



**Reports on national R&I activities and their potential
synergies with EU-Rail Programme**

SRG Report

Consolidated version

December 2024

Purpose of this report

The states' representatives group (SRG) is one of the advisory bodies of Europe's Rail Joint Undertaking (EU-Rail), according to the Council Regulation (EU) 2021/2085 establishing the Joint Undertakings under Horizon Europe (SBA).

Article 20.10 of the SBA provides that:

“The states' representatives group shall submit, at the end of each calendar year, a report describing the national or regional policies in the scope of the joint undertaking and identifying specific ways of cooperation with the actions funded by the joint undertaking.”

This report includes the list of national/regional R&I activities provided by SRG members during 2024. In total, fourteen countries contributed to this exercise; and more than sixty projects and programmes have been identified by EU-Rail for potential synergies with the EU-Rail Programme.

The SRG Chair presented a summary of the report at the EU-Rail General Assembly held on 21-22 November 2024.

EU-Rail is currently updating the synergy actions between the SRG members' R&I activities and the EU-Rail Programme proposed in 2024, as well as analyzing potential further actions. The objective is to complete all proposals for synergy actions in early 2025.

This report will be updated, including a state of play on the implementation of all ongoing actions, twice a year.

About 30 programmes have been identified by the MS, of which the following are open for call for submission, or will be in the upcoming months:

- WBIF – Investment Grants and Technical Assistance. Calls published twice per year. <https://www.wbif.eu/investment-grants> <https://www.wbif.eu/technical-assistance-grants>
- Rail4Climate: Digitalization and automatization of the rail system. 2024-2027. First call 23/10/2024-12/03/2025 (evaluation decision expected in June 2025). Calls on a yearly basis. Budget: 5M/year. https://www.ffg.at/dtm_r4c_call2024
- DOPRAVA 2030 (successor of DOPRAVA 2020+): Modernizing the transport sector regarding sustainability, safety and societal needs (2023-2030). <https://www.tacr.cz/program/doprava-2030/>
- FoPS: Finances scientific research projects that contain model solutions for typical transports problems in cities and municipalities that are transferable nationwide as far as possible. Calls on a yearly basis. <https://fops.de/>
- Subsidy program for companies to support sustainable and digital transport (Spanish Ministry of Transport): Subsidies to companies to support sustainable and digital transport in competitive competition, within the framework of the Recovery, Transformation and Resilience Plan (PRTR) (2022-2025). Total budget: 800M. <https://www.transportes.gob.es/ministerio/proyectos-singulares/prtr/programa-de-subsenciones-empresas-para-el-apoyo-de-un-transporte-sostenible-y-digital>
- PT 2030 Programme (Structural funds – ERDF): R&I collaborative calls are foreseen for all subjects.
- InfraSweden: Strategic innovation program for a smart, sustainable, resilient and competitive transport infrastructure. One call per year until 2027. <https://www.infrasweden.nu/>
- Albania: Economic Reform Programme (ERP) 2023 – 2025: Technical assistance for preparation of national ITS strategy for Albania (railway and maritime) and other regional partners in the Western Balkan.
- UK RSBB cross-industry research programme: The aim is to enable a safe and efficient railway by providing knowledge and solutions to best utilize existing assets and unlock future change. The core funding for the programme is provided by a grant from the Department for Transport (DfT) which is currently around €10m per year. This is run as a three-way partnership involving DfT, RSSB and industry. In addition, industry provides some cash co-funding, significant in-kind support and lead on using the outputs so that they deliver benefits.

More than 60 projects have been identified by the MS, of which several synergies are expected by the SRG members, here below few examples that will be further enlarged during the course of 2025, with a specific action plan:

With EU-Rail FP1:

- ✓ **FW03010571: AI system for multimodal traffic data evaluation**
 - Synergies to be considered with FP1, FP2 and FP5.
- ✓ **2023-05-D[1]1217: Framework conditions, processes and planning tools for capacity-optimized building and maintenance activities in the existing rail network:**
 - Synergies to be considered with FP1 and FP3.

