Interreg CENTRAL EUROPE

Co-funded by the European Union

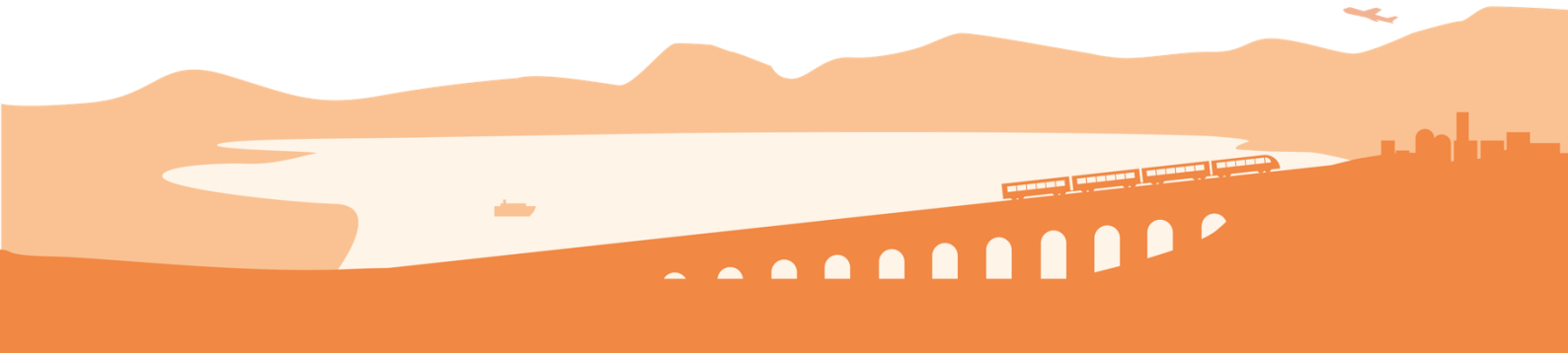
Rail4Regions

Workpaper Loading Points
D 2.1.2

Available Knowledge and Expertise

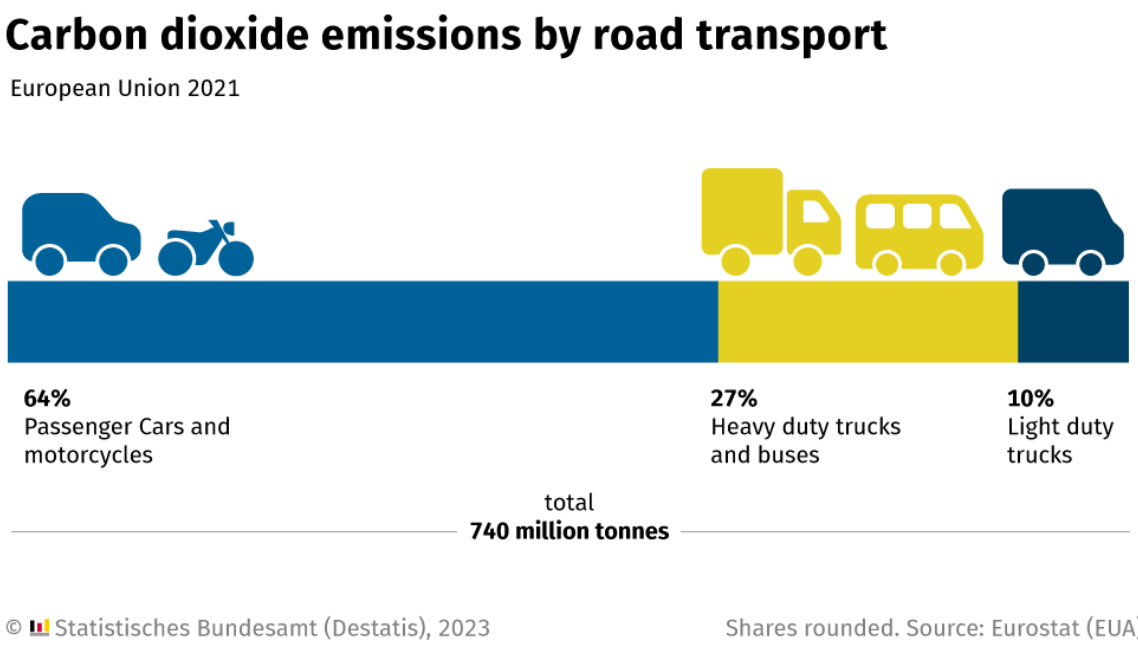
Version 1

12 2023

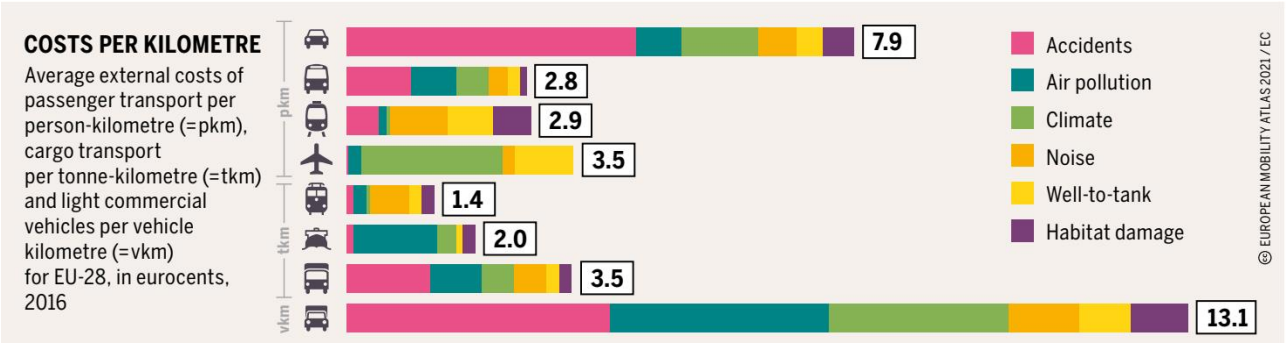


A. Status quo and problem definition

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 develop a toolbox as an information platform for potential users of rail freight transport.

