 A–D: PARALLEL-SESSIONS 9:00 – 11:00 4A The long road to e-fuels – Successes and challenges Room M1–M3 4B Strengthening bioethanol – Expanding blending, accelerating CO2 reduction Room M4–M5 4C Globally connected – Opportunities and risks in international trade with renewable fuels Room M6–M7 4D From the lab to the road – Paths to advanced alternative fuels in practice Room M8
SESSION 2: ROOM A6 14:00 – 16:00 Higher blends of renewable fuels for greater climate protection Including round table	SESSIONS 5 A–D: PARALLEL-SESSIONS 11:30 – 13:30 5A Implementation of RED III in Germany and Europe Room M1–M3 5B Transport in transition – Travelling with biomethane & BioLNG Room M4–M5 5C Green waterways – Full steam ahead with renewable marine fuels Room M6–M7 5D Turning waste into power – Biofuels for sustainable mobility Room M8
YOUNG TALENTS COMPETITION 16:45 – 17:15 SESSION 3: ROOM A6 17:15 – 18:45 The role of renewable fuels in strengthening energy security and resilience	SESSIONS 6 A–D: PARALLEL-SESSIONS 14:30 –16:30 6A Renewably charged – Green hydrogen in the tank Room M1–M3 6B Climate-friendly today – Renewable fuels for heavy goods and freight transport Including round table Room M4–M5 6C Flying responsibly – Renewable fuels in aviation Room M6–M7 6D Green power in the field – Renewable drive energy for agriculture and forestry Room M8

BIOENERGY RECEPTION
19:15
at hub27 (Hall 27, Exhibition Centre)
(free admission for all conference participants)

FUELS OF THE FUTURE

HOW TO REFUEL A HYDROGEN TRAIN I:

SIEMENS MIREO PLUS H in practice

Hydrogen-powered rail vehicles have only been around for a few years. In Germany, they are offered by manufacturers Alstom and Siemens; elsewhere in Europe, Stadler and PESA are also working on such vehicles. During the initial rollout, there were frequent reports of malfunctions and difficulties. Some observers were skeptical about the new technology as a whole. Dr. Arnd Stephan, a professor at the Technical University of Dresden, is convinced that this skepticism is misplaced. The information service befootec.de quotes the professor – who holds the Chair of Electric Railways – as saying: *„The same thing happened at the dawn of electrification. People spent the first ten years learning the ropes and took quite a few hard knocks in the process.“*

As with any new technology, one should not harbour excessively high expectations at the outset. The hydrogen infrastructure still needs to be built. The German federal government must implement its plans to expand green hydrogen production capacity to ten gigawatts by 2030; currently, it stands at a mere 0.1 gigawatts. Green hydrogen is produced via electrolysis using renewable electricity. To date, Germany has also utilised so-called „blue“ hydrogen – derived from fossil fuel sources or processes involving carbon capture. Enno Wagner, head of the Fuel Cell Technology Laboratory at the Frankfurt University of Applied Sciences, also advocates for patience. He notes that fuel cell technology is highly complex and new to widespread, everyday application. „This requires comprehensive field tests, which should also receive government support.“

How is a hydrogen-powered Siemens Mobility Mireo Plus H trainset actually refueled? Our editorial team had the opportunity to observe two different methods up close.

METHOD 1: AD HOC FILLING

What can be done if there is no hydrogen production facility or stationary refueling station near the train depot? DB Energie, the energy subsidiary of Deutsche Bahn AG, devised a mobile solution involving two trucks. One trailer remains by the railway track to serve as a mobile refueling unit, while the other – a storage trailer – travels to the production plant to transport the hydrogen to the rail infrastructure. This allows a hydrogen train to operate virtually anywhere, as the hydrogen is brought directly to the train.

This model is currently being tested at the Bavarian Railway Company (BEG) depot in Augsburg. DB Energie produces the green hydrogen from renewable energy sources at its innovation hub in Tübingen and delivers it by truck to the refueling station in Augsburg.

METHOD 2: STATIONARY FILLING STATION

Since 2024, the Niederbarnim Railway Company (NEB) has been operating seven Mireo Plus H



A Mireo Plus H is being refueled in southern Germany from this mobile DB Energie trailer.

trainsets on the Brandenburg-based Heidekrautbahn line near Berlin. The trains' traction system – featuring second-generation fuel cells from Ballard and lithium-ion batteries from Saft – delivers a power output of 1,700 kilowatts. This enables an acceleration of 1.1 m/s² and a top speed of 140 km/h. Thanks to the use of silicon carbide power semiconductors, the vehicles are considered highly energy-efficient. Plans for a stationary refueling station were incorporated from the very beginning. NEB's partners include the energy company Enertrag, Kreiswerke Barnim, the Brandenburg University of Technology Cottbus-Senftenberg (BTU), and the German Aerospace Center (DLR).

Sebastian Achtermann, Managing Director of NEB, speaking at the presentation of the refueling station on August 20, 2025: *“We can be proud of what we have achieved together with our project partners – Kreiswerke Barnim and Enertrag – and our vehicle supplier, Siemens Mobility: establishing operations that are now highly stable and reliable. This is outstanding and pioneering – and currently unique in Germany.”*

The facility consists of an electrolyser, a compression system, and storage tanks with a combined capacity of 1,800 kilograms of H₂. The electrolysis capacity currently under construction is four megawatts, providing approximately 230 tons

of hydrogen annually for the Heidekrautbahn. The NEB requires around 900 kilograms of H₂ per day. The hydrogen is produced locally using wind and solar power; to this end, Enertrag utilises energy from existing wind turbines as well as from a newly constructed eight-megawatt photovoltaic plant.

Hermann Schmidtendorf



NEB Managing Director Sebastian Ackermann in front of a route map of the Heidekrautbahn, where the new Siemens hydrogen trains operate.

Security, reliability, dialogue-oriented

Our editorial team spoke with Christian Mehnert, Managing Director of the Kreiswerke Barnim corporate group, at the hydrogen refueling station for Mireo Plus H trains at the NEB depot in Basdorf.

? r&m: Mr. Mehnert, are you operating a truck shuttle service here between the filling station and the hydrogen production plant?

Christian Mehnert: Yes, we do. Our supplier, Enertrag, operates five trucks. This provides a substantial safety margin. A truck might get stuck in a long traffic jam or encounter technical issues, yet the hydrogen supply remains secure. A new truck carrying fresh hydrogen arrives roughly every three to four days. It stays on-site for a day; while the actual refueling process doesn't take that long, there are specific time slots allocated for it, and the overall procedure includes final maintenance checks.

Initially, Enertrag delivered the green hydrogen from their production facility in Central Germany. Now, however, a new production facility – featuring a new electrolyser – is being built in Wensickendorf, just nine kilometers away. This proximity will make our supply situation even more secure. At the very beginning, there was a proposal to lay a small pipeline connecting the production site to our filling station here. That idea was ultimately abandoned, however – due to safety concerns and the complex permitting process.

? How much hydrogen can this filling station store, and how large is the site?

Around nine hundred kilograms are stored here. The site covers three thousand square metres. The Rostock-based company H2Apex is the contractor for the refueling station technology. Many regional companies were involved in all other aspects of the project. We have three compressors here for safety reasons. In theory, we only ever need two of them. They operate to generate the pressure required to boost the level from three hundred to five hundred bar; the hydrogen pressure must be increased in stages. The third compressor serves solely as a backup – a safety measure ensuring that operations continue even if one of the compressors fails.



Here, a Mireo Plus H is being refueled with hydrogen directly from the refueling system.

FOCUS II: ALTERNATIVE ENERGY IN MOBILITY

? What quantity of H₂ is used to fill each train?

We refuel with 100 to 140 kilograms. Of course, that depends on how much is already in the tank; these are things that are still settling into a routine. How much residual hydrogen do the trains have when they arrive at the station? That depends on the scheduled service rotation – specifically, when the next refueling window occurs. It is also worth noting that you cannot operate a hydrogen refueling station the same way you do a diesel station. You have to build up pressure first, and specific intervals are required between refueling operations.

At night, we refuel the trains without using compressors. Compressors generate noise – not a lot, but enough to be a possible nuisance to people. There are noise control regulations in place, and while

we have erected a sound barrier, we refuel without running compressors at night to avoid any potential disturbance. This means refueling relies solely on the transfer of gas by 'overflow' from the 500-bar buffer storage tanks. This allows for a maximum of two refueling cycles; after that, the pressure in the storage tanks drops too low for refueling to work. However, two cycles a night is sufficient. We are currently trying to increase this to three or four cycles. We are investigating whether it is possible to run a compressor at night without causing noise pollution.

We are in close communication with local residents throughout this process; it is crucial for us that the people living here accept what is happening. ►

This stationary tank storage facility of the NEB in Basdorf is a complex piece of equipment.





A tanker truck at the NEB.

The worst-case scenario would be for people to have concerns without having a point of contact. That is why residents have been given the email addresses and phone numbers of our operations team – we are the operator here. Neighbours can contact us at any time, and they do so occasionally to share observations. For instance, neighbours once called to let us know that someone had entered the site without authorisation. It is a great neighbourhood, and we naturally want to maintain that relationship.

? Can a train loaded with 100 to 150 kilograms of hydrogen run for the entire day on that amount?

Yes, no problem. The Heidekrautbahn covers a route of just about eight hundred kilometres – you can see that on the network map. A single tank of fuel is easily enough for that.

? The Siemens expert said the train has also already been tested for a range of up to 1,200 kilometres?

All the better! It is always good to have a fuel reserve. Importantly, this is also a research project. The BTU is monitoring the hydrogen plant's operations, while several partners are collecting and analysing exten-

sive data. The aim is to provide technical support to other investors interested in this type of technology. We operate with a high degree of transparency; for instance, in our report on the pre-operational phase, we spoke very openly about initial problems. That is precisely the point: to keep nothing hidden and to report instances where things didn't go well. New technology always presents a challenge.



A Mireo Plus H on the Heidekrautbahn.

? Are there no other comparable hydrogen filling stations?

No, not of this size. I believe we are unique, at least within Germany.

The interview was conducted by Hermann Schmidtendorf.

HOW TO REFUEL A HYDROGEN TRAIN II:

The filling technology is also important

In 2016, ALSTOM became the world's first railway company to launch a hydrogen-powered train for series production: the Coradia iLint. This was a novel undertaking that required the use of components originally designed for other applications. The iLint stores hydrogen at a pressure of approximately 350 bar. Refueling for the train's initial deployment in Lower Saxony was carried out using a specially designed train refueling station supplied by the renowned hydrogen provider Linde.



Hydrogen refueling technology from the manufacturer WEH.

However, unexpected issues arose during the winter months. The hydrogen filler neck – or rather, the refueling coupling – was prone to icing up. Reports indicate that the cause was not the hydrogen itself, but rather moisture within the coupling or the dispensing system. During rapid filling, the hydrogen expands within the coupling, causing a significant drop in temperature. Moisture from the ambient air or insufficiently dried compressed air can freeze; residues of condensation, snow, or ice then prevent the coupling from locking securely. Furthermore, refueling station components – such

as seals, valves, and the filling coupling – can become stiff or sluggish at low temperatures. Typically, this results in the refueling process failing to start, aborting prematurely, or a leak test failing – triggering a safety shutdown that can severely disrupt operations.

Market leader WEH reports: „The ‚Coradia iLint‘ train developed by the French manufacturer Alstom is equipped with the WEH® TN1 H2 35 MPa receptacle. Naturally, the train is refueled using the WEH® TK16 H2 35 MPa fueling nozzle.“ The iLint therefore relies on proven brand-name technology for the refueling process as well. However, perhaps the wrong configuration was chosen? The manufacturer WEH, for instance, offers the TK20-S1 H2 refueling nozzle and notes: „The nozzle is equipped with a purge line that enables nitrogen purging during and after the refueling process. This helps prevent moisture ingress and ice crystal formation when refueling with pre-cooled hydrogen.“ The TK20-S1 H2 supports media temperatures as low as -40°C, whereas the TK16 H2 is rated only for -20°C.

