FP4-Rail4EARTH Newsletter

JUNE 2025

INTRODUCTION

In this newsletter of the FP4-Rail4EARTH project, which started its activities in December 2022, you will learn more about the main achievements now that the project has passed its halfway point. Through the various developments that are being described, you should also get an idea of what's to come until the project concludes after its four-year duration.

To find out more about FP4-Rail4EARTH and its objectives, to access the public deliverables and to get a closer look at the project partners, please visit our website on https://rail-research.europa.eu/rail-projects/fp4-rail4earth/

Enjoy the read!

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

PROJECT SCOPE & STRUCTURE

The scope of work of the FP4-Rail4EARTH "Sustainable and Green Rail Systems" project, is to improve the existing sustainability performances of railway and to contribute towards the objectives of a Climate Neutral Europe for 2050. The project includes 38 demonstrations of new technologies, methodologies or tools. The activities are covering rolling stock, infrastructure, stations and all of their related sub-systems (traction, bogies, brakes, energy storage systems, HVAC, etc.).

The project is structured in six sub-projects:

➔ **Sub-project 1: Alternative energy solutions for the rolling stock,** 6 demonstrations in:

- High performances Batteries Electric Multi-Unit (BEMU) train, TRL6/7 in 2025;
- Hydrogen hybrid trains with test of heavy-duty inspection vehicle and loco for freight-passengers, TRL4/5 in 2025;
- Sub-urban catenary trains with on board Energy Storage Systems (ESS) , TRL 3/5 in 2025;
- Auto adaptive train energy consumption to various services situations.

➔ **Sub-project 2: Energy in rail infrastructure and stations,** 7 demonstrations in:

- H2 refueling station, TRL6 in 2025;
- Smart low consumption electrical infrastructures (with local renewable energy sources, ground energy storages, etc.), TRL6 in 2025;
- Smart green railway stations, TRL6 in 2025;
- Energy hubs in railway infrastructures, TRL5 in 2025;
- Methodologies/ guidelines for the optimal design/rehabilitation of stations including modularity and carbon footprint reduction, TRL5/6 in 2025.

➔ **Sub-project 3: Sustainability and resilience of the rail system,** 3 demonstrations in:

- Software tool specification on European climate variables usable for railway assets Reports, TRL5 in 2025;
- Noise indicators, simulation tools and development of optimised components for noise and vibrations minimisation, TRL6 in 2025;
- Software tools and indicators to promote eco-design, assess environmental performance / standardised reporting of the environmental impacts of the rail sector, TRL5 in 2025.

➔ **Sub-project 4: Electro-mechanical components for the rolling stock,** 18 demonstrations in:

- (Airless) electro-mechanical braking system, pantograph and suspensions, TRL7 in 2025;
- Optimised (energy, weight) motors and gearboxes, TRL in 2025;
- Replacing hydrofluorocarbon refrigerants by HVAC system using green refrigerants or new cooling technologies, TRL6 in 2025;
- Enhanced experimental and numerical methods on train aerodynamic optimisation, TRL6 in 2025.

➔ **Sub-project 5: Healthier and safer rail system,** 2 Demonstrations in:

- Healthier HVAC – air quality improvement, contaminant (particle / aerosol) removal, reduced virus/bacteria lifetime, TRL7 in 2025.

➔ **Sub-project 6: Train Attractiveness (Interiors),** 2 demonstrations in:

- Reinforcing train attractiveness via on-demand comfort for users (access, lighting, thermal and acoustic comfort), TRL5/6 in 2025;
- Reinforcing the facility to adapt rolling stock interiors (like modular architecture) to support the increase of capacity of the rolling stock, targeting TRL5/6 in 2025.

SUB-PROJECT 1: Alternative energy solutions for the rolling stock

Development of alternative propulsion based on ESS

One of the most relevant goals of the FP4-Rail4EARTH project is decarbonisation. Innovative propulsion systems based on Energy Storage System (ESS) are developed as alternative to the use of fossil fuels towards a zero CO2 emission rail system. The main targets are:

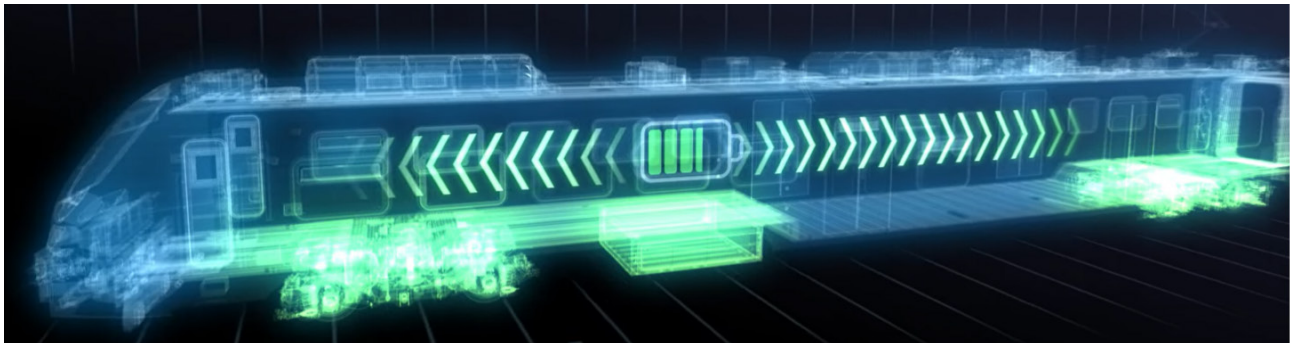
- Reduction to zero CO_2 emissions in regional trains. This would be able by replacing diesel trains (DMUs) by battery powered trains (BEMUs) without local CO_2 emissions;
- Achievement of 200 km of autonomy on Regional BEMUs. The current catenary-free operational range of the sold BEMUs is in 2025 around 80km–100km;
- Reduction of 5–10% LCC for specific use cases.

