Deliverable D 28.2
Dissemination activities (Including Project KPIs Update) Intermediate Report n°1

Project acronym:	FP4 – Rail4Earth
Starting date:	01/12/2022
Duration (in months):	48
Call (part) identifier:	
Grant agreement no:	101101917
Due date of deliverable:	Month 24
Actual submission date:	30-11-2024
Responsible/Author:	L NICOD/ ALSTOM
Dissemination level:	PU
Status:	Issued

Reviewed: (yes)

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101101917.

Document history		
Revision	*Date*	*Description*
1	27/11/2024	First issue

Report contributors		
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1. Executive Summary

This document provides the realized FP4 – Rail4Earth dissemination & and exploitation actions on the global scope of the project (rolling stocks, infrastructures, stations, all related sub-systems and the 28 WPs of the project) during the 2 first years of the project.

The dissemination of FP4 – Rail4Earth is essential throughout the project's life and has been carried out with the cooperation of all Work Packages and many partners of the project. The topics of technical and scientific communications are mainly proposed by the 26 technical WPs (WP1 to WP26). They are depending on their respective progress and their results generated during the project realization.

Main achievements during these two years:

- Creation of a project identity;
- Population of the EU-RAIL FP4 – Rail4Earth website;
- Physical and online participation to conferences;
- The submission of abstracts for conferences in 2025 ;
- The publication of news through social media;
- The publications of articles in specialized journals;
- The participation to products-oriented exhibition "InnoTrans 2024" (Berlin).

The Dissemination and Exploitation Plan is in line with FP4-Rail4Earth Grant Agreement WP28.

2. Abbreviations and acronyms

Abbreviation / Acronym	Description
BEMU	Battery Electric Multi Unit (Regional trains)
CEN	Comité européen de normalisation (European Committee for standardization)
CENELEC	Comité européen de normalisation en électronique et en électrotechnique (European Committee for Electrotechnical standardization)
EN	European Norm
ERA	European Union Agency for Railway
EU-Rail	Europe's Rail Joint Undertaking
FM	EU-Rail Founding Member
FP4	Flagship Project 4, named FP4 – Rail4Earth
SP	System Pillar
STIP	Standardisation and TSI Input Plan
TSI	Technical Specification for Interoperability
WP	Work Package

3. Background

This Report follows the D28.1 Dissemination and exploitation plan delivered in Month6 of the project.

4. Objective/Aim

This document has been prepared to provide an exhaustive description of the Dissemination, Communication and Exploitation actions described in the project's WP28, covering the actions of the project's first two years.

It will be followed by D28.3 Dissemination activities (Including Project KPI Update) Final Report at the end of the project (to be submitted in Month 48/ November 2026).

5. Public dissemination related to Task 28.1

5.1 Introduction

The EU-RAIL communication and dissemination strategy is used for FP4 – Rail4Earth communication policy and actions and, on M24 (Nov 2024), the WP28 leader has participated to several EU-RAIL Chief Stakeholder Relations and Dissemination telephone conferences to get the main guidelines and policy elements. Moreover, the Flagship Project Manager (SNCF) is directly involved in the communication reporting to the Communication Department of Europe's Rail JU, as well as an external consultant from UNIFE mobilised to consolidate and reinforce the Rail4Earth project communication actions proposed by the 71 partners of the project

Alstom, as WP28 leader and Project Coordinator, has also exchanged internally with the ALSTOM Brand, External events & Customer Communications Vice-President to check how the EU-RAIL Communication policy will be used in respect also with ALSTOM communication strategy on this R&D Project.

This double check is needed in all external communication events by all concerned project partners.

Two types of communications have been highlighted:

- The **scientific and technical communication**, mainly coming from the proposals made by the project WPs technical experts (for example a conference on traction noise reduction by WP3 Noise and Vibrations experts);
- **Strategic and more political communication**, resulting more generally from the JU invitation or from the proposals of the partners of WP27 Project Management and Technical Coordination and WP28 Dissemination, Communication and Exploitation. This one will present a global approach on railway sustainability work with macro consequences on political/societal/business rules/investments impact and/or needs. For example, the project (via DB) participated to a round table discussion on climate change during InnoTrans 2024.