With EU-Rail FP2:

- ✓ **ERTMS ASAP for the implementation of a new European train safety system (until 2050)**
 - Links to be established with FP2 to align where possible and exchange.
- ✓ **CK04000088: Increasing of tunnel safety using continuous accurate vehicle location (2023-2025).**
 - No JU Members involved.
 - To be seen whether this can be of use for FA2 – ASTP project or not. Not specifically mentioned that work will be focused on improving onboard localization as such or whether we are dealing with a mix of different technologies – including detection on the trackside.
 - Ongoing Action: following a check with the FP, organise a dedicated meeting between projects to see whether there are synergies or not.
- ✓ **FW08010072: Wagon 5G communication unit (2023-2025).**
 - Links to be established with FP2 to align where possible and exchange.
- ✓ **CK04000082: Advanced cyber security methods in tunnel systems as a part of critical transport infrastructure (2023-2025).**
 - No JU Members involved.
 - To be seen whether this can be of use for FA2 or SP (cybersecurity). This project focuses on Tunnel safety/security.
 - Ongoing Action: following a check with the FP, organise a dedicated meeting between projects to see whether there are synergies or not.
- ✓ **TARO (“Towards Automated Railway Operation”): Automatization & Digitalization for the Railway System.**
 - EU-Rail already part of the advisory group and OEBS ensuring transfer of knowledge through IKAA.

- ✓ **Rail4Climate (R4C):** digitalization and automatization of operations, maintenance, infrastructure, and rolling stock; reduction of the time-to-market; substantial contribution to climate neutrality of the mobility system.
 - Synergies to be considered with FP2 and FP4.
- ✓ **FW03010571: AI system for multimodal traffic data evaluation**
 - Synergies to be considered with FP1, FP2 and FP5.
- ✓ **2022-21-D[1]1202:** Teleoperation as a complement for automatic train operation (ATO): Framework and human[1] centered design.
 - Synergies to be considered with FP2.
- ✓ **2022-20-D[1]1202:** Further Development of the Open Data Foundations for Object Detection and Classification by Means of Artificial Intelligence in Automatic Train Operation.
 - Synergies to be considered with FP2.
- ✓ **2022-19-S[1]1202:** Stakeholder expectations and societal acceptance conditions in automated rail transport in GoA3+.
 - Synergies to be considered with FP2.
- ✓ **2020-20-D[1]1202:** ATO: Functional requirements of sensors and logic module.
 - Synergies to be considered with FP2.

With EU-Rail FP3:

- ✓ **CK04000082: Advanced cyber security methods in tunnel systems as a part of critical transport infrastructure (2023-2025).**
 - Links to be established with FP3 to align where possible and exchange.
- ✓ **CK03000182: Research of construction-technical requirements for the use of TEN-T ground infrastructure to solve large-scale crisis situations (2022-2025).**
 - Links to be established with FP3 to align where possible and exchange.
- ✓ **CK04000109: Predictive diagnostics of ITS technological equipment using IA approaches (2023-2025).**
 - Links to be established with FP3 to align where possible and exchange.
- ✓ **FW06010422: Simulation and design of structures from digital concrete (2023-2025)**
 - Links to be established with FP3 to align where possible and exchange.
- ✓ **CK03000168: Intelligent methods of digital data acquisition and analysis for bridge inspections.**
 - Links to be established with FP3 to align where possible and exchange.
- ✓ **CL01000137: Modular Traction Converter for Substations and Flexible AC Transmission System (FACTS)**