As a first step, a complete set of European-wide harmonised requirements for alternative propulsion systems based on ESS was established. These requirements were developed in collaboration with key railway operators, infrastructure managers, and rolling stock manufacturers, providing a standardised framework for the sector. The conclusions are summarised in a table collecting the requirements for different European countries. FP4-Rail4EARTH incorporated the latest technological advancements, particularly in energy storage technologies, and fast-charging solutions. Major challenges for achieving full railway decarbonisation were identified.

Energy management was identified as a critical element to optimise the performance long range BEMUs. Several strategies have been developed, aiming to maximise energy efficiency. Predictive models for train energy consumption have been developed enabling virtual optimisation of energy use under real operational scenarios.

Virtual validation methodologies have been successfully implemented through the development of Digital Twin models for propulsion and energy storage subsystems. These Digital Twins enabled a functional verification of the system and simulation of component degradation. The ability to virtually validate systems is expected to reduce physical testing needs, shorten development cycles, and lower overall costs.

The working group has progressed in the field of power semiconductor. Given the crucial role of Silicon Carbide (SiC) technology for future high-efficiency railway applications, dedicated work on reliability testing, lifetime modelling, and environmental robustness of SiC devices have been carried out. Collaboration with semiconductor suppliers and the European Center for Power Electronics (ECPE) has been part of the work performed.



All the previous tasks were directly linked with the development of the components to be assembled for the long range BEMUs. Technological developments were carried out at multiple levels. Both traction and on board Energy Storage System have been studied to improving the energy efficiency and increase the range of the BEMU.

On-board energy storage systems have been designed to meet requirements related to operational autonomy, cost efficiency, climatic adaptability, energy density, and safety. Partial testing activities, including Hardware In the Loop (HIL) simulations and preliminary laboratory validation, confirmed that the developed ESS prototypes could meet the targets set by the project. Components such as DC/DC converters, Batterie Thermal Management System (BTMS) and Batteries have been developed.

New developments on optimised traction systems to improve BEMU performance, including the use of SiC-based components have been made. Traction converters have been designed and manufactured. Innovations focused on maximising energy efficiency, reducing system weight and size, and enabling longer operation without the need for overhead catenary.

SUB-PROJECT 2: Energy in rail infrastructure and stations

Interoperable Hydrogen Refueling Station

This work supports the deployment of clean, efficient, and safe hydrogen technologies across the railway sector. Progress in technical and strategic areas has been made.

Analysis of refueling station location and configuration

A thorough assessment was carried out to identify optimal locations and configurations for hydrogen refueling stations in Poland, considering operational needs and future scalability. A micro-model of a refueling station was developed to facilitate strategic planning with stakeholders.

Safety and risk management

A comprehensive update of the hydrogen-specific risk register was completed, identifying hazards across the refueling process and guiding mitigation strategies. Some exchanges with international partners, including UIC, allowed to align with evolving safety standards and ensure compliance with EU regulations.

Modelling of the refueling Process

Advanced simulations of the hydrogen refueling process were performed using railway vehicle data. These models enable optimisation of key factors such as energy consumption, thermal dynamics, and refueling duration.

H2 refueling Interface between vehicle and station

A preliminary design of a universal mechanical interface was developed to ensure compatibility between various types of rolling stock and hydrogen refueling systems. In parallel, the definition of a data exchange interface between the vehicle and refueling infrastructure was studied. This is a key step toward automation, safety monitoring, and interoperability across different systems and manufacturers.

Smart infrastructure power supply

The main objective of this innovation area is to develop new solutions for improving the quality and energy efficiency of the catenary power supply in different European use cases (25kV AC and 15kV AC) .

Double side feeding of 50 Hz AC traction substations using Flexible Alternating Current Transmission System (FACTS)

The work was broken down into three areas: topologies and control strategies concepts, modelling of use cases and site identification, and lastly definition of general requirements for FACTS.

The generic requirements useful for the design of the Railway Interline Power Flow Converter (RIPFC) and Static Frequency Converter (SFC) systems and their control strategy have been delivered. Two topologies and two control strategies have been proposed for RIPFC. The main work has been to simulate a line equipped with RIPFC to observe the transient behavior of RIPFC depending on the topology chosen and the control strategy that will be applied to the converter.

Use cases on French and Italian railway networks have been modelled and simulated. Models of SFC and RIPFC are being implemented on the SNCF load flow tool to help determine the field of application of the converters and locate a potential experiment site.