These two types of communication actions require different profiles: technical expert profiles for the first type; high level executives, more business or political oriented for the second type of communications.

5.2 Project Identity

The logo has been chosen at the beginning of the project. See below:

Furthermore, a number of tools have been created, such as templates for presentation and shared on the project collaborative Sharepoint hosted (for free) by SNCF.

5.3 Public website

The project public website of FP4 – Rail4Earth, hosted by the general EU-RAIL Website, has been populated in order to present the general information on structure, goals and news about the project.

Four posts/publications were made in 2023 as follows:

- News post about the participation to the RailLive! 2023 congress that took place in Madrid;
- News post about KTH journal paper on Air Quality in underground Metro platform;
- News post about workshop organised during TRAKO 2023 (Poland);
- Publication of project Brochure.

And six posts/publications in 2024 as follows:

- News post about the 7 abstracts of papers submitted for Transport Research Arena 2023 (Dublin/Ireland);
- News post about representation of the project at InnoTrans2024 during Climate Change roundtable discussion;
- News post about paper presented during Lambda-Mu 2024 conference;
- Publication of the Dissemination plan D28.1;
- Publication of the "Sustainable Interiors knowledge and opportunities" deliverable D24.1;
- Publication of the "Energy Management & Pre-Standardisation for Alternative drive trains and related railway system ntermediate report n°1" deliverable D1.1.

All the aforementioned posts/publications can be found here:
eurail-fp4 (europa.eu)

5.4 Organisation of project Kick-Off Meeting.

The project's kick-off meeting has been organised, as already described in D28.1.

5.5 Project targeted dissemination and knowledge sharing activities.

The knowledge produced by the project partners is promoted through different dissemination channels such as participation in conferences, workshops and exhibitions (such as Transport Research Arena, InnoTrans, WCRR, …).

The project partners are describing their communication actions (realised or in preparation) in an Excel file shared within WP28 in the project Sharepoint tool.

Since the beginning of the project in December 2022, the Consortium produced and realized the following dissemination actions:

Transport Research Arena congress 2024, Dublin, 7 abstract submissions

- Europe's Rail RAIL4EARTH – Sustainable rail systems Progress point of the European R&D Project: general presentation of the project, its objectives and future demonstrations (SNCF-Alstom);
- From Shift2Rail to Europe's Rail, future perspectives for alternative drive trains standardizations and energy efficiency (SNCF);
- Railway assets resilience to climate change – Application of the smarter and faster adaptation EU strategy (SNCF);
- Assessing the perceived annoyance of high-speed trains with an experience sampling method (SNCF/UGE);
- Environmental Assessment of Components for Trains Based on the Use of Fiber Reinforced Plastic (Talgo);
- Influence of the air flow concept on aerosol spreading in a generic train compartment (DLR);
- New attractiveness of rolling stock: circular and modular interiors (SNCF).

InnoTrans 2024

- Presentation to Europe's Rail Technical Tour delegation on Alstom's stand:
    - Presentation 1: Green Traction for Regional trains, corner on Decarbonisation;
    - Presentation 2 : Low Carbon Traction system, SiC use in Traction (results of S2R) and eco-design work.
- Round Table Speaker's Corner: Discussion around adaptation to climate change in Railways (DB).
- Physical Demo on JU stand: Electro-mechanical brake (Knorr-Bremse).

Other conferences

- OXFORD BATTERY MODELLING SYMPOSIUM (Oxford) and Advanced Battery Power (Münster): poster describing a direct comparison of a power and an energy-optimized Li-ion pouch cell: characterization, ageing and modelling (NRD/IFE);
- PCIM, Nuremberg: A Digital Twin Approach Toward Lifetime Analysis and Predictive Maintenance of Power Semiconductors for Railway Application (Alstom);
- HYDROGEN4RAIL – FUTURE OF TRANSPORT, 3rd Conference "HYDROGEN RAILWAY, Poznań-Poland: Interoperable Hydrogen Refueling Station (PKP and WP9 partners);
- 7th edition of the International Conference on Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles (ESARS) and International Transportation Electrification Conference: The Static Phase Converter. A Solution to Reinforce the Power Supply of 25 kV/50Hz Railway Lines (SNCF);
- Conference Innovative Solutions in Industry 4.0 (online): PKP presentation of activities in Rail4EARTH project;
- 27th International Scientific Conference Transport Means 2023, Palanga:
    - Simulation of railway power supply systems based on Siemens Sitras Sidytrac (PKP);
    - The methods to increase the use of renewable energy sources in railways (PKP).

