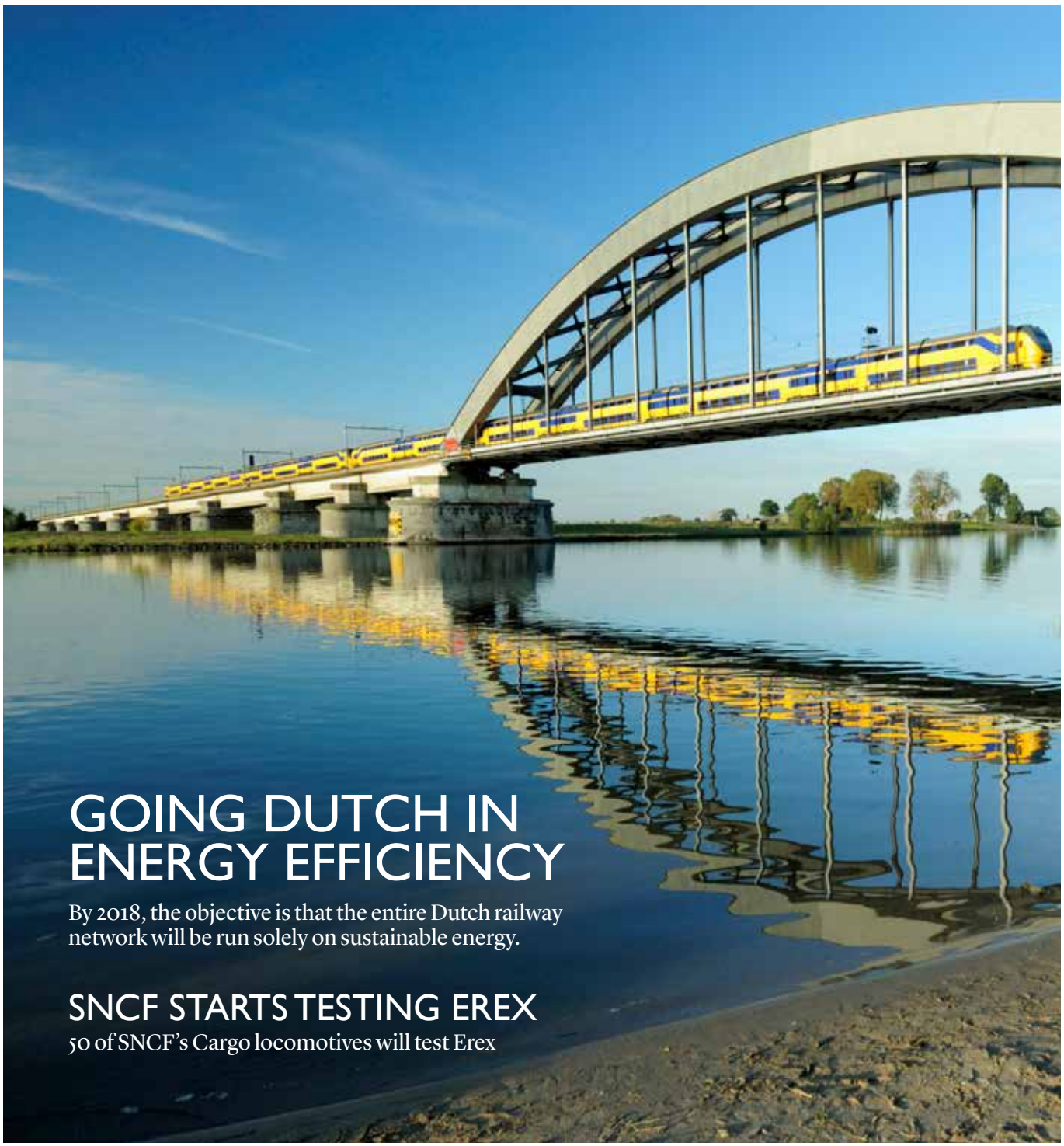
Eress

ANNUAL MAGAZINE 2015



GOING DUTCH IN ENERGY EFFICIENCY

By 2018, the objective is that the entire Dutch railway network will be run solely on sustainable energy.