- Links to be established with FP3 to align where possible and exchange.
- ✓ **Several projects from DZSF (various TRL):** synergies foreseen with FP3 and FP4.
 - Ongoing Action: following a check with the FP, organise dedicated meetings between projects.
- ✓ **2023-05-D[1]1217:** Framework conditions, processes and planning tools for capacity-optimized building and maintenance activities in the existing rail network:
 - Synergies to be considered with FP1 and FP3.
- ✓ **Management and Extension of Service Life of infrastructures affected by Alkali-silica reaction (MESLA):** The overall aim is to build up new knowledge on how to manage and maintain existing ASR-affected structures in a technical, economic and environmental beneficial way, and verify how this knowledge can be applied to ensure structural safety and extend the service life of existing bridges.
- ✓ **Sound TRANsport NETworks (S-TRANET):** The aim is to establish the cause of hazard events on railway infrastructure using a distributed sensor network (2023-2027)
- ✓ **Railway Construction Innovation:** The aim is to deliver demonstrations of innovation in railway construction working with the teams building the Global Centre of Rail Excellence (GCRE) facility. The current budget is approximately EUR 8M for 2022-2025 (2025 tbc).

With EU-Rail FP4:

- ✓ **CK04000107: Research and development of advanced composite cylinders for alternative fuels (2023-2025).**
 - Links to be established with FP4 to align where possible and exchange.
- ✓ **Rail4Climate (R4C):** digitalization and automatization of operations, maintenance, infrastructure, and rolling stock; reduction of the time-to-market; substantial contribution to climate neutrality of the mobility system.
 - Synergies to be considered with FP2 and FP4.
- ✓ **CK02000218: Wayside diagnostic of railway vehicles running gear**
 - Links to be established with FP4 to align where possible and exchange.
- ✓ **CK02000044: Progressive development of hydrogen economy in transport in the Czech Republic**
 - Links to be established with FP4 to align where possible and exchange.
- ✓ **CL01000041: Means for the implementation of low-emission technologies in rail transport**
 - Links to be established with FP4 to align where possible and exchange.

- ✓ **Several projects from DZSF (various TRL):** synergies foreseen with FP3 and FP4.
 - Ongoing Action: following a check with the FP, organise dedicated meetings between projects.
- ✓ **ADIF R&I Programme.** Mainly dedicated to the following projects: Platforms (TRL 8), Hydrogen fuel cell train. (TRL 7) and Broken rail. (TRL 7).
 - Possible synergies to be considered with FA3 and FA4.
 - Ongoing Action: following a check with the FPs, organize a dedicated meeting between projects.
- ✓ **Program Source Approach to Rail Vibrations.** English: Innovation Agenda for Minimizing Track Vibrations at the Source.
 - Synergies to be considered with FA4 activities.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.
- ✓ **Resilient Rail:** Operational safety questions for increased resilience in rail.
- ✓ **3D scanning and reverse engineering algorithms in the railway sector:** The project goal is to establish a reverse engineering workflow from physical parts to well behaved CAD models facilitating rapid manufacturing of replacement parts as well as a library of digital replica and tools for training personnel and efficient maintenance of components.

With EU-Rail FP5:

- ✓ **CK04000041: SmartRail – Automated data analysis related to rail freight traffic (2023-2025).**
 - Links to be established with FP5 to align where possible and exchange.
- ✓ **CL01000180: Use of Artificial Intelligence in Support of Dispatcher Control of Rail Freight Transport**
 - Links to be established with FP5 to align where possible and exchange.
- ✓ **SCOPE Project for shared freight transport services connecting shipper and carrier operations (forwarding and carriers)** (from European regional Development Fund Interreg Balkan MED (Balkan Mediterranean)).
 - Links to be established with FP5 and possible expression of interest for DAC pre-deployment trains.
- ✓ **FW03010571: AI system for multimodal traffic data evaluation**
 - Synergies to be considered with FP1, FP2 and FP5.
- ✓ **Operating regime of overhead contact line-less traction in rail freight transport (Project number 2022-10-W-1202 - Ongoing)**
 - Links to be established with FA5 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organise a dedicated meeting between projects.

- ✓ **Determination and optimisation of influences in rail passenger transport and rail freight transport on the capacity of the overall rail system (Project number 2022-04-D-1202 - Ongoing)**
 - Links to be established with FA5/FA6 and ESEP4Freight to align where possible and exchange.
 - Ongoing Action: following a check with the FP, to possibly organize a dedicated meeting between projects.

- ✓ **Digital Automatic Coupling – Demonstrator (Project number 2020-E12-1202 - Ongoing)**
 - Links to be established with FA5 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.

