



The CER Essay series

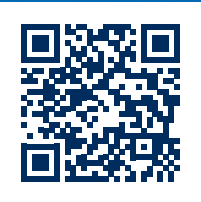
Where academic analysis
meets business insight

Laying Tracks for Growth: European Railway Infrastructure as Strategic Investment

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CER Essays

The CER Essays initiative features a series of essays that show the rail sector as contributing not only to EU transport policy, but touching on different aspects of society at large. Topics covered by the initiative will range from modal shift, climate policy, infrastructure investment, high-speed rail, demography and more. Each essay will feature a different topic and be co-authored by a CER member CEO and a leading academic from the same country and will be used to spark debate among political stakeholders on the role of rail in the EU.



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Abstract

This essay highlights the strategic importance of railway infrastructure investments in revitalizing the European Union's economic potential. As the Single Market approaches its 30th anniversary, it calls for significant investments to modernize and expand the Trans-European Network of Transport (TEN-T) and create a fully realized Single European Railway Area (SERA). Critical enablers, such as the European Rail Traffic Management System (ERTMS) and other digital tools, are essential to achieving greater productivity, connectivity, and sustainability.

The essay emphasizes that stagnation in public infrastructure investment since 2000 relative to GDP jeopardizes Europe's long-term productivity and prosperity. An estimated EUR 500 billion is needed to complete the TEN-T core network by 2030, far exceeding current funding mechanisms like the Connecting Europe Facility (CEF). Various options for attracting private capital for rail infrastructure investment, including Public-Private Partnerships (PPP) and the Regulatory Asset Base (RAB) model, are explored as ways to bridge the investment gap. Case studies from Austria, Germany, and Switzerland showcase different approaches to planning, financing, and implementing rail projects.

Railways are presented as dual-purpose investments, addressing both economic and environmental goals. Cross-border upgrades and digitalization are seen as critical for reducing ecological footprints and enhancing Europe's competitiveness.

The essay concludes with a call for the EU's Multiannual Financial Framework (MFF) to prioritize railway-related projects in order to allocate sufficient budgets for infrastructure expansion, resilience, and digital transformation. By aligning economic growth with sustainability, the EU can secure future prosperity, making railways a cornerstone of integration and ecological transition.

The authors extend their gratitude to Bettina Gusenbauer and Iga Niznik for their exceptional support in content and documentation. We also appreciate the valuable feedback from colleagues at Deutsche Bahn Group and SBB Swiss Federal Railways.



By aligning economic growth with sustainability, the EU can secure future prosperity, making railways a cornerstone of integration and ecological transition.



**Alberto
Mazzola**

CER Executive Director

Foreword

Railways have long been the backbone of Europe's connectivity, driving economic growth and social integration. As the European Union strives to meet ambitious climate goals and strengthen its competitive edge, railway infrastructure emerges as a vital area for strategic investment. This CER Essay on public infrastructure investments offers a compelling vision for leveraging railways to achieve these objectives.

The authors emphasize the dual role of rail investments in fostering economic development and addressing environmental challenges. The Essay highlights the need to modernize and expand the Trans-European Transport Network (TEN-T) and deploy digital enablers like the European Rail Traffic Management System (ERTMS) to enhance capacity and increase connectivity across the EU.

Drawing from case studies in Austria, Germany, and Switzerland, this work provides valuable insights into innovative approaches to railway infrastructure planning and financing. Rail infrastructure is a public good and as such a major candidate for public investments. Given the fiscal challenges faced by many countries, models like Public-Private Partnerships (PPP) and the Regulatory Asset Base (RAB) are explored

to address the significant investment shortfall—estimated at €500 billion by 2030—for completing the TEN-T core network. The case studies underscore the necessity of aligning public and private sector efforts to secure Europe's transport future. They recommend that all Trans-European railway projects with a significant positive net present value be implemented.

The CER Essay also advocates for adopting a targeted program in the EU's Multiannual Financial Framework (MFF) to prioritize railway digitalization, resilience, and the implementation of key technological upgrades, such as Digital Automatic Coupling and Digital Capacity Management. By focusing on these areas, Europe can ensure a high-performing, cross-border rail network that integrates seamlessly with national systems and meets future mobility demands.

Three decades after the creation of the Single Market, this publication serves as a call to action.

We hope this essay inspires the dialogue and decisive action necessary to realize this vision. By advancing rail as a strategic priority, Europe can secure a prosperous, sustainable future for its citizens.

A handwritten signature in blue ink, appearing to read 'A. Mazzola', located at the bottom right of the page.



Introduction

A good 30 years after its launch, the Single Market, which has been hailed as the jewel in the crown of European integration,¹ needs a new polish. As highlighted by the Letta Report,² the European Union requires an economic policy shift to revamp the Single Market as an engine of convergence and growth.³ Accordingly, the report calls for a new strategic agenda for European competitiveness, including the creation of a single market to finance strategic objectives. These involve the construction of a Trans-European Network of Transport (TEN-T) which forms the backbone of intra- and cross-border division of labour and the resulting advances in productivity. In particular, the Single European Railway Area has not yet fully materialized, lacking the (full) deployment of key enablers such as a European Rail Traffic Management System, the Future Railway Mobile Communication System, Digital Automatic

Coupling, and Digital Capacity Management.⁴ While ensuring interoperability is a prerequisite for efficient service provision, the availability of and non-discriminatory access to infrastructure is a necessary condition for such services. A case in point is the lack of a comprehensive, pan-European high-speed rail (HSR) network that seamlessly links all EU capitals and major urban centres.⁵

As railways in Europe approach their 200th anniversary in 2025, it's clear that they have significantly contributed to the continent's transformation from a state of economic subsistence to one of the world's leading high-income macroregions. Without excellently developed transport routes and efficiently provided transport services, the four freedoms of the European Single Market could not be realised. It is therefore no exaggeration to state

- 1 Vestager, M. (2023): Speech by the Executive Vice-President of the European Union at the ceremony on the 30th anniversary of the Single Market, 16th January 2023, Strasbourg.
- 2 Letta, E. (2024): *Much more than a market – speed, security, solidarity, empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*, high-level report on the future of the Single Market, commissioned by the European Council.
- 3 European Council (2024): *Conclusions of the Special Meeting of the European Council* (17th/18th April 2024), EUCO 12/24, Brussels.
- 4 Letta, E. (2024): *Much more than a market – speed, security, solidarity, empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*, high-level report on the future of the Single Market, commissioned by the European Council, p. 84.
- 5 Letta, E. (2024): *Much more than a market – speed, security, solidarity, empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*, high-level report on the future of the Single Market, commissioned by the European Council, p. 85.

that **investment in transportation networks is crucial for harnessing Europe's (not merely economic) potential in the future.** Therefore, the authors of this paper urge EU leaders and officials to take bold steps towards expanding, upgrading and digitalizing the European railway system in the next Multiannual Financial Framework (MFF). EU member states must be empowered to renew, modernize, and develop railway infrastructure on a national and cross-border level, particularly through the implementation of TEN-T requirements.

