Interreg CENTRAL EUROPE

Co-funded by the European Union

Rail4Regions

Workpaper Branch and Feeder Lines
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Version 2

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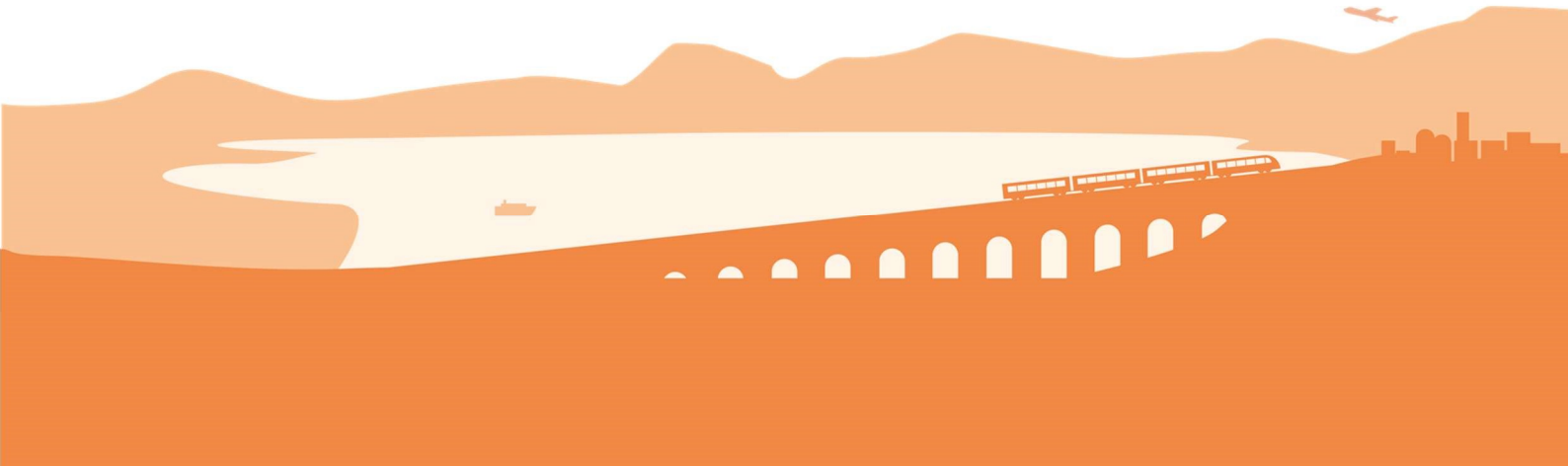
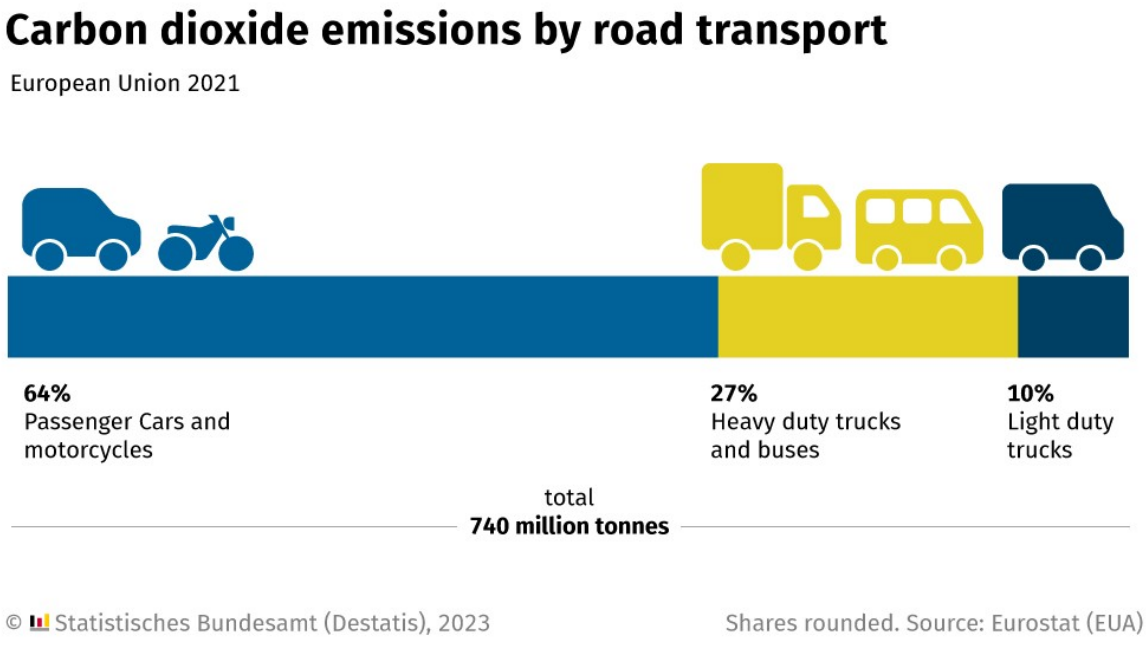
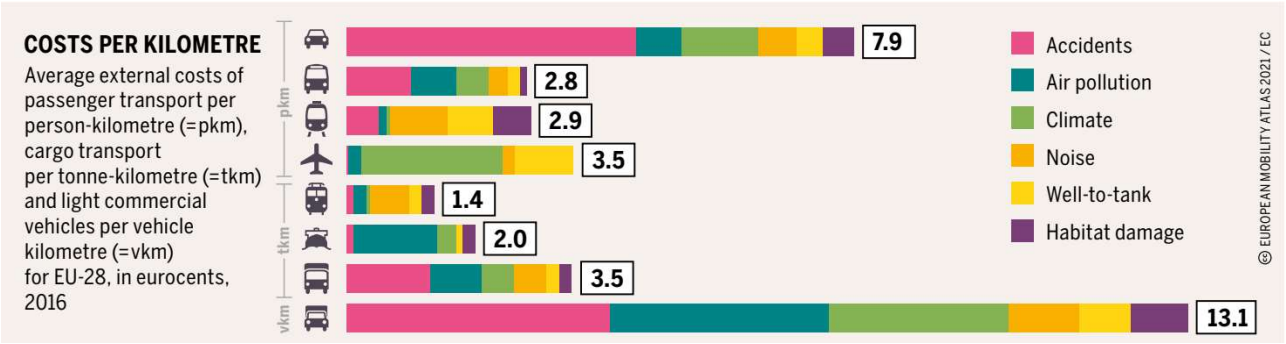


A. Background

The share of transport in greenhouse gas emissions in Europe rose from 13% to 21% between 1990 and 2021. According to the forecasts of the Federal Transport Infrastructure Plan Germany (BVWP), a further 38% increase in traffic volume is expected for road freight transport between 2010 and 2030. According to the European Union's Green Deal, Europe's net greenhouse gas emissions are to fall by 55% by 2030 compared to the reference year 1990.



Against this background, the freight transport sector is to be transformed into a transport system with environmentally friendly means of transportation.



A comparison of means of transport shows that rail freight transport has significantly better greenhouse gas values than road freight transport. Rail transport also has significantly less other negative effects to the society: it pollutes way less, its quieter and much safer than the road transport too. The shift from road freight transport to rail freight transport or combined transport therefore represents a promising transformation path.

The aim of the Rail4Regions working group is to elaborate a guideline for the revitalization of branch and feeder lines for improving the infrastructure for rail freight transport.

The following aspects will be considered:

- Strategic issues / stakeholders

  In this aspect, it is first of all a question of clarifying who has a fundamental interest in such a revitalization. Depending on the plant, this could be an individual company, a municipality / region / a business park operator or even the infrastructure operator or a utility company.

  This is followed by the question of the strategic background of the individual stakeholders to the project. What is the trigger? What is the goal? E.g., improvement of the competitive position of a company, a region, transport policy objectives, overcoming bottlenecks, legal requirements ... . because this in turn has an impact, e.g., on financing models or subsidies.

- Market

  The next question is the underlying market or markets. This is relatively easy for a single company, but more difficult for an industrial park, and a different matter for a site development.

  Which markets are to be served?

  Which industries are behind them?

  Which source/target regions?

  What does the infrastructure look like there?

  Important: Who makes the transport decision? What are the medium and long-term prospects and also the competitive situation - both for the individual company and for the location?

- Political and regional conditions (infrastructural development / transport and environmental policy / spatial planning)

  Here it must be clarified which political influences, in the broadest sense, there could be on the project. Here, the possibly planned infrastructure expansion in the surrounding area is an issue, here both road and rail.

  Likewise, spatial planning issues such as possible rezoning in the surrounding area, general spatial planning objectives or even the availability of land in general are topics here.

  In addition, there are also transport and environmental policy objectives.

- Legal framework

  The next aspect is concrete legal aspects for the project itself.

  E.g. which procedures are necessary?

  Which authority is responsible?

  Which permits are required?

Are other legal matters to be considered (e.g. environmental laws, nature conservation areas, no-building zones, commercial law, ...)?

Is there also the question of an operator role (e.g. with or without own operation).

What does the cooperation look like with several parties involved?

- Technical aspects / infrastructure / structural facilities

  This includes all technical aspects of the plant. In principle, all the trades that can be involved in such a project must be taken into account here (structural systems, mechanical systems, safety systems, overhead lines, electro technical systems, buildings, etc.).

- Operational aspects / employee protection

  This is where all operational aspects come together, i.e. the interaction between railroad operations on the public infrastructure, the possibly private infrastructure with the railroad undertaking.

  Of course, this depends on which facility is involved. In the simplest case, it will be a matter of concluding an operating agreement, but in the case of a main track, it can become more complex. The whole subject of regulations also belongs here.

  The topic of operation must also be clarified (this may also have an impact on the structural facilities). Is open access desired, what does the operating concept look like? Is it possible to handle third-party volumes on the connecting track?