- ✓ **ELETA Project for Enhanced Data Interoperability for Combined Transport (EDICT) for the period up to and including 2024.**
 - Links to be established with FA5 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects (and with ESEP4Freight).

- ✓ **Pilot automation container-transport shuttles (INDIGO+):** Pilot to automated train preparation and breaking process (automatic brake testing, automatic wagon inspection, digital automatic coupling (DAC)).
 - Links to be established with FA5 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.

- ✓ **Sensoring Better use of Last Mile:** The aim of the pilots is to increase the planned capacity at rail yards by 25%, thereby achieving better use of the existing rail infrastructure. The financial coverage of the pilots is provided by the Ministry of I&W and different port authorities.
 - Links to be established with FA5 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.

- ✓ **Subsidy scheme for modal shift from road to rail and inland shipping. The scheme has been approved by the European Commission and has a duration of four years and includes €7.5 million for rail.**
 - Links to be established with FA5 and FA6 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.

- ✓ **Zefes (Zero-Emission Long-Haul Freight Transport):** 3,5-year project aiming to deploy 9 different long-haul truck configurations (BEV and FCEV) in various use cases covering important TEN-T corridors in Europe. The project addresses the decarbonization of long-distance freight transport by demonstrating real-world applications with battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs) across Europe.

With EU-Rail FP6:

- ✓ **Reactivation of railway lines in border regions (Project number 2022-23-U-1202 - Ongoing)**
 - Links to be established with FA6 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organise a dedicated meeting between projects.

- ✓ **Determination and optimisation of influences in rail passenger transport and rail freight transport on the capacity of the overall rail system (Project number 2022-04-D-1202 - Ongoing)**
 - Links to be established with FA5/FA6 and ESEP4Freight to align where possible and exchange.
 - Ongoing Action: following a check with the FP, to possibly organize a dedicated meeting between projects.

- ✓ **ADIF R&I Programme with referred activity for low cost ERTMS (TRL 7)**
 - Ongoing Action: to strengthen the links with FP6 to align where possible and exchange.

- ✓ **MaaS Mobility as a Service / MaaS apps developed / MaaS cross-border planning**
 - Links to be established with FA6 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.

- ✓ **Subsidy scheme for modal shift from road to rail and inland shipping. The scheme has been approved by the European Commission and has a duration of four years and includes €7.5 million for rail.**
 - Links to be established with FA5 and FA6 to align where possible and exchange.
 - Ongoing Action: following a check with the FP, organize a dedicated meeting between projects.

Potential links with several FPs:

- ✓ **CORIFER 2023:** Contribute to the in-depth transformation of the railway sector and the corresponding mobility system, by responding to technological, competitiveness and ecological transition challenges. (*Theme 1 - Train with very low environmental impact; Theme 2 – Efficient and inclusive daily mobility; Theme 3 – Digitalization of rail transport: vehicle, infrastructure and industry; and Theme 4 – Acceleration of rail freight*)
 - Impact on MAWP – links to be established.

- ✓ To follow up the Pilot-T scheme, smart mobility solutions by developing and testing and/or piloting technologies, services and business models with the potential to influence the transport system of the future to make it efficient, safe and environmentally friendly.
 - Ongoing Action: following a check with the FPs, organize dedicated meetings between projects

- ✓ **Norwegian Transport 2025 programme:** Generate knowledge and solutions for use in the development of an integrated, future-oriented transport system that will meet the needs of trade and industry and society at large for effective, sustainable transport.

- ✓ **Projects funded by BRIK II Programme** (Research and Development in Railway Infrastructure).

