ERA hybrid workshop on Rail Traction Energy Studies

10 December 2025 | in Brussels and via TEAMS

EUROPEAN UNION AGENCY FOR RAILWAYS

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Introduction

- This workshop is held in Brussels and via TEAMS. The workshop recording will be published on the ERA website
- During the Q&A sessions, you can raise your hands to be given the floor. Please state your name and organisation. Questions posted in the TEAMS chat will not be answered

- Today we present the Draft Final Reports of:
  - **Study AS-02 Harmonisation of electrification systems**: assessment if harmonising the current 4 traction current systems (1.5 kV DC, 3 kV DC, 15 kV AC, 25 kV AC) is beneficial
  - **Study AS-03 On-ground energy data collecting systems and metering:** evaluation of MS compliance with existing TSI Energy requirements and analysis of technical, legal and regulatory issues affecting traction energy billing

- The Draft Final Reports have been reviewed by the ERA Economic Steering Group and other rail sector stakeholders
- These studies are produced by ERA in-house pursuant to Art. 9 of Regulation (EU) 2016/796
- Further to adaptations, the Final Reports will be published on the ERA website by year end, submitted to the European Commission as part of the multi-annual TSI revision request

Item 2. Opening remarks

Oana Gherghinescu| ERA Executive Director

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Item 3. Study AS-02 Harmonisation of electrification systems, key findings

Mitchell van Balen, Esteban Coito Gonzalez, Eva Valeri | ERA staff

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AS-02: Harmonisation of electrification systems

What

- ERA 2009 IA for TSI ENE: No economic case for migration towards 25 kV AC
- EC Revision Request 2024: additional study on harmonisation of systems
- Scope
  - Status: Infra / Vehicles
  - Benefits / costs: National and European
  - Focus on voltage

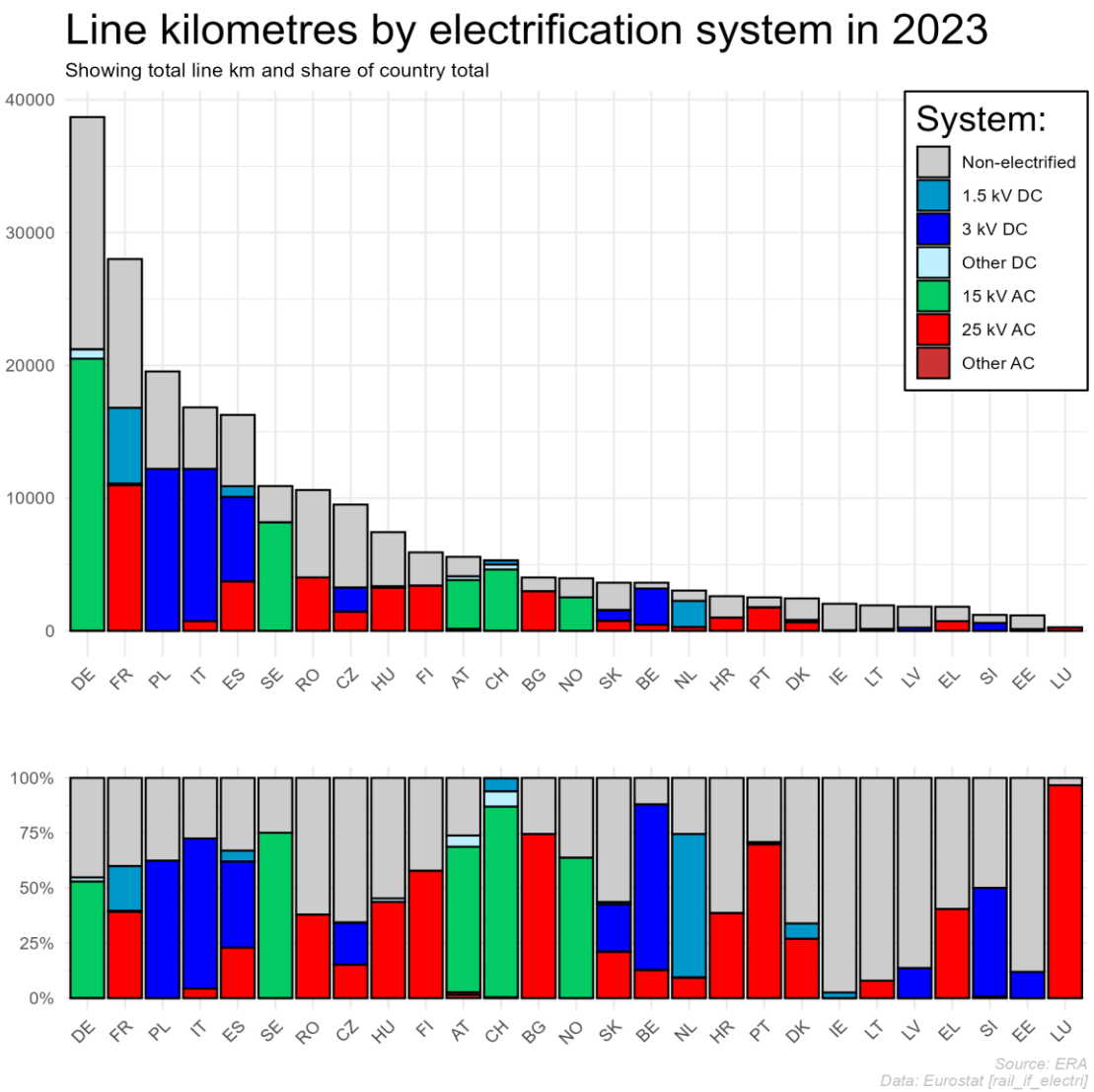
How

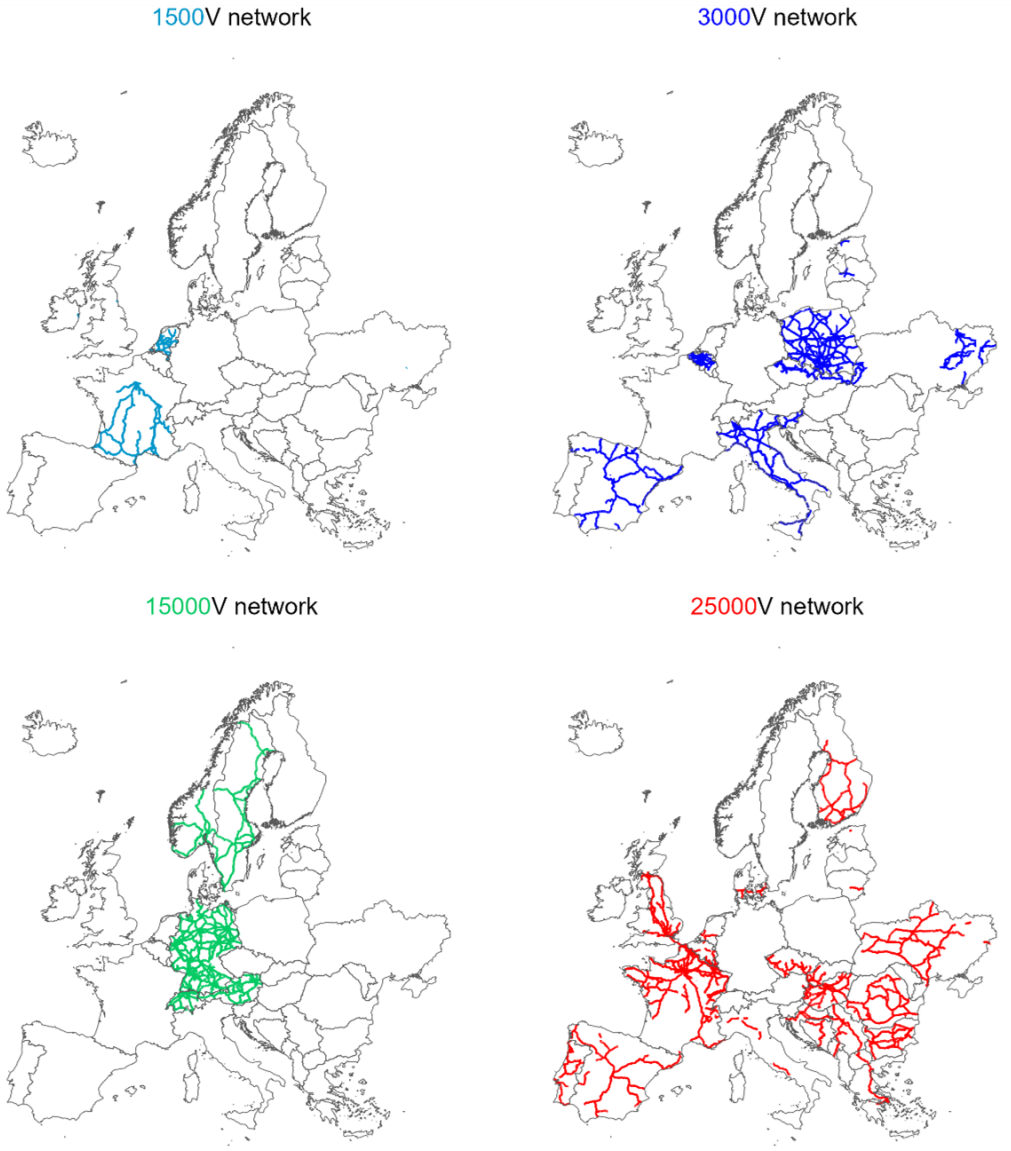
- Interviews and written inputs
- Large scale infra and vehicle data analysis
- Consultation round
- Feedback integrated. Response will follow