SNCF STARTS TESTING EREX

50 of SNCF's Cargo locomotives will test Erex

WELCOME!

2015 may very well go down as a landmark year for the railway industry.

The launch of the European 'Energy Union' has been groundbreaking, while the full adoption of the Technical Specifications for Interoperability (TSIs) by the European Commission looks set to boost railway travel.

We've seen proposals for a new European investment fund for improvements to transport infrastructure, and the unforgettable DB Schenker Cargo train, which went from Hamburg to Zhengzhou in 17 days – 20 days faster than transport by sea.

And of course, Eress and Erex continue to grow and expand. Erex has become a mature system, tried and market tested, with the proven capacity to have a real impact on Europe's changing energy landscape.

We're now part of a truly energy-conscious railway community, working together with train operators, metering suppliers, infrastructure managers, the European Commission, ERA, CER and EIM, among many others.

Interest in Eress continues to grow, with NS/Vivens from the Netherlands and Akiem and SNCF from France, now testing Erex. Our railway energy community does not just 'talk the talk' - it helps reduce CO_2 emissions in the real world, on a daily basis.

Last years' forum was one of our most remarkable, wherein preparedness for the opening of the railway market was the main topic. Standout moments included having DG Move, and DG Energy, as keynote speakers, as well as cycling around Antwerp with representatives from the Indian, Japanese, and Russian railways – and we've spared no effort to ensure 2015's Forum holds as much progress and excitement as the last one.

As we look forward to working further with the railway community, this year is all about simplification and working together on establishing forward thinking standards across the continent. As a community, we now have the opportunity to make a significant difference, on a 'continental scale'.

Welcome to this year's Eress Annual Magazine!

Claudia van Diermen Jacobsen
Marketing and Partner Manager
Eress

12 By 2018 the Netherlands will run their entire railway network on renewable energy.

SOURCE: CAROLINE ROKA

4 Erex is setting the standard, says Dyre Martin Gulbrandsen, Director of Eress Norway.

6 Cross border energy billing is no longer a key problem for the French train provider Akiem.

10 EU 2020 targets are changing the world of railway transport.

TOGETHER WE ARE SETTING THE STANDARD

As the European Commission launches discussions on the proposed 'Energy Union', we spoke to Dyre Martin Gulbrandsen, Director of Eress Norway, on the Union's future potential and how Erex can make the inception of the energy union easier.

On the 4th February 2015, the European Commission announced they were to start work on the establishment of an 'Energy Union' - considered to be a fundamental step towards the completion of a single energy market – thus reforming how Europe produces, transports, and consumes energy.

This of course is good news for Eress, and the development of Erex, which offers an ideal solution to accurately measure, settle, and bill for the energy consumed by trains across Europe.

Gulbrandsen says, "By metering electric trains across Europe and utilising Erex to collect, validate, and distribute the data through an easy to use and easy to adapt standardised format, infrastructure managers and train operators are able to accurately measure the exact amount of energy they consume at all times.

Additionally, when trains travel across European borders, the same standardised Erex system ensures an accurate invoice by providing vital information to help operators assess how, or where, they can become more efficient in their energy consumption".

We now have a system that is working effectively throughout Europe - it's been tried and tested, and we can now demonstrate that to the remaining countries outside Eress.

With the Energy Union's primary aim being: 'to diversify energy sources currently available to Member States', Single Market countries will become less dependent on energy imports, and make the EU world number one in renewable energy consumption, whilst leading the fight against climate change. In the harmonised Energy Union, it's easy to see how Erex could play a pivotal role.

Eress has been actively contributing in the creation of standards and helping Europe to establish a standardised system since its inception in 2004. Since then the Erex solution has handled and measured energy data generated from electric trains, and could soon be wheeled out across the continent as a standardised 'European Energy Settlement' solution for the Railway Industry.