  Another important point is the protection of employees.

- Economic aspects (business management, national economy, subsidies)

  Finally, it is a question of looking at the whole thing from the economic point of view. This means costing, cost/benefit calculations or profitability calculations, and also including the funding landscape (regional, national and also international).

  But a part should also be dedicated to the economic benefit. This is because many infrastructure projects in this area cannot be presented in economic terms, or at least not in their entirety, and this is also an argument in favour of funding.

B. Objective

In contrast to the major European economic centres, which are generally well connected to the existing freight transport corridors, the more rural regions usually have to contend with the disadvantage that the transport distances to the nearest rail freight connection are relatively long for their companies. One reason for this is the thinned-out rail network and the lack of branch and feeder lines for connecting loaders in rural areas with the freight transport corridors.

As a result, a particularly large number of goods that should be transported by rail are transported by road. This is a disadvantage for the carbon footprint of companies and their products.

Some of these lines still physically exist. They have only been closed and taken out of service.

With the guideline for revitalization of branch and feeder lines, partners of the Rail4Region project want to give a support to initiatives that intend to bring such closed lines back to service. This way the project will contribute to improve the modal split of rail freight transport.

C. Origin of freight traffic and its climate relevance

Freight traffic is generated by supply and disposal processes in trade and industry and by the commercial transportation of goods. The low spatial resistances lead to an expansion of the spatial division of labour and are reflected in the further increase in transport costs while the transport volume remains almost constant. As a result of increasing specialization and the realization of cost advantages, the place of production and the place of use or consumption of goods have moved further and further apart. The growth in traffic is therefore primarily a result of the growth in distances.

In addition to the geographical division of labour, there are a variety of often interlinked reasons for the long-standing and expected growth in traffic. The expansion of transport routes, the development of transport technologies and also the deregulation and liberalization of the transport market have contributed to a considerable increase in demand - particularly in road freight transport. Recently, the development of freight transport has also been increasingly influenced by the logistics effect and the digitalization effect. The production and logistics strategies of trade and industry are focusing on the high flexibility of road freight transport due to the associated smaller consignment sizes and tight scheduling.

As a result, freight transport performance is increasing faster than freight transport volumes for all modes of transport.

D. Shifting transportation from road to rail

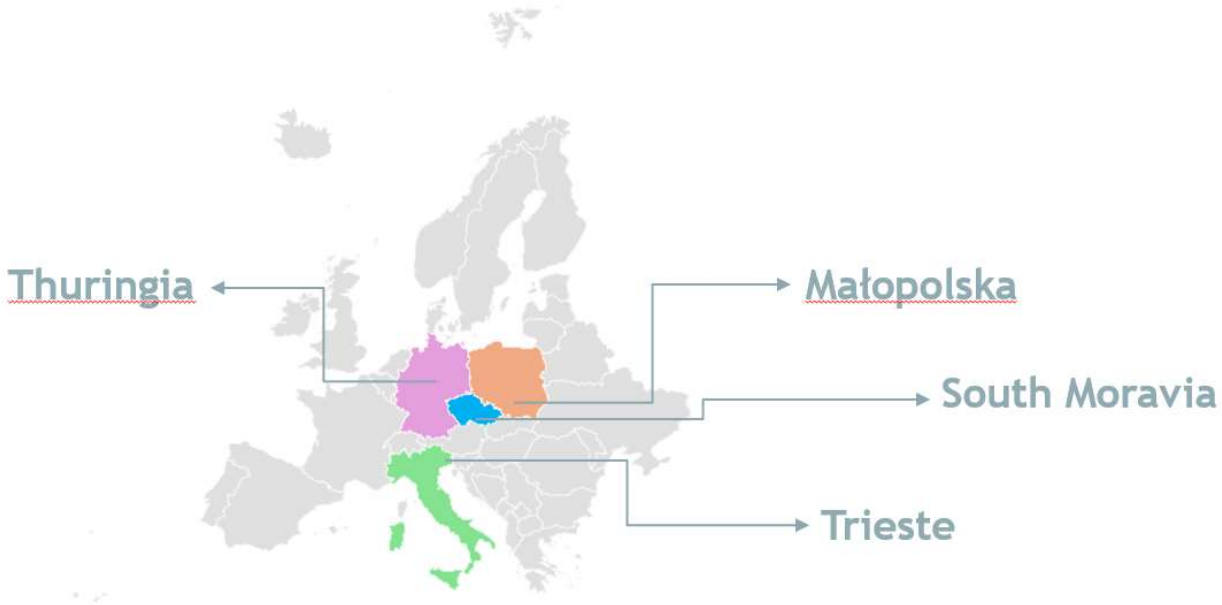
A comparison of the development of absolute greenhouse gas emissions shows that, despite all the efficiency gains in road transportation, these alone will not be sufficient to reduce absolute emissions from freight transportation processes. If no measures are taken to fundamentally reduce transport volumes and distances, the only remaining approach at present is to reduce emissions from the means of transport or the emissions from their operation. Under current conditions, the electrification of transportation is the central starting point. Overall, the rail mode of transport already has the prerequisites to significantly reduce transport-related climate impacts in the short to medium term, even by simply shifting goods from road to rail.

E. Strengths and weaknesses of rail transportation services

In principle, today's shippers' requirements for freight transport systems differ only slightly from those of 1965, when the key criteria were mass performance, network capability, speed, predictability, frequency, safety and convenience. From the perspective of transport and logistics service providers, cost efficiency, reliability, flexibility, individualization, speed and IT expertise for mapping logistics processes as well as good knowledge of the customer industry can also be mentioned. More recently, new evaluation criteria such as environmental impact and resource utilization or resilience have been added. In addition, convenience (consideration of transaction costs) and, above all, informational access to transport systems have become significantly more important thanks to new ICT technologies.

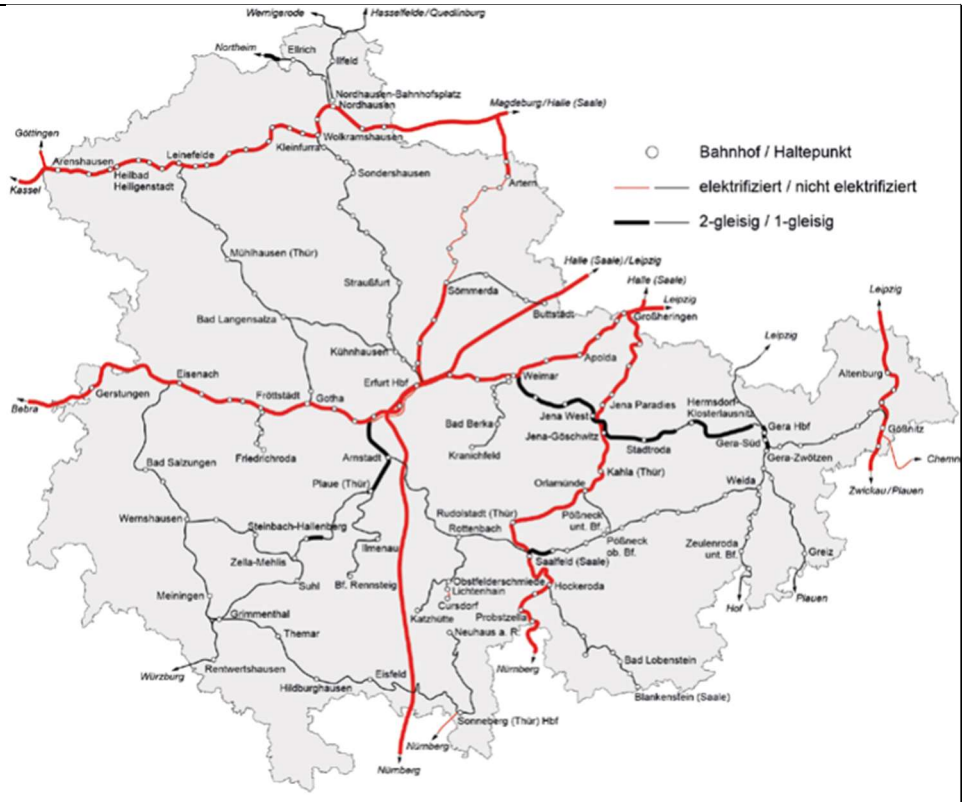
F. Experiences from partner regions

The analysis of strategies to revitalize secondary rail lines examines planning instruments and infrastructural interventions in four distinct regions: Thuringia, South



Moravia, Poland, and Trieste.

Thuringia	
Overview	Thuringia, centrally located in Germany, boasts a rail network that is notably **dense** compared to other German states, akin to the networks in Rhineland-Palatinate and Lower Saxony, and denser than in Bavaria, Brandenburg, or Schleswig-Holstein. This network efficiently supports both **passenger and freight traffic**, crucially integrated with Thuringia's multiple urban centers to ensure seamless connections between local and long-distance transport.