Railways themselves and the railway industry are an important economic factor⁶ in Europe, with “the market value of rail supply” being “valued at EUR 176 billion a year.”⁷ In addition to its economic importance, the strategic significance of rail will increase in the coming years due to the necessary decarbonization of transport as well as the key role of a well-functioning rail system for security and defence. Furthermore, Rail has always been characterised by mass use of the latest technology, thus creating highly qualified jobs and continuously driving innovation in a remarkably sustainable growth industry. Continuous investment in rail infrastructure and technology are therefore essential to realise future European innovation and production potential and thus increase productivity and the prospect of prosperity in the EU. As accentuated in the Draghi Report, “if Europe cannot become more productive, we will be forced to make choices. We will not be able to become, simultaneously, a leader in new technologies, a beacon of climate responsibility and an independent player on the world stage. We will not be able to finance our social model. We will have to scale back some, if not all, of our ambitions. This is an existential challenge.”⁸ The Draghi Report's call for large-scale investment to increase the European economy's productivity

is to be supported – this can be achieved above all through technology development and infrastructure expansion. At the same time, a warning should be sounded against continuing the current course of many Member States, where debt is used to finance expenditure that does not generate sustainable productivity gains.

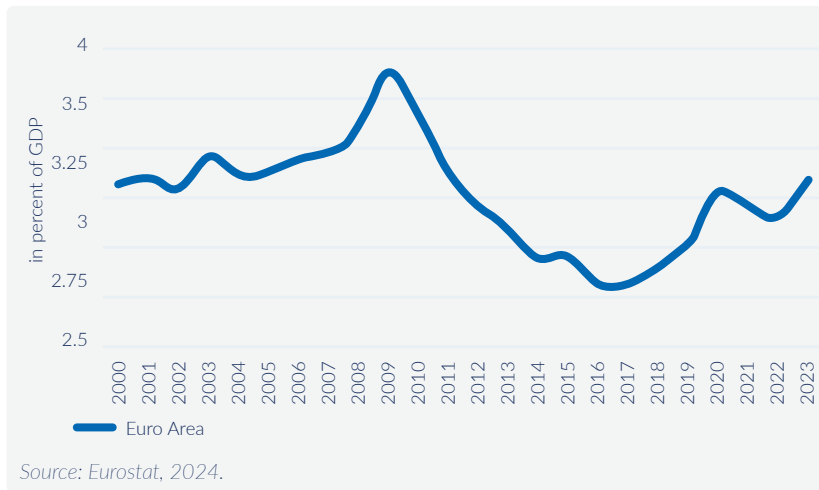
The higher today's investment, provided it is productive, the greater future European income will be, and the stronger its growth will become. Despite this positive link between productivity-enhancing investment and national income, public investment in relation to GDP in the Euro Area has remained unchanged over the long term since 2000. Even worse, since its peak in 2009, the public investment ratio has declined by more than half a percentage point relative to GDP. This indicates that our society has already missed out



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- 6 Austrian Federal Railways (ÖBB), Austrian Rail Industry Association and Federation of Austrian Industries (2013): The Economic Footprint of the Railway System, report prepared by Economica Institute, Vienna.
- 7 Draghi, M. (2024): The future of European competitiveness, Part B | In-depth analysis and recommendations, p. 207, commissioned by the European Commission.
- 8 Draghi, M. (2024): The future of European competitiveness, Part A | A competitiveness strategy for Europe, p. 01, commissioned by the European Commission.

Figure 1: Dynamics of Public Investment in the European Union



on significant potential for prosperity, and without policy changes, this gap is expected to persist.

In the short run, **investing means saving instead of consuming. Does this imply that European societies today are less capable and less willing to cut back on consumption than they were in the year 2000?** And this even though the European Union's **gross domestic product has increased by 35.3 percent in real terms**, i.e. adjusted for inflation, since the turn of the millennium? The substantial increase in output and income was accomplished despite the multiple crises of recent years, indicating that European societies are far more efficient today than they were in 2000. This reflects a strong preference for current

consumption over future-oriented investments, and a disregard for a potentially stronger and more competitive future European economy.

The diminishing political focus on productivity-enhancing public spending creates uncertainty around the realisation of vital European infrastructure projects. The investment needs associated with realizing the Trans-European Transport core Network (TEN-T) by 2030 are estimated at around **EUR 500 billion**, with a significant portion still lacking sufficient financial resources.⁹ The Connecting Europe Facility (CEF), extended by resources from the Cohesion Fund, the European Regional Development Fund, the InvestEU Programme, the Recovery and Resilience Facility (RRF) as part of the NextGenerationEU plan, and the European Investment Bank will not be sufficient to meet the major investment needs.¹⁰ However, according to the stability criteria of the Maastricht Treaty, the limits of public deficit and debt in many European countries have not only been reached but have already been largely exceeded.

Taking into consideration that potential growth and, consequently, debt sustainability have decreased further since the definition of the Maastricht criteria in 1992, **public debt in many Member States has reached a problematic level**. In order to avoid further burdening future generations and to gradually reduce public debt levels, a reduction in public spending and/or an increase in public revenue might seem unavoidable. However, given that public income and expenditure ratios are close to their historic

⁹ Letta, E. (2024): *Much more than a market – speed, security, solidarity, empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*, high-level report on the future of the Single Market, commissioned by the European Council, p. 83. COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT REPORT Accompanying the document Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Union guidelines for the development of the trans-European transport network, amending Regulation (EU) 2021/1153 and Regulation (EU) No 913/2010 and repealing Regulation (EU) 1315/2013, p. 55.

¹⁰ According to an estimate by the McKinsey Global Institute, from 2017 through 2035 the world needs to invest about 4.1 percent of GDP, or an average of \$ 3.7 trillion a year in economic infrastructure just to support expected rates of growth. Emerging economies account for about 63 percent of that need. But if the current trajectory of underinvestment continues, the world will fall short by roughly 0.3 percent of global GDP or a cumulative \$ 5.5 trillion of investment by 2035. The size of the gap is even larger if the additional investment required to meet the UN Sustainable Development Goals is factored in. McKinsey Global Institute (2017): *Bridging infrastructure gaps: Has the world made progress?*, Discussion Paper, Washington, DC.

high, there is not much room for manoeuvring the latter. This means that reducing government spending is the remaining option for consolidating debt, but at the same time reducing government spending could harbor economic disadvantages. A reduction of public spending could in the short term suppress government demand, further weakening economic momentum. More importantly, **in the medium to long term, European growth potential might be reduced if spending cuts affect public investment.** Even in an optimistic scenario where only the consumptive part of government spending would be affected by cuts, it should be noted that **current public investment activity in infrastructure and technology is already insufficient to maintain, let alone strengthen, Europe's competitiveness.** Furthermore, to trigger more private investor activity - particularly in infrastructure - additional public investment, which often complements private investment, **would be essential.** The greater the public investment activity, the greater the willingness of private investors to invest, as higher potential growth can be expected. This could initiate a self-reinforcing, positive process of a self-sustaining upswing, provided that the current lack of confidence regarding the reliability of location conditions can be overcome.



The greater the public investment activity, the greater the willingness of private investors to invest, as higher potential growth can be expected.

In short: European institutions and governments face the challenge of finding a solution within the Maastricht regime, that continues to allow future-oriented public investment, thus also providing an incentive for the mobilisation of private capital.

By issuing a new guideline for Member States on the Information Requirements for the Medium-Term Fiscal-Structural Plans¹¹ stating that national co-financing of CEF funded infrastructure projects are not relevant for the Maastricht regime, the EU Commission has already set a first, encouraging step.

¹¹ European Union (2024): *Guidance to Member States on the Information Requirements for the Medium-Term Fiscal-Structural Plans and for the Annual Progress Reports* (C/2024/3975), Official Journal of the European Union, C series, pp. 1-29.