Credits: Chetgal, elements.envanto.com

Energy storage solution for AC railway grid

A global simulation model of the Swedish railway traction power system has been successfully developed based on real-world field data. The accuracy and reliability of the model have been validated through two representative case studies.

Advanced energy storage systems (ESSs) and corresponding interface converter technologies have been explored to address voltage instability and power quality. To support these ESSs, a dedicated DC-AC converter topology was developed and integrated in the existing traction power substation. The system was evaluated through simulations under various configurations. In parallel, a novel approach was proposed to integrate ESSs directly into existing SFCs to enable peak power shaving and effective utilisation of regenerative braking energy.

The developed system-level model and proposed ESS integration strategies present a validated and cost-effective pathway to enhance the reliability, energy efficiency, and power quality of the Swedish railway traction network. Future work will focus on finalising the optimal ESS installation capacity and placement.

Optimisation and management tools for AC & DC railway grid

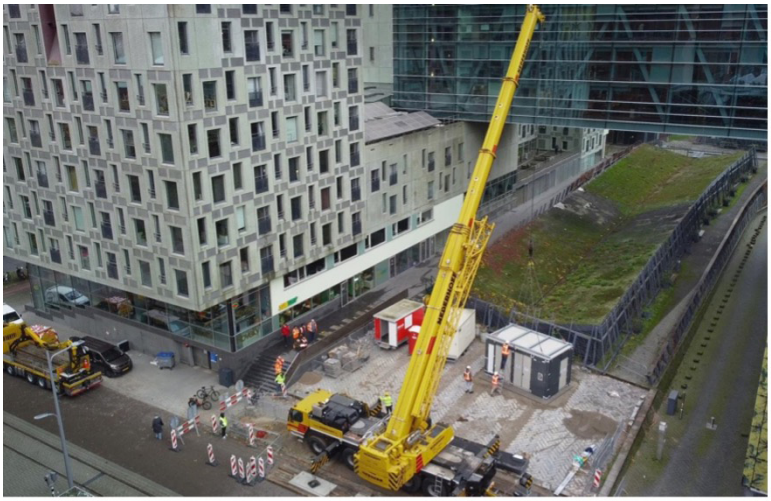
The working group created new tools and methods related to energy use, CO_2 equivalent emissions, and the reduction of Life Cycle Costs at grid level on different use cases.

The development of the load-flow simulation tools has been completed and validated with a real dataset of train on board and substation measurements. The specific use cases, centred on the Madrid-Levante high-speed railway line for the AC model and on the Zeeland railway line for the DC model, provided a practical scenario for analysing operational and power grid design parameters.

Smart energy hubs for a more reliable railway network

The FP4-Rail4EARTH project is helping to save energy. A part of this effort is developing smart, flexible Energy Hubs that combine on ground energy storage, renewable energy sources, and smart controls. These hubs reduce the request on the power grid, CO_2 emissions.

A leading example is the RET Energiebank pilot in Rotterdam. This mobile, battery-powered unit supports the tram network during busy periods. It stores braking energy, integrates solar power, and charges during off-peak times via the overhead line. With a footprint of only 15 m^2, it replaces traditional substations that require 125 m^2, saving up to €19 million in investment and reducing energy use by up to 30%. It can also charge electric cars and buses, making it a smart multi-use energy point.



The unit in front of Strukton facilities and being placed on final location in Rotterdam

In addition to Rotterdam, four other pilots are testing different types of energy hubs in various contexts:

- **The Netherlands – 1.5 kV DC Traction System:** This pilot explores how energy hubs can exchange power & energy between renewable sources, batteries, and train loads. Using real-time simulation and advanced control systems, it improves energy efficiency and reduce the need for grid upgrades.
- **Italy – Energy Storage on the DC Side:** This solution captures both braking energy and renewable energy on the 3 kV DC rail system.
- **Poland – Energy Storage on the AC Side:** It explores how to store and manage energy on the AC side of the power system. It uses weather forecasting and smart algorithms to optimise the charging/discharging cycles of batteries, supporting both the rail system and local energy demands.

All pilots improve the same KPIs: reduced energy use, lower CO_2 emissions, improved cost-efficiency, and smarter use of space and grid connections. Some even give a second life to old EV batteries, reducing waste and raw material demand.

Building the Green Station of the Future

The development of new type of stations using modular construction, digital technology, and renewable energy have been realised. These stations are not only better for the environment, but also quicker and cheaper to build.

One of the main results is a flexible, scalable station concept based on modular units. These units come in different sizes—from small shelters to full-service stations—and can be easily adapted to different locations. The design uses energy-efficient materials like Structural Insulated Panels (SIPs) and is prepared for off-grid operation with solar panels and battery storage. Energy simulations show that the most advanced modular variant reduce by 40% the energy consumption and emits 78% less CO_2 (in the construction phase) than a traditional station.

The project applies Building Information Modelling (BIM), Common Data Environments (CDE), and Digital Twins to support design, construction, and operation. These tools allow real-time monitoring of energy performance and remote management. Pilots in Poland and Spain have already started using these tools, with the goal of reducing both costs and environmental impact over the station's life cycle.