According to a WEH spokesperson, heated or temperature-controlled components are also available. Experts consider this a way to avoid winter-related issues. Other important measures include keeping the refueling nozzle and vehicle receptacle dry and free of ice before connection; sufficiently drying the hydrogen and compressed air and regularly draining the refueling station; verifying that seals, check valves, and locking mechanisms are suitable for low-temperature operation; and – in cases of extreme frost – conducting refueling operations more slowly or using adjusted station control settings. *hfs*

Electric Buses from Vietnam for Europe

At the Mobility Move trade fair in Berlin, buses from China had previously been the most widely traveled exhibits. In 2026, another long-distance traveler joined them – from Vietnam. Our editorial team spoke with the representative of the company Vinvast.



The front area of the Vinvast bus.

? rail & mobility: Mr. Oosterveld, I wasn't aware of a manufacturer from Vietnam before. Now you're offering buses from this country for sale in Germany and Europe. What kind of vehicles are they?

Patrick Oosterveld: Vinvast is a subsidiary of the Vin Group from Vietnam. We've been selling passenger cars in Europe for a long time. Since October 2025, Vinvast has also been producing buses for Europe. There's a Vietnamese bus production facility for Vietnam and one for Europe. These are two different products. Here at the trade fair, we're exhibiting our EB12 bus, produced in Vietnam for Europe with Western European components. The door system comes from the Netherlands, the front and rear axle system from ZF in Germany, and the seats are from Ster in Poland.

We're not new to Europe. We have about fifty people working daily in the passenger car sector in Germany and one hundred in France, and the e-buses are now being integrated into that. But the prerequisites, the structures, are already in place – logistics, homologation approval, spare parts supply, spare parts warehouse, after-sales service.

? What was the response from the trade fair audience?

There was a lot of interest. Due to climate protection regulations, around 30,000 diesel buses in Europe need to be replaced by 2030. We want to help with that. We have short delivery times of seven months because we also manufacture many components ourselves. We're also not dependent on other partners for logistics. We have our own ship to transport the vehicles to Europe.

? You certainly won't be shipping spare parts from Vietnam only when needed?

No. We have our own warehouse in the south of the Netherlands. Furthermore, we've installed many Western European components in the buses. As I mentioned, the ZF axle, but also components from Knorr-Bremse and WABCO suspension systems. We all work with the same basic tools to ensure the buses are easy to maintain and repair. And we have our own FSEs, Field Service Engineers – essentially flying doctors – who come to the customer when something goes wrong, when a regular workshop can't resolve the issue with their standard expertise. For high-voltage issues, we come directly to the customer's location and are there quickly to help.

? Mr. Oosterveld, you're Dutch. How did you come to work for Vinvast? Did you study Vietnamese?

No. From 2014, I helped the Chinese manufacturer BYD enter the market and oversaw their work until 2022. Now I was asked, „Can you do the same for the Vinvast brand from Vietnam?“ and I agreed. The great thing is that we are an interesting alternative. We come from Asia, but we're not Chinese. There's already an alternative from India, and perhaps in the future, from the Philippines and Malaysia. Asia isn't just China; it's much broader. And that's what we're demonstrating here with the Vinvast product.

? This fits perfectly with today's demands for diversification. How do you address potential speculation that your low prices are achieved through poor workmanship?

We operate with complete transparency, inviting trade journalists for test drives. Test reports are publicly available on our website. We offer a five-year warranty on the vehicle, a ten-year warranty on the chassis because we apply an electrophoretic coating bath, a cathodic dip coating bath with a nine-layer finish to the chassis. And we offer a fifteen-year warranty on the battery.

? Fifteen years for the battery? That's ambitious for daily driving?

Exactly. If everything isn't properly installed and perfectly executed, you can't offer a five-year comprehensive warranty and a fifteen-year battery warranty. The VIN Group is large enough to support what Vinvast promises for its buses.

? How long has this company been around? Is it a private company, or does it have government participation? How far could you ramp up production if there were sufficient demand from Europe?

The company is family-owned. It has borne its current name since 2000. Passenger cars are our main product. We currently produce about 2,200 buses. But there's no limit. If I call my boss and say, „I've sold 4,000 vehicles,“ she'll accept the order. Vinvast isn't held back by limitations. The company stands for expansion and innovation. Building a production plant is relatively easy in Vietnam. Our goal is to bring as much as possible to market in the shortest possible time.

? Can you comment on the price?

The vehicle costs €410,000. If you order the vehicle without double glazing, without electric ramps, without front heating, the price is €400,000. This includes the five, ten, and fifteen-year warranties. ►



The entrance of the EB12.

You told me the staff enjoys their work. Is the pay higher than average? Yes, there's an agreement for that, and the employees are well looked after. When I'm there, I eat in the same kitchen as the employees, and with customers too. We don't make any distinctions.

? Do you eat with metal chopsticks?

Yes, metal chopsticks. They're reused. That's all fine.

? And you're allowed to have a union there?

Yes, of course.

? Batteries are an important topic. What can you tell us about them?

We use CATL batteries. They're pure LFP batteries, iron phosphate batteries. These batteries are difficult to burn and are 98 percent recyclable. There are no rare earth elements or valuable materials like nickel, manganese, and cobalt in it. We have 422 kWh on board and can expand the pack to 530 kWh. This also makes it unlikely that such batteries will catch fire during shipping, which has happened before.

? What about the heating?

The vehicle has a CO2 heat pump on the roof, and we also have radiators that are powered by a diesel or hybrid heater, HVO compatible. You can set them to five, zero, or minus five degrees Celsius to provide additional heating.

? Do you think that after such a trade fair appearance, more visitors will approach you?

I think so. We've had several roadshows in North Rhine-Westphalia, and there's interest in the Berlin and Munich areas, as well as in Switzerland. A roadshow means that we travel by bus for several days, visiting customers and presenting the vehicle with test drives. Interest was also high at the Bus2Bus trade fair in Berlin, where the privately owned member companies of the German Bus and Coach Association (bdo) were among the participants.

? These are companies that have to spend their money sparingly and can't rely on public funding for luxury models?

Exactly. And then we have the answer: 400,000 euros, not Chinese-made, seven-month delivery time.

! That's clearly a lot of advantages. Thank you for the interview, and best of luck with your future presentations and sales!

Interview by Hermann Schmidtendorf.



CEO Patrick Oosterveld in front of the bus EB12.

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BIOFUEL EXPRESS: „Prices are currently lower than for fossil fuels!“

At the Bus2Bus trade fair in Berlin, the CEO of the German company Biofuel Express explained the benefits of his company's biofuels to us.

? rail & mobility: Mr. Waitz, „Biofuel Express“ – that sounds like rapid delivery. Which biofuels does your company supply?



CEO Oskar Waitz

Oskar Waitz: We have several products in our portfolio. HVO 100 (Hydrotreated Vegetable Oil) is our flagship product, particularly for the German and Central European markets. We also offer classic RME 100 (Rapeseed Methyl Ester) – the conventional bio-diesel everyone knows. There are also some specialty products, particularly regarding cold-weather performance for Scandinavia, as that is our home market.

? Oddly enough, it is often a bureaucratic battle just to get approval for the widespread use of biofuel products. Do you understand why this is so difficult in some countries?

That is a very valid question. You always have to be aware of the markets you are operating in and the political climate – or, let's call it, the mindset – that prevails there. For a long time, Germany was dominated by an „all-electric“ ideology – the idea that everything had to be electrified, very quickly and urgently. This varies from country to country. We try to operate within this complex landscape by delivering immediately tangible and implementable solutions – using a product that works in existing internal combustion engines and delivers an immediate reduction in CO2 emissions.



Reaching the customer at express speed: a tanker from Biofuel-Express

? Do the engines need to be modified in any way to use these fuels? And do I need to take special precautions regarding fuel station tanks?

No engine modifications are required. It's ready to go – plug and play; you simply fill up. You can mix our biofuel with conventional diesel in any ratio. You can use HVO at concentrations of up to 100 percent, or blend it with conventional diesel. It meets the same standard and is therefore approved by manufacturers for newer engine generations. Essentially, you don't need to make any changes to your refueling infrastructure. However, we are naturally subject to regulatory requirements. This means that if I switch the product stored in the tank from diesel to HVO, I have to notify the authorities. They come out, pay a visit, and then re-certify the facility for the new fuel. Biofuel has a slightly lower density than diesel fuel. If you want to use a metering system for public refueling, it has to be officially calibrated. The same applies when I switch fuels. But in any case, such a system has to be recalibrated once a year anyway, so it's not a big deal.

? What kind of response are you seeing in the industry – among bus companies, for instance?

We are active in the field. We are using the fuel successfully. Demand is high, and the Bus2Bus trade fair has shown great interest in improving existing diesel vehicles in terms of CO2 emissions – and that's where we offer a „plug-in“ solution. We hope to see – and are seeing – the market increasingly adopt our product. We consider it market-ready, backed by strong growth figures, and we see the market ramping up.

? Is the bus sector your specific target market, or are you also looking at smaller delivery vans or passenger cars?

We don't see ourselves in the passenger car sector in the long term. I believe the trend toward hybrid or electric passenger cars makes perfect sense there. We see our role in the heavy-duty sector – trucks and buses – but we are also active in rail transport. Deutsche Bahn and DB Cargo use HVO as well.

? Supplied by you, too?

Yes, they are already running on our products from Neste. We are also active in inland shipping, powering conventional diesel engines. And that makes sense, because we achieve CO2 savings immediately.

BI FUEL EXPRESS

? So, how do we get enough refueling infrastructure rolled out across the region? After all, when I'm on the road, I don't want to have to keep switching fuels, right?

That makes no difference. Even if you can't find a station offering HVO, you can simply fill up with regular diesel without any negative effects. That serves as a sort of backup. HVO actually offers significantly better cold-start performance; otherwise, there are no downsides.

? So, the situation here differs from hydrogen where people often argue that adoption only makes sense once there is a vast network of refueling stations?

What is your response to the suggestion that your fuel cannot play a major role because there aren't enough raw materials available for mass production? We naturally aim to produce our fuel from feedstocks based on organic waste. We try to avoid using primary energy crops, focusing instead on finding secondary uses for these waste materials. Examples include animal fats, used cooking oil, and even fatty acids from the paper industry. Since these materials have a potential for secondary use in our processes, we take them and feed them into production. There are certainly other sources and supply streams that could be tapped into. However, it is also clear that this won't be enough on a one-to-one basis to replace all fossil diesel. Scaling up will likely only be possible within a certain double-digit percentage range. Even so, these are significant impacts, as every drop and every liter makes a positive difference regarding CO2 emissions and sustainability. That is why we believe that even slow, steady growth makes sense.

? Do you have „waste scouts,” so to speak, who look for new sources and try to establish long-term commitments with potential waste producers?

Yes, absolutely. Contracts are being signed internationally. At the Bus2Bus trade fair, the Ambassador of Bangladesh visited our stand, and we had a productive conversation. Large quantities of frying or cooking fat are generated there – material that is currently simply discarded. The idea of capturing or collecting this waste fat for secondary use really resonated with the Ambassador. And for people in Bangladesh with limited economic means, receiving a small rebate for used kitchen fat represents an important local contribution.

? Could you transport these fats to Europe by ship? And would it still be financially viable?

The answer to both questions is yes. In fact, that is already being done. Each individual business case has to be calculated, but in principle, there is definitely potential there. The current difficult situation regarding oil resources is certainly working to our advantage. Our pricing is currently even lower than that of fossil fuel. And, in principle, our prices are less volatile; our product is not as exposed to political fluctuations. And this market pressure actually fosters creative ideas. We can see this in the strong response at Bus2Bus. We anticipate being able to bring the volumes we showcased to bus companies at the trade fair to market in the near future.

! Mr. Waitz, thank you for the interesting conversation!

Interview conducted by Hermann Schmidtendorf.

Scandinavian Rail Optimisation Nov 4th, 2026:

Innovation and intelligent technologies for a dynamic market

At this year's leading conference on IoT in Rail organised by the British event agency ROTAIA MEDIA in Cologne, May 20th and 21th, our staff asked the Managing Director Ben Holliday to share with us his impressions and plans.

