2026

TRENES PARA CHILE 2050

NATIONAL RAIL POLICY FOR CHILE

TRAINS FOR CHILE – 2050

FABIÁN FIGUEROA – APRIL 2026

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Words from the author

Trains for the Chile of tomorrow…

In recent decades, Chile has distinguished itself as a country with high infrastructure standards compared to its regional peers, thanks to the continuous development of projects that transcend government terms. Thus, every day we see airports and ports being modernised, new state-of-the-art multimodal logistics centres being created, modern urban and inter-city highways of the highest standard, mega-structures such as the Chacao Bridge, and new automated metro lines with cutting-edge technology being inaugurated in Santiago. On the other hand, despite numerous attempts, the railway in Chile has not yet achieved the prominence or vanguard status that its air and road competitors have attained. Unfortunately, the 'huge gap' left by the neglect of the railways several decades ago, combined with certain short-sighted measures of the past (such as the indiscriminate sale of land or the loss of central stations in major regional capitals), has prevented a recovery of the rail sector, resulting in slow and limited development in recent years.

This makes it clear that a series of ambitious measures is required to break the inertia and bridge the gap that still exists in terms of national logistics competitiveness and urban and inter-urban mobility solutions. Rail was a prominent solution in the past, it remains so for certain current mobility and productivity challenges, and it is also a modern solution for the needs of the future. The context outlined above has been, amongst other things, the motivation for my work in the railway sector over the past several years, both in Chile and (currently) abroad, always guiding my focus towards a comprehensive view of railway issues: learning first-hand how railways operate in other countries, how they are assessed, how they are justified, how the different levels of service are designed, how they complement other modes of transport, how their infrastructure is designed and built, how trains are manufactured and operated; how decisions are made, and, in general, what 'clear rules' successful countries in these areas have and apply.

There have been repeated calls for the need for 'a railway policy' in Chile and, whilst recent governments have put forward ideas to revitalise the railways, and there is also a certain trend towards priority projects "as a matter of state policy", there is no official document describing the role the state should play in this area, let alone a national vision for the future of the railways, which would counter the typical proposals that appeal to nostalgia and other slogans that fail to highlight the value of the railways, often clashing with parallel proposals that ultimately undermine railway development. Chile is heading towards a bright future. The country is seeking development in the medium term, for which the railway becomes not only indispensable, but also critical. To this end, it is necessary to "change the rules of the game" by establishing clear, long-term public policies on railways, with clear and realistic objectives, particularly in the areas of evaluation methodologies, legal frameworks, and investment mechanisms, in order to generate cross-cutting (rather than fragmented) efforts by the various Chilean government bodies involved in the sector.

This document aims to serve as a guide in this process of change, presenting concrete objectives, an analysis of the current state of affairs, and a summary of the outlook for the coming years, highlighting the main reasons why railways must be considered in the development of a country that must also ensure a balanced development of the various mobility solutions.

We invite the railway, industrial, political and government sectors, as well as academia and the public, to read this proposal, with a view to discussing, reflecting on and dreaming together about the trains for the Chile of tomorrow.

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TRENES PARA CHILE 2050

Words from the President of the Chilean Railway Institute

On a public policy for the railway in Chile…

Railways in Chile are a traditional means of transport which, in various forms, have provided continuous freight and passenger services since 1851, following the inauguration of the railway line from Caldera to Copiapó.

During the first thirty years of the 20th century, the railway undoubtedly became the main mode of transport in Chile, linking the north of the country with the south-central region, along with its various towns and industrial centres.

With the emergence and consolidation of road transport from the 1950s onwards, the railway gradually began to lose the prominence that had characterised it until then; a process that was by no means unique to Chile, but rather a global phenomenon. Various accounts indicate that the decline was most evident between the 1970s and 1990s; a period characterised by the closure of branch lines, the discontinuation of freight and passenger services, privatisation, and, in general, the decline of railway operations and the loss of the railway's relevance in the modal split. With unenthusiastic policies and unclear prospects, from the 2000s onwards, discussion began to take shape once again regarding the role the railway should play in Chile, given its evident necessity for development.

These new prospects must constantly contend with the 'myths surrounding the railway in Chile', such as the notion that our country 'is perfect for a long train running from Arica to Punta Arenas', or that trucks 'are the railway's true enemies'. At the end of the day, neither is true: in the late 1850s, Enrique Meiggs could not travel more than 90 kilometres north of Santiago without struggling to overcome the slope of Tabón. On the other hand, since the 1950s, it has been impossible to conceive of freight rail without trucks, as complementary modes of transport, in a country suffering from strong centralism and a relatively narrow strip of high population density and productive centres.

The Chilean Railway Institute is a think tank and forum for discussion established in 2008 to propose ideas that strengthen the new role the railway should play in our country. To this end, it makes available to the authorities and the public its vision for the railway in Chile, looking ahead to the year 2050.

We hope that this text, the result of years of discussions within the organisation, will once again highlight the railway as a tool that enables the development of the country and its people.

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Executive Summary

Chile currently faces a structural gap in the development of its railway system, resulting from years of neglect: decades of low investment, institutional fragmentation and the prioritisation of other modes of transport. Consequently, rail has a low modal share, and the country is therefore highly dependent on road transport for both passengers and freight. This situation has had negative impacts on economic competitiveness, territorial equity, environmental sustainability and the resilience of the national infrastructure.

In this context, the **National Railway Policy "Trains for Chile 2050"** proposes to reposition the railway at a cutting-edge level comparable to leading countries, thereby standing out in the Latin American region, and to reaffirm it as part of the national critical infrastructure, as a structural backbone of public transport (urban, regional and national) and national logistics, from a comprehensive, multimodal, efficient and sustainable perspective. Its purpose is to guide government action within a long-term vision (to the year 2050), promoting a modern, integrated, efficient, resilient and sustainable railway system that contributes to economic development, territorial cohesion and the well-being of the population.

Furthermore, the **national railway vision for 2050** envisages a railway system capable of coordinating public transport in cities and regions, integrating high-standard strategic logistics corridors, and efficiently connecting the country's main capital cities and even linking them to international networks. This involves significantly increasing investment in railway infrastructure, moving towards standards comparable to those of OECD countries, and consolidating the railway as a competitive alternative to road and air transport.

To realise this vision, the policy is structured around eight strategic guidelines:

1) Rail as the backbone of public transport.
2) Integration into strategic logistics corridors.
3) The development of high-performance services.
4) Modernisation of the institutional and legal framework.
5) New mechanisms for planning, evaluation and investment.
6) Resilient and efficient infrastructure.
7) Integration with urban development.
8) Strengthening the railway industry and human capital.

Each of these guidelines is implemented through specific objectives, indicators and instruments, notably the **National Railway Infrastructure Plan**, the definition of **strategic corridors** and the development of new **financing mechanisms and public-private partnerships.**

The policy also proposes a **new governance model** based on a **Ministry of Mobility and Critical Infrastructure**, a **national railway authority**, **transport associations** acting as bodies for territorial coordination, and planning mechanisms for strategic corridors, inspired by international experiences. This model seeks to improve inter-institutional coordination, accelerate decision-making and ensure the efficient execution of investments.

Finally, the policy is aligned with the main national strategies on transport, urban development, energy, climate change and logistics, positioning itself as a key instrument for advancing towards sustainable, safe and comprehensive mobility. Its progressive implementation, accompanied by strategic indicators and continuous evaluation mechanisms, will ensure its coherence, effectiveness and adaptation over time, consolidating the railway as a pillar of Chile's development by 2050.

1. Introduction and purpose of the National Railway Policy

This *National Railway Policy* defines the Chilean State's strategic direction for the long-term development of the railway system (up to 2050). Its purpose is to establish a strategic framework that corrects the current and evident structural imbalances, guides and coordinates the State's actions to restore, develop and consolidate the national railway system as critical infrastructure, promoting comprehensive, sustainable and resilient mobility and logistics that contribute to economic development, territorial cohesion, the country's competitiveness and the well-being of the population.

2. Diagnosis (executive summary)

Chile lags significantly behind in railway development compared to other modes of transport such as roads, airports and ports. Although the country ranks in the middle in terms of global competitiveness, it shows weaknesses in infrastructure, with low investment in railways: only 4% of the total invested in infrastructure and 0.06% of GDP, well below OECD standards.

It is estimated that Chile needs to invest around 6.5% of GDP in infrastructure, with a significant portion allocated to revitalising the railway system. However, in recent decades, efforts have been limited, disjointed and lacking a solid institutional framework to enable long-term planning. This, coupled with the historical decline of the railway since the mid-20th century (notably the severe crisis of 1979 and the aggressive rationalisation in the 2000s), has prevented its recovery as a significant player.

The imbalance in investment has led to a heavy reliance on road transport, with negative effects such as congestion, higher costs, accidents and pollution. In contrast, the railway presents itself as an efficient, safe and sustainable alternative, with great potential to improve the country's mobility and competitiveness.

Rail freight transport, which already connects ports and industrial areas, is characterised by its high capacity to carry large volumes, its high energy efficiency, and its role in reducing road congestion and emissions. Opportunities have been identified linked to the growing demand for sustainable transport, the reactivation of railway lines, the development of bi-oceanic corridors, and the promotion of private investment in integrated logistics. However, there are weaknesses associated with limited and dilapidated infrastructure which, together with poor intermodal coordination, currently account for its low modal share. The main threats relate to fierce competition from road transport, weather events and natural disasters, regulatory constraints and excessive bureaucracy, and the lack of tax incentives or subsidies.

Passenger rail transport, which, although currently limited in scale, has a proven experience and acceptance among users. It is characterised as a high-capacity solution for passenger transport, offering high energy efficiency, independence from road congestion, and safety. It is worth noting that today, metro and rail projects are already regarded as state policies, transcending the current government in power. The projects aim to increase demand for sustainable transport, which could be reinforced by the development of new inter-city corridors, incorporating new technologies and greater integration, including in some cases through public-private partnerships. Unfortunately, the territorial coverage of rail services is currently limited, and many existing services already suffer from an offer deficit and, in some cases, weak modal integration. Furthermore, regulatory institutional fragmentation and slow, complex processes cause project evaluation and implementation to be delayed, even running the risk of discontinuity. The main threats relate to the high level of competition from car use, as well as climatic events and natural disasters.

3. Vision for the future (executive summary)

Chile by 2050

Chile is facing a demographic transition towards an ageing, more urban population with higher incomes. Forecasts already suggest that the population could decline by 2070, whilst demand for housing, urban services and accessible, high-capacity transport is set to grow. On the other hand, the country is on track to become a high-income economy, with increased consumption, mobility and trade expansion. The trend towards an increasingly urbanised territory (now over 88%) with a strong concentration in the Metropolitan Region is evident, posing enormous challenges for decentralisation. Another major future challenge relates to waste management and its logistics.

In economic terms, Chile plans to consolidate its role as an export powerhouse in mining, agribusiness, aquaculture and clean energy (such as green hydrogen), which will significantly increase the demand for freight transport. Tourism is also a key sector, driving inter-regional mobility.

In summary, these trends will lead to:

- Increased urban, suburban and inter-city passenger mobility.
- Greater demand for logistics and large-scale freight transport (industrial, mining, forestry, agriculture, aquaculture and energy), including waste, heavy, dangerous goods and refrigerated goods.
- A need for efficient multimodal systems.

All of this reinforces the need for high-capacity, safe and sustainable mobility solutions such as the railway.

The success of rail in Chile

Recent rail services have demonstrated high demand and success:

- Suburban rail service Biotrén: Strong growth in passenger numbers and rapid post-pandemic recovery.
- Suburban rail service Santiago-Nos: Exceeded its design capacity within two weeks of opening.
- Suburban rail service Limache-Puerto: Sustained growth, now exceeding 20 million passengers a year.
- Intercity rail service Santiago-Chillán: Despite constant service disruptions, it is currently the only reasonably competitive intercity service in the region, having recently recorded a 72% increase in passengers carried, reaching almost 250,000 passengers a year.

Overall, EFE[1]'s services are showing steady increases in passenger numbers, reaching historic highs. On the other hand, whilst rail freight transport has played a leading role in major expansion projects in the mining and forestry sectors and for port logistics, it has also incorporated new technologies to enhance safety and achieve greater capacity. The railway has proven to be essential for high-volume industries and is beginning to expand into new types of freight (containers, fruit, salmon), consolidating its strategic role.

[1] *EFE: Chilean State Railway Company*

Challenges for a modern railway by 2050

Despite the progress made, significant limitations remain:

Institutional and planning

There is a lack of coordination between government bodies and a lack of a comprehensive long-term vision. Furthermore, assessments are carried out at project level rather than adopting a network-based approach. Projects are subject both to social assessment methodologies (defined by the State itself) that significantly underestimate the benefits of the railway (externalities, territorial integration), and in-depth demand studies from the earliest stages of the project, required and supervised by the Undersecretariat of Transport of the Ministry of Transport and Telecommunications (SECTRA). This results in very lengthy, costly processes with a high degree of uncertainty for rail investments.

Challenges for freight trains

The main weakness of rail freight services relates to the actual state of the national rail network, which is currently very old and limited (with many low-speed sections), offering poor coverage and lacking connections to production hubs, ports and terminals; and facing repeated operational restrictions, in contrast to the reality of road transport (by trucks). In particular, with the private railways in the north, the high levels of investment required to restore infrastructure damaged by natural disasters (floods, rising water levels, earthquakes) often lead to indefinite closures, causing freight to shift to less efficient modes with lower capacity.

For Chile, the development of combined transport represents a strategic opportunity for the railways, insofar as it allows for the realisation of efficiencies similar to those observed in Europe. The European experience shows that this model not only grows steadily but also strengthens the role of the railways as the backbone of medium- and long-distance transport. In a country such as Chile, with extensive logistics corridors and a heavy reliance on road transport, combined transport could help reduce logistics costs, improve environmental sustainability and increase the competitiveness of the rail system, particularly in port–inland connections and export supply chains. Based on recent studies of freight transport cost models in Chile, rail is capable of offering a cost up to 5 to 8 times lower than road transport (cost per tonne-km) on a main route and reducing the fare by up to 67% in a combined train-and-truck solution.

Challenges for urban services

The main challenge facing urban rail systems is not merely technical or financial, but also institutional and cultural; in other words, progress must be made towards an integrated vision of urban rail transport, with appropriate regulatory frameworks, continuity in public policy, and a broader understanding of these systems as structural solutions to mobility issues. Whilst there are notable success stories such as the Metro de Santiago, in other regions—particularly Concepción—similar projects have faced difficulties regarding funding, political prioritisation and institutional definition, which have delayed their implementation. On the other hand, there is a tram paradox, linked to the strong private sector interest in implementing them and the systematic rejection by the authorities, who replace such initiatives with alternative projects (electric bus corridors). Finally, the neglected funiculars (Valparaíso Funiculars) have suffered prolonged neglect because they are ‘erroneously’ perceived as tourist attractions, when in reality they are an integral part of the public transport solution for large cities (Valparaíso).

Challenges for suburban and regional services

The first challenge is conceptual, where service levels must be clearly defined (e.g. Metro vs. Suburban Train). Secondly, suburban services have historically been under-resourced, currently operating at the limits of their capacity, thus requiring ambitious expansion plans. Despite the success of these services, there is evidence of public policy decisions that have prioritised the development of other, less efficient modes (buses), forcing an unfounded competition. Finally,

there are opportunities to establish new services in the northern capital cities through public-private partnerships with the private railways in the north of the country.

Challenges for intercity services

Since the closure of services to Valparaíso and Concepción in 1997 and 2007 respectively, it is still not possible in 2026 to establish rail connections to and from the two largest cities after Santiago. Today, the current state of the infrastructure, the long-standing delays in projects and the loss of key central stations within the cities prevent the planning of competitive services in the short term and make medium- and long-term initiatives more costly.

In general, the rail system faces structural, regulatory and investment barriers that hinder its development.

High-speed rail by 2050?

High-speed rail is positioned as a competitive alternative to air travel and cars, especially over medium distances of around 600 kilometers (with journey times of between 1.5 and 4 hours). International examples, such as the TGV in France, demonstrate its ability to lead the modal shift in the market. The main benefits relate to a significant reduction in journey times, a boost to economic growth and employment, territorial integration and regional development, and a lower environmental impact (much lower CO_2 emissions than cars or aeroplanes).

Furthermore, high-speed rail strengthens connectivity, tourism and national competitiveness. However, its implementation requires a long-term vision, sustained investment and institutional adaptation. For Chile, there is an opportunity to develop a strategic corridor of around 600 kilometres (Valparaíso–Santiago–Concepción), which accounts for a large proportion of the population (75%) and the country's economic activity.

Why more rail?

Rail is one of the most efficient, safe and sustainable modes of transport for passengers and freight, offering significant advantages that make it particularly valuable for long-term policies: high capacity, high energy efficiency, lower emissions, reduced land use, lower external social costs, greater safety, a driver of regional economic development, a generator of direct and indirect jobs, and a promoter of innovation.

Resilient railways

Although railways are highly sensitive, as they depend entirely on the condition of the infrastructure to operate safely, the resilience of that infrastructure is key to ensuring that trains continue to deliver their benefits, which become even more essential in extraordinary circumstances. In this regard, there are valuable lessons from the past, such as the use of trains during the War of the Pacific or the Beagle Conflict in Chile, alongside more recent examples in Ukraine during the war with Russia, in France with hospital trains during the pandemic, and in Spain with the 'solidarity train' for those affected by Storm 'Dana' in Valencia.

Maintaining ideal infrastructure conditions in the face of natural disasters is not easy, and if this is not possible, it must at least be ensured that passengers and the goods being transported are not affected by it. Given the reality in Chile, it is crucial and highly relevant to study the experience of the Japanese railways in order to develop a highly resilient railway system. For example, in 2011 Japan was able to restore the Tohoku-Shinkansen line, which was severely affected by a magnitude 9.0 (Richter) earthquake, in just 49 days.

4. Broader strategic framework

Purpose

To establish a long-term strategic framework (to 2050) that will reverse the structural deficit in railway development in Chile, strengthening the role of the railway as the backbone of public transport, logistics and territorial development, through coordinated government action, sustained investment and institutional modernisation, thereby contributing to the country's competitiveness, sustainability and resilience.

Vision

By 2050, Chile will have a railway system with high standards of service and reliability, integrated into public transport and national logistics, serving as a benchmark in Latin America for its efficiency, sustainability, innovation, safety and resilience.

Mission

To guide, coordinate and promote the development of the national rail system through long-term strategic planning, effective governance and a modern institutional framework, bringing together public and private stakeholders, with the aim of strengthening public transport, logistics, regional development and human capital, thereby contributing to Chile's sustainable development.

Values

Values represent the fundamental convictions or ideas that should guide the State's actions. They define the ethical or aspirational framework that guides decisions:

1. Public service and a people-centred approach: The railway system is developed with the aim of improving people's quality of life, ensuring accessibility, safety, service continuity and territorial equity.

2. Sustainability and environmental responsibility: Railway development actively contributes to climate change mitigation, energy efficiency and the reduction of negative externalities, promoting a clean and sustainable transport system.

3. Balanced territorial development and national integration: The railway is a tool for reducing territorial disparities, strengthening social cohesion, integrating cities and regions, and promoting the country's harmonious development.

4. Efficiency, transparency and proper use of public resources: Railway planning, investment and operations are governed by criteria of efficiency, ongoing evaluation, accountability and the responsible use of state resources.

5. Innovation, competitiveness and integrated logistics: The adoption of new technologies, management models and innovative solutions that strengthen the competitiveness of the railway system is promoted, with a particular focus on driving the development of freight transport and its integration with the national logistics chain through efficient, high-capacity multimodal solutions.

6. Human capital, professionalisation and railway culture: Promoting training, specialisation and the development of railway know-how, strengthening human capital, recovering historical knowledge, and safeguarding and developing technical capabilities for the future of the system.

7. Resilience, safety and support for national emergencies: The railway system is conceived as critical national infrastructure, designed to withstand, recover from and adapt rapidly to adverse events, and to support emergency management, civil protection and the country's operational continuity in crisis situations.

Enabling factors

Enabling factors are those institutional, regulatory, financial, technical and social elements that will allow this public policy to be designed, implemented and sustained effectively:

1. Governance and inter-institutional integration: Establishing a new framework that promotes effective coordination between public and private sector actors, academia and civil society, ensuring consistency in the planning and implementation of the railway system.

2. New legal and regulatory framework: A set of updated laws, standards and regulations establishing the rules of the railway system, providing legal certainty, promoting investment and ensuring operational and safety standards.

3. Financing and economic model: A structure of financial mechanisms and business models that enable the long-term sustainability of investment, operation and maintenance of the railway system, combining public and private resources where appropriate.

4. Planning and instruments with a multimodal approach: To have new tools and up-to-date methodologies (particularly for rail investments) that enable the development of the country's transport system to be defined, prioritised and coordinated in a comprehensive, efficient and multimodal manner, thereby ensuring consistency with the country's spatial, urban and logistics planning.