Workshop

- Share study insights
- Collect additional feedback
- Improve final report

State of electrification

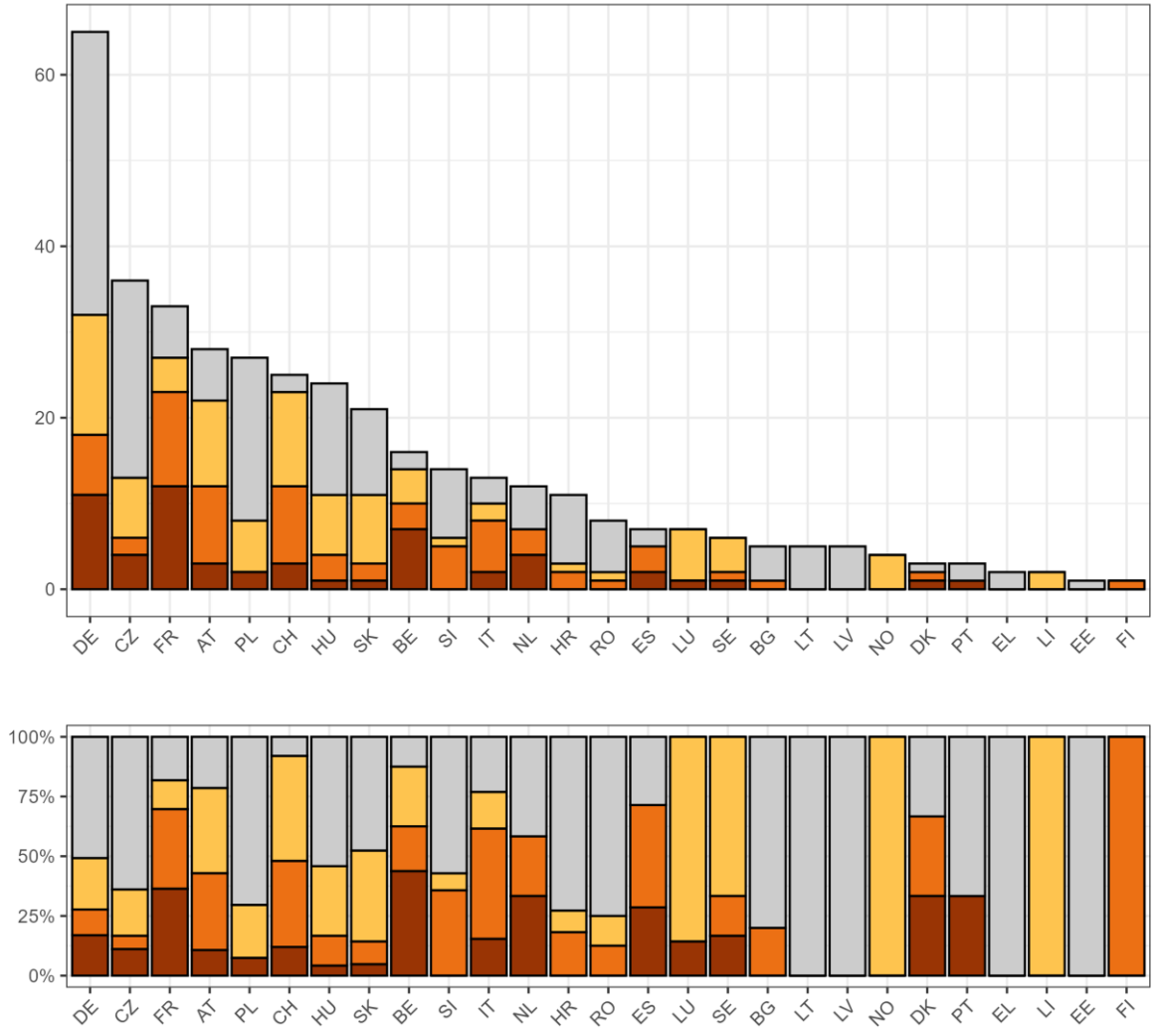




Border sections

Electrification of EU cross border sections by country

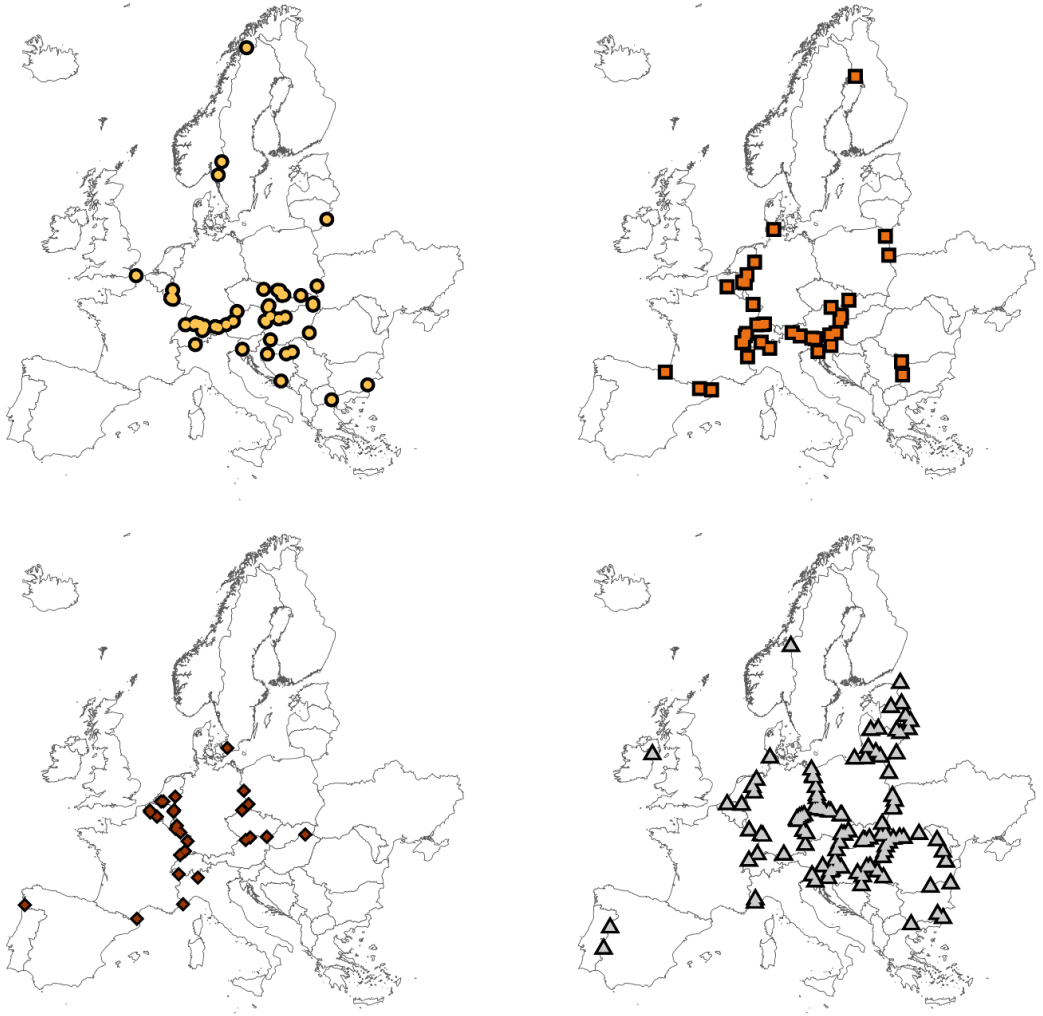
Border sections: ● Harmonised ■ Harmonised border stations only ◆ Unharmonised ▲ Non-electrified



Source: ERA
Data: OpenStreetMap contributors, RINF

Electrification status of border sections

Border sections: ● Harmonised ■ Harmonised border stations only ◆ Unharmonised ▲ Non-electrified



Source: ERA
Data: OpenStreetMap contributors, RINF
Note: Only main and branch lines shown

Overview

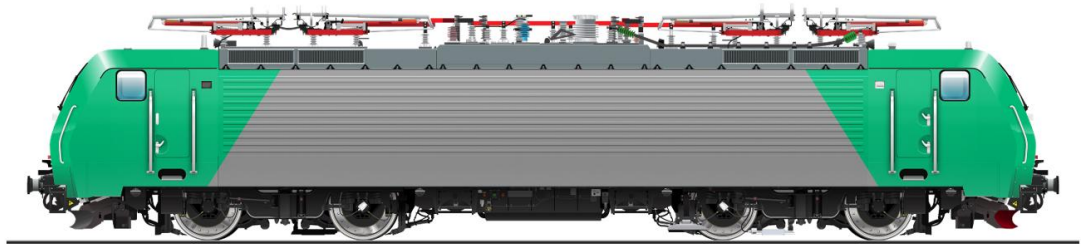
	1.5 kV DC	3 kV DC	15 kV AC	25 kV AC	Non-elec
Total EU/EFTA countries with system*	10	11	12	21	27
Total length (line km)**	9 160	36 328	39 525	36 775	86 869
Share of this system of all lines***	4.4%	17.3%	18.8%	17.5%	41.3%
Border sections with this system****	8	59	94	103	210
Share of all border sections***	1.7%	12.4%	19.7%	21.6%	44.1%

** The number is determined by considering main, branch, regional and local lines*

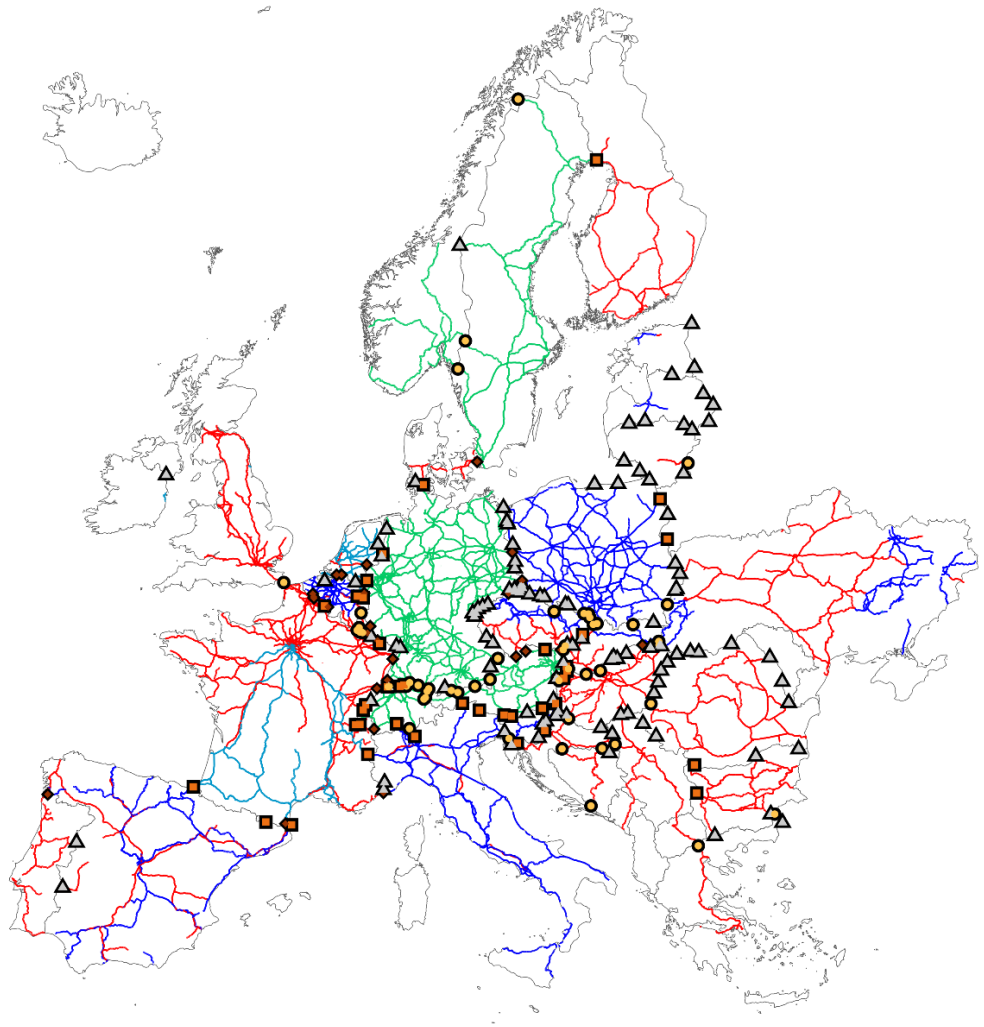
*** May exclude some networks that are not reported to Eurostat, such as urban or functionally separated networks*

**** Percentages do not add up to 100% as there are also other minor electrification systems*

***** Considering both sides of the border separately*

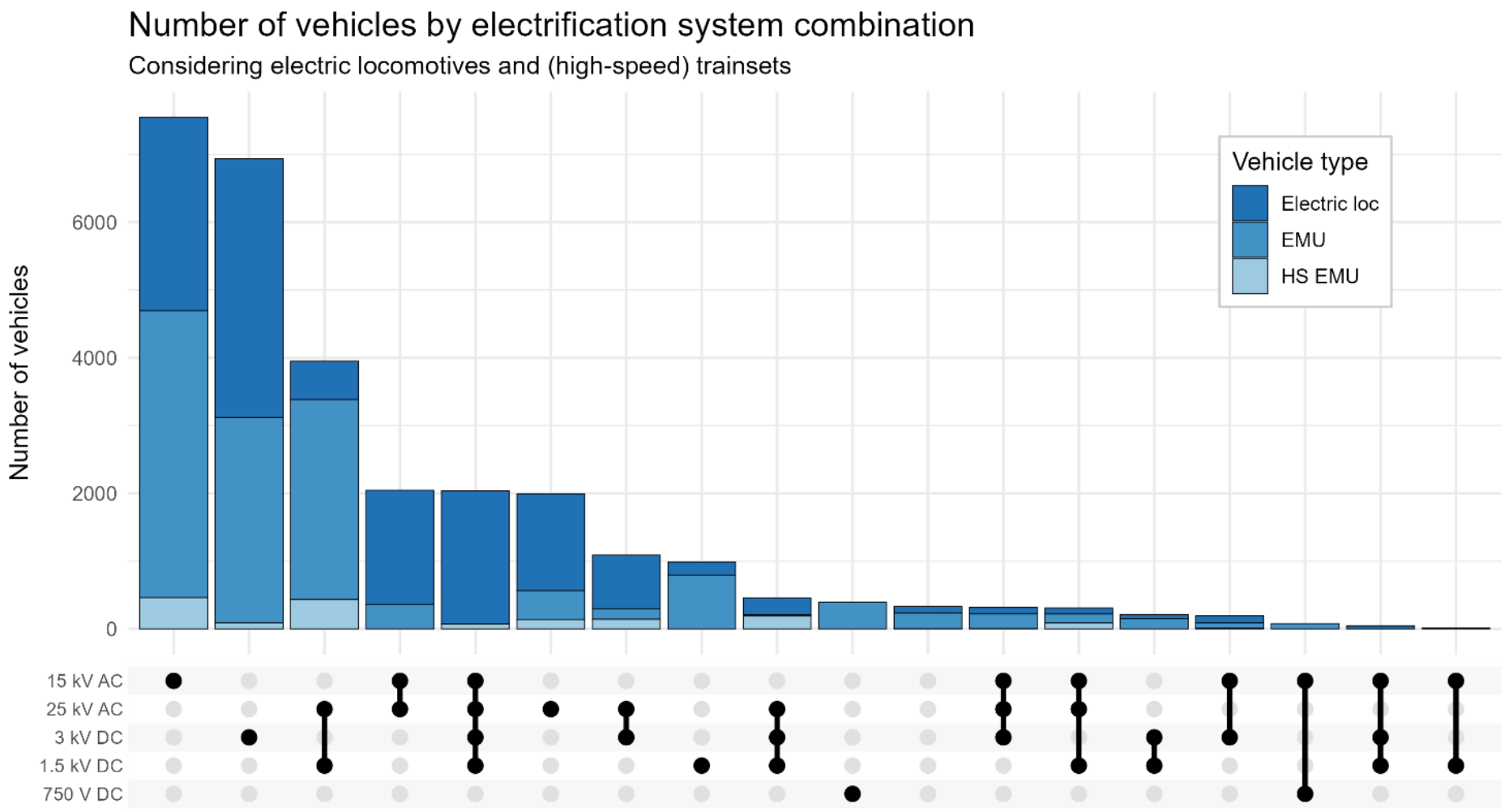


Source: Railcolor



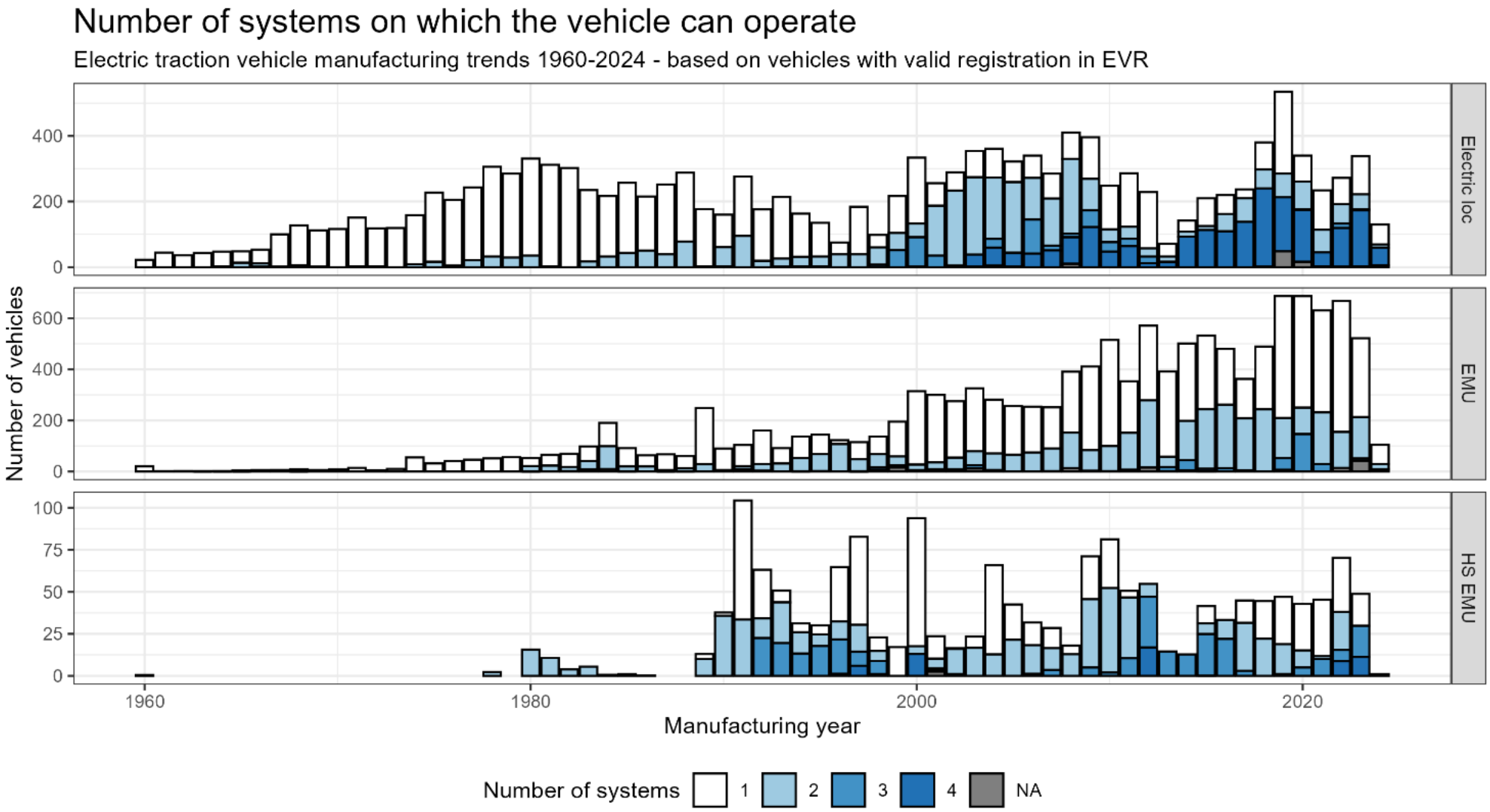
Source: ERA
Data: OpenStreetMap contributors, RINF
Note: Only main and branch lines shown