This is our ninth year organising this event. In fact, it's our highest attended event that we've organised in the past nine years. So it goes to show the popularity of the event, but also the importance of the topics and themes that are discussed at the event. It's very much an ever-evolving topic. The conference name has slightly changed this year from **The Rise of IoT and Big Data in Rail** to **The Rise of IoT, AI, and Data in Rail**, to illustrate the emergence of AI. So yes, it's given that fact, it's attracted a higher audience, which is obviously a positive thing.

There are still further players in the industry that would like to attend the conference. To be honest, we've actually sold out year on year in terms of sponsorships. Unfortunately, we can't actually accommodate more sponsors to the event, but the sponsors that obviously do attend, the majority, are repeat customers. But of course, there are new companies that join the event when those companies who previously attended have chosen not to, for whatever reason. But yes, there are companies who are experts, whether it be in AI, analytics, data, predictive maintenance, sort of trace and tracking.

It's a very niche event. So naturally, the companies that are exhibiting their products almost match the requirements of the speakers, i.e., the end users. For example, the infrastructure managers and the rail operators, the challenges which they're facing, many of the exhibitors and sponsors have the technology to essentially overcome those challenges. So we're a very sort of close community. That's why people return year on year, because we're attracting the right caliber of people.



Ben Holliday

November 4th this year, we're running Scandinavian Rail Optimisation in Stockholm, which is a sister event to this Cologne event, like a spinoff. As the title suggests, it's focused on the Scandinavian Nordic region, covering very much the same sort of topics and themes as this event. This Cologne event is considered to be more international, obviously attracting suppliers as well as railways from around the world.

Whereas the Stockholm event is very much focused on Sweden, Denmark, Norway, Finland, as well as the Baltics. So you have a more concise sort of personnel that attends that particular event. Europe's North is a dynamic rail market, and we want to present the latest innovations and intelligent technologies, give a place for networking- <https://www.scandinavianrail.co.uk/>

ELIN PROPULSION SYSTEMS FOR SHIPPING AND THE MARITIME INDUSTRY:

Tailor-made solutions to reduce emissions and boost efficiency

The International Maritime Organization (IMO) has set ambitious goals: maritime transport is to be climate-neutral by 2050, with total annual greenhouse gas emissions required to drop by at least 20 percent compared to 2008 levels by as early as 2030.¹

The non-profit „Maritime Battery Forum“ network estimates that there are already over 1,800² fully or partially electric ships in operation. This marks the start of a technological shift, even though the challenges facing motors and generators in maritime applications are significant and varied. Space is limited, operational loads are high, the atmosphere is saline, and the operating environment – including wave action – is demanding. „Electric machines therefore need to be easy to integrate, robust, durable, and corrosion-resistant,“ explains Bernd Passath, Sales Manager at ELIN Motoren and an expert in maritime propulsion technology³. The Austrian company boasts a 130-year history and has established itself in the maritime sector as a specialist in sophisticated small-batch production and electric propulsion systems.

There is a demand for electric propulsion systems that prioritize efficiency, robustness, and data-driven design. „In the maritime sector, every inquiry must be evaluated individually because requirements vary depending on the intended use and location,“ notes Passath. „That is why customized engineering is essential.“ Standard solutions fall short; the transition cannot be achieved without specialized solutions that take individual operating conditions into account right from the development stage.

High Standards for Corrosion Protection and Cooling

Corrosion protection is a specific requirement for electric marine drive technology: although most motors are installed below deck and are not directly exposed to the external environment, they still require high-quality coating to protect them from saline air. Additionally, drive vibrations must be kept to a minimum, even under continuous high loads. A marine motor must operate reliably for decades while emitting minimal acoustic signals into the water – an area where electric drives offer a distinct advantage, as they are significantly quieter than internal combustion engines. This characteristic is essential for environmental conservation and research purposes, as well as in light of the increasingly volatile geopolitical climate. Consequently, vibration analysis and continuous load testing are integral parts of the development process. Passath notes: „This allows us to guarantee maximum reliability for marine applications.“

Cooling is another critical factor for electric marine motors. Reliable cooling systems are required to prevent overheating and subsequent drive failure – after all, a ship must not be left stranded on the open sea. Air-cooled systems – featuring single- or double-sided ventilation as needed – are suitable for open machines, while air or water jacket cooling is



Production at ELIN is diverse and customised.

recommended for enclosed machines. „The necessary cooling systems must also be individually tailored during the development process,“ emphasizes Passath.

Main Propulsion, PTO/PTI Systems, Auxiliary Propulsion

Customized electric drive solutions are available for both main and auxiliary applications, including thrusters, PTO/PTI systems, pumps, compressors, and other auxiliary equipment. Asynchronous motors and synchronous machines – available in low- and medium-voltage versions – are predominantly used for main propulsion. These are used primarily in diesel-electric and fully electric ferries, offshore service vessels, LNG/LPG carriers, and research vessels. A water-jacket-cooled motor is particularly well-suited to the maritime industrial environment; it achieves the

highest efficiency class (IE4/5) and power outputs of up to approximately 2,500 kW. „These motors align with IMO goals while also being extremely efficient,“ says the Sales Manager.

In general, the trend for electric propulsion systems is currently moving towards hybridization. Power Take-Off (PTO) and Power Take-In (PTI) systems can function as both motors and generators; they support the main propulsion system but can also supply energy to auxiliary units. „This optimizes energy distribution on the ship and reduces emissions,“ explains Passath. It is also possible to switch off the conventional main propulsion system when required – for instance, to enter ports in fully electric mode with zero carbon dioxide emissions. On the open sea, an electric drive can operate as a shaft generator to supply the ship’s electrical grid. ►

„In the long term, the goal is for ships to operate entirely on electric power, though there are currently still certain challenges involved,” notes the drive technology expert. As the operating range increases, the energy storage system adds to the vessel’s total weight. The availability and design of charging infrastructure are also key factors. „However, these de-

velopments are steadily progressing and starting to bear fruit,” says Passath, alluding to the electrification of the Voith Schneider Propeller: in this instance, the traditional mechanical components were removed and replaced by a drive system featuring a permanent-magnet electric motor. This approach improved the propeller’s efficiency while simultaneously reducing its physical size.

Examples of practical maritime applications

Real-world examples illustrate the diverse ways electric drive systems are already being used in the maritime sector. Passath describes a retrofit project involving a semi-submersible vessel – 160 meters long with a 3,500-square-meter cargo deck area – where the old diesel generator was replaced by an electric drive system. The new system delivers 2.5 MW of power and consists of two electric motors – one rotating clockwise and the other counter-clockwise – that operate completely independently and feature integrated, dedicated oil supply systems. This solution allows the semi-submersible to operate in fully electric mode, with the drive system also handling lifting and lowering operations. The system was supplied as a ready-to-use plug-and-play solution.

Two further use cases come from the LNG industry: pump drives – specifically air-to-water cooled electric motors with power ratings of 1.5 to 3 MW – were manufactured for an LNG terminal. For another



ELIN Sales Manager Bernd Passath



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LNG terminal, a main drive system utilizing a shaft generator was produced; this system is capable of operating in both PTI (Power Take-In) and PTO (Power Take-Out) modes. “The shaft generator supports the conventional propulsion system when a particularly high power output is required at specific times. In calm seas, the energy is fed into the onboard power grid. This reduces emissions from the diesel generator,” explains Passath.

Julia Kowal, Editor for Wordfinder

1. „Internationale Seeschiffahrts-Organisation (IMO) beschließt Klimaneutralität bis 2050“, Bundesministerium für Wirtschaft und Energie, <https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Pressemitteilungen/2023/07/20230707-internationale-seeschiffahrts-organisation-imo-beschliesst-klimaneutralitaet-bis-2050.html>
2. Maritime Battery Forum, <https://www.maritimebatteryforum.com/general-information>
3. www.elinmotoren.com



On the high seas: electric propulsion solutions.

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FUELS OF THE FUTURE 2027

INDEPENDENT FUEL STATIONS IN GERMANY:

Regionally rooted and flexible

In Germany, most gas stations are affiliated with internationally operating oil companies. However, there are also independent, so-called “free” gas stations (Freie Tankstellen). The Federal Association of Independent Gas Stations (bft) comprises around 530 member companies with over 2,800 gas stations, representing approximately 20% market share. These medium-sized, family-run businesses describe themselves as technology-neutral, adaptable, regionally rooted, and committed to greenhouse gas-neutral mobility. Daniel Kaddik has been the CEO of the bft since November 1, 2025. Our editorial team requested statements from him and Professor Hanna Schramm-Klein, author of the German industry study “Gas Station Market 2025”. *hfs*

DRIVING THE TRANSFORMATION

The bft members are not just part of the transformation, they are driving it. This is particularly evident in how many of our member companies are working on products like Biofuel HVO 100, how many are also advancing e-fuels, and how we are investing heavily in electro mobility. This transformation also creates demands on policymakers. We need to decarbonise the existing fleet. We’re still talking about more than 40 million combustion engine vehicles in Germany out of a total vehicle fleet of 49 million. We also need to remove obstacles to the approval of sales of alternative products. **Daniel Kaddik**

MORE SHOP BUSINESS, MORE SUSTAINABILITY

At the beginning of November 2025, HVO100 was available at around 555 stations in Germany, and HVO blends were available at over 2,000 stations. The price difference compared to diesel was generally 8 to 15 cents per litre throughout the year. Large oil companies are increasingly withdrawing from day-to-day operations (TotalEnergies petrol station sale to the Canadian company Couche-Tard, sale of Jet network). We are observing an increasing market entry from players outside the industry, such as convenience specialists like Circle K. The overall pricing structure in the service station market is still quite traditional. There are the A prices of brand-name providers like Aral, Shell, and Total; B prices, for example, at bft, Jet, and Star; and C prices, which are

more commonly found in the discount segment at supermarket service stations or automated stations. Overall, the service station market is characterised by very high competitive pressure. As of January 1, 2025, there were 14,376 service stations in Germany, the majority of which were roadside stations, with approximately 360 located on highways. We are observing a displacement of smaller, less profitable locations, primarily in favour of larger, modernised sites. And there are indications of an increase in unmanned and automated concepts in the market. Fuel sales and consumption are declining in the long term, partly due to more efficient engines and changes in mobility patterns. The business areas of gas stations can be divided into three main segments. The first is the fuel business, which drives customer traffic and remains the economic backbone of the station, but is characterised by declining trends. The second segment is the convenience store, an area with comparatively high profit potential and differentiation,



Daniel Kaddik



A modern, independent of any corporate group refueling station.

although it is also subject to competitive pressure from new entrants. In the area of services, it is evident that these are declining in importance. The car wash business is the primary focus here. We can observe a shift in service models towards automation and self-service options. Fuel sales now account for approximately one-third of the gross earnings of gas stations. The convenience store segment represented about 46% of gross earnings last year, and service accounts for roughly one-fifth. Depending on the business model and the purchasing model of the gas station or operator, the various players in the value chain benefit to varying degrees – lessees versus operators versus oil companies. The fuel business remains economically important, but strategically uncertain. Alternative fuels offer potentially new opportunities. However, this requires stable framework conditions that can be relied upon for investments. The average revenue of gas station shops in 2024 was €1.25 million per station. The average sales area was 76 square metres, and the gas stations exhibit a remarkably high sales productivity per square meter. This was approximately €16,900 per square metre, significantly higher than that of discount stores and supermarkets. For comparison, the average sales productivity of a Lidl supermarket is around

€10,000 per square metre. The product range, however, is characterised by the fact that we are dealing with high-end products, particularly in the convenience food sector. The highest share of revenue comes from beverages, tobacco products, snacks, and coffee. Nevertheless, the shop business offers significant opportunities for differentiation in terms of brand offerings, for example, through private labels, fresh produce, and especially with regard to quality. Gas stations generally suffer from a petroleum-centric image that needs to be overcome, for example, through sustainability measures affecting the operation and equipment of the respective facilities, such as energy management, sustainable shop assortments, reusable systems, packaging, refrigeration, and logistics. All of these are areas where sustainability is also a key consideration. E-mobility currently represents more of a supplementary business. However, the charging infrastructure is not only relevant in terms of direct monetisation, but it can also lead to further monetisation by increasing dwell time, for example, boosting shop and food service sales. It is also essential to remember that gas stations naturally play a role in local supply, especially in rural areas. They can serve as mobility hubs and local suppliers. *Professor Dr. Hanna Schramm-Klein*

DVF/SCHÜSSLER PLAN:

Transportation requires certainty in planning and finance

On April 13, 2026, the German Transport Forum (DVF) hosted a press conference under the motto “Alliance for Competitiveness and Sustainable Infrastructure.” The DVF is a business association of over 170 German and European companies. As a discussion platform between business, politics, and science, the DVF strives to improve transportation conditions in Germany and Europe. Speakers at the event included Dr. Pierre Dominique Prümm, Chairman of the DVF Executive Board and Member of the Executive Board of Fraport AG; Matthias Magnor, Vice Chairman of the DVF Executive Board and CEO of BLG LOGISTICS GROUP AG & Co. KG; and Christina Zimmermann, DVF Executive Board Member and Treasurer, and Managing Partner of Schüssler-Plan GmbH. Our editorial team spoke with Christina Zimmermann about current challenges in the transportation sector.