5. Technical and operational capabilities: Ensuring the availability of the human resources, specialist knowledge and institutional capabilities required to efficiently design, implement, operate and manage the railway system.

6. Sustainability and social acceptance: To have environmental, social and territorial criteria in place that ensure the long-term viability of projects, together with the support and legitimacy of the public and the authorities.

7. Multimodal integration: Adopting a multimodal approach to project development, so that the railway system can integrate with other modes of transport, facilitating the efficient movement of passengers and freight through multimodal solutions.

8. Sustained economic growth of the country: Essential for the realisation of the 2050 rail vision, as the development of rail infrastructure requires long-term investment and high technological standards, the viability of which depends directly on fiscal capacity, macroeconomic stability and the attraction of private investment. Furthermore, greater economic dynamism increases demand for passenger and freight transport, strengthening the social and economic returns of railway projects. In this way, economic growth and railway development form a virtuous cycle, where the former creates the conditions for the latter's deployment, and the latter contributes structurally to sustaining and enhancing the country's development.

Principles

The following principles are the operational criteria that will guide decision-making and the implementation of this policy. Here, the values are translated into guidelines for action for the design of programmes, projects and instruments:

1. Strategic – "The strategic role of the railway": The railway is recognised as a strategic part of the country's infrastructure and as an essential structural component of the transport system, logistics and territorial connectivity.

2. Public – "Public interest and a people-centred approach": Railway development prioritises people's well-being, accessibility, safety, service quality, and the reduction of negative transport externalities.

3. Integrated – "Multimodal and territorial integration": The railway system is developed in an integrated manner with other modes of transport and in line with urban, regional and inter-urban planning.

4. Sustainable – "Environmental sustainability and energy efficiency": Railway policy actively contributes to the decarbonisation of transport, energy efficiency and the reduction of emissions, accidents and social costs.

5. Enduring – "Long-term planning and continuity of the State": Railway development is supported by long-term planning, with mechanisms to ensure continuity, periodic evaluation and progressive adaptation.

6. Efficient – "Efficient use of public resources": Investment in the railways is guided by criteria of economic, social and environmental efficiency, taking into account comprehensive assessments of projects, portfolios and strategic plans.

7. Resilient – "Resilience and safety of critical infrastructure": Railway infrastructure is designed, built and operated taking into account the seismic, climatic and operational risks specific to the country.

8. Innovative – "Development of national capabilities": The State promotes the development of the railway industry, human capital and the recovery of national know-how, strengthening the sector's autonomy, innovation and competitiveness.

5. Objectives

Railway policy objectives

To carry out regulatory changes within a maximum period of 3 years and implement comprehensive plans within a maximum period of 5 years for a new framework of state governance in the field of railways and mobility in Chile, through the implementation of a modern institutional architecture, an updated and coherent legal framework, and integrated planning procedures and instruments, enabling the effective coordination of public and private stakeholders and facilitating the fulfilment of the national railway vision for 2050. The conceptual architecture and instruments are detailed in sections A5, A6 and A7 of this document.

Objectives incorporated into the national railway vision

The **national railway vision for 2050** consists of developing a modern, integrated and resilient railway system that acts as the backbone of public transport and the national logistics chain, particularly in those areas where it offers significant advantages over other modes. The vision was developed based on the assessment described in sections A1 and A2 and the international references mentioned in section A8 of this document.

Objectives relating to freight rail

1. Around 50% of gross freight transported in tonne-kilometres (tonne/km) is carried by highly efficient modes, including freight rail and domestic shipping. These figures are similar to those in the United States (~50%)[2] lower than in Europe (~75%, mainly due to domestic shipping)[3] and slightly higher than in Japan (~49%)[4] .

2. Achieve a minimum modal share of 30%[5] of total net freight transported (tonnes) in at least all state-owned ports (also desirable in private ports).

3. Develop combined transport as the backbone of Chile's rail freight system, increasing its share of total land transport to levels similar to those in advanced and emerging economies (the United States, Japan, India and Europe, which range from around 3–10%), with the aim of doubling its volume in the long term through investment in intermodal infrastructure, digitalisation and interoperability.

4. Establish legal mechanisms to ensure that a significant portion of the cost savings offered by rail compared to other modes are passed on to users, thereby enhancing the competitiveness of the productive system.

5. From Chile, to promote a portfolio of multimodal international rail corridors, with the aim of establishing at least two high-standard, 100% rail-based international connections by 2050, subject to the multilateral agreements and financing mechanisms required to bring them to fruition.

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[2] *https://www.bts.gov/content/us-ton-miles-freight*
[3] *https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Freight_transport_statistics_-_modal_split*
[4] *Freight Rail Overview & Freight Management in JAPAN Japan Freight Railway Company*
[5] *https://logistica.mtt.cl/transporte-terrestre-ferroviario/*

Objectives relating to passenger rail

6. Achieve a modal share equal to or higher than the global average for urban rail (tram, metro and/or funicular), with 16%[6] and suburban rail 16%[7] in public transport in regional capitals with over 400,000 inhabitants, such as Antofagasta, La Serena-Coquimbo, Valparaíso, Concepción and Temuco. It is also desirable for other cities with populations of between 200,000 and 400,000 to have rail solutions within their public transport systems, such as Arica, Iquique, Calama, Rancagua, Talca, Chillán, Los Ángeles and Puerto Montt. Furthermore, it cannot be ruled out that rail transport may also be developed in other smaller cities depending on their specific conditions, such as the availability of existing railway tracks.

7. To achieve a modal share in Santiago that exceeds the global average (as mentioned in the previous point) for urban and suburban rail (combined), ideally reaching figures close to 50% (though still lower than in cities with high rail multimodality such as Paris[8] , Berlin[9] and Prague[10]).

8. Establish a high-standard corridor, covering at least ~600 kilometres between Valparaíso, Santiago, Rancagua, Talca, Chillán and Concepción, where 75% of the national population is currently concentrated. In this way, regular and permanent inter-city and regional rail services can be implemented between the capital cities, as well as freight transport services (mixed and/or segregated traffic, as clarified in the engineering studies). Extension towards Temuco and/or La Serena-Coquimbo is desirable, as is the creation of a similar corridor between Antofagasta and Calama. It is essential that the Valparaíso-Concepción corridor achieves positive results in its development and operation.

9. To study and implement high-speed rail by 2050 along the high-standard corridor mentioned in the previous point (Valparaíso–Santiago–Concepción), so that intercity services achieve a modal share of at least 30%[11] similar to that in the United States' Northeast Corridor (Boston–Washington, ~600 km), and eventually reaching desirable figures close to 50%, though still lower than in other cases such as Spain (around 75%[12] on the Madrid-Barcelona route ~620 km), France (around 60%[13] on the Paris-Marseille route ~750 km), Italy (around 60%[14] for Milan-Rome ~570 km), Germany (around 50%[15] for Berlin-Munich ~580 km), South Korea (around 70%[16] for Seoul-Busan ~325 km) or Japan (around 80%[17] for Tokyo-Osaka ~515 km).

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[6] *https://cms.uitp.org/wp/wp-content/uploads/2020/08/UITP_Statistic-Brief_national-PT-stats.pdf*
[7] *https://cms.uitp.org/wp/wp-content/uploads/2020/08/UITP_Statistic-Brief_national-PT-stats.pdf*
[8] *https://en.wikipedia.org/wiki/Transport_in_Paris*
[9] *https://en.wikipedia.org/wiki/Modal_share*
[10] *https://en.wikipedia.org/wiki/Transport_in_Prague*
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[15] *https://www.l-iz.de/wirtschaft/mobilitaet/2018/12/Die-Bahn-hat-ihre-Fahrgastzahlen-zwischen-Muenchen-und-Berlin-mehr-als-verdoppelt-247632*
[16] *https://www.korail.com/intro*
[17] *https://www.mdpi.com/1996-1073/11/5/1151*

Cross-cutting objectives

10. Actively support a 30% reduction in accident rates by 2030[18] .

11. Actively contribute to reducing transport energy demand by 25% by 2035[19] , given that transport is responsible for 23% of global CO2 emissions.

The 2050 vision involves increasing investment in infrastructure in general, reaching levels above 4%[20] of GDP, with 6.5%[21] of GDP being desirable. With regard to railways, the aim is to increase the share of total infrastructure investment from 4% to 16% or more, and in terms of GDP, to increase it from 0.06% to 0.10% or even 0.40% of GDP, reaching the standard levels of OECD countries (Australia and South Korea invest 0.4% of GDP in railway infrastructure[22]).

In this way, urban, regional, inter-city and international connectivity will be strengthened, thereby contributing to Chile's development and improving people's quality of life.

[18] *National Road Safety Strategy 2021–2030, CONASET.*
[19] *https://mtt.gob.cl/cop30-chile-impulsa-indicadores-para-avanzar-hacia-un-transporte-mas-limpio-y-resiliente/*
[20] *https://www.infraestructurapublica.cl/wp-content/uploads/2025/09/RDI-9-FINAL-09_25-1.pdf*
[21] *https://www.df.cl/empresas/industria/cartera-de-proyectos-permanente-y-mayor-apoyo-a-iniciativas-estatales*
[22] *https://www.itf-oecd.org/infrastructure-investment-data-reveal-contrasts-between-countries*

6. Main guidelines

Guideline 1. Rail as the backbone of public transport

Position rail as the backbone of mass public transport in large cities, metropolitan areas and integrated urban systems, ensuring high capacity, energy efficiency and reliability.

Indicators: Rail's share of total public transport journeys in metropolitan areas (%).

Instruments: National Railway Infrastructure Plan and related guidelines; investment programmes for trams, metro, funicular railways, commuter trains and regional trains. Multimodal fare and operational integration.

Guideline 2. Railways integrated into strategic logistics corridors

Integrate the railway into the national and international logistics chain through rail connections at strategic terminals and the development of competitive, high-standard rail corridors.

Indicators: Rail's share of national land freight transport (%).

Instruments: Definition of the National Network of Strategic Railway Corridors. National Railway Infrastructure Plan and corresponding guidelines. Development of multimodal logistics centres. Investment programmes in freight railway infrastructure and port and airport connections.

Guideline 3. Development of high-performance rail services

Progressively develop high-performance rail services connecting the main regional capitals with competitive journey times and high-quality standards.

Indicators: Average rail journey time between major regional capitals.

Instruments: Professional study of high-speed rail (exceeding the 200 km/h barrier) and its feasibility. National Railway Infrastructure Plan and corresponding directives. Investment programmes in high-standard railway corridors. Updating of technical regulations associated with the development of a new standard. New models of operation and service provision.

Guideline 4. Modernisation of the institutional and legal framework for railways

Modernise the institutional and regulatory framework to enable efficient, integrated and safe management of the railway system.

Indicators: Average time taken for the assessment and approval of railway projects. Indicators of progress and processing of plans and projects.

Instruments: Framework Law on Mobility and Critical Infrastructure. New General Railways Law and update of sectoral regulations. Update of the EFE Organic Law. New technical and railway safety regulations.

Guideline 5. New mechanisms for planning, evaluation and investment

Establish a system for the planning and evaluation of long-term railway investments, based on corridors, portfolios and comprehensive plans.

Indicators: Percentage of railway investments implemented in accordance with an approved multi-year plan.

Instruments: National Railway Infrastructure Plan and corresponding directives. Multi-year financial planning. Public-private partnerships and railway concessions.

Guideline 6. Resilient and efficient railway infrastructure

Ensure that railway infrastructure incorporates standards for seismic, climatic and operational resilience.

Indicators: Percentage of the railway network that meets defined resilience standards. Incident and accident rate.

Instruments: Technical standards for resilient design. Infrastructure modernisation and reinforcement programmes. Risk monitoring and management systems. Railway infrastructure as a network for preventive and predictive monitoring of seismic, climatic and operational events.

Guideline 7. Integration of the railway into urban development

Coordinate railway development with urban development, promoting more integrated, accessible and sustainable cities. Key to this is the development of railway stations as genuine meeting points for both railway users and non-users, incorporating multiple services as well as aspects associated with promoting the identity of cities.

Indicators: Number of railway stations integrated into multimodal hubs and urban plans.

Instruments: National Railway Infrastructure Plan and corresponding guidelines. Station–city integration plans. Development of multimodal hubs. Coordination with spatial planning instruments. Coordination with the public sector (services) and private sector (retail, property, services).

Guideline 8. Development of the railway industry and human capital

Strengthen the national railway industry and specialised human capital, by recovering and developing railway know-how.

Indicators: Number of active railway education and training programmes.

Instruments: Railway industrial development programmes. Think tanks (e.g. Chilean Railway Institute). Technical and vocational training programmes. R&D initiatives and public-private partnerships. New railway campus.

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7. Implementation and monitoring

This policy will be implemented progressively, through specific plans, programmes and measures. The policy will include strategic indicators and regular evaluations to ensure its monitoring, updating and continuous improvement.

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8. Final provision

This National Railway Policy constitutes the guiding framework for the State’s action in the railway sector and shall be implemented through the relevant institutional, legal and programmatic reforms.

TECHNICAL ANNEX

A1. Diagnosis (in detail)

Chile has a structural deficit in railway development, particularly when compared to the significant investment and modernisation of roads, airports and ports over recent decades. The country ranks 42nd in the global competitiveness ranking[23] . Within the infrastructure pillar, the country ranks 48th, reflecting that challenges remain in terms of quality, coverage and modernisation. Regarding the statistics, of the total investment allocated to infrastructure, only 4% is spent on railways (compared to 20% in OECD countries[24]). Furthermore, our country invests only 0.06% of GDP in railway infrastructure (compared to 0.4% in Australia and South Korea[25]).

Chile needs to invest around 6.5% of GDP[26] in infrastructure to achieve development, and a significant portion of this should go towards compensating for the historical lack of investment in railways, thereby bridging the gaps that currently exist in terms of infrastructure and competitiveness. Over the last 25 years, our country has seen half-hearted, ad hoc efforts to revive the railways through expansion projects and initiatives, but without the associated institutional framework to enable the authorities to plan, execute and oversee such projects with the necessary long-term public policy perspective, often resulting in setbacks to the already limited use of rail. This, coupled with the decline of the railway as a mode of transport since the late 1950s—a consequence, amongst other factors, of the boom in road transport and the sustained neglect of the rail sector until the mid-1990s—has prevented the railway from regaining its position as a key player in national transport. In contrast, there are the institutional measures that the State itself has implemented to improve service levels, resilience and cutting-edge technology on Chilean roads, at airports and in ports.

This imbalance has led to high dependence on road transport, chronic congestion, higher logistics and energy costs, and negative externalities such as emissions and accidents, which are often not taken into account by the authorities when defining and prioritising the most appropriate public investment to resolve mobility issues, thereby obscuring the potential role that rail could play in the country.

Rail offers high capacity, energy efficiency, safety, resilience and a lower environmental impact, positioning itself as a strategic mode of transport for the country's sustainable development.

SWOT analysis of rail freight transport:

- **Strengths:**
  - **Capacity to transport large volumes:** Ideal for minerals, agricultural and industrial bulk goods, enabling economies of scale.
  - **High energy efficiency:** Rail consumes less energy per tonne transported compared to road transport, reducing operating costs.
  - **Reduction in road congestion and emissions:** The use of rail reduces heavy traffic on the roads and lowers pollutant emissions.
  - **Connectivity with ports and industrial zones:** There are now key rail logistics corridors connecting to port terminals (e.g. Antofagasta, San Antonio and Talcahuano).
- **Opportunities:**
  - **Increased demand for sustainable transport:** Companies are seeking 'greener' alternatives, driving a preference for rail.
  - **Revitalisation of railway lines:** There are currently public and private projects to rehabilitate infrastructure and expand rail freight coverage.

[23] *https://uchile.cl/noticias/229513/chile-sube-a-niveles-prepandemia-en-ranking-global-de-competitividad*
[24] *https://www.itf-oecd.org/infrastructure-investment-data-reveal-contrasts-between-countries*
[25] *https://www.itf-oecd.org/infrastructure-investment-data-reveal-contrasts-between-countries*
[26] *https://www.df.cl/empresas/industria/cartera-de-proyectos-permanente-y-mayor-apoyo-a-iniciativas-estatales*

- **Development of bi-oceanic corridors:** Integration projects with neighbouring countries (Argentina, Bolivia and Peru) could boost international rail freight transport.
- **Private investment in integrated logistics:** Railway concessions and public-private partnerships could enable improvements in infrastructure and operational efficiency.

- **Weaknesses:**
  - **Limited and dilapidated infrastructure:** Many tracks are not electrified, have load restrictions and very low speeds.
  - **Low modal share**: Rail accounts for only a small fraction of national freight transport compared to road transport.
  - Lack of **intermodal coordination**: There is a lack of seamless integration between rail transport and other logistics modes at ports and distribution centres.
  - **Dependence on specific products:** Rail freight transport in Chile is concentrated in sectors such as mining, which creates vulnerability to market fluctuations.

- **Threats:**
  - **High competition from road transport:** Which currently offers greater flexibility, coverage and more competitive delivery times.
  - **Regulatory constraints and excessive bureaucracy:** Concession processes, tariff regulation and permitting procedures can hinder the sector's development.
  - **Weather events and natural disasters:** Track closures due to floods, earthquakes or fires affect service continuity.
  - **Lack of tax incentives or subsidies:** Rail transport faces competitive disadvantages compared to road transport, which receives greater state support.

SWOT analysis of passenger rail transport.

- **Strengths:**
  - **Capacity for mass passenger transport:** It allows large volumes of passengers to be moved efficiently, particularly in urban and suburban corridors.
  - **High energy efficiency:** Lower energy consumption per passenger-km compared to road and air transport, usually electric.
  - **Independence from road congestion:** Generally, there is dedicated infrastructure that allows for greater reliability in journey times.
  - **Safe transport:** Lower accident rate compared to road transport.
  - Experience **and acceptance:** Services with accumulated technical expertise and, generally, a very positive public perception.
  - **Project continuity:** Metro and railway projects are now regarded as state policy, transcending the terms of individual governments.

- **Opportunities:**
  - **Increased demand for sustainable transport:** Greater demand for structural mass transport due to urban growth and metropolitan expansion, in line with positioning the railway as a key solution for sustainable mobility.
  - **Development of new inter-city corridors:** Potential to connect intermediate cities and regional capitals, particularly re-establishing the connection with Valparaíso and Concepción.
  - **Trains at the cutting edge of technology:** Incorporation of the latest technological advances in rail, so that trains are more efficient and safer.
  - **Integration:** Integration between different modes of transport at the physical level (stations) and at the fare level. Furthermore, the comprehensive development of the railway in conjunction with cities, particularly around stations. Finally, regional integration with potential international connections that boost passenger services, such as between Arica and Tacna.

- **Private co-financing:** The potential to attract private investment in infrastructure and operations through various public-private partnership mechanisms, thereby enabling the provision of new services, for example in Antofagasta, Calama, Copiapó and La Serena-Coquimbo.

- **Weaknesses:**
  - **Limited territorial coverage:** Low presence of passenger rail services nationwide, with a strong concentration in the central region (EFE), excluding major inter-city connections (e.g. Valparaíso and Concepción).
  - **Limited infrastructure:** A small, ageing network, with sections that are non-operational and/or of poor standard, leading to operational constraints.
  - **Shortage of supply and weak modal integration:** Limited competitiveness compared to cars and buses due to limited supply, as well as a lack of modal integration with other modes of transport (buses, metro, airport connections).
  - **Institutional and regulatory fragmentation:** Currently, there is no integrated governance of the rail system, nor is there a leading authority to ensure its harmonious development alongside other modes of transport.
  - **Slow and complex investment processes**: Project evaluation poorly suited to railway systems, thereby undermining their feasibility and implementation timelines.
  - **Reliance on public subsidies:** Low financial self-sustainability across several services.

- **Threats:**
  - **High competition from road transport:** Which currently offers greater flexibility, coverage and more competitive journey times, particularly at the inter-city level.
  - **Public investment and excessive bureaucracy:** Long project development times with a high risk of political discontinuity or changes in priorities. Furthermore, regulatory and institutional uncertainty discourages private investment and long-term planning.
  - **Weather events and natural disasters:** Track closures due to floods, earthquakes or fires affect service continuity.
  - **Land and social conflicts:** Expropriations, urban impact and local opposition can delay projects. On the other hand, many communities see railway projects as an opportunity to obtain compensation funds, which are not usually provided by local, regional or central government.
  - **Preference for the car:** Difficulty in achieving a modal shift away from the car due to cultural factors influencing preference.