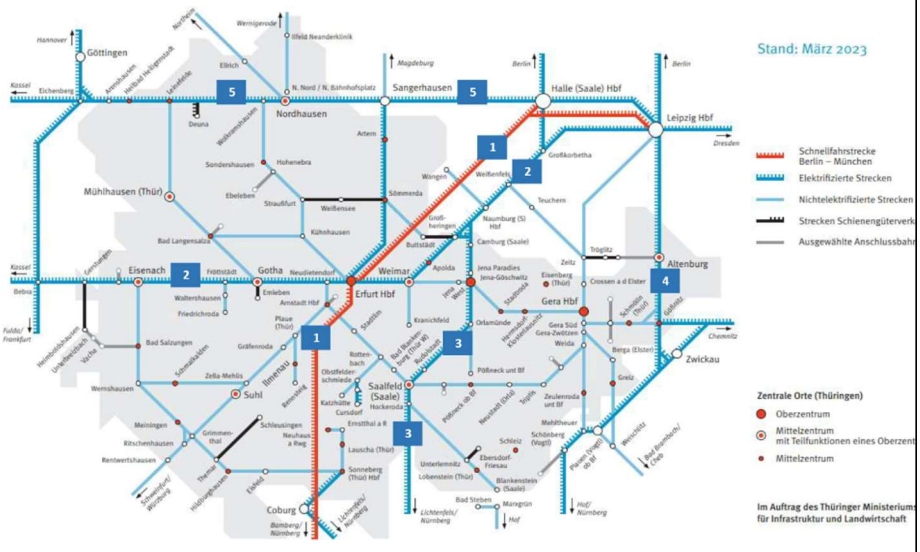
Railway Network

Significant railfreight transport volumes in Thuringia are handled by Dyckerhoff GmbH, Deuna plant, K+S AG in southwest Thuringia, Mercer Rosenthal GmbH in southwest Thuringia, Mercer Rosenthal GmbH in Rosenthal am Rennsteig, MDC Power in Kölleda, the Opel plant in Eisenach, the Thuringia steelworks in Unterwellenborn and the Starkenberger Baustoffwerke GmbH in Starkenberg.
Bulk goods, mineral products, wood and chemical and automotive products are primarily handled in Thuringia.

Rail lines with specific importance

The railroads listed represent key rail routes in Thuringia, Germany, noted for their national and, in some cases, international importance. Here's a summary of each:

1. **Schnellfahrstrecke Berlin-München (Route No. 5919)**: This high-speed rail line covers 110 kilometers within Thuringia, forming a part of the longer Berlin to Munich corridor.
2. **Thüringer Stammbahn Halle-Bebra (Route No. 6340)**: Stretching 128 kilometers, this route connects Halle to Bebra, representing a significant rail link in the region.
3. **Saalbahn Großheringen-Saalfeld/Saale (Route No.**

	6305/6383): This line extends for 101 kilometers, facilitating connectivity from Großheringen to Saalfeld/Saale. 4. **Sachsen-Franken-Magistrale Leipzig/Dresden-Hof (Route No. 6362)**: The shortest segment mentioned, covering only 29 kilometers within Thuringia, this line is part of a larger route linking Leipzig/Dresden with Hof. 5. **Halle-Kasseler Bahn Halle (Saale)-Hann Münden (Route No. 6343)**: Running 88 kilometers, this railway connects Halle (Saale) to Hann Münden. 6. **MDV Weimar-Jena-Gera-Goessnitz (Route No. 6307/6268)**: This 100-kilometer route links Weimar, Jena, Gera, and Goessnitz, serving as a crucial regional transport route.  Important Railwaylines
RailFreight Transport	**RailFreight Transport Lines:** • **Mixed Traffic Routes:** ○ Berlin-Munich high-speed ○ Electrified Main Lines: ▪ **Thüringer Stammbahn:** Over 50 trains

per day.

- **Saalbahn:** Over 50 trains per day.
- **Halle-Kasseler Bahn:** Over 50 trains per day.

- **Freight-Only Line:** Gerstungen-Heimboldshausen.
- **NE-EIU Operated Tracks (235 km):**
  - **Unstrutbahn:** Artern-Rossleben-Landesgrenze ST by Deutsche Regionaleisenbahn GmbH (DRE).
  - **Kyffhäuserbahn:** Bretleben-Bad Frankenhausen by Bayerische Regionaleisenbahn GmbH (BRE).
  - **Sonneberg Network:** Eisfeld-Sonneberg-Neuhaus am Rennweg by Thüringer Eisenbahn GmbH (ThE).
  - **Ohratalbahn:** Gotha-Emleben by ZossenRail Betriebsgesellschaft mbH.
  - **Rennsteigbahn:** Ilmenau-Schleusingen-Themar by Rennsteigbahn GmbH & Co. KG (RSB).
  - **Harzquerbahn:** Nordhausen-Landesgrenze ST by Harzer Schmalspurbahnen GmbH (HSB).
  - **Pfefferminzbahn:** Straußfurt-Sömmerda-Großheringen by Thüringer Eisenbahn GmbH.
- **Other Routes (Owned or Leased by NE-EIU):**
  - **Ohratalbahn:** Emleben-Ohrdruf-Gräfenroda by ZossenRail.
  - **Max- und Moritz-Bahn:** Probstzella-Ernstthal am Rennsteig by DRE (lease ends 31.12.2023).
  - **Oberlandbahn:** Triptis-Ebersdorf-Friesau by DRE.

Rail Freight Infrastructure and Volume:

- **Service Facilities:**
  - Examples: Workshop tracks, tank tracks, sidings, loading tracks.
  - Operated by: ADAM Eisenbahnverkehrsunternehmen GmbH, Roland Mills Ost GmbH & Co. KG, Süd Thüringen Bahn GmbH, Rennsteigbahn GmbH & Co. KG, KEM Krayenberg Eisenbahn Merkers GmbH, rail thu-

	ringia GmbH.
	• **Transport Services in 2022:**
	  ○ Total: 33 million train kilometers.
	  ○ DB Netz AG lines: Over 30 million train kilometers.
	  ○ Breakdown:
	  ▪ Local trains: 23 million km (70%).
	  ▪ Long-distance trains: 4.4 million km (13%).
	  ▪ Freight trains: 4.6 million km (14%).
	  ▪ Other services: 3%.
	• **Train Numbers in 2022:**
	  ○ Local trains: 400,000.
	  ○ Long-distance trains: 41,000.
	  ○ Freight trains: 73,000.
	  ○ Main lines: Over 200 trains per day.
	  ○ Secondary lines: Less than 50 trains per day.
	• **Freight Handling:**
	  ○ Sidings: Around 100.
	  ○ Loading points: More than 20.
	  ○ Combined transport terminals: 2.
	  ○ Goods handled: 7.7 million tons (4.1 million tons in transit).
	  ○ Daily freight trains: More than 200.
	
	Rail Freight Transport Stations:
	
	• **Key freight transport stations:**
	  ○ Eisenach.
	  ○ Erfurt freight station.
	  ○ Gerstungen.
	  ○ Nordhausen.
	  ○ Saalfeld (Saale).

Rail infrastructure owner and rail operators	The length of the railroad lines operated in Thuringia in accordance with the Railway Construction and Operating Regulations (EBO) is 1,607 km (as of January 2023). Of these 1,372 km are operated by DB Netz AG as a federal railroad and 235 km are operated by non-federally owned railway infrastructure companies (NE-EIU).
Good Practice	**Planning strategies and development program:** • **Related to all rail network:** • The dense railroad network in Thuringia corresponds to the polycentric settlement structure of the Free

State, ensuring good connections between local and long-distance transport.
- Preservation and expansion before new construction is the necessary target in Thuringia.
- The State Development Program 2025 (LEP 2025) was adopted by the Thuringian state government and came into force on July 5, 2014. At present the LEP is currently being partially updated.
- Over **seven billion euros** invested in the rail infrastructure in the Free State of Thuringia since 1994.

Infrastructural interventions:

- **Related to all rail network:**
  - 565 km of the rail network in Thuringia have been upgraded to **double track**.
  - Moderate increases in electrified lines by 115 km and double-tracked lines by 130 km since 2007.
  - Comprehensive **expansion** of the Central Germany line (MDV), including **speed increase** to 160 km/h in sections and almost complete double-track expansion Weimar-Gera, along with **redesign** of Gera junction.
  - **Modernization** of the Gotha-Leinefelde and Erfurt-Wuerzburg regional lines.
  - Currently planned **electrification** of the Weimar-Gera-Goessnitz, Gotha-Leinefelde, and Gera-Leipzig lines would significantly increase electric transport capacity in Thuringia.
  - **Expansion** of the Bebra-Erfurt line (VDE 7).
  - Ongoing **expansion** of the Sachsen-Franken-Magistrale line in eastern Thuringia.
  - Fundamental **renovation and redesign** of numerous lines and stations.
  - Complete **reconstruction** of the Erfurt **junction** (VDE 8).
  - Commissioning of the **Berlin-Munich high-speed line** in 2017, establishing Erfurt as a key ICE hub.
- **Related to feeder lines:**
  - **Loading points** are being **developed near large industrial sites** as part of Thuringia's large industrial sites initiative.

Future Trend	**Planning Strategies and Development Program:** • **Related to all rail network:** • **Shift of Freight Traffic from Road to Rail**: Thuringia plans to implement structural, climate-friendly, and economically viable infrastructure measures to encourage the shift of freight traffic from road to rail. The region will also provide advisory support to private rail infrastructure operators. • **Digitalization of Routes and ETCS Implementation:** With ongoing advancements in digitalization, it is anticipated that the German rail network will become increasingly appealing for freight companies. Investing in modern technologies like the European Train Control System (ETCS) will be a strategic move to improve route efficiency and attractiveness. • **Related to feeder lines:** • **LEP 2025 and Infrastructure Development**: Under the LEP 2025 framework, there will be significant development of infrastructure, particularly for rail transport. This is expected to spur economic growth by creating a more efficient transport system. • **Reactivation of Disused Railroad Lines in Thuringia**: Like other federal states, Thuringia will consider reactivating or upgrading disused public railroad lines for both freight and passenger transport, aiming to improve connectivity and transportation efficiency. • **VDV and Pro-Rail Alliance Concept Paper (April 2020):** The Association of German Transport Companies and the Pro-Rail Alliance will publish a concept paper advocating the reactivation of 277 railway lines across Germany, totaling 4,573 km. This initiative aims to enhance passenger potential and facilitate the transfer of traffic from road to rail. • **Development of Loading Points in Thuringia**: As part of an initiative to enhance Thuringia's large industrial sites, new loading points will be developed near these areas to facilitate easier and more efficient transportation of goods. **Infrastructural Interventions:**