Fleet electrification – total numbers



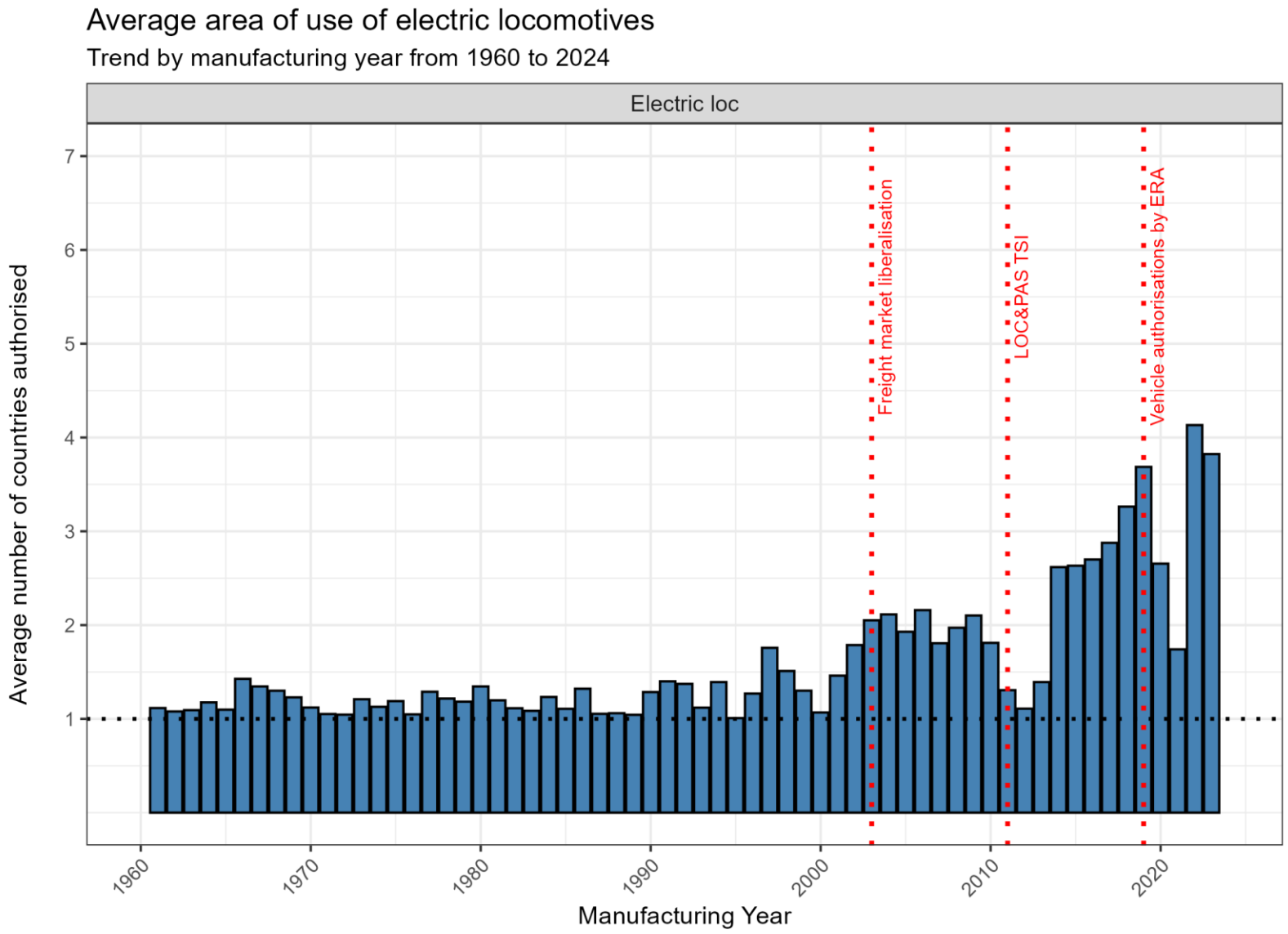
Source: ERA, OS
Note: Trainsets estimated to be 4 cars per EMU, 8 cars per HS EMU

Fleet electrification – trends



Source: ERA
Data: EVR and OS data
Note: Trainsets estimated to be 4 cars per EMU, 8 cars per HS EMU

Multi-system locomotives and area of use



Source: ERA. Based on EVR extract 2024

Re-electrification cases

Country	From	To	Scope	Years
France/ Switzerland	1.5 kV DC	25 kV AC	Bellegarde-sur-Valserine to Geneva. 32 line kilometres	2014
Portugal	1.5 kV DC	25 kV AC	The 25.4 km long Lisbon-Cascais line	2025-2027
Belgium	3 kV DC	25 kV AC	Lines in South-East Belgium, connecting with Luxembourg	1999-2030
Luxembourg	3 kV DC	25 kV AC	Line between Luxembourg City and Belgium border	2018
Croatia	3 kV DC	25 kV AC	Zagreb-Rijeka line	2012
Czechia	3 kV DC	25 kV AC	Large scale re-electrification plan	Since 2025
Slovakia	3 kV DC	25 kV AC	Large scale re-electrification plan	Since 2015
Spain	3 kV DC	25 kV AC	Monforte de Lemos – Orense – Vigo line, with a cross-border connection with the north of Portugal	2028-2030

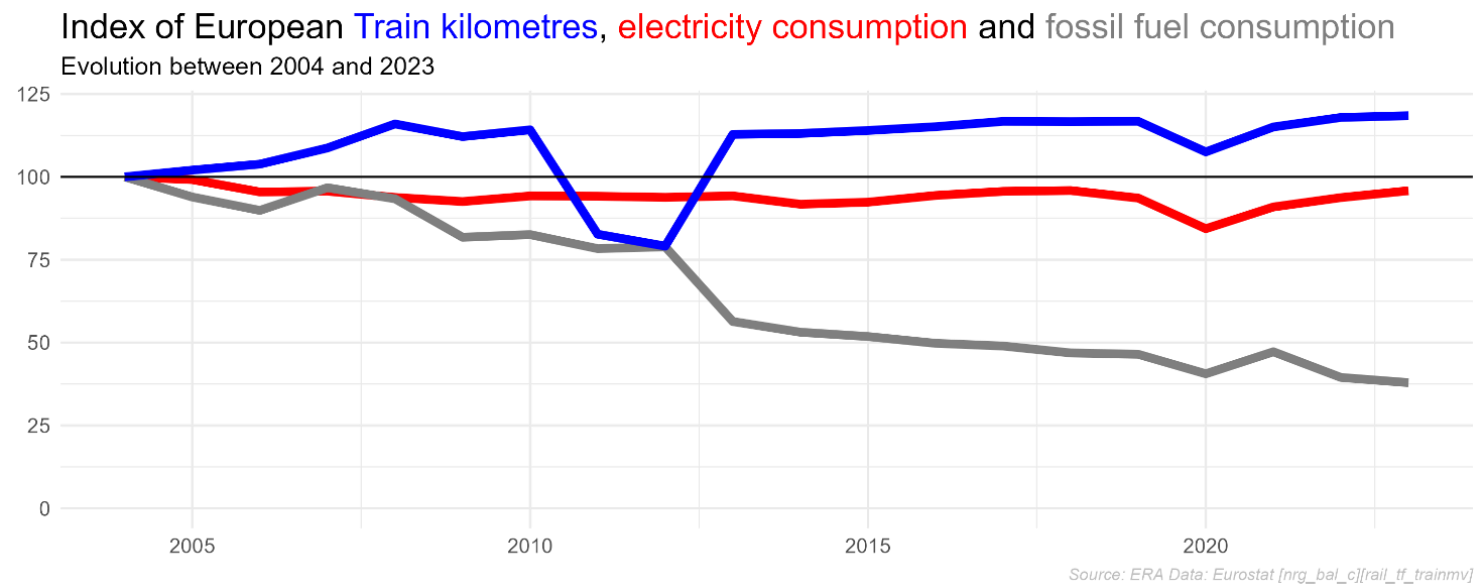
Cost of re-electrification

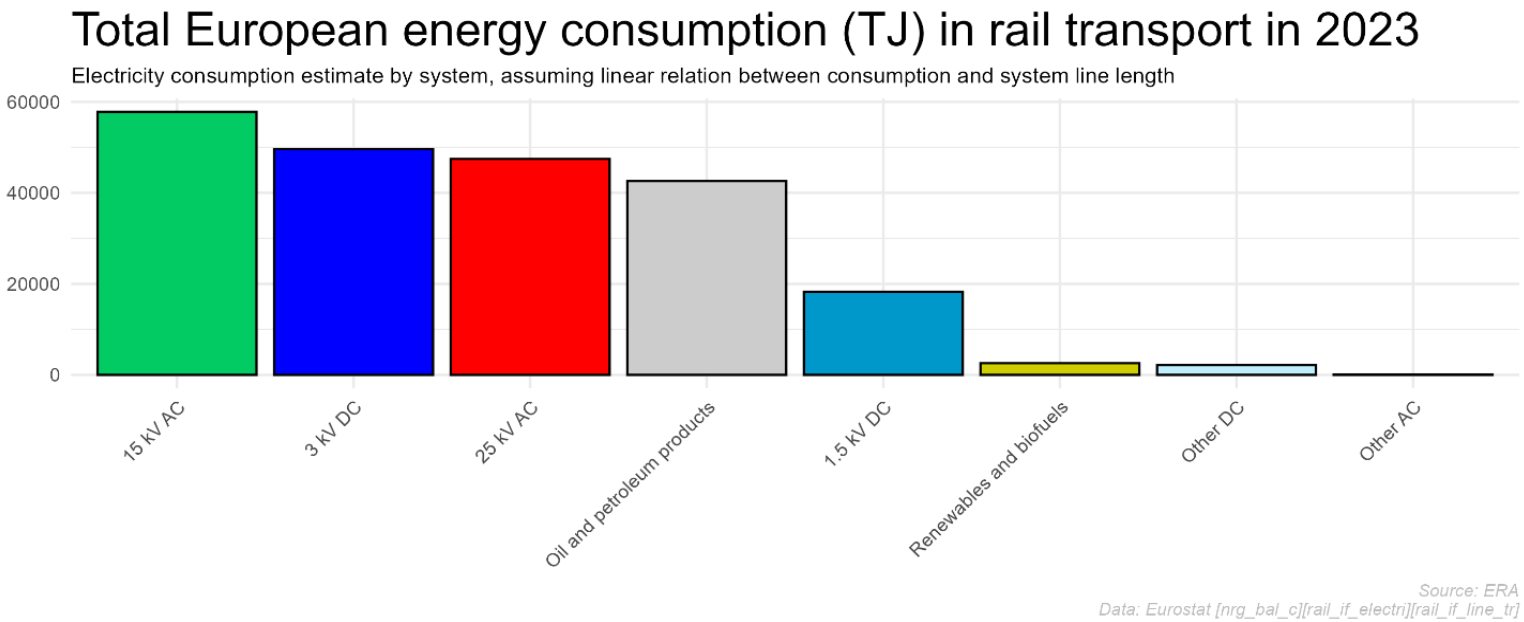
- Extrapolated costs of selected projects to European level, showing a -10% to +10% range
- **NOTE: Practically impossible to assess the costs due to project/country specificities. Numbers should not be used for individual projects and understood as broad estimate on the order of magnitude**
- The costs for retrofitting vehicles cover:
  - The cost for taking a vehicle out of service (idle time)
  - The technical adaptations for DC to AC, meaning the fitting of a transformers, invertors, circuit breakers, electronics, pantographs, insulation.
  - The cost for testing, certification and a new authorisation
- The costs for retrofitting lines cover:
  - Adaptations to the OCL, including to structures
  - Adaptations to the grid and substations
  - Do note that for adaptations to the train detection and protection systems are needed, too. These costs are not included here as they would largely be covered by other budget lines as per the ERTMS National Implementation Plans.
- In addition, costs related to line closures and less efficient operations during migration, … . These costs are not captured in the table
- Finally, there is the point of feasibility

