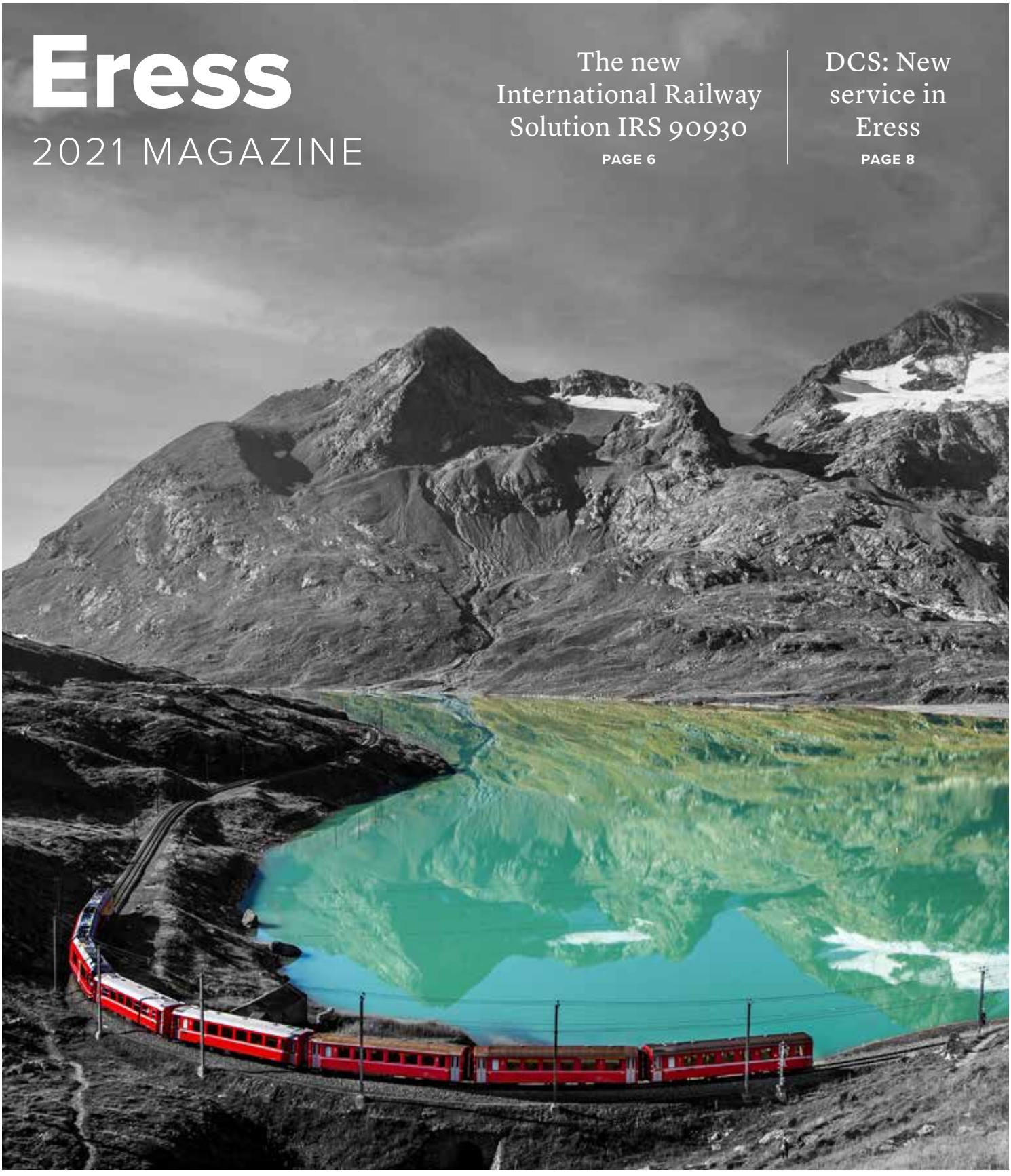
Eress

2021 MAGAZINE



RAILWAY ENERGY IN EUROPE

How are we doing?

EU Dates for Metering & Billing

Mandatory in the EU from:

2014

Energy Meters on Trains
Energy meters are mandatory on all new, renewed and upgraded rolling stock since November 2014 (Commission Regulation 1302/2014).

2020

Exchange and Settlement System for Energy Data
EU countries must have a settlement system.
By July 2020 each member state in EU will be able to exchange and settle energy data, Including validation and allocation of energy consumption to correct end user (Commmission Regulation 1301/2014).

2022

Data Collecting System (DCS)
EU countries must have a DCS by 2022.
Each member state in EU will be able to collect and exchange energy data. from January 2022. (Commission Implementing Act amendment of TSI ENE and TSI LOC&PAS).

2020

Eress in the time of COVID-19

Eress was not the only organisation in the world that needed to make sudden, significant operational changes because of COVID-19. With the backdrop of COVID-19, travel restrictions and general global chaos, Eress responded quickly. Yet, 2020 has been a good year for Eress. To learn more about the 2020 year at Eress, we interviewed both the new Eress Steering Group Chair, Vibeke Hodne, and the Eress Director, Dyre Martin Gulbrandsen.

Welcome, Vibeke Hodne. What have been your impressions of the Eress organisation in this, your first year?

I see the Eress organisation as competent, co-operative and efficient. The Partners and the administration are ambitious on behalf of new technology, the efficient use of energy, reducing the carbon footprint of the sector and further developing the cooperation in the Eress family. We utilize the strengths and possibilities as a group. We work strategically and focus on common challenges.