A2. Vision for the future (in detail)

Chile in 2050

Chile is moving towards an ageing society: the population now exceeds 20 million, with a life expectancy of around 81.8 years, and could fall to less than 17 million by 2070, reflecting an advanced demographic transition[27]. Similarly, the average household size has fallen to 2.8 people, with 21.8% of households consisting of a single person, which points to a sharp rise in demand for urban housing and services associated with an ageing population[28] . Furthermore, Chile aims to become a high-income economy, with a projected GDP per capita of around US$42,000 by 2030, which would imply a gradual convergence towards the income levels of developed economies[29]. If we consider that Chile's projected economic growth is between 2.2% and 2.5% annually for the coming years, this supports the gradual expansion of domestic consumption and, with it, the retail sector[30] . Finally, the consolidation of an increasingly large urban middle class and the rise in per capita income will continue to drive the modernisation of the retail sector, the digitalisation of consumption and the expansion of e-commerce[31] .

In terms of territory, Chile has become one of the most urbanised countries in Latin America, with 88.1% of the population currently living in cities, whilst only around 12% reside in rural areas, reflecting a sustained trend of rural-to-urban migration over more than six decades[32] . Chile's urban population exceeds 17.4 million people in 2024, more than triple the figure in 1960 (when the railway began its decline), reflecting sustained urban expansion and growing demand for urban infrastructure and metropolitan services[33]. Chile's urbanisation rate has risen by more than 20 percentage points since 1960, consolidating cities as the country's main hubs of economic activity, employment and mobility[34] . In many rural areas of Chile, there is a significant exodus of young people towards urban centres or mining hubs, which accelerates rural ageing and reduces the labour base in agricultural regions[35] . Furthermore, Chile faces the challenge of balancing its territorial structure, where the Metropolitan Region accounts for nearly 40% of the population and a similar proportion of national GDP, whilst other regions seek to strengthen their economic and administrative autonomy[36] . In this vein, economic decentralisation policies aim to boost regional production hubs — such as mining in the north, aquaculture in the south and agribusiness in the south-central region — to reduce economic concentration in Santiago[37] .

One of the critical problems facing Chile today is waste management, characterised by the saturation of landfill sites. Currently, approximately 19.6 million tonnes of waste are generated annually, of which 9 million tonnes (24,000 tonnes daily) are household waste, and 80% of this ends up in landfills/ waste disposal sites[38] , with 40% of that being deposited in landfills that have reached the end of their useful life or are close to capacity[39] . Only the remaining 20% is

[27] *https://elpais.com/chile/2026-02-05/chile-enfrenta-un-envejecimiento-acelerado-y-en-2028-las-defunciones-superaran-a-los-nacimientos.html*
[28] *https://elpais.com/chile/2025-03-27/mas-viejos-con-menos-hijos-y-mas-solos-en-chile-todo-lo-que-esta-ocurriendo-a-nivel-internacional-es-mucho-mas-acelerado.html*
[29] *https://www.chilenews.cl/noticias/104549/Proyecci%C3%B3n-optimista%3A-PIB-per-c%C3%A1pita-de-Chile-alcanzar%C3%A1-los-US%24-42-mil-para-2030*
[30] *https://www.cepal.org/*
[31] *https://www.oecd.org/*
[32] *https://www.theglobaleconomy.com/chile/Percent_urban_population/*
[33] *https://statbase.org/data/chl-urban-population/*
[34] *https://www.statista.com/statistics/455791/urbanization-in-chile/*
[35] *https://elpais.com/chile/2025-04-03/envejecer-en-las-zonas-rurales-de-chile-los-chiquillos-se-van-por-trabajo-y-los-mayores-de-65-anos-nos-quedamos.html*
[36] *https://www.subdere.gov.cl/*
[37] *https://www.cepchile.cl/*
[38] *https://radio.uchile.cl/2024/05/17/dia-mundial-del-reciclaje-gobierno-proyecta-que-chile-reciclara-el-75-de-sus-residuos-para-el-2040/*
[39] *https://www.meteored.cl/noticias/actualidad/chile-y-su-basura-al-limite-40-de-los-residuos-se-entierran-en-vertederos-sin-vida-util.html*

recycled[40]. Many municipalities without their own waste disposal sites must transport waste to other regions, thereby incurring high logistics costs. Recent extreme cases can be found in both the north and the south where rubbish accumulates due to a lack of final disposal sites, such as in Ancud, where more than 10% of its budget is spent on sending rubbish to the Biobío region[41] . Therefore, the main bottleneck lies not only in waste treatment but also in the logistics of waste transport. Based on an extrapolation consistent with population growth and global trends, Chile could exceed 25–30 million tonnes annually[42]. Furthermore, the country has set a target of achieving 75% recycling by 2040[43]. Consequently, it is expected that in the future there will be a more complex system, comprising regional recycling plants, controlled incineration plants, treatment centres (for organic, hazardous and industrial waste), and an evolution in landfill sites: fewer in number, but more specialised. This will increase the need for large-scale inter-regional transport and genuine waste logistics hubs. Here, the railway can play a key role, given the advantages it offers for long-distance mass transport and its lower environmental impact compared to lorries. Consequently, the system will shift from 'burying waste' to 'transporting materials to specialised plants'. In terms of impact, if 50% of household waste were transported by rail, this would mean 120,000 fewer trucks journeys per year, thereby reducing congestion and emissions and increasing the viability of large-scale regional facilities.

Chile aims to establish itself as a high-income economy, which will entail increased consumption of goods, domestic trade and the movement of people. Chile is currently the world's leading exporter of at least 24 products, including copper, lithium, cherries and salmon[44] , consolidating an economy that is deeply integrated into global trade with strong future prospects. For example, the projected mining investment portfolio is set to reach US$104.5 billion by 2034[45], driven by global demand for copper and strategic minerals for the energy transition. Meanwhile, Chilean agricultural exports continue to expand; exports to the United States alone reached over 2.8 million tonnes of fresh fruit in 2024[46]. As for the aquaculture industry, Chile produces around 990,000 tonnes of salmon per year, establishing itself as the world's second-largest producer[47] . The salmon industry accounts for approximately 15% of Chile's non-mining exports, confirming its strategic role in the national export economy[48]. To this must be added Chile's aspirations to become a world leader in clean fuels, with industrial projects integrating the production of hydrogen, ammonia and synthetic fuels for energy exports[49]. Here, the green hydrogen strategy envisages potential investments of up to US$330 billion, with exports estimated at US$30 billion annually by 2050[50]. This means that green hydrogen production could reach 2–3.5 million tonnes annually by 2050, positioning Chile among the world's leading exporters of clean fuels[51].

Consequently, industrial, mining, forestry and energy production generates massive flows of heavy and dangerous cargo (steel, cellulose, fuels, chemicals and minerals, amongst others), where the railway can position itself as a genuine alternative due to its high competitiveness. Today, road transport presents high operational risks when transporting high-tonnage freight, such as logs, heavy machinery, scrap metal, steel beams and coils, which can cause serious

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[40] *https://radio.uchile.cl/2024/05/17/dia-mundial-del-reciclaje-gobierno-proyecta-que-chile-reciclara-el-75-de-sus-residuos-para-el-2040/*
[41] *https://www.pauta.cl/ciudad/2024/01/25/crisis-de-gestion-de-basura-en-ancud-10-del-presupuesto-municipal-se-destina-en-enviarla-biobio.html*
[42] *https://www.portalagrochile.cl/2023/06/20/generacion-de-residuos-a-nivel-mundial-proyecta-alcanzar-3-400-millones-de-toneladas-al-2050/*
[43] *https://www.cnnchile.com/pais/gobierno-reciclaje-chile-residuos-2040_20240517/*
[44] *https://www.subrei.gob.cl*
[45] *https://www.reuters.com/world/americas/chile-raises-mining-investment-forecast-through-2034-105-billion-2025-12-11/)*
[46] *(https://elpais.com/chile/2025-04-16/guerra-de-aranceles-las-industrias-chilenas-mas-afectadas-por-la-politica-proteccionista-de-trump.html)*
[47] *https://www.consejodelsalmon.cl/informacion-de-la-industria/principales-datos-de-la-industria/*
[48] *https://revista.mundoacuicola.cl/*
[49] *https://www.worldbank.org/en/news/press-release/2023/06/29/chile-to-accelerate-its-green-hydrogen-industry-with-world-bank-support*
[50] *https://www.worldbank.org/en/news/press-release/2023/06/29/chile-to-accelerate-its-green-hydrogen-industry-with-world-bank-support*
[51] *https://strategicenergy.eu/chile-resets-its-green-hydrogen-strategy-lower-targets-higher-costs-new-priorities/*

accidents through displacement (being thrown from the vehicle and crushing cabs and/or other vehicles). There is currently a high reliance on trucks for industrial freight and significant logistical fragmentation (many small journeys rather than a few large ones). The transport of dangerous goods (fuels and chemicals) is also currently carried out mainly by road, despite the inherent risks of road transport: a higher probability of accidents (due to traffic volume), difficulty in ensuring safe routes, and high exposure to the urban environment. Accidents involving hazardous substances have a disproportionate impact, causing major explosions, environmental pollution, and mass evacuations. In contrast, rail offers greater safety, a lower accident rate per tonne transported and segregated routes (less interaction with urban traffic). In the future, greater demand is expected for the transport of fuels (even taking the energy transition into account) and industrial chemicals (such as hydrogen or sulphuric acid).

Furthermore, international tourism in Chile exceeded 5 million annual visitors prior to the pandemic, establishing itself as one of the service sectors with the greatest growth potential[52]. The tourism sector accounts for approximately 3–4% of national GDP and more than 600,000 direct and indirect jobs, making it a significant economic activity for many regions of the country[53]. Chile is positioned globally as a leading destination for nature and adventure tourism, with more than 40 national parks and over 100 protected areas, covering nearly 20% of the national territory[54]. Chile's longitudinal geography — stretching over 4,300 km from north to south — allows for the development of large-scale tourist routes connecting deserts, mountain ranges, lakes, glaciers and Patagonia, promoting long-distance tourism and inter-regional mobility[55].

In short:

- **Chile is ageing, becoming wealthier and continuing to urbanise,** which demands:
    - Greater demand for urban and suburban mobility.
    - Expansion of metropolitan public transport systems.
    - Integration of medium-sized cities with major capital cities.
    - A need for accessible transport systems, given the increased regional mobility of the adult population.
    - Higher service quality standards thanks to increased purchasing power.
    - Greater inter-city passenger mobility.
    - Improved urban logistics.
    - Improved large-scale waste management.
- **Chile is becoming a major exporter of food, minerals and clean energy** thanks to investment in key industries, which requires:
    - Increased freight flows to and from ports.
    - The need for high-capacity multimodal logistics corridors.
    - Consolidating multimodal integration and combined transport.
    - The need for efficient transport solutions for large volumes of heavy, dangerous and even refrigerated cargo.
    - Guaranteed connections to agricultural areas, consolidation centres and ports.
    - Increased volume of domestic freight.
    - Expansion of retail and associated logistics.
    - Large-scale logistics infrastructure.
- **Chile is positioning itself as a leading tourist destination**, which requires:
    - Increased inter-city passenger mobility due to the growth in long-distance tourism.
    - Connections with airport, bus, rail and cruise terminals.

[52] *https://www.subturismo.gob.cl/*
[53] *https://www.subturismo.gob.cl/*
[54] *https://www.conaf.cl/parques-nacionales/*
[55] *https://www.gob.cl/chile/*

- Development of interregional tourist routes in line with greater territorial integration.
- Need for comprehensive multimodal services.

The vision for Chile's future by 2050 shows a clear trend: increased production and exports (mining, agribusiness, salmon farming, energy), greater urbanisation and mobility (dense cities, tourism, consumption) and greater territorial integration (decentralisation and regional hubs). Taken together, these trends will generate a greater volume of bulk freight transport and increased passenger mobility at various scales (urban, suburban, regional and interurban), making it essential to have high-capacity, highly efficient and low-emission corridors. This reinforces the need to develop a modern national rail network as critical and structural infrastructure for Chile's economic and territorial development.

The success of the railway in Chile

- **The 'underestimated' Biotrén:** The Biotrén is now a suburban rail system comprising two main lines that form the backbone of public transport in Greater Concepción. In 2022, it carried around 9 million passengers, 137% more than in 2021 (6.6 million passengers) and 174% more than in 2019 (5.2 million passengers)[56]. This makes it one of the few public transport services nationwide to have achieved a rapid post-pandemic recovery. All these figures exceed the estimates made in 2016 to double the 1.6 million passengers carried by the Biotrén in 2015. It should be noted that service on Line 2 to Coronel was significantly disrupted for four months due to a failure of the existing (and ageing) railway bridge over the Biobío River. In response, contingency measures were implemented by transferring passengers to buses. Despite this, the service recorded a 20.45% increase in passenger numbers compared to figures for the same period in 2021, a 52.5% increase compared to 2019 and a 73.4% increase compared to 2018[57] . In August 2024, EFE launched a tender for the extension of platforms on the line to Coronel, enabling double-unit formation to operate in the near future[58] .

- **The 'overloaded' Santiago-Nos Train:** The Santiago-Nos train exceeded its design capacity just two weeks after being inaugurated[59] . The same service in 2018 carried over 19.3 million passengers, covering a 20-kilometre stretch in around 24 minutes, which translates to travel time savings of over an hour a day. The service's success is evident when considering the nearly 74,000 users who use it every day, whereas the initial projection was 50,000 passengers per day[60]. In 2022, the service received additional new trains, which were added to the 16 trains in the original fleet,[61] allowing it to operate in double-unit formation throughout the day, whilst maintaining the established frequencies. To date, there are no plans to expand capacity.

- **The first of its kind: Limache-Puerto Train:** In 2025, the service reached a record figure of 23 million passengers carried per year, surpassing the previous record set in 2023 of 22.9 million passengers, and leaving behind the 20.3 million carried in 2024. The service's sustained growth has been evident over the years; following its launch, passenger numbers increased progressively and, since 2013, demand has remained at around 20 million users per year, establishing itself as an essential mode of transport for thousands of people who commute daily between inland districts and the coastal region[62] .

- **The 'surviving' Alameda-Chillán train:** Over the last 30 years, passenger rail in Chile has faced fierce competition from road transport, with long-distance services being the

[56] *https://assets.diarioconcepcion.cl/2023/01/06-01-2023.pdf*
[57] *https://www.radioudec.cl/biotren-supero-los-9-millones-de-pasajeros-transportados-en-2022/*
[58] *https://www.soychile.cl/concepcion/sociedad/2024/08/27/874383/extension-biotren-estaciones.html*
[59] *https://www.emol.com/noticias/Nacional/2017/10/20/879985/Tren-a-Nos-supera-su-capacidad-de-diseno-y-alcanza-5-pasajeros-por-m2.html*
[60] *https://www.efe.cl/metrotren-nos-cumple-su-segundo-ano-de-operacion-con-record-de-pasajeros-transportados/*
[61] *https://portalportuario.cl/efe-desembarca-en-dp-world-san-antonio-nuevos-trenes-para-servicios-nos-y-rancagua-estacion-central/*
[62] *https://www.efe.cl/tren-limache-puerto-alcanza-record-historico-en-pasajeros-anuales-transportados-y-premia-a-su-pasajera-numero-23-millones/*

hardest hit, compounded by ongoing investment and management issues along the corridor. In the face of this, the Santiago–Chillán service, which links four regions over a distance of around 400 kilometres, has weathered the storm and established itself as one of the few remaining long-distance rail services on the continent (the fastest in South America; 160 km/h), capable of maintaining operational continuity and regaining prominence. Despite ongoing suspensions and delays[63], the service is not only continuing but growing. The Alameda–Chillán service saw the highest growth within EFE Central, with a 72% increase in passengers carried between 2024 and 2025, rising from 145,000 to 249,632[64]. The service also enjoys a high level of user satisfaction (96%), mainly linked to aspects such as comfort, cleanliness, travel experience and perceived safety[65]; aspects that have improved recently thanks to the acquisition of new trains for the service. The service not only 'survives', but is one of the best-rated in the Chilean rail system, despite some shortcomings in the service design (such as luggage check-in and the designation of doors for boarding and alighting), the backlog in critical infrastructure investment (stations, depots, lockdown, uneven crossings and systems), and constant day-to-day operational problems: cancellations and delays, collisions and accidents at level crossings, and thefts of overhead lines and fibre-optic cables.

Together with the other services, EFE carried a total of 32,037,368 passengers between January and June 2025, exceeding by 2.3% the 31.3 million passengers carried during the previous record period, corresponding to the first half of 2023. Compared with the same period in 2024, the increase was 6.5%[66].

In terms of passenger satisfaction, services such as the Santiago-Nos train and Biotren have been rated as the best by passengers, with net satisfaction rates of 79% and 87% respectively. Another key example is the Victoria-Temuco train service, where 8 out of 10 users recommend the service. This was identified in the User Satisfaction and Experience Study conducted by Feedback in 2019[67] , which also highlights the attributes with the highest overall ratings, notably:

- Ease of movement through stations (98%)
- Safety of train travel, cleanliness and ease of access (95%)
- Pleasant atmosphere (70%)
- Smooth boarding and alighting (79%)
- Additional services that enhance the journey (79%)
- Relevant information about the service inside the train (86%)
- Safety when boarding and alighting from the train (84%)
- Orderly queuing on the platform (89%)

With regard to **the Metro de Santiago** and considering that it is currently undergoing the greatest expansion in its history, it recorded over 640 million journeys on the network in 2024 (a 6.8% increase compared to 2023), approaching pre-pandemic passenger numbers[68] .

Finally, regarding the **freight railway**, around 27 million tonnes are transported by rail in Chile annually (2016 figures), of which 17 million tonnes correspond to the northern network and 10 million tonnes to the central-southern network of EFE[69]. In 2021, EFE Arica conducted tests with a train carrying 422 tonnes of steel coils between Arica and Visviri (205 km), before continuing on to Oruro (a further 411 km in Bolivia), handing over the wagons to Ferroviaria Andina, thereby demonstrating the viability of the route and the feasibility of reactivating international rail transport[70]. Meanwhile, the Antofagasta to Bolivia Railway (FCAB) ended 2024 having transported 7.1 million tonnes of freight, via both rail and road[71] . In the same context, FERRONOR was awarded the new project in the same year to transport freight from Minera

[63] *https://ladiscusion.cl/usuarios-critican-servicio-de-tren-chillan-por-suspensiones-y-retrasos/*
[64] *https://www.cnnchile.com/pais/efe-record-transporto-mas-32-millones-pasajeros-primer-semestre-2025_20250926/*
[65] *https://www.revistaei.cl/encuesta-de-satisfaccion-pasajeros-valoran-protocolos-de-limpieza-de-estaciones-y-trenes/*
[66] *https://www.efe.cl/efe-registra-record-historico-de-pasajeros-al-primer-semestre-de-2025/*
[67] *https://www.efe.cl/aumenta-satisfaccion-de-usuarios-de-trenes-en-todos-los-servicios-de-grupo-efe/*
[68] *https://www.metro.cl/noticias/metro-de-santiago-entrego-balance-2024-en-el-momento-de-mayor-expansion-de-su-historia*
[69] *https://logistica.mtt.cl/transporte-terrestre-ferroviario/#:~:text=In%20Chile%20they%20are%20transported%20via,EFE's%20central-southern%20network.*
[70] *https://portalportuario.cl/tren-de-carga-inicia-viaje-de-prueba-desde-el-puerto-de-arica-con-destino-a-bolivia/*
[71] *https://portalportuario.cl/fcab-completa-2024-con-resultado-estable-en-movimiento-de-cargas/*

Escondida, amounting to 400,000 tonnes of copper cathodes per year and 1,200,000 tonnes of sulphuric acid per year[72]. Finally, CODELCO's El Teniente Mine Railway, which in 2021 transported around 141,000 tonnes of ore daily[73], has increasingly integrated the latest technological advances, notably the implementation of automated operations and, with this, the implementation of ATO (Automatic Train Protection) on its trains[74], similar to the Metro lines in Santiago. In the forestry sector, a major benchmark is the MAPA project, which will require the transport (by FEPASA) of approximately 2,100,000 tonnes of cellulose; together with the increased use of chemical inputs (caustic soda, sodium chlorate and petroleum), this adds a further 250,000 tonnes per year[75]. Given the volumes involved, the mining and forestry industries would not be viable without the support of the railway. Other types of freight have recently been added to the rail network, such as the transport of clinker (BSA) by the company TRANSAP, with logistics 100% rail-based[76] , the transport of containers, with increases of up to 50% in rail usage on the San Antonio–Santiago route by companies such as SITRANS[77], and the "fruit train", which in 2022 transported some 2,900 tonnes of fresh produce in its first weeks of operation[78]. Finally, it is worth highlighting a pilot service carried out in southern Chile in 2025 aimed at evaluating a multimodal solution for the transport of salmon[79] .

Challenges for a modern railway by 2050

Despite the limited success of the railway in Chile at present, efforts to further develop it continue to be hampered, and it is vital that certain changes are made. Over the last 15 years, various railway projects have managed to reactivate approximately 360 kilometres of existing track, enabling the transport of almost 65 million passengers a year. This figure is expected to triple by 2030 with the implementation of new projects, which will involve work on a further 215 kilometres of track. Work on a further 270 kilometres of track could be added, according to other ongoing studies. It should be emphasised that since 1913 there has been no policy for the construction of new railway lines as part of state policy, in contrast to the development of the national road network.