Estimation of the magnitude of costs per re-electrification scenario as per the above assumptions

From	To	Vehicles						Infrastructure		Summary of total bn EUR		
		Type	Count	Vehicles to be retrofit-ted	Retrofit EUR per vehicle	Bi-current vehicle purchases	Extra EUR vs mono system	Line km	Retrofit cost EUR/km	Vehicle cost range	Infra Cost range	Total cost range
1.5 kV	**3 kV**	Locs	174	44	545.000	131	250.000	9.160	1.000.000	0,5-0,7	8-10	8-12
		EMU	753	188	1.400.000	564	500.000					
		HS	0	0	NA	0	NA					
1.5 kV	**25 kV**	Locs	174	44	1.090.000	131	500.000	9.160	1.500.000	1-1,2	12-15	12-18
		EMU	753	188	2.800.000	564	800.000					
		HS	0	0	NA	0	NA					
1.5, 3 kV	**25 kV**	Locs	4.137	1.034	1.090.000	3.103	500.000	45.488	1.500.000	7,3-9	61-75	62-92
		EMU	3.989	997	2.800.000	2.992	800.000					
		HS	102	26	7.000.000	77	1.600.000					
1.5, 3, 15 kV	**25 kV**	Locs	7.085	1.771	1.090.000	5.314	500.000	85.013	1.500.000	16-19,5	115-140	118-176
		EMU	8.843	2.211	2.800.000	6.632	800.000					
		HS	566	141	7.000.000	424	1.600.000					

Energy consumption

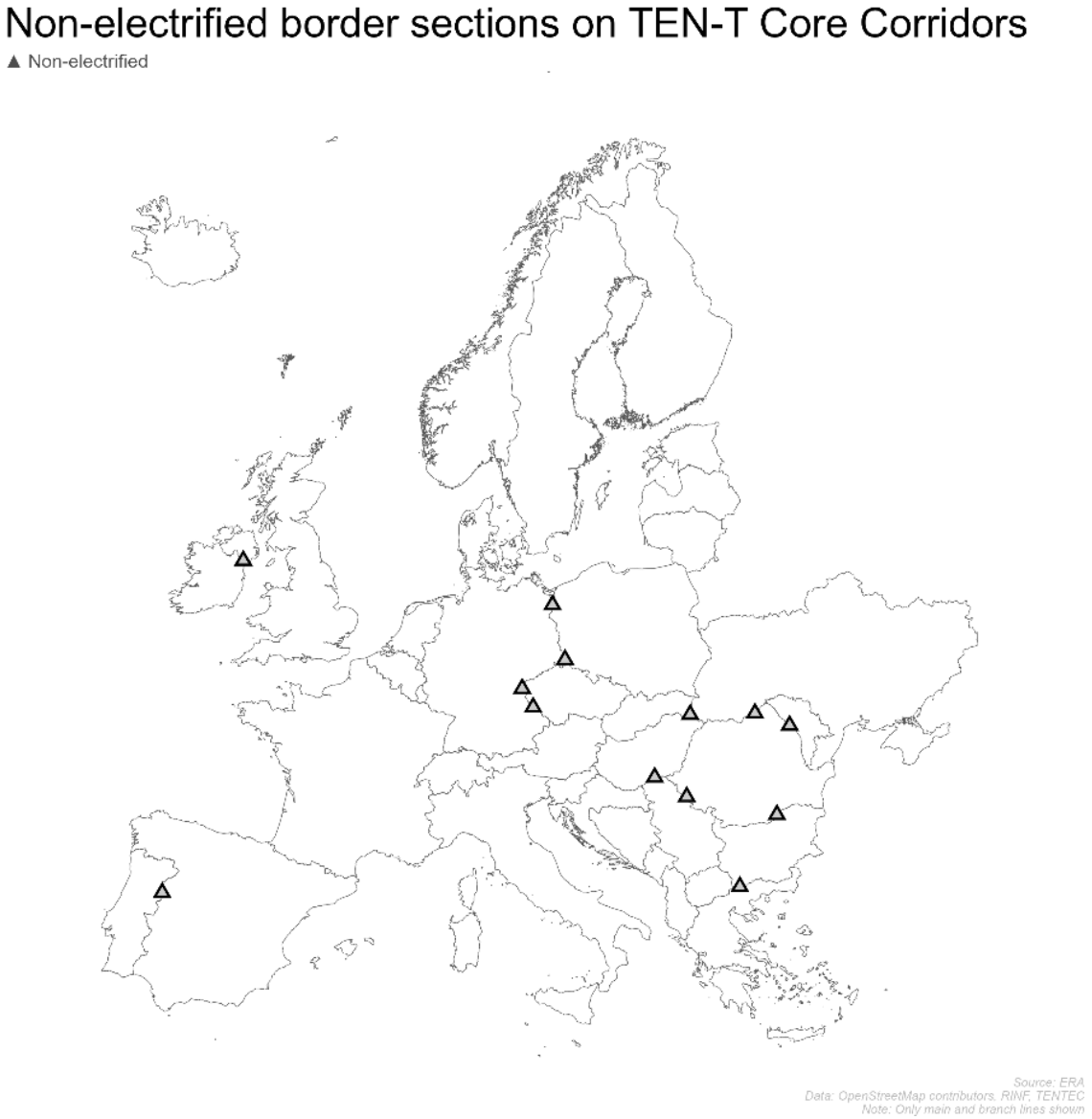




Benefits of re-electrification for railway undertakings

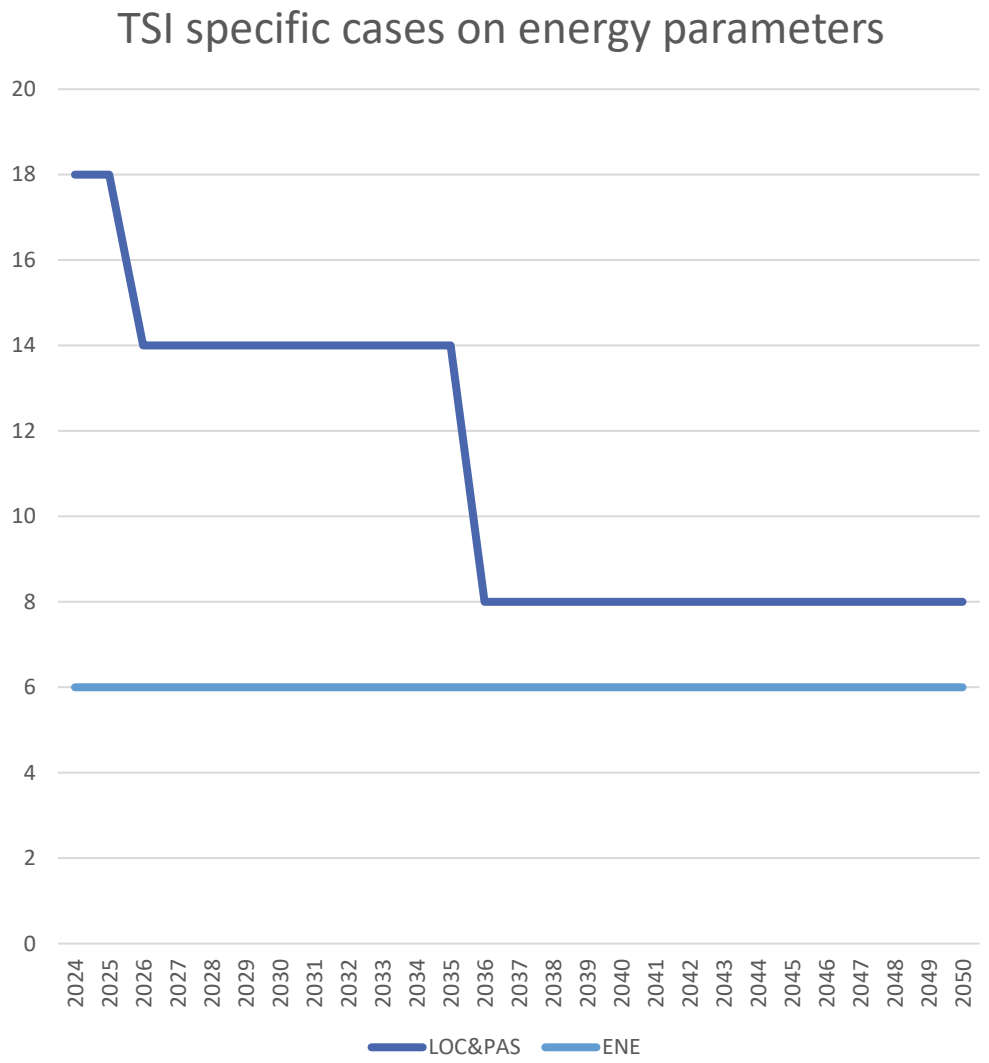
- Greater operational flexibility for international travel with less variety in energy subsystem
- Single/bi system vehicles cheaper in capex/opex than multisystem vehicles
- Yet, during migration, single system vehicles may need to be replaced by multi-system vehicles, causing higher retrofit, acquisition and operational costs
- Benefits and costs to be assessed on a case-by-case basis

Non-electrified border sections



Energy subsystem beyond voltage

- Voltage is but one of the barriers to interoperability
- Currently 24 specific cases, several with T0 (to be determined) or P (permanent) application
- In addition, a number of national rules on pantograph head geometry, pantograph contact force, arrangement of pantographs, contact strip geometry



Pantograph-OCL compatibility

Pantograph compatibility across Europe

TSI Pantograph heads:
1600 mm, 1600 mm and 1950 mm,1950 mm

NON-TSI Pantograph heads:
1450 mm

Source: ERA
Data: RINF parameters 1.1.1.2.3.1 & 1.1.1.2.3.2 - 10/2025
Note: Only electrified lines shown

Point 1: (Re)electrification

Recommendations:

- No absolute requirement should be introduced in the TSI ENE for 1.5 kV DC and 3 kV DC lines to re-electrify towards 15 kV AC or 25 kV AC after upgrade or renewal

- Analyse which instruments and requirements could facilitate the harmonisation of the electrification system of lines if relatively small DC sections are found along current or future predominantly AC corridors

- A study on cross-border sections should assess which stations would benefit from being connected by alternative electrification solutions or a different electrification system to facilitate cross-border traffic.

Point 2: Other energy subsystem requirements

Recommendations:

- Monitor the level of compliance of ENE subsystem to the TSI including evaluation of the existing tracks.

- Study the costs and benefits of greater harmonisation of OCL geometry, focusing both on greater harmonisation of the 1950 mm and 1600 mm systems (for all line speeds) and the progressive removal of non-TSI compliant OCL geometries, particularly those stemming from national rules and specific cases related to compatibility with 1450 mm pantograph heads.

- Review the energy related specific cases in TSI ENE and LOC&PAS to assess their impact on interoperability and duration.

Point 3: High-speed rail

Recommendations:

- Conduct a comprehensive analysis to determine whether there is a feasible path towards simplifying the energy subsystem requirements for high-speed trainsets by re-electrifying specific lines, points, or by building bypasses. Additionally, the analysis should reflect on the impact of national rules on the interoperability of the high-speed rolling stock fleet. Finally, the analyses should evaluate the need and options for promoting multi-system high-speed trainsets with greater areas of use.

Item 4. Q&A on study AS-02

Open discussion

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Item 5. Study AS-03 On-ground energy data collecting systems and metering, key findings

Giacomo Potenza, Esteban Coito Gonzalez, Gianvittorio Tavola| ERA staff

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Study AS-03 objective

The European Commission request:

- Evaluate the state-of-play of on-ground Data Collecting Systems (DCS), as defined in TSI ENE Article 9, point 4 of Commission Implementing Regulation (EU) 2018/868
- Assess issues affecting energy metering in railways:
  - Problems for implementers of DCS on-ground, Energy Metering System (EMS) on-board
  - National rules or IM requirements impacting interoperability and free choice of energy supplier
  - Problems for metering data exchange and settlement
  - Technical and authorisations hurdles
- Provide a list of recommendations on identified challenges

Study AS-03 methodology

The project ran from January to December 2025. We performed:

- Desk research
- A large web survey of RUs, IMs, NSAs, MS, train manufacturers, EMS/DCS suppliers, vehicle lessors, NoBo, DeBo. >80 detailed replies, summary of results at the Eress Forum
- 38 bilateral interviews with excellent EU coverage, attendance to UIC and ERJU System Pillar Task 1 workshops
- Collaboration as advisor with Eress, UIC, SP Task 1 and CEN/Cenelec given parallel workstreams
- Assessment of 180+ comments to the AS-03 draft final report (still on-going)
- ERA independent analysis and drafting of recommendations