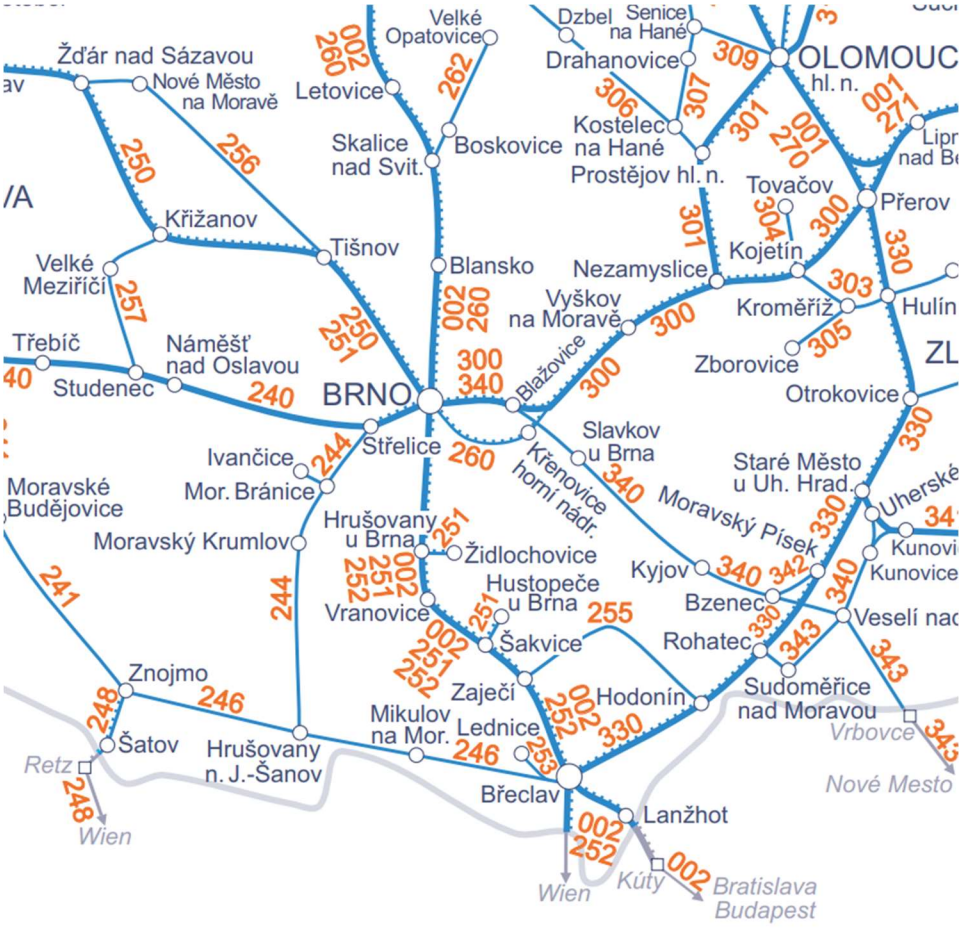
	• **Related to all rail network:** • **Lines Waiting for Reactivation:** ○ Eisfeld-Coburg ○ Triptis-Unterlemnitz ○ Blankenstein-Marxgrün ○ Ernstthal am Rennsteig-Probstzella ○ Ilmenau-Rennsteig ○ Suhl-Schleusingen ○ Gotha-Gräfenroda ○ Vacha-Bad Salzungen ○ Gerstungen-Heringen (Werra)-Vacha ○ Rennsteig-Themar ○ Großheringen-Buttstädt ○ Sömmerda-Straußfurt ○ Bretleben-Bad Frankenhausen ○ Wangen-Artern

South Moravia (CZ)	
Overview	• **Historical Overview**: Railway transport in the Czech Republic began in the 1830s, with the construction of regional lines peaking at the end of the 19th and the beginning of the 20th century. These lines were crucial for the development of peripheral regions and for transporting agricultural and industrial products. • **Modernization Phases**: The railway system has undergone significant modernization during two main periods. The first, during the 1950s and 1960s, focused on the electrification of key national and international lines. The second phase of modernization began after the establishment of the Czech Republic in 1993 and is currently ongoing. This includes the development of four transit corridors that are crucial for both domestic and international routes. • **Challenges and Developments: While main lines are currently prioritized for development and improvements, minor regional lines are awaiting further investment. Regional lines face challenges of limited capacity due to being largely single-tracked and handling both passenger and freight traffic, leading to potential congestion and delays.** • **Strategic Importance**: The Czech Republic serves as a key transit country, focusing investment on main freight corri-

dors. The South Moravian Region, in particular, has a dense network predominantly in its southern and south-eastern parts, with fewer lines in the northern areas due to topographical challenges and lower population density.

- **Total Railway Length**: The Czech Republic has a total railway line length of 9,355 kilometers.
- **Track Configuration**:
  - **Monorail (Single-track) Lines**: The majority of the network, amounting to 7,287 kilometers, consists of monorail lines.
  - **Double-track Lines**: There are 2,003 kilometers of double-track lines, which facilitate more efficient and higher capacity rail transport.
- **Electrification**:
  - **Electrified Lines**: A significant portion of the network, totaling 3,215 kilometers, is electrified.

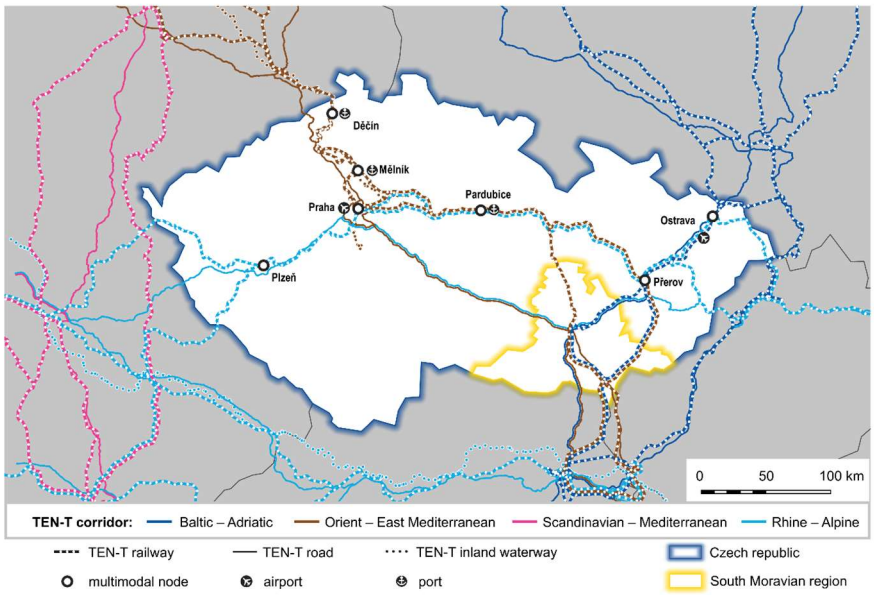
    Non-Electrified Lines: The majority of the network, with 6,141 kilometers, remains non-electrified.



Scheme of railway lines with track numbers in the South Moravian Region

https://www.spravazeleznic.cz/o-nas/vse-o-sprave-zeleznic/zeleznice-cr/zeleznicni-mapy-cr

- **Key Lines and Sidings**:
  - **No. 240 Brno – Jihlava – Havlíčkův Brod**: Includes siding at Zastávka u Brna.
  - **No. 260 Brno – Česká Třebová**: Sidings include Brno-Maloměřice, Adamov, and Rájec – Jestřebí.
  - **No. 300 Brno – Přerov**: Sidings at Mokrá-Horákov, Vyškov na Moravě, and Ivanovice na Hané.
  - **No. 252 Šakvice – Břeclav – Kúty**: Notable for its extensive sidings and connectivity to industrial areas, including a vital link to Dukovany Nuclear Power Plant near Moravský Krumlov.
- **International and RFC Corridor Lines**:
  - Lines part of RFC corridors include No. 240, No. 260, and No. 300.
  - Lines connecting to foreign countries (highlighted with underlines in the original text, not shown here) enhance the region's international connectivity.
- **Additional Lines with Sidings**:
  - **No. 246 Znojmo – Břeclav**: Sidings at Znojmo and Hrušovany u Brna.
  - **No. 330 Břeclav – Přerov**: Sidings at Břeclav, Mikulčice, Hodonín, Bzenec přívoz, and Moravský Písek.
  - **No. 343 Hodonín – Veselí nad Moravou – Vrbovce**: Sidings at Strážnice and Veselí nad Moravou.