- Poznań University of Technology Science Day 2024, Poznań: Integration of energy storage and photovoltaic sources with traction substations (PKP);
- UITP Global Public Transport Summit: UITP Spotlight Forum Session 5: Europe's Rail JU developments Railway Energy Hubs (Strukton);
- Lambda Mu 2024, Bourges: Railway assets resilience to climate change – Application of the smarter and faster adaptation EU strategy (SNCF);
- Internoise 2023, Chiba: Validation of rolling-stock interior noise simulation in viaduct and tunnel environments (Alstom);
- Rail Live! 2023, Madrid: Re-Plan city LIFE + Neoballast (COMSA);
- Internoise 2024, Nantes:
    - Railway curve squeal detection using rail vibration analysis (Trafikverket/LTU);
    - Virtual validation of a metro rolling stock for exterior and interior in standard controlled conditions (Alstom);
    - Results of a pilot study using experience sampling method to assess railway noise annoyance (SNCF).
- FORMNEXT, Frankfurt: Additive Manufacturing for SNCF Reseau: an overview (SNCF);
- 22nd Nordic Seminar on Railway Technology:
    - Evaluation of low-cost air quality sensors at train platforms (KTH);
    - A study on the metro train type influence on the particulate emissions and pollution cost on an underground platform (KTH);
    - Railway curve squeal field measurements and tonal analysis (Trafikverket/LTU).
- Journées techniques acoustique et vibrations Autun (France) : Reconnaissance automatique du passage de TGV. Retour sur la campagne expérimentale du projet Rail4Earth (Automatic recognition of VHST TGV passage. Return to the experimental campaign of the Rail4Earth project) (SNCF).

Workshops

- TRAKO 15th International Railway Fair, Gdańsk-Poland: Hydrogen Refuelling station for Railways (PKP);
- Workshop Biomimicry: How can we learn from nature? (SNCF);
- Workshop Sustainable Interiors: the 5 whys methodology (SNCF).

Social media post, Linkedin project website

- FP4-Rail4Earth going forward! (ADIF);
- LinkedIn post on TRA 2024, plenary session on efficiency and Resilience: Combining Energy and Railways: A Vision for Efficiency and Resilience (Strukton);
- WP11 follow-up meeting hosted by ADIF in its Railway Technology Center in Málaga (Adif);
- Post of Workshop Biomimicry: How can we learn from nature? (SNCF);
- Post of Workshop Sustainable Interiors: the 5 whys methodology (SNCF).

5.6 Project publications

The FP4 – Rail4Earth **newsletter** is foreseen in 2025 and is expected to outline the main results and achievement of the first half of the project.

5.7 Articles in specialised magazines and scientific papers.

The Consortium produced several **articles in Journals, as follows:**

- In “Energies 2024”: Progress and Challenges Connected with the Integration of Renewable Energy Sources with Railway Distribution Networks (PKP);
- In the European Research Studies Journal: Optimizing Regeneration Energy Usage on Railways: Innovative Approaches to R&D Project Management (PKP);
- In “Atmospheric Environment X”: Estimating Particle Matters (PM) Levels on an Underground Metro Platform by Exploring a New Model-Based Factor Research (KTH);
- And SSRN Paper: Estimating PM Levels on an Underground Metro Platform by Exploring a New Model-Based Factor Research (KTH).

5.8 Participation to the Annual EU-Rail Innovation Days

Up to now, the project has not been invited to attend the Annual EU-Rail Innovation Days.

5.9 Organisation of Final conference.

The project’s final conference is not expected before the end of 2026.