This last year has seen us implementing the new and improved Erex 2.0 IT system. We welcomed two new partners – Spain and Luxembourg – and adapted to the corona situation in an impressive way.

The Eress Forum on a digital platform was very well received with a record breaking number of participants. And now, the new digital Eress Events on various topics open knowledge sharing between the Eress organization and our extended railway family across Europe.

The Eress belief is that the Partners in Eress will benefit together better to meet common challenges.

I am in awe of what Eress has already achieved now and look forward to contributing to furthering the good work.

What has it been like to get to know people from the 9 Eress countries via Teams? Does it work?

It has been a pleasure getting to know the 9 Eress countries and the Partner representatives. I was lucky enough to meet most of the representatives before the corona situation, so switching to full-on Teams meetings went smoothly. Teams open new ways of working together efficiently without travelling. Presentations and information are shared with all, and discussions are open and accessible.

But I miss the small talk, the exchange of experience, information and know-how when we meet in person. In the future, I see us combining Teams meetings and physical meetings to get the best of both worlds.

You come from the energy sector. What can the railway sector learn from the energy sector in the Nordic countries?

The energy sector in the Nordic countries has been at the forefront of change with the deregulation of the power market. When Norway decided to deregulate the market for electric energy trading in 1991, Sweden soon followed in 1996. Finland followed in 1998, and Denmark joined the Nordic power market in 2000. And later, even more European countries joined. Infrastructure and interconnectors between countries were built. Nord Pool has evolved, connected, changed and shaped the energy market for more than 25 years. Now wind and solar energy, electric cars, transportation and digitalization make room for even more possibilities. And room for change.

The railway sector has the same unique chance of changing, connecting and shaping the European future of railways. The electrification, the de-carbonisation, the energy efficiency of train runs and the greener European transport sector are all within our possibilities. The Eress organization will contribute to making this happen. The future is electric!

Vibeke Hodne
Director of Energy at Bane NOR and Eress Steering Group Chair

How do you see the Eress organisation in 5 years?

I hope to see an even larger Eress family evolving and contributing to further railway as the greener transportation choice in Europe.

We want to be a driving force in developing and improving energy exchange and settlement, using data and our know-how to further focus on energy consumption.

Is climate important for Eress? For Bane NOR in Norway? And for you?

Climate is important for Eress, for Bane NOR and for me! This is one reason I find my job at Bane NOR and in the Eress organisation fulfilling. As part of the critical infrastructure in our society, we can contribute to the necessary changes.

What have you learned so far from the pandemic?

New possibilities, new ways of working, communication and cooperation. And Teams.

And finally, with stay-at-home orders, many people have picked up new hobbies. Do you have any new hobbies?

After a year of working from my home office, I tend to make nerdy coffee and homemade bread.

Dyre Martin Gulbrandsen, how has 2020 been for the Eress partnership? Have you any new partners? New technology? Has there been more or less work? Meetings? Stress?

2020 has been a good year for Eress. But also, very different with the whole Eress staff working from home offices since 12th March 2020.

ADIF of Spain joined Eress as the 8th partner in January, and CFL of Luxembourg joined as the 9th partner in April. The onboarding of both new partners has been managed effectively, despite the pandemic.

Setting up a working settlement system like Erex in a country has, until now, been a long and time-consuming process. But Eress introduced a lean approach to implementing a full settlement system in a country in less than one week. It is a well-planned process taking the new Eress partner through every step of setting up a well-functioning settlement system that supports all operations.

The innovative team-based approach matches experts from Eress Administration and representatives from the new partner's organization. The teams then work closely together on the implementation for an entire week. This new working method applied to both ADIF in Spain and CFL in Luxembourg. For CLF, this ramp-up week ran completely digitally, and all meetings and training used Teams.

On the IT-development side, Erex 2.0 has been implemented in the Netherlands, Finland, and Belgium. The work with the other partner countries and the Exchange module is in progress.

In 2020 the Eress Administration also further professionalized service management by introducing a fully digital service desk.

How has Eress been affected by Covid-19?

Working from home for Eress Administration and most partner organizations has led to new ideas. First, our annual Eress Forum went digital last year. It was a great success. Then this autumn, we launched Eress Events to strengthen our position as the hub and competence center in Europe. At Eress Events web page, you can find information and invitations to many exciting digital events.

We also introduced a new method for testing in Erex. This session-based digital testing conducts the new functionality tests in Erex IT-system as it ensures the high quality standards of the Eress organization. The session-based testing started in-house, with outstanding results, so testing this way with Eress partner organizations was a natural next step.

Do you expect more countries to join Eress in the near future? Why or why not?

The EU Commission clearly states the requirements for a settlement solution through the TSIs. However, there are still several European countries not fulfilling this yet. With the continuous increase in the number of advanced energy meters installed in rolling stock, more train companies are requesting a transparent way of settling and paying for their energy consumption.

Covid-19 has increased the need to be more cost and energy-efficient. So, paying for the exact energy usage with Eress gives train companies direct incentives to reduce energy costs even more.

And Eress has demonstrated that implementing a settlement solution can be accomplished in a lean and very cost-effective way. So yes, I expect more countries to join Eress in the future.

Dyre Martin Gulbrandsen
Director of Eress

2020 has been a good year for Eress. But also, very different ...

Dyre Martin Gudbrandsen

Joining Eress for a Strong United Future
Although 2020 saw incredible challenges for Eress, it resulted in an excellent year for the organisation. And the future looks promising, too. As more European countries join the Eress partnership, we see how working together is indispensable to positively contribute to the future of our planet.