- ✓ **Smart logistics considered in their National Plan 2030 with instruments to finance pilots and demonstrations**
 - Ongoing Action: following a check with all FPs, organize dedicated meetings between projects, considering the National Plan provided as reference.
- ✓ **Infrasweden is a strategic innovation program that has one call per year with different focuses within sustainable transport infrastructure (<https://www.infrasweden.nu/>)**
 - Ongoing Action: following a check with all FPs, organize dedicated meetings between projects as synergies with FPs could be explored.
- ✓ **Component 9 of the Renewal Plan** – More effective management and strengthening of funding for research, development and innovation.
- ✓ **First of a Kind Programme**: The aim is to reduce costs and risks for the rail industry associated with implementing new technologies. It supports rail innovation through the demonstration of an innovation on the live railway. There are new competitions annually with approximately EUR 7.5M allocated to new projects as a result.
- ✓ **Control Period (CP) 7 Research and Development Programme**: It refers to the next five-year planning and funding cycle for Network Rail in Great Britain, covering the period from 1 April 2024 to 31 March 2029. The plans include investment in technology and research and development.

Annex: List of country contributions (in alphabetical order)



ALBANIA

- **SCOPE Project for shared freight transport services connecting shipper and carrier operations (forwarding and carriers)** (from European regional Development Fund Interreg Balkan MED (Balkan Mediterranean))
- **Economic Reform Programme (ERP) 2023 – 2025:** Technical assistance for preparation of national ITS strategy for Albania (railway and maritime) and other regional partners in the Western Balkan.



AUSTRIA

- **FADACIO (digital automatic coupler) project**
- **H2RailTube (hydrogen transport on rail): hydrogen tank**
- **RailCharge (charging of e-cars during rail transport)**
- **AM4Rail (additive manufacturing of spare parts for rail vehicles)**
- **TARO (Towards Automated Railway Operation)**
- **Rail4Climate (R4C):** digitalization and automatization of operations, maintenance, infrastructure, and rolling stock; reduction of the time-to-market; substantial contribution to climate neutrality of the mobility system.



CZECHIA

- **CK04000088: Increasing of tunnel safety using continuous accurate vehicle location (2023-2025).**
- **CK04000082: Advanced cyber security methods in tunnel systems as a part of critical transport infrastructure (2023-2025).**
- **CK04000041: SmartRail – Automated data analysis related to rail freight traffic**
- **FW08010072: Wagon 5G communication unit**
- **CK03000168: Intelligent methods of digital data acquisition and analysis for bridge inspections**
- **CK03000182: Research of construction-technical requirements for the use of TEN-T ground infrastructure to solve large-scale crisis situations**
- **CK02000044: Progressive development of hydrogen economy in transport in the Czech Republic**

- **CK02000218: Wayside diagnostic of railway vehicles running gear**
- **CK04000107: Research and development of advanced composite cylinders for alternative fuels**
- **CK04000109: Predictive diagnosis of ITS technological equipment using AI approaches**
- **FW06010422: Simulation and design of structures from digital concrete**
- **FW03010571: AI system for multimodal traffic data evaluation**
- **CL01000041: Means for the implementation of low-emission technologies in rail transport**
- **CL01000137: Modular Traction Converter for Substations and Flexible AC Transmission System (FACTS)**
- **CL01000180: Use of Artificial Intelligence in Support of Dispatcher Control of Rail Freight Transport**



GERMANY

- **Several projects from DZSF (various TRL)**
- **Reactivation of rail lines: accompanying measures (Project number 2022-25-U-1202 - Ongoing)**
- **Reactivation of railway lines in border regions (Project number 2022-23-U-1202 - Ongoing)**
- **Operating regime of overhead contact line-less traction in rail freight transport (Project number 2022-10-W-1202 - Ongoing)**
- **Determination and optimisation of influences in rail passenger transport and rail freight transport on the capacity of the overall rail system (Project number 2022-04-D-1202 - Ongoing)**
- **Digital Automatic Coupling – Demonstrator (Project number 2020-E12-1202 - Ongoing)**
- **2023-05-D[1]1217: Framework conditions, processes and planning tools for capacity-optimised building and maintenance activities in the existing rail network.**
- **2022-21-D[1]1202: Teleoperation as a complement for automatic train operation (ATO): Framework and human[1] centered design.**
- **2022-20-D[1]1202: Further Development of the Open Data Foundations for Object Detection and Classification by Means of Artificial Intelligence in Automatic Train Operation.**
- **2022-19-S[1]1202: Stakeholder expectations and societal acceptance conditions in automated rail transport in GoA3+.**
- **2020-20-D[1]1202: ATO: Functional requirements of sensors and logic module.**



SPAIN

- **ADIF R&I Programme with referred activity for Low cost ERTMS (TRL 7)**
- **ADIF R&I Programme.** Mainly dedicated to the following projects: Platforms (TRL 8), Hydrogen fuel cell train. (TRL 7) and Broken rail. (TRL 7).