The following aspects will be considered:

- Investigation of the network of the existing and potential loading points in the participating regions and their utilization, expansion and new construction possibilities.

- Support of logistical concepts for the railway only and multimodal transport of small consignment sizes below block train volume and below a container or wagon load

- Support for logistics concepts designed for rail transport with the transport distances less than 300 km.

The potential greenhouse gas savings and other external costs savings of the logistics concepts compared to road freight transport will be discussed.

B. Hypotheses

The above objectives are based on the following working hypotheses:

1) A substitution of road by rail freight transportation has a net environmental benefit in terms of reduced transport-related greenhouse gas emissions.

2) Increased use of rail freight transport is hindered by various market imperfections (barriers). A reduction or even complete elimination of these imperfections favours a modal shift from road to rail freight transport.

3) For containerized loads, access to rail freight transport is easier compared to other load sizes. However, this represents a barrier to the use of rail transport for shippers of shipments below container size. If non-containerized shipments had comparably easy access to rail transport, this would support a modal shift from road to rail freight transport.

4) Particularly critical boundary conditions for shippers when planning long-distance transportation are the short-term availability of transport capacity and reliability in meeting delivery deadlines. Uncertainties, ignorance and insecurities on the part of shippers are currently to the detriment of rail transport. Greater planning certainty with regard to the availability of transport capacities and punctuality for shippers would work in favour of rail freight transport.

5) A shipper will replace a purely road-based transport with a long-distance CT or rail-only transport if it can achieve at least the same transport quality (especially reliability and punctuality) with less effort (costs and processing effort).

With the development of a toolbox for loading points in Europe, we primarily want to simplify the access of freight to the rail system and thus serve the hypothesis.

In addition to improving transport planning, the toolbox should also support the work of regional planning in creating optimal conditions for regional access to rail freight transport and thus strengthen regional development.

The toolbox should offer a proper and specific recommendation for an easy development of specific measures that strongly encourage the usage of the railway freight transport, on regional and local level, even for small loads and packages and even for short distances. Such measures could be easily implemented into local and regional strategies (like SULPs and regional Master plans) that tackle transportation, economic, spatial and other regional problems, and that support the development of sustainable transport, economy, spatial planning, urban planning and other sustainable regional development.

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. Strenghts 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. The rail access nodes – a network of cascading nodes and their functionalities

In the transport system, logistical nodes are interfaces at which goods and merchandise can be transferred into the transport system, transferred out of the transport system or realized through intermodal transport. They are just as important for the handling of transportation as the transport infrastructure in the form of roads, waterways or railroads.

The size and functionality of the nodes differs according to the number, size and functionality of the modules in the nodes. Logistics nodes can also be differentiated according to whether they are single-company or cross-company facilities. Nodes organized as individual companies generally have their own optimized logistics. Nodes at which several companies are located enable synergy effects through cross-company processing.

Unfortunately, the number of physical access points to the rail network has fallen sharply in recent decades, meaning that many shippers are no longer (or can no longer be) served via direct sidings. In addition, many freight stations and (open) loading tracks have been abandoned. Where shippers are unable to load goods and merchandise directly onto rail, this means additional costs for road transportation and transhipment.

In addition, many freight stations and (open) loading tracks have been abandoned. Where shippers are unable to load goods and merchandise directly onto rail, this means additional costs for road transport and transhipment.

One of the problems in the recent times is the focus of rail freight operators mostly on block trains or unit trains or trainload services. Such trains consist of the same type of wagons carrying the same type of goods, sometimes even for only one customer. Many operations which include single wagonload pick-ups and shunting operations have been gradually abandoned. If countries and regions could find the way to finance and implement the solutions that would support single wagon load shipments and shunting operations, that sometimes include operations at several nearby small stations and industrial sidings, that could make composing the full-length freight trains easy. Shunting operations can collect single wagonloads and single wagons being loaded in local loading points to full-length trains. They can also

deliver single wagonloads to customers after these have arrived as parts of large trains. Such development could make shipping freight with rail much more attractive and feasible.

The aim of the multilingual toolbox as an information-based platform is to provide shippers, freight forwarders and operators with localized information on loading points and their technical and infrastructural equipment, such as

- Presence of (which) facilities,
- ownership structure,
- condition of the charging point,
- active companies/industries and potential interested parties on site,
- Loading potential (wood, glass, waste, etc.),
- the potential for activating the facility (temporary, permanent), etc. ...

and thus facilitate easier access to the rail system.

It should also contain general information about the possibilities and framework conditions for the transportation of goods by rail.

Further features such as existing connections, CO2 calculation, what is missing for my transport request, ... could be integrated.

Sea and inland ports and freight villages

Seaports, inland ports and freight villages are generally large multimodal hubs where transhipment between road, rail and/or water is possible. In some cases, intermodal connections by air are also possible (sea-air dispatch), which could also develop into rail-air dispatch in the future. These large logistics hubs are often connected to international transport corridors as well as to each other and to relevant production and consumption centres.

As logistics centres, in addition to handling, they generally also offer additional transport services such as the deconsolidation and consolidation of larger consignment units and link logistics-intensive industrial and commercial operations. These large multimodal, multifunctional hubs usually have a CT facility and have developed into important components of combined transport in recent years.