Involving private capital in infrastructure financing

To expand the scope of action for investments usually made by the public sector, private capital could be increasingly involved in infrastructure projects. This has already taken place in the Anglo-Saxon countries for some time, and continental Europe should take up this development conceptually at an accelerated pace. Crowdfunding models, e.g. for local energy generation projects, have attracted considerable media attention, but to date they have not been of any economic relevance considering upcoming investment requirements in the rail sector. **Enormous financial potential could be tapped if institutional investors** (insurances, pension funds etc.) **invested more in infrastructure as an asset class.** However, numerous hurdles currently impede the exploitation of this potential. These include a limited number of accessible projects and often inadequate project-related transparency and regulatory constraints. Consequently, these investors have so far primarily focused on fund-of-fund structures or indirect commitments, particularly in infrastructure companies that operate in areas resembling natural monopolies. This is in stark contrast to the growing demand

from investors for largely non-cyclical, inflation-neutral and predictable long-term investment forms with top credit ratings, especially given the very low, and sometimes even negative, real returns on government bonds. **Two prominent forms** of private sector involvement in financing, delivering and operating infrastructure currently in use are the **Regulatory Asset Base model (RAB)** and **Public Private Partnerships (PPP)**.

The RAB model is a regulatory framework in which the regulated private or corporatized state-owned companies act as infrastructure manager: They own, invest in and operate infrastructure assets. The infrastructure manager receives revenue from users and/or subsidies to fund its operations, recovers investment costs and earns a reasonable return on the investment. Furthermore it provides the basis for the intake of private investments. In the absence of regulation there might be the risk that the infrastructure manager might behave much like a natural monopoly – setting prices too high in an attempt to earn “super normal” profits. **Therefore, an economic regulator is necessary to provide efficiency**

Enormous financial potential could be tapped if institutional investors (insurances, pension funds etc.) invested more in infrastructure as an asset class.

incentives along with certain price or other caps for the infrastructure manager to improve social welfare. Investor-oriented, incentives-based performance metrics aim to mimic the incentives that would be faced by the market if it were competitive. In this case, efficiency gains primarily result from the ongoing interaction between the regulator and the infrastructure manager during the contract, including potential corrective interventions, especially considering the extremely long investment horizons associated with rail infrastructure.¹²

The PPP model is based on a (long-term) **contractual agreement between a public sector authority and a private sector entity resulting from a government tender.**¹³ Typically, the contract, often in the form of a Design-Build-Finance-Maintain-Operate (DBFMO) contract, covers a single infrastructure project. It assigns

the successful private consortium responsibility for all aspects of project financing, delivery, and operation, usually for decades. The consortium receives revenue either from the government through periodic 'availability payments' or other performance-linked payments, and/or directly from users. Efficiency gains in this approach are primarily determined ex ante through competition between bidders for the contract. Upon expiry, the infrastructure remains in or reverts to public sector ownership." In fact, there are several deviations from this purely stylized characterization of the two models. Additionally,¹⁴ there are also other models of private sector involvement, such as sale-and-lease-back operations, crowdfunding activities, and various types of concessions and management contracts.

The RAB model has two main advantages: It reduces the taxpayers' burden by offering the lowest cost for financing the construction and operation of the infrastructure. Additionally, incentive-oriented regulation helps ensure operational efficiency. However, the RAB model faces challenges in incentivizing efficient (i.e., lowest possible) capital expenditures both at the outset and throughout the infrastructure's lifespan. This includes the risk of moral hazard, such as overinvestment in infrastructure or, conversely, an inefficient outflow of funds as shareholder dividends due to the intake of private equity capital. In contrast, PPP models are well-established for delivering projects on time and on budget. However, the cost of financing PPPs is substantially higher than for RAB models, and PPP contracts are considered relatively rigid during the operation phase.¹⁵

12 Makovsek, D. and Veryard, D. (2016): *The Regulatory Asset Base and Project Finance Models. An Analysis of Incentives for Efficiency*, Discussion Paper 2016/01, OECD / International Transport Forum, Paris, p. 6.

13 Yescombe, E.R. (2011): *Public-private Partnerships. Principles of Policy and Finance*, Elsevier, Amsterdam, p. 3.

14 Cf. Helm, D. (2009): *Infrastructure investment, the cost of capital, and regulation: an assessment*, Oxford Review of Economic Policy, vol. 25, pp., 307-326.

15 Makovsek, D. and Veryard, D. (2016): *The Regulatory Asset Base and Project Finance Models. An Analysis of Incentives for Efficiency*, Discussion Paper 2016/01, OECD / International Transport Forum, Paris, p. 7.



The Austrian model of railway infrastructure planning & financing

Austria employs an alternative model to provide stable funding, ensure a high degree of system integration, and pursue public welfare-oriented objectives. To achieve this, two interrelated portfolios of policy instruments are used to fund railway-based mobility both in the short and the long run:

First, investments are based on the Federal Government's long-term strategy plan for expanding and strengthening the railway network in Austria, the so-called Target Network. Currently the Target Network 2025+ ("Zielnetz 2025+"), issued by the government in 2009, is being implemented and serves as a transport policy guideline. The next long-term strategy plan for the upcoming decades, called "Target Network 2040", has already been presented in 2024 but has not yet been adopted by the government. It accounts

for changed business conditions, such as the implementation of the Trans-European Networks for Transport.¹⁶ The target network strategy is based on profound academic research ((including long-term economic and demographic analyses, mobility- and transport-related forecasts) and a broad social and political consensus between the Federal Government, the provinces and social partners.

When developing the Target Network 2040 – just like the still valid Target Network 2025+ expansion-oriented investments were identified, evaluated, and selected in the form of modules. These modules were defined based on a recognized need for measures on a route, axis, or hub area. They consist of one or more individual projects, representing project bundles with a common functional and/or spatial context,

¹⁶ The 2040 target network is the result of a joint endeavor of the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), ÖBB-Infrastruktur AG and the Schieneninfrastruktur-Dienstleistungsgesellschaft mbH (SCHIG mbH).

contributing to overarching objectives as well as route- or axis-specific effects. All modules were evaluated using a state-of-the-art cost-benefit analysis to improve evidence-based decision-making for future railway expansion. The 2040 Target Network includes measures totalling around EUR 26 billion at current prices and is expected to secure or create the equivalent of 21,000 years of employment during the construction phase. Second, from a short- to medium-term perspective, the target network is implemented via six-year framework plans drawn up by ÖBB-Infrastruktur AG.^{17, 18} These framework plans contain precise descriptions of the projects, capacity analyses, forecasts of expected traffic growth, a timetable with project-related planning and construction progress, cost estimates, cost-benefit analyses per project or project bundle, and an implementation program on an annual basis. This long-term predictability in planning and budgeting enables better quality infrastructure implementation, facilitates a high degree of conformity with planned costs, ensures considerable project cost stability, and helps maintain stable train timetables despite construction work.

These framework plans form the basis of the subsidy agreement concluded between the Federal Minister of Finance and the Federal Minister for Climate Protection, Environment, Energy, Mobility, Innovation and Technology. The framework plans are supplemented annually by one year and aligned with the new six-year period.



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Throughout the 2023 (2022) financial year, ÖBB-Infrastruktur AG¹⁹ invested EUR 2,991 billion (EUR 2,766 billion) in the expansion and modernization of the Austrian rail infrastructure, implementing the strategic guidelines and projects laid out in the Target Network 2025+. According to the pre-determined six-year period in the framework plan,²⁰ average investments totalling EUR 3.525 billion are foreseen for the 2024-2029 period.