Is it difficult to coordinate the collaboration with 9 countries from home?

Eress is an organization that works in several European countries. We have always relied on digital collaboration methods. So, we had a solid foundation in place before. Covid-19 forced us to work from home and rely 100% on digital communication. The digital collaboration has worked fine for both the Eress Administration and Eress partners, but we miss working more closely, and everyone looks forward to the opening of the society.

What have you learned so far from the pandemic?

That the restrictions imposed by the Covid-19 result in a lot of new ideas. And that we adapt and change quickly.

And finally, with stay-at-home orders, many people have picked new hobbies. Do you have any hobbies?

I like to spend time running orienteering. I still compete regularly, so I need to stay in good shape. I practice running with a map and compass as often as I can. It is a great sport, as it combines running with brainwork. And you spend time outside in nature. I share an interest in orienteering with the rest of my family. I also coach the junior athletes in my club.

ROLES AND FUNCTIONS

The new International Railway Solution IRS 90930

The new business solution for ‘Traction Energy Settlement and Data Exchange’ was published at the end of 2020, after several years of shared work by railway energy experts from many countries in Europe. It replaced the well-known UIC Leaflet 930 from 2009, which it is partially based on.

This technical and new harmonized railway standard, called IRS, defines and details processes, parties and data interchanges needed in traction energy settlement, with a particular focus on metering data. It covers many business aspects that are not covered by the technical CENELEC standards, nor by the regulatory Technical Specifications for Interoperability (TSIs) given by the European Union Agency for Railways (ERA). The new IRS is complementary and compatible with all of these.

Hereunder you will find a summary of the major changes from the Leaflet 930 to the IRS 90930.

Role Models

All roles are now well structured and defined, clarifying positions, tasks and responsibilities.

New Role – Consumption Point Administrator

The Consumption Point Administrator (CP Admin) starts and stops metering data transfers to the settlement market for their meters. The CP Admin provides essential information, documents and compliance downstream about installed metering systems in a country or settlement area. So, affected parties can check if installed metering systems are acceptable or not.

Functions – Revision of UIC LEAFLET 930

An XML-based transfer method will replace the EDI-based transfer method. The gradual transition will make it easier for system holders to exchange data while avoiding risks and translation costs.

Structured Masterdata

Structured data sets can be transmitted, including details about companies, traction units and meters. Conformity assessments have links to further documentation. The IRS defines content, transfer methods, parties, and responsibilities to make tasks and duties more straightforward, faster and safer. Also, these descriptions streamline configuration changes to recognize, accept and correctly handle data.

Uniform Metering for Different Periods

The IRS defines the translation of data between 5- and 1-minute metering systems. This definition simplifies the receipt and use of the data and supports the interoperability of the two metering systems.

Common-Process Maps

Common-process maps follow interactions in the lifetime of onboard metering system units as data-sources for input to settlement. The map concludes when the metering system is ready to use.

IRS – An International Business Solution

The IRS is not a law or a standard, but a business agreement between UIC members. Each IRS provides a solution(s) on how systems and parties operate, cooperate and interoperate. Written and revised by specialist UIC members, the IRS document structure is similar to norms from similar standardization bodies. All UIC Leaflets are updated into IRS format documents or are in process.

Traction Energy Settlement & Data Exchange – Scope IRS 90930

The purpose of IRS 90930 is to support traction element settlement actors with new requirements and challenges because of the European market developments. IRS90930 also focuses on facilitating cost efficiencies by defining a framework for energy volume used by the consumer. The framework establishes relevant functions, roles and interactions, common solutions, requirements and recommendations specifically related to the challenges associated with data exchanges in cross-border traffic.

2012/34 Railway Market Directive

The minimum access package includes the use of electrical supply equipment for traction current, where available. Additional services may consist of traction current. The charges are shown separately from the electrical supply equipment on the invoices, without prejudice to the application of Directive 2009/72/EC.

The freedoms under the Directive 2009/72/EC guarantee citizens of the Union a fully open market, enabling all consumers the freedom to choose suppliers and all suppliers the freedom to deliver to their customers. This aims to ensure that end-users pay the right price.

The same high-level requirements typically used in the rest of the energy market are not economically feasible for RUs. Although prices paid by the RUs must remain transparent and non-discriminatory. Each country can choose the most cost-effective solution considering the need for RUs of all sizes.

Possible solutions include:

- Infrastructure Manager (IM) purchases all electricity, delivering directly to the RUs. Scale advantage could result in lower prices.
- Railway sector jointly purchases all electricity and agrees on splitting costs between end-users, defining unit costs.
- Electricity for railways purchased on the spot market. RUs access the spot market to define the price for their electricity.
- RUs choose a supplier and (if applicable) balance responsible party in the electricity market (all products possible).
- Each Settlement responsible (usually IM) takes responsibility and investigates the situation in its country. If needed, contacting all relevant actors (regulators, government, TSO) to adapt the juridical, technical, and organisational framework.

The current shifts in management processes for metering, exchange, validation, and settlement of traction energy methods emphasise cross-border traffic. As the methods became industry norms, energy consumption in the railway industry reduces in the EU. Eress leads the way in supporting compliance, and energy-saving efforts as RUs and IMs boost energy efficiency in train operations.

New DCS service in Eress

The EU requires member states to offer a TSI-compliant DCS to the railway operators in their countries as of January 2022. Ahead of the EU deadline for member states, Eress already provides DCS service to the railway infrastructure managers in 9 member states. This service lets railway companies install energy metering systems compliant to the latest standard and TSI (2017/2018), with confidence that their energy metering data can and will reach the systems that produce their energy bills. The Eress DCS can also handle other onboard energy metering systems and has valuable additional services for the railway companies.