Christina Zimmermann

? rail & mobility: Ms. Zimmermann, in Germany, many costs in the transportation sector are higher than elsewhere because – as some observers put it – planning is done with a gold standard rather than a silver one, meaning that regulatory requirements are set particularly high. In your presentation, you highlighted another cost factor – the costs of bureaucracy?

Christina Zimmermann: In Germany, we have 66.5 billion euros in bureaucratic costs annually, and the trend is rising. I’m not against reporting requirements. But these requirements must be risk-oriented and implemented judiciously. Duplication must be avoided. We want a sensible design so that we don’t just spend our time on reporting obligations, but can use it operationally and productively, thus creating a sense of proportion. The requirements must be practical, with reasonable deadlines, and we must

recognise added value. You certainly can’t eliminate bureaucratic costs entirely. But you can reduce the burden. We’re seeing this in our own company as well. The increasing requirements are tying up more and more staff who could otherwise be productive elsewhere. And that’s precisely the point in Germany: we need to increase efficiency again to improve our international competitiveness. There are many reporting obligations regarding cybersecurity, the CSRD (Corporate Sustainability Reporting Directive, the EU’s sustainability reporting), and so on. I’m not saying that all of this is unnecessary, but I advocate for a measured, sensible implementation of these reporting obligations so that they also contribute to security, compliance with certain standards, and an overview for planning purposes.

? Of course, you need an overview. But as we all know, Germany is the master of statistics.



During the conference

There are statistics on almost every topic. The question is, how do you run a company, or how does a government run a country?

It doesn’t work with just statistics and numbers. We have to move beyond trying to force everything into a guideline. That doesn’t work. We also have to be agile. We have to respond proactively to situations. And most importantly, we have to launch projects and construction projects with a clear objective. Then we can also tackle effective planning. The icing on the cake would be reliable, multi-year financing that is reliably deployed, so that the financing is linked to the project duration. Then we will also see that we can plan much faster and more effectively.

? And regulations shouldn’t change frequently halfway through?

Reversing some stipulations can be useful in certain circumstances – but not to the extent or with the diversity we currently practice, and especially not at such late stages. Because by then, companies have naturally adjusted, they follow certain paths, have strategies, have production lines in place, and so on, or they have also tailored their employee training accordingly. Changing regulations again at that point is, of course, not particularly effective or productive for a company.

? On the other hand, you would like to see projects implemented over several legislative periods. Switzerland has a railway fund for this purpose. The possibility of setting and financing planning objectives over several legislative periods sounds absolutely fantastic. Is that the direction you’re aiming for? ►

That's what I hope for, and perhaps we'll even achieve it. I'm rather optimistic. We will work together constructively and propose constructive measures. And I believe that we will be heard in this situation. It certainly seems to me that many people in politics are quite aware of this.

? If I initiate something today that won't be implemented for another ten years, then I might not have the opportunity to take credit for it. But in order to even be able to initiate something, I would need the necessary budgetary basis in the public budget. We heard another key point at the DVF briefing: single-entry bookkeeping versus double-entry bookkeeping?

Mr. Magnor spoke about this. He addressed the obstacle of the single-entry principle, namely that funds approved for a project but not spent expire at the end of the year instead of being carried over to the following year. This is essential for us. Projects in the planning phase, depending on what's required, including planning approval and so on, don't just last a few months, a year, or even a single legislative term; they take longer. And we need to reflect that. We need certainty – for the companies that are planning, for the financing, and for the cities that want to implement the corresponding construction phases.

? Your company is renowned and involved in many transportation planning projects. What are your main areas of activity?

Schüßlerplan is an engineering company offering a 360-degree range of services. However, we are active in transport infrastructure for about 75 percent of our business, planning, advising on, and managing construction projects across all sectors. We have a particularly strong presence in the road and rail sectors and also collaborate extensively across different modes of transport. That's why the German Transport Forum is so important for us, to have an opinion and a voice there.

? What would you specifically like to see from your company's perspective? In which direction should planning proceed?

I believe we need planning in all areas. We see that we need to plan intensively in energy infrastructure to further promote climate-friendly energy sources. But that also means we need to network. We need to collaborate with municipal transport companies – keyword: charging infrastructure – as well as with large corporations like Deutsche Bahn. And these are the aspects that make it extremely exciting. You can't leave out a piece of the puzzle; you have to think in terms of the big picture. Only then will it be truly effective and productive.

! Thank you very much for the interview!

Interview conducted by Hermann Schmidtendorf

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ADVERTORIAL

MATISA:

BEYOND MACHINES: VALUE THROUGHOUT THE LIFECYCLE

At InnoTrans 2026, MATISA will show how advanced on-track machines, Swiss engineering and lifecycle services come together to support long-term performance.

Railway professionals are under increasing pressure to improve productivity, reliability and cost efficiency while meeting growing expectations around safety, sustainability and operational performance. Responding to these challenges requires more than machine output alone. MATISA combines advanced on-track machines, Swiss engineering and dedicated lifecycle services to create solutions designed around operational realities. This is the thinking behind "Reduce complexity, Boost value": applying technology with purpose and considering performance throughout the machine lifecycle.

At InnoTrans 2026, two product highlights will demonstrate how this approach addresses different areas of railway infrastructure work.

The TRR (Rail Renewal Train) is dedicated to continuous rail-only renewal. It replaces rails and fasteners while retaining sleepers and ballast that remain fit for use. By bringing the principal stages of this specific renewal process together within a coordinated system, the TRR supports productive operations and safe working conditions.

The B 66 UC NEO Active brings MATISA's NEO concept into focus within universal tamping. More than a single feature or technology, NEO is a design approach based on four connected dimensions: infrastructure, operating expenditure, work performance and the human operating environment.

This is reflected in the machine's optimised energy architecture, reduced mass and operator-oriented working environment. Key working functions are brought together at a single workstation, while proven MATISA technologies, including 42 Hz elliptical tamping, support reliable work performance. Although the two highlighted machines address different applications, they share a broader perspective: technology must respond to operational needs, support its users and continue to create value throughout its working life. MATISA's engineering expertise, connectivity and lifecycle services extend this approach beyond the machines themselves.

What if the right machine for your market were already within reach? Beyond the two main highlights, Visitors will be invited to discover MATISA flagship machines and solutions developed for specific markets. Built on proven platforms, selected configurations meet market-specific type approval requirements and comply with the Fourth Railway Package and Cyber Resilience Act (CRA). Visitors can explore their availability by country, including configurations that could be offered within shorter lead times.

MATISA specialists will be available to discuss the company's wider portfolio, including the C 75 for high-capacity ballast cleaning, and the requirements of individual networks and projects.

RAILWAY REFORM:

„We need legal certainty and standardisation!“

The state-owned Deutsche Bahn is in dire need of reform. The board, under its new chairwoman Evelyn Palla, has announced a series of improvements for passengers, which are intended to take effect quickly. A conversation with Karl-Peter Naumann, honorary chairman of the German passenger association Pro Bahn.

? rail & mobility: It's usually nice to talk about rail transport. But in Germany, the word "crisis" unfortunately often comes up in such discussions. Do you see any sign of the new beginning that decision-makers are now talking about?

Karl-Peter Naumann: Well, I do see the crisis. But when it comes to crisis management, Johann Wolfgang von Goethe comes to mind. The poet wrote, "I hear the message, but I lack the faith." I believe that many right things are said today, but the subsequent action is lacking.

? Deutsche Bahn has announced 22 so-called "quick steps" to improve its performance. Can improvements really work quickly?

It could work quickly if there were the will to do so, and if we didn't introduce regulations that then slow everything down again. I think we have a regulatory frenzy in Germany. We're also partly afraid to change anything at DB InfraGo because we fear that the Federal Railway Authority (EBA) will shut the whole thing down. We need legal certainty here.

? Shouldn't the European Union Agency for Railways (ERA) play a decisive role? Do Ger-

man authorities really need to make everything even more complicated and restrictive? It's also about costs and time?

We have too many systems. Incidentally, this is the same in other areas in Germany. We have 93 statutory health insurance funds, all essentially doing the same thing. These are all areas where we need a certain degree of standardisation, where we need a reasonable balance. We don't need a state-run economy. But we need to concentrate, above all, on areas where we can benefit from uniformity. We don't need to test on-demand transport at 20 different locations. We don't need to adapt every single vehicle to each individual federal state. The seats can certainly be different colours. That's not the problem.

But the platform height, the boarding height, the number of doors – everything that incurs costs if it's not standardised – we have to standardise that. In the past, you could pull any carriage with any locomotive and push everything together. Today, you can't even couple two multiple units of the same type together if they're three years apart in age. So we need standardisation here. That's absolutely crucial. And if we don't have it, it will be expensive. And of course, we have to have the courage to prioritise and say, as the



Credits (3): Hermann Schmidtendorf

It's not just different platforms that need standardisation.

FDP has always said, that public transport is difficult in rural areas. That's certainly true. But cars are just as difficult in cities and for long distances. With trains and public transport, we have completely different possibilities, and we have to use them. That also needs to be prioritised.

? There are warnings that artificial intelligence shouldn't be left unchecked, otherwise, it will eventually become uncontrollable and impossible



Extremely unpleasant: non-functioning train toilets

to manage. But this ever-increasing fragmentation of regulations isn't AI-driven, but rather driven by legislators. Could it still be reined in here?

Yes. And it's also driven by vanity. That, I think, is the point. Every state minister needs something different, something specific. But it has to be about the issue at hand. Potatoes are potatoes, and buses are buses. There's no need to differentiate between individual federal states and city.

? A question about the announcement that there will be better-functioning train toilets, and even in the short term. The main problem doesn't seem to be the toilets themselves, but rather the pumping or water refilling systems, which apparently don't always work. These systems belong to InfraGo, the company that already has more than enough to do maintaining and improving the rail infrastructure. Apparently, there is no reporting system where all trains can see in real time which systems can empty and refill their toilets and which can't due to a defect. Wouldn't that be a task for a transport minister?

The minister could certainly advocate for that. Because ultimately, in every company, the boss has the



Karl-Peter Naumann

final say. And the boss is, in fact, the Federal Minister of Transport. If we're currently telling InfraGo to do this and that, then I think it's a good thing to develop a computer system that provides real-time updates on which pumping and refilling system is malfunctioning. That's a crucial issue for passengers on long-distance and regional trains, who could otherwise quickly conclude that the entire country is shut down because the train toilet isn't working.

But we've also seen a massive reduction in the number of toilets on trains. If I look at a double-decker carriage with 130 seats today, it has one toilet. Previously, a standard passenger coach, the so-called Silberling, with 90 seats had two toilets. That means we've significantly reduced the number of toilets. Now if a toilet on a train is closed, it's a disaster. We definitely need to regulate this better. We should regulate it and allocate the necessary funds. And it's not that expensive.

Regarding safety. I find it appalling that the aggression of some passengers towards

railway staff has apparently increased. What can be done to make employees feel safe on trains again?

Certainly, double patrols of railway staff at stations and on trains are important. It's also crucial that we have surveillance that actually works when necessary. Body cameras, for example, are incredibly helpful, as we've learned internally from Deutsche Bahn. We simply have to invest in this. And those who do something that shouldn't be done must also be held accountable.