FRANCE

- **CORIFER 2023:** Contribute to the in-depth transformation of the railway sector and the corresponding mobility system, by responding to technological, competitiveness and ecological transition challenges.



LUXEMBOURG

- **Zefes (Zero-Emission Long-Haul Freight Transport):** 3,5-year project aiming to deploy 9 different long-haul truck configurations (BEV and FCEV) in various use cases covering important TEN-T corridors in Europe. The project addresses the decarbonization of long-distance freight transport by demonstrating real-world applications with battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs) across Europe.
- **Survey on public transport satisfaction in Luxembourg:** Online survey, launched by LISER, that will run from November 2nd to mid-December, sponsored by the Luxembourg National Research Fund (FNR). This survey is different but also complementary to those already carried out on the territory (e.g., [Border Mobility Survey](#) in 2010-2011, [LuxMobil](#) survey in 2017 in Luxembourg, etc.), because it seeks to estimate a level of satisfaction with public transport and mobility in the country. The results of this survey will be compared to those of a previous survey organized by LISER on public transport in Luxembourg.
- **Antoine:** Data analytics platform & decision support tool that will empower the operational & tactical decisions of intermodal freight activities. The tool will serve as a cockpit by forecasting operational issues, and identifying robust solutions to handle disruptions & stochasticity stemming from train delays, wagon breakdowns, etc. In the long run, by integrating rail processes with maintenance operations and costs, ANTOINE allows the reduction of overall system costs.



NETHERLANDS

- **Development of rail freight based on technological innovations/digitalisation**

- **ELETA Project for Enhanced Data Interoperability for Combined Transport (EDICT)** for the period up to and including 2024.
- **Pilot automation container-transport shuttles (INDIGO+)**: Pilot to automated train preparation and breaking process (automatic brake testing, automatic wagon inspection, digital automatic coupling (DAC)).
- **Sensoring Better use of Last Mile**: The aim of the pilots is to increase the planned capacity at rail yards by 25%, thereby achieving better use of the existing rail infrastructure. The financial coverage of the pilots is provided by the Ministry of I&W and different port authorities.
- **MaaS Mobility as a Service / MaaS apps developed / MaaS cross-border planning**
- **On top, subsidy scheme for modal shift from road to rail and inland shipping. The scheme has been approved by the European Commission and has a duration of four years and includes €7.5 million for rail.**
- **Program Source Approach to Rail Vibrations**. English: Innovation Agenda for Minimizing Track Vibrations at the Source. From the title, synergies to be considered with FA4 activities as well as Call 23 – Explo research. ProRail involved.



NORWAY

- **To follow-up the Pilot-T scheme, which seeks to accelerate the application of new, smart mobility solutions by developing and testing and/or piloting technologies, services and business models with the potential to influence the transport system of the future to make it efficient, safe and environmentally friendly.**
- **Transport 2025 programme**: Generate knowledge and solutions for use in the development of an integrated, future-oriented transport system that will meet the needs of trade and industry and society at large for effective, sustainable transport.
- **Management and Extension of Service Life of infrastructures affected by Alkali-silica reaction (MESLA)**: The overall aim is to build up new knowledge on how to manage and maintain existing ASR-affected structures in a technical, economic and environmental beneficial way, and verify how this knowledge can be applied to ensure structural safety and extend the service life of existing bridges.
- **Sound TRANsport NETworks (S-TRANET)**: The aim is to establish the cause of hazard events on railway infrastructure using a distributed sensor network (2023-2027)
- **3D scanning and reverse engineering algorithms in the railway sector**: The project goal is to establish a reverse engineering workflow from physical parts to well behaved CAD models facilitating rapid manufacturing of replacement parts as well as a library of digital replica and tools for training personnel and efficient maintenance of components.