Because the modules are standardised and produced off-site, construction is faster and has less impact on the surroundings. This makes the concept especially useful for rural areas, temporary services, or fast upgrades in growing regions.

SUB-PROJECT 3: Sustainability and resilience of the rail system

This sub-project contains the transversal activities of the FP4-Rail4EARTH project, e.g. at a railway system level. Four different areas deal with the sustainability and resilience of the rail system:

1. Energy management & pre-standardisation for alternative drive trains and related railway system;
2. Adaptation to climate change;
3. Noise and vibrations;
4. Circular economy & environmental data management tools and solutions.

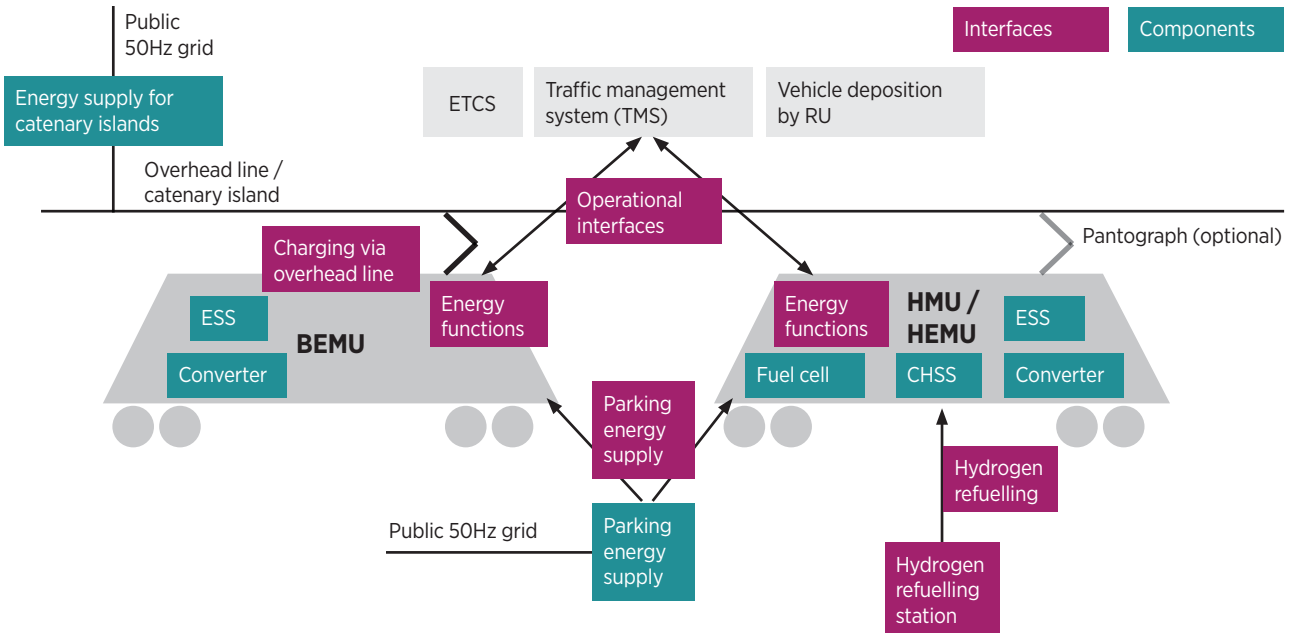
Energy management & pre-standardisation for alternative drive trains and related railway system

The work focuses on energy management at the railway system level separated in two parts: 'Pre-standardisation for trains with alternative drives' & 'Smart energy management'.

Pre-standardisation for trains with alternative drives

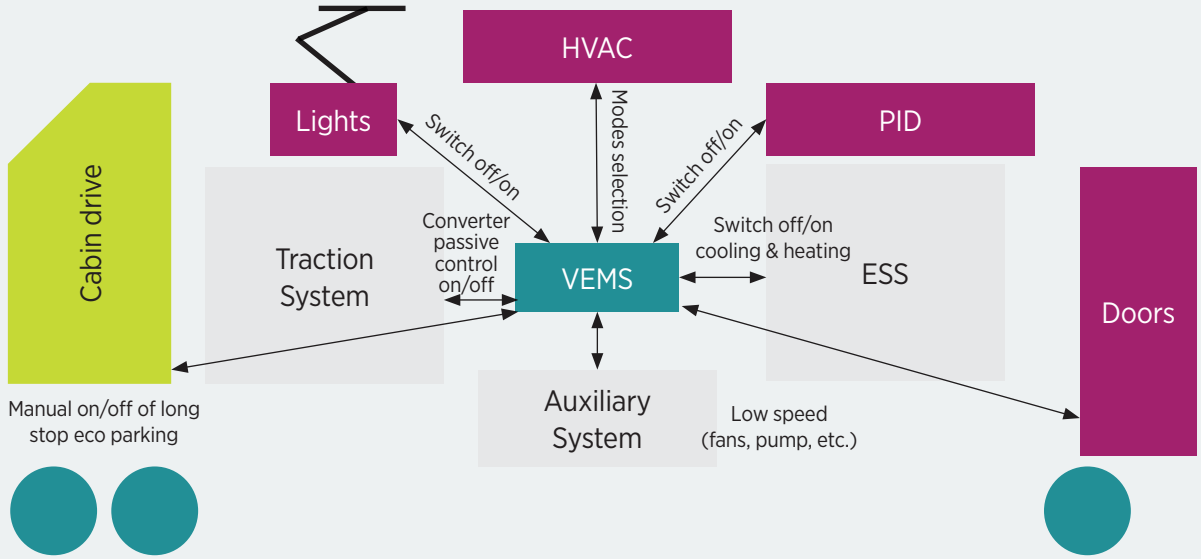
The identification of the interfaces of trains with alternative drives and related infrastructure resulted in the first list of 37 standards to be revised or to be created for infrastructure charging of alternative drive trains, as well as for on-board energy storage systems. A list of interfaces was identified relevant to the vehicle, to the infrastructure and to the Traffic Management System (TMS).