"We're now a facilitator and the backbone of this market," says Gulbrandsen. "Erex has already done the groundwork to define the potential future European standard, so it will make it easier for others to simply join in with little to no hassle."

And join in they will – there's a real business case to be made for Erex. A simple example is the system's ability to handle the energy generated from 'reverse braking', which creates energy to feed back into the grid.

There are several countries in Europe that are talking about energy settlement, but there is still a long way to go, says Dyre Martin Gulbrandsen, Director of Eress.

SOURCE: CAROLINE ROKA

According to Gulbrandsen, NSB, the largest train company in Norway, has reduced its energy consumption by 23%, and trains have been able to feed up to 50% more energy back into the system than before.

"We now have a system that is working effectively throughout Europe - it's been tried and tested, and we can now demonstrate that to the remaining countries outside Eress", says Gulbrandsen.

He remarks, "Naturally, there are and will be challenges to overcome if Erex is to become a major player in the Energy Union. "There are several countries in Europe that are talking about energy settlement, but there is still a long way to go.

We face standardization issues, even within the manufacturing process, but our biggest challenge at Eress has been how to handle the growth we have been experiencing – which of course is a welcomed challenge".

"With more partners coming onboard and far greater interest in what we do, finding the right combinations and solutions to follow this growth will be crucial to future success," says Mr Gulbrandsen.

The team at Eress believes that the general public is becoming more environmentally aware, and more concerned about the type of energy used to power infrastructure like railways across Europe. This favourable public opinion, will also lead to greater growth opportunities for Erex. It certainly will encourage potential partners to come onboard, as the benefits become more and more universally apparent.

SOURCE: AKIEM

Erex has solved cross-border challenges for the French train provider Akiem.

AN AKIEM CASE STUDY

Cross-border energy billing was a key problem for French train provider, Akiem. Eress, and its Erex system, have proved to be a crucial solution in the measurement of energy and the transmission of important data for Akiem. We spoke to Matthieu Glaume, Akiem engineer, to find out more.

Akiem is a leading French train provider which manages freight and passenger locomotives and leases them to SNCF (the French state-owned railway company) as well as other European rail operators. Founded in 2008, Akiem has 350 locomotives and customers in several countries, including France, Germany, Poland, Italy and Morocco.

But things weren't always so picture-perfect for the company, which initially struggled with the issue of energy billing and transmitting crucial energy data across the continent.

Erex is the first system that´s worked for us when it comes to French-German energy transmitting and billing.

Matthieu Glaume, engineer at Akiem, says, "In the beginning, before we began cooperating with Eress, we had a lot of problems with transmitting data for billing purposes between the French and German infrastructure managers. Deutsche Bahn Energie and RFF had not been able to agree on a common way to transmit, receive, and validate data. We had a meeting and many phone calls with them, but we couldn't find a solution."

Luckily for all of the parties involved, Eress was suggested to Mr Glaume. The Erex solution had already been tested and approved by both Germany and France. "I asked Deutsche Bahn Energie, and they said yes. They had tested Erex and gave it the go-ahead."

All parties attended the Eress Forum in Vienna in 2013, and an agreement was forged. Since December 2013, Akiem has been testing Erex on three locomotives that cross the French-German border. In June 2014, plans were laid to extend the tests to more than 30 trains. So far the verdict is unanimous – Erex has been a great success.

One of the key problems that Erex has managed to solve is the issue of deductions in circumstances where energy is returned to the network while braking. "Our customers are being billed by the infrastructure managers, but they may lose hundreds of Euros due to the difference between theoretical billing and billing based on real, transmitted data. For example, without Erex, billing does not take into account the deductions for energy returned to the network while braking," says Matthieu. It was a question of customer satisfaction, he agrees, confirming that cooperating with Eress was crucial in solving this problem.