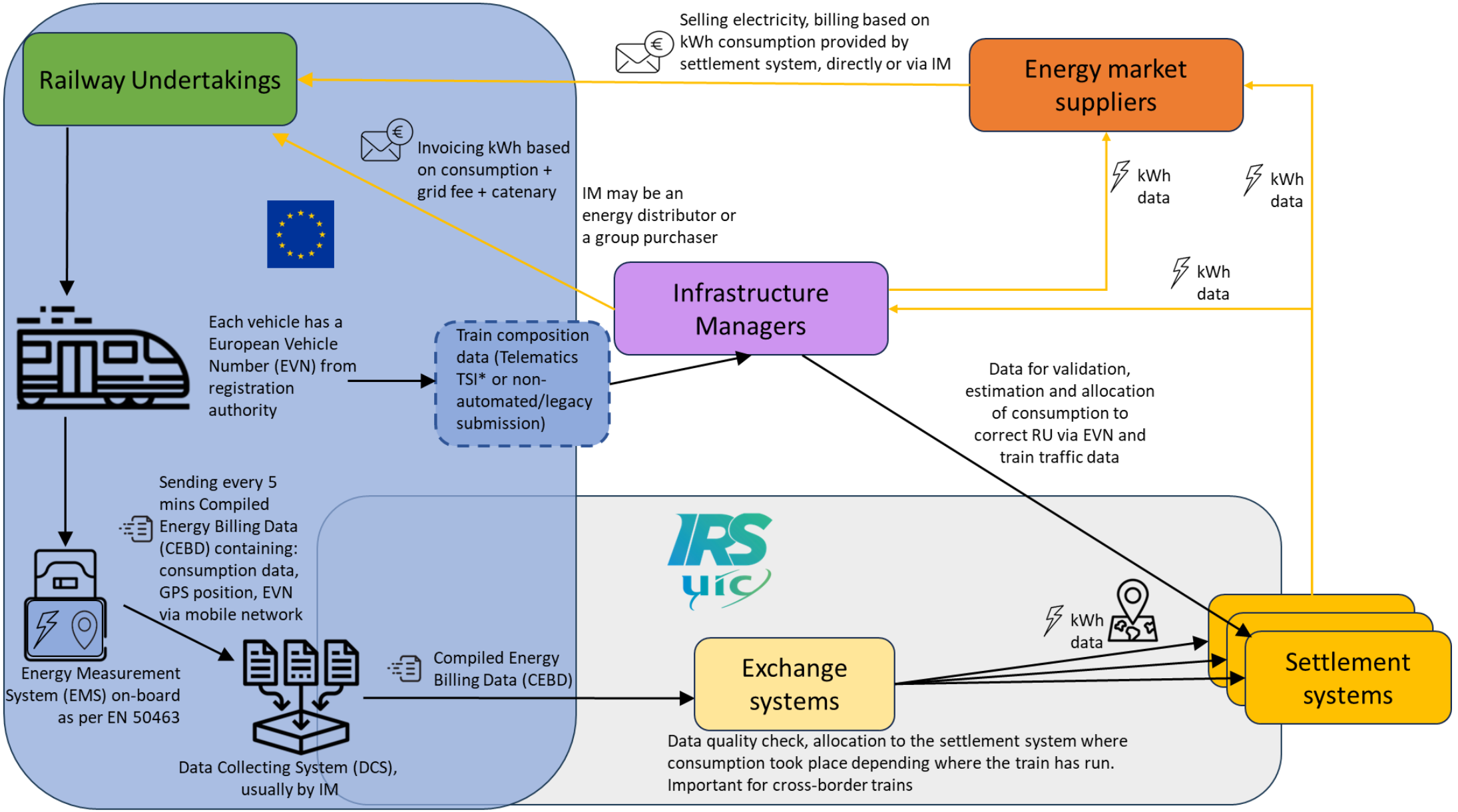
Why metering traction energy for trains?

- In 2023, 58% of the EU rail network was electrified but handled ~90% of train-km
- Traction energy accounts for 87% of the whole rail sector's electricity consumption, it is a key cost driver for RUs and makes railways a major consumer of electricity
- The use of catenary and, optionally, the provision of traction current, is part of the minimum access package IMs shall provide to RUs as per Directive 2012/34/EU
- Historically, traction energy has been billed according to estimations of consumption. This approach entails:
  - Energy providers tend to over estimate the real consumption to protect from losses
  - RUs have no incentives to be energy efficient or to request energy efficient vehicles from manufacturers. Overall rail consumption is higher than it could be
  - RUs' OPEX are not optimised, real train weight not always considered in estimations making rail less competitive, especially intermodal transport

What is an EMS and why metering energy matters?

- Energy metering systems (EMS) are a digital meter installed on-board traction vehicle able to transmit position and consumption data
- Some MS introduced meters more 30 years ago. EU legislation started in 2007 with a first recommendation. Since 2014 EMS are mandatory for new or modified vehicles as per LOC&PAS TSI. In 2020 the rail sector made a specific declaration with committments for energy metering
- Billing based on metered consumption allows:
  - Fairer invoices and incentives for RUs to minimise energy consumption through eco-driving, purchase of lighter and more aerodynamic vehicles. Overall rail consumption is optimised
  - Regenerative braking with recuperation of energy
  - Access to the liberalised EU energy supply market with option for green-only energy sourcing
  - Use of financial instruments to cover the risk of energy price volatility or to achieve volume/off peak time discounts
- However, trains are a moving cross-border consumption point making energy metering complex
- Data Collecting Systems (DCS), exchange function and settlement systems are required since 2020
- TSI ENE provides some basic requirements for DCS. EN50463 is the European Standard for EMS, UIC's IRS 90930 is a voluntary framework for traction energy settlement and data exchange

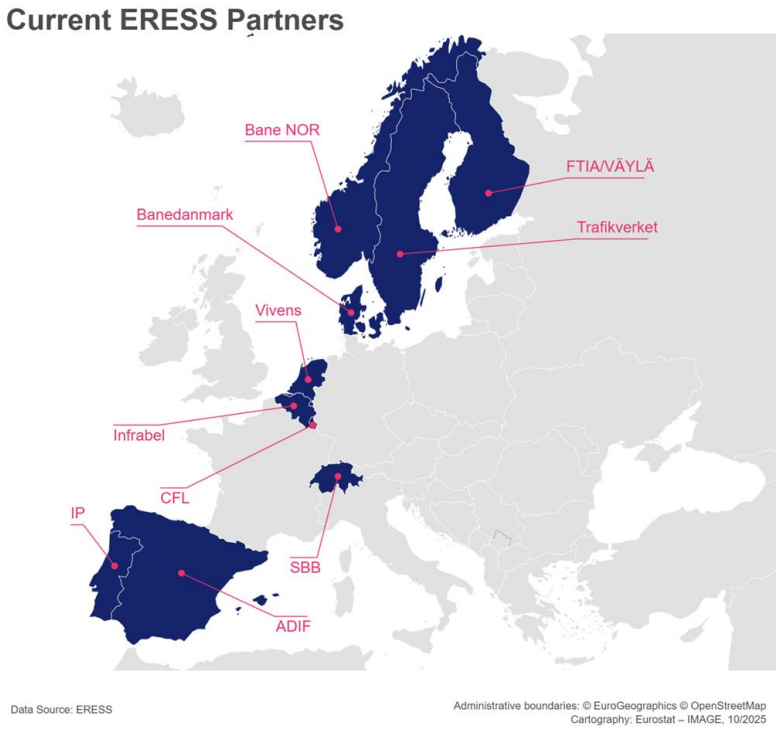
The data flow partially covered by TSI ENE

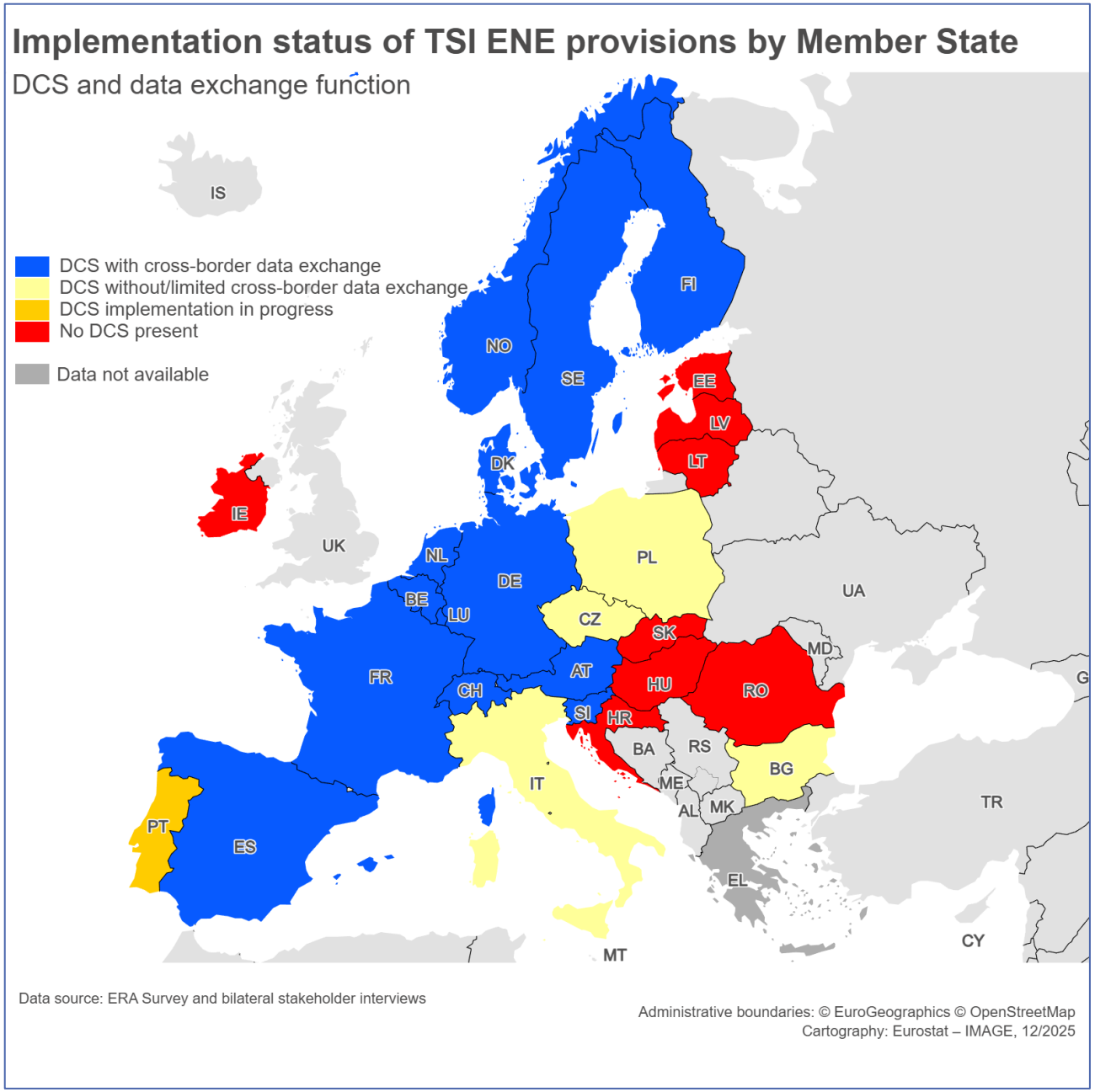


* TSI Telematics will replace soon TAF/TAP TSI

AS-03 key findings: state-of-play of on-ground DCS, as defined in TSI ENE

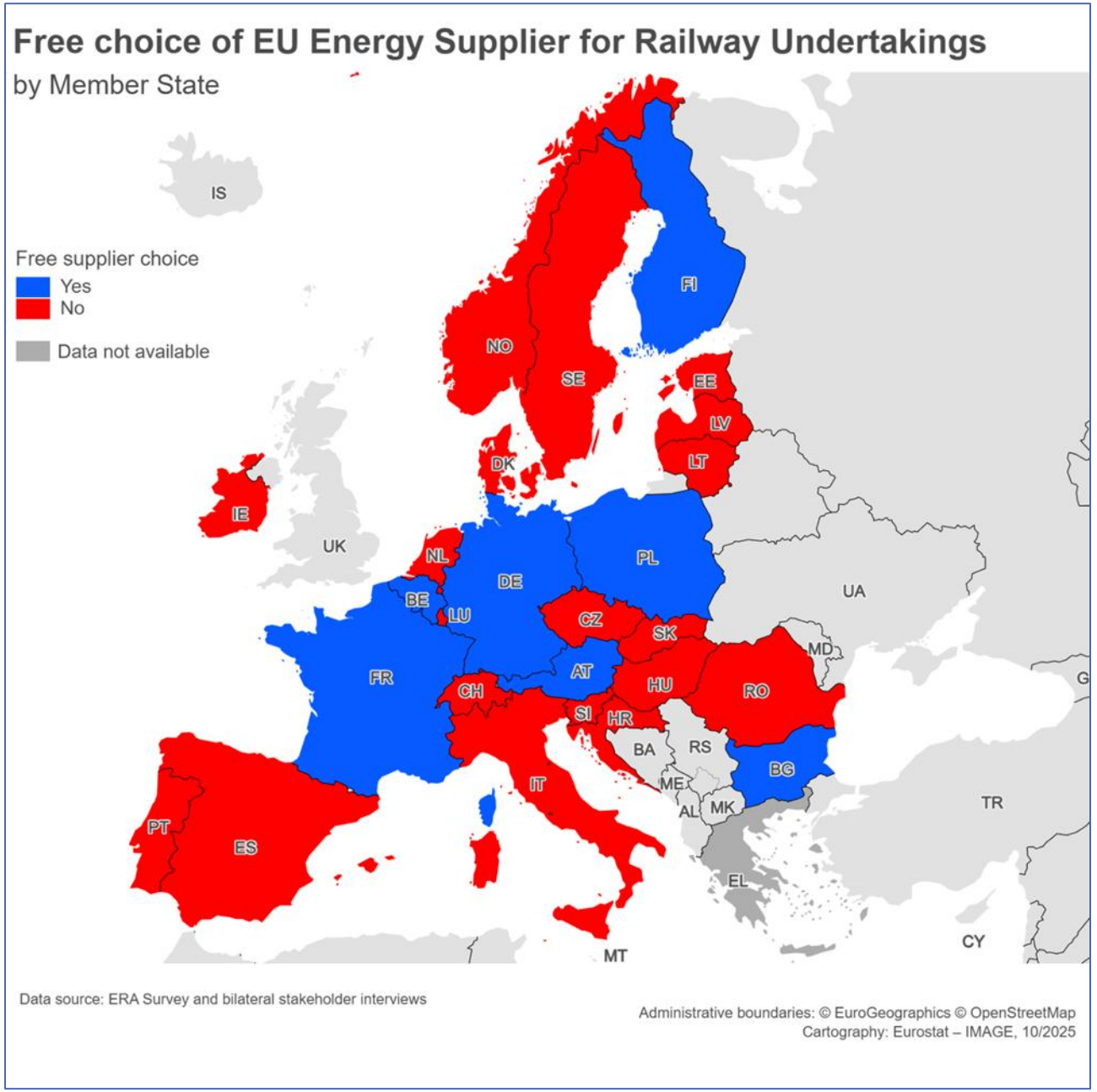
- DCS are implemented by IMs except in FR, DE, PL
- Some IMs share DCS or exchange function through Eress