Onboard metering systems and compatible on-ground data collecting services have be reopened. In been used in the regular energy grids for several decades, both at energy transfer points between grids and at energy delivery points to consumers. The nature and behaviour of the energy consumers in a railway grid fundamentally differ from the consumers in a regular energy grid. Those in the railway grid move around. Accordingly, they may change energy grid suppliers whenever necessary and be offline as a consumer or metering data supplier at random times. As a result, the electronics industry has, over the last 20 years, developed and delivered metering solutions specialized for railways.

But 14 years ago, the railway industry raised an important issue. The existing energy metering systems were all tied-for-life to the on-ground data collecting solution provided by the meter supplier. The communication onboard-to-ground was defined by the supplier as its property and not publicly available. This caused some critical problems:

- If a supplier went bankrupt, the onboard metering installations it had delivered would be worthless/useless. If the data collecting service on-ground disappeared with the bankruptcy, no other system could communicate with the affected meters.
- If a railway company bought an energy metering system for a fleet of vehicles, then it would be stuck for the lifetime of its meters (10-20 years.) The railway company could have no rights or the possibility to force updates or upgrades in the data collecting system, which is very unusual for any commercial or IT-system.
- If a railway company, during a 10-20 year period, chose different suppliers of metering systems for various fleets of vehicles, it would likely get stuck with operating many parallel data collecting systems with different user-interfaces and solutions for many years. The railway company's choice will be the result of the different metering products available on the market each time the company runs a tender process.

In 2007, the decision was made to create a common standard for the onboard energy metering systems in Europe. The standards included a common and complete interface standard between the metering system onboard and any data collecting system on-ground. But the resulting standard published in 2012 did not include sufficient standardisation of the interfacing part. ERA, which had requested the development of the energy metering standard, required that the standardization work on the communication part. In 2017 an updated standard was published. The interface was completely standardised, and the data collecting system (hereafter named by abbreviation "DCS") was also standardised. ERA updated its TSIs accordingly to define these as the legal standard thereafter. The EU Commission completed the process by requiring that member states provide DCS service to railway companies by January 2022. This facilitates that energy metering systems compliant to the official TSI and referenced metering norm (50463:2017) have a data collecting service available on-ground to fulfil their purpose and get the metering data to the billing parties. Suppliers of energy metering systems have been working since before 2017 on developing their products to be 2017-compliant (many suppliers participated in the standardisation work).

Bjørn Lysne
Exchange
Responsible
Eress

Such products have started to be offered in the market.

Now the railway companies have a 2017-compliant DCS to deliver their data to in the Eress countries. The Eress DCS can also handle non-2017 compliant metering systems as long as the interface is compliant to the 2017 standard. The intention is to support some metering systems that, due to the transition period after 2017, have 2017-compliance issues with parts of the metering system other than interfacing with a DCS. The Eress DCS also includes valuable additional/supporting services for the railway companies using it. Eress is in close contact with all parts of the railway market and has worked over the years to find an optimal and ready solution. And now Eress has an operational 2017-compliant DCS.

News around the World

Lessons from Covid-19

France and Spain, turn high-speed trains into transports of Covid-19 patients during the crisis. If passenger traffic takes time to recover to pre-pandemic passenger volumes, containers that fit on a passenger seat can be used to transport goods or packages. Another possible development is modular seats that can be rotated during a pandemic or the annual flu season. Where every other passenger is facing forward and every other backwards. An easily attachable cover, covering the head area, can avoid spreading the droplets of virus. Digitalization Physical tickets are exchanged with QR codes. Apps informing passengers on crowding on platforms and trains.

Source: Rail and the Effects of the COVID-19 Pandemic. Published by WSP Global Inc.

Calculate your Emissions!

Check the emissions of your travel and the travel of the products you buy in the best possible way! EcoPassenger (www.ecopassenger.org) made by the Sustainable Development Unit of the UIC and EcoTransIT (www.ecotransit.org/calculation.en.html) are user-friendly tools, comparing the energy consumption and CO_2 emissions for planes, cars/trucks and trains in Europe. The methodology behind the calculations of EcoTransIT are approved by the European Environment Agency.

European Commission proposes new partnership to improve rail's competitiveness

On 23 February 2021, the European Commission (EC) proposed to set up 10 new European Partnerships between the European Union (EU), Member States and/or the industry. The goal is to speed up the transition towards a green, climate neutral and digital Europe, and to make European industry more resilient and competitive.

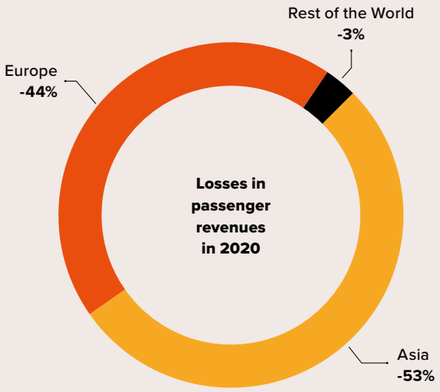
Source: globalrailwayreview.com

Effects on Travelling

Globally

Percent of missed passenger revenues in 2020 by region, slow recovery scenario.

Globally, the total passanger losses are estimated at $60 billion in 2020, and this slow recovery will continue to impact the business of passanger operators in 2021.