6. Contribution to other EU-RAIL activities related to Task28.2

6.1 Master Plan KPIs

The project updated it's 5 project level KPIs (Energy, CO2, noise, LCC and autonomy of the BEMU) in M24 (November 2024). These updated KPIs are described below:

WP	description	use cases	Autonomy (km)	Physical energy consumption (train, infrastructure, station)	Physical CO2 equivalent emissions (LCA)	Noise emitted per component	Life Cycle Costs reduction
6	**Trains with on-board Energy Storage Systems.**	1 BEMU (CAF)	200	100%	100%	N/A	100%
6	**Trains with on-board Energy Storage Systems.**	1 BEMU	200	100%	100%	N/A	100%
6	**Trains with on-board Energy Storage Systems.**	1	120	100%	100%	N/A	100%
6	Suburban catenary trains with high level of braking energy recovery and energy autonomy	1 ESS for Suburban case	N/A	90% - 100%	100%	N/A	100%
8	**Hydrogen hybrid trains**: infrastructure inspection/maintenance vehicle and loco for freight-	1 Loco (Talgo)	500	85%	100%	N/A	120%
8	**Hydrogen hybrid trains**: infrastructure inspection/maintenance vehicle and loco for freight-	1 Infra inspection vehicle (CEIT)	N/A	N/A	99%	N/A	98%
9	**production, storage and refuelling of hydrogen**	1 (PKP)	N/A	90-99%	90 - 95%	N/A	95 -97%
12	Integration of **various sources in different (infra)**	1(Strukton)	N/A	100%	100%	N/A	50%
12	Integration of **various sources in different (infra)**	1(PKP)	N/A	100%	100%	N/A	100%
12	**optimal energy management in the whole power system**	1 (PKP/CEMOSA/ Tekniker)	N/A	100%	100%	N/A	100%
12	**optimal energy management in the whole power**	1 (FSI)	N/A	100%	100%	N/A	N/A
13	**optimal energy management in the whole power**	1 (Cemosa/ADIF)	N/A	90 to 97%	90-97%	NA	90 - 95%
2	**tool on European climate variables usable for railway assets**	1 (common tool built by WP	N/A	N/A	N/A	N/A	N/A
3	**noise indicators, simulation tools and development of optimised components**	1 (Laboratory test of Neoballast)	N/A	N/A	N/A	100%	N/A
11	**optimal design/rehabilitation of station layout including modularity**	1(PKP)	N/A	100%	100%	N/A	100%
4	**tools and indicators to promote eco-design**	1 (common tool built by WP partners). Demos	N/A	N/A	N/A	N/A	N/A
15	**(airless) electro-mechanical braking system, pantograph and suspensions**	1 Electro-mecanical Brake	N/A	100%	N/A	100%	100%
15	**(airless) electro-mechanical braking system, pantograph and suspensions**	1 airless pantograph	N/A	100%	N/A	100%	100%