AS-03 key findings: third party access for RUs in the energy supply market

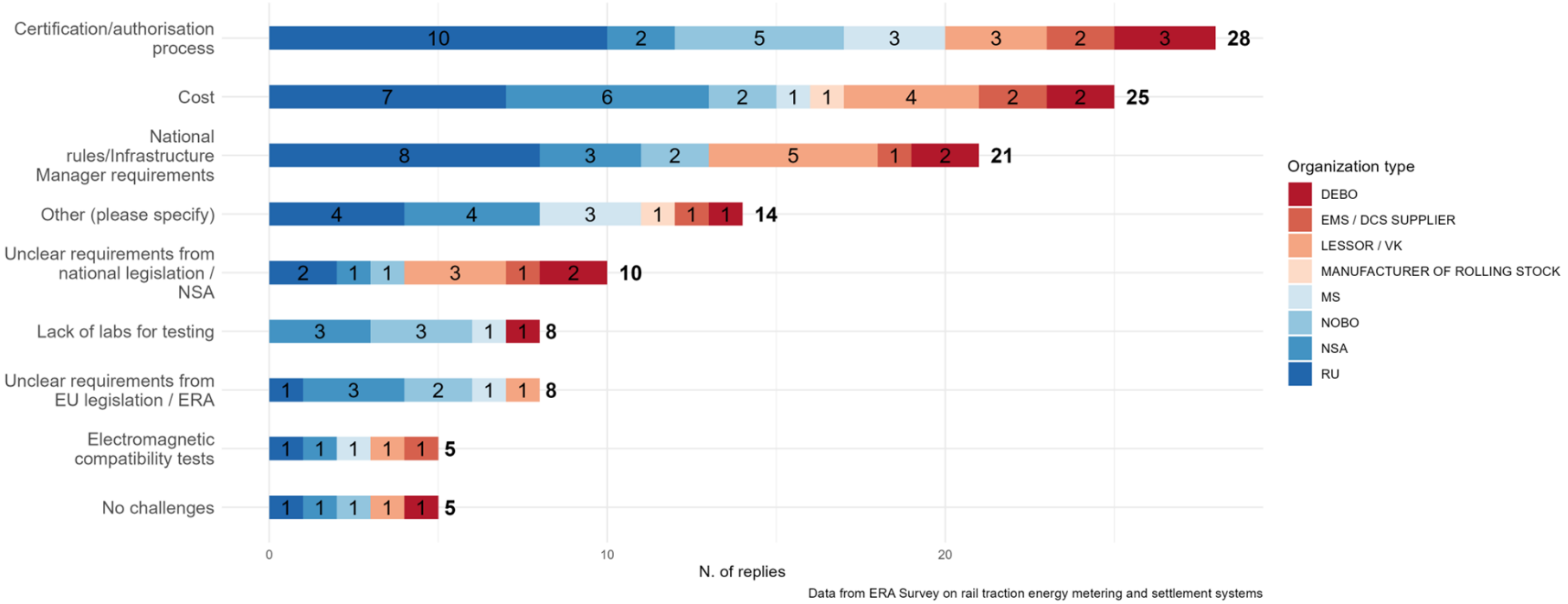
- In some MS national law mandates the IM being the sole energy provider for RUs
- In some MS, RUs can choose their energy supplier only for domestic trains
- In NL since 2008 the purchasing group Vivens by Prorail and all RUs is in use. Free choice of supplier as of 2028
- In BE no RU opted for an alternative to Infrabel's supply
- In IT traction energy is considered cheap for the DC network as it is subsidised by government for historical reasons



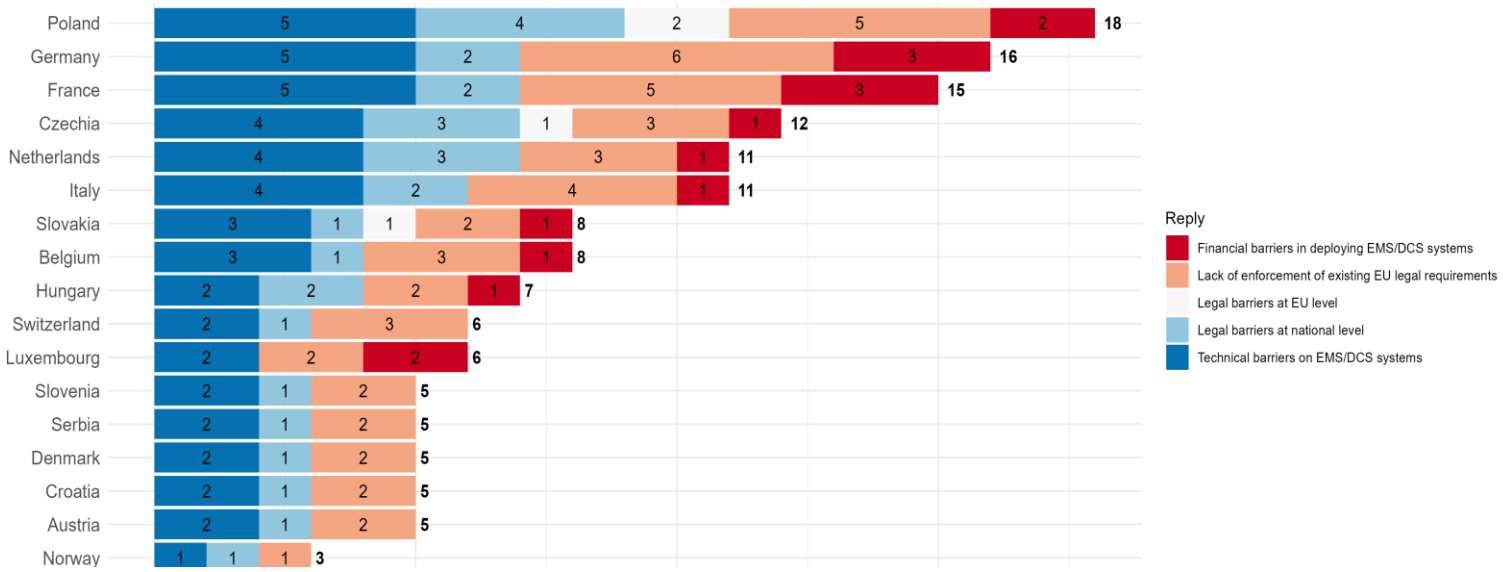
AS-03 key findings: main issues affecting energy metering

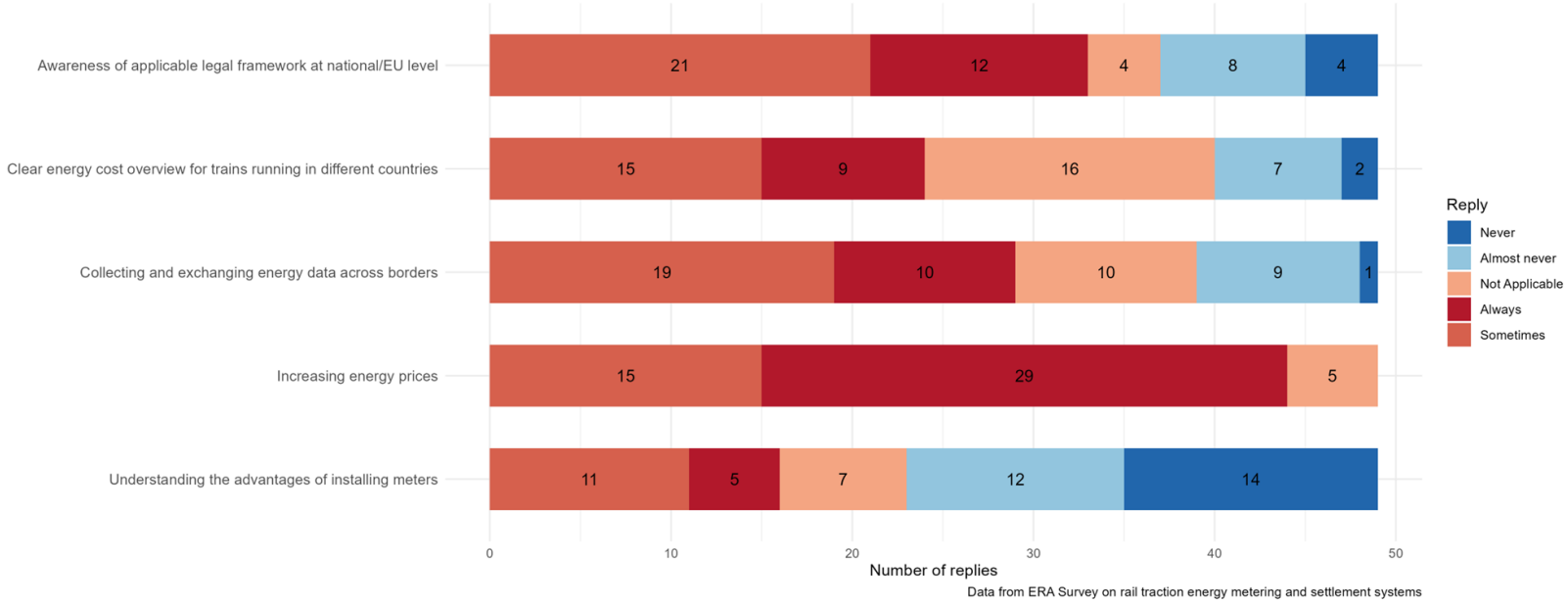
- Data quality and data sharing corporate policies affecting the ability of exchange function to match consumption with actual tractive vehicle operators
- Difficult EMS certification/authorisation, different IMs/DCS requiring own calibration, certifications, seals, installation, cybersecurity requirements etc to accept data from whatever compliant EMS

What are the key challenges to install/retrofit EMS on-board to comply with latest LOC&PAS TSI?



AS-03 key findings: main issues affecting energy metering





- TSI ENE not applied everywhere, DCS still not present in some MS
- Different barriers, low knowledge of legal requirements and data frameworks for energy metering
- Uncertainty regarding the applicability of other EU legislation affecting potentially EMS and billing of grid fees

AS-03: Recommendations

1. **Consider to enforce TSI ENE's existing requirements**, allowing all the benefits of energy metering to materialise
2. **Consider to make train composition messages from rail telematics a mandatory data flow from RUs to IMs and then to exchange/settlement systems**, sharing the EVN of tractive vehicles allows a smooth matching of consumption with actual vehicle operator
3. **Improve dissemination and knowledge sharing on traction energy metering**
4. **Analyse the opportunity to amend Table B.1 in Appendix B of TSI ENE,** requiring NoBos to assess point 4.2.17 for authorisation of place into service of fixed installations
5. **Analyse the opportunity to extend the scope of application of TSI ENE into the data exchange function and settlement processes,** improving interoperability, legal certainty and minimising national requirements on data exchange
6. **Explore the costs and benefits of one DCS and settlement system at EU level,** to reduce complexity, costs or at least allowing MS to pool/share a single DCS/exchange

AS-03: Recommendations

7. **Analyse the opportunity to amend TSI LOC&PAS making EMS an Interoperability Constituent,** for facilitating certification/authorisation and competition among EMS suppliers
8. **Analyse and potentially clarify the applicability of Directive (EU) 2014/32/EU on measurement instruments (MID) to EMS,** for legal certainty at EU level and for minimising assessments and certifications
9. **Consider the potential need to analyse the legal status of IMs and energy supply with regards to traction current infrastructure and services in EU MS**, for legal clarity at EU level on the boundaries, third party access, related grid fees and competent regulator between rail market (Directive 2012/34/EU) and energy market (Directive (EU) 2019/944 and Regulation (EU) 2019/943)
10. **Analyse the status of EMS and DCS vs EU cybersecurity legislation,** for legal certainty at EU level
11. **Consider R&D on EMS telecommunications,** for lowering costs and complexity by reducing antennas and having EMS connected and sending data to DCS via FRMCS

Item 6. Panel discussion on study AS-03 findings

Bart Van der Spiegel, Infrabel Energy Management
Dyre Martin Gulbrandsen, Eress Director
Esteban Coito Gonzalez, ERA Project Officer

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WG 37 – EN 50463 Energy Measurement