In Europe

Q2 2019 vs. Q2 2020

Source: UIC COVID-19 TASK FORCE MANAGEMENT OF COVID-19, Economic impacts of Covid-19 on Rail Transport

STATISTICS 2021

Railway Energy Temperatures in Europe

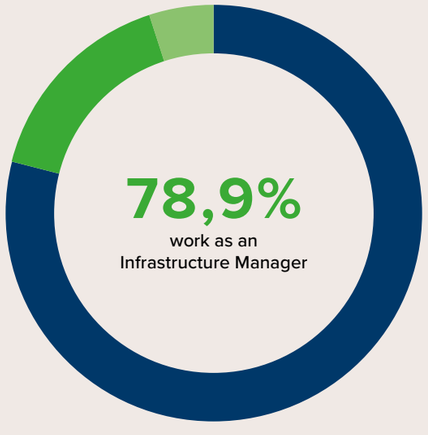
Rail transport offers a more sustainable alternative to most other transport modes — both in terms of energy use and carbon emissions per passenger-kilometre or tonne-kilometre — and is anticipated to continue doing so for decades to come. That said, the transportation sector is one that contributes the most to CO_2 emissions in Europe, accounting for approximately 28.3 percent of total emissions in 2015. Therefore, it is important to continue efforts to reduce the carbon footprint of the railway-energy sector.

The Sustainable Development Foundation has worked together with Eress, on the status on railway energy in different countries across Europe. We expect to highlight the urgency of working together for reducing the impact — created by transport — on human well-being and the environment.

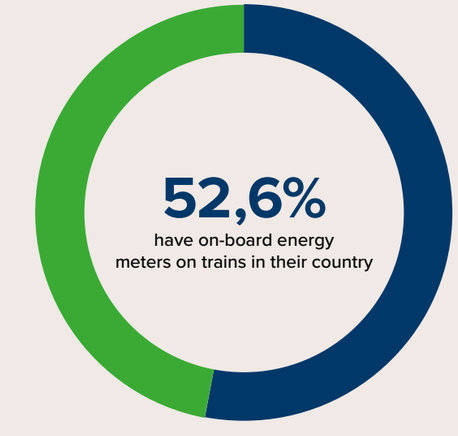
This year's survey collected key information from infrastructure managers and train operators. The purpose of this survey is to describe the state-of-the-art of the railway-energy sector, according to the people that work in it and face new challenges on a daily basis. The outcome provides an overview of railway energy monitoring systems within Europe's borders, taking into account the technological aspects as well as train operators' expectations on the future of the European energy market. More importantly, the results of this survey facilitate a better understanding of the complex world of railway energy.

The results of this survey provide a better understanding of the complex world of European railway energy.

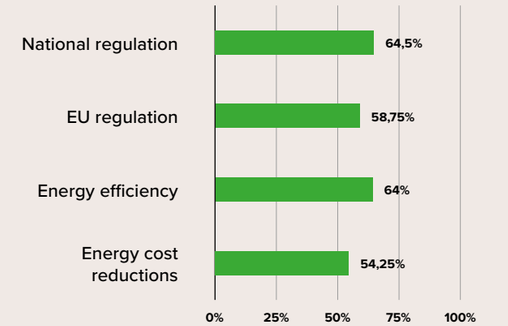
Where do you work?



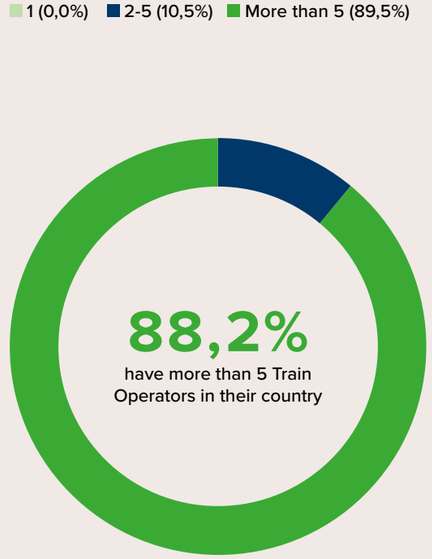
About on-board energy metering systems, do you have energy meters on trains in your country?



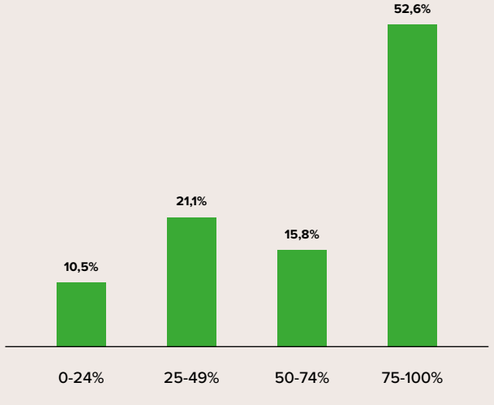
How important are the following drivers for implementing a rail energy billing system?



How many Train Operators do you have in your country today?

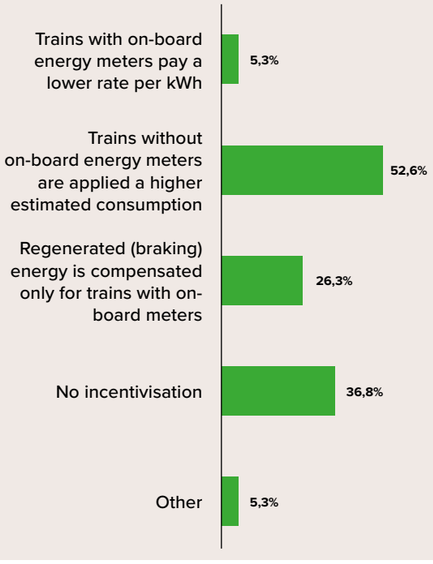


What is the percentage of traction units equipped with meters that you expect in your country by 2022?