That's everyone's responsibility. If we demand that the train runs smoothly and on time, we can't simultaneously attack the staff who are personally not responsible for delays or other problems.

! That's right. Thank you very much for the interview!

You're welcome, as always!

Interview by Hermann Schmidtendorf



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TRACK TEC

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Die Marke Track Tec bedeutet: Bereitstellung von Dienstleistungen auf höchstem Niveau in jedem der acht Produktionsstandorte in Polen und anderen europäischen Ländern. Kompetenzen und Referenzen, die die Umsetzung von Verträgen in über 30 Ländern weltweit bestätigen. Eine konsequent umgesetzte Strategie der individuellen Ansprache von Kunden und Dienstleistungen. Sicherheit, pünktliche Lieferungen und Optimierung von Lagerbeständen, Kosten und Kundenzeit dank Just-in-Time- und One-Stop-Shop-Systemen. Innovative Logistik und zukunftsweisende Lösungen.

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A picture from the good old days: the Brussels-North signal box in 1934.

A YEAR TO CELEBRATE:

100 years of the modern SNCB-NMBS state railway

2026 is the year of heartfelt thanks – at least for the railways. „Merci,” thank you, is embazoned in large letters on many trains, along with: „The journey continues, thanks to you.” The reason for this jubilation is explained by three intertwined numbers displayed alongside: 1926-2026-100.

On July 23, 1926, the modern “National Railway Company of Belgium” was founded as part of the transformation of the former state railway. Belgium is a federal state where the official languages Dutch, French, and German play a significant role. Therefore, the railway company uses two abbreviations, with the French abbreviation legally sanctioned as the first: **SNCB/NMBS (Société nationale des chemins de fer belges/Nationale Maatschappij der Belgische Spoorwegen)**. A language-neutral symbol for the railway was designed in 1936 by railway graphic artist Henry van de Velde: the letter B inside

a horizontal oval. SNCB/NMBS still uses this symbol today.

The railway’s anniversary is being used to promote train travel throughout the country through a variety of events. A model train visited many stations across Belgium, inviting passengers to try setting it in motion themselves. Music was composed for commuters and travelers. There were podcasts, an art competition, and, starting in August, a traveling exhibition of a train with historic rolling stock. The national railway’s “Train World” museum is also involved. It is housed in the impressive Schaerbeek/Schaarbeek station building, built in 1837 in the Flemish Neo-Renaissance style, near Brussels. The museum presents historic locomotives, carriages, railway technology, and exhibits of all kinds, focusing particularly on providing a direct experience of the railway atmosphere, especially for young visitors.

In September, the SNCB Museum will present its new exhibition, “Fashion & Trains, from 1835 to the Present Day.” Two SNCB workshops will be open to the public on the first Sunday in October. Further information can be found on the SNCB website: www.belgiantrain.be/fr/about-sncb/100years.

„EGGS WILL ARRIVE AS OMELET!”

The origins of the Belgian railway system date back to 1835. On May 5, 1835, Belgium opened the first railway line on the European mainland, connecting Brussels and Mechelen. This made Brussels the first capital city in the world with a rail connection. In 1830, the Southern Netherlands separated from the Northern Netherlands, declared their independence as the nation-state of Belgium,

1, 1834, King Leopold I signed the railway law. Then everything happened very quickly.

Initially, Belgium ordered six steam locomotives. Five came from the factory of the British railway pioneer Robert Stephenson and represented an improvement on his famous “Rocket” model. Stephenson himself even drove the first train between Brussels and Mechelen. The sixth Belgian steam locomotive, “Le Belge,” was of the same design but was produced under license at the John Cockerill & Cie. factory in Seraing, province of Liège. A 1927 replica of this first locomotive built in Belgium is now on display at the “Trainworld” railway museum. As in France, Belgium also adopted the operating procedure defined by Stephenson – trains run on the left on double-track lines.



Credit: SNCB/NMBS

The large B has been the symbol of the Belgian State Railways since 1936.

elected their own National Congress, and adopted their own constitution in 1831. This had economic consequences. Trade routes between Antwerp and the German Rhineland via Dutch waterways could no longer be guaranteed. **The British industrialist John Cockerill, later a manufacturer of steam locomotives in Belgium, proposed a railway line between Antwerp and Brussels. The Belgian Minister of the Interior initiated plans for a railway line between Antwerp and the Rhineland.** The debates in the Belgian Parliament were heated. Some members of parliament speculated that the train journey would turn “milk into buttermilk” and “eggs would arrive as omelets!” However, a clear majority in parliament supported the railway plans. On May



Credit: Trainworld

Factory plaque for a steam locomotive built by Cockerill in Seraing. Steam locomotive production there ended in 1955.

In 1870, 39 companies operated rail services in Belgium. Industry, particularly in Wallonia, made intensive use of the new transport option. Several locomotive factories were established for the domestic market and for export. **Political and economic reasons led the state to assume all railway concessions from 1870 onwards. These repurchases brought 2,393 km of railway lines into the possession of the state railway by the outbreak of the First World War. 138 km of railway lines remained in private hands.** With almost 80,000 employees, the state railway was Belgium’s largest employer. Although Belgium strove for neutrality, Germany invaded Belgium twice during the First and Second World Wars. The country and its railways suffered severe ►



Special stamps commemorating the railway anniversary.

damage. An important sign of a new beginning after the suffering of the war came on October 4, 1952. King Baudouin inaugurated the six-track north-south line – a railway line that quickly became the main artery of the Belgian railway network and remains an indispensable part of the Belgian railway system today.

With the rise of private car ownership, the number of rail passengers declined. Investments were made in areas such as the electrification of important railway lines, but funds were lacking for many other necessary projects. The last scheduled steam locomotive journey took place in 1966. From 1957 onwards, the introduction of the comfortable, cross-border Trans-Europe Express (TEE) in Belgium's railways, capable of speeds up to 140 km/h, provided a highlight. However, this luxury train only offered first-class seating. Consequently, even this train did nothing to prevent the replacement of many regional trains with supposedly cheaper bus services. According to a documentary by the Trainworld Museum, influential politicians wanted to maintain rail service only on a few main lines, such as Antwerp – Brussels – Charleroi and Ostend – Brussels – Liège.

Electrification and ETCS

However, the 1973 oil crisis triggered a gradual shift in thinking. Investments in railway electrification increased, and an Intercity/InterRegio (IC/IR) service was introduced. In 1986, planning began for an international high-speed rail network connecting France, Germany, Belgium, and the Netherlands, with the intention of extending the network to London. Passenger numbers on domestic railways have also risen steadily since 1995, thanks to service expansion and investments in infrastructure and rolling stock. Today, Belgium's infrastructure is remarkably modern and serves as a model for its neighbors in many respects. Eurostat and the European Union Agency for Railways (ERA) projected the length of the railway network to be 3,615 kilometers in 2024. Of this, 88 percent is electrified, and six percent is high-speed (HSR) line. HSR lines are authorized for a maximum speed of 300 km/h (190 mph). Only 19 percent of Belgian railway lines remain single-track.

Hermann Schmidtendorf



Pleasantly punctual, easily understandable passenger information: trains at Brussels-Midi station.



A "thank you" train at Bruxelles-Midi Station.

FACTS

- **Dominant voltage of the Belgian railway power grid: 3 kV DC**
- **Voltage of the traction current on the four international high-speed lines: 25 kV/50 Hz AC**
- **Traction current in neighbouring countries: Germany: 15 kV/16.7 Hz AC; Netherlands: 1.5 kV DC**
- **Infrabel:** Management of the railway infrastructure (state-owned company, operator-neutral, separated from SNCB/NMBS operations since 2005)
- **SNCB-NMBS:** Passenger transport only (excluding HSR), state railway, maintenance of trains and stations
- **HR Rail:** Since 2014: Legal employer for all Belgian railway staff
- **Lineas:** Since 2015, the corporate name of the privatised former state-owned freight company

SNCB/NMBS-CHIEF SOPHIE DUTORDOIR:

Dynamic and gentle, loyal and independent, communicative and effective

Sophie Dutordoir has been steering the fortunes of the Belgian national railway, SNCB/NMBS, since 2017. In 2023, she was confirmed in the role of CEO until 2029. This is remarkable in a country where filling state positions requires balancing professional competence with regional and political quotas. Yet Ms. Dutordoir has already served unchallenged under four different prime ministers. Her specific leadership style evidently meets with approval; the railway chief described it to the Flemish business magazine ‘Forbes’ in 2025 as follows:

“I am not a puppet. There is only one Sophie, whether I am sitting here or speaking with unions or politicians. I am 100% loyal and also 100% independent in spirit. The two can go perfectly hand in hand.”

Until 2014, Dutordoir headed companies including the telecommunications firm Proximus and the Belgian energy group Electrabel. Then, she discovered the appeal of running her own business. She opened and managed Bistro Poppeia in Overijse – a life-changing experience: *“I learned more about customers there than in all my previous jobs combined.”* She is a woman of diverse interests and skills – and possesses a highly specific interest in languages: *“I studied languages because of their mathematical structure. Languages are a form of algebra.”*

Sophie Dutordoir is the perfect fit. Although she is Flemish, her background as a qualified Romance philologist makes her a credible partner for dialogue with the Walloon linguistic community. As a Christian Democrat, she may not have been the Flemish nationalists’ preferred candidate, yet her Flemish heritage made her an acceptable choice. Furthermore, Dutordoir accepted the – by no means lavish – salary cap for the railway executive role, which started at a gross annual figure of 290,000 euros.



Dynamic and communicative: railway boss Sophie Dutordoir.

A female leadership style?

Although Dutordoir had declared in an interview with the business magazine Dynamiek, *“Er bestaat niet zoiets als een vrouwelijke managementstijl”* – *“There is no female leadership style”* – she simultaneously identified key characteristics of good *“feminine”* leadership: *“The first is undeniably a sense of organisation, which leads to greater efficiency. All women have to juggle several things at once, specifically a family and a career, and so they don’t like wasting time on useless things. I also place great value on flexibility. Another characteristic of women, in my opinion, is a straight-*

forward, direct approach. This is, of course, also related to their sense of efficiency. By going straight to the point, you save a lot of time when you risk getting lost in less important details. So I also hate written communication, as far as it goes beyond brief instructions or short announcements.”

Dutordoir confidently added: *“I work efficiently and in a result-oriented manner, and I know the Belgian political landscape.”* **And:** *“You have to be steeped in communication.”*

With this straightforward manner and her ability to listen, Dutordoir has so far managed – in a refreshing way – to advance the modernisation of the state railway desired by the government. Right upon taking office, she declared: *“There are three absolute priorities: safety, punctuality, and real-time communication with passengers.”* The online service ‘levif.be’ marveled: *“What does Dutordoir want? Hold on tight: more punctual trains, more trains, better station accessibility, better*



fares, Wi-Fi in major stations, better passenger information, and better maintenance of trains and stations. Oh yes, and she wants no political interference. Dutordoir explains that the SNCB should operate as a ‘normal company with clear and efficient management.’ That’s it!” **‘Forbes’ summed it up this way: She can be as soft as velvet but also take decisive action – a “Madame 100,000 Volts,” alluding to the nickname** ►

of the famous French singer Gilbert Bécaud, “Monsieur 100,000 Volts.”

Dutordoir describes her straightforwardness like this: “I hate weak compromises, vague concepts, and mediocrity. I would rather say yes; that makes for a happier outcome. But when it’s no, it really is no.” Yet she also constantly seeks to stay grounded by consulting with internal advisors – from whom she expects clear criticism when necessary: “Every leader needs to have two or three people around them – no more – who dare to say what others don’t, and vice versa.” As a sign of this grounded nature, she now dreams of getting an anchor tattoo. “To shock people when they ask me if I’m doing badly.” When she said this during the interview, ‘Forbes’ noticed a playful look on the railway boss’s face – she added gently: “And also because it’s beautiful...”

End “military hierarchy”

The present is grim, but the future could be fantastic. Using this dialectic, the railway chief served up bitter pills to the public – and even received applause for doing so. She described the corporate structure as outdated, citing an “almost military, top-down hierarchy” and a “culture characterised by fragmented and unclear lines of responsibility.” The roughly 4,000 employees across the various SNCB/NMBS divisions worked in anonymity within “isolated internal silos.” Fewer than half of the staff had their own email addresses – a situation she found unacceptable, noting, “I am used to making personal contact with everyone who works for me.”