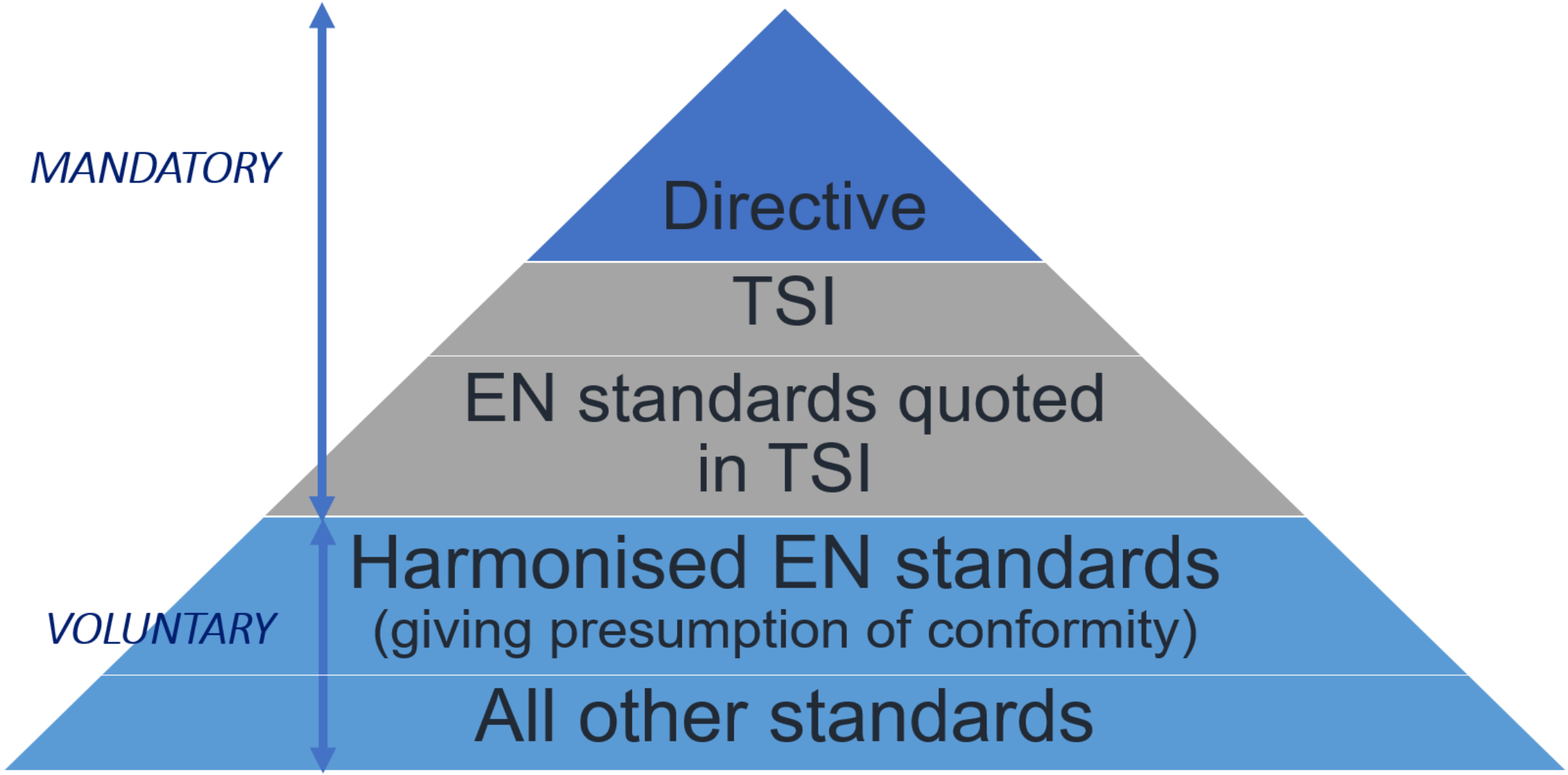
10th December 2025

ERA Additional Studies workshop

Bart Van der Spiegel (convenor of WG 37)

bart.vanderspiegel@infrabel.be

Voluntary, mandatory and harmonised standards

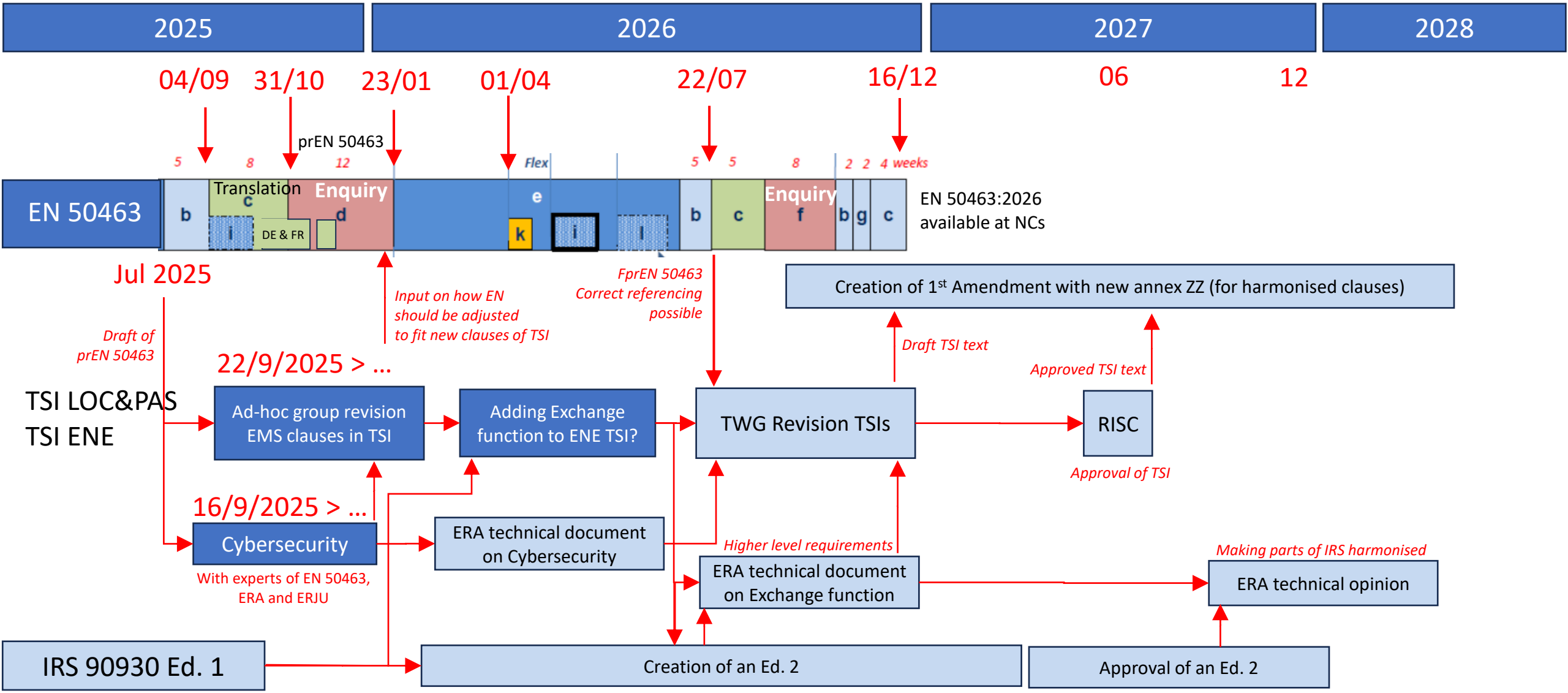


CENELEC

Main changes to EN 50463

- Distinction between Energy Measurement System and Consumption Point (i.e. EMS installed on-board).
- Introducing multiple changes for hybrid trains.
- Clarifying process of commissioning and maintenance.
- Introducing possibility to have integrated Energy Measurement Function (EMF) combining current measurement, voltage measurement and energy calculation.
- Improve test procedures due to user experience.
- Introduce secure protocols.
- Add possibility of a direct connection on-board.
- Add standardised digital signature, uncompressed payloads and mechanism for a batch of samplings at a higher frequence (e.g. every second).
- The same protocol will be used in EN 50463 and IEC 62888. We are paving the road for a merged version in 203x.

Planning


2025
2026
2027
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04/09
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23/01
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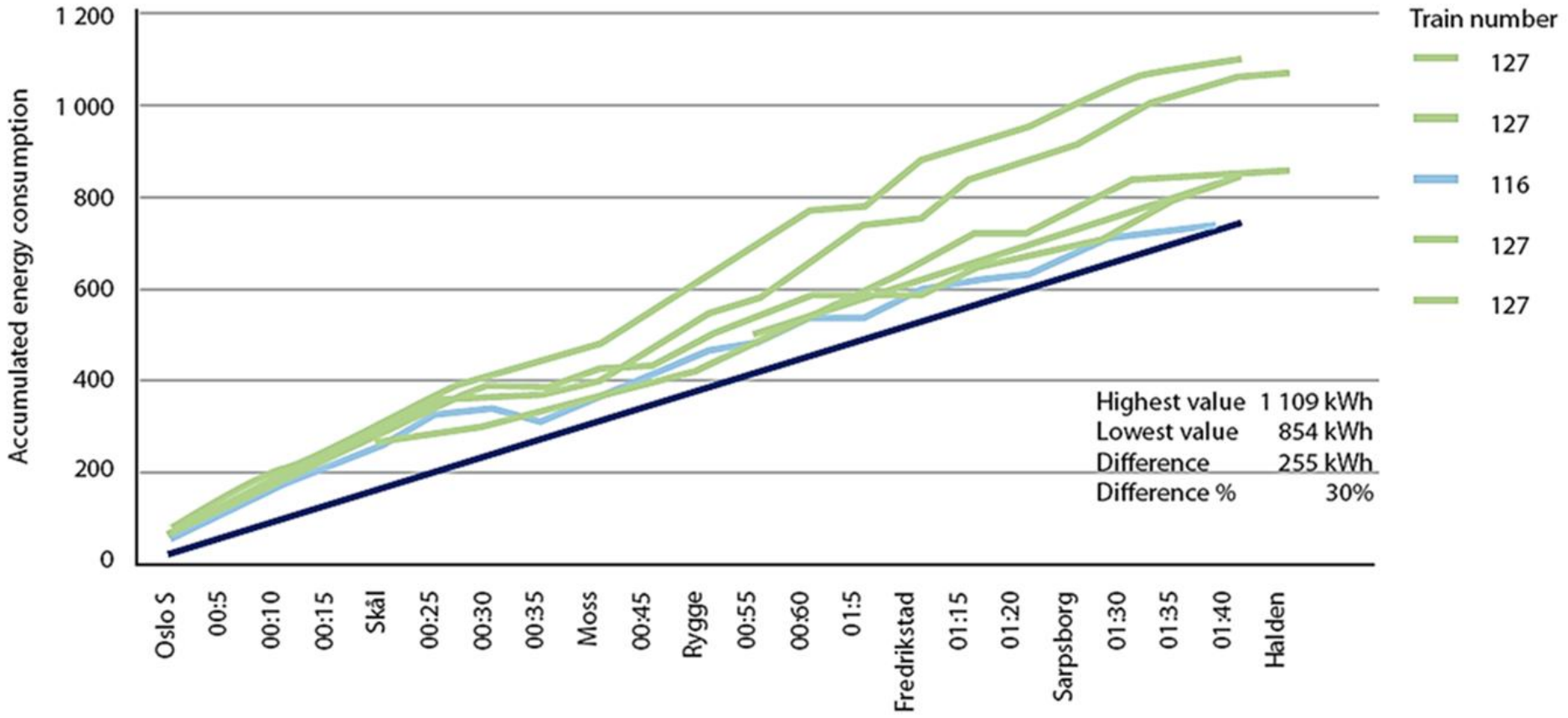
12
prEN 50463
5 8 12 Flex 5 5 8 2 2 4 weeks
EN 50463
Translation
Enquiry
Enquiry
DE & FR
EN 50463:2026
available at NCs
Jul 2025
Input on how EN should be adjusted to fit new clauses of TSI
FprEN 50463 Correct referencing possible
Creation of 1st Amendment with new annex ZZ (for harmonised clauses)
Draft of prEN 50463
Draft TSI text
Approved TSI text
22/9/2025 > …
TSI LOC&PAS
TSI ENE
Ad-hoc group revision EMS clauses in TSI
Adding Exchange function to ENE TSI?
TWG Revision TSIs
RISC
Approval of TSI
16/9/2025 > …
Cybersecurity
With experts of EN 50463, ERA and ERJU
ERA technical document on Cybersecurity
Higher level requirements
Making parts of IRS harmonised
ERA technical document on Exchange function
ERA technical opinion
IRS 90930 Ed. 1
Creation of an Ed. 2
Approval of an Ed. 2

Eress

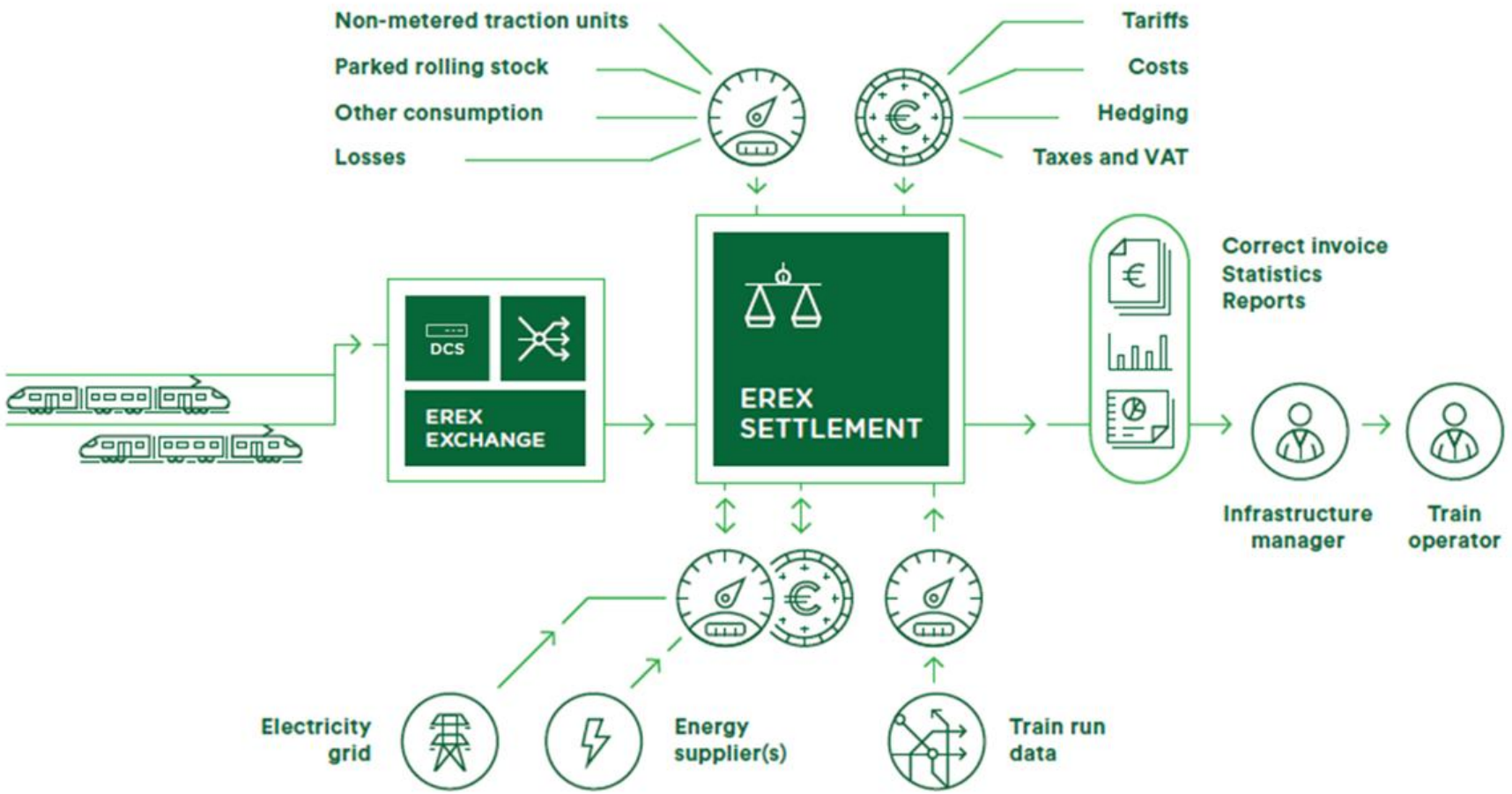
ERA hybrid workshop on Rail Traction Energy Studies