After an analysis of exiting solutions, one common mechanical interface for hydrogen refuelling for all railway application and its communication system was agreed.



Smart energy management at train level

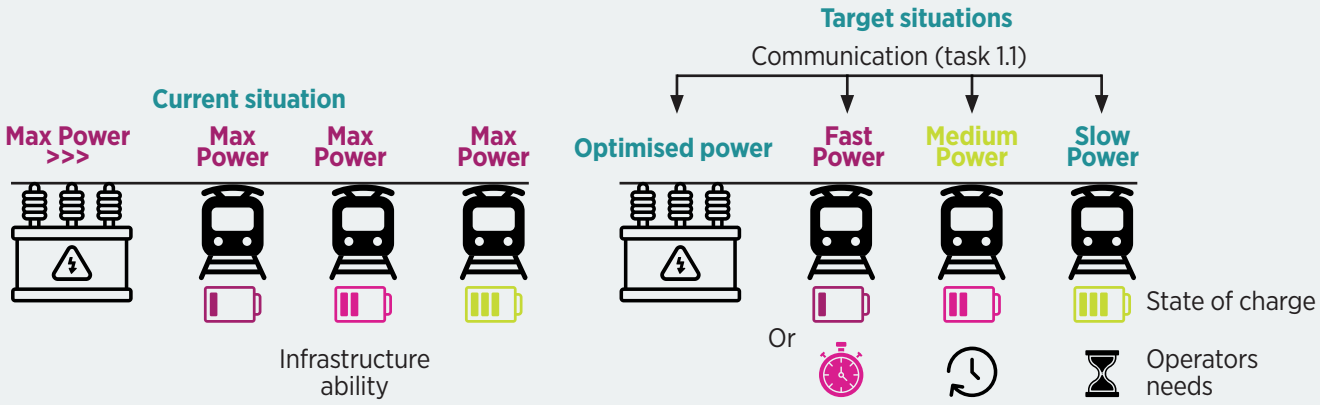
A state of the art of **energy functions** on-board and on-ground was realised to propose their standardisation.



VEMS = Vehicle Energy Management System, PID = Passenger Information Display

A definition of 6 scenarios (regional virtual profiles) to model battery train energy consumption according to EN50591, as well as simulations with various partial electrification scenarios were carried out.

The optimisation of the charging process with different strategies was analysed.



Adaptation to climate change

The first step has been made, to provide climate data usable for the design of railway equipment (more resilient to climate change) by using the best of climate science to exploit meteorological records as well as available climate projection models.

The achieved analysis highlighted the need to carry out vulnerability studies for all railway assets: rolling stock, infrastructure and stations. This work identifies the pre-existence of methodological tools enabling evidence-based decision-making.

Noise and vibrations

The following areas of research are investigated:

1. **Improvement of noise source characterisation:** methodology for aeroacoustics source characterisation has been written and applied on some area of rolling stocks as for example the 1st bogie.
2. **Noise perception indicator:** to better under-

stand the annoyance perceived by the railway tracks neighbours, monitoring stations have been installed at residents' homes along high-speed lines, tonality perception experiments realised in laboratory, inside trains and at residents' homes.

3. **Noise and vibrations emission over lifespan:** a catalogue of ground-borne vibration mitigation measures has been realised.

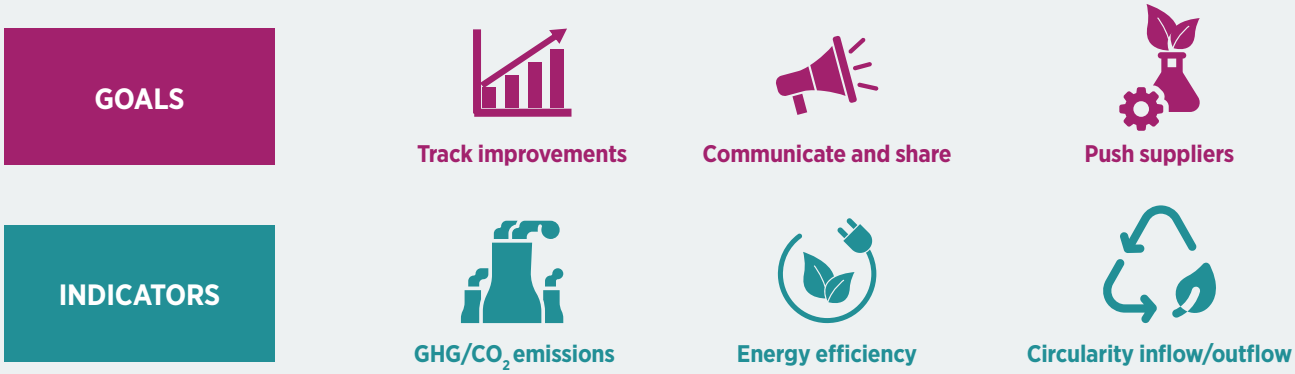
4. **Development of effective mitigation measures of ground-borne vibration:** a demonstrator to prove the technical feasibility in terms of dynamic response and ground-borne vibration mitigation has been produced with the development of a "Neoballast", made of non-conventional ballast aggregates with a special coating made of an advanced binder and rubber powder. Dynamic tests with conventional ballast and Neoballast have been realised.