WP	description	use cases	Autonomy (km)	Physical energy consumption (train, infrastructure, station)	Physical CO2 equivalent emissions (LCA)	Noise emitted per component	Life Cycle Costs reduction
15	**(airless) electro-mechanical braking system, pantograph and suspensions**	1 Electro-mecanical Brake (Knorr Bremse)	N/A	100%	N/A	100%	100%
15	**(airless) electro-mechanical braking system, pantograph and suspensions**	1 air-less suspension (Alstom)	N/A	100%	N/A	100%	100%
15	**(airless) electro-mechanical braking system, pantograph and suspensions**	1 airless pantograph (Siemens)	N/A	100%	N/A	100%	100%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 Independnat Rotating Wheel bogie NGT (DLR)	N/A	98%	98%	N/A	95%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 composite bogie frame (Talgo)	N/A	98%	98%	N/A	95%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 IRW bogie frame (Talgo)	N/A	98%	98%	N/A	95%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 new **running gear** architecture (Alstom)	N/A	100%	99%	N/A	99%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 lightweight axle (Siemens)	N/A	97%	95%	N/A	95%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 Active steering motor (DLR)	N/A	99%	99%	N/A	98%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 Motor for IRW (Talgo)	N/A	98%	98%	N/A	97%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 Motor and gearboxes (Alstom)	N/A	100%	99%	100%	99%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 Motor for SiC converters (CAF)	N/A	99%	99%	N/A	97%
17	**optimised (energy, weight) motors and gearboxes**, high performance **bogies**, suspensions and **new materials**	1 Motor PMSM (CEIT for Talgo)	N/A	99,6%	99,6%	N/A	99,6%
19	**replace hydrofluorocarbon refrigerants by HVAC system using green refrigerants or new cooling technologies**	1 (Wabtec)	N/A	80%	80%	100%	100%
19	**replace hydrofluorocarbon refrigerants by HVAC system using green refrigerants or new cooling technologies**	1 (Knorr Bremse)	N/A	80%	80%	100%	82%
20	**enhanced experimental and numerical methods** on **aerodynamic** certifications	1 (DLR)	N/A	N/A	N/A	N/A	100%
22	**healthier (HVAC)** environment	1 (ALSTOM)	N/A	N/A	N/A	N/A	100%
22	**healthier (HVAC)** environment	1 (Wabtec)	N/A	N/A	N/A	N/A	100%
25	**train attractiveness** via **on-demand comfort for users**	**1:Ultra-modularity & circular**	N/A	N/A	100%	N/A	100%
26	**adapt rolling stock interiors to support the increase of capacity**	**1 new architectures for ultra-modularity** and	N/A	100%	N/A	N/A	100%

They are available, as contractually described in WP28 to contribute to the quantification of the following macro KPIs of the Master Plan:

- Meeting evolving Customer Requirements;
- Improve EU Rail supply industry;
- Reduce costs;
- More sustainable & resilient transports;

- Improved performances & capacity.

6.2 Contribute to push standards & norms evolution/creation

Like all the EU-Rail Flagship projects, FP4-RailEARTH took part in the elaboration of the key document STIP. The STIP permits to gather the project's proposals of harmonization documents creation or evolution. These documents could be standards (e.g. EN norms), TSIs, or System Pillar documents.

The STIP was approved at EU-Rail level and presented to the standardisation bodies, the European Commission and the ERA.

FP4-Rail4EARTH was requested by EU-Rail to collect the topics for STIP on 17 July 2023. In respond to this demand, a first draft of FP4 STIP was elaborated by the project's work packages, namely the WPs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 26, and was sent to the SP in November 2023.

Two meetings were organised by FP4 WP28 in November 2023 with the project's Sub-project leaders and the SP team to share the understanding of the use of the STIP Excel file.

Despite this large number of WP responding, many proposals were too vague and did not correspond to the minimum acceptance criteria for the STIP (at minimum describing a link with a harmonization document and an expected time frame).

The first SP STIP draft was then sent back to FP4 in December 2023 to be commented and completed by the partners of the project, including 7 proposals made by FP4.

After a bilateral meeting FP4-SP Core group in February, an amendment adding 12 new topics was proposed by FP4.

Finally, the first official STIP V1_0 includes the topics listed in Table 1 below proposed by FP4:

Category	Topic ID	Topic
Energy management and supply	STIP_108	New standard for standardised interfaces for energy management functions
	STIP_109	IRS 90940 v2 update or new standard on interfaces between train and operation for operational measures for Energy management *(if finally new standard to be completed with the title of the new document when available)*
Alternative propulsion, traction energy	STIP_111	prCLC/TS 50729:2022 update or new standard *(if finally new standard to be completed with the title of the new document when available)*
	STIP_112	IEC 62928:2018 update or new standard *(if finally new standard to be completed with the title of the new document when available)*
	STIP_113	New standard (To be completed with the title of the document when available)