These “silos” consisted of ten buildings scattered around the Bruxelles-Midi station – an arrangement that made effective communication extremely difficult. All operational and HR divisions have now been consolidated at a single location near the Bruxelles-Midi station. The state railway’s board of directors

also approved another major change: Sophie Dutordoir is authorised to appoint her own leadership team – free from the politicisation that previously influenced executive roles. **Making customers “want to take the train” and employees “want to work there” – so far, railway chief Dutordoir appears to be successfully achieving her goal.**

Hermann Schmidtendorf

FACTS

SNCB/NMBS IN FIGURES

- **The National Railway Company of Belgium organises** and markets railway services and is responsible for the maintenance and refurbishment of trains and stations. The network is managed by **Infrabel**, which also allocates train paths.
- **Number of passengers:** 245.1 million in 2024.
- **Number of trains:** 3,800 per day (more than 90% electric traction; SNCB/NMBS is the country’s largest electricity consumer).
- **Number of stations:** 551
- **Number of employees:** 16,953 (January 1, 2025)
- **Operating result:** €131.6 million in 2024

RAILWAY MARKET BELGIUM:

The dominant player retains its monopoly – but only in passenger transport

For 2024, the EU Agency for Railways (ERA) and the statistical office Eurostat calculated that the Belgian state railway holds a 90 percent market share in the country’s passenger rail sector. This is hardly surprising, given the absence of competing railway companies. The remaining ten percent of the figure is accounted for by international high-speed services passing through Belgium, in which SNCB/NMBS does not participate.



The situation differs in rail freight transport. While Lineas – now a private company and the successor to the former state-owned freight carrier – held the top spot in the statistics, its market share stood at only 46.5 percent. Other Belgian railway companies held a 26.9 percent share, while foreign companies held 26.6 percent. For 2026, the ERA recorded 15 companies with safety certificates for freight transport and one company with a combined safety certificate for both freight and passenger transport. According to these statistics, the top ten companies in rail freight transport are: **Lineas, Eurotunnel S.E., Move Intermodal, BLS Cargo Nord, Northern Diabolo, Railtraxx, Madway Belgium, Donati Benelux, Car Park Benelux, and Nortraffic.**

Compared to other European nations, Belgium performs well in terms of punctuality. Statistics for 2024 showed a train punctuality rate of 89.73 percent for passenger transport. In freight transport, 69.93 percent of trains were on time.

A contributing factor is undoubtedly the fact that the infrastructure manager, **INFRABEL**, has equipped 56.41 percent of railway lines with Level 1 of the European Rail Traffic Management System (ERTMS) and 20.56 percent with Level 2 (as of 2024). In 2026, there were 752 railway stations in Belgium.

Hermann Schmidtendorf



“Looking for a job? Infrabel is hiring across Belgium!” Advertisement at the entrance to the Infrabel office in Brussels.

LTE-GROUP:

English as the lingua franca of the railway; making semi-trailers craneable

LTE Logistik- und Transport-GmbH is a major private Austrian railway company headquartered in Graz. Its CEO, Andreas Mandl, also holds a leading position in the Austrian Federal Economic Chamber, representing the transport and logistics industry. Furthermore, Mandl is the originator and co-founder of the locomotive workshop Lokmasta in Gramatneusiedl. CFJ talked to the LTE CEO and head of the LTE group about rail freight logistics in Europe and the European locomotive driver's license.

? **CARGO FREIGHT JOURNAL:** Mr. Mandl, you are an important person in rail freight transport in Austria and beyond and have many tasks in your company and the industry. I understand you have two wishes for improving conditions in European rail freight logistics?

Andreas Mandl: **I personally pursue two major goals. One is that we in Europe should operate with English as the working language on the railways. The other is that all semi-trailers should be craneable.** Regarding a universal language for the railways: What works in global aviation should also work on the European rails. If a train driver is on the track somewhere and there's a problem, it doesn't matter whether they're German, Spanish, or Romanian – when they hear "all trains stop," they press the red button. Nothing can go wrong; it's not a plane that can crash.

Digitalisation is necessary for this and the European control system ETCS should be implemented. The automatic digital clutch DAC is also helpful. These are important components. Driving today is extremely difficult. For example, if I take a train from Budapest today, the train driver has to get off at the Austrian border three hours later, even though he could easily go to Vienna or maybe even Linz. The shift would allow him. But no, he has to end the journey because



he doesn't speak German. Why can't he speak English? Train English is not that complicated.

? Several years ago, the Swiss Federal Railways (SBB) tested tablet-based software solutions for cross-border traffic – an electronic language system with eight or ten languages, accompanied by scientific research. One could also use an acoustic translation program on the tablet – I speak German into it and get French out. Clarity, intelligibility, and security should be guaranteed; everything is recorded, every action, every reading and input, and can be analyzed. What do you think of this?

That might be interesting as a form of support. But in principle, such systems cost money and

increase the cost of rail freight, which is already expensive enough. And a certain basic level of English should already be mastered. Everyone learns English in school these days. It's the most common foreign language. A train driver should already have that much basic English. Then some technical English should be added. I've spoken with pilot instructors from airlines about this and heard: Don't think that all pilots from China, African countries, or even European countries all speak Oxford English. That's not to be expected. Everyone speaks with their own accent. But there are established procedures in aviation. When a plane arrives in Berlin and wants to

who decide they want to drive trains across borders. Then they only need to speak a little of one foreign language, namely English, and not Czech or French, for example. I don't have to speak English in Germany if I speak German. Yes, French train drivers would speak English in Germany. But we would still be allowed to speak German under this proposal.

? So it's all about optimising cross-border traffic? That certainly has its appeal. A few years ago, there was a similar debate regarding border traffic between Poland and Germany. The Polish government's position was that they would never accept German as the language for train drivers on Polish railway tracks. But English might be okay.

Exactly! And let's just look south, to the border near Bad Schandau between Germany and the Czech Republic. If the German train driver

simply switches to a different system from a technical standpoint, once ETCS is in place, communication will probably no longer be necessary. The locomotive automatically switches from 15 kilovolts to 25 kilovolts. And the driver can then travel from Dresden to Prague using English, making full use of their shift. There are no border waiting times, no delays.

English as the operating language would be an improvement in cross-border traffic, one that would also increase throughput. After all, we want to shift traffic to rail; we're supposedly living in the century of the railway! It's about the main lines, and it's about cross-border traffic. A kind of European train driver's license should definitely be feasible, at least with the right tools. With the expansion of ETCS, I also have ►



land, the pilot says, "I'm flight number so-and-so, and I'm coming from this direction." And the tower tells him, "Yes, you're flight number so-and-so, and you're now going to runway XY." It's routine, with questions and answers. You could control it on the railways in exactly the same way.

? What do you say to the objection that this would raise the bar even higher for recruiting new train drivers? There are clearly too few train drivers, and some might think, "Why should I learn English? I might as well not even enter the profession."

Not every German train driver is supposed to drive to the Turkish border. But just think of those

standardised signaling. Just like on the road, where I have red, yellow, and green traffic lights. There's no sudden blue light thrown in.

? A sensible idea! You naturally have this European perspective because your company operates in various European countries. You see every day how cumbersome the current system is. And your second wish?

I'd like to work towards ensuring that all standard semi-trailers, the classic standard curtain-sided trailers, are manufactured to be crane-liftable. I wonder, couldn't this simply be regulated by law? All newly built semi-trailers simply have to have the necessary equipment. That way, there's at least a chance of eventually shifting these trailers to rail transport.

Of course, there are many systems that work to help with non-craneable trailers. I've looked at many of them. They represent high-level engineering; people

FACTS

LTE – LOGISTICS & TRANSPORT /
LTG-GROUP IN NUMBERS

- Active in 13 countries with subsidiaries and partners
- Own fleet: 120+ locomotives
- 700 cars available
- 140 million freight tons p.a.
- 500+ experienced employees
- Sales: €140 million (2020)

have really put some thought into them. But such systems have three major drawbacks: they cost money, they reduce payload, and they aren't compatible with each other. Just recently, I looked at one system and realised that I lose the weight of two trailers on a complete train. Well, that's a significant disadvantage! And the money on the railway is made precisely with the last two or three trailers.



The LOCMASTA workshop building is on the left in the picture. The tracks continue towards the Hungarian border on the horizon.



? There's this CargoBeamer, right?

But of course, it only operates on certain routes. If I have a CargoBeamer station at one end, I need one at the other. And while there are retrofit kits available, they also cost money. Not as much as is sometimes claimed, but the vehicle is out of service for a week or two. Therefore, my thought is this: if retrofitting were mandatory, it wouldn't be a competitive disadvantage. Around 100,000 trailers are produced annually in Europe. That's by far the largest segment of all products in this sector. If you then say, "We'll just weld the struts; it's just a bit of mechanical

engineering..." then the downtime wouldn't be so significant. **It would just have to be mandatory.** It's not unreasonable to expect all semi-trailer owners to be equipped for crane handling. They don't have to use it, but they can.

! Mr. Mandl, I wish you continued success in these two areas, and of course, in general, that your company flourishes! Thank you for the conversation!

The interview was conducted by Hermann Schmidtendorf.

INFO

The LOCMASTA locomotive workshop in Gramatneusiedl, near Vienna, is located directly on the Eastern Railway line from Vienna to Hungary and Slovakia. The workshop utilises innovative technologies and state-of-the-art equipment. The workshop covers an area of over 1,200 m² and includes:

- 4 work bays on two tracks (elevated pit and mat tracks)
- 3 roof work platforms
- 1 overhead crane with a lifting capacity of 12.5 tons
- 1 jack stand with a lifting capacity of up to 100 tons
- 1 wheelset turning device
- Forklifts for the safe transport of materials
- Overhead contact line inside the building
- 1 washing pit outside (for removing organic materials)
- Testing equipment and various special tools (e.g., for train radio communication)



In addition to indoor and outdoor storage areas and a modern office wing, the workshop is the heart of the new site: light maintenance work is carried out at up to four workstations. The order management system, developed specifically for LOCMASTA in collaboration with a software partner, is also innovative. It ensures seamless, digital documentation of maintenance work and allows for a redesigned approach to existing services. Safety and quality have been top priorities since the project's inception. Therefore, the company was certified according to ISO 9001, ISO 14001, and ISO 45001 at the start of regular operations. With the ECM 4 certificate, LOCMASTA achieves conformity for the maintenance of railway vehicles in accordance with EU Regulation 445/2011 of May 10, 2011 (ECM IV). The workshop promotes its services as a "drive-in" facility and even offers weekend services.

hf/lm

RAILNOVA / RAILSTER:

Real-time monitoring and predictive diagnostics for trains

At InnoTrans 2026 in Berlin, Railnova will present its products in Hall 1.2, Booth 250. „When trains run every minute and every delay has consequences, reliable information is key to reliability on the line,” says parent company Knorr-Bremse regarding Railnova’s digital technologies. These technologies make maintenance, fleet planning, and daily operations more predictive and efficient. An average annual growth of around 13 percent over the past five years and an attractive EBIT margin demonstrate sustained business success. Our editorial team spoke with Railnova’s Head of Sales, Francis Vander Ghinst, at the IoT in Rail conference in Cologne and asked for a demonstration of their leading device Railster.

? CARGO FREIGHT JOURNAL: Before us lies a case containing a honeycomb buffer, the kind commonly used to protect ampoules of vaccine or nitroglycerin during transport. But you have something else in this case, one of your top products?

Francis Vander Ghinst: This is a demo case for the purpose of showing the **Railster** product. This device allows you to collect data inside trains and locomotives. What we are showing here is a simulation of a train. This is the screen you can compare to a train, a train that is sending data to this box. What we have



Francis Vander Ghinst (left) demonstrating the Railster system.

on the screen here? We have different information, but we also have two lever. We have the lever of traction to start the train and to put it in movement. And we have a brake. We may also demonstrate that doors could be open and closed. You also have typical driver information needed to control the doors, the mileage, the catenary voltage, the main tank if it is a diesel, and the main air vessel for the brakes. You need to activate a certain pressure for the brakes so that it works in time.