Dyre Martin Gulbrandsen
Director Eress

Train 73-04 from Oslo to Halden, May 2006. Journey time 1h 45m, distance 136.6 km



Erex Settlement



MAIN INPUTS/ISSUES FROM SECTOR CONSULTATION I

Recommendations	Details	Key benefits
4. Analyse the opportunity to amend Table B.1 in Appendix B of TSI ENE	Table B.1 in Appendix B of TSI ENE should require a mandatory assessment of 'On-ground energy data collecting systems – 4.2.17. Today it is not applicable.	➢ Simplification of the APIS process ➢ NoBo required to assess DCS during design, installation or operations ➢ Reduction of risks of possible national requirements imposed on IMs to obtain APIS of lines

- *"Choosing a working DCS from a provider is no problem. Certification does not bring any added value here, apart of higher costs. The specifications are sufficient."*
- Other comments: the intervention of NoBo could help bringing the DCS compliant with TSI requirements

MAIN INPUTS/ISSUES FROM SECTOR CONSULTATION II

Recommendations	Details	Key benefits
7. Analyse the opportunity to amend TSI LOC&PAS making EMS an Interoperability Constituent	Having EMS as an interoperability constituent would facilitate vehicle authorisations, facilitate certification, minimise national or IM requirements for calibration, installation, etc and achieve a full cross-acceptance of compliant EMS everywhere in the EU whatever the manufacturer.	➢ Less complex and faster vehicle authorisations ➢ Higher certainty and facilitated NoBo assessments ➢ Enhanced interoperability for RUs and reduced costs for EMS ➢ Increased competition among EMS suppliers ➢ Real Single Market for EMS

- *"The EMS should not only be 'compliant'; first and most important, it should provide reliable energy values. The NoBo, together with the Vehicle Keeper and supplier should provide a reliable basis with a conformity assessment."* To improve too EN 50463 requirements?
- *"Consider adding the fact, that the current TSI LOC&PAS requirements do not ensure that the NoBo verifies the correct functioning of the system (e.g., NoBo does not verify the types and positions of cables between individual components). It requires only EMS integration and installation type test, but no integration and installation design review."*

MAIN INPUTS/ISSUES FROM SECTOR CONSULTATION III

Recommendations	Details	Key benefits
10. Analyse the status of EMS and DCS vs EU cybersecurity legislation	TSI and EN40463 should take into account all the relevant obligations stemming from the broad and complex legal framework on cybersecurity	➢ Legal certainty ➢ Clear compliance
11. Consider R&D on EMS telecommunications	Future R&D should be focussed on the exploring the benefit and feasibility of having EMS connected and sending data to DCS via FRMCS instead of the current dedicated communication channel	➢ Simplification of products and installation of EMS on-board trains ➢ Lower costs

- Ad-hoc group on EMS Standard EN50463: on-going specific working group from ERA to reviewing the TSI clauses (in Loc&Pas and ENE TSI) considering the draft EN 50463 series standard and identifying possible contradictions with the TSI clauses
- This Ad-hoc group also assesses:
  - coherency of the TSI clauses/EN 50463 series with the Cybersecurity activities
  - consistency between EN50463 and other EU energy regulations (see recommendation 8 of study).

MAIN INPUTS/ISSUES FROM SECTOR CONSULTATION IV

- Choosing of energy suppliers is not always allowed in all MSs
- National/particular rules/provisions in some MSs
- Study references to Eress solution: Eress is one provider, it is an open partnership but all other solutions are equally good, if compatible and compliant

Item 7. Q&A on study AS-03

Open discussion

EUROPEAN UNION AGENCY FOR RAILWAYS

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AS-03: Additional Q&A on Recommendations

1. **Consider to enforce TSI ENE's existing requirements**, allowing all the benefits of energy metering to materialise

Some considerations:

- DCS exist in many MS since years
- Different solutions for DCS and exchange function are available in the market
- Invoicing traction energy based on estimations is detrimental for rail competitiveness and interoperability
- Implementation costs for DCS can be low

AS-03: Additional Q&A on Recommendations

2. **Consider to make train composition messages from rail telematics a mandatory data flow from RUs to IMs and then to exchange/settlement systems**, sharing the EVN of tractive vehicles allows a smooth matching of consumption with actual vehicle operator

Some considerations:

- TSI Telematics will amend soon TAF/TAP TSI following a positive vote by the MS in RISC
- Train composition messages will be used also for exchange and settlement
- The use of telematics can streamline reporting requirements on actual users of vehicles

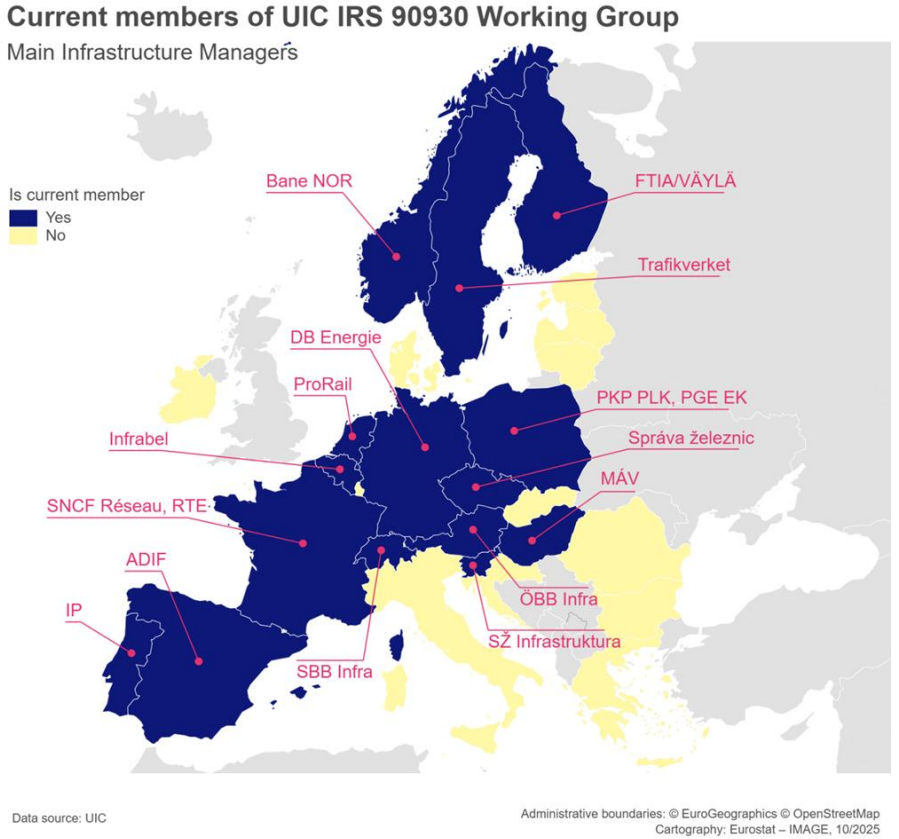
AS-03: Additional Q&A on Recommendations

3. **Improve dissemination and knowledge sharing on traction energy metering**
5. **Analyse the opportunity to extend the scope of application of TSI ENE into the data exchange function and settlement processes**, improving interoperability, legal certainty and minimising national requirements on data exchange

Some considerations:

➢ The main interoperability hurdles for energy metering are in exchange and settlement, mandating only the existence of a compliant DCS seems to be not enough

➢ Sector-led efforts with IRS 90930 lack full EU geographical coverage, legal enforceability and require contracts on data model and processing



AS-03: Additional Q&A on Recommendations

6. **Explore the costs and benefits of one DCS and settlement system at EU level,** to reduce complexity, costs or at least allowing MS to pool/share a single DCS/exchange

Some considerations:

- TSI ENE text should aim to force the concept one-DCS per MS
- DCS are a receiving computer of data. Pooling such function can reduce overall rail sector costs and concentrate scarce IT expertise in energy metering

AS-03: Additional Q&A on Recommendations

8. **Analyse and potentially clarify the applicability of Directive (EU) 2014/32/EU on measurement instruments (MID) to EMS,** for legal certainty at EU level and for minimising assessments and certifications

Some considerations:

- EMS are not the same as a smart energy meters installed in buildings, trains are moving consumption points across different grids and IMs
- EMS are already regulated by TSI LOC&PAS and by the EN50463 standard
- EMS are certified and authorised when installed on rolling stock

AS-03: Additional Q&A on Recommendations

9. **Consider the potential need to analyse the legal status of IMs and energy supply with regards to traction current infrastructure and services in EU MS,** for legal clarity at EU level on the boundaries, third party access, related grid fees and competent regulator between rail market (Directive 2012/34/EU) and energy market (Directive (EU) 2019/944 and Regulation (EU) 2019/943)

Some considerations:

- The overhead contact line is clearly a direct cost charged by IMs to RUs
- The ownership of traction current infrastructure (transformers, substations, transmission lines, etc) and the designation of IMs as closed distribution system is different across MS
- Through Court rulings and national law, Germany clarified boundaries between energy and rail infra and grid fee setting by the energy regulator for DB Energie. Germany is particular as the rail IM (DB InfraGo) is a separate company from DB Energie but both part of DB AG Group.

Item 8. Closing remarks

Veronika Sarik| Policy Officer, European Commission (DG MOVE Unit C4)

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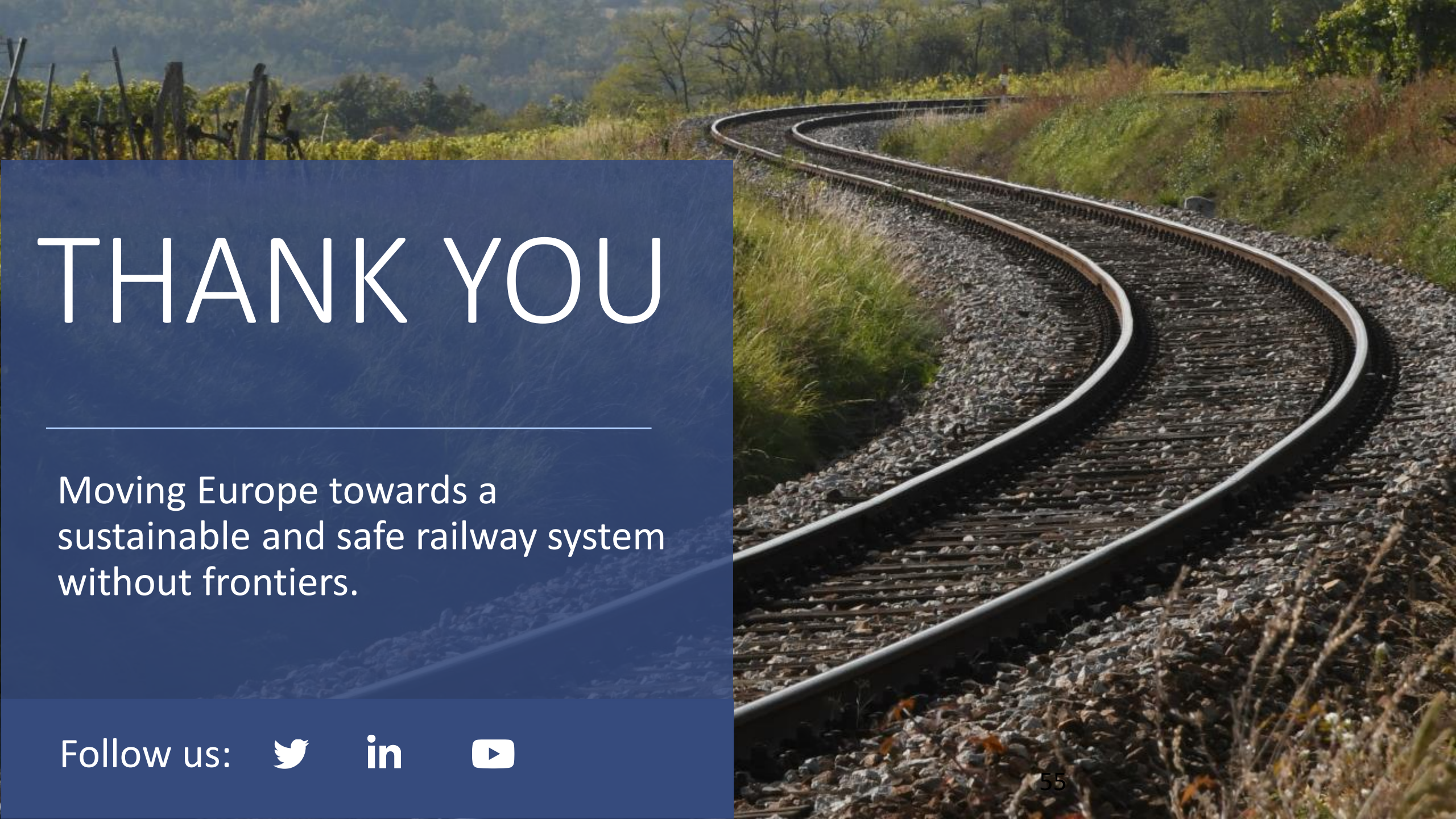

THANK YOU

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