Conceptual challenges facing the railway

Understanding the different levels of public transport services and their interface with urban and regional planning is key. The lack of coordination between the various ministries involved and planning bodies, coupled with limited technical knowledge regarding the planning of mass rail transport systems and their integration with urban and regional planning, has led to a clear and long-standing tendency to opt for 'trendy' solutions that are not always effective in addressing the real mobility problems in cities and regions. For example, the clear distinction and definition of service levels for high-capacity rail transport: urban services (trams, metro, monorails, etc.), suburban, regional, inter-regional and inter-city services (express or conventional). In the case of railways, as an integrated system involving not only rolling stock but also infrastructure, traction and power systems, signalling systems, facilities and buildings, the definition of the service level—and with it the functional definition—takes on vital importance, thereby refining designs and forecasting capacities at the service level and across integrated networks. From a technical perspective, this is highly relevant for sizing and operational design, with a view to assessing the coexistence and comprehensive, efficient use of the infrastructure.

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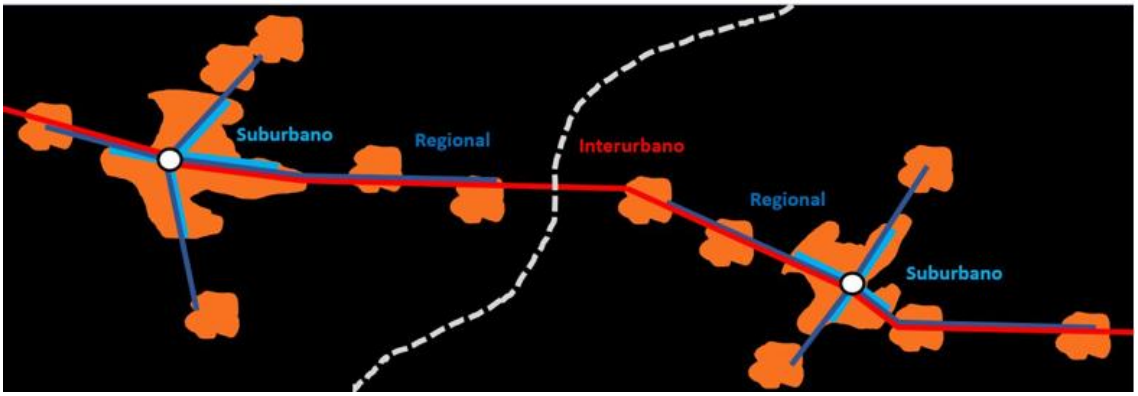
[72] *https://portalportuario.cl/ferronor-iniciara-operacion-de-nuevo-proyecto-minero-en-febrero/Fina*
[73] *https://www.elrancaguino.cl/2022/01/03/ferrocarril-teniente-8-logro-record-de-acarreo-en-2021/*
[74] *https://www.codelco.com/division-el-teniente-avanza-con-exito-en-proyecto-de-automatizacion-de*
[75] *https://portalportuario.cl/fepasa-se-adjudica-transporte-de-celulosa-e-insumos-quimicos-para-proyecto-mapa-de-arauco/*
[76] *https://www.mundomaritimo.cl/noticias/cementos-bsa-proyecta-aumentar-su-transferencia-de-carga-de-clinker*
[77] *https://www.infraestructurapublica.cl/trenes-en-chile-las-razones-que-explican-el-aumento-del-uso-de-ferrocarriles-en-logistica-en-los-ultimos-anos/s*
[78] *https://redagricola.com/a-su-maxima-capacidad-tren-de-la-fruta-ha-transportado-unas-2-900-toneladas-de-carga-fresca-en-sus-primeras-semanas-de-operaciones/*
[79] *https://www.mundoacuicola.cl/new/lanzan-piloto-ferroviario-bimodal-que-transportara-salmon-desde-puerto-montt-a-la-region-del-biobio/*



Schematic representation of the role of different rail services in relation to the distribution and size of urban centres. Source: Own work, Fabián Figueroa

Major challenges facing the railway in terms of evaluation and implementation

Another major challenge for the railway relates to the mechanism for implementing railway projects and their various pathways. This begins with the development of strategic plans, the evaluation and justification of projects, and finally the authorisations required for their implementation:

- **Private investment instruments:** International evidence (mentioned in section A9 of this document) shows that the railway sector faces significant structural barriers to 100% private investment, primarily due to the risk of unstable demand, high capital requirements and dependence on public policy. These include: Integrated private model (Brightline case, Florida), state-supported PPP (Brightline West), availability payment concession (DBCC, Uruguay), and concession with 'anchor' users (Rumo, Brazil). The factors determining the choice of model should be based on the level of expected demand and its stability, the nature of the demand (single customer, for example), the state's fiscal capacity, the property value of the surrounding area (passenger projects) and modal competition. In general, the models avoid the total transfer of demand risk to the private sector.

  International experience shows that there is no single successful model, but rather combinations adapted to specific contexts. Chile could adopt a more pragmatic approach, selecting concession mechanisms according to the structural conditions of each project, maximising private participation without compromising the viability of the rail system.

- **Public investment plans:** EFE in particular has a so-called Three-Year Plan, a mandatory planning instrument defined in its enabling legislation, which sets out the portfolio of projects and investments to be carried out over a three-year period, organised around key areas such as maintenance and safety, infrastructure replacement and improvement, freight expansion and passenger expansion. The plan is drawn up by EFE, comprising projects, priorities, costs and a timetable, and is subsequently submitted to the Ministry of Transport and Telecommunications (MTT) for approval. Even if the Plan is approved, the projects it comprises must be entered into the National Investment System (SNI) and undergo a social impact assessment, and finally, public funding is authorised by the Budget Directorate (DIPRES).

- **National Public Investment System:** In the case of the public railways EFE and Metro de Santiago, which are coordinated and supervised by the System of Public Enterprises (SEP), they are subject to the National Public Investment System (SNI), managed by the Ministry of Finance and the Ministry of Social Development and Family. Each individual project (rather than project portfolios) must undergo the various project stages: Basic Study (Profile), Pre-feasibility (Conceptual Engineering), Feasibility (Basic Engineering), Design (Detailed Engineering) and finally implementation (Works, procurement). Each of

these stages must incorporate demand studies, engineering studies, private economic evaluation and social evaluation (in accordance with social evaluation methodologies), relevance assessments and environmental studies as appropriate and depending on the stage. At each stage, the Ministry of Social Development and Family determines whether the initiative is eligible for the allocation of resources for its implementation based on the results of a technical and economic analysis (known as RATE), for example, with a satisfactory recommendation (RATE - RS).

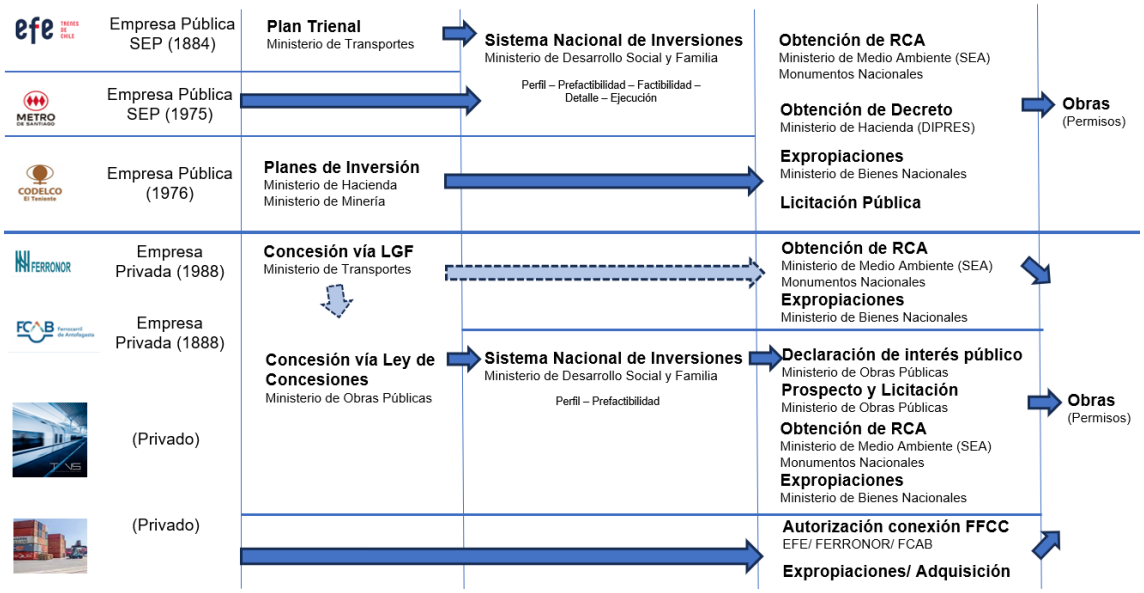
- **Social assessment:** Projects submitted to the National Investment System (SNI) must undergo a social assessment. The key variables feeding into the assessment are primarily demand, derived from studies commissioned and supervised by SECTRA, initial investment (CAPEX), operating and maintenance costs (OPEX), transport variables (travel time and distance travelled), economic parameters (social discount rate), social value of time, and social costs (e.g. cost of accidents). The assessment provides indicators to determine whether the project is socially desirable, such as the social NPV (Net Present Value), social IRR, benefit-cost ratio and benefits (travel time savings, reduction in system operating costs, improvements in connectivity). In terms of weighting, time savings are usually the dominant benefit in transport projects. Among the main problems and limitations is the fact that the official methodology does not require the systematic incorporation of externalities, such as emissions, accidents and congestion, amongst others. This leads to the benefits of the railway being underestimated, thereby distorting investment decisions. Furthermore, there is a high sensitivity to assumptions, as the results depend heavily on the parameters of demand modelling as well as on investment levels. Another major drawback is that both the methodology and the evaluation system require projects to be assessed in isolation rather than as part of a network. Other aspects, such as the intangible benefits arising from territorial development and integrity, and social equity, are not considered in the evaluation.

- **Forecasts from scratch:** Transport demand forecasts, managed by SECTRA, focus primarily on urban transport in certain cities across the country, limited to a radius that often coincides with the urban area and, on other occasions, is even more restricted. Forecasts are usually updated during the development and updating of the diagnostic phase of Urban Transport System (UTS) studies. Additionally, both Metro and EFE must carry out demand studies to size and justify their projects, which are assessed using a cost-benefit analysis. In the specific case of EFE, as the projects are usually suburban, regional and inter-urban, the scope of action tends to be much broader than that of SECTRA studies; consequently, data collection and modelling (using the tools defined by SECTRA) are usually carried out from scratch and funded by the state-owned company. The lack of a transport forecast based on an integrated projection study that analyses how transport supply and demand in the country will evolve towards a defined horizon (for example 2030 and/or 2050), not only makes studies for any new rail initiative more expensive, but also introduces greater uncertainty and extends timelines across all stages of the project cycle in accordance with established methodologies. The absence of this multimodal forecast at urban, regional and national levels hinders comprehensive infrastructure planning, investment evaluation, the prioritisation of initiatives and decision-making at national and infrastructure levels. Furthermore, there is no distinction in the depth of demand studies between the stages defined in the system; that is, the basic studies (first stage) are designed to carry out demand studies in great detail, and in subsequent stages this study is updated as the baseline situation evolves. The baseline situation is defined by the Ministry of Social Development and Family and may vary across the different stages of the project. Furthermore, the same ministry may require iterations in the demand modelling each time a transport project or measure is implemented within the project's scope.

Although various rail projects may receive favourable outcomes in feasibility studies, the government may decide not to proceed (or simply fail to make a decision at all), causing projects

to be delayed by 10 years or more, and thereby leading to the same study being repeated time and again, based on the fact that the studies are out of date. In fact, there are inconsistencies even amongst public companies: For example, Line 7 of the Metro de Santiago: although the initial proposal was made in 2007, the project was officially announced in 2017, its Environmental Impact Assessment (EIA) was submitted in 2019 and approved in 2021, with construction starting in 2022 and a forecast for it to enter service in 2028. In contrast, the Melipilla railway line (EFE) was initially operated on a limited basis between Santiago and Talagante as a measure to mitigate potential overcrowding on public transport resulting from the introduction of a four-digit vehicle restriction in May 1990, which lasted for several weeks. The first studies for the Melipilla railway line were presented in 1997, followed by a failed tender in 2002, the presentation of a new study in 2010, its official announcement in 2013, its environmental impact assessment (EIA) submitted in 2015 and approved in 2019, and finally, construction work began in 2021, with a second official ceremony planned for 2025 and operations expected to commence between 2028 and 2029.

Finally, the path to follow for projects is not always the same depending on whether they originate from a public enterprise (state-owned or otherwise) or a private one. It also differs depending on whether the project is a railway, road, airport, river or maritime transport project. There is a significant difference between the procedures for a project submitted under the National Investment System, one submitted via the Concessions system from the Ministry of Public Works (MOP), or one submitted under the outdated General Railways Law.



Summary of authorisations required under the public and private investment systems for railways. Source: Own compilation, Fabián Figueroa

Not only is the public investment system outdated, but so too are the railway legal framework and the state structure responsible for decision-making on railway investments; they fail to meet the expectations of a country crying out for development along the lines of what we have already seen (and which has worked) in roads, ports and airports.

Major challenges and opportunities for integrating rail into the national logistics chain.

Today, there is greater awareness of the importance of rail transport in achieving high competitiveness across the entire logistics chain. Given the country's vast geographical expanse, establishing an extensive and competitive rail network is a task that will take years.

- **Infrastructure:** Limiting factors for the development of rail transport. Much of the national rail network is over 100 years old, originally designed for relatively small and light trains. Today, maintenance criteria are geared more towards reducing costs than towards making services competitive. Consequently, only a small fraction of the network allows for the operation of heavy, long or high-speed trains. For example, on around 70% of the EFE network today, the infrastructure does not allow freight trains to exceed 40 km/h. Ensuring the infrastructure is in good condition is key to fulfilling customer commitments, guaranteeing the safety of rail operations and, consequently, the transport of heavy and dangerous goods.

- **Coverage:** The railway infrastructure has not been able to keep pace with the evolution of the country's productive system, as many of the new production centres are located far from the railway lines and there is no attempt to connect them to the network. Furthermore, many branch lines with potential for freight transport have been closed, and in many cases, the land has been sold off. A notable example was the closure of access to the CELCO plant in Constitución, which already handled a considerable volume of freight.

- **Regulatory** decisions**:** Certain decisions have led to measures that prevent freight trains from operating at specific times on mixed-traffic networks. This prevents, for example, trains from reaching Valparaíso or Concepción from Santiago on the same day.

- **Modal competition:** At present, the biggest beneficiary is road freight transport, which causes greater road damage without paying a fee to compensate for it. Current charges on lorry traffic (including the specific tax on diesel) fall far short of the cost of this damage.

- **"Getting on Rails":** The railway must be developed by involving all stakeholders in the industry. Whilst there is greater awareness of the importance of the railway in the north and south, due to its greater presence and high volumes transported, it is in the central region where the greatest challenges lie in terms of establishing a presence and being regarded as a modern and comprehensive solution. Many companies across various industries are unaware that the railway can be a total or partial solution to their transport problems; indeed, many do not know how to contact railway companies or what is required to "get on rails". It is vital to work together to promote the railway and give it the status it deserves within the transport system. The railway must also take a more active role within the community and demonstrate the added value it can offer.

- **Combined transport logistics:** For Chile, the development of combined transport represents a strategic opportunity for the railways, insofar as it allows for efficiencies similar to those observed in Europe (see reference in section A8 of this document). The European experience shows that this model is not only growing steadily (at over 5% annually) but also strengthens the role of the railways as the backbone of medium- and long-distance transport. In a country such as Chile, with extensive logistics corridors and a heavy reliance on road transport, combined transport could help reduce logistics costs, improve environmental sustainability and increase the competitiveness of the rail system, particularly in port–inland connections and export supply chains.

  Although Chile remains primarily a producer of raw materials, there is potential to develop intermodal services focused on certain agro-industrial products, particularly those for export, and for the movement of imported freight between ports and Santiago. In this case, infrastructure problems are exacerbated by a lack of access and internal capacity

at land terminals and ports to ensure rail access and the necessary manoeuvring for trains.

Based on the updated study of the freight transport cost model, for the analysis of logistics costs by the Ministry of Transport's Logistics Observatory[80], it is possible to carry out a brief exercise based on transport costs for both rail and road. According to the report, rail is capable of offering a cost up to 5 to 8 times lower than road (cost per tonne-km) on a main route. For example, considering an average cost of $16/tonne-km for rail and an average cost of $100/tonne-km for road:

- ✓ For a distance of 1,000 kilometres, the cost per tonne transported by rail is $16,000/tonne and by truck is $100,000/tonne. Transporting goods entirely by rail would result in a saving of around 84% compared to transporting them entirely by truck.
- ✓ Considering combined transport where 800 km are covered by train and 200 km by truck, a combined cost of $32,800/tonne is obtained. The combined solution represents a saving of around 67% compared to the journey being made entirely by truck.
- ✓ According to the same report, in the north, rail transport has costs per tonne-kilometre of around $13 to $16/tonne-km, and in the central and southern regions, these range from $17 to $18/tonne-km.

- **Transport of dangerous goods:** The transport of dangerous goods, including fuels, gas, chemicals and mineral concentrates, represents one of the main challenges for the Chilean logistics system, due to their high exposure on the road network and the associated risks to the population and the environment. Recent incidents such as the one in Renca in February 2026[81], including explosions or fuel spills in urban areas, have highlighted the need to strengthen safety and risk management standards. In this context, rail presents a strategic opportunity for the transport of dangerous goods, offering greater levels of operational control, reduced exposure to urban environments and a significant reduction in systemic risk compared to road transport. Its development would enable progress towards a safer logistics model, particularly in high-volume corridors linked to mining, energy and fuel supply.

- **Logistics and the circular economy:** The move towards a circular economy in Chile places new demands on the logistics system, particularly regarding the transport of waste, industrial by-products and recyclable materials, which require efficient, safe solutions with a low environmental impact. Currently, a large proportion of these flows is transported by road, which generates higher costs, emissions and congestion, limiting the scalability of circular models at a national level. In this scenario, rail emerges as a key enabler for circular logistics, allowing for the bulk transport of materials and integrating production centres, treatment plants and ports under multimodal schemes. Railway development would also enable the creation of specialised corridors for industrial and mining waste, as well as for the recycling economy, contributing not only to the reduction of negative externalities but also to the generation of new value chains in the country.

- **Infrastructure resilience and continuity:** Particularly in the case of private railways in the north, when faced with high-impact weather events, affected sections tend to be closed indefinitely due to the high investment costs required for repairs, despite the fact that, at an operational level, this has been the most efficient and cost-effective solution. For example, the Potrerillos Railway (Potrerillos – Puerto de Barquito, Chañaral) was closed in 2015 because its infrastructure was severely damaged by flooding caused by unusual rainfall in the highlands. Consequently, freight transport has since been carried out by trucks, despite the fact that the train was much more efficient and safer. Another

[80] *Final Report, Update of the Freight Transport Cost Model for Logistics Cost Analysis, by the Logistics Observatory, Steer, 23 January 2020.*

[81] *https://www.radioagricultura.cl/noticias/nacional/tras-explosion-de-camion-en-renca-como-regula-chile-el-transporte-de-carga-peligrosa_20260219/*

example was the SQM electric railway (Pedro de Valdivia–Tocopilla), which was closed in 2016 due to landslides caused by an earthquake in Tocopilla that severely damaged the railway infrastructure. Consequently, and once again, freight transport began to be carried out by trucks.

Major challenges and opportunities for urban rail services (trams and metro)

The main challenge for urban rail systems is not only technical or financial, but also institutional and cultural; in other words, progress must be made towards an integrated vision of urban rail transport, with appropriate regulatory frameworks, continuity in public policy and a broader understanding of these systems as structural mobility solutions.

- **The Metro as a success story and benchmark:** The case of the Metro de Santiago is an emblematic example of sustained success. Its expansion has been made possible by a long-term vision that positions it as a true 'state project', capable of transcending different governments and political cycles. This approach has enabled the consolidation of technical standards, continuous funding and social legitimacy – key elements which, unfortunately, have not yet been fully replicated in other cities across the country.

  In regional areas, particularly in Greater Concepción, various proposals have emerged to implement metro systems. However, these projects have faced difficulties regarding funding, political prioritisation and institutional definition, which has delayed their realisation.

- **The tram paradox:** On the one hand, there is interest, including from the private sector, in developing this type of solution, which is more economical and flexible than a metro line; on the other hand, however, they have been systematically ruled out or replaced by alternative projects, such as electric bus corridors. Unfortunately, in addition to rejection by the authorities, there are other highly relevant factors, such as current regulatory and legal gaps, and a weak culture of road safety, where the safe interaction between trams, cars and pedestrians could represent a significant challenge, though not an impossible one to overcome.