The Federal Government subsidizes railway infrastructure financing.²¹ Additionally, the Federal Government is responsible for ensuring the liquidity of ÖBB-Infrastruktur AG.²² Until 2016, ÖBB-Infrastruktur AG issued bonds on the capital market to fund its infrastructure investments. These bonds were guaranteed by the Republic of Austria, with repayments made by the Republic in annual installments (known as annuities, see figure 2).

17 In accordance with the Federal Railways Act, ÖBB-Holding AG is the sole owner of ÖBB-Personenverkehr AG, Rail Cargo Austria AG and ÖBB-Infrastruktur AG. ÖBB-Holding AG, in turn, is fully owned by the Republic of Austria. The ÖBB-Infrastruktur AG is responsible for the construction, maintenance and operation of the Austrian railway network.

18 Pursuant to Section 42 (7) of the Federal Railways Act.

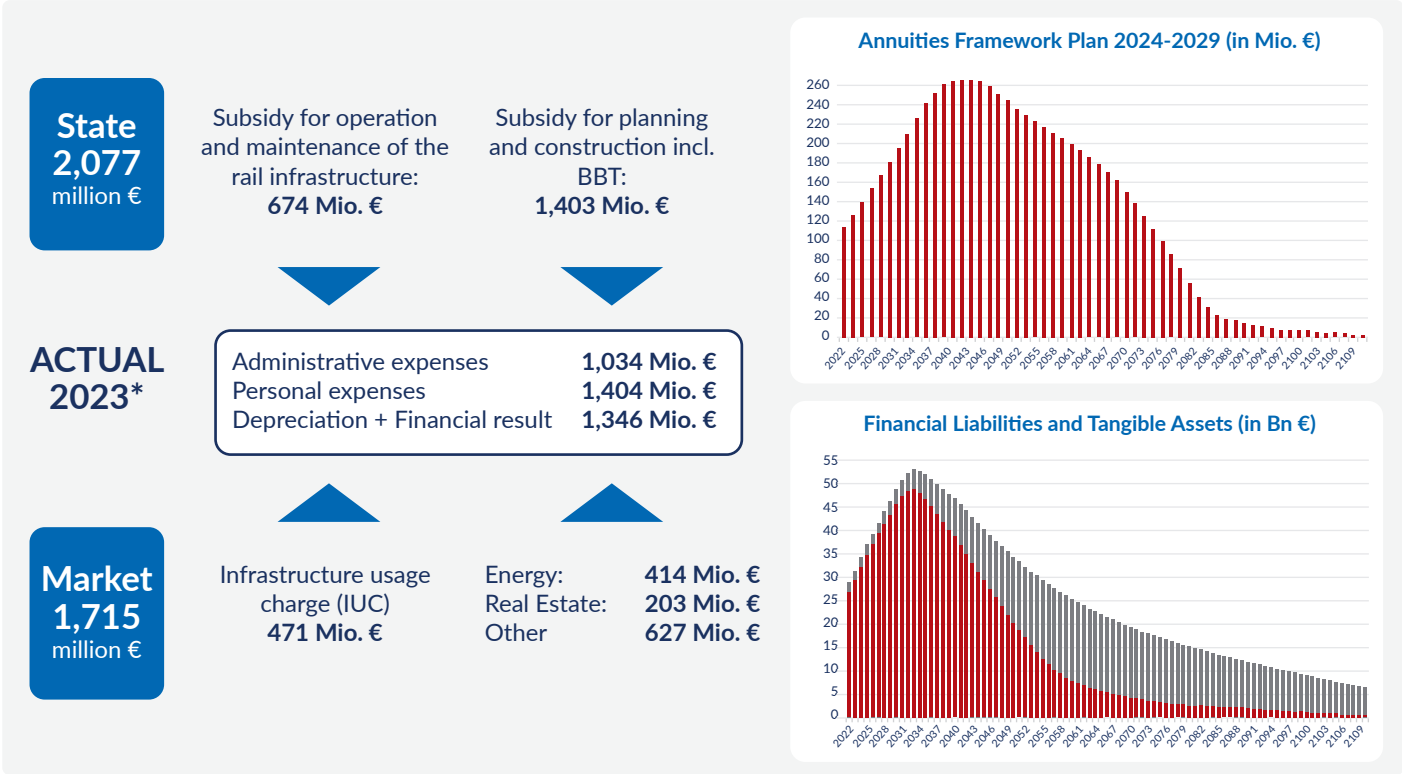
19 For more detailed and up-to-date information on ÖBB-Infrastruktur AG, cf. <https://infrastruktur.ÖBB.at/de/projekte-fuer-oesterreich>.

20 The 2024-2029 framework plan is available on the website of the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK).

21 Cf. Federal Ministry of Finance (2023): Infrastructure Supplement, overview pursuant to Section 42 (4), Federal Budget Act 2013, Vienna.

22 In accordance with Section 47 (1) of the Federal Railways Act.

Figure 2: Cash flows for infrastructure financing



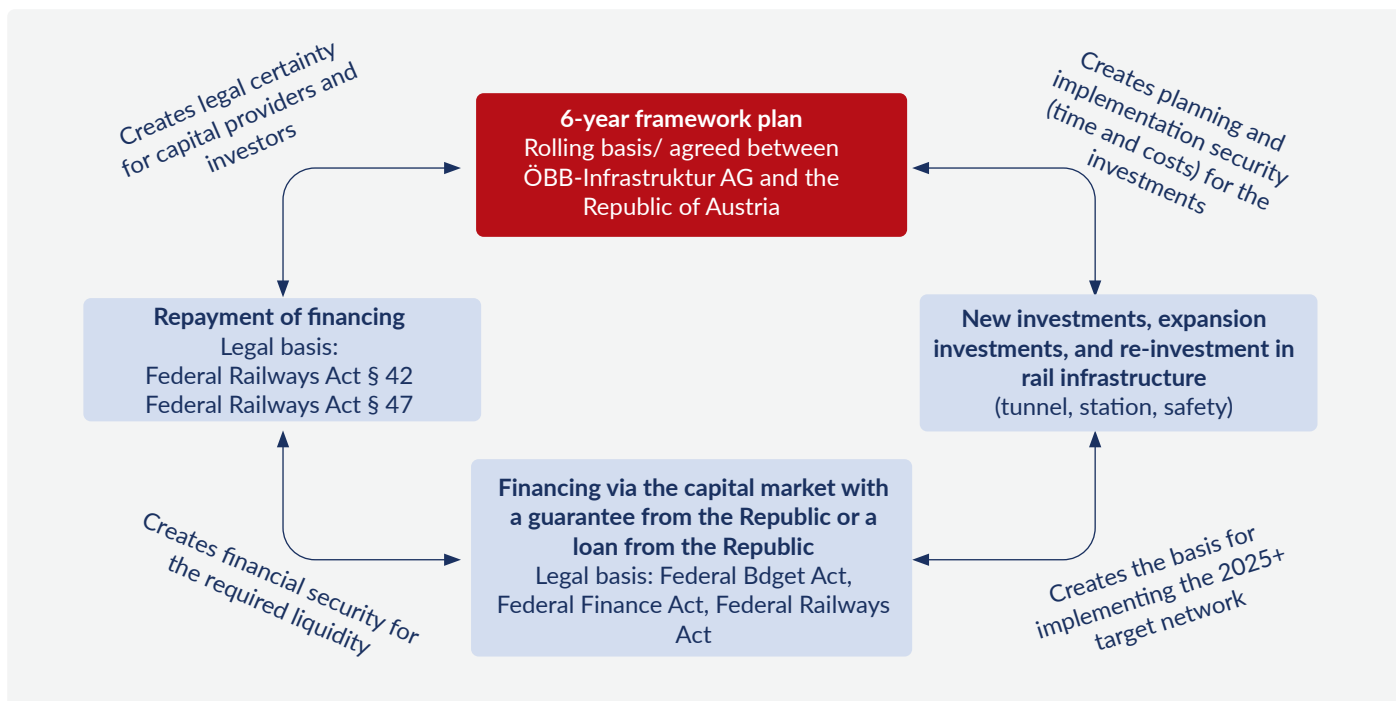
Red columns: financial liabilities of OeBB Infrastruktur AG; grey columns: tangible assets of OeBB Infrastruktur AG
Source: OeBB- Infrastruktur AG (2023): "Explanation of the framework plans 2018-23 and 2020-25".