	Railway network in the South Moravian Region https://www.spravazeleznic.cz/documents/50004227/157475276/Jihomoravsk%C3%BD+kraj+-+mapa/01dd477b-c3cd-47d5-9aa9-f162fb520270?t=1684132292361
Rail lines with specific importance	The Czech railway administration participates in four major international freight corridors: • RFC 5 **Baltic-Adriatic**, • RFC 7 **Eastern and Eastern Mediterranean**, • RFC 8 **North Sea-Baltic**, • RFC 9 **Rhine-Danube**.  *TEN-T corridors running through the Czech Republic*
Rail Freight Transport	**Rail Freight Transport Lines:** • **Freight Train Routes in South Moravian Region:** ○ Břeclav to PřerovBřeclav to Slovakia and Austria ○ Žďár nad Sázavou to Brno ○ Česká Třebová to Brno • **Rail Freight Corridors:** ○ Most freight trains use the main rail freight corridors (RFC). **Rail Freight Infrastructure and Volume:** • **Brno Terminal:**

	○ **Terminal area:** 49,000 m² ○ **Equipment:** 2 container stackers ○ **Capacity:** 500 TEU ○ **Truck capacity:** 10 trucks ○ **Renovation:** 2013 • **Freight Train Volume:** ○ **Břeclav to Přerov:** 45-50 trains per day. ○ **Břeclav to Slovakia and Austria:** 45-50 trains per day. ○ **Tišnov to Žďár nad Sázavou:** 40 trains per day. ○ **Skalice nad Svitavou to Česká Třebová:** 20 trains per day. **Rail Freight Transport Stations:** • **Important Freight Stations in South Moravian Region:** ○ **Marshalling yards:** ▪ **Brno-Maloměřice:** Largest in the region. ▪ **Břeclav:** Significant for freight transport. ○ **Transhipment (container) terminals:** **Terminal Brno, a.s. in Horní Heršpice:** Only terminal in the region, privately owned by ČD Cargo and Rail Cargo Operator – CSKD.
Rail infrastructure owner and rail operators	Správa železnic - is the owner and provider of national and regional railway infrastructure owned by the state. It is responsible for the railway network in the Czech Republic. It also ensures the operation, operability, modernization and development of the railway transport route and allocates capacity on the national railways and on regional railways owned by the Czech Republic
Good Practice	**Planning Strategies and Development Program:** • **Related to all rail network:** • Establishment of Transit Corridors: After the establishment of the Czech Republic in 1993, four transit corridors were set as lines with high importance. These lines ensure domestic transport and are also part of international routes. Modernizations include higher line speeds, line load classes, building of platforms and underpasses in stations, and technological equipment to improve transport safety and traffic management. After 30 years, this modernization is almost completed. • Safety and ETCS Implementation: The railway infra-

	structure in the Czech Republic includes safety equipment. The plan is to gradually switch to the European Train Control System (ETCS). Reconstructions rather than new constructions are planned. Freight transport is also being considered in the reconstruction process. **Infrastructural Interventions:** • **Related to all rail network:** • Past Investments in the South Moravian Region: The South Moravian Region has invested in the electrification and modernization of railway tracks to Hustopece and Židlochovice. • Electrification in the South Moravian Region: • Main Electrified Lines: Railway lines leading to Brno and the railway corridor from Břeclav to Přerov. These lines are shown by a line with dots on one side. • Restored Operations: On some previously unused lines, operations have been restored. For example: ○ Hrušovany u Brna to Židlochovice: Electrification was implemented on this restored line. ○ Šakvice to Hustopece u Brna: The line was electrified, with the difference that even before electrification, the line to Hustopece was in operation but required the use of diesel trains.

Scheme of railway lines with track numbers in the South Moravian Region

https://www.spravazeleznic.cz/o-nas/vse-o-sprave-zeleznic/zeleznice-cr/zeleznicni-mapy-cr

Future Trends

Planning Strategies and Development Program:

- **Related to all rail network:**
  - **Electrification of Railway Lines:**
    - **Objective:** Increase the share of electromobility on railways to reduce negative impacts on human health and the environment by reducing harmful emissions and greenhouse gases.
    - **Plan:** Electrification of lines up to around 2030, with some lines receiving simple electrification (construction of power lines without track modifications) and others undergoing full modernization along with electrification.
  - **European Train Control System (ETCS):**
    - **Main Task:** Install ETCS on railways in the Czech Republic to increase safety and im-

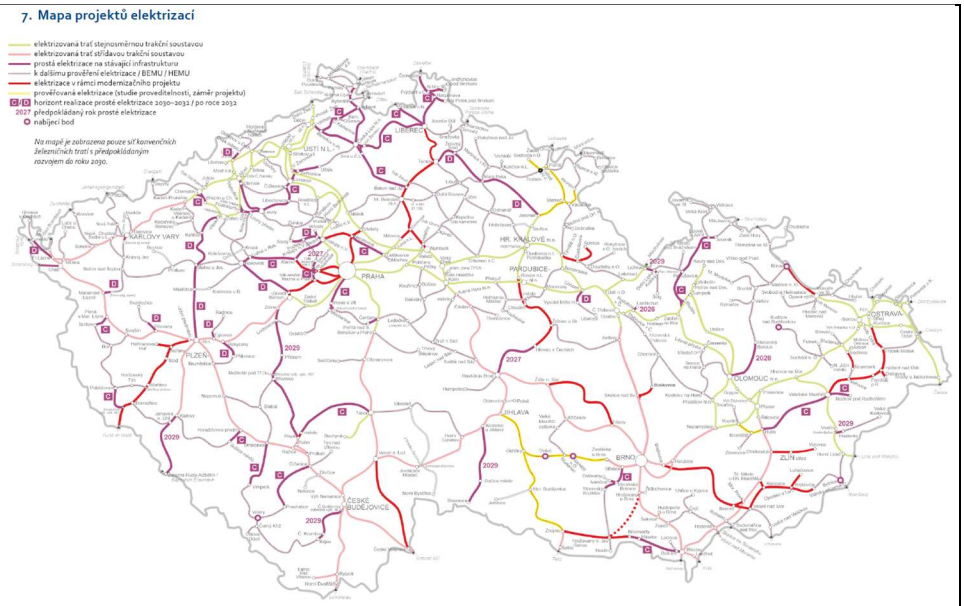
prove transport capacity.

- **High-Speed Rail (HSR):**
  - **Long-Term Planning:** HSR is a major development topic for Správa železnic (railway infrastructure operator) and is currently in the planning stages.
  - **Capacity Optimization:** Once HSR is completed, passenger rail traffic will transfer to HSR, allowing original lines to be fully utilized for freight traffic.
- **Financial Investments**
  - **Potential Development in South Moravian Region:** Considering the development of a siding leading to the Mokrá cement plant for passenger transport, transforming it into a regional line. This potential investment could enhance passenger traffic and regional connectivity.

Infrastructural Interventions:

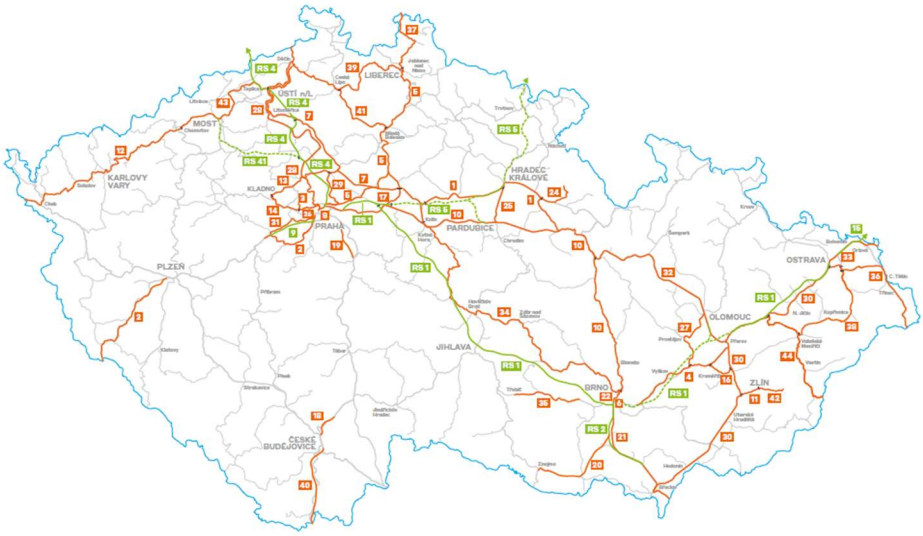
- **Related to all rail network:**

  - **European Train Control System (ETCS):**
    - **Implementation Timeline:**
      - **1 January 2025:** Exclusive operation of ETCS on the 1st transit corridor (Děčín - Praha-Holešovice - Praha-Libeň - Česká Třebová - Brno - Břeclav).
      - **Future Plans:**
        - Gradual introduction of ETCS on 4,800 km of lines by 2030.
        - Full network implementation by 2040.
        - Timeline for regional lines ETCS implementation remains unclear.
  - **Priority Infrastructure Projects:**
    - **High Priority Projects:**
      - **Brno - Přerov High-Speed Rail Line:** The most important project for the South Moravian Region.
      - **Brno Railway Junction:** Construction of a new main station and addressing transit through the city.



Map of electrification projects

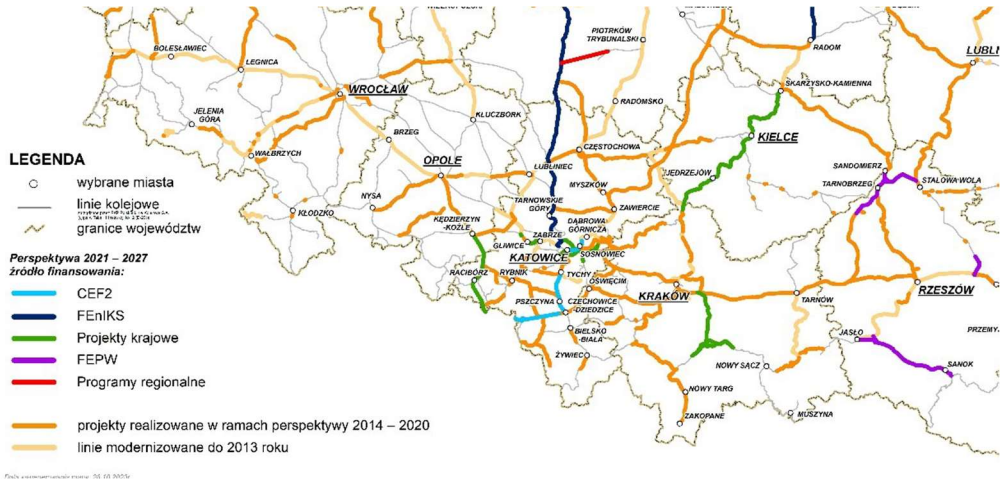
https://www.mdcr.cz/getattachment/Dokumenty/Drazni-doprava/Zeleznicni-infrastruktura/Koncepce-rozvoje-elektricke-trakce-2023.pdf.aspx?lang=cs-CZ



Priority rail infrastructure projects

https://mdcr.cz/getattachment/Media/Media-a-tiskove-zpravy/Dopravni-sektorove-strategie-Dostavba-zakladni-da/md_SESTRA-2023.pdf.aspx

Małopolska (PL)

Overview	• **Railway Network Overview:**
	  ○ The Małopolska Voivodeship features 1,043.1 km of standard gauge railway lines, making up 5.46% of Poland's total railway line length.
	  ○ The region's railway network density is 6.9 km/100 km², higher than the national average of 5.9 km/100 km².
	  ○ The highest railway density is near Kraków and the western part of the voivodeship, adjacent to the Silesian Voivodeship, which has the highest density in Poland.
	• **Historical Significance and Infrastructure:**
	  ○ Key north-south and east-west routes traverse the Małopolska Voivodeship.
	  ○ Most railway infrastructure was established in the latter half of the 19th century.
	  ○ Lines vary in importance, with some being crucial for national and international rail transit.
	• **Broad Gauge Metallurgical Line (LHS):**
	  ○ Located on the West-East line, this transit-only railway plays a limited role in the regional transport system due to its lack of integration with other local rail lines.
	  ○ It significantly influences costs related to renovations, modernization, and planning investments in the railway network.
	 