"Erex is the first system that's worked for us when it comes to French-German energy transmitting and billing. It's important that we continue to develop our cooperation with Eress – I expect we'll be using Erex with our locomotives that travel back and forth between France and Belgium in the near future," says Matthieu.

For train providers all over the continent, it's important to know that future partners in different countries will be able to receive correct measurement data thanks to Eress. "We were so pleased when Deutsche Bahn told us it worked, and we plan to work with Eress wherever and whenever relevant in the future. Erex appears to be one of the very best in Europe for data transmission and billing."

AKIEM

FOUNDED IN

2008

350

LOCOMOTIVES

ENABLING INFORMED DECISIONS

Erex is all about arming decision-makers with the right data to enable informed decisions about energy efficiency. CATO Driver Advisory System is an innovation, which goes hand-in-hand with Erex, enabling decisions based on hard data as opposed to guesswork. We spoke with Andreas Törnblom, of Transrail Sweden, to find out more.

Ten years ago, Transrail set out to develop an advisory system, which would minimise operational costs, improve punctuality, and maximise the traffic capacity of the railway; thus the CATO Driver Advisory System was born – an innovative system which advises train drivers on how to be energy efficient.

CATO matches perfectly with Erex, since it advises train drivers on how to save energy, whilst Erex simultaneously verifies the energy savings - measuring and monitoring the energy output.

So we asked Andreas Törnblom, of Transrail Sweden, what the benefits of such a system were – and how Erex has made Transrail's value proposition even more appealing. "It is quite obvious that an energy billing system creates a very important incentive to increase energy efficiency," says Törnblom. "If energy costs only depended on data such as gross tonne kilometres, there would be no real incentive for improvement. When it comes to energy reductions on electrified lines - systems for energy measurements and billing become quite essential for the implementation of eco-driving technologies."

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CATO provides additional advantages, one of which is its 'cost function' feature, which establishes the basis for optimisation - and CATO can be easily calibrated to reflect billing needs, such as: consumed energy, regenerated energy, power, or any other criteria, based on time, or region. CATO provides the optimal driving strategies under all situations."

CATO offers plenty of energy-efficient benefits for train companies and electricity providers - but what about specific detailed data on energy consumption?

"Energy data is important to increase railway competitiveness. The railway is already considered an efficient means of transport, but there are numerous ways in which it could be improved further. Apart from the fairly modern technology of 'regenerative braking' in electric trains, the actual driving style is the most important way to reduce energy consumption," says Andreas Törnblom. "As I mentioned – energy data and billing measurements are important in pushing developments in this field."

CATO Driver Advisory System transforms Erex data into optimal driving strategies.

SOURCE: CATO

"The Erex energy data provides an excellent source of information on the overall energy consumption for a specific unit, fleet, or operation." Transrail has used Erex's data to evaluate the potential of CATO installations, and has also used Erex's data to follow up on installations already done. "In our studies, for instance, we have used Erex's data to study how energy consumption is affected by weather conditions and the impact of other energy saving regimes other than eco-driving."

Andreas also states that Transrail will continue to use Erex's data in their projects. Tools based on Erex's data are already in development, and Transrail hopes to use the breakthrough to study specific characteristics on specific operations or lines. "Put simply," he adds, "Erex's data is definitely a driving force for informed decisions and development."

EIM AND THE FUTURE EU RAIL TRANSPORT SYSTEM

The world of railway transport is undergoing significant change, with an eye on the EU's 2020 objectives and an emphasis on eco-friendly solutions. We talked to Ville Saarinen from EIM in Brussels about Erex's role in meeting the 2020 targets, as well as the technical developments we can expect from the railway sector in the coming years.

The EU's 2020 targets are looming large, and Erex is proving to be a key solution in meeting those objectives. How does Ville Saarinen believe innovations like Erex are helping?

"It is clear that railways cannot be content with their current status of being an environmentally-friendly mode of transport," Ville Saarinen says. "We need to keep improving."