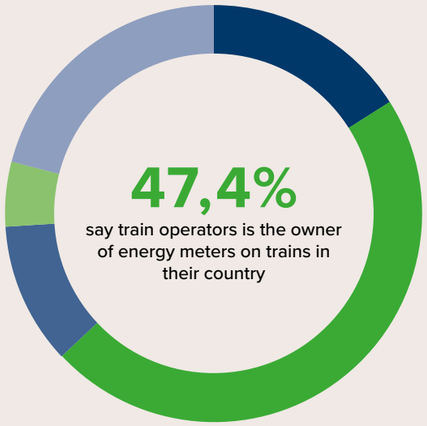
How is the installation of on-board energy meters incentivised in your country?

(multiple choices allowed)



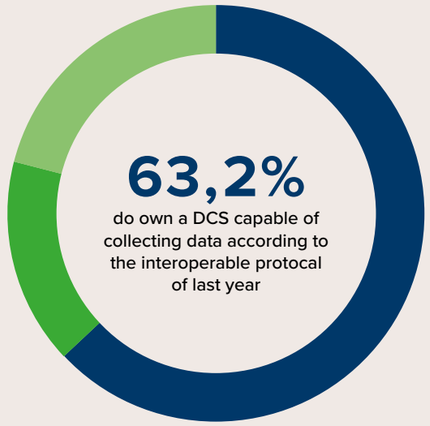
Who is the owner of energy meters on trains in your country?

- Infrastructure Manager (15,8%)
- Train Operator (47,4%)
- Combination of Infrastructure Manager and Train Operator (10,5%)
- Metering Service Supplier (5,3%)
- Vehicle Keeper (21,1%)



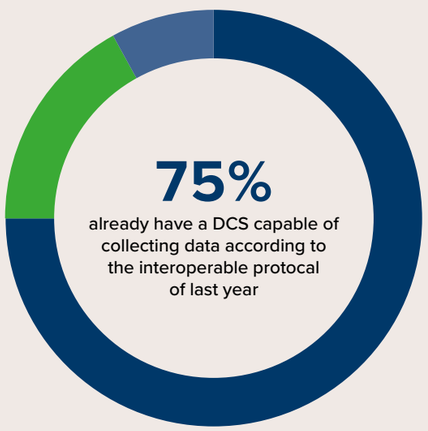
Does your organization own or will own a Data Collecting System (DCS) capable of collecting data according to the interoperable protocol.

- Yes (63,2%)
- No (15,8%)
- Other (21,1%)



When are you planning to have such a DCS?

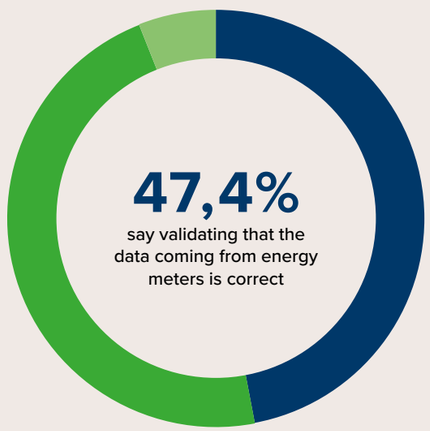
- Already have (75,0%)
- Before January 2022 (16,7%)
- After January 2022 (8,3%)
- I don't know (0%)



If there are installed meters in your country,

do you have any challenge with validating that the data coming from energy meters is correct?

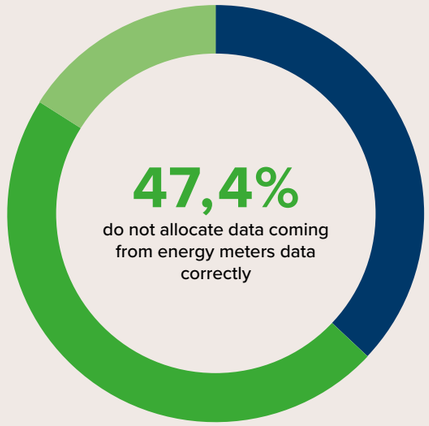
- Yes (47,4%)
- No (47,4%)
- I dont know (5,3%)



If there are installed meters in your country,

do you have any challenge with allocating this data correctly?

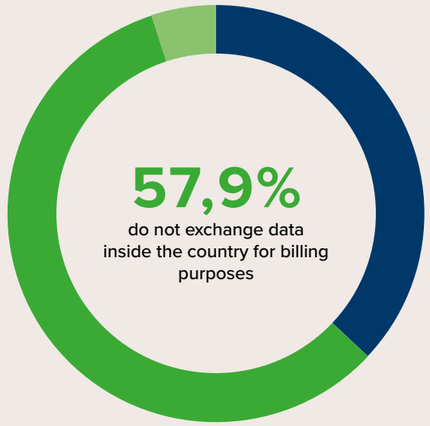
- Yes (36,8%)
- No (47,4%)
- I don't know (15,8%)



If there are installed meters in your country,

do you have any challenge with exchanging data inside the country for billing purposes?