Lines with specific importance	• **International Railway Lines Overview:**
	  ○ **Line E 30 (Lines No. 133 and 91 - AGC8)**: Part of the 3rd pan-European corridor connecting Berlin, Wrocław, Katowice, Kraków, and Lviv.
	  ○ **Line C-E 30 (Lines No. 91, 95, 100, 133, 940 - AGTC9)**: Also part of the III pan-European corridor linking Berlin, Wrocław, Katowice, Kraków, and Lviv.
	  ○ **Line C 30/1 (Lines No. 96, 104 - AGTC)**: Includes the route from Kraków through Tymbark to Nowy Sącz and

<table>
<tr><td></td><td>Muszyna, with plans for a new line construction of approximately 50-60 km.
○ Line C 65/2 (Lines No. 93, 138 - AGTC): Connects Chorzew, Siemkowice, Częstochowa, Jaworzno Szczakowa, Oświęcim, and Czechowice Dziedzice.
○ Line No. 8 (Included in TINA10 report): Establishes a connection between Psary and Kraków, marked as PL/AD-106.</td></tr>
<tr><td>Rail Freight Transport</td><td>
<h2>Rail Freight Transport Lines:</h2>
• Passenger and Freight Traffic Lines:
○ Lines: 8, 62, 91, 93, 94, 96, 97, 108, 118, 133, 138, 948
• Freight-Dominant Lines:
○ Lines: 95, 100, 114, 156, 602, 603, 605, 608, 609, 699, 860, 882, 886, 941, 942, 943, 947, 987
<h2>Rail Freight Infrastructure and Volume:</h2>
Transport of Goods by Mode of Transport in 2020
<table>
<tr><th>Mode of Transport</th><th>Tonnes (in thousands)</th><th>2019=100</th><th>In Percent</th><th>Tonne-kilometres (in millions)</th><th>2019=100</th><th>In Percent</th><th>Average Distance Travelled by 1 Tonne (km)</th></tr>
<tr><td>Railway Transport</td><td>144,811</td><td>92.5</td><td>100.00</td><td>228.5</td><td>93.7</td><td>100.00</td><td>195</td></tr>
</table>
Operated Railway Lines by Voivodships as of 31 December 2020
<table>
<tr><th>Region</th><th>Total (km)</th><th>Per 100 km² (km)</th><th>Electrified (km)</th><th>Single-track (km)</th><th>Double- and More Track (km)</th></tr>
<tr><td>Poland</td><td>19,422</td><td>6.2</td><td>12,149</td><td>10,478</td><td>8,944</td></tr>
<tr><td>Małopolska</td><td>1,081</td><td>7.1</td><td>914</td><td>598</td><td>483</td></tr>
</table>
<h2>Rail Freight Transport Stations:</h2>
• Stations:
○ Brzeski Container Terminal
○ Zagórzany
○ Kraków Główny
○ Tarnów Główny
○ Sławków (Silesia Region)
</td></tr>
<tr><td>Rail infrastructure owner and</td><td>PKP Polskie Linie Kolejowe S.A.</td></tr>
</table>

rail operators	
Good Practice	**Planning Strategies and Development Program:** • **Related to feeder lines:** ◦ **Modernization and Renovation Projects (2021):** PKP Polskie Linie Kolejowe S.A., the railway infrastructure manager, implemented several renovation and investment projects in the Lesser Poland Voivodeship, covering a total of 82.6 km of track. **Infrastructural Interventions:** • **Related to all rail network:** ◦ **Railway Station Investments (2018):** PKP undertook investments in the renovation and reconstruction of railway stations. Some stations were decommissioned and commercialized, such as the station in Zagórzany becoming a popular restaurant. Notable projects include: ▪ Opening of the new underground Kraków Główny railway station in 2012, a key element of a large transfer hub in Krakow. ▪ Renovation of the Tarnów Główny station. ◦ **Małopolska Investment Plan for 2015-2023 (2022):** Development of the infrastructure of the Małopolska railways included: ▪ **Purchase of Electric Multiple Units:** Task implemented; purchase of 13 railway vehicles. ▪ **Purchase of Rolling Stock:** Task completed; purchase of 4 electric multiple units in a four-unit version with comprehensive service, maintenance, and repair services. ◦ **Modernization and Renovation Projects (2021):** ▪ Modernization of the E30 railway line, Zabrze-Katowice-Kraków section, stage II b. ▪ Works on the E30 railway line on the Kraków Główny Towarowy - Rudzice section, including the construction of agglomeration line tracks. ▪ Works on railway line No. 93 on the Trzebinia-Oświęcim-Czechowie-Dziedzice section. ▪ Works on railway lines No. 97, 98, 99 on the Skawina-Sucha Beskidzka-Chabówka-Zakopane section. ▪ Works on railway lines No. 62 and 660 on the Tunel-

	Bukowno–Sosnowiec Płd. section. ○ Revitalization of railway line No. 117, section Kalwaria Zebrzydowska Lanckorona - Wadowice - voivodeship border - stage I. ○ Modernization of the E30 C-E30 railway line, Kraków–Rzeszów section, stage III, phase II. ○ Installation of ERTMS-ETCS on the lines of the TEN-T – IRE3 core network. • **Related to feeder lines:** • **Małopolska Investment Plan for 2015-2023 (2022):** ○ **Construction of Equipment and Technical Facilities:** Task implemented; construction and equipment of technical facilities for the operation of rolling stock, including connection with the control system. • **Modernization and Renovation Projects (2021):** ○ Construction of a new railway line Podłęże–Szczyrzyc–Tymbark, Mszana Dolna and modernization of the existing railway line No. 104 Chabówka–Nowy Sącz – Stage I – preparatory works. ○ Works on railway line No. 94 on the Kraków–Płaszów–Skawina–Oświęcim section. ○ Works on railway line No. 96 on the Tarnów–Muszyna section.
Future Trends	**Planning Strategies and Development Program:** • **Related to all rail network:** • **Master Plan for Rail Transport in Poland until 2030 (Warsaw, Ministry of Infrastructure):** ○ **Activities of Freight Carriers:** ▪ Implementation of systems enabling tracking of wagons and shipments, providing customers with information on their condition, particularly for highly processed cargo (intermodal transport). • **Strategic Classification and Prioritization of Infrastructure Measures in Małopolska:** ○ Priorities in the modernization and development of regional railway connections, particularly for freight transport.

- **Related to feeder lines:**

  - **Polish National Railway Program until 2030 (with a perspective until 2032):** Infrastructure investments are included in the Program implemented in the financial perspective 2021–2027 for Southern Poland, covering the regions of Lower Silesia, Opole, Silesia, Małopolska, and Podkarpackie.
  - **Master Plan for Rail Transport in Poland until 2030 (Warsaw, Ministry of Infrastructure):**
    - **Activities of Freight Carriers:**
      - Implementation of systems supporting transport management and enabling effective use of resources (rolling stock, cargo units, personnel).

Infrastructural Interventions:

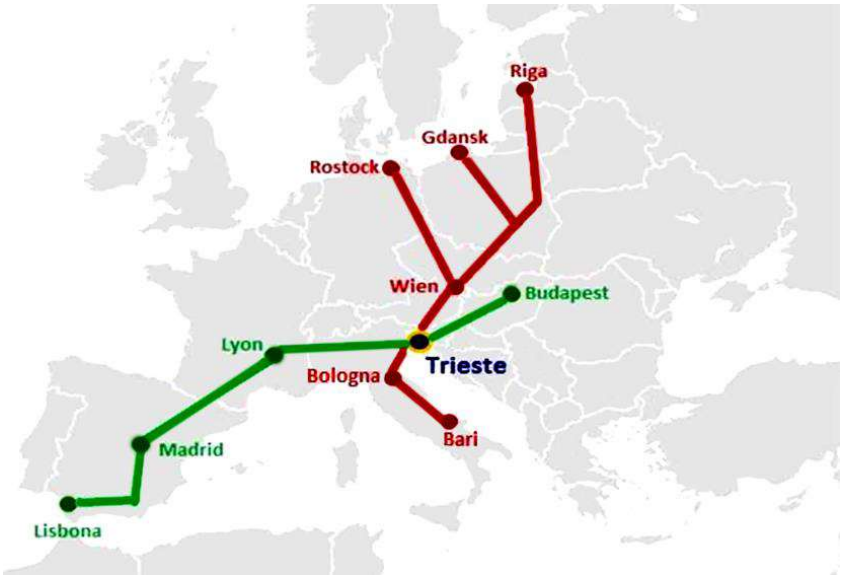
- **Related to all rail network:**

  - **National Projects:**
    - **Modernization of Key Railway Lines:**
      - E 30 railway line, Zabrze - Katowice - Kraków section.
      - E 30/C-E 30 railway line, Kraków-Rzeszów section.
      - E65/C-E65 railway line, Grodzisk Mazowiecki - Kraków/Katowice - Zwardoń/Zebrzydowice - state border.
      - E30 railway line, Kraków Główny Towarowy - Rudzice section.
    - **Construction and Modernization:**
      - Existing railway line No. 104 Chabówka - Nowy Sącz.
      - Line No. 92 Przemyśl - Medyka, section Rzeszów - state border.
  - **Regional Projects:**
    - **Revitalization Efforts:**
      - Railway line No. 97, section Sucha Beskidzka - voivodeship border.
      - Railway line No. 108, section Stróże – border of the voivodeship.
  - **Priority Projects in Małopolska:**
    - **New Construction and Modernization:**
      - Podłęże - Szczyrzyc - Tymbark/Mszana Dolna.
      - Railway line No. 104 Chabówka – Nowy Sącz, sections Chabówka - Rabka Zaryte - Mszana