5. **Squealing noise:** a practical approach to specify low squeal rolling stock and insight in possible squeal mitigation methods has been done. A practical track side measurement approach to monitor squeal noise and to obtain data for noise mapping calculations has been defined and on board (in rolling stock) and in track side measurements done.

Circular economy & environmental data management tools and solutions

Environmental data management tool and environmental indicators

The objective is software tools and indicators development to promote eco-design, assess environmental performance with a standardised reporting of the environmental impacts of the rail sector. The scope the tools and indicators has been defined considering the goals for manufacturers, rolling stock operators and infrastructure managers. Three main indicators have been selected.



The first calculation methods for each indicator have been defined, allowing to start the phase related to their tests and refinements with existing railway assets data.

Circular economy solutions

A list of criteria which enables to exchange second hand parts and material in confidence within the railway industry added in internal working instructions and processes has been defined. Carbon calculator to quantify the impact of catenary installations is finalised. Work also on linear materials, second-hand functionalities for marketplace, recycling of composite materials has been achieved.

SUB-PROJECT 4: Electro-mechanical components and sub-systems for the rolling stock

The work in this sub-project is focused on developing sustainable and efficient on board components. It covers electro-mechanical components, eco-friendly HVAC systems, low weight high energy efficiency bogies, and improved train aerodynamics.

Electro-mechanical Systems Supporting Air-less Trains

The analysis of EN standards for brakes has been finalised, with current demonstrations achieving TRL6-7 on test bench and with a real-scale prototype tested on a dyno test bench. For pantographs, the analysis of existing standards has been completed and the demonstration achieving TRL4-5 through sub-components tested on a test bench. This includes hardware-in-the-loop test bench upgrades and simulations.

Development of High-Performance Bogies and New Materials

The team has designed and validated new running gear architectures, including lightweight axles and bogies and together with active steering systems, with the integration of these components being tested in relevant environments. The development of new materials, such as composites, has progressed with the creation of a new standard (prEN 18121-1) and the acceptance of composites as a new working item in CEN (future EN 18121-2). Additionally, the design and specification of motors and gearboxes have been defined, showing improvements in power-to-volume ratios.

Development of Eco-friendly HVAC Systems

Various HVAC technologies were assessed and R290 (propane) HVAC units with efficiency improvements is the most promising option. The selection of train platforms for HVAC demonstrators has been completed. The development and design of HVAC units based on R290 is underway, with digital twin models being created to simulate the systems.

Improved trains Aerodynamics

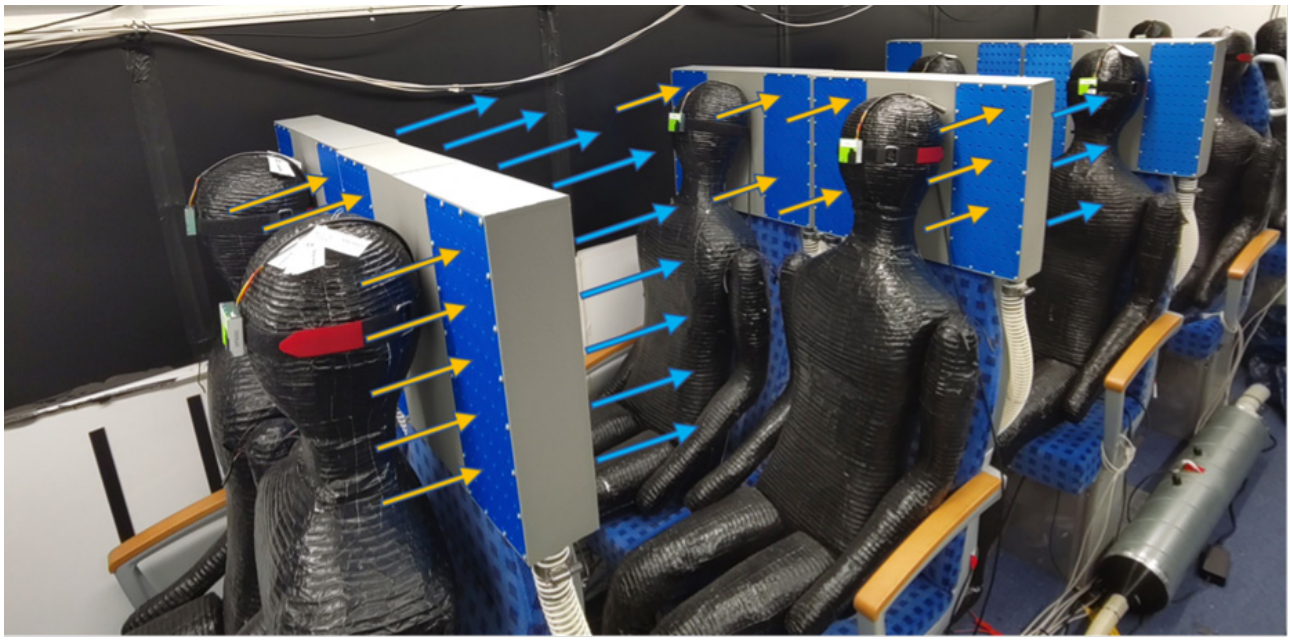
The team designed a generic reference model for aerodynamic performance assessment and prepared for wind tunnel tests. The team developed a matrix of roof configurations and designed a generic pantograph for wind tunnel testing.