Since 2016, financing has been provided by the Federal Finance Agency, which in turn issues bonds for the Republic on the capital market.

Since 2017 the Austrian Federal Financing Agency (OeBFA) has been raising the necessary funds for ÖBB-Infrastruktur AG on the capital market. This has enabled ÖBB-Infrastruktur AG to benefit from the Republic of Austria's favourable financing conditions. Previously, the Federal Government assumed separate liability for individual financing transactions of ÖBB-Infrastruktur AG based on the respective federal budget laws. By the end of 2023, the Federal Government's liability for ÖBB-Infrastruktur AG amounted to approximately EUR 16.8 billion.

This long-term predictability in planning and budgeting enables better quality infrastructure implementation.

Figure 3: Financing logic of railway infrastructure expansion in Austria



Source: Presentation of ÖBB-Infrastruktur AG on „Explanation of the framework plans 2018-23 and 2020-25”

All railway undertakings must pay track access charges to ÖBB-Infrastruktur AG for using the infrastructure network. Additionally, third-party cost contributions to ÖBB-Infrastruktur AG for investments based on the framework plans are made by regional authorities (federal states, municipalities) if they have a particular interest in the construction of rail infrastructure. This includes EU subsidies as well as cross-financing for the Brenner Base Tunnel. Two six-year contracts with revolving terms are concluded annually between the Federal Government and ÖBB-Infrastruktur AG.²³ These contracts are extended by one year per annum and adjusted to the new six-year period (currently: 2024-2029).

The first contract involves providing subsidies for the operation and maintenance of rail infrastructure, ensuring its availability to users. These subsidies are necessary when the revenue generated under current market conditions is insufficient to cover the expenses incurred through efficient management.²⁴ This contract also includes provisions for the ongoing improvement of the quality of the rail infrastructure and its safety by ÖBB-Infrastruktur AG.

The second contract governs the Federal Government's subsidies for maintenance, planning and construction of railway infrastructure.²⁵

23 According to Section 42 (1) and (2) of the Federal Railways Act.

24 Pursuant to Section 42 (1) of the Federal Railways Act.

25 Pursuant to Section 42 (2) of the Federal Railways Act.

According to the grant agreement, the Federal Government commits to covering construction costs through repayment instalments spread over 30 years, in addition to the subsidies provided under the first contract.

Finally, there is a subsidy for inspection, maintenance, fault clearance and repair. Altogether, ÖBB-Infrastruktur AG is expected to receive EUR 2.51 billion from public subsidies in 2024.

Between 2020 and 2024, the amount of subsidies ranged steadily between 0.5% and 0.7% of Austrian GDP, with volatility mainly due to the large COVID-19-induced fluctuations in GDP. According to the group's annual report, short- and long-term liabilities stood at EUR 31.4 billion at the end of 2023, with an equity ratio of 4.3%.²⁶

The framework plan of the Austrian Federal Railways serves as the Federal Government's planning and financing instrument for investments in the ÖBB-Infrastruktur AG network.²⁷ To ensure a high degree of planning reliability for funding railway-related investments, especially considering the various fiscal challenges mentioned above, Austria utilises a special legal instrument known as the Prior Charges Act ("Vorbelastungsgesetz").²⁸ Prior charges are obligations by the Federal Government to fulfil federal expenditures that are due in one or more future financial years. Such prior charges may only be authorized by a budgetary authority with the

The 'Target Network 2040' stands out as an exemplary investment programme due to its significant economic impact.

consent of the Federal Ministry of Finance, as they preemptively limit the federal legislator's flexibility. These obligations are subsequently agreed upon between the Federal Government and ÖBB-Infrastruktur AG in the form of subsidy contracts, which serve as the legal basis for realizing the investments.

The 'Target Network 2040' stands out as an exemplary investment programme due to its significant economic impact. While investments are an abstract concept in national accounts at the macroeconomic level, they must be implemented concretely at the microeconomic level. In Austria, this crucial role is assigned to ÖBB-Infrastruktur AG. The activities of this individual company at the microeconomic level are so significant that they generate macroeconomic relevance. If railways were a financial institution instead of network operators, one would undoubtedly consider them systematically important.

26 ÖBB-Infrastruktur AG (2024): Jahresfinanzbericht für das Geschäftsjahr 2023 (Annual Report for the Financial Year 2023), Vienna.

27 The legal basis for this is § 42 of the Federal Railways Act.

28 Federal law authorizing prior budgetary commitments by the Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology (Bundesgesetz, mit dem die Begründung von Vorbelastungen durch die Bundesministerin für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie genehmigt wird).



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Alternative macro- and micro-level funding approaches

The implementation of ambitious railway investment programs faces the challenge of increasing demands on the public budget. The Letta report outlines three goals that offer “considerable opportunities, but will inevitably come with significant costs”. These are “a fair green and digital transition”, “the decision to pursue enlargement”, and “the need to enhance the EU’s security”.²⁹ The implementation of each of these three goals could also create a major push forward for the development of the European Railway System. However, additional challenges also place demands on EU budgets, such as demographic

aging and its impact on the stability of the social security system, as well as large-scale cross-border immigration from outside Europe and the necessity of successfully integrating new inhabitants. Hence, competition for public funds will intensify further, especially against the backdrop of weak European growth. To reiterate, prioritizing productivity-enhancing public investment is essential, and private capital should be mobilized to complement these efforts. To fund railway infrastructure, alternative models to Austria’s approach can be considered, such as those implemented by Germany and Switzerland.

²⁹ Letta, E. (2024): *Much more than a market – speed, security, solidarity, empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens*, high-level report on the future of the Single Market, commissioned by the European Council, p. 6.