- **The forgotten funiculars:** Urban funiculars, particularly those in Valparaíso, have suffered from prolonged neglect because they are 'mistakenly' perceived as mere tourist attractions, when in fact they are also an integral part of the city's public transport system. Funiculars play an essential role in a city with complex topography and could be replicated in other cities across the country. Alongside other transport solutions such as cable cars and mountain railways (rack railways), they are often integrated within the same transport regulatory framework, facilitating their development and implementation, as is the case in countries such as Germany, Switzerland and Austria.

Major challenges and opportunities for suburban (commuter) and regional rail services

Despite the tremendous success of recent suburban services, they have been completely underestimated both in their design and in the prioritisation of initial investments and future improvements. Evidence of this has been the historical under-provisioning of capacity, leaving them today with no possibility of increasing structural capacity and facing bureaucratic barriers from the State itself in justifying investments that are becoming increasingly urgent. Today, there are still major cities such as Antofagasta and Valparaíso that lack plans for new lines. Below are some practical examples of the various challenges:

- **Conceptual errors:** In Chile, these services are often identified by commercial names such as 'MERVAL', 'METROTREN' and 'BIOTREN'. Although there is no official definition of suburban services (Cercanías, RER, S-Bahn, etc.), they are often confused with Metro services, when in practice they usually have different objectives and, consequently, a different definition of service levels, requirements and specifications for infrastructure, rolling stock, systems and facilities. A suburban service may even become something more like a "Metro" when its service definition is conditioned by the context and needs of much more densely populated cities (e.g. Japan). Conversely, regional services are distinguished particularly by their objective of providing coverage to towns and other cities within the region, including neighbouring regions (inter-regional). A very significant variation is the regional express service, which, whilst having the same scope as a conventional regional service, offers fewer stops, high capacity and higher operating speeds, making it a fast service with greater territorial coverage. An example is when a passenger wishes to take a train on the Santiago-Rancagua service to travel from San Bernardo to Estación Central, avoiding the stops made by the Santiago-Nos service.

- **Systems originally undersized:** Santiago's first suburban train was designed based on the commuter train concept, drawing inspiration from the successful commuter rail networks in Spain. The new service exceeded its design capacity within two weeks of opening and now operates with double-units trains practically all day. To date, there are no plans to expand capacity. Similar situations are currently being experienced by the services in Puerto-Limache and the Biotrén on its two lines. Current services have reached the point where they require comprehensive capacity expansion projects, going beyond simply increasing the fleet, reinforcing the traction system or installing more efficient and safety systems, but also involving the modification and expansion of the railway infrastructure.

- **Separation from and independence of the road network:** To date, there are still high-frequency rail services exposed to multiple road crossings, level crossings for pedestrians, as well as a critical lack of physical separation. Consequently, it is not possible to ensure that services have high reliability, let alone prevent collisions and fatal accidents.

- **Lack of credibility despite success:** In June 2022, the Biobío Regional Government conducted a public consultation on transport, in which 25.65% of participants living in Concepción opted for the development of a metro, 37.58% of people in Coronel want the current Biotrén passenger trains to be larger (an increase in passenger carriages), whilst in Lota 43.61% are keen for the train to reach their district, as are the districts of Penco (43.47%) and Tomé (42.53%). Regarding service ratings, 41% rated the Biotrén between 6 and 7, whilst 50.33% rated the buses between 1 and 3[82]. Upon learning of these results, the Biobío Regional Government stated it was "aware of the needs of all those living in

[82] *https://www.biobiochile.cl/noticias/nacional/region-del-bio-bio/2022/06/10/resultados-de-consulta-ciudadana-decide-bio-bio-son-llevados-al-ministerio-de-transportes.shtml*

the region". However, in October of the same year, the government delivered a huge surprise by announcing investments of USD 450 million for a network of electric bus corridors for Greater Concepción running parallel to the Biotrén. Whilst a transport system should be a single, comprehensive offering of different modes of public transport, it is clear that the authorities at that time were completely disregarding the public consultation and planning routes parallel to the train, accelerating them through the concessions mechanism (MOP), thereby ensuring that all railway investment (which must go through the public investment system) treat the electric bus corridors as a baseline scenario and, in doing so, undermine the profitability of railway investments. In this way, it is the State itself that creates unfair competition through the bureaucratic and biased transport planning in the region.

- **Public-private partnership opportunities in the north:** Passenger rail services are currently operated by public companies such as EFE and Metro de Santiago, through projects funded by the public investment system. However, in the north, where the rail networks are owned by private companies (with the exception of Arica, where EFE operates), a different approach is required, presenting an opportunity to establish genuine public-private partnerships. For example, suburban and/or regional services in Antofagasta-Mejillones[83] (FCAB), Copiapó (FERRONOR), La Serena-Coquimbo (FERRONOR and CMP[84]) and towns in the north of the Valparaíso region (FERRONOR).

- **Urban and regional connectivity:** Suburban services, characterised by their high capacity and traffic intensity, enable the consolidation of internal connectivity within established conurbations such as Greater Valparaíso and Greater Concepción, as well as conurbations currently forming, such as Greater Antofagasta, Greater La Serena-Coquimbo, Greater Temuco and the Puerto Montt-Puerto Varas metropolitan area. In addition, regional services enable the provision of express services within the 'urban sprawl' and also ensure connectivity between the various towns in a region and its regional capital, or even with that of a neighbouring region (interregional service), depending on the geographical location. Another key role of regional services is to help consolidate and coordinate genuine urban-regional systems, such as in the Maule region: Curicó-Talca-Linares-Parral.

[83] *https://goreantofagasta.cl/tren-de-pasajeros-mejillones-antofagasta-sector-publico-y-privado/goreantofagasta/2024-07-10/192824.html*

[84] *https://www.diarioeldia.cl/noticias/2025/07/02/127442-tren-de-pasajeros-la-serena-coquimbo-las-dudas-en-torno-a-su-financiamiento*

Major challenges facing inter-city rail in Chile

To date, regular rail services between major cities such as Valparaíso, Santiago, Concepción and Temuco – which were suspended at the end of the 20th century and the beginning of the 21st – have not been resumed. Unfortunately, the current state of the rail infrastructure does not allow for the implementation of competitive services; for example, today a special train covers the journey between Santiago and Temuco in just over 12 hours. In contrast, in the 1940s, the old Flecha del Sur railcars covered the same route in just 9 hours. Recent progress has been limited and confined to the Santiago–Chillán service; for example, in 2024, with the arrival of modern intercity trains capable of reaching 160 km/h, these will be the third of their kind following those acquired in 1973 and 2003. Beyond a few studies, to date there has been no real commitment to breaking the 200 km/h barrier in the coming years. Below are some notable and practical examples relating to the challenges and historical setbacks faced by the long-distance intercity railway:

- **Train to Concepción:** Suspended since 2007. In September 2014, an initial pre-feasibility study entitled 'the country's first high-speed train between Santiago and Concepción' was carried out. Its results were announced in 2016 with a social IRR of 16.5%. Ten years later, SECTRA announced the start of the (same) pre-feasibility studies to establish the same connection.

- **Train to Valparaíso:** Suspended since 1992. Since 1995, numerous ideas for a high-speed train have been proposed, including many private-sector initiatives. In 1997, the Ministry of Public Works (MOP) decided not to subsidise or invest in high-speed rail projects. In 2009, a new high-speed rail project emerged, and it was not until 2016 that a pre-feasibility study was carried out by EFE, which delivered the first favourable results. Subsequently, in 2018, private initiatives for a high-speed rail project were presented, and a concession was requested under the General Railways Law. In the same year, it was decided that the projects would proceed via the MOP's concession mechanism; the project was declared to be in the public interest in 2019, and a mandate was issued from EFE to the MOP for the development of the train construction project. Despite new route proposals, in 2023 the Government decided to use the current route and to put out to tender a comprehensive study, which to date has not been awarded.

- **Train to Temuco:** Although it was reopened on 1 December 2003 to replace the "Rápido de La Frontera" service, it has been suspended since 2009 due to ongoing operational and infrastructure difficulties, coupled with poor management and implementation of the service by EFE and the government at the time. To date, only sporadic services are operated during the summer months, primarily consisting of night trains.

- **Antofagasta-Calama Railway:** In 2024, Juan Armando Vicuña, President of the Chilean Chamber of Construction (CChC), proposed the introduction of a modern passenger train service linking the cities of Calama, Sierra Gorda, Mejillones and Antofagasta, thereby improving regional connectivity and mobility and contributing to the quality of life of the local population[85]. The project consists of a rail corridor, focusing in the first phase on freight transport and adding passenger transport in the second phase.

- **Loss of major central railway stations:** Both Valparaíso and Concepción have seen their 'central stations' removed, whilst in Santiago the city's best-located railway station—Mapocho Station—has been closed. Consequently, it is very difficult to reactivate long-distance services in the short term without affecting other rail services that are already operating at maximum capacity using 'what remains' of those stations. On the other hand, project investment costs are rising due to the need to either reactivate the remains of the major central stations, establish their rail connections, or even build new major railway stations from scratch in urban (central) areas that are increasingly in demand by the major cities.

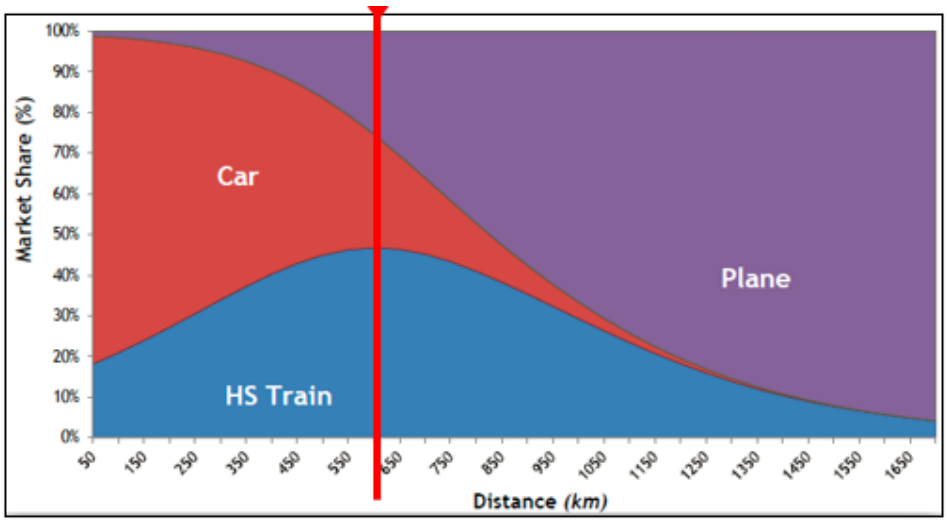
[85] *https://regionalista.cl/2024/05/proponen-tren-de-pasajeros-entre-calama-y-antofagasta-para-mejorar-la-conectividad-de-la-region/*

- **A new standard:** In order to provide highly competitive intercity services, it is necessary to rethink the appropriate standard and, in doing so, scale all the elements involved in the railway system. To achieve high commercial speeds, it is necessary to have advanced safety systems (ATP), ensure the power supply for the traction system, remove all operational restrictions caused by external factors (level crossings, lack of visibility) as well as by the railway infrastructure itself (geometry, design or even the condition of bridges, viaducts and tunnels), and prevent any intrusion by unauthorised third parties (isolation). Finally, rolling stock capable of reaching the speeds that would make the target service competitive (breaking the 200 km/h barrier?).

High-speed rail in Chile by 2050?

Rail can and must be the referential mode to compete strongly with air travel and cars (modes of transport with greater negative externalities compared to rail), particularly given that 'high-speed' trains have gained market share in recent years, positioning themselves today as a modern and more sustainable mobility solution.

The mobility and sustainable development challenges faced by various countries are prompting a rethink of where each mode of transport fits in, so that modes complement one another rather than competing so fiercely. Road congestion is another structural factor providing an incentive to develop rail transport. Thus, rail can and should be the mode of choice for journeys lasting between one and a half and four hours, with air travel for very long distances and the car for short distances (less than an hour).



Methodology for determining the optimal design speed on a high-speed line. Source: Spanish Railways Foundation, Ignacio González Franco, 2017

For example, in France, the TGV has a higher modal share compared to air travel, provided that journey times are less than four hours.

Regarding the main benefits of high-speed systems, we can highlight the following:

- **Reduced journey times:** An 'obvious' benefit for passengers is the reduction in total journey time, given that passengers can board and alight from the train in city centres very quickly, as no additional time is required for journeys to and from airports or for check-in.

- **Economic growth:** The development of high-speed projects has generated real momentum that has a positive impact on the economies of the countries involved. For example, in the early stages of Spain's high-speed rail construction programme, investment reached 0.9% of GDP in 2005; as a result, there was a significant demand effect during the project's construction (around 1.6% of GDP in 2005), thus generating a positive economic impact. Due to the increase in productivity following the opening of the new lines, the overall effect of rail investment on Spanish GDP reached 2.5%.

- **Regional development:** Planning at regional and national level is key, as new high-speed connections have also served to better integrate remote and poor regions into the economy. These economic benefits are accompanied by considerable cost savings for society. For example, the opening of new high-speed lines in France has often literally transformed towns and cities around stations (housing, environment, traffic, commercial activity, etc.). One of the most classic examples was turning TGV stations into genuine

business hubs, as in Lille, Lyon and Le Mans, thereby creating jobs in the service sector and property development projects.

- **Stations as meeting points:** Railway stations in many parts of the world are genuine meeting points for people, not only for passengers but also for those who do not necessarily use the rail system. Many countries are developing their railway stations with the aim of making train travel more attractive to potential customers, as well as strengthening their role as meeting points within the city by facilitating the provision of a wide range of services. The station is a highly strategic consideration from the outset of any high-speed project, as it is synonymous with high demand and high customer expectations. Stations are just as important as the line itself, as they are perceived by customers and non-customers in terms of their location, accessibility, appearance, functionality, services, comfort and even identity.

- **Environmental benefits:** From an environmental perspective, any shift towards rail transport will reduce CO_2 emissions and thus help to meet CO_2 emission reduction targets. High-speed trains generate 5–7 times fewer greenhouse gas emissions than their direct competitors, whether by road or rail. French statistics, for example, show that, on a 500 km journey, high-speed trains generate 7 grams of CO2 per passenger per kilometre, whereas buses produce 17 grams of CO2 per passenger per kilometre, cars produce 47 grams of CO2 per passenger per kilometre, and finally, aeroplanes produce 66 grams of CO2 per passenger per kilometre. Taking the train between London and Paris instead of flying leads to a 90% reduction in CO2 emissions (return journey by plane 140.6 kg CO2 and 8.2 kg CO2 by train per passenger). From a land-use perspective, one can cite the example of the high-speed line between Cologne and Frankfurt in Germany. The double-track railway corridor uses a 25-metre right-of-way along which 12 trains per hour run, each with a capacity of 666 passengers, i.e. 8,000 passengers per hour in each direction. Meanwhile, the adjacent highway providing the same connection consists of 6 tracks, forming a width of 75 metres, along which 4,500 cars travel per hour, with an average occupancy of 1.7 passengers per vehicle, resulting in 7,650 passengers per hour in each direction. This is further emphasised if rail corridors make use of an existing highway route or railway corridor, which already divides an ecosystem and, therefore, eliminates the need to create new barriers through new routes.

- **High-speed rail as a flagship:** For example, in France, the Train à Grande Vitesse (TGV) has become a keystone of the SNCF's business over the last few decades. As a result, the train has significantly displaced air travel on the relevant routes, where today the TGV is the flagship for long-distance travel; however, this quantum leap is the result of a long-term vision regarding passenger transport services, which meant taking major risks—both financial and technical—in designing a system that was integrated from the very outset, with dedicated infrastructure and specialised trains.

- **Other indirect benefits:** In the broadest sense, other indirect socio-economic and political benefits can be identified. These are more difficult to measure and quantify:

    - Improving links between capital cities and regions to promote trade and relations.
    - Job creation, both in the construction sector and in the cities where stations are built (mainly in the service sector).
    - Contributing to national and regional planning, particularly by bringing regional urban centres closer to the capital, to other regional centres, or to international airports, making tourist regions more accessible, facilitating travel within a region, etc.

The development of a new high-speed system is not achieved in a couple of years; it is a long process. For example, in the United States it has taken more than five decades, marked by gradual testing, institutional adaptation and regulatory changes. Since the 1990s, the country undertook a systematic effort when Amtrak organised trials with European trains on its tracks (the Swedish X-2000 and the German ICE). These technical trials made it possible to measure performance on existing infrastructure, assess compatibility with local standards and demonstrate the technology to the public and decision-makers, constituting a key stage of technology transfer

and operational learning. The US experience shows that the implementation of high-speed rail depended not only on railway technology, but also on decades of regulatory adjustments, institutional coordination and adaptation to a unique railway structure dominated by freight transport.

For Chile, there is an opportunity to establish a first railway corridor to a new standard of approximately 600 kilometres, for example, between Valparaíso, Santiago and Concepción, where more than 75% of the country's population and over 65% of national GDP are currently concentrated.

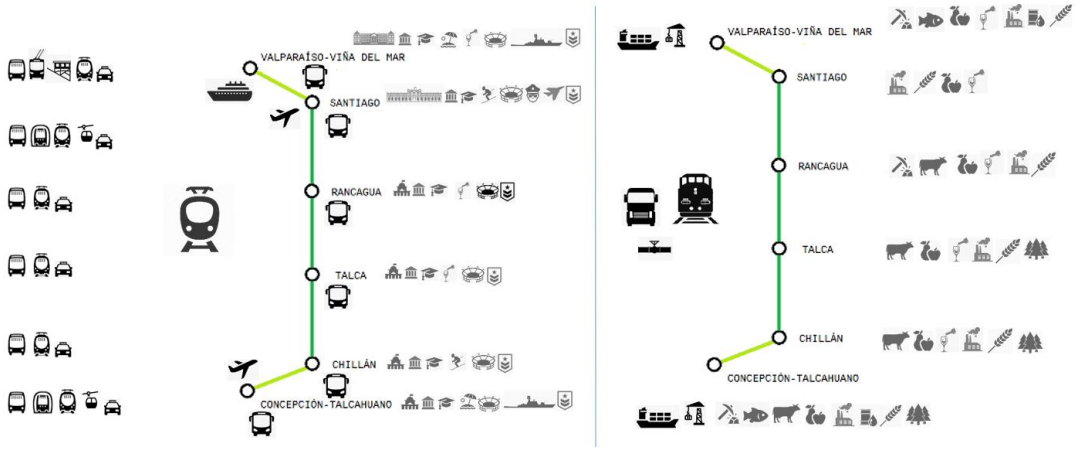
A corridor of this type would also connect the international airports of Santiago and Concepción, enabling genuine combined services between the high-standard intercity railway and international travel, as well as offering alternatives in the event of contingencies at either airport (flight disruption and/or transfer by train). In the specific case of the Valparaíso region, connections to the cruise terminal could be included.

Connecting at least six regions also ensures connectivity between:

- Schools, colleges, higher education institutions (and their respective campuses), and scientific research centres.
- Military training schools and regiments.
- Sports centres and stadiums: Key to the organisation of major sporting events.
- Museums, amphitheatres, heritage sites and cultural centres: Cultural network.
- Tourist destinations: Beaches, vineyards, food festivals, breweries, ski resorts, campsites, national parks, etc.
- Offices, headquarters and head offices of various companies.
- Industries with a significant regional presence in the nation's capital.
- Ports, airports, dry ports and logistics centres.

It should be noted that the coexistence or segregation of freight and passenger train traffic must be determined based on a railway operations analysis to be carried out at the various engineering stages; this may result in the following scenarios:

- Full coexistence (mixed traffic), considering overtaking tracks and sidings.
- Partial coexistence, considering (temporary) restrictions on the use of certain tracks for one service or the other, or even through the implementation, for example, of dedicated bypasses around certain cities.
- Segregated traffic, through the allocation of services to dedicated tracks (passenger-only tracks and freight-only tracks), either on the same route (same track section) or on separate routes (different track sections), the latter being the most beneficial for each service level, but also the most costly.



Scope of a central mixed-use rail corridor between Valparaíso, Santiago, Rancagua, Talca, Chillán and Concepción. Source: Own work, Fabián Figueroa.

The key lies in the high-standard corridor being integrated into an even larger network, comprising rail services (urban, suburban, regional, inter-city, freight) as well as other modes of public and private transport.

To provide some background, in 1937, the then General Directorate of State Railways gave serious consideration to the need to purchase modern passenger rolling stock, on the grounds that the introduction of the new 'Flecha' (arrow) trains would provide passengers with comfort and speed—two essential conditions for the success of tourism, as highlighted in the advertising of the time: "Seated comfortably whilst the "Flecha del Sur" takes you at top speed to your destination, you will feel right at home: comfortable, safe and well looked after". The first trains ordered arrived in 1940 and reached speeds of up to 130 kilometres per hour, meaning a journey to Temuco took 9 hours and to Osorno 13 hours, thus making the "Flecha del Sur" one of the first high-speed trains in the Americas and placing our country at the forefront of global railways at the time.