Combined Transport (CT) facilities

CT facilities are interfaces for combined transport and specialized in the handling of standardized loading units. They are important hubs for the shift from road to rail. Seaport hinterland, as a form of combined transport, mainly involves container traffic, whereas in continental CT the focus is on semi-trailers and swap bodies. There are now special handling techniques and transport solutions. Accordingly, the CT facilities are also equipped differently.

However, these multi- and intermodal nodes also serve to optimize the composition of trains per relation. The CT facility itself comprises the transhipment facility and, as a rule, a depot for empty containers; sometimes also for loaded containers.

Freight forwarding systems and railports

Railports are rail-based multimodal logistics facilities that enable handling, storage and extensive logistics for different types of goods. They are geared towards bulk goods (e.g. steel and paper) and special customer requirements.

In recent years, the term railport has been used to describe a multimodal logistics facility in which the transhipment of cargoes below container size (i.e. Less Container Load) from road to rail and vice versa is offered or such transhipment can take place. Furthermore, a multimodal logistics facility has storage space to bundle and distribute shipments or to store goods.

Freight stations and privately operated railroads

A freight station is a publicly accessible rail loading point. It can be a freight station to a connecting railroad or a direct siding. Freight stations also serve as billing points for calculating tariff kilometres.

Privately operated railroads (infrastructure) are of great importance for access to the rail network. Often, railroad infrastructures are the only way to find loading tracks and stations for flexible and fast transhipment in certain regions.

Open loading tracks

A (open) loading track is a facility that is generally accessible to everyone and where loading can be transferred directly from the truck to the freight wagon and vice versa via a loading lane or ramp. Many open loading tracks and loading facilities no longer meet modern standards in terms of track length, ground conditions (load-bearing capacity) and shunting areas, technical facilities with loading aids and buildings for handling and storage. Loading points and open loading tracks are the smallest nodes in the network.

G.Experiences from partner regions

Province of Novara (IT)

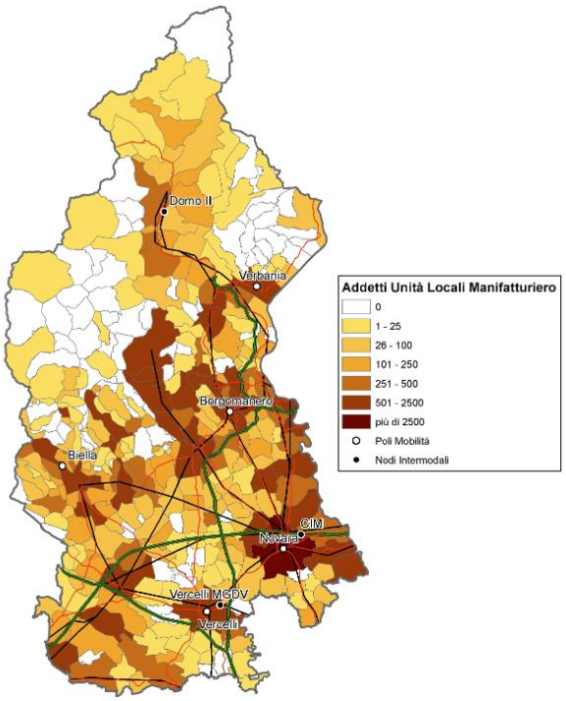
The Province of Novara is located at a crossing of TEN-T Rail Freight Corridors Rhine-Alpine and Mediterranean, in the heart of northern Italy, one of the most developed and industrialised regions in Europe.

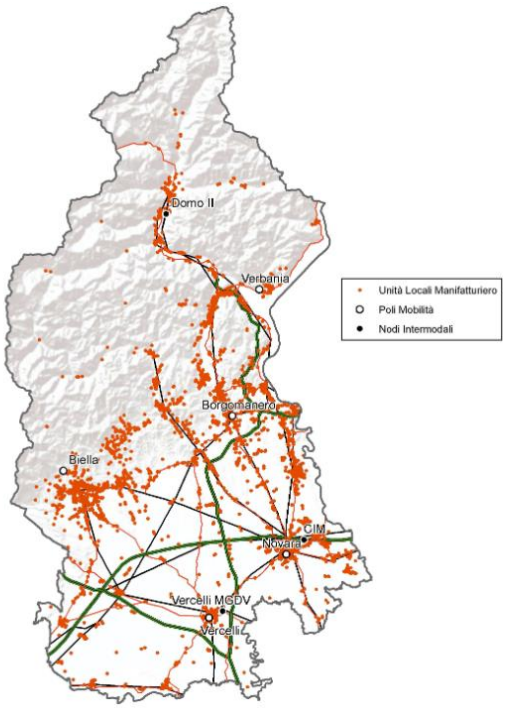
In the entire area considered, which includes cities such as Milan, Turin and Genoa, no more than 100 km from Novara, there are therefore numerous large industrial districts with high manufacturing capacity in a very wide range of sectors.