SUB-PROJECT 5:
Healthier and safer rail system

Since the beginning of the COVID-19 pandemic investigations about air quality and impact of air conditioning and air distribution systems have been carried out. The impact of the air distribution system on the spreading behaviour is confirmed and the potential of alternative ventilation concepts is indicated. Further, many suppliers have proposed materials offering new functionalities claiming to be bactericidal, germicidal, fungicidal, or even virucidal. However, the efficiencies claimed by these materials are not comparable or verifiable directly on Rolling Stock because the standards and testing protocols used are not adapted to Rolling Stock applications or operating constraints. Besides this, the Sub-Project 5 also focusses on building a better understanding of non-exhaust emissions to assess the risks, with a focus on underground railway rights-of-way: Knowledge development, requirements as well as predictive tools and measurement protocols. The developments contribute to the air quality improvement and reduce concentration of particulate matter, virus or bacteria.

Concerning airflow concepts in passenger trains, an experimental study of a novel headrest-integrated ventilation system for passenger compartments was carried out. The objective of the novel ventilation system is to reduce the spread of exhaled particles, often referred to simply as aerosols, in densely occupied spaces such as passenger train compartments.

A generic prototype was designed, 3D-printed and tested for different operating configurations in a generic train laboratory. The results proved that the novel system has a positive effect on both the overall particle concentration in the compartment

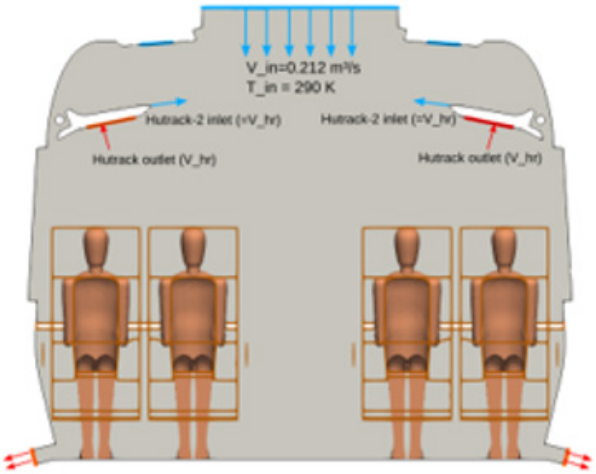


Generic prototypes of active blowing (blue arrows) and suction (orange arrows) headrests. Tested in the Generic Train Laboratory of the DLR in Göttingen, Germany, using thermal passenger manikins, an aerosol exhalation system and localised particle sensors.

and the peak concentrations on the neighbouring seats. At the same time, the potentially negative draft rates on the seats also increase with increasing volume flow rates, but always remain below 25%, even at the highest flow rates. A new 3D printed prototype tested experimentally in a generic train laboratory using an exhaling thermal manikin and spatially distributed particulate matter probes was produced. The best results were achieved which reduced the total aerosol exposure by almost 50% and by 60% for the seats next to the source, compared to the baseline.

In parallel, another alternative concept comprising a suction opening at the bottom side of the hat rack was analysed, which aims to collect aerosol exhaled by passengers before it reaches the other passengers (see Figure). The respective air is then filtered and re-supplied at the aisle facing edge of the hat rack. The respective aerosol particle concentration distribution plots for an active hat rack concept were calculated using computational fluid dynamics (CFD). The results show the effectiveness: The areas of the increased concentration are significantly reduced and therefore the exhaled aerosol particles will interact with less passengers.

A more detailed investigation regarding the decay of active particles was performed in terms of an analysis of the time that the exhaled particles are flying through the compartment, i.e., those particles which are not settled, removed through an exhaust or filtered by the hat rack unit. The results reveal a significantly faster decay of the number of active particles in the compartment for the active hat rack units compared to a reference case without active hat racks. A reduction to 50%, i.e., half of the initially exhaled particles are removed, can be achieved after 43 to 95 s (depending on the hat-rack flow rate) while it takes 150 s for the reference case (see Table 1).



Drawing with hat rack air cleaner.