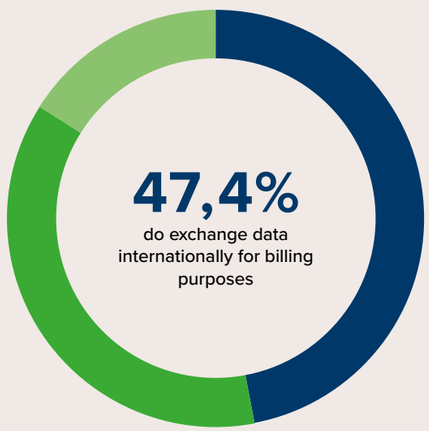
- Yes (36,8%)
- No (57,9%)
- I don't know (5,3%)



If there are installed meters in your country,

do you have any challenge with exchanging data internationally for billing purposes?

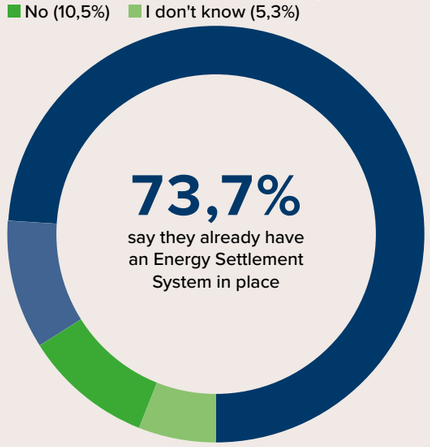
- Yes (47,4%)
- No (36,8%)
- I don't know (15,8%)



If there are installed meters in your country,

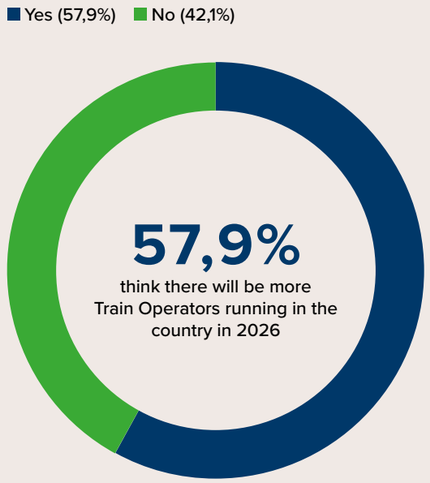
Do you have an Energy Settlement System to correctly handle metering data from trains for billing purposes?

- Yes, we already have an Energy Settlement System in place (73,7%)
- It is in progress (10,5%)
- No (10,5%)
- I don't know (5,3%)



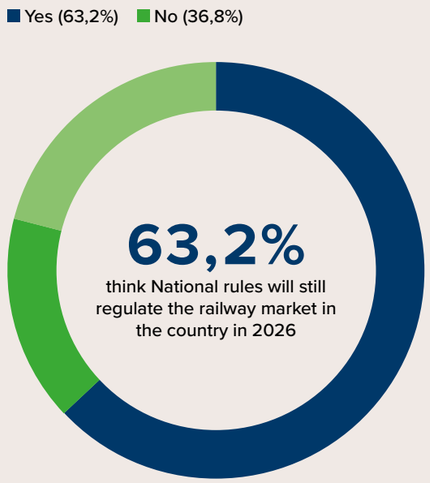
How do you think railway energy in your country will look in 2026?

There will be more Train Operators running in the country



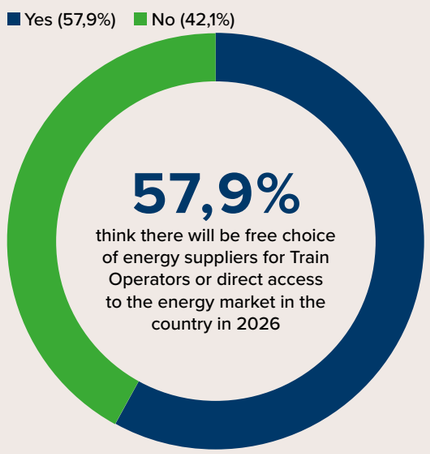
How do you think railway energy in your country will look in 2026?

National rules will still regulate the railway market



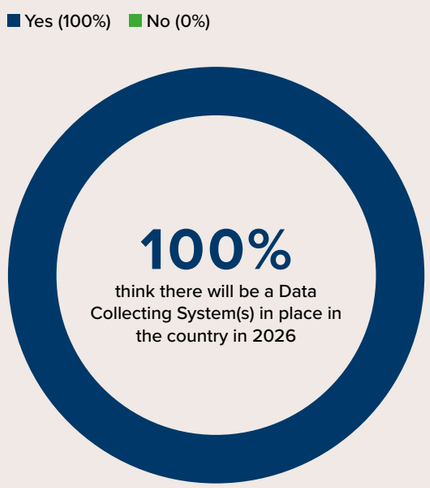
How do you think railway energy in your country will look in 2026?

There will be free choice of energy suppliers for Train Operators or direct access to the energy market



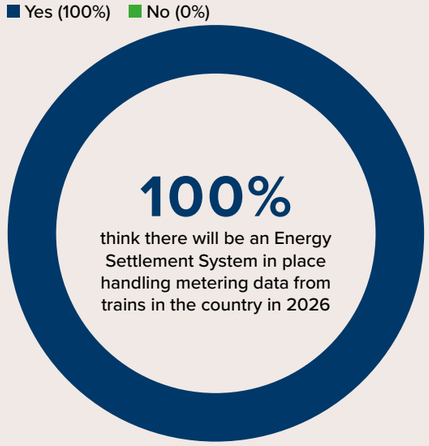
How do you think railway energy in your country will look in 2026?