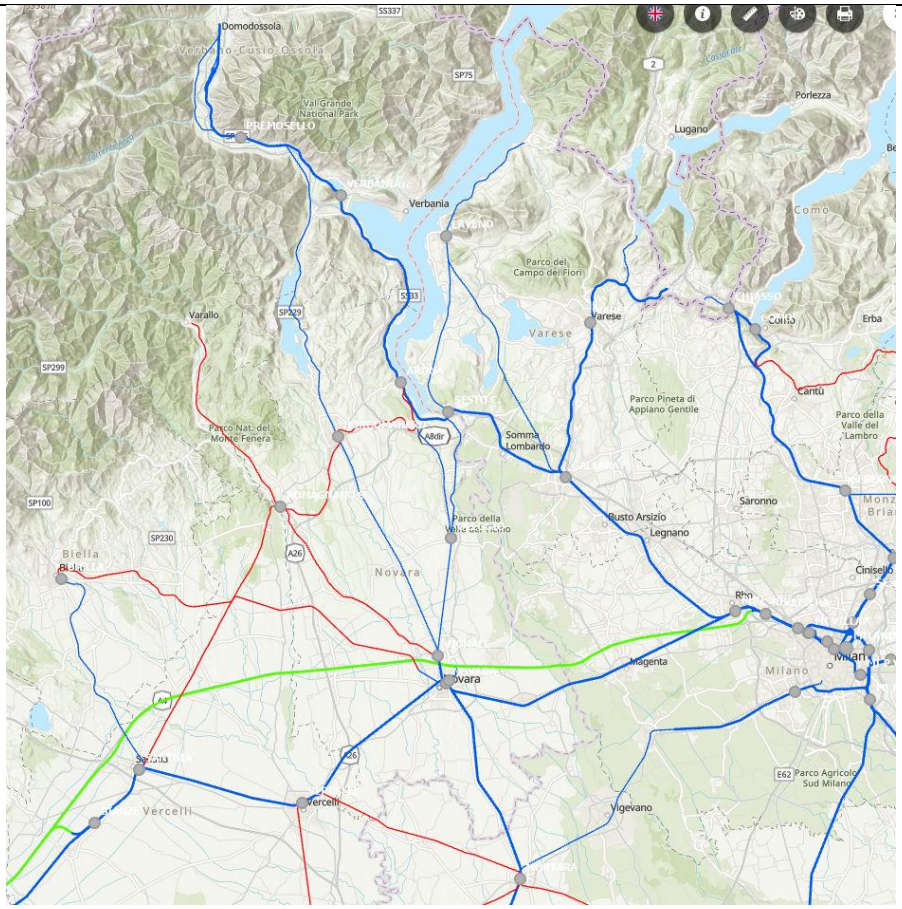
Limiting our attention to the Novara area, however, we can observe the presence of a number of important production clusters, linked both to the primary sector (approximately 30,000 hectares of agricultural land

devoted to rice, with an annual production of over 2.3 million tonnes), and to industry, where the valve and tapware, chemical, food and metal-mechanical sectors are strong. Due to the strategic location of the area, the presence of settlements dedicated to freight logistics is also very much in evidence.

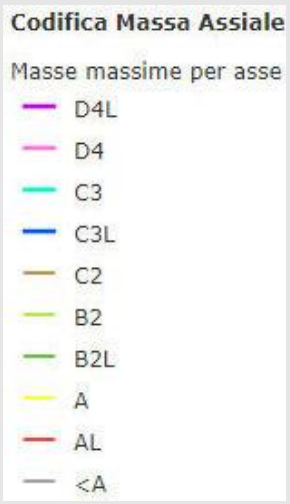
Economical background and Rail infrastructure

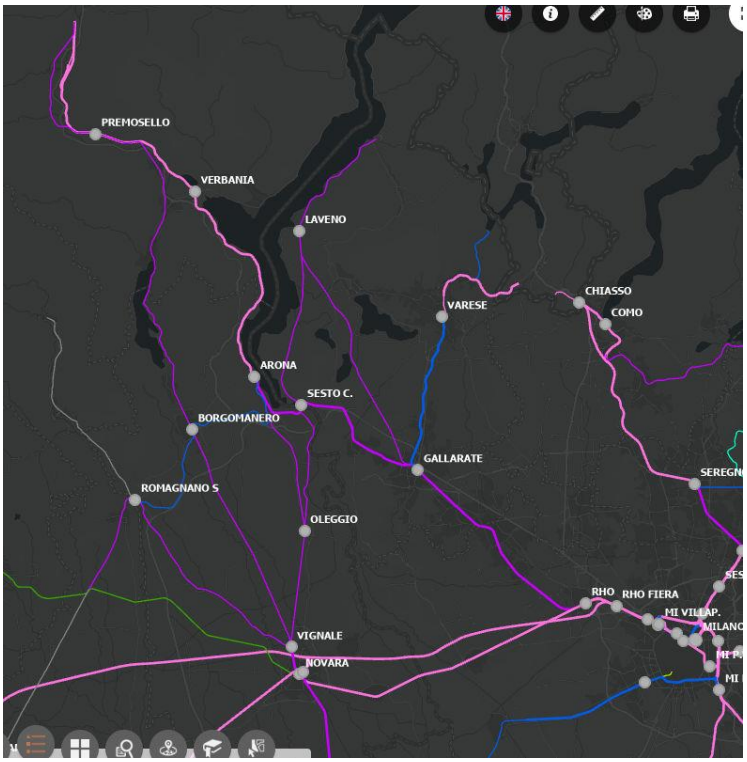
Industrial clusters/branches	The main industrial branches (volume of sales) in the area of Novara are: Specialised manufacture: chemicals, electronics, machinery Traditional manufacture: food, textiles, garments, furniture Logistics: transport and warehousing activities All such industries are clustered around the urban area of Novara. The Verbano-Cusio-Ossola area, which is north of Novara and partly refers to logistics centres in the Novara area, is also home to a significant building and materials industry, including a district with fine building stone quarries.
Industrial sites	The following map shows in darker shades of brown the municipalities in the wider area around Novara where the number of workers in the manufacturing sector is higher. The map includes the main locations around Novara that are beyond the administrative borders of the Province of Novara but likely refer to Novara for rail services (including the provinces of Novara, Vercelli, Biella, Verbano-Cusio-Ossola). The map reveals the clustering of manufacturing around Novara and along the main motorways and railways.  *Number of employees in the manufacturing industry by municipality. (Source: Regione Piemonte, Regional Plan on mobility and logistics)* The location of the manufacturing sites is further detailed in the next map, depicting the localisation of the manufacturing sites and plants in the same wider Novara area considered above. The map shows the locations of the

	plants as orange dots compared to the location of the intermodal terminals as black dots.  *Location of manufacturing sites (the orange dots) compared to the location of the intermodal terminals (the black dots).* *(Source: Regione Piemonte, Regional Plan on mobility and logistics)*