The Swiss model

In Switzerland, the railroad infrastructure is financed through the Railway Infrastructure Fund (Bahninfrastukturfonds, BIF). The fund's resources come from several sources: up to two-thirds of the net revenue from the heavy vehicle charge, one per mille from the value-added tax, two percent of the revenue from the direct federal tax on natural persons, 2.3 billion Swiss francs from the general federal budget (adjusted for real GDP dynamics and inflation using the specific railroad construction inflation index), and cantonal contributions of around 500 million Swiss francs annually (indexed from 2019). In addition, the following funds are allocated to the BIF for a limited period: one additional VAT per mille (until 2030 at the latest); nine percent of the net proceeds of the earmarked mineral oil tax (until the advance is repaid in full), up to a maximum of 310 million Swiss francs at 2014 prices. The Federal Government uses the BIF to finance all railroad infrastructure costs, including both the operation and maintenance of the existing railroad infrastructure and its further expansion.³⁰ A similar model could also be conceivable at EU level: a new EU Rail Infrastructure Fund, fed by ETS revenues, to supplement the EU's midterm financial plan (MFF). This fund would finance cross-border rail infrastructure expansion and upgrading, as well as rail digitalization

The Swiss Government manages the operation and maintenance of the railroad infrastructure by setting targets and deriving associated key figures for infrastructure operators. These operators are responsible for the efficient operation and maintenance of the infrastructure. The objectives to be achieved include: safety, availability, resilience and quality of the network, optimal and non-discriminatory use of existing capacities, long-term value maintenance, high productivity, and efficient use of available resources. By setting

targets, the Government aims to ensure that public funds are used effectively and efficiently. To better measure the achievement of objectives, key performance indicators were defined for the selected goals. When the performance agreement is concluded, individual target values for these KPIs are established for each infrastructure operator. The key figures are included in the annual reporting. The Federal Office of Transportation (Bundesamt für Verkehr, BAV) reviews the achievement of targets and makes recommendations for adjustments. If necessary, it also defines corrective measures.³¹

The German model

To achieve better results in expanding capacity and ensuring availability, the funding for new construction, expansion and replacement investments in the federal railroads has recently undergone significant reform. The infrastructure units of Deutsche Bahn group were merged to form a new, public-interest infrastructure division called DB InfraGO AG ("Infrastruktur Gemeinwohl Orientiert", infrastructure geared towards the common good). DB InfraGO AG is wholly owned by Deutsche Bahn group, not by the Federal Government, and will continue to operate as a railway infrastructure company within the group. Profits from the operation of the infrastructure will be used exclusively within the new infrastructure unit.

In this way, the Federal Government aims to take on more responsibility and strengthen its shareholding management. Operationally, within the Ministry of Transport a steering committee ("Steuerungsgruppe Bahn") has been established to coordinate, monitor and control the progress of corridor renovation and the implementation of more customer-friendly construction, among others. The committee regularly reports to the Minister on the status of project implementation

30 <https://www.bav.admin.ch/bav/de/home/verkehrsmittel/eisenbahn/bahninfrastuktur/bahninfrastukturfonds.html>.

31 <https://www.bav.admin.ch/bav/de/home/verkehrsmittel/eisenbahn/bahninfrastuktur/substanzerhalt-und-betrieb/lv-kennzahlen.html>.

and quality of service and is working towards improved enforcement of the owner's interests. In addition, a Sector Advisory Board ("Sektorbeirat") was established. It has the task of advising DB InfraGO AG on the development, expansion, type, maintenance and provision of rail infrastructure. It makes recommendations and issues statements on these issues. At its core is a binding dialogue with DB InfraGO AG, involving an exchange of expertise, particularly on railway technology, railway law, and rail transport issues. It also includes the analysis and concept development of DB InfraGO AG's activities from the sector's perspective.

The most important funding sources for capital expenditures on infrastructure are grants, primarily from the Federal Government and from Federal states and local authorities. The vast majority of these investment grants are related to infrastructure. The main bases for these grants are the LuFV ("Leistungs- und Finanzierungsvereinbarung" - multi-annual performance and funding agreement) and the Federal Rail Infrastructure Extension Act (Bundesschienenwegeausbaugesetz; BSWAG).

On the funding side, Deutsche Bahn group requested an additional EUR 45 billion from the Federal Government for the financial planning years 2024 to 2027. According to the 2024 federal budget and the federal budgetary plan decided in 2024 approximately EUR 24 billion in additional funding was granted, plus a EUR 3 billion own contribution. The Federal Ministry aims to 'mobilize further investment in rail infrastructure in the coming budgets'. However, a decision on the 2025 budget is still pending.³²

In contrast to an overarching approach to infrastructure planning, funding, and

implementation, numerous other funding schemes can be found at the project level. Three examples may highlight the broad spectrum of funding approaches:

Example: The Øresund Fixed Link

The Øresund Fixed Link connects Denmark and Sweden across a strait with a combination of tunnel, artificial island, and bridge.³³ Metropolitan regions are located at both ends of the crossing: the capital Copenhagen in Denmark and the cities of Malmö and Lund in Sweden. Completed in 2000, the project is characterized by the following features: Construction was completed without delays. The cost overrun was 39 percent, largely due to additional requirements from stakeholders (e.g. environmental protection measures). The socio-economic ex post evaluation shows a cost-benefit ratio of 2.2 in a medium growth scenario. Even in a pessimistic scenario, the cost-benefit ratio remains above 1. As a joint venture between Denmark and Sweden, the Øresund Bridge project, was primarily financed through private loans backed by state guarantees. Construction costs were EUR 2.6 billion, with the EU contributing EUR 127 million in co-financing.³⁴

Example: High-speed railway axis Paris–Brussels–Cologne–Amsterdam–London

The high speed rail connection between Paris, Brussels, Cologne, Amsterdam and London with its four border crossing links became fully operational in 2010. The plan was based on individual national projects in four countries, along with the Channel Tunnel as a major cross-border project. Cost overruns ranged from 25 percent (Paris-Lille leg) to 116 percent (Cologne-Frankfurt leg), with the

32 Cf. Federal Ministry for Digital and Transport (February 5th, 2024): "Informationen zum Bundeshaushalt 2024 sowie dem Klima und Transformationsfond", Berlin, <https://bmdv.bund.de/SharedDocs/DE/Artikel/K/bundeshaushalt-2024.html>, as of November 09th, 2024.

33 Global Infrastructure Hub, Case Study: The Øresund Fixed Link, cf. <https://cdn.gihub.org/umbraco/media/3755/the-oeresund-fixed-link.pdf>, as of January 14th, 2025.

34 Doll, C., W. Rothengatter and W. Schade (2015): *The Results and Efficiency of Railway Infrastructure Financing within the European Union*, study commissioned by the EU Directorate-General for Internal Policies, Brussels, p. 16.

Eurotunnel experiencing a 69 percent overrun. The total costs amounted to EUR 18.8 billion, financed through various schemes according to national preferences: public finance in France and Germany, and private finance with public support and guarantees in the UK. EU co-financing contributed about 5 percent.³⁵ The associated economic internal rate of return varies widely depending on the specific line, the perspective (ex ante or ex post), and the discount period and factor applied. The North High-Speed Line (Ligne à Grande Vitesse Nord) yielded an unusually low ex post EIRR of 3.0 percent, compared to an expected ex ante rate of 13.0 percent. Its socio-economic rate of return exceeds these values by 2.0 and 6.7 percentage points, respectively.³⁶

Example: High-speed railway axis of south-west Europe

The South Europe Atlantic high-speed rail network aims to merge Europe's two largest high-speed networks to bring Portugal, Spain and Southern France closer to each other and to central Europe. The total cost for the Atlantic branch was calculated at EUR 1.25 billion. Due to emerging doubts about whether traffic volumes would reach the forecasted figures from cost-benefit analyses, there were significant delays in implementation and a substantial reduction in scope. EU co-funding contributed 7.2 percent to the Spanish part.³⁷ The PPP for the section between Tours and Bordeaux was financed through a blend of

sources from the concessionaire, EIB loans, private loans and guarantees, all managed according to traffic risk. Advanced tools were used to manage financial risks. The total funding amounted to EUR 7.8 billion, with the concessionaire contributing EUR 3.8 billion. This contribution was composed of 20.3 percent equity from shareholders, 27.9 percent bank debt guaranteed by the French government, 16.1 percent non-guaranteed bank debt, 19.9 percent by Fonds d'Épargne, (managed by the Caisse des Dépôts and guaranteed by Réseau Ferré de France), 10.5 percent EIB credit guaranteed by the French government, and 5.3 percent non-guaranteed EIB

In contrast to an overarching approach to infrastructure planning, funding, and implementation, numerous other funding schemes can be found at the project level.

credit.³⁸ The Atlantic network achieved an ex post economic internal rate of return of 7.0 percent and a socio-economic rate of return 12.0 percent, both sufficient to cover financial costs.³⁹

35 Doll, C., W. Rothengatter and W. Schade (2015): *The Results and Efficiency of Railway Infrastructure Financing within the European Union*, study commissioned by EU Directorate-General for Internal Policies, Brussels, p. 16.