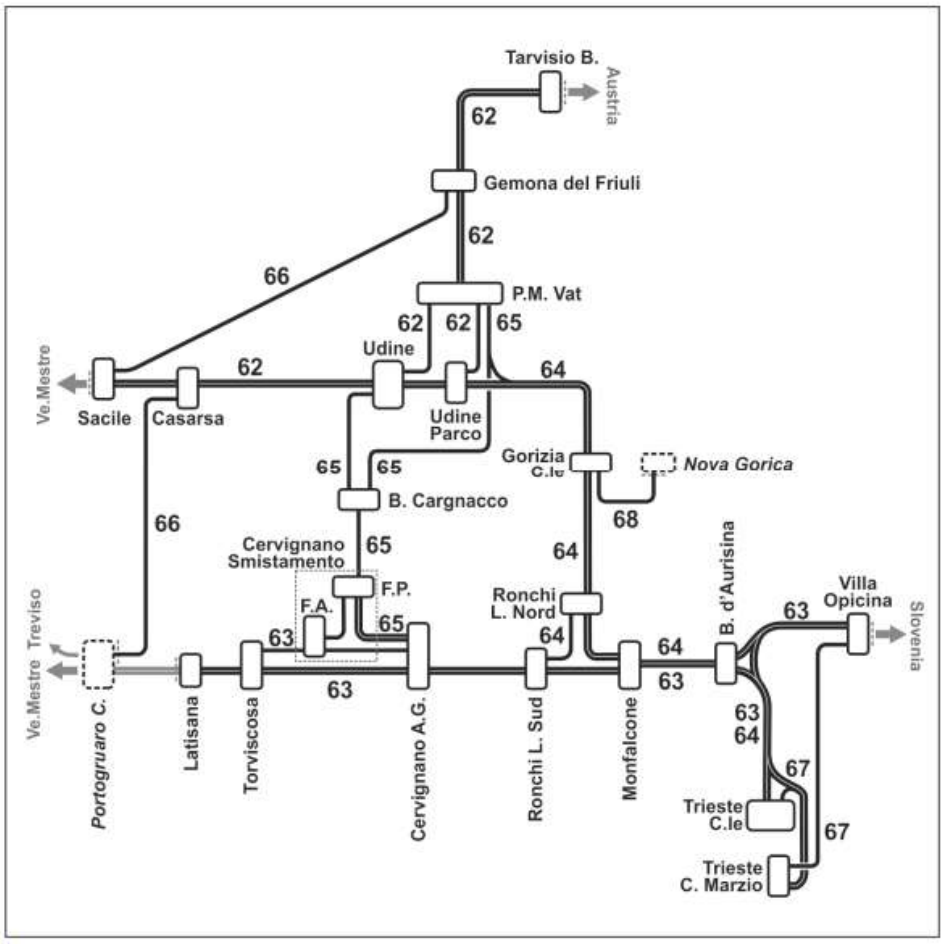
	Dolna and Limanowa - Klęczany - Nowy Sącz.
	• **Related to feeder lines:**
	  • **National Projects:**
	  ○ **Construction and Modernization:**
	  ▪ New railway line Podłęże - Szczyrzyc - Tymbark/Mszana Dolna.
	  ▪ Railway line No. 91 Kraków Główny Osobowy - Medyka.
	  • **Regional Projects:**
	  ○ **Revitalization Efforts:**
	  ▪ Railway line No. 117, section Kalwaria Zebrzydowska Lanckorona - Wadowice - border of the voivodeship.
	  ▪ Railway line No. 96, section Guardians – Muszyna.
	  • **Priority Projects in Małopolska:**
	  ○ **Revitalization:**
	  ▪ Railway line No. 117, section Kalwaria Zebrzydowska Lanckorona - Wadowice - border of the voivodeship.
	  ▪ Railway line No. 96, section Stróże – Muszyna.

Trieste	

Overview	• **Rail Intermodality and Railway Volumes**:
	  ○ In 2019, the Port of Trieste had 56% of its containers and 29% of its UTIs (Intermodal Transport Unit) moved by Ro/Ro using rail intermodality.
	  ○ Trieste is one of the top ports in Europe and the number one in Italy for railway volumes.
	• **Policies and Technological Innovations**:
	  ○ This success is due to specific policies that promote rail intermodality from Northern Italy's main port systems.
	  ○ Regional policies in Friuli-Venezia Giulia also help increase the use of railways for freight.
	  ○ Companies at the Trieste terminal get full support to develop new technologies, making the railway market bigger.
	• **Strategic Position and Infrastructure**:
	  ○ Trieste is in a great location at the crossroads of the TEN-T axes—the Baltic-Adriatic and Mediterranean corridors.

	○ The port has natural deep water up to 18 meters, making it easy for ships to dock. ○ It has excellent road and rail links and is close to central and eastern EU markets. • **Supply Chains and Trade Efficiency**: ○ Trieste is important for two supply chains: long-distance intercontinental maritime transportation and short/medium-distance intra-Mediterranean trade. ○ The Port of Trieste saves almost five days of sailing on routes between Europe and East Asia compared to North European ports. ○ This means a fleet of 6,000 TEU container vessels can save over USD 25 million a year in freight and fuel costs.  Trieste between 2 Trans-European Transport Network (TEN-T)
Lines with specific importance	• **Important Railway Lines**: ○ **Pontebbana (Udine – Tarvisio)**: ▪ The Pontebbana is the key railway line connecting the free Port of Trieste with the markets of north and east Europe. This line has a capacity of 220 trains per 24 hours. ○ **Line 67**: ▪ The line 67 is crucial for the Port of Trieste and consists of: ▪ A connection between Trieste Campo Marzio and Trieste Central Station via the "Galliera Cintura".

	▪ A connection between Trieste Campo Marzio and Villa Opicina using the "Transalpine line".
Rail Freight Transport	**Rail Freight Transport Lines:** • **F.L. 62**: ○ Line: P.M. Vat - Udine Parco ○ Line: Tarvisio Boscoverde - Udine ○ Line: Udine - Venezia tratto Udine - Sacile • **F.L. 63**: ○ Line: Portogruaro - Trieste C.le tratto Latisana - Trieste C.le ○ Line: Torviscosa - Cervignano A.G. ○ Line: Trieste C.le - Villa Opicina • **F.L. 64**: ○ Line: Ronchi d.Leg. Sud - Ronchi d.Leg. Nord ○ Line: Udine - Trieste C.le • **F.L. 65**: ○ Line: P.M. Vat - Cervignano Smistamento ○ Line: Udine - Cervignano A.G. • **F.L. 66**: ○ Line: Casarsa - Portogruaro ○ Line: Gemona - Sacile • **F.L. 67**: ○ Line: Trieste C.Marzio - Villa Opicina ○ Line: Trieste C.le - Trieste Campo Marzio • **F.L. 68**: ○ Line: Nova Gorica - Gorizia C.le



General Part - Trieste Lines Traffic

Rail Freight Infrastructure and Volume:

- **Advanced Managing System - SCC:**
  - Located in Venezia Mestre, controlling railway traffic in Veneto and Friuli-Venezia Giulia.
  - Features include remote-controlled train stations, advanced rail technologies, and remote train control.
- **Intermodal Links Network:**
  - Supports more than 200 weekly trains connecting to various destinations including Italian Northeast industrial sites, Luxembourg, Germany, Austria, Hungary, Slovakia, and the Czech Republic.
  - 9,771 total trains in 2019.

- **Port of Trieste Internal Rail Network:**
  - Features 70 km of tracks connected to both national and international networks.
  - All docks are served by rail with the ability to shunt and assemble freight trains directly at various terminals.
- **FREEeste:**
  - Initially covered an area of 240,000 sqm, including three warehouses, a bundle of tracks, and an operating area.
  - It later expanded to include Interporto di Cervignano del Friuli S.p.A., increasing the total available area to 932,000 sqm.
- **Multimodal Terminal Interporto Trieste in Fernetti:**
  - Located 18 km from the Port of Trieste, at the border with the Republic of Slovenia.
  - The terminal covers 350,000 sqm and serves as a hub for freight transport between north and east European markets and the Mediterranean area.
  - Key features include 6 rail tracks, a parking area, and storage facilities, supporting port terminals in managing freight transport operations.
- **Fernetti Trieste Interport:**
  - At the end of 2021, the Fernetti Trieste interport was included in the legislative proposal for the revision of the TEN-T networks by the European Commission.
  - Fernetti was designated as a central hub (core) in the "rail-road terminals" category.