? How do you collect this information in a train as you work independantly from any specific train manufacturer and need to work with quite a variety of trains?

We collect the data on field buses that you find in trains, like FTB, CAN, FIP. Some manufacturer have their own protocols that really are the heart of our capabilities to collect the data. And we get access to that, indeed. Here you see the blinking LED. We connect from this connector on the CAN network which is situated in the train. We connect the information on the read-only mode. And that is okay from the manufacturer’s side.



The Railster-Box.

? Because you don’t go into the system?

Exactly. **For safety reasons we read data only**, we put a special device between the network and the Railster system. That is the data diode, a one-directional device that makes sure you can only read data.

? A digital osmotic membrane?

In fact, it mimics the electrical diode concept where you have currents flowing in one direction and not in the other direction. That’s the idea. Once we have connected a network to our devices, we can read the data. I’ll show you how it works. These are the different data that we read today. We have the speed at zero kilometres per hour, traction percentage, brake percentage, the number of hours the train was in operation, pressure, catenary voltage.

Now what will be interesting to see is that I’m going to play the role of a driver. I would like to put some speed, some traction to my train. So what do we see? The gauge now is leveling up, and we see that the indication of kilometres is going up. This is what the

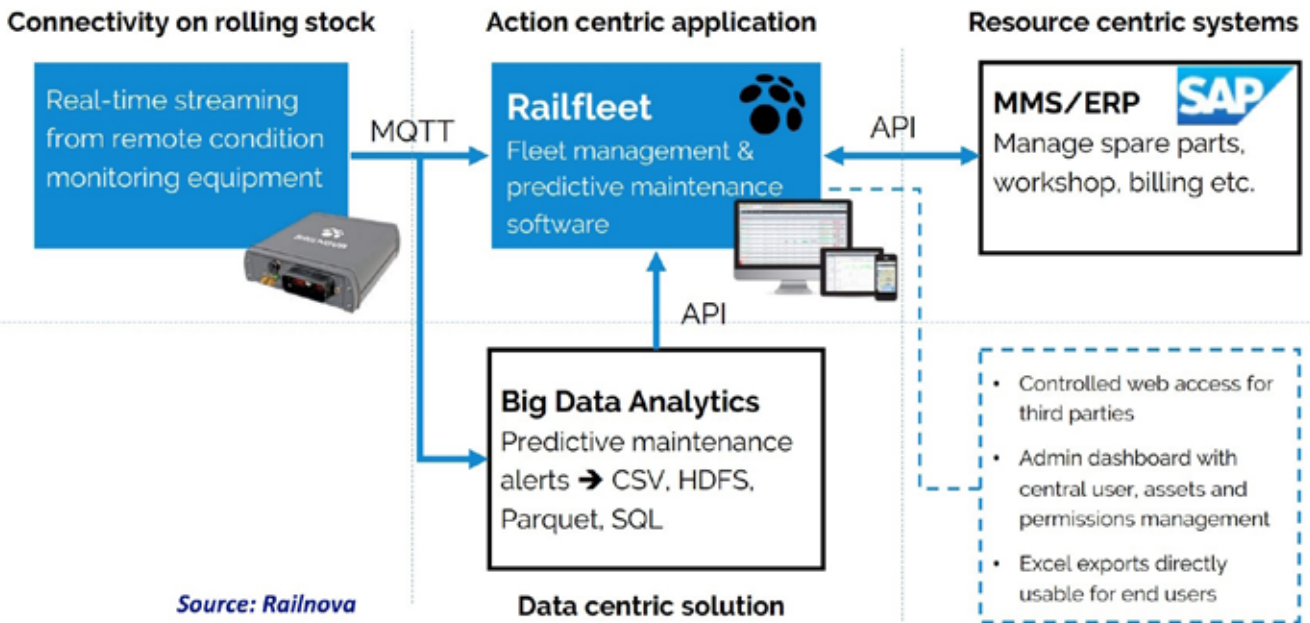
driver sees in his driver’s cabinet. And e information that we read here, we of course read the same information there. Okay? This device is like I was reading the data from my gateways, and this gateway is able to communicate the data through a platform. Let me now start to stop the traction and put some braking. We see here that the brake percentage is 62%. That’s to show that there is a direct interaction between what we read from the train and what we see here.

? Where do you have installed what we see here, on a laptop, in some central command station, in the cockpit?

It’s in the cockpit. There is much more in the control centre how my train is operating.

? And that’s connected to a data centre to filter the necessary and interesting from the less interesting data?

Exactly. Now I’m going to show you how our real-time monotoring works and triggers an alert. I’ve engaged the brakes and am accelerating slightly. And you see, we have an alert here. Now I’m going to ▶



simulate something really forbidden. I will accelerate, and I am braking at the same time. As you can see, there is an alert again that could be sent to the driver, but also to a control centre. Now let's say, we have a main air tank with a pressure of 6.1 bar. We have a leak in the pressure tank. We could put an alert saying that if we go below that level, there is a leak, so maybe the system is malfunctioning. That could be done for all tanks.

? To detect this, do you need additional sensors?

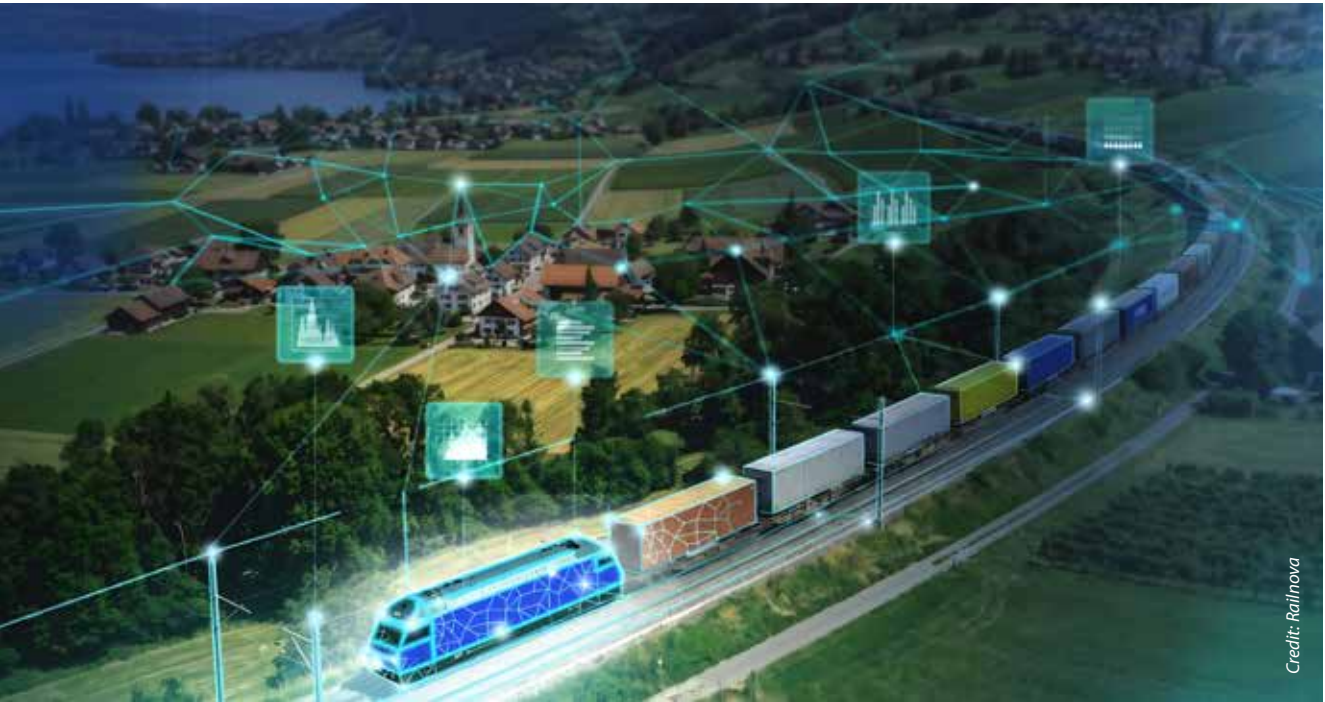
That's a very good question. If the locomotive, the train unit, the tram does not provide a certain sensor, we might need to add such a sensor, yes. For instance, if we are facing a passenger train, we want to check everything that's related to comfort. I'm talking about toilets, toilet clogging, to control whether the toilets still have some fresh water or you need to empty the used water tank. I'm thinking about the door closing mechanism. If a door does not close anymore, the train could not start again. I'm talking about the passenger information system, whether it's working or not.

? What about the diameter of the wheels to check whether they are equal and sufficient?

Again, if there are appropriate sensors inside the train, we could take such information and draw conclusions. **We want to provide data for predictive diagnostics and maintenance**, so such data are valuable.

? So you have enough open slots for plugging in? Let's say we want to check the impact of the weather conditions for the climate inside the train, the passenger occupancy in each separate train compartment?

We could analyse this and propose action, once the data is available in the train. HVSC (High Voltage Shore Connection) monitoring may be used for this aim. We could balance a little bit the power of all the compressors on the HVSC to say, okay, inside these coaches, I have a certain temperature. On this coach it's a little bit less because there are less passenger and of course, I should not use the compressor with the same power. The system should be able to provide the data.



Always monitored, always networked: a train with digital Railnova equipment.

? What are your main customers?

We work with major leasing companies such as Alpha Trains, Beacon, Akiem, ELP. But we also deal with public transportation companies, such as SNCF, RET (Rotterdamse Elektrische Tram) in Rotterdam. We have connected until now about 3,500 trains all together.

? And what about the maintenance of your systems? Nothing lasts eternally, so sometimes you have to maintain or to exchange some components. You are offering this?

Yes, we do. We try to make life easy for our customers. We provide a warranty extension so that the customer should not care about sending the device into repair, into fixing. So there are warranty extensions on the devices.

! This sounds quite impressive. Thank you very much for this interview!

The Interview was conducted by Hermann Schmidtendorf.

FACTS

The Railster has been thoroughly tested for a railway environment by independent safety assessors. The Railster complies with railway standards such as EN50155, EN45545, EN50121-3-2, EN60950-1. Railnova also provides the necessary documentation for the CSM risk analysis and accompanies you throughout the entire process.



The data acquisition by the Railster is passive by design and adapts to any type of component (such as MVB, Profibus, CAN etc). As the Railster is isolated from e.g. the MVB network there's no re-homologation required. The modification has been submitted to the EBA and approved as non significant. *rn*

DRONES, HACKERS, AND THE LIKE:

The attacks are getting closer

Overnight into Wednesday, August 5, 2026, an airport employee discovered a drone equipped with an explosive device in the secure area of Leipzig/Halle Airport. Flight operations were completely halted for a time. At the same time, a collision occurred between a cargo aircraft and an unidentified flying object. The attack apparently targeted Ukrainian cargo planes; a Russian connection is suspected. Security experts warn that drones could be used to deliberately target civil aviation.

European airports have also been targeted by hackers in the past. On September 20, 2025, such an incident caused long wait times and some flight cancellations. BER Airport stated that the cause was an attack on the service provider Collins Aerospace, which is responsible for digital passenger processing systems. The airport subsequently severed connections to these systems; however, manual passenger processing—relying on paper lists and pencils—took significantly longer.

Hackers demanded 10 million francs from Stadler

The railway industry has also fallen victim to direct cyberattacks. In July 2026, cybercriminals stole technical data from a supplier to the Swiss train manufacturer Stadler Rail and demanded a ransom of 10 million francs. Stadler vehemently refused to pay and filed a criminal complaint. According to Stadler, the cybercriminal group Everest Group claimed responsibility for the data theft in a written statement.

Stadler reported that the perpetrators gained access to a supplier's data exchange platform using compromised credentials. While the supplier's technical data was affected, Stadler's own IT systems were not compromised. According to cybersecurity experts, previous victims of Everest include BMW and, more recently, the aviation supplier Collins Aerospace.