	STIP_114	EUROSPEC / Specification for alternative traction energy supply and related infrastructure interfaces Part 1: Battery driven systems - update
	STIP_115	EN 50546:2020 update
	STIP_116	EUROSPEC / Specification for alternative traction energy supply and related infrastructure interfaces Part 2: Hydrogen
	STIP_117	ISO 17268: 2020 - Gaseous hydrogen land vehicle refuelling connection devices
	STIP_118	ISO 19880-10 - Gaseous hydrogen fuelling stations Part 10: Gaseous rail refuelling station
	STIP_119	Holistic Risk Analysis for the use of Hydrogen as power supply for trains
Subsystem components	STIP_125	EN 15734-1 & 2: 2010 + AC:2013 - Railway applications - Braking systems of high speed trains -Part 1: Requirements and definitions - Part 2: Test methods
	STIP_126	EN 16185-1 & 2: 2014 + A1:2020 - Railway applications - Braking systems of multiple unit trains -Part 1: Requirements and definitions - Part 2: Test methods
	STIP_127	prEN 13452-1 & 2: 2023 - Railway applications - Braking - Urban rail brake systems -Part 1: Requirements and definitions - Part 2: Test methods
	STIP_128	EN 15595: 2018+ AC: 2021 - Railway applications - Braking - Wheel slide protection
	STIP_129	EN 14531-1:2015+A1:2018 - Railway applications – Methods for calculation of stopping and slowing distances and immobilization braking - Part 1: General algorithms utilizing mean value calculation for train sets or single vehicles
	STIP_130	EN 50125 - Railway applications Environmental conditions for equipment
Reduction environmental impact	STIP_131	CEN/ TR 16891:2016 - Railway applications - Acoustics - Measurement method for combined roughness, track decay rates and transfer functions
	STIP_132	Definition of common protocols to assess and validate solutions to improve air quality onboard
	STIP_133	Adaptation to climate change

Table 1: STIP V1_0 FP4-Rail4EARTH topics (extract from EU-RAIL_STIP_-V1_0_Final.xlsx [1])**.**

The process of resolving the standardisation bodies comments to the FP4 STIP begun from the SP Core Group, with the support of FP4 partners through bilateral meetings and exchanges of requests / answers in March 2024 and is still ongoing in November 2024.

7. Conclusions

This D28.1 presents all the dissemination and exploitation actions of the project realised between M1 (Dec 2022) and M24 (November 2024), as mentioned in our WP28 description of action.

The project delivered already a lot of communications and is in line with its contractual commitments outlined in the WP28 description of action:

Instruments	Expected impact (KPI)	Target Groups	done 2022	done 2023	done 2024	done 2025	done 2026	planned in GA	total done	due
E-mails	300 persons	Rail authorities / Policymakers and regulators (including the EP) / Researchers / Industry associations of "enablers" / Other Rail, Mobility and Transport / Research projects / Academia / The media	0	2					2	0
Project brochure	1 project brochure	Rail authorities / Policymakers and regulators and supply chains / Researchers from other transport-energy projects / Industry associations of "enablers" / Policymakers and regulators / The media / Academia	0	1	0			**1**	1	0
Website posts (at least **four per each year of the project**)	200 visitors per year	Rail authorities / Policymakers / Researchers from other transport-energy projects / Industry associations of "enablers" / Policymakers and regulators / The media	0	3	8			**24**	11	13
Newsletters (1 issue during the life of the project)	> 200 subscribers	Rail authorities / Policymakers / Researchers and Academics	0	0	0			**1**	0	1
Webinars/workshops for stakeholders including at least six countries (LN note :External workshop)	2 workshops	Rail authorities / Policymakers	0	0	3			**2**	3	0
A short video about the demos, to be posted on EURAIL web site	> 500 (rough estimate of viewers)	The public and passengers (FP4-Rail4EARTH project will send press releases to the media and other outlets about the availability of the videos)	0	0	to be done			**1**	0	1
Project website creation	> 1000 of visitors in tota	Transport-energy authorities / Policymakers / Academia and other researchers / Media / The public	1	N/A	N/A	N/A	N/A	**1**	1	0

8. References

[1] EU-RAIL_STIP_-V1_0_Final file: EU-RAIL_STIP_-V1_0_Final.xlsx. Available on https://rail-research.europa.eu website at: https://rail-research.europa.eu/wp-content/uploads/2024/08/EU-RAIL_STIP_-V1_0_Final.xlsx

9. Appendices