POLAND

Projects funded by BRIK II Programme (Research and Development in Railway Infrastructure):

- **Innovative Railway Vehicle Warning System:** Develop a system that provides advance warning of an approaching railway vehicle, allowing workers to safely leave the track.
- **Line Dispatcher Support System:** The project involves developing a system that supports line dispatchers in making the quickest possible decisions to reroute certain trains during crisis situations.
- **Bidirectional Traction Substations and Energy Storage Systems:** Increase network receptivity and improve energy efficiency and reliability in railways. The project involves developing new technologies to utilize the process of electric energy recuperation for the railway infrastructure manager's operations.
- **Enhance the Energy Efficiency of Heating Systems for Turnouts (EOR):** The task aims to improve energy efficiency mainly by proposing technical and organizational solutions to reduce electricity consumption for EOR devices.
- **Innovative Solutions for the Use of Photocatalytic Concrete in Infrastructure Managed by PKP PLK:** The project will include research and analyses to determine the optimal use of photocatalytic concrete technology in PKP PLK's operations. This technology, which helps combat smog, could be used, for example, on platform slabs.
- **Development of a method for managing environmental hazards affecting Railway Traffic Safety:** The project will develop and test an effective method for obtaining information about trees and shrubs located near railway lines and a methodology for managing them.
- **Development of a concept for using point clouds from scanning measurements to model spatial objects near railway tracks:** The project aims to develop a concept for using scanning measurement data for both maintenance and investment processes. It includes creating and testing software for modeling and analyzing the acquired data in real-world conditions.
- **Development of a system for precise monitoring of railway networks managed by PKP PLK in terms of the impact of railway traffic on the environment:** The project aims to develop an innovative system for precise monitoring and processing of traffic, technical, and environmental data on the railway network, in compliance with current legal regulations. The acquired data will, among other things, streamline the complex investment process in preparing environmental documentation.
- **Development of innovative and ecofriendly solutions for vegetation control on railway lines managed by PKP PLK:** The project aims to enable the use of ecological methods for vegetation control on railway infrastructure.



PORTUGAL

- **Smart logistics considered in their National Plan 2030 with instruments to finance pilots and demonstrations**



SWEDEN

- **Infrasweden is a strategic innovation program that has one call per year with different focuses within sustainable transport infrastructure (<https://www.infrasweden.nu/>)**



SLOVAKIA

- **Component 9 of the Renewal Plan – More effective management and strengthening of funding for research, development and innovation**
 - Investment 1: Support for international cooperation and involvement in Horizon Europe and EIT projects
 - Investment 4: Research and innovation for the decarbonisation of the economy
 - Investment 5: Research and innovation for the digitization of the economy



UNITED KINGDOM

- **First of a Kind Programme:** The aim is to reduce costs and risks for the rail industry associated with implementing new technologies. It supports rail innovation through the demonstration of an innovation on the live railway. There are new competitions annually with approximately EUR 7.5M allocated to new projects as a result.
- **RSBB cross-industry research programme:** The aim is to enable a safe and efficient railway by providing knowledge and solutions to best utilize existing assets and unlock future change. The core funding for the programme is provided by a grant from the Department for Transport (DfT) which is currently around €10m per year. This is run as a three-way partnership involving DfT, RSSB and industry. In addition, industry provides some cash co-funding, significant in-kind support and lead on using the outputs so that they deliver benefits.
- **Railway Construction Innovation:** The aim is to deliver demonstrations of innovation in railway construction working with the teams building the Global Centre of Rail Excellence (GCRE) facility. The current budget is approximately EUR 8M for 2022-2025 (2025 tbc).



- **Control Period (CP) 7 Research and Development Programme:** It refers to the next five-year planning and funding cycle for Network Rail in Great Britain, covering the period from 1 April 2024 to 31 March 2029. The plans include investment in technology and research and development.