Table 1. Time until the number of active particles in the cabin air falls below a certain threshold.

active particles	reference	active hat-rack low	high
50%	150 s	95 s	43 s
20%	285 s	235 s	120 s
10%	390 s	320 s	175 s

SUB-PROJECT 6: Train Attractiveness (interiors)

The interiors are based on a tailor-made design specific to each series. Moreover, quick-fit fasteners are almost non-existent, limiting the range of reuse solutions and increasing purchase and replacement costs. The objective is to reinforce train attractiveness and to increase the circularity in train interiors.

Sub-project 6 has two parts, one dedicated to modular and circular interiors and the second one to user's experiences and interfaces (including new architecture and new interfaces).

Current designs are neither designed to be renovated nor to evolve throughout the life of the train.

A methodology has been used to define boost a "designed for modularity" approach and support circular economy during the train interiors life.

The main identified challenges and opportunities are:

- The design for second life;
- The carry over with interiors modules independent from car bodyshell;
- The validation process to accelerate a new layout and reduce the time to market;
- The standardisation of the fixation system;
- The new approach to reduce tailored design but increase the personalisation;
- The choice of technologies to reduce the obsolescence.

For operators, the lack of modularity in design and uses limit the offers and the main technical locks to change is the poor capability to adapt a rolling stock to the "unknown" future passengers needs during 40 years of the train lifetime. The lack to offer real new experiences on board from one train to another has also been underlined.

Seven other challenges have been identified:

- The time to market;
- The carbody and the vehicle gauge to free more space for passengers;
- The customisation to adapt interiors;
- The obsolescence of technology and certification renewal;
- The toilet and the hygienic design;
- The increasing and/or evolving capacity of passengers on board;
- The new interfaces with new devices for passengers and drivers.

The following figures are resuming the main achievements of the sub-project 6 :

- Research for recycled and recyclable materials including Biomimicry works
- Shortlist potential circular materials
- Feasibility study (kind of application available in the interiors design)

Demonstrator:
- 10 realistic samples for testing

Circular materials – recycled/reused 1A

- Research for renewable materials
- Shortlist potential renewable and extend the life time materials
- Feasibility study

Demonstrator:
- 3 pilots for testing

Circular materials – renewable 1B

- Research for quick fasteners
- Shortlist potential adaptation for railway
- Feasibility study

Demonstrator:
- 3 pilots for testing with functional mock-up

Modular design – quick assembly 2A

- Research for separation of materials including Biomimicry works
- Shortlist potential separable design
- Feasibility study

Demonstrator:
- 3 pilots for validating the main principles

Modular design – separable design 2B

- Research for additive manufacturing materials
- Shortlist potential 3D printing
- Feasibility study

Demonstrator:
- 3 pilots for testing and evaluate the potential benefits

Less materials – 3D printing 3A

- Research of number of pieces and how reduce it
- Shortlist potential a simplified design
- Feasibility study

Demonstrator:
- 3 concepts (3D model) for evaluate the impact

Less materials – simple design 3B

- Analysis of the current European standard to identify potential issues
- Research the way to harmonise main part of interiors design to facilitate the re-use train to train
- Shortlist potential adaptation for railway
- Feasibility study

Demonstrator:
- start 3 proposal of rewordings

Standardisation for reuse – 4

- LCA for interiors
- Weight saving

Demonstrator:
- LCA impact and energy impact

Low impact analysis 0

Roadmap Sustainable interiors

- Ceiling/roof/isolation/ compactness
- Evolving space GOA1 to GOA4 (driver's cabin to passengers' room)
- Compactness of the driver's cabin
- Electricity without cable
- Modular toilet

Optimisation of passengers room

- Biomimicry → materials
- HMI touchless toilet
- Design of the toilet

Hygienic design

- New proposals of HMI for passengers
- New HMI for drivers: gestural and vocal controls
- New services

UX-UI passengers and on-board staff

- Uses cases
- Certification (impact and constraints of the European rules)
- Acoustic (impact)
- Configurator VR (tools)

Ultra modularity and impact

Rail4EARTH consortium

The consortium is composed of the 23 beneficiaries listed below which, together with their affiliated entities, brings the total to 71 partners across Europe.

Coordinator

ALSTOM

Other partners

adif · CAF · ceit IK4 Research Alliance · DB · DLR · cemosa Ingeniería y Control 50 AÑOS · COMSA CORPORACIÓN · Tekniker Member of Basque Research & Technology Alliance

Faiveley Transport A Wabtec Company · Ferrovie dello Stato Italiane · HITACHI · Talgo · Jernbane-direktoratet · KNORR-BREMSE · ÖBB

PKP Polskie Koleje Państwowe Spółka Akcyjna · ProRail · NS · SIEMENS · SNCF · Strukton Rail · Trafikverket

Facts and Figures

Starting Date: 01/12/2022
Grant Agreement N° 101101917
Coordinator: ALSTOM TRANSPORT S.A.

DURATION
48
Months

TOTAL PROJECT VALUE
95.1 M€
Max grant amount
38.38 M€

PARTNERS
71

Contact

Flagship Project coordinator:
Laurent Nicod, laurent.nicod@alstomgroup.com

Website:
https://projects.rail-research.europa.eu/eurail-fp4/