Rail infrastructure	The railway network in the area surrounding Novara and its territory is focused on the node of Novara, one of the most important nodes in the Rail Freight Corridors of the TEN-T Network. North-South RFC 1 “Rhine-Alpine” [formerly Genoa-Rotterdam] and East-West RFC 6 “Mediterranean” are crossing in Novara, where also 2 core-terminals (CIM Novara and Intermodaltrasporti Agognate) are located. Even if some of the lines afferents to the RFC1 have single track, they are part of a system of complementary/alternative routes connecting Novara both to Simplon and Gotthard to the north, and port of Genoa (and farther to southern Italy) to the south. All these lines are electrified (3 kV dc). There are also some single-track, non-electrified, local traffic lines, suitable with limitations for freight traffic. Only one of these actually has some freight services to a private siding for an industry. The railway and terminal/sidings network must be considered functionally integrated in the entirety of the lines extended to the adjacent territory of the provinces of Verbano-Cusio-Ossola, Varese, Milan, Pavia.
Railway infrastructure: lines, number of tracks and electrification **Sistema di Trazione** Sistema di Trazione Linea elettrificata 25 kV Linea elettrificata 3 kV Linea non elettrificata	

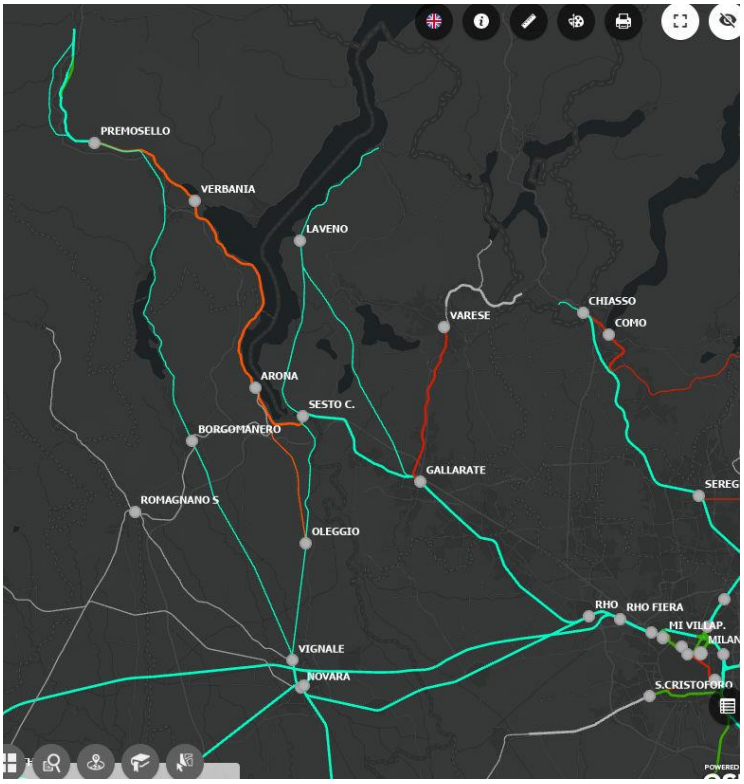
Railway infrastructure: max weight per axle





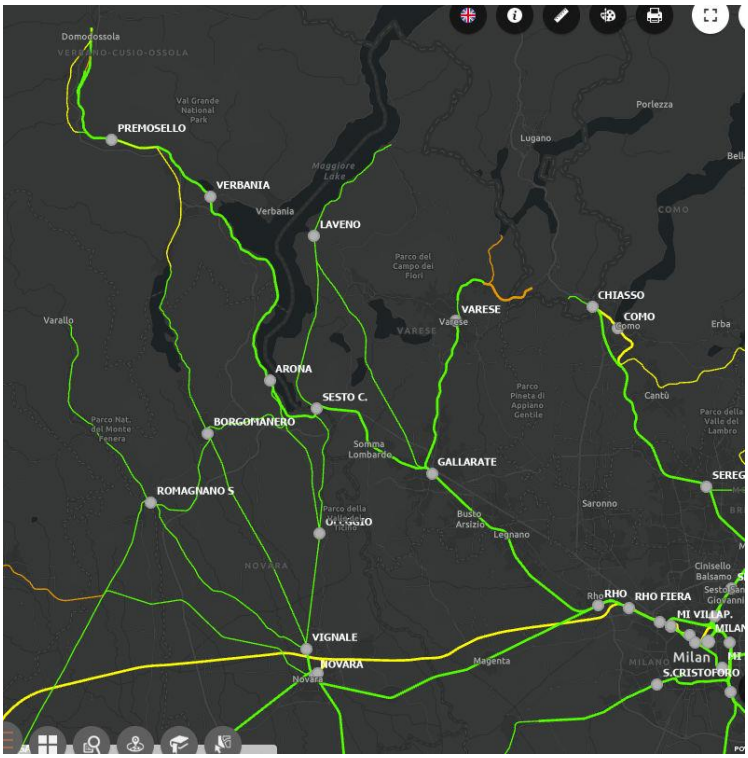
Maximum weight per axle. (Source R.F.I.)