"Flecha del Sur" advertisement. Source: En Viaje magazine, published by the State Railway Company, 1941. Flecha del Sur railcar in Mapocho. Source: Oil on canvas. Eduardo Garcés.
Three-car diesel railcar catalogue. Source: MAN A.G.

Why more railways?

Rail is one of the most **efficient, safe and sustainable** modes of transport for passengers and freight, offering significant advantages that make it particularly valuable for long-term policies. It stands out for its **high capacity** to move large volumes (freight and passengers), reducing the need for multiple journeys in vehicles with lower capacity, which translates into less congestion and greater operational efficiency. In terms of **energy efficiency**, rail consumes significantly less energy per unit transported than road or air transport; globally, rail accounts for around 2% of total transport energy consumption, reflecting its high energy efficiency compared to other modes that dominate energy use and emissions[86] . With regard to emissions, travelling by train produces between **three and ten times less CO_2 per passenger-km** than travelling by car or plane, and the use of electrified trains powered by renewable energy can reduce direct CO_2 emissions to virtually zero, also contributing to the mitigation of other negative externalities such as air pollution, land use and ecosystem fragmentation[87]. Furthermore, studies show that **land use per passenger-km is around 3.5 times lower than for cars**, and **social external costs** (including accidents and pollution) are **more than four times lower than those of road transport** for passenger transport and **more than six times lower for freight transport[88]**. In terms of **safety**, segregated railway routes have much lower accident rates than roads, reducing the risk to users and third parties. Railways also drive **regional economic development**, strengthening connectivity between urban centres, intermediate zones and rural areas, generating **direct and indirect jobs**, and promoting innovation in advanced signalling systems, digital logistics and electrification. These factors mean that rail is not only competitive in terms of efficiency and sustainability, but also makes a comprehensive contribution to the economic, social and technological development of the regions that adopt it as the backbone of their transport and logistics system.

Resilient railways

As the rail network regains a more prominent role in the logistics chain and in public transport, becoming an integral part of the multimodal transport system, it is crucial that it is able to maintain this status during 'abnormal' times: in times of crisis, natural disasters and even war (whether civil or foreign). Although the railway is highly vulnerable, as it depends entirely on the condition of the infrastructure to operate safely, the resilience of that infrastructure is key to ensuring that trains continue to offer their benefits, which become even more essential in abnormal situations.

Examples of these benefits can be seen in the past, such as the use of the railway during the War of the Pacific (1879–1884), which was a key logistical resource for Chilean troops, particularly for the transport of troops, water, supplies and the wounded, and for reconnaissance or rapid advances in the desert. Chile mainly utilised the existing lines in the occupied territories (Bolivia and Peru), which were mostly saltpetre railways or port-to-inland connections. Some remarkable campaigns:

Antofagasta Campaign (February–March 1879): Here, immediate control of the railway operated by the Compañía de Salitres y Ferrocarril de Antofagasta (CSFA, the precursor of the future FCAB) enabled Chilean troops to be moved inland to occupy key saltpetre extraction points and prevent foreign (Bolivian) resistance.

Tarapacá Campaign (November–December 1879): Following the amphibious landing at Pisagua (2 November 1879), the Chileans captured the saltpetre lines intact, which proved vital for logistics in the desert (water, troops and supplies). This was one of the most intensive uses of the railway throughout the war, for reconnaissance and the advance inland (Dolores/Agua Santa).

[86] *https://www.iea.org/reports/the-future-of-rail*
[87] *https://uic.org/sustainability/energy-efficiency-and-co2-emissions/*
[88] *https://uic.org/sustainability/energy-efficiency-and-co2-emissions/*

Tacna and Arica Campaign (December 1879 – June 1880): Following the landing at Ilo (31 December 1879), the railway was used for reconnaissance and logistics into the interior, thanks to the control of the railway workshops at Ilo/Moquegua and telegraphs for logistical coordination.

During the war, the railway proved decisive in Antofagasta and Tarapacá for mobility in the desert, as well as playing a supporting role in Tacna-Arica. Control of the railway enabled Chile to overcome the logistical limitations of the arid and hostile terrain. Historical sources highlight its strategic role.

Later, during the **Beagle Channel conflict with Argentina (1978)**, Chile mobilised a large part of its troops and supplies by train in the south-central region, particularly cavalry units towards Polcura, Santa Bárbara, Lonquimay and Lago Ranco. Hundreds of reservists were transported by trains running day and night from the Púa branch line, between Victoria and Lautaro, to Vado de Tucapel[89] .

Other examples of the military use of the railway in Chile include its use for the annual transfer of troops from the Military Academy for final instruction and training from Mapocho (Santiago) to Caldera (changing trains at La Calera) during the 1970s; or the **Military Railway** between Puente Alto and El Volcán, whose main function was to patrol the border and prevent any attacks from Argentina into Chile between 1910 and 1985.

More recent examples can be seen in Ukraine during the war with Russia[90] , where a 24,000-km rail network (the third largest in Europe) became a lifeline for the country, enabling the evacuation of the civilian population (4 million people and around 120,000 pets) by rail. The Ukrainian railways also contributed to the war effort, enabling soldiers to return from the battlefield and spend time with their loved ones. Special trains evacuated the wounded, whilst others transported service personnel, residents and medical staff. With airports closed, the railways played a vital role in transporting officials and important international guests:

Image of the mass evacuation in Zaporizhzhia, Ukraine. Source: Report by Sam Kiley for CNN, March 2022.

[89] *https://www.elperiodista.cl/2018/08/coronel-r-slater-recuerdos-del-78/*
[90] *https://www.theguardian.com/artanddesign/2023/apr/20/iron-people-ukraines-railway-network-in-a-time-of-war-photo-essay*

Chile was no exception when it came to special trains; one of these was the 'Chilean Army Lazaretto Train', which was put into service following the 1939 earthquake in Chillán to transport the wounded, and similarly for the 1960 earthquake in Valdivia.

Chilean Army Lazaretto Train – Following the earthquake in January 1939, Chillán. Source: National Historical Museum, heritage photograph. Photograph by Miguel Rubio, 24 January 1939.

More recent examples can be seen in France with the hospital trains deployed during the pandemic[91]: The Covid-19 pandemic created an unprecedented situation in France, where, for the first time in its history, the SNCF transported intensive care patients at high speed on trains known as "Chardon" – a code name derived from a crisis drill organised in 2019 by the SNCF, the APHP, the Paris SAMU, the Ministry of Health and the Police Prefecture, for the urgent transfer of critically ill patients on medicalised TGV trains to regional hospitals to relieve the pressure on Parisian hospitals, in a scenario involving terrorist attacks in the capital. This large-scale exercise greatly facilitated the deployment, as one year later, in the context of the Covid-19 pandemic, 10 trains adapted for the transfer of 202 critically ill patients to regions where hospital capacity was less strained were prepared within 48 hours[92] .

Coronavirus patients from Paris arrived in Rennes on a specially adapted TGV train. Source: Ouest France, April 2020.

[91] *https://www.groupe-sncf.com/en/group/behind-the-scenes/special-operations/hospital-trains*
[92] *https://www.groupe-sncf.com/fr/groupe/coulisses/mobilisations-exceptionnelles/tgv-medicalises*

Another interesting example was the recent initiative in Spain involving the 'Solidarity Train' for those affected by the DANA storm in Valencia[93], which was a collaboration with the Spanish Red Cross and facilitated the transport of large quantities of essential supplies and materials:

Renfe launches the Solidarity Train on the Madrid-Valencia AVE line to bring aid to those affected by the DANA. Source: Actualidad Valencia, Photo by Oscar Puente, November 2024.

The main corridors will thus enable the connection of various barracks, regiments, schools and academies, command and supply centres, hospitals and care centres, amongst others, facilitating the transport of personnel, supplies, tools, field hospitals, building materials, prefabricated houses, vehicles and machinery (in the best-case scenario). It would be crucial to have public-private partnerships with terminals (connected to the railway) and operators, in order to activate services in emergencies, disasters, crises and times of war. In Europe, for example, there is already talk of the TEN-T network having a dual role[94], with military mobility in mind.

Maintaining infrastructure in optimal condition in the face of natural disasters is no easy task, and if this is not possible, it is essential to ensure that passengers and the goods being transported are not adversely affected. Given the situation in Chile, it is crucial and highly relevant to study the experience of the Japanese railways in order to develop a highly resilient rail system. Japan has not only developed resilient designs for infrastructure, systems and rolling stock, but has also established strict preventive and evacuation procedures, along with corresponding tests and simulation exercises[95]. One example of this is the earthquake early warning system, which allows high-speed trains to be brought to a halt and their power cut off when a major seismic event is detected, thereby preventing the trains from derailing at high speed as a result. This system also allows the railway network to be used as a network of seismographs, thereby enabling the population to be alerted to the imminent arrival of an earthquake.

[93] *https://www.renfe.com/es/es/grupo-renfe/comunicacion/renfe-al-dia/sala-de-prensa/renfe-pone-marcha-tren-solidario-ave-madrid-valencia-ayuda-afectados-dana*
[94] *https://transport.ec.europa.eu/transport-themes/military-mobility_en*
[95] *https://global.jr-central.co.jp/en/company/ir/annualreport/_pdf/annualreport2024-11.pdf=*

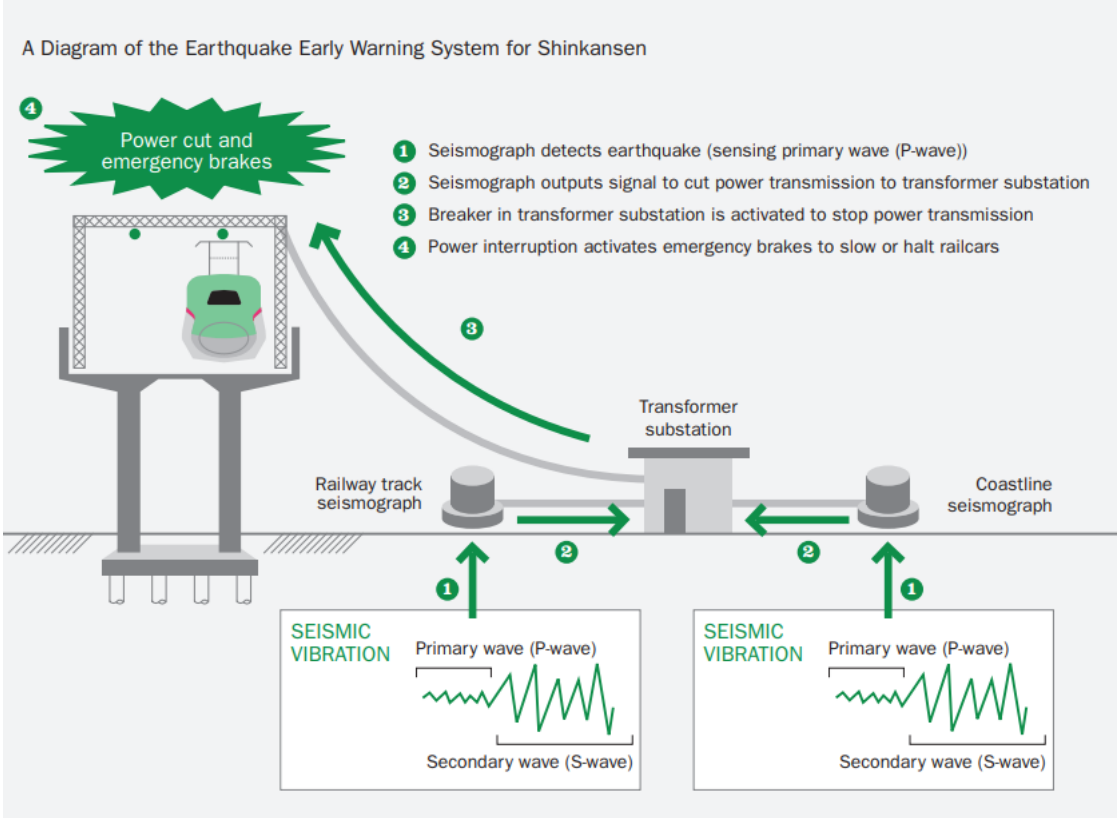


Diagram of the earthquake early warning system for the Shinkansen. Source: Article on lessons from disasters and the application of science, Public Relations Office, Government of Japan, Toshio Matsubara, March 2013.

This system, together with other key measures, enabled them, for example, to restore the Tohoku Shinkansen line in 2011—which had been severely affected by a magnitude 9.0 (Richter) earthquake—in just 49 days[96] .

Workers begin installing hydraulic jacks to lift the carriages of the Tohoku Shinkansen bullet train that derailed as a result of an earthquake, in order to resume services before Golden Week. Source: East Japan Railway Co., March 2022.

[96] *https://www.jreast.co.jp/e/investor/ar/2011/pdf/ar_2011_08.pdf*

A3. Governance and institutional coordination (conceptual model)

The policy goes further, proposing an integrated governance model based on:

- A lead ministry for mobility and critical infrastructure.
- A specialised national railway authority.
- Transport associations as bodies for territorial coordination.
- Inter-ministerial coordination mechanisms for strategic corridors.

This model is intended as a framework and must be implemented through the necessary institutional and legal adjustments. The integrated governance model is detailed in the following points:

1. Structure of a new Ministry of Mobility, Critical Infrastructure and Territory.

It would result from the merger of the current Ministry of Public Works (MOP) and the Ministry of Transport and Telecommunications (MTT), also incorporating attributions currently held by the Ministry of Social Development and Family (MDSyF) relating to the social assessment of infrastructure and mobility projects and the management of the National Investment System (SIP); and with others belonging to the Ministry of Housing and Urban Development and the Ministry of National Assets, the latter relating in particular to land use regulation. This new and single governing body of the State would be responsible for the planning, regulation, assessment, authorisation and coordination of critical infrastructure and the national mobility system, within which the railway system stands as one of its essential and coordinating elements.

This ministry would centralise strategic planning, social and environmental assessment; the setting of standards, certifications and authorisations; and territorial and sectoral coordination. This would reduce fragmentation, duplication and delays – structural problems already identified in the assessment.

1.1 Social assessment of infrastructure projects: The functions currently carried out by the Ministry of Social Development and Family (MDSyF) regarding the social assessment of critical infrastructure projects will be transferred to the new Ministry. This will ensure greater consistency between planning, assessment and implementation, as well as enabling assessments to be carried out on the basis of plans, portfolios and corridors, rather than solely on individual projects. Furthermore, this will significantly reduce approval times and assign political responsibility in the event of delays and changes to plans.

1.2 Environmental assessment of critical infrastructure: To study and incorporate into the new Ministry a strategic (high-level) environmental assessment of critical infrastructure projects. This will be based on a preventive approach, involving early assessment by corridor, thereby achieving greater regulatory certainty whilst maintaining high environmental standards. The Environmental Assessment Service (SEA) will then retain a complementary or supervisory role, subject to the final legal definition.

2. Railway governance and key roles.

Key bodies to ensure the State's role in planning, territorial coordination, oversight, authorisation, safety and regulation:

2.1 National Railway Authority (ANF): A specialised unit within the new Ministry of Mobility, Critical Infrastructure and Territory. Its main functions include:

- Proposing, establishing and reviewing general railway regulations in Chile.
- Issuing and supervising railway certifications and authorisations for rolling stock and infrastructure.
- Reviewing technical and safety standards, interoperability, and the standardisation of systems and technologies.

The aim is to reduce barriers to entry, ensure transparency and free competition, improve safety standards, and professionalise the railway system.

2.2 Transport Associations: Based on the German and Austrian models. Transport Associations, of a public or mixed nature, with a regional or macro-regional scope, are established. The association comprises the (new) Ministry of Mobility, Critical Infrastructure and Territory, regional and provincial governments, local authorities, public companies (such as EFE or Metro) and private operators, as well as other user and trade associations. Its main function consists of operational and fare coordination, coordination of multimodal integration, service planning, channelling of investments and subsidies, and ensuring public participation. This institution is key to the effective territorial implementation of the policy.

2.3 National Committee for Strategic Multimodal Corridors: A high-level strategic body comprising the new Ministry of Mobility, Critical Infrastructure and Territory (which leads the committee), the Ministries of Finance, Economy and the Environment, regional governments, transport associations and railway companies that manage infrastructure. Its main function is to define and update the National Network of Strategic Rail Corridors, prioritise investments by corridor and ensure coherence with logistics, transport and territorial development. This concept is directly inspired by the European TEN-T model, adapted to the national level, and can also be extended to all modes of land, sea and air transport, thereby achieving integrated planning.

2.4 Railway Companies (public and private): Public and private railway companies perform distinct and complementary roles. The primary role of infrastructure management companies is the comprehensive management of the network and its assets, including the planning, maintenance, renewal and expansion of the infrastructure, as well as the management and control of rail traffic and operational safety, ensuring transparent, non-discriminatory and efficient access conditions for all operators. For their part, operating companies, particularly in passenger transport, are linked to the authority through **Public Service Obligation (PSO)** contracts**,** which establish standards, service levels and funding mechanisms. Furthermore, they actively participate, in coordination with those managing the infrastructure, in the drafting, adjustment and management of **timetable changes (itineraries)** and their annual/biannual publication, helping to optimise the use of the network, service quality and the reliability of the railway system as a whole.

3. New model for railway planning, evaluation and investment.

3.1 National Railway Infrastructure Plan: Based on the Austrian model, this consists of a new railway investment plan with a horizon of over 25 years, subject to five-yearly review (directive), multi-annual financial programming and politically approved by a council of ministers and/or parliament (to be defined). The plan is based on a diagnosis

and demand forecasts, the definition of strategic corridors, and a prioritised investment portfolio with a single, integrated social, economic and environmental assessment.

3.2 Integrated investment assessment: Projects, portfolios, corridors and plans assessed by the new ministry in conjunction with the relevant public enterprises. The assessment includes social assessment, economic assessment, environmental assessment, and resilience and risk analysis.

3.3 Role of the new ministry in demand studies and forecasts: Following the Austrian model as a reference, the new ministry assumes sole responsibility for national mobility models, passenger and freight demand studies, the identification of growth scenarios, and the measurement and traceability of climate and energy impacts.

4. Policy monitoring, evaluation and adjustment

4.1 National Rail Monitoring System: Managed by the new ministry based on indicators, traceability of key corridor indicators, investment evaluation, and annual public reports.

4.2 Periodic evaluations: Process evaluation (every 2 years), results evaluation (every 4 years) and structural impact evaluation (every 8 years).

4.3 Adjustment mechanism: Updating of strategic corridors, investment adjustments and annual updating of the National Railway Infrastructure Plan without altering the mission, vision or principles, through the five-year directive.

A4. Key indicators (annual/half-yearly)

- Rail modal share (passengers and freight).
- Number of passengers and freight transported annually and half-yearly.
- Territorial coverage of rail services.
- Level of public and private investment.
- Percentage of GDP spent on critical infrastructure investment.
- Percentage of GDP allocated to rail investment.
- Compliance with and progress of the framework plan and associated projects.
- Kilometres of operational and modernised railway network.
- Percentage of the railway network electrified.
- Reduction in emissions from the transport sector.
- Energy efficiency indicators.
- Railway incident and accident rate.
- Level of multimodal integration.
- Punctuality of services.
- Service quality indices and acceptance indicators.

A5. Catalogue of instruments of the National Railway Policy

The catalogue of instruments of the National Railway Policy comprises the set of plans, programmes, regulatory and financial mechanisms that enable its implementation. These instruments are grouped into the following categories:

1. **Strategic planning tools:** National Railway Infrastructure Plan (Framework Plan) and five-year directive, identification of strategic corridors, and integration with urban and regional master plans.
2. **Investment and financing instruments:** Multi-year investment planning, public investment, concessions and flexible public-private partnerships.
3. **Regulatory and normative instruments:** Framework Law on Mobility and Critical Infrastructure, Railways Law (updated), EFE Organic Law (updated), technical standards (updated and geared towards rail interoperability where possible and appropriate), safety standards (updated), registers and certifications.
4. **Management and coordination instruments:** National railway authority, transport associations, national committee for strategic corridors, inter-ministerial coordination mechanisms, coordination with public enterprises.
5. **Productive development and human capital instruments:** Training, research, innovation and railway industry strengthening programmes. New railway campus.

This catalogue will be updated periodically in line with policy developments and the needs of the national railway system.

A6. Interfaces with other State public policies

The National Railway Policy is structured in a coherent and complementary manner with the main public policies currently in force in the State of Chile. These interfaces ensure strategic consistency, avoid duplication and maximise impact.

National Transport Policy (2013)[97]

The National Transport Policy constitutes the strategic framework that guides the development of the transport system across all modes. The National Railway Policy is directly embedded within this framework as **a structuring mode of the transport system**, acting as one of its main operational instruments.