36 Crozet, Y. (2013): Performance in France: From Appraisal Methodologies to Ex-post Evaluation. Discussion Paper No. 2013-26, prepared for the Roundtable on the Economics of Investment in High Speed Rail, December 18th-19th, 2013, New Delhi, International Transport Forum, Paris, pp. 21-22.

37 European Court of Auditors (2018): *A European high-speed rail network: not a reality but an ineffective patchwork*, special report no. 19/2018, Luxembourg, Annex III.

38 Vinci (2011): *High-speed rail between Tours and Bordeaux - Réseau Ferré de France and Vinci sign world's biggest rail concession contract*, press release, Nanterre. (<https://www.vinci.com/vinci.nsf/en/press-releases/pages/20110616-1740.html>).

39 Crozet, Y. (2013): Performance in France: From Appraisal Methodologies to Ex-post Evaluation. Discussion Paper No. 2013-26, prepared for the Roundtable on the Economics of Investment in High Speed Rail, December 18th-19th, 2013, New Delhi, International Transport Forum, Paris, pp. 21-22.



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Recommendations and conclusions

Some of these approaches allow for the direct participation of private investors at the individual project level. Not all funding approaches ensure a Maastricht-neutral funding structure to prevent public debt levels from rising, in some cases provinces may be actively and flexibly involved in the projects. The involvement of private investors assumes that expected returns align with capital market conditions. Since 2022, capital market funding conditions have been comparatively volatile, depending on factors such as the country- and project-specific credit rating, duration, and debt currency. Lastly, infrastructure managers must set charges for the use of the infrastructure at the level of the costs directly incurred from operating the train service.⁴⁰

With a base rate for 10-year loans dominated in euros (10-year EUR swap rate) of 2.33 percent⁴¹ and a standard risk premium of 200-250 basis points, the required minimum return from the investors perspective is 4 to 5 percent per annum.⁴² With one exception, all of the projects mentioned in this essay have exceeded this threshold, some by a wide margin.

Innovative schemes involving private participation should consider the following design features:

- **Target Setting:** The public sector should retain control over target setting, focusing on guarantees rather than fulfillment functions.

40 Commission Implementing Regulation (EU) 2015/909 on the modalities for calculating direct costs provides details on how infrastructure managers should calculate their direct costs. In accordance with the requirements of the fourth railway package the return on capital will be earned via the infrastructure usage charge which, in turn, is one of the most relevant factors in (cost) competition between rail and road, especially in cargo transport. Cf. European Parliament (2016): The fourth railway package – Another step towards a Single European Railway Area. For legal reference, cf. https://transport.ec.europa.eu/transport-modes/rail/railway-packages/fourth-railway-package-2016_en.

41 As of November 8th, 2024. Source: Infront Financial Technology GmbH.

42 The average interest rate charged by the DB Group for the use of internal financing for railway infrastructure companies was 1.34 percent in the 2022 financial year. Source: German Bundestag, printed matter 20/8945, 20th electoral term, October 19th, 2023, p. 7.

- **Management of Private Funds:** Private funds should be managed by a professional services provider or a highly specialized in-house unit. Lean management structures with experience in the target areas, along with transparent cost and performance accounting, are essential.
- **Regulatory Predictability:** A sufficient degree of predictability in the regulatory environment is indispensable.
- **Collateralization:** Investment collateralization should be possible to counteract de facto partial expropriation in the event of regulatory changes or other discretionary public interventions with similar effects.
- **Creditworthiness:** The high creditworthiness of the public sector should be leveraged to negotiate funding conditions. In this context, infrastructure projects may present a long-term investment opportunity for private investors, offering the lowest possible correlation to other asset classes.

To conclude, the analysis presented here reveals that the classic rivalry between economy and ecology has ceased to exist in many areas. On the contrary: economic prosperity and ecological transformation can only be secured by investing in both infrastructure and technology development. Creating a high-performance, digitalized and cross-border EU rail infrastructure is one of the most effective investments for both the environment and the economy, yielding short-term and long-term positive effects. Therefore, the next Multiannual Financial Framework (MFF) should include a targeted program for cross-border infrastructure sections, sufficient budget for infrastructure resilience (including global renewal projects) - and funding for rail digitalization. This would allow for key technological upgrades (ERTMS, FRMCS, DAC, DCM, and IT tools for capacity allocation)⁴³ for both rail infrastructure, rolling stock, and operations. **Furthermore, we suggest that all Trans-European railway**

infrastructure projects with a significant positive net present value should be implemented. This should be done while ensuring it does not lead to a further increase in public debt. With strong EU financial impetus, Member States can be encouraged to shift their budget focus towards productivity-enhancing investment. This approach also sends a strong signal to private capital and institutional investors.

Pursuing this approach would strengthen the investment part of the budget and provide sustainable impetus for growth. Only by safeguarding and expanding the foundations of prosperity through investment can the market economy fulfil its promise: that the next generation will be better off than the previous one. There is no attractive alternative to Europe-wide, large-scale railway-related investment programmes.

Creating a high-performance, digitalized and cross-border EU rail infrastructure is one of the most effective investments for both the environment and the economy.

43 ERTMS = European Rail Traffic Management System, FRMCS = Future Railway Mobile Communication System, DAC = Digital Automatic Coupler, DCM = Digital Capacity Management)



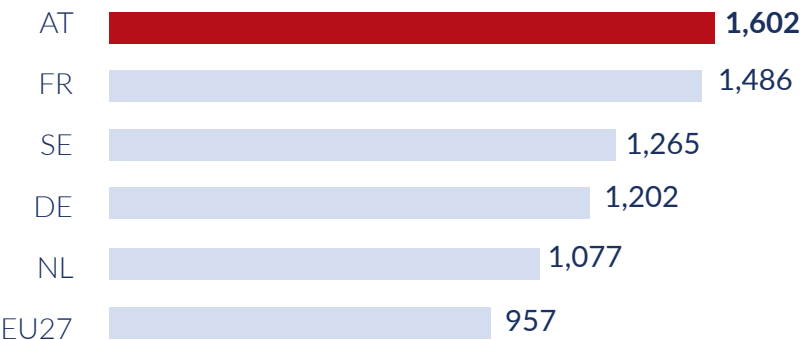
Key facts

Importance of the Austrian railway industry as a whole

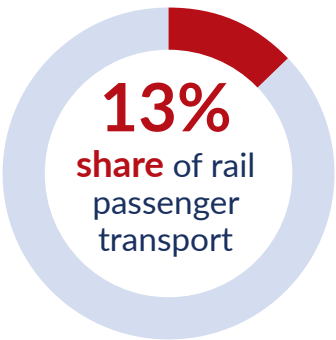


325 million
passengers in Austria in 2023

Kilometres travelled by rail per inhabitant 2023



83%
High satisfaction
with punctuality and
reliability, cf. EU 59%
(2018)