Railway infrastructure: combined traffic codes

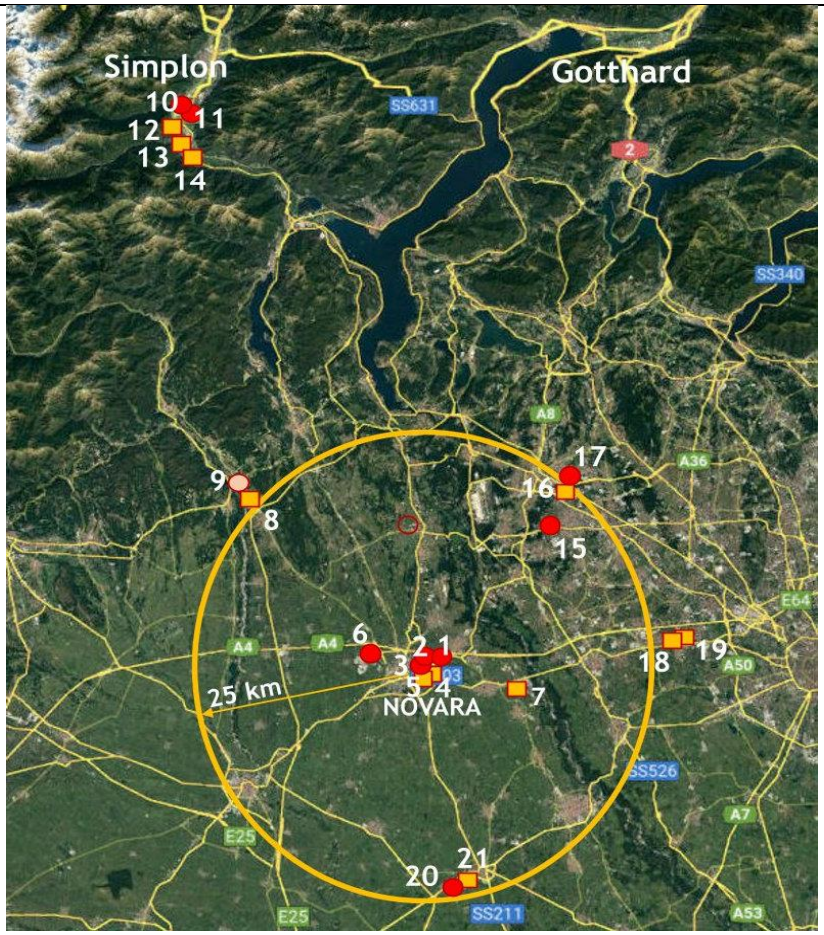


Combined Traffic codes. (Source R.F.I.)

Railway infrastructure: gradients



Gradient of railway lines (‰). (Source: R.F.I.)

Intermodal facilities: terminals and sidings	 Loading points in Novara, Verbano-Cusio-Ossola, Varese, Milan, Pavia provinces: **transhipment facilities used by the logistic operators to serve customers located in the territory of Novara and surrounding main towns.** **<u>Province of Novara</u>** **1- Novara Boschetto - CIM** (combined transport transhipment facility, open-access, and interport) **2- Novara Boschetto -RAlpin bundle** (Loading Point for Rolling Highway, open-access) **3- Novara Boschetto- Eurogateway Boschetto** (combined transport transhipment facility, open-access) **4- Novara Boschetto - industrial siding to Radici Chimica** (private facility - tank wagons with ADR, conventional transport in company trains) **5- Novara Boschetto - siding with loading yard** (private facility – wagon type E for bulk goods in groups of wagons [*check if operating*]) **6- P.M. Agognate - siding to terminal Intermodaltrasporti** (connected to railway Novara-Biella - private – transhipment facility for combined and conventional transport – also open to third parties by agreement) **7- Trecate - basic siding for chemical industrial park** (tracks for train delivery to the connected private sidings – tank wagons with ADR, conventional transport in company trains) **8- Romagnano Sesia - industrial siding to Kimberly-Clark** connected along line Novara-Varallo S. (private – wagon type H with palletised goods in groups of wagons – operated in traffic interruption from home station Romagnano Sesia [train length max 310m])

	9- Romagnano Sesia – public loading point of RFI (public siding – two tracks for wagons park 92+42 m – opening time limited – *possible upgrading tracks for loading on yard 110-75 m*) **<u>Province of Verbano-Cusio-Ossola</u>** **10- Domo 2 – Equipped area at DB Cargo Transa FLS** (combined transport transhipment facility, open-access – RFI property) **11- Domo 2 – siding to CargoBeamer** (Private - combined transport transhipment facility, open-access) **12- Villadossola – industrial siding to Vinavil** line Premosello-Domodossola (private – tank wagons with ADR, conventional transport in company trains [*<u>maybe non operating at the moment</u>*]) **13- Villadossola – industrial siding to Duferco** connected along line Premosello-Domodossola (private – wagon type E for bulk goods in company trains – operated in traffic interruption from home station Villadossola) **14- Pieve Vergonte – industrial siding to Hydrochem,** line Premosello-Domodossola (private – tank wagons with ADR, conventional transport in company trains – train delivery track 540 m) **<u>Province of Varese</u>** **15- Sacconago (net FNM) – siding to Malpensa Intermodale** (Private - combined transport transhipment facility, open-access) **16- Gallarate – siding to Ambrogio Intermodal** (Private - combined transport transhipment facility) **17- Gallarate/Busto Arsizio – siding to Hupac** (Private - combined transport transhipment facility, open access) **<u>Province of Milan</u>** **18- Vittuone-Arluno – industrial siding to Spinelli** (Private - combined transport transhipment facility, backport for sea-containers) **19- Vittuone-Arluno – industrial siding to Nichel-Leghe** (Private – wagon type E for bulk goods in company trains) **<u>Province of Pavia</u>** **20- Mortara –siding to terminal TIMO** (Private - combined transport transhipment facility open access and interport) **21- Mortara – industrial siding to SIT Saviola** (Private – wagon type E, wagon type S for special containers loading bulk freight in company trains)