- Multimodality and intermodality, linking urban, inter-city, port and logistics transport.
- Improving the efficiency and quality of the system through high capacity and reliability.
- Long-term planning, through coordination between the National Railway Plan and transport master plans.
- Recognition of the railway as critical and strategic infrastructure.

National Urban Development Policy (2013)[98]

Strategic framework to guide urban growth in an integrated, sustainable and equitable manner. In this context, the railway acts as an **instrument of spatial planning and sustainable urban development,** highlighting:

- The integration of transport and land use around railway stations.
- Improved accessibility from the suburbs to employment and service centres.
- As a structural alternative to 'sprawling urban growth' based on car use.

National Sustainable Mobility Strategy (2023)[99]

An instrument aimed at advancing towards clean, inclusive, safe and efficient mobility by 2050. Here, the National Railway Policy stands as **one of the main instruments for** implementing this strategy, due to:

- The promotion of a modal shift towards rail.
- Its direct contribution to the decarbonisation of the transport sector.
- The provision of high-capacity public transport services.

National Logistics and Ports Policy[100]

A policy currently under development aimed at establishing a competitive and sustainable logistics system. Here, rail acts as a **critical component of the national logistics system** and as a **structural pillar** of logistics and port policy. Key priorities include the development of efficient port–hinterland connections, the reduction of logistics costs, congestion and emissions across the entire logistics chain; and, finally, the strengthening of intermodality and combined freight transport.

National Electromobility Strategy (2021)[101]

Roadmap to accelerate the transition towards zero-emission mobility solutions. Here, the railway **represents the most established and efficient form of large-scale electromobility**, through:

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[97] *https://mtt.cl/wp-content/uploads/2013/05/documento-politica.pdf*
[98] *https://www.mop.gob.cl/archivos/2021/04/Politica-Nacional-de-Desarrollo-Urbano-2013.pdf*
[99] *https://www.sectra.gob.cl/publico/Documento%20oficial%20ENMS%202023-SECTRA.pdf*
[100] *https://www.subtrans.gob.cl/wp-content/uploads/2025/09/PNDLP-Eje-1-vF.pdf*
[101] *https://energia.gob.cl/sites/default/files/estrategia-nacional-electromovilidad_ministerio-de-energia.pdf*

- Electromobility as a common technological principle.
- Reducing emissions and improving energy efficiency.
- Transport–energy integration, particularly with renewable energy.
- It is integrated as a low-emission public transport and logistics solution.
- Opting for efficient technologies with a long range.

Energy Policy 2050 (2022)[102]

Strategic framework for a clean, secure and resilient energy system. Here, the railway is a **strategic user**, reinforcing transport electrification and energy efficiency.

Sectoral Plan for Climate Change Mitigation and Adaptation – Transport (2024)[103]

A tool for reducing emissions and increasing the resilience of the transport sector. Here, rail is one of the **main tools for mitigation and adaptation** in the transport sector, thanks to reduced emissions and greater resilience to extreme weather events.

National Road Safety Strategy (2021)[104]

Policy aimed at reducing road accidents and their social impacts. Railway development contributes to **improving the safety of the transport system** as a whole by reducing road accidents through modal shift and by making a greater contribution to systemic safety and road safety culture.

[102] *https://energia.gob.cl/energia2050*
[103] *https://movilidadactiva.sectra.gob.cl/wp-content/uploads/2025/02/Plan-SMACC_FINAL-2025_BP.pdf*
[104] *https://www.conaset.cl/wp-content/uploads/2021/05/Estrategia-Nacional-de-Seguridad-de-Tr%C3%A1nsito_2021-2030.pdf*

A7. Interfaces with other proposals

Infrastructure Policy Council (CPI) – Strategic Document 2026–2030 (2026)[105]

This corresponds to the proposed roadmap for infrastructure investment in Chile, structured around key areas such as institutional framework, financing, logistics, sustainable cities and energy transition. The Infrastructure Policy Council (CPI) explicitly proposes complementing road, rail, port and airport modes to improve logistics efficiency. Here, rail is positioned as the optimal mode for bulk freight, serving as a key pillar for logistics corridors. From the perspective of national infrastructure planning, the CPI's proposal promotes a National Infrastructure Plan with a long-term vision, in which the planning of key rail corridors is central. Furthermore, the CPI proposes infrastructure compatible with climate change and the energy transition, where rail offers improved energy efficiency and a significant reduction in emissions. The CPI's strategic document is one of the documents most conceptually aligned with rail policy, particularly regarding multimodality and strategic infrastructure.

CAMPORT: "99 Proposals for Maritime and Port Competitiveness" (2025)[106]

The Chilean Maritime and Port Chamber puts forward 99 proposals to improve the logistical competitiveness of Chilean foreign trade, addressing governance, port efficiency, land access, sustainability and the digitalisation of the logistics system. With regard to port-hinterland connectivity, the document identifies gaps in land access to ports and in the integration of the logistics chain. Here, the railway can play a very significant role in the transport of bulk cargo, facilitated by direct connections to port terminals, thereby largely alleviating road congestion at port access points and on motorways. From the perspective of integrated logistics, CAMPORT emphasises the need to conceive of the logistics system as an integrated, rather than fragmented, chain. This aligns directly with railway policies that promote multimodal transport, the development of dry ports and intermodal hubs, and logistics railway terminals. Furthermore, the document includes proposals for electrification, energy efficiency and emissions reduction within the port chain. Once again, the railway can help reduce emissions in freight transport and thereby improve the carbon footprint of exports. The CAMPORT document implicitly calls for a competitive railway system, although it does not always mention this as a central focus.

Corporation of Public Infrastructure Concessionaires (COPSA) – 5 Proposals from COPSA (2025)[107]

The Chilean Association of Public Infrastructure Concessionaires (COPSA) has put forward five priority proposals in response to the challenges of economic growth and social welfare that Chile will face in the period 2026–2030.

The document advocates expanding the concessions model and prioritising infrastructure that boosts productivity and is fully connected. As rail is key to the transport of bulk freight via integrated logistics corridors, a link is established with COPSA's proposal to explore financing and investment models, such as rail concessions and PPPs for logistics infrastructure.

National Strategy for Critical Minerals (2026)[108]

The main link with railway policy relates to the facility provided by the railway for the bulk transport of critical minerals (lithium, refined copper, etc.) via heavy goods trains and dedicated mining corridors to ports. Railways, on the other hand, allow minerals to be transported more efficiently

[105] *https://www.bibliotecacpi.cl/docs/publicaciones/CPI-propone-documento-estrategico-y-guia-para-la-accion-2026-2030-infraestructura-para-el-desarrollo-que-queremos.pdf*
[106] *https://www.camport.cl/wp-content/uploads/2025/12/99-Propuestas-para-la-competitividad-maritimo-portuaria.pdf*
[107] *https://copsa.cl/5x5/*
[108] *https://www.economia.gob.cl/2026/01/27/gobierno-presenta-estrategia-nacional-de-minerales-criticos.htm*

and with lower emissions, reducing the carbon footprint of the mining sector. Mining is one of the main business cases for freight rail.

Chile's National Forest and Climate Change Strategy (2025)[109]

The main link with rail policy relates to the ease with which rail facilitates the transport of large volumes of timber, pulp and biomass. The forestry sector forms part of the climate strategy, and rail thus contributes to very low-carbon logistics. Forestry logistics is another of the main business cases for freight rail. It reduces the carbon footprint in forestry and manufacturing sectors.

[109] *https://www.forestcarbonpartnership.org/system/files/documents/Chilean%20ERs%20Early%20Idea%20for%20the%20Carbon%20Fund.pdf*

A8. International References – Case Studies

European Union – Trans-European Transport Network (TEN-T)[110]

As a reference for the concept of strategic corridors, the TEN-T network corridors are defined, from a public policy perspective, as integrated transport governance instruments, aimed at coordinating policy priorities, investment decisions, technical standards and management mechanisms at a transnational level. In terms of public investment and financing, the corridors constitute programming frameworks to guide and sequence long-term investments. Corridors enable resources to be concentrated on critical projects (bottlenecks, cross-border sections, strategic nodes). They also serve as a reference for the allocation of investment funds and introduce a project portfolio approach at the corridor level, rather than isolated projects. In terms of public management, corridors enable progress monitoring, risk identification and the correction of deviations. They also promote coordination between administrations, operators and investors, based on a management approach focused on objectives and results, with shared timelines and commitments.

Trans-European transport network. Source: TENtec Information System and TEN-T map library.

Europe – National Railway Safety Agencies[111] .

The National Railway Safety Agencies in Europe, such as the AESF (Spain), EPSF (France), EBA (Germany) and ILT (Italy), are regarded as benchmarks for the concept of a National Railway Authority, whose remit includes:

- Ensuring operational safety on the railway network by supervising compliance with the obligations of the various stakeholders in this area.
- Authorising the placing in service of structural subsystems that make up the railway system and ensuring compliance with the established essential requirements.
- Authorising the placing in service of railway vehicles within its remit.
- Issuing, renewing, amending or revoking the single safety certificates of railway undertakings, whether they are operators and/or infrastructure managers, as well as subsequently supervising them, within the scope of its competence.

[110] *https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en*
[111] *https://www.seguridadferroviaria.es/quienes-somos/competencias*

- To propose, draw up and develop the regulatory framework for safety and monitor compliance with it, as well as to formulate proposals, guidelines and regulatory recommendations, including technical specifications for railway subsystems.
- Monitor safety objectives and levels through accident indicators and statistics, and prepare reports on rail transport safety.
- To organise and manage a railway register, and to supervise the proper registration of railway staff and rolling stock authorisations, statistics and databases relating to railway transport safety, including infrastructure inventories.
- Grant, suspend and/or revoke authorisations for training centres and centres for the psychophysical assessment of railway staff.
- Grant, suspend and/or revoke the certification of entities responsible for maintenance.
- To grant, renew, suspend and revoke licences and driving certificates for railway staff, as well as to propose the content of the examinations for obtaining railway staff qualifications, approve the minimum content of training programmes for obtaining qualifications, and the psychophysical fitness requirements for the certification of personal aptitude assessments.
- Regulation and supervision of the transport of dangerous goods by rail.
- Regulation and supervision in relation to the protection of the public railway domain and the modification of building line limits, without prejudice to the powers vested in the railway infrastructure manager.
- Exercising the power to impose sanctions in matters of railway safety.

Additionally, the US model is cited as a complementary reference, where functions are more clearly separated: investigation by the National Transportation Safety Board (NTSB) and regulation by the Federal Railroad Administration (FRA).

The NTSB[112] is highly regarded for its independence, technical rigour and transparency. One of the most recent examples was the investigation into the derailment of the Amtrak train in Philadelphia in 2015, caused by excessive speed on a curve. The NTSB identified root causes (human, technical, systemic) and issued recommendations that led to changes in standards and technologies, in this particular case, recommendations regarding automatic control and the expansion of the PTC system.

Investigative bodies such as the NTSB take a 'post-accident' approach, i.e. one focused on investigation and systemic learning (diagnostics). In contrast, regulatory bodies such as the FRA or the European National Safety Authorities (NSAs) take a more 'preventive' approach, focused on regulation and ongoing supervision.

Austria: Transport Associations[113] (Example: VOR[114]): A transport association is a legal and organisational association of local authorities and/or transport companies in the form of a network for the joint and coordinated management of public transport. It may be established, for example, as a limited liability company alongside the formation of a supervisory board. Its tasks focus on the planning, coordination and optimisation of public transport in a region or macro-region, as determined. These include setting fares and timetables, as well as customer service and the awarding of transport contracts. All urban and regional bus services, as well as part of the rail transport services, are contracted by the association. Experts from the transport association also act beyond the established region as points of contact for smart and intermodal mobility in neighbouring regions.

[112] *https://www.ntsb.gov/about/Pages/default.aspx?utm*
[113] *https://www.bmimi.gv.at/themen/mobilitaet/transport/nahverkehr/verkehrsverbuende/oesterreich.html*
[114] *https://www.vor.at/unternehmen/ueber-uns/aufgaben*

- Transport planning: This aims for modern and efficient transport management by creating short, smart door-to-door transport chains. The integration of public transport with pedestrian routes, cycling facilities and Park+Ride and Bike+Ride options can form part of the association's multimodal transport strategy.
- Fare structure: The association develops and coordinates, together with its partners, the fare structure for buses and trains in the designated region. A modern and comprehensive fare system for the entire region ensures affordable and fair public transport. Passengers benefit from a simple fare system and uniform prices.
- Procurement of services and revenue distribution: The association acts as a contracting authority for transport operators, as well as a clearing house for the distribution of subsidies among the transport operators in the network. In this way, the association must ensure a comprehensive public transport service in the region.
- Quality management: The association must be synonymous with consistently high quality. Regular quality checks, the immediate rectification of shortcomings and the identification of opportunities for improvement must be standard practice. Key to this will be the comprehensive quality criteria included in contracts with the various transport companies, which contribute to the continuous optimisation of the service.
- Customer service and information: Ensuring that users receive the best possible information about the service through route planners (apps and/or on the website), information leaflets, transport route maps, a helpline and a service centre at the main stations. Close collaboration with all network partners ensures a comprehensive service for all passengers in the region.

Transport associations in Austria. Source: BMIMI, Austria

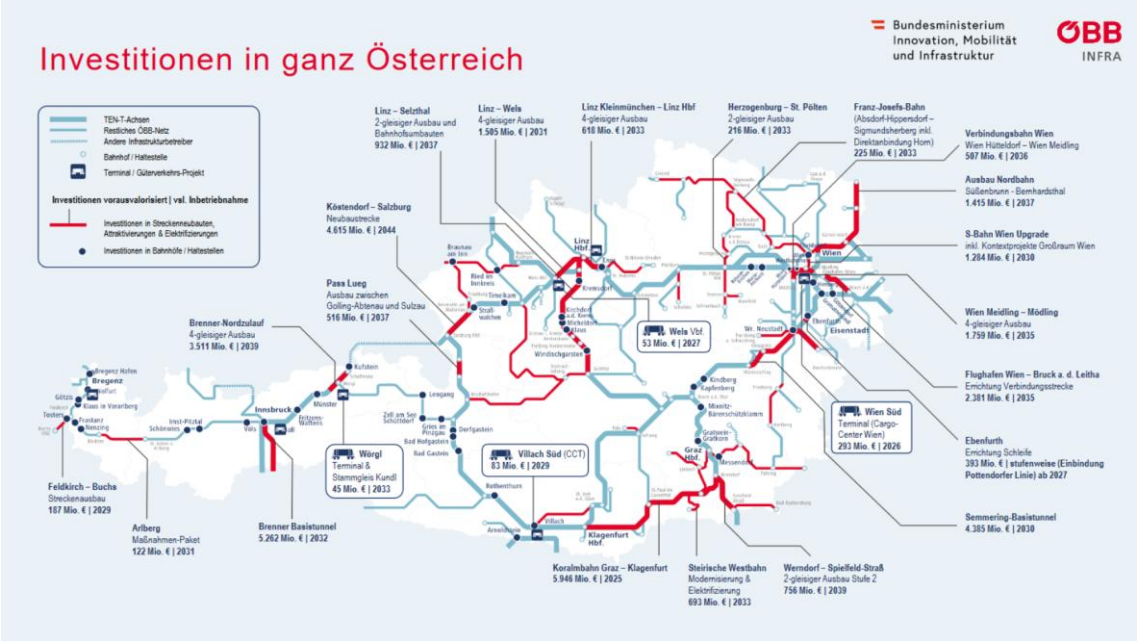
Austria – Framework Plan and its evaluation.[115]

The Austrian Railway Investment Framework Plan is a planning and financing instrument for investments and maintenance costs planned over a six-year period, subject to annual adjustment. The plan is approved by the Council of Ministers, then submitted to Parliament; upon its approval, grant agreements are concluded between the Ministry of Mobility and the railway company responsible for the infrastructure (ÖBB), establishing the contractual basis for the implementation of investments and the content of the grants. A project included in the plan initially represents a declaration of intent by the Government to implement it. Once the subsidy contract is in place, an agreement is reached for its implementation. Projects and programmes must also comply with official approval procedures. The plan is drawn up by the Ministry and the railway company (ÖBB), after which an agreement is established with the Ministry of Finance. The main basis is the target network on which the main objectives of transport policy are anchored (for example, by 2050). Government priorities and other national plans (Energy, Environment, etc.) are also taken into account. For a project to be included in the plan, processes must be in place between the ministry (and its internal agencies or departments) and the railway company (ÖBB), so as to ensure that the projects are meaningful, cost-effective and in line with higher-level objectives. Furthermore, regional authorities may grant subsidies for the expansion of infrastructure of particular regional interest.

In Austria, for example, projects are not financed individually; instead, the railway company finances the project portfolio on the capital market. In this case, for repayment, the ministry grants an annual subsidy based on the volume of investment. However, the grant is paid annually over a period of 30–50 years, allowing for steady financing based on the useful life (calculated from the net investment). Investments are discounted (actual foreseeable costs) at 2.5% annual.

The plan also shows varying degrees of cost stability depending on the project phase. The framework plan includes a broad portfolio of projects. The projects included range from those whose costs were determined during strategic studies in the form of feasibility studies to projects that are already under construction. Furthermore, the framework plan can show different levels of cost stability according to the maturity level of the projects: Level 5 (Very low) associated with the strategic development stage. Level 4 (Low) associated with a feasibility study. Level 3 (Medium) associated with approval. Level 2 (High) associated with a tendering process. Level 1 (Very high) associated with project implementation (construction).

[115] *https://www.bmimi.gv.at/themen/verkehrsplanung/ausbauplan/plan_oebb.html#:~:text=What%20is%20the%20Framework%20Plan%3F,is%20Article%2042%20of%20the%20Federal%20Railway%20Act.*



Austrian Railways 2025–2030 Framework Plan. Source: BMIMI, Austria

Austria – Transport forecasts[116]

A Transport Forecast based on an integrated projection study that analyses how transport supply and demand in the country will evolve over a given time horizon (e.g. 2030 and/or 2050). It takes into account social, economic, technological and political trends, and serves as a solid basis for infrastructure planning, investment evaluation and the formulation of national mobility policies. This forecast: Integrates the movement of people and freight, taking into account all modes of transport. It includes specific models for passenger and freight transport, complemented by a comprehensive reference economic model. The study serves as a reference document for decisions at national level and regarding infrastructure (roads, railways and logistics), as well as for environmental and demographic studies.

The political and technical responsibility for producing this forecast lies with the Ministry of Mobility and Infrastructure: it establishes the framework and strategic objectives of the projection, and coordinates sectoral institutions and external technical experts for its implementation. External entities and teams collaborate in its preparation: institutes and consultants, under the technical direction of an expert coordinator. This instrument is one of the technical pillars of the national mobility approach, as it enables coherent and forward-looking planning of infrastructure investment; serves as a basis for assessing the impact of public policy measures; facilitates coordination between different modes of transport and operators (roads, rail, logistics, public transport); and incorporates demographic, environmental and technological aspects into a single integrated model (rather than segregated as is currently the case).

European Union – Public Service Obligation (PSO) Contracts[117]

Public service obligation contracts (PSOs), as defined in Regulation 1370/2007, aim to establish obligations to ensure that public passenger transport services are provided in the general interest,

[116] *https://www.bmimi.gv.at/themen/verkehrsplanung/verkehrsprognose.html*
[117] *https://cer.be/images/publications/positions/CER_PSO_Brochure.pdf*

requiring an operator to provide services. It also allows for the possibility of grouping together services that cover costs and those that do not. In accordance with Regulation 1370/2007, these services correspond to those of general economic interest provided to the public on a non-discriminatory and continuous basis. However, it is the national public authorities that decide which services should be included in this category. A direct link is established here between the definition of the PSO and public transport policy, indirectly imposing on the competent authority the obligation to demonstrate, firstly, that such a link exists and, secondly, that it exists in a cost-effective manner that guarantees the long-term financial sustainability of the service. Therefore, the competent authorities are obliged to follow a broadly defined framework.

The main public service obligations currently required of operators include:

- Fare obligations covering fare reductions for certain categories of passengers. In some cases, the legislation allows the operator a certain degree of discretion to increase fares. In general, this margin is limited, in the sense that railway undertakings cannot raise prices above the level set by the authorities.
- The definition of service provision, including services between major cities, during peak hours and stopping patterns.
- Quality requirements are generally included, either directly in the section on public service obligations or indirectly through 'incentive and penalty' schemes. This constitutes an increasingly important aspect of the economic implications of the contract, as quality comes at a price, and this price must be negotiated fairly between the parties. Quality requirements typically include: punctuality, seat reservations, services for passengers with reduced mobility, customer information (including the level of information to be provided at stations, on board or via general announcements), requirements regarding ticket sales (at stations and on trains), cleanliness of rolling stock, number of seats available during peak and off-peak hours, the presence of staff on trains, rolling stock characteristics, the marketing of public transport options/availability at specific fare levels, which are often set by the competent authority, service reliability, including data on the actual running of scheduled trains, and obligations to provide alternative transport in the event of rolling stock breakdowns.