That said, he is enthusiastic and optimistic about the contributions of Erex. "Erex can offer support for reaching the objective of a 20% energy efficiency increase. It is true that we can't control what we can't measure - and it has to be remembered that a locomotive is a moving consumption point with its own challenges for energy measuring. However after having been responsible for the test measurements for locomotive energy consumption in Finland, I can see that the technology has started to become mature enough for large scale implementations."

It is clear that railways cannot be content with their current status of being an environmentally-friendly mode of transport. We need to keep improving.

Ville Saarinen has implemented the first demonstrations of Erex in Finland in cooperation with his colleagues, to great success. The process was not without its struggles, and the team behind the installation had to learn from previous mistakes in order to ensure successful test runs. "The installation of the first energy measuring systems in Finland was performed only after analysing and meeting with other Eress partners. We learned what to do and what to avoid - for example, we learned to test the EMS units in a test bench prior to installing them on locomotives. With these shared practices organised under the Eress umbrella, the Finnish test runs were a success and are currently being duplicated."

However, he flags up one of the major challenges of meeting the 2020 targets – which is increasing the share of renewable energy within the sector - something that is largely dependent on players outside of the sector. Could Erex be an important factor in bridging this gap?

"By making the railway system consumptions known at each point of the system, we as a sector could attract new suppliers of energy into the system – perhaps even directly into the catenary system from new sources of energy," says Ville Saarinen. "In Finland Erex serves the purpose of energy saving objectives and free purchase of energy from the markets by railway stakeholders. I see the role of Erex to be an important tool to meet the objective of the railway sector to push its energy consumption even lower than today."

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And what of the future? Ville Saarinen is of the opinion that, even if the 2020 targets are met, work to improve the efficiency of railway transport should continue indefinitely. "New technological developments and their implementation into real life projects have to be supported by a stable and efficient legislative process. By measuring more and more consumption points of the railway system we can make the market more transparent and reward energy measuring schemes taken by individual stakeholders," he says.

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EU **2020** TARGETS

-20% GREENHOUSE GAS EMISSIONS

-20% ENERGY CONSUMPTION

+20% RENEWABLE ENERGY

Dutch railway operators hope to meet their target of powering 100% of their electric trains with wind power by 2018.

‘GOING DUTCH’ IN ENERGY EFFICIENCY

The Netherlands has big ambitions for the future of trains. By 2018, the objective is that the entire Dutch railway network will be run solely on sustainable energy. In less than three years, the goal is to have 100% of all trains running on wind power. How will it be achieved – and how close are they to meeting the target? We sat down with Ralph Luijt, Energy Manager at Dutch Railways (NS) and board member of the energy procurement cooperation, Vivens Netherlands, to find out more.

The Netherlands has always been famous for its windmills – and now wind power is set to be harnessed and used in an even more revolutionary way for the Dutch.

Based on our 2015 - 2025 objectives, railway companies will do their best to avoid sourcing electricity from traditional markets as they push towards clean energy sources. Using new wind farms, the Netherlands railway operators hope to meet their target of powering 100% of their electric trains with wind energy by 2018. Ambitious? Yes – but achievable, according to Ralph Luijt, of NS, one of the parties to have signed the agreement.

The first advantage the Dutch train operators have is that saving energy has already been a central theme within the sector for many years. Therefore, the amount of energy that needs to be sourced is far less than it would have been without the energy-efficiency program.

This year, 50% of energy consumption on the railway will come from renewable sources.

“In the Netherlands, there is a long-term agreement with the government for improving energy-efficiency,” says Ralph Luijt. “The aim is an annual energy efficiency improvement of at least 2%. NS and ProRail (the infrastructure manager) joined several years ago, and Arriva joined last year.”

With this agreement going in favour of sustainable, environmentally-friendly solutions, it’s little wonder that Dutch operators are right on track to meet their 2018 targets – which seems unfeasible for many countries across Europe.

“This year, 50% of energy consumption on the railway will come from renewable sources,” says Ralph Luijt. “This will gradually increase to 100% in 2018.”