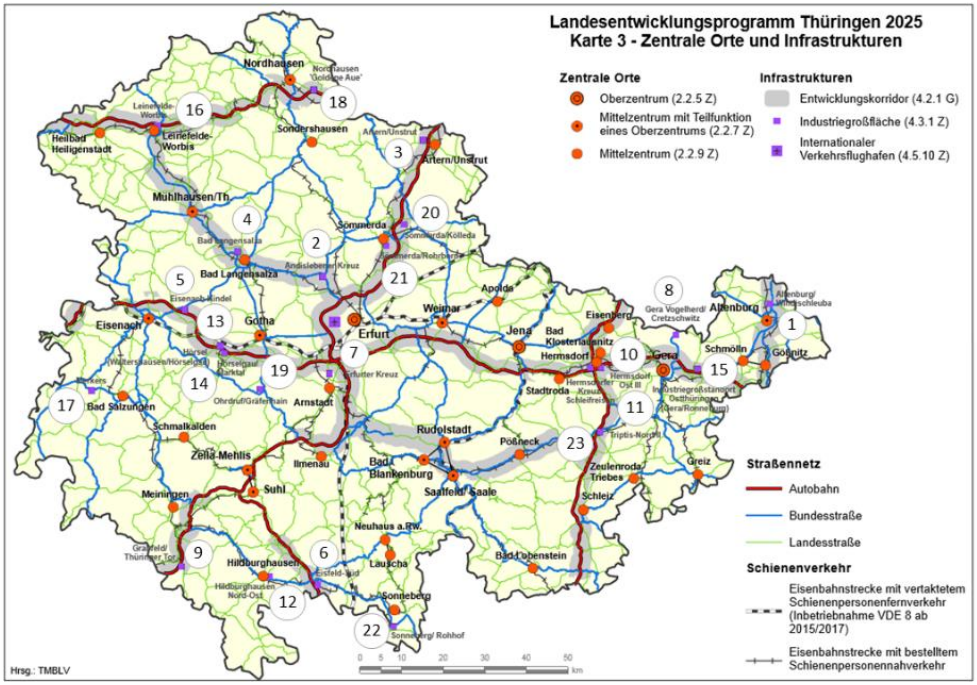
Thuringia (DE)

The Free State of Thuringia is located close to the Scandinavian – Mediterranean TEN-T Corridor as well as to the Orient/East-Med Corridor and the North Sea-Baltic Corridor. As the railway network has good connections to Saxony and Saxony-Anhalt, there is an indirect, peripheric connection to those corridors. The Free State is covered by 1,500 km rail network and almost 10,000 km of road network. Together with the developments of the locations at the Baltic and Adriatic Sea these are very good prerequisites for Thuringia to participate positively in the development of both transport volumes and logistic concepts.

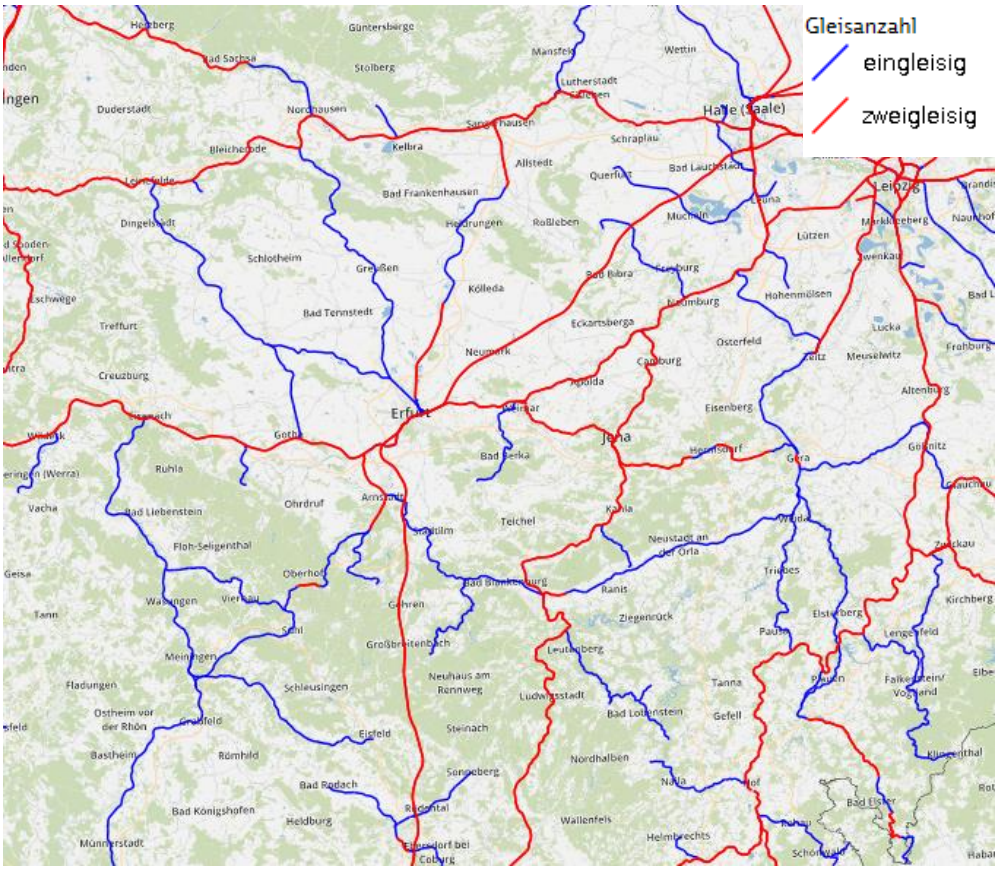
In Thuringia loading points especially in rural regions are a bottleneck. Thuringia has one big intermodal loading point at Vieselbach (Erfurt). The main issue is that the freight volume for single loading points is not efficient. Thus suitable locations, terminals, railports have to be created as efficient interfaces between rail and road, collection points for different goods and access points for combined transport. These hubs of European and large-scale network level of rail and road transport have the best location conditions for the development of the area for combined transport. Currently, such a terminal has been launched in Thuringia at the Nordhausen site for companies from northern Thuringia and neighbouring regions. This terminal is to be further developed. Other freight transport points or potential freight transport points designated in regional plans are to ensure long-term access to the rail network.