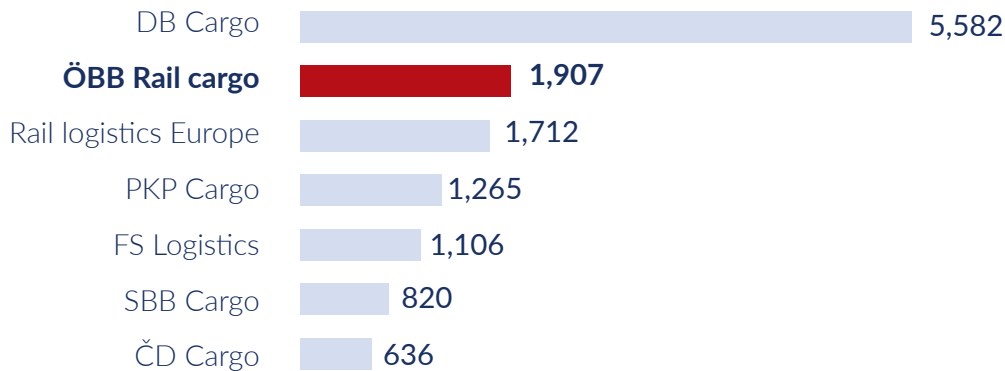




92 million

net tonnes in Austria in 2023

Revenue in mil. euros 2023



#5

Top 5 exporting countries of rail-related vehicles and equipment in the EU



Leading mobility provider in Austria

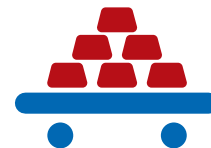
494 million

Passengers train
and bus



79 million

Freight goods
transported,
net tonnes per year



5,022 million

Sales revenue in euros



1,031

Stations and halts



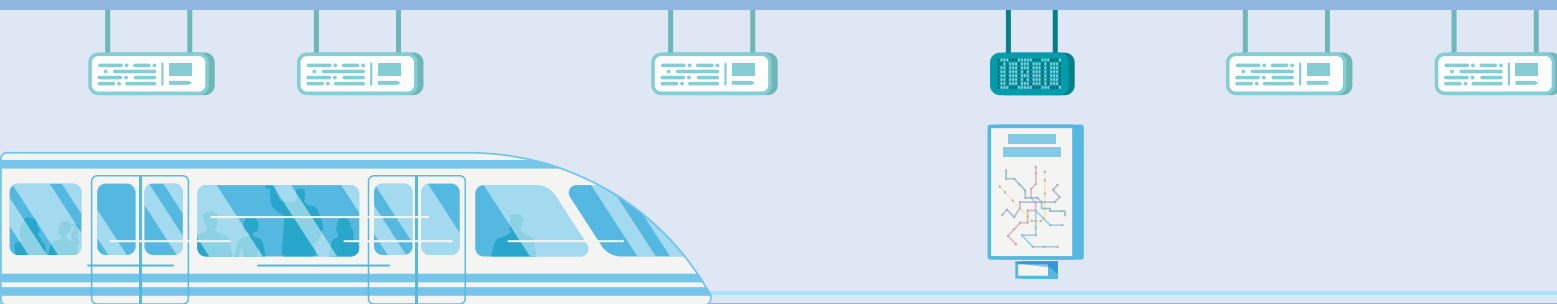
112 million

EBT in euros



45,041

Employees
(including apprentices)



PUBLIC FUNDING IS ESSENTIAL
for infrastructure operation
and investment

Rail infrastructure expenditure EU27

€94
infrastructure
expenditure
per inhabitant
in 2020 (EU27)

Total infrastructure expenditure

Year	Expenditure (billion)
2020	€41.8
2015	€39.8

Breakdown of expenditure (2020)

Category	Percentage
Maintenance	25%
Renewals	27%
Upgrades	28%
New infrastructure	20%

Funding sources (2020)

Source	Percentage
National budgets	69%
EU co-financing + other sources	31%

EUROPEAN RAIL MARKET DEVELOPMENTS 2015 - 2020

Country/Region	Publications (approx.)
LU	480
AT	310
SE	240
DK	200
CZ	185
DI	155
DE	125
BE	110
NL	105
FI	100
FR	95
LT	95
IT	75
LV	75
EE	65
IE	60
ES	55
HR	50
SK	45
HU	40
BG	30
PT	20
EL	5
EU27	95
NO	410

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL Eighth monitoring report on the development of the rail market under Article 15(4) of Directive 2012/34/EU of the European Parliament and of the Council, Package data and figures, figure 14 (https://transport.ec.europa.eu/transport-modes/rail/market/rail-market-monitoring-rmms_en#:~:text=In%20September%202023%2C%20the%20European%20Commission%20presented%20its,presented%20in%20the%20accompanying%20Commission%20Staff%20Working%20Document.)

Austrian Federal Railways

Today. For Tomorrow. For us.

ÖBB has been shaping mobility in Austria for 100 years. As a comprehensive mobility and logistics service provider, ÖBB transported a total of 494 million passengers and over 78 million tonnes of freight to their destinations in an environmentally friendly manner in 2023. This is thanks to the electricity for trains and stations being generated entirely from renewable energy sources. With a punctuality rate of 95% in passenger transport, ÖBB is one of the most punctual railway operators in Europe. ÖBB invests more than 4.5 billion euros annually in railway infrastructure and its fleet as part of its drive to build a railway system fit for the future. Across the Group, over 45,000 bus and rail employees and about 2,000 apprentices ensure that around 1.4 million passengers reach their destination safely every day. ÖBB is the backbone of the Austrian public transport system and, as Austria's largest climate protection company in the mobility and logistics sector, gets people and freight to their destinations safely and in an environmentally friendly manner. The strategic lead company of the group is ÖBB-Holding AG.

Economica Institute, Federation of Austrian Industries, and Seeburg Castle University

Economica is a Vienna-based, independent not-for-profit research organisation founded in 2005. The institute focuses on analysing structural change and the corresponding policy design. To this end, Economica employs both sophisticated theoretical and advanced empirical methods to study the associated economic phenomena and social processes. Economica is part of the Cognion Research Group.

The Federation of Austrian Industries (IV) is the voluntary and independent organisation representing the interests of Austrian manufacturing and its associated sectors. It serves its more than 5,000 members as a think tank, a networking centre, and an advocate for competitiveness and efficiency vis-à-vis all governmental levels and, as a member of BusinessEurope, the European Commission.

Seeburg Castle University is a state-accredited private university based in Salzburg with an additional teaching venue in Vienna. It provides cutting-edge research and teaching in the fields of innovation and transformation management, business psychology, and the economics and management of sports.

CER

The Community of European Railway and Infrastructure Companies (CER) brings together railway undertakings, their national associations as well as infrastructure managers and vehicle leasing companies. The membership is made up of long-established bodies, new entrants and both private and public enterprises, representing 71% of the rail network length, 76% of the rail freight business and about 92% of rail passenger operations in EU, EFTA and EU accession countries. CER represents the interests of its members towards EU policy makers and transport stakeholders, advocating rail as the backbone of a competitive and sustainable transport system in Europe.



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