Thomas R. Köhler is the author of several books on cybersecurity. He points out that back in 2017, Maersk—the world's largest container shipping company—was paralysed for days due to infected software originating in a third country, an incident that also brought dozens of ports to a standstill: „The whole world was affected because of negligence in a small office with just a few employees on the other side of the globe.“ Accounting software used at that location had been hacked without anyone noticing. Since that incident, the critical importance of supply chain security should be clear to everyone.



Airports are also in the crosshairs of cybercriminals.

„The situation is tense,“ confirms Claudia Plattner of Germany's Federal Office for Information Security (BSI). Ransomware—malicious software that encrypts data for extortion—poses the biggest problem for companies. According to the data, 15 percent of surveyed companies experienced a cyberattack within a single year. This figure counts only those attacks requiring a corporate response; the millions of intercepted or failed phishing attempts were not included. In phishing attacks, criminals attempt to gain access to corporate software systems using methods such as deceptive emails.

IT Security Is No Luxury

Many companies still harbour a false sense of security. Indeed, 91 percent rate their IT security as good or very good. Claudia Plattner of the BSI expressed surprise at this: „That is, to some extent, wishful thinking.“ Small businesses, in particular, often fail to meet even half of the basic requirements in the BSI's

cyber risk assessment. Investing in security pays off, the expert notes; such investments are significantly less costly than the consequences of a successful attack. For instance, data could be outsourced to a commercial cloud provider responsible for ensuring IT security.

This applies to all key technical and legal services—ranging from law firms and engineering companies to hardware and software suppliers.. This applies to all key technical and legal services—from law firms and engineering consultancies to hardware and software suppliers. „Special caution is required wherever internal data is being handled.“

Hermann Schmidtendorf

RAILWAY FORUM CRACOW 2026:

Resilience Meets Technology

Europe's railways are expected to carry more traffic while remaining reliable under increasingly demanding conditions. Extreme weather, cyberattacks, sabotage and vulnerable supply chains coincide with major investment needs, shortages of skilled personnel and rapid technological change. Resilience must therefore be more than a political catchword. It has to prove itself in railway networks, rolling stock, signaling and control systems, operations and maintenance. Under the theme "Resilience Meets Technology – New Challenges for European Railways", the Railway Forum Cracow 2026 will bring together experts from academia, railway undertakings, industry, professional associations and public authorities.

The Forum is organised by UEEIV – the Union of European Railway Engineering Associations – with the Railway Division of the Polish Association of Engineers and Technicians of Transportation, SITK, as its local partner. Poland is investing dynamically in its railway infrastructure and is becoming increasingly important for Europe's north-south and east-west connections.

The central idea of the Forum is to combine strategic discussion with practical railway engineering. A resilient railway system cannot be created by political objectives alone, nor by isolated technological innovations. It requires efficient international corridors and harmonised standards, as well as robust components, manageable interfaces and forward-looking maintenance. Digitalisation must not become an end in itself: artificial intelligence, digital twins and automated condition monitoring must make a measurable contribution to availability, safety and economic efficiency. Railway resilience means also

harmonic coexistence with the nature. The Forum will address the intelligent system of animal protection based on real warning voices which are understandable for wild animals.

The event will begin with a political and strategic pre-conference evening at Cracow University of Technology. Entitled "Rail without Borders – The Future of Central European Corridors", it will focus on railway connections between Poland, Germany, the Baltic States, the Czech Republic and Austria. Topics will include Poland's planned high-speed rail network, Rail Baltica and the Warsaw–Katowice–Ostrava–Vienna axis. Rolling-stock procurement and train-control systems also require stronger cross-border coordination. A panel discussion will bring together political, operational and technical perspectives, followed by an informal get-together offering further opportunities for exchange.



In the heart of Poland's capital Warsaw: Warszawa Centralna Central Station.

The first main conference day will focus on resilience and the new challenges facing the railway sector. Young engineers will deliberately be given a prominent position immediately after the opening session. Presentations on condition monitoring, numerical modelling, BIM and digital twins will demonstrate that the younger generation is not regarded as an addition at the margins of the pro-

gramme, but as a driving force behind the transformation ahead.

Further contributions will address climate-adapted infrastructure and intelligent point-heating systems, as well as the physical protection of critical infrastructure and the cybersecurity of interlockings, rolling stock and the future FRMCS railway communication system. ATO and traffic management ►

UEEIV/RAIL SAFETY SYSTEMS

systems will illustrate how closely resilience, digitalisation and operational performance are connected. The presentations and panel discussions are intended not only to showcase potential solutions, but also to identify risks, unresolved interfaces and practical limitations.

The second conference day will provide an in-depth examination of classic and modern railway engineering. Infrastructure topics will include prefabricated components, AI-assisted condition assessment, life cycle and risk analysis, the prevention of hanging sleepers, automated work documentation, ballasted track and slab track. Further sessions will address command and control, level crossings, open EULYNX interfaces and highly integrated turnout solutions. The programme will conclude with presentations and discussions on modern rolling stock, ranging from high-speed trains to suburban and metro vehicles and ATP/ATO onboard systems.

Cross-border personal exchange is an essential part of the concept. Many of the railway sector's challenges are already well known; what is often lacking is not individual expertise, but the ability to bring knowledge, organisations and solutions together and turn them into practical action.

On an additional excursion day, the themes of the conference will be extended into the practi-



Dipl.-Ing. Olaf Scholtz-Knobloch

cal world of railway engineering. A technical railway-related visit in the Cracow region is planned, with the precise destination currently being coordinated. The Railway Forum Cracow 2026 aims to demonstrate that the future of rail is created where European cooperation, sound engineering expertise, innovative technologies and a new generation of railway professionals come together.

Dipl.-Ing. Olaf Scholtz-Knobloch, President UEEIV



UEEIV/RAIL SAFETY SYSTEMS

VDEI PUBLIC TRANSPORT WORKING GROUP:

Tram excursion in Frankfurt/Oder

On January 13, 2026, we founded a new working group in the VDEI in Berlin for strategic questions about local rail passenger transport and public transport. The idea: We want to give all VDEI members who have to do with public transport an opportunity to contribute their special knowledge and exchange ideas. We also want to show other engineers from the regional rail/public transport sector that the VDEI can be a professional home for them. And of course we also want to help further improve public transport.

So far our working group has organised two well-attended video conferences. A first specialist excursion took place on August 24, 2026 – to Frankfurt/Oder, where we were able to drive across the city during a special trip with a newly purchased tram from Stadtverkehrsgesellschaft mbH Frankfurt (Oder) – SVF. The trip was organised for us by VDEI member Wolfgang Worf, who himself had been managing director of the SVF for a while. Wolfgang also gave detailed explanations during the journey. A big thank you to Wolfgang as well as to the current SVF managing director Christian Kuke and the workshop manager, who gave us an exciting insight into their work!



A new Škoda ForCity Plus-46T.

The SVF was founded in 1898 and currently has 202 employees. The company operates ten bus lines, one of which goes to the Polish twin town of Słubice on the other side of the Oder, and five metre-gauge tram lines. All 26 buses run on natural gas. In the future they will be replaced by battery buses. The tram's track network covers 43 kilometres with

297 stops. The SVF in Frankfurt/Oder was the last transport company in Germany to receive 34 KT4D trams between 1987 and 1990 from the Czech manufacturer ČKD Tatra, which stopped production in 2001. The company has since been transferred to Siemens Mobility. Some of these trains are still running today. ►

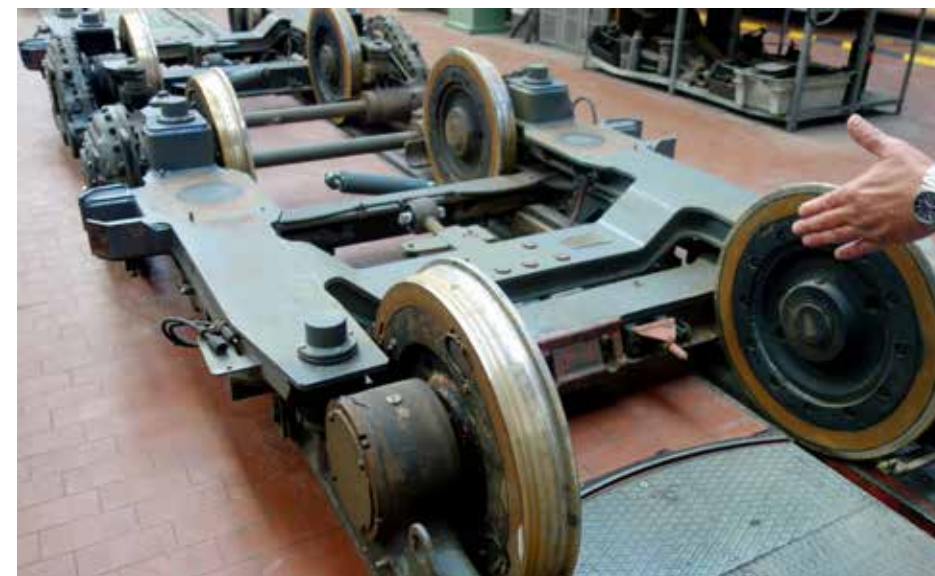
UEEIV/RAIL SAFETY SYSTEMS



The VDEI excursion group in front of the new tram in Frankfurt (Oder). 4th from left: Dr. Jürgen Murach; 1st from right: Wolfgang Worf.

Between 1993 and 1995, the SVF purchased eight GT6M low-floor vehicles from AEG. This company has since gone to Alstom. The vehicle was more comfortable for passengers than the Tatra vehicles because of the 100 percent low floor. But Wolfgang Worf was not very enthusiastic about the driving experience:

„We were not satisfied. This vehicle quickly fell on the track. The vehicle has 100 percent accessibility, but no continuous axles. These are just individual wheels at the front, wheelsets without a continuous connecting shaft. When navigating curves or descending hills, the trams could derail – something



A front bogie of a GT6M tram in the SVF workshop.

we experienced frequently. That is why a different approach was chosen for the most recent procurement: the new trams feature a 70% low-floor area but are equipped with standard, robust solid axles.“

During the tour of the SVF workshop, a GT6M bogie was undergoing maintenance. It was clear to see: when the entire trainset pushes forward this leading bogie – equipped with individual wheels measuring 662 mm in diameter – , maintaining secure track guidance is undoubtedly difficult, especially on curves and gradients. The manufacturer implemented improvements in later versions of this tram model. Frankfurt was unfortunate enough to receive prototypes featuring a design that was evidently not yet fully refined.

And now, 13 new trams from the Czech manufacturer Škoda Transportation have arrived. The order was placed as part of a joint procurement with the cities of Cottbus and Brandenburg an der Havel, resulting in a lower unit price. Modified versions of these vehicles are already in service in the Slovak ca-

pital, Bratislava, and the Czech capital, Prague. The specific model designation is Škoda ForCity Plus-46T. They weigh in at 37.9 tonnes, making them nearly ten tonnes heavier than their predecessors in Frankfurt (Oder).

A test run with the new Škoda tram left a positive impression. The train accelerates quickly, runs smoothly, is flooded with light, and features a pleasant interior – clearly a sound investment. There were some initial manufacturing issues, but these early teething problems have evidently been resolved. Now, a challenge regarding the track infrastructure must be tackled, as Wolfgang Worf explained: „Due to the trains’ greater weight, wear and tear on curves is naturally higher. Consequently, the curves and the track itself need to be adapted.“ However, this may take some time: „At the moment, there is no funding available in Brandenburg.“ Fortunately, the SVF specialists are determined and patient. The vehicles are here; the rest will work out, too!

Dr. Jürgen Murach, Vice president VDEI,
AK Strategische Fragen des SPNV und des ÖPNV

IMPRINT

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CARGO FREIGHT JOURNAL | 98

REDUCE COMPLEXITY, BOOST VALUE



A large, bold, black 'FREIGHT' is written diagonally across the top half of the page. Below it, the word 'INNO' is written in a large, green, stylized font, also diagonally. The background is a solid yellow. In the bottom left corner, there is a QR code, the InnoTrans logo (a stylized blue and green 'i' with a swoosh), and the text '22-25 September Berlin Hall 26/Stand 250'. At the bottom, the text 'BEYOND MACHINES. SOLUTIONS THAT PERFORM THROUGHOUT THE MACHINE LIFECYCLE.' is written in bold black capital letters.



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