European Union – (Day of) timetable change (in German, "Fahrplanwechsel")[118]

The timetable change across Europe takes place every year on the Sunday following the second Saturday in December. On that day, train and bus timetables for all public transport – urban, regional, national and international – are amended. If necessary, additional changes and adjustments are also made before or after the school holidays.

United States – The Development of High-Speed Rail in America[119]

The development of high-speed rail is a long process, which in the United States, for example, has taken more than five decades, marked by gradual testing, institutional adaptation and regulatory changes. Experiments with high-speed trains have been carried out since the 1960s, but it was not until the 1990s that the country undertook a systematic effort when Amtrak tested European trains such as the Swedish X2000 and the German ICE on the Northeast Corridor. These technical tours made it possible to measure performance on existing infrastructure, assess

[118] *https://service.ooevv.at/portal/de/kb/articles/wann-ist-fahrplanwechsel*
[119] *https://www.geotren.es/blog/alta-velocidad-en-los-estados-unidos/*

compatibility with local standards and demonstrate the technology to the public and decision-makers, constituting a key stage of technology transfer and operational learning.

One of the greatest challenges was the regulatory and structural differences between the US railway system and those in Europe and Japan. The network was dominated by private freight operators, with stricter safety regulations geared towards heavy trains, which necessitated adapting designs, developing new federal standards and progressively modernising the infrastructure. During the 1990s, extensive works were carried out on the Northeast Corridor—electrification, signalling improvements and track renewal—and an international tender process was launched, culminating in the acquisition of the Acela Express trains, specifically designed to meet US regulatory and operational requirements.

In the 21st century, high-speed rail development has evolved towards more ambitious projects, driven by new public policies, federal funding and technological advances. Initiatives such as Brightline in the west and the California High-Speed Rail Authority state programme reflect an institutional shift towards mixed public-private models and standards more in line with international systems. Overall, the US experience shows that the implementation of high-speed rail depended not only on railway technology, but also on decades of regulatory adjustments, institutional coordination and adaptation to a unique railway structure dominated by freight transport.

France – The French High-Speed Train (TGV) as a flagship[120]

The “Train à Grande Vitesse” (TGV) has become a cornerstone of SNCF’s business over the past few decades. Since the opening of the first line between Paris and Lyon in 1981, the TGV network has expanded in a star-shaped pattern radiating out from Paris to major destinations across France. As a result, the train has significantly displaced air travel on the relevant routes.

Long-distance passenger transport in France dates back to the launch of the Corail trains in 1975, followed by the TGV in 1981 – the first high-speed rail service in Europe – which is now the flagship of long-distance travel. But this quantum leap in high-speed travel, the result of a long-term vision for passenger transport, meant taking major risks—both financial and technical—in designing a system that was integrated from the very outset, with dedicated infrastructure and specialised trains in particular.

The national and international network that has developed over time continues to expand and is gradually focusing on cross-country links, the future development of which is already planned. Given the substantial investment involved in building a new high-speed line, certain profitability criteria must be considered, including traffic forecasts in particular, which can be used as a basis for estimating projected revenue and operating costs. On the other hand, the conventional internal rates of return (IRR), estimated by France for the main TGV projects in 1993, were often below the level required by the government (8%) to proceed with the projects, and therefore did not justify the construction of all the lines.

In the broader sense, this infrastructure also brought other benefits to the government in the form of numerous indirect socio-economic and political effects. These criteria, which are more difficult to measure and quantify, may encompass a range of objectives, in particular:

- Improving links between European capitals for the regions, to promote trade and relations (e.g. Paris-London, Lyon-Turin).
- Helping to create European links between networks (e.g. Paris–Strasbourg–Frankfurt, Perpignan–Figueras and Bordeaux–Dax–Spain).

[120] *Mireille Faugère, Railway Transformation, Roland Berger Strategy Consultants, Eurailpress, 2010.*

- Bringing Paris closer to economically attractive locations (such as the ports of Rouen and Le Havre) or, in particular, politically (e.g. Strasbourg and Brussels).
- Develop freight transport by freeing up capacity on conventional lines (such as in Brittany).
- Reducing congestion on roads or at airports operating at full capacity.
- Reducing the risk of accidents associated with the use of dangerous roads (e.g. Lyon-Turin).
- Job creation, both in construction and in the cities where stations are built (mainly in the service sector).
- Mitigate the environmental impact of transport by prioritising more environmentally friendly modes.
- Contributing to national and regional planning, particularly by bringing regional urban centres closer to Paris, to other regional centres (for example, Nîmes-Montpellier, Marseille-Toulon-Nice, where one in five journeys is made from one province to another), or to international airports, making tourist regions more accessible (such as Saint-Malo), and facilitating travel within a region, etc.

The national and regional planning approach is key. Indeed, the opening of new TGV lines has often literally transformed towns and cities around stations (housing, environment, traffic, commercial activity, etc.). One of the most classic examples is turning the TGV station into a business hub, such as Euralille in Lille, Part-Dieu in Lyon and Novaxis in Le Mans, thereby creating jobs in the service sector and property development projects. A point worth noting is that it is extremely difficult to assess the returns on major transport projects, even in hindsight. The impact may lie well in the future or run very deep within the economic fabric and is therefore difficult to quantify. Consequently, decisions to extend the network are not based solely on a purely financial internal rate of return, in the strict sense of the term, but on an economic return that includes many induced effects. The challenges posed by the accurate and objective assessment of these effects, coupled with the level of investment required for the infrastructure, mean that the political will to extend the network often plays a significant role in deciding whether to build new lines. This means that the SNCF, the operator, faces quite different returns on new lines, depending on whether the economic viability of the new line depends on indirect effects or not.

Transport infrastructure, such as high-speed lines, is characterised by requiring high levels of investment that must be regularly upgraded, as high-speed trains require specific infrastructure (often dedicated tracks) whose cost is much higher than that of conventional lines. Whilst the maintenance costs of the infrastructure are broadly similar to those of conventional tracks, the cost of acquiring, operating and maintaining the trains is much higher. Furthermore, the investment has a very long lifespan, usually more than 50 years, with very slow obsolescence. In terms of costs, the latest high-speed rail projects recorded a cost per kilometre of between 12, 16 and 19 million euros, with other cases being even more extreme, such as the Lyon-Turin line, which reached a record 134 million euros per kilometre due to its particular topography. By way of comparison, in Germany, South Korea and the Netherlands, the latest high-speed lines had costs per kilometre of between €28 million and €50 million.

High-speed trains are the only mode of transport to have gained market share at the expense of cars and air travel in recent years, and they are the only mode that meets the growing demands for sustainable development. For example, in France, the TGV naturally outperforms air travel, provided journey times are under four hours. In fact, trains are often cheaper on routes where the two modes compete (train and plane). In addition to price, the concept of total journey time comes into play when choosing between modes, and favours the train (from city centre to city centre, with no check-in time, no security queues, etc.). This is why rail has a market share of around 70–75% on the Paris–Marseille and Paris–Bordeaux routes, and as much as 90% between Paris and

Lyon; as the air market share was strictly limited to connecting passenger traffic to and from central Paris.

Route	Distance	Journey time	Rail modal share	Air modal split	Source
Paris-Lyon	433 km	2h00	94%	6%	SNCF Voyages data 2009
Paris–Marseille	753 km	3h00	75%	25%	SNCF Voyages data 2009
Paris-Brest	613 km	4h00	54%	47%	SNCF Voyages data 2009
Paris-Nice	974 km	5h30	38%	62%	SNCF Voyages data 2009
Paris–Toulouse	825 km	5h10	28%	72%	SNCF Voyages data 2009
Madrid–Barcelona*	630 km	2h35	50%	50%	Via Libre, 23 July 2009
Madrid–Seville	471 km	2h30	90%	10%	El Economista, 13 and 17 April 2007

*(*Ramp-up currently underway: January 2009 for the Madrid-Barcelona route)*

The efficiency of the TGV on routes of less than four hours has an immediate impact on the position of air travel. For example, when the Paris-Strasbourg TGV line opened, reducing the train journey time from four hours to two hours and twenty minutes, the railways' market share against air travel rose from 35% to over 60% in five months. The SNCF had predicted it would take between twelve and eighteen months for air travel to become less competitive and, in the long term, for rail to completely displace air travel, as happened on the Paris to Brussels route. When the TGV Méditerranée opened, the rail market share against air travel jumped from 40% to 70% between Paris and Marseille, and it is now believed that rail is 'squeezing out' air travel on routes such as Paris-London and Paris-Strasbourg.

On the other hand, the extent to which road travel and high-speed rail compete is more difficult to assess, since, unlike air travel, not all journeys are comparable. Both air travel and high-speed rail connect large and medium-sized cities, and travellers must reach a single departure point, subject to time constraints, and arrive at a single destination before completing their journey. On the other hand, the car has few or no time constraints and can start and end anywhere. Passengers generally place greater value on reducing access times and waiting times than on journey times. As a reference, it was estimated that the opening of the TGV Méditerranée would have a 5–10% impact on road traffic.

The mobility and sustainable development challenges facing our countries mean that we really need to consider where each mode of transport fits in, so that we can have modes that complement one another rather than compete. Viewed from this perspective, rail is vital for achieving sustainable mobility, compared to aeroplanes and cars, which pollute more. Road congestion is another structural factor providing an incentive to develop rail transport. Thus, rail can and should be the mode of choice for journeys of between one and a half and four hours, with air travel for very long distances and the car for shorter journeys (less than an hour). Linking the different modes in this way and ensuring they complement one another is driven both by a fundamental vision of mobility and by the logic of increasing urbanisation, as well as by modes that cooperate and coordinate more closely with one another to make journeys easier and more efficient, whilst at the same time minimising environmental impact.

Japan – Resilient Railways

The resilience of the Japanese railway system is a global benchmark due to the integration of earthquake-resistant design, advanced technology and safety-focused operational protocols. This approach has driven strategies aimed at minimising casualties, preventing derailments and ensuring service continuity[121]. To this end, Japan has established clear objectives for railway resilience:

- Absolute priority for human safety, preventing structural collapse even during severe earthquakes.
- Service continuity, reducing downtime following disasters.
- Reducing response times, with automatic braking activated within seconds.
- Minimisation of derailments, through automatic seismic control systems.
- Optimisation of evacuation, using models that maintain passenger flows within station capacity.

The Japanese system incorporates multiple engineering solutions that significantly reduce the risk of catastrophic failures, such as seismic reinforcement of infrastructure, including pillars, bridges and electrical systems; the use of sensors and seismic monitoring systems integrated into the rail network; deformation-resistant structural design, allowing for controlled damage without collapse; and redundant systems that enable partial operation to be maintained following extreme events.

Resilience also depends on operational management; to this end, Japan has adopted advanced evacuation models that optimise passenger flow and recovery times[122] ; coordination with emergency services, integrating disaster response plans; frequent drills, which prepare both staff and users; and finally, post-earthquake inspection protocols before resuming operations. One of the most critical components of railway resilience is the **Japanese seismic early warning system,** which is based on a network of sensors that detect primary (P) waves, which are faster and less destructive than secondary (S) waves. Upon detecting these initial signals, the system automatically calculates the location and magnitude of the earthquake, sending alerts in real time. In the railway sector, this enables trains to be brought to a halt through automatic braking and power cut-off within seconds, drastically reducing the risk of derailment[123] . The system evolved from the UrEDAS railway system and was integrated into a national system managed by the Japan Meteorological Agency, which not only protects infrastructure but also issues alerts to the public via television, radio and mobile phones, providing critical seconds to react before the arrival of the destructive waves[124] .

Japanese railway resilience is based on a comprehensive strategy that combines measurable objectives, advanced structural design, efficient operational protocols and a sophisticated early warning system. This model has enabled exceptional levels of safety to be achieved even in one of the world's most challenging seismic environments.

Europe – Combined transport[125]

The 2024 report on combined transport in Europe, produced by UIC and UIRR, highlights that the combined transport model—which primarily integrates rail with road transport—has established itself as a key solution for improving logistics efficiency and moving towards more sustainable transport systems. Among its main advantages are the reduction of greenhouse gas emissions, the alleviation of road congestion and the optimisation of door-to-door logistics chains, positioning

[121] *http://hsr.ca.gov/es/about/safety/early-earthquake-warning/*
[122] *https://arxiv.org/abs/2507.19545*
[123] *https://www.vietnam.vn/es/nhat-ban-cai-tien-he-thong-phat-hien-dong-dat-som-cho-tau-shinkansen*
[124] *https://en.wikipedia.org/wiki/Earthquake_early_warning_system?utm_source=chatgpt.com*
[125] *Report on Combined Transport in Europe 2024 – UIC – UIRR.*

it as a central instrument in the transition towards cleaner mobility for Europe. In terms of development, combined transport has shown a trend of sustained growth in the medium term. Between 2018 and 2023, the volume measured in tonne-kilometres grew by approximately 8.7%, reflecting a gradual consolidation of this model, albeit with recent fluctuations resulting from operational disruptions. Furthermore, a significant upturn was observed in 2024, with increases of around 5.2% in shipments and over 8% in performance (tonne-km), driven mainly by growth in domestic transport. Looking ahead, the report projects that combined transport will continue to expand structurally, with growth rates of around 3% per annum towards 2040, which would imply a market approximately two-thirds larger than the current one. However, it also highlights significant challenges, such as operational fragmentation between countries, infrastructure limitations and interoperability issues, particularly in cross-border services.

A9. References: private investment in railways

United Kingdom – Europe – Channel Tunnel[126]

The Channel Tunnel is one of the most emblematic examples of railway financing through **large-scale private investment.** Developed under **a DBFO (Design-Build-Finance-Operate) scheme**, the project was awarded to Eurotunnel without any initial direct subsidies, transferring both construction and demand risks to the concessionaire. Although the tunnel established itself as a strategic infrastructure link between the United Kingdom and continental Europe, its development was marked by significant cost overruns and lower-than-projected demand in its early decades, leading to financial restructuring processes. This case demonstrates that, even in corridors with high structural demand, the total transfer of risk to the private sector can compromise the project's financial sustainability, requiring robust financing structures and extended payback periods.

Spain – France – Figueras–Perpignan Line (LFP)[127]

The Figueras–Perpignan Line represents a significant case of **an international rail concession** initially conceived as a 100% private project under a **BOT (Build-Operate-Transfer)** scheme**.** The infrastructure was awarded to the concessionaire TP Ferro, which undertook the financing, construction and operation, recouping its investment through the collection of fees from rail operators. However, the project faced difficulties linked to an overestimation of demand, delays in complementary rail connections and a high dependence on political decisions in both countries (Spain and France), which led to the concessionaire's bankruptcy. Subsequently, the infrastructure was integrated into the public networks of SNCF Réseau (France) and ADIF (Spain). This case demonstrates the limitations of the BOT model in rail infrastructure, particularly where there is uncertainty regarding demand and a reliance on institutional externalities.

United States – Brightline (Miami and West)[128]

The development of Brightline in the United States offers two quite distinct cases regarding private investment models in rail infrastructure. The first case is that implemented in the State of Florida (Miami–Orlando); the project was structured as an **integrated private initiative** combining rail operations with **property development around stations (Transit-Oriented Development)**, allowing for the diversification of revenue streams and the mitigation of demand risk. This model has been made viable through the use of financial instruments such as **Private Activity Bonds (PABs),** alongside the utilisation of **existing rail corridors**, significantly reducing investment costs.

The second case is the Brightline West project currently under development between the states of Nevada and California, which follows a model closer to a traditional **Public-Private Partnership (PPP)**, with a **significant element of state support through grants**, **concessional financing** and **institutional backing**. Unlike the Florida case, this project involves the construction of new railway infrastructure (a 'greenfield' project), which increases capital requirements and risk exposure, making a **risk-sharing arrangement** necessary.

[126] *Flyvbjerg, B. 2007; Anguera, R. 2006; https://www.getlinkgroup.com*
[127] *European Court of Auditors, 2018; Albalate, D. & Bel, G. 2012; https://www.eca.europa.eu).*
[128] *(U.S. Department of Transportation; OECD, 2021; https://www.gobrightline.com; https://www.brightlinewest.com).*

Both cases demonstrate that the viability of private investment in railways depends largely on the surrounding conditions, particularly demand density, the availability of existing infrastructure and the potential to generate additional revenue.

Railway concessions in Latin America: Brazil, Uruguay and Colombia[129]

In Latin America, private investment models tend to focus on the freight transport segment, where **demand is relatively stable and 'captured'.** Generally, more robust concession structures are established, for example, with some state support or the transfer of certain risks.

In Brazil, for example, the rail freight system has been developed through **long-term concessions** to private operators such as Rumo and Vale, under **vertically integrated** schemes **and with investment obligations**. This model has been successful due to the existence of an **"anchor client" (anchor customer)**, which is a key client that guarantees a stable, long-term minimum demand for an infrastructure or service, thereby significantly reducing the commercial risk of the projects. Examples of this can be found in sectors such as mining, agribusiness and forestry, where large volumes allow for economies of scale to be exploited.

In Uruguay**,** the Ferrocarril Central Uruguay project has been implemented under a **DBFM (Design-Build-Finance-Maintain) public-private partnership** scheme**,** based on **availability payments**, where **the State assumes the demand risk** and viability is supported by a **main user**, the company UPM. The rail operator DBCC is responsible for transporting UPM's products and supplies between the plant located in the department of Durazno and the port of Montevideo.

In Colombia, railway concessions have yielded more limited results due to structural factors such as market fragmentation, competition from road transport and a lack of consolidated demand, which has hampered the sustainability of the concession projects. For example, in August 2025, the National Infrastructure Agency (ANI) and the Línea Férrea Central concession signed a 10-year contract under a **Public-Private Partnership (PPP**) scheme for the rehabilitation and operation of the La Dorada–Chiriguaná corridor. Initially, it will transport steel for construction (Ternium plant in Barranquilla), paper pulp (Papeles Nacionales) and consumer goods, and it is expected that more stakeholders will join over time.

Latin American cases show that railway concession models tend to be based on models with **guaranteed demand** (stable over time) and high volumes, through **long-term contracts** or **state support mechanisms**.

Generally speaking, international evidence shows that, even in cases where railway projects were conceived and implemented under private investment schemes, there has often been a need for subsequent public intervention to ensure their operational continuity and financial sustainability. Comparative experience demonstrates that railway projects (especially in passenger transport) require, to a greater or lesser extent, explicit or implicit public support, whether through financing, regulation, guarantees or, ultimately, the direct absorption of assets, reaffirming their strategic nature as infrastructure of public interest.

[129] *World Bank, 2010; World Bank, 2017; CAF, 2020; IDB, 2016; ANTT Brazil; ANI Colombia; https://www.antt.gov.br ; https://www.gub.uy; https://www.ani.gov.co; https://www.dbcc-transport.com.uy/#laempresa https://lfc.com.co/*

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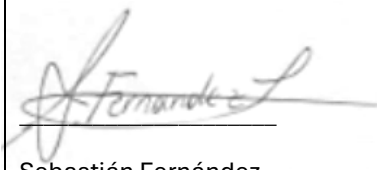
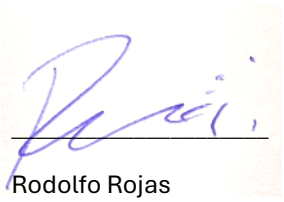
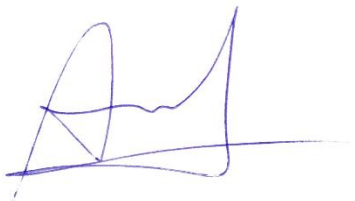
 Santiago Vera President, Chilean Railway Institute	 Sebastián Fernández Chilean Railway Institute
 Francisco Godoy Chilean Railway Institute	 Rodolfo Rojas Chilean Railway Institute
 Andreas Hoffmann Chilean Railway Institute	 Ariel López Chilean Railway Institute

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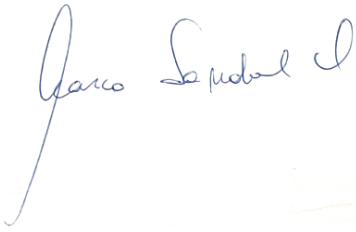
 Rodrigo Chávez Chilean Railway Institute	 Marco Sandoval Chilean Railway Institute

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B	New chapters and new structure.	22 February 2026
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A10. Signatories

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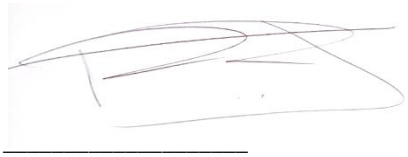

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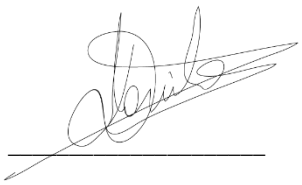

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