The clean, renewable, environmentally friendly plan is a prime example of what other European countries should strive for. With just three years to go until the deadline for 100% wind-powered trains, representing an annual volume of approx. 1.4 TWh, the rest of the world will be watching with interest to see how successful this Dutch railway experiment will truly be – and how it can be adapted within their own countries.

SNCF STARTS TESTING EREX

Eress has announced that SNCF (Société Nationale des Chemins de fer Français) has decided to test the Erex system. SNCF, which is France's state-owned railway company and in charge of managing rail traffic in France, will be testing the system for fifty of its cargo locomotives, measuring and managing the energy consumption of each one.

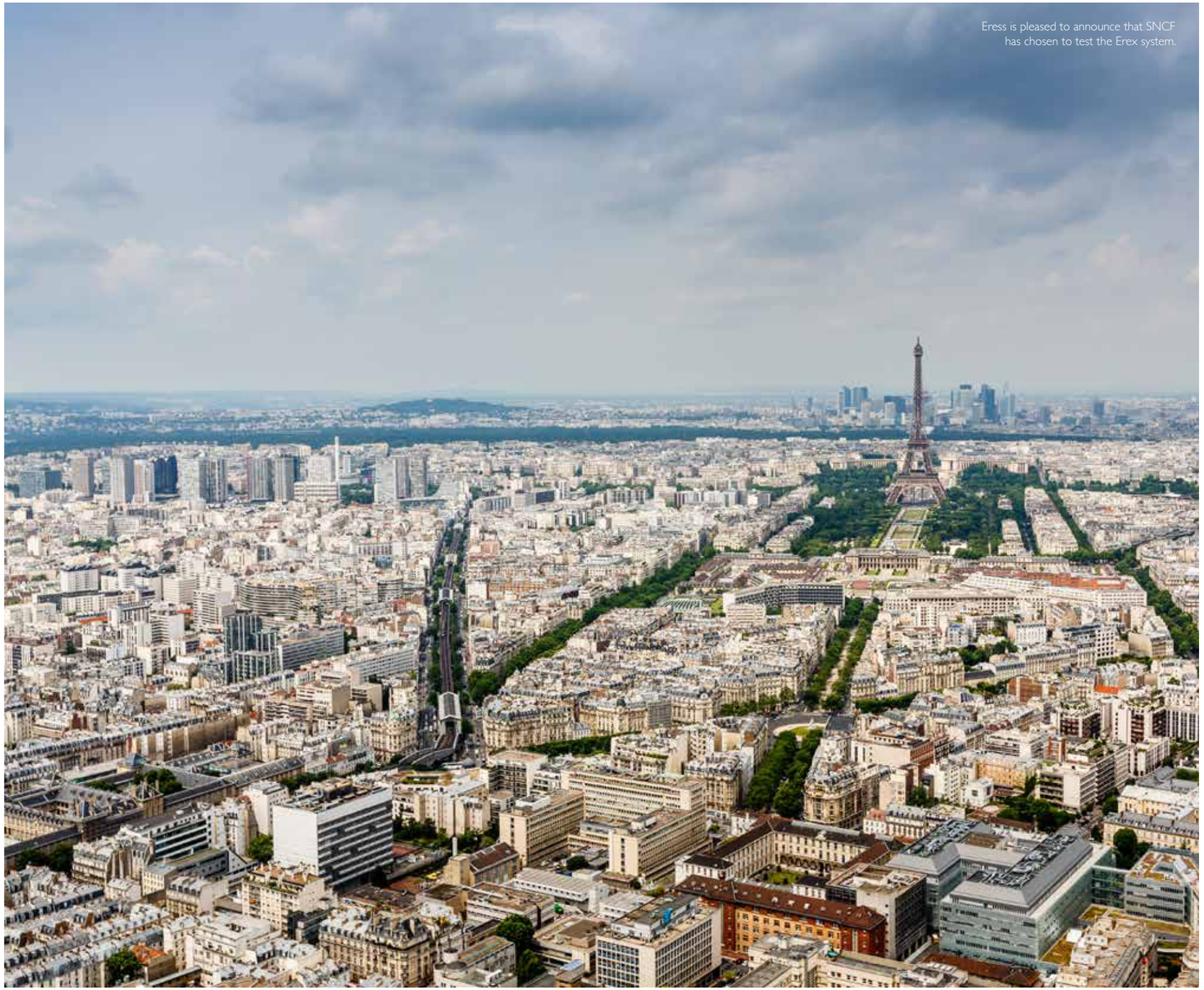
Dyre Martin Gulbrandsen, Eress Director, says, "We are very pleased to announce that SNCF has chosen to test the Erex system, and we consider this a significant milestone."