There will be a Data Collecting System(s) in place



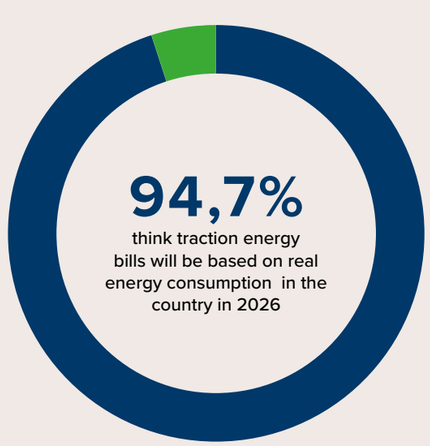
How do you think railway energy in your country will look in 2026?

There will be an Energy Settlement System in place handling metering data from trains

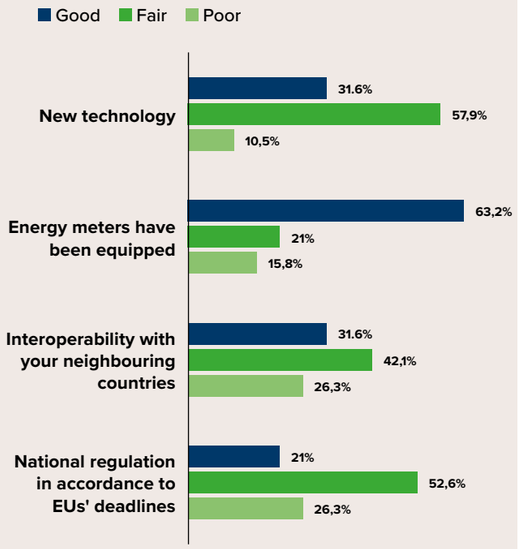


How do you think railway energy in your country will look in 2026?

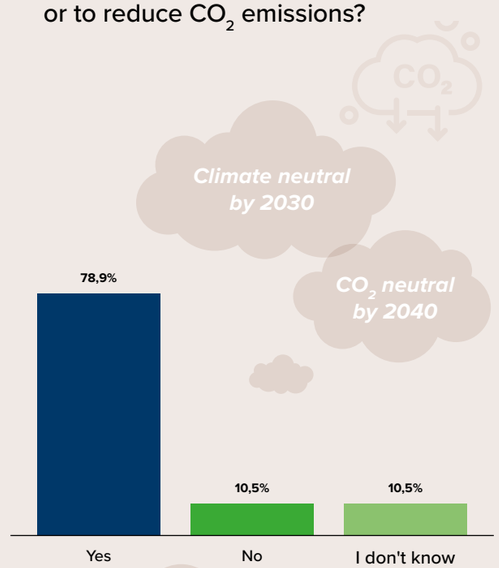
There will be Traction energy bills based on real energy consumption



How do you see the development of the following railway energy fields in your country, during the last 3 years?



Has your organization set any target to improve energy efficiency or to reduce CO_2 emissions?



SPAIN

Why did ADIF joined Eress Partnership

Starting January 2020, ADIF, the state-owned Administrator of Railway Infrastructures in Spain joined Eress as their eighth European partner. To learn more about why ADIF joined Eress and how the experience is going, we interviewed ADIF's representative on Eress Steering Board, Victoria Calleja Duro, Ph.D. in Electrical Engineering with 20 years of experience in the railway energy sector and currently the On-Board Data Manager of the Energy Division.

The EU Commission clearly states the obligation for a settlement solution. ADIF needed to be absolutely sure the solution implemented fulfilled all the EU requirements. With Eress, ADIF accessed an existing solution, previously successfully implemented in other countries.

Victoria Calleja explains that "ADIF had two options. The first option was to develop our own system from scratch. The second option was to join an existing solution. We decided not to reinvent the wheel, so we chose the second option, which was the more cost-effective solution."

She adds: "It is key for ADIF to provide a high-quality service to its train operators, and to have access to a system previously successfully implemented in other countries which gives us security and confidence in the solution. Plus, with Eress, we are sure the system is always updated with the most recent regulations from the EU."

Setting up a settlement system like Erex is arduous and time-consuming. However, Eress's innovative team approach combining experts from Eress Administration with representatives from different countries achieves a more fruitful result. "Collaboration between countries and working together becomes more and more necessary every day, both in terms of sharing knowledge and costs-sharing. The experience is very positive."

It is key for ADIF to provide a high-quality service to its train operators.

Victoria Calleja

ADIF is still in the ramp-up testing phase with the Erex system. Like many other European countries, the train operators are still invoiced based on estimated energy consumption using general factors. "We use gross tons per kilometer (GTK) as the basis for energy billing. For DC traction power supply lines, the prices applied are defined for each type of service. In the case of AC traction power supply lines, in 2020, we introduced a new consumption conversion ratio (Wh/GTK) to obtain the estimated energy consumption. Once the consumption has been obtained, expressed in Watt-hours (Wh), the inherent cost of power supply will be determined by applying the rates published in € / MWh in the Network Statement."

Victoria Calleja
Partner representative from ADIF in Eress

Eress has always worked across Europe, so they relied on digital collaboration methods even before COVID come onto the scene. All communications became remote during the onboarding process as both ADIF and Eress shifted to the work-from-home model. "The work has adapted quite easily to the current challenges, and the implementations of the systems have continued without much delay. It is always more rewarding to work and share difficulties with others and see that you are not alone."

Partners
Switzerland
Finland
Belgium
Denmark
Sweden
Norway
The Netherlands
Luxembourg
Spain

For further information, please contact Eress by e-mail: eress@banenor.no

www.eress.eu

Photos: iStock, Design: Spoon Agency