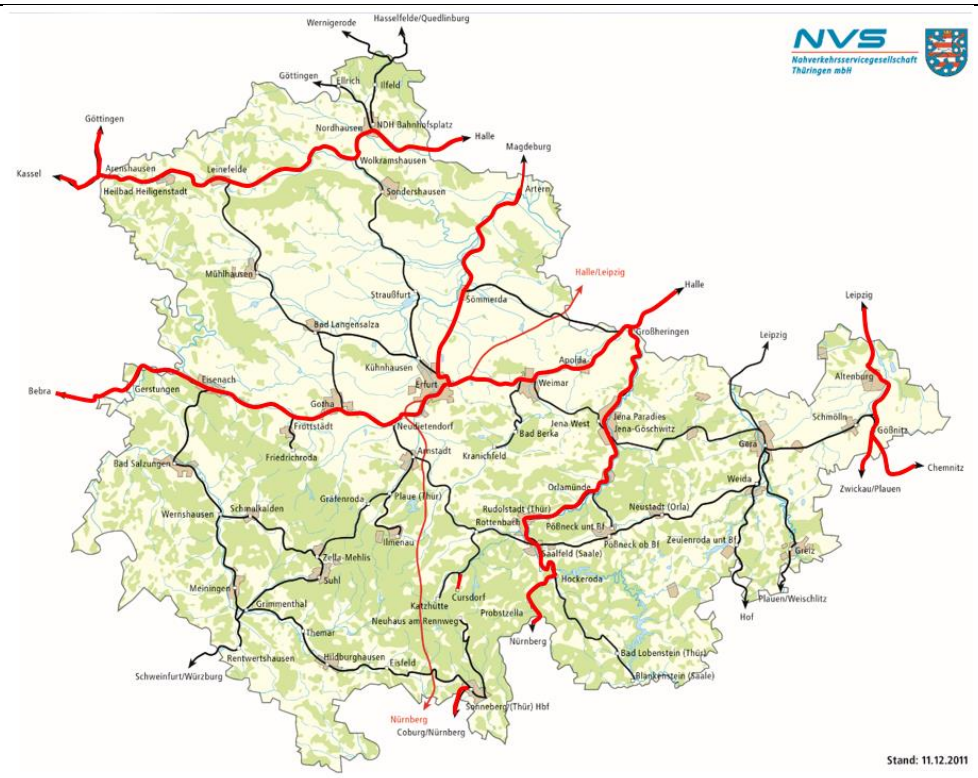
The preservation of freight transport points and access points for connecting railroads ensures the competitiveness of the companies located in the planning regions and enables an expansion of freight handling with the existing capacities in case of changing framework conditions.

Regions/Ports and their Hinterland/catchment area

Industrial clusters/branches	The main industrial branches (volume of sales) in Thuringia are the following: - Machinery and vehicle construction - Metal production and processing - Food - Electrical engineering, precision engineering, optoelectronics, EDP - Rubber and plastics - Paper and printing industry - Glass, ceramics, processing of stones and earths - Chemical and pharmaceutical industry
Industrial sites	The following large industrial areas in Thuringia with high structural and supraregional importance are bindingly defined in the Regional Development Program Thuringia: 1. Altenburg/Windischleuba 2. Andislebener Kreuz 3. Artern/Unstrut 4. Bad Langensalza 5. Eisenach-Kindel 6. Eisfeld-Süd 7. Erfurter Kreuz 8. Gera Vogelherd/Cretzschwitz 9. Grabfeld/Thüringer Tor 10. Hermsdorf Ost III 11. Hermsdorfer Kreuz/Schleifreisen 12. Hildburghausen Nord-Ost 13. Hörsel (Waltershausen/Hörselgau) 14. Hörselgau/Marktal 15. Industriegroßstandort Ostthüringen (Gera/Ronneburg) 16. Leinefelde-Worbis 17. Merkers 18. Nordhausen „Goldene Aue“ 19. Ohrdruf/Gräfenhain 20. Sömmerda/Kölleda 21. Sömmerda/Rohrborn 22. Sonneberg/Rohhof 23. Triptis-Nord II These industrial sites have at least a surface of 20 ha and an existing or a potential rail connection to railway freight transport.  Source: Landesentwicklungsprogramm Thüringen 2025