Railways consume a huge amount of energy in comparison with other infrastructural elements. In Germany, the energy required to run the railway systems is as much as 5 terawatts a year, while in the UK, running trains requires 15% of the UK's entire railway operating cost.

Erex makes it possible to meter and accurately bill the energy each train uses, ensuring that train operators pay only for what they use, since bills are based on precise energy measurements. Without the addition of Erex, bills are all based on estimates, making it hard to measure and reduce the amount of energy consumed.

Accurate energy data is the starting point for a number of other environmental initiatives.

Accurate energy data is also the starting point for a number of other environmental initiatives. Erex data makes it possible to implement further measures to reduce energy use, even saving up to 30% of energy consumption in certain conditions. With the 2020 objectives looming, it's more important than ever that train operators seek new ways to measure and reduce the amount of energy they use to power the continent's railway networks.



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AROUND THE WORLD

WORLD'S LONGEST RAILWAY ROUTE LINKS CHINA WITH SPAIN

The world's first freight train to link China and Spain has completed its maiden journey this year, marking the opening of the world's longest railway. Covering more than 13,000km, the train passed through Kazakhstan, Russia, Belarus, Poland, Germany and France before arriving in Madrid 21 days later. Hailed 'the new Silk Road', the railway carried 30 containers with 1,400 tonnes of cargo aboard.

JAPANESE 'SUPER EXPRESS' TRAIN LANDS IN THE UK

A brand new Japanese train has been uploaded at Southampton docks as a first step to replacing the familiar InterCity 125 on Britain's railways. 122 Hitachi Class 800 Super Express trains will be assembled in County Durham over the coming years, with a view to it becoming 'the 747 of the railways' when they're put into use in 2017.

The Hitachi newcomers will run on the Great Western mainline and East Coast mainline. All of the trains will be electric, with some of them being able to switch between electric use and diesel, where a line has not yet been electrified.

SNCF COMMIT TO TGV

SNCF, France's state-owned railway company, has unveiled plans to make TGV the preferred means of transport for the French. The plans have three main objectives: reducing fares, improving the quality of travel, and minimising costs across the board. The plans will be implemented over the next two years.

WHAT EUROPEAN WORKERS SPEND ON TRAIN TRAVEL

A new report has found that British workers spend more than 17% of their wages on commuting, in comparison with 12% in France, 9% in Germany and 6% in Spain and Italy. The average monthly season ticket from Brighton to London costs €544, with many commuters paying upwards of this figure as a result of price hikes and privately-owned services.

17% British workers spend more than 17% of their wages on commuting

12% FRANCE

9% GERMANY

6% SPAIN

6% ITALY

RAILWAY ACCIDENTS CONTINUE TO DECREASE

A total of 2,137 significant train accidents were registered in the 28 EU countries in 2013. This represents a decrease of 1.9% compared to 2012, and it continues the downward trend being observed since 2004.

28 EU COUNTRIES

2,137 SIGNIFICANT TRAIN ACCIDENTS

1.9% DECREASE COMPARED TO 2012

ITALY RECEIVES ALMOST €1BN FOR RAILWAY IMPROVEMENT

The European Investment Bank has granted a €950m loan to fund RFI's investment programme, designed to inject new life into conventional railway lines in Italy. The money will be used to bring regional and local routes up to date, as well as modernising older lines all over the country.