Rail Freight Transport Stations:

- **Rail Freight Transport Stations:**
  - Trieste Campo Marzio
  - Trieste Centrale

	○ Villa Opicina ○ Bivio D'Aurisina
Rail infrastructure owner and rail operators	**Infrastructure owner:** • **RFI (Rete Ferroviaria Italiana)** - Gruppo FS - Owner (National Railway Infrastructure Manager). The Holding Gruppo FS SpA is a public company 100% owned by the Ministry of Economy (Propoerty of the State) • **The Port System Authority of the Eastern Adriatic Sea Ports of Trieste and Monfalcone** (The Port System Authority of the Eastern Adriatic Sea) is a non-economic public entity, endowed with administrative, budgetary, and financial autonomy. **Rail operators:** • **Adriafer srl (Shunting service & Railway company)** Adriafer was founded in 2002 by the Network Port Authority of Trieste • **AlpeAdria Spa** (Multimodal operator) Alpe Adria is equally owned by the Port Authority of Trieste, Friulia (the financial company of the Friuli-Venezia Giulia Region), and Mercitalia Rail (part of the Ferrovie dello Stato Group). It is associated with UIRR, the pool of European logistics operators based in Brussels. • **Interporto di Trieste s.p.a (Fernetti, FreeEste, Interporto di Cervignano)**
Good Practice	**Planning Strategies and Development Program:** • **Related to feeder lines:** • **Promoting Rail Transport - "Trihub":** ○ Trieste is striving to promote rail transport through the creation of a "Trihub," aiming for intermodal integration with other regional hubs. To achieve this, a series of interventions are underway to enhance branch lines that feed into the mainline and surrounding connections.

Infrastructural Interventions:

- **Related to all rail network:**
  - **Arrivals/Departures Tracks at Trieste Campo Marzio**:
    - Construction of 10 new tracks, including 4 tracks approximately 750 meters each.
    - Comprehensive refurbishment of tracks serving docks V, VI, and VII.
  - **Expansion of Port Area**:
    - Activation of the new Logistics Platform.
  - **Technological Upgrades for Bivio d'Aurisina-Villa Opicina Section**:
    - Implementation of a new traffic management system.
    - Interventions aligned with the implementation plan for ERTMS (Level 2) on the Venice-Trieste/State Border line and the main National Network routes.
    - Ensures improved punctuality and enhances cross-border services between Italy and Slovenia.
    - Aligns infrastructure with STI (Technical Specifications for Interoperability) requirements.
- **Related to feeder lines:**
  - **Arrivals/Departures Tracks at Trieste Campo Marzio**:
    - Revisions to facilities at Aquilinia and Servola, with direct connection to the Trieste-Venice line.
  - **Restoration of Facilities**:
    - Activities include installation of signaling, lighting systems, and telecommunications at Servola and Aquilinia.
    - Renewal of track laying, electrical traction, and tunnels on the railway section between Trieste and Aquilinia.
    - Streamlining of maneuvers for direct departures to the national network.
  - **Expansion of Port Area**:
    - Planned expansion in the areas of the former Aquila refinery and former Servola ironworks.
    - Activation of the new Logistics Platform.
    - Reconnection via a 1 km railway branch between the former Bivio San Giacomo and the former Bivio Canteri.
    - Direct connection from Servola to the Trieste Belt

	Line without intermediate maneuvers.
	• **Transalpine Railway Line**:
	  ○ Restoration of the line connecting Campo Marzio station to Villa Opicina station, the border station with Slovenia.
	  ○ Connects port docks to the border station, 310 meters above sea level.
	• **Technological Upgrades for Bivio d'Aurisina-Villa Opicina Section**:
	  ○ Increases capacity to the standard levels of a double-track line.

Future Trends	**Planning Strategies and Development Program:**
	• **Related to all rail network:**
	• **Encouraging Competition**:
	  ○ To develop services to over 25 destinations, Trieste encourages competition among railway companies. In 2020, eight railway companies were active, with Austrian carrier OBB Cargo managing almost 50% of the trains.
	• **Managing Shunting Operations in-house through Adriafer:**
	  ○ This strategy involves direct oversight and optimization of the organizational and technological platform for terminal operators and industrial sites. This includes the preparation of a detailed railway district regulation.
	• **Differentiating Shunting Services in the long term**:
	  ○ To enhance flexibility, shunting services can be differentiated into three types:
	  ▪ Services within the port area (already implemented).
	  ▪ Territorial shuttle services connecting ports and regional interports to promote hubbing logic and mixed trains.
	  ▪ Border services towards Slovenia.
	• **Fostering Partnerships with Inland Platforms**:
	  ○ To create an "intermodal pipeline," through reinforcement and commercial focus, coordination in planning, optimizing control over tracks, and harmonizing handling technologies (e.g., non-craneable semi-trailers).

- **Related to feeder lines:**
  - **Trihub Infrastructure Development:**
    - To serve the port's needs, such as the storage of goods during port infrastructure congestion, Trihub will develop and enhance the facilities at Cervignano and Villa Opicina. These facilities will increasingly interconnect with the port, contributing to the development and growth of the railway system and promoting sustainable development.
  - **Trihub Investment and Objectives:**
    - RFI has invested around 200 million euros in Trieste to support the port's growth in the coming years. The primary goal is to avoid critical situations by accommodating the port's expansion and creating a privileged bridge for trade between the Far East (primarily China) and Europe.

Infrastructural Interventions:

- **Related to feeder lines:**
  - **Trieste Campo Marzio Station:**
    - Trieste Campo Marzio station, serving the port's main basin, has undergone a 110-million-euro renovation by Italferr, adding four 750-meter tracks to boost train capacity. Completion is phased until 2024. Recently, the station reconnected with Villa Opicina via the 14 km "Transalpine line," linking port docks to the crossing station at 310 meters above sea level.
  - **Reactivation of the Port Backbone:**
    - Reactivating Trieste Servola and Trieste Aquilinia to send trains directly to the Venice-Trieste line via the Bivio San Giacomo-Bivio Cantieri branch. This creates a hub for goods, complementing Campo Marzio.

G.Conclusions

This study investigates the primary strategies for revitalizing rail infrastructure, with a focus on branch and feeder lines, by examining four distinct regions: Thuringia, South Moravia, Poland, and Trieste.

The analysis of practices applied in these contexts highlights three key areas of action to revitalize secondary rail lines: **planning strategies and development programs, financial investment, Infrastructural interventions.**

In terms of **planning strategies and development programs**, the analysis of the best practices underscores the following main approaches:

- ✓ a primary focus **on preserving and expanding existing** rail infrastructure to maintain and improve connectivity without extensive new construction (State Development Program 2025 in Thuringia).
- ✓ fostering **intermodal integration** between maritime transport and rail transport, with a priority focus on enhancing secondary rail lines ("Trihub" initiative in Trieste).
- ✓ Switching to the European Train Control System (ETCS) promoting the Safety equipment (South Moravia strategies).
- ✓ focusing on construction and equipment of **technical facilities** for the operation of rolling stock (Małopolska).

Regarding **financial investment**, substantial investments have been made across the studied regions, which are summarized as follows:

- ✓ over seven billion euros invested in rail infrastructure projects, focusing on maintaining and expanding the network (Thuringia).
- ✓ significant investments on electrification and modernization of key transit corridors (South Moravia).
- ✓ significant investment in rail infrastructure aiming to enhance operational efficiency (Małopolska Investment Plan 2015-2023).
- ✓ heavy investments in new tracks, facility restorations, and technological upgrades (Trieste).

Infrastructural interventions have been pivotal across all regions, with the most important ones summarized here:

- ✓ facility and rail line modernization:
  - Electrification of the lines Hustopece and Židlochovice (South Moravia)
  - railway lines No. 94 and No. 96 (Malopolska)
  - line No. 104 Chabówka–Nowy Sącz (Małopolska)
  - Restoration of signaling and lighting systems (Trieste)
  - Facility revision at Aquilinia and Servola (Trieste)
- ✓ loading points development near industrial sites to support freight operations (Thuringia).
- ✓ expansion of the port area with a new logistics platform (Trieste)

Looking to **future trends**, significant developments are planned across the studied regions, which are summarized as follows:

- ✓ facility and rail line revitalization:
  - Campo Marzio Station (Trieste)
  - Public rail line (Thuringia)
  - Podłęże - Szczyrzyc - Tymbark/Mszana Dolna, Kraków Główny Osobowy - Medyka (No. 91), Kalwaria Zebrzydowska Lanckorona - Wadowice - border of the voivodeship (No. 117), and Stróże – Muszyna (No. 96) (Malopolska)
- ✓ implementation of systems to support transport management and effective use of resources related to rolling stock, cargo units, personnel (Master Plan for Rail Transport in Poland until 2030)
- ✓ managing shunting operations through the main rail transport operator to optimize the organizational logistics activities (Adriafer in Trieste)
- ✓ fostering partnerships with Inland Platforms to create an "intermodal pipeline" (Trieste)

The analysis of best practices in four different contexts highlights the following **scalable elements** that can help revitalize the feeder lines:

- ✓ planning instrument that supports the development of the rail lines as a network with a specific consideration for feeder lines, prioritizing the reactivation of existing secondary lines rather than construction of new infrastructure.
- ✓ sustainable financing models and substantial investments to support continuous infrastructure development.
- ✓ sustainable partnership models and new management system to foster a better coordination between transport operators and modes.
- ✓ infrastructural interventions that enhance operational efficiency and safety through the adoption of the European Train Control System (ETCS), the construction of equipment for technical facilities, and the modernization or electrification of rail lines.

- ✓ the development of loading points near industrial sites.

In summary, the revitalization of branch and feeder lines is crucial for creating a sustainable and efficient rail transport system. By adopting good practices, leveraging innovations, and addressing existing gaps, regions can enhance their infrastructure, promote environmental sustainability, and improve overall transport efficiency. The collective efforts of Thuringia, South Moravia, Polska, and Trieste are paving the way for a greener, more efficient future.