PASSENGER NUMBERS RISE BY **3%**

BUSINESS TRAVEL INCREASED BY **4%**

MORE THAN 150 MILLION PASSENGERS SINCE 1994 **150**

EUROSTAR REPORTS CONTINUED GROWTH

Eurostar marked its 20th birthday in 2014, and saw passenger numbers rise by 3% in the process. Business travel increased by 4% year-on-year, and with Eurostar e320 trains set to enter service by the end of 2015, the Eurostar looks set for plenty more growth. More than 150 million passengers have travelled on the service since its launch in 1994.

AN ENERGY EFFICIENCY SHIFT BACK TO RAILWAY

Raimondo Orsini has worked with the International Union of Railways (UIC), and is currently working for the Sustainable Development Foundation in Italy. In this interview, he discusses the energy-efficient shift facilitated by railway metering, and how metering impacts the objectives of achieving green economies in Europe and further afield.

It's been clear for a long time that electricity usage within the railway industry needs to be reduced for both financial and environmental factors. Railway operators in many countries are among the most prominent consumers of electricity.

There's a critical roadblock to industry-wide energy efficiency, says Raimondo Orsini, of the Sustainable Development Foundation. "You simply can't reduce, what you can't measure". This is key when it comes to minimising energy usage on European railways.

The impediment lies in how to take steps to reduce energy used to power trains when there is no clear way to measure or monitor energy usage, and no clear way to exchange data between different infrastructure managers on cross-border trains.

"The answer was initially found in Scandinavia", says Orsini, as metering and data exchange solutions like Erex came into play. After seven years of metering development, there are now approximately 10,000 meters installed on electric trains across Europe – with Deutsche Bahn alone, owning almost 4,500 meters.

"By 2020, it's expected that 20,000 meters will have been installed, and by 2030, the entire electric train network will be monitored by meters," says Orsini. That juncture will mark the first time we are able to accurately measure energy

You simply can't reduce, what you can't measure. This is key when it comes to minimising energy usage on European railways.

consumption across the railway networks of Europe - in real time.

Such a crucial geopolitical and industry-wide development for Eress does come with its challenges – namely, garnering the support of the train companies all over the continent. "Part of the challenge is of course getting more countries on board with Erex, especially the Spanish, the French, and the Italians", says Raimondo Orsini.

There's also the issue of train manufacturers. They need to be influenced to make energy efficiency part of the design process of new trains. The cost savings are clear, says Orsini. "Meters need to be installed at manufacturing. While it costs almost nothing to install meters on electric trains - around 3000 euro each - at the time of manufacturing, it costs between 10,000 to 20,000 euro to retrofit each train with meters after they have been delivered, or on existing models."

Orsini believes, "metering alone is not enough - energy efficiency must be the goal". European railways have done a great job in the past decade, and a lot more can still be done. The automobile and airline industries have been obligated by law to improve fuel and energy efficiency, and the railway industry as well will have to do its part.

"Railway remains the most environmentally friendly mode of transportation," says Raimondo Orsini, who believes we could witness a market-driven 'shift back to railway' within freight and intercity connections in the near future – due to greater environmentally friendly and energy efficiency standards.

By 2020, it's expected that 20,000 meters will have been installed, and by 2030, the entire electric train network will be monitored by meters.

Developments like Erex, which address cross-border metering, and cross-border standardisation in information gathering and reading may prove to be essential to making rail more energy efficient, and to making the shift back to rail a viable reality.

Railway remains the most environmentally friendly mode of transportation, says Raimondo Orsini of the Sustainable Development Foundation in Italy.

SOURCE: SUSTAINABLE DEVELOPMENT FOUNDATION

Utgitt av Eress mai 2014 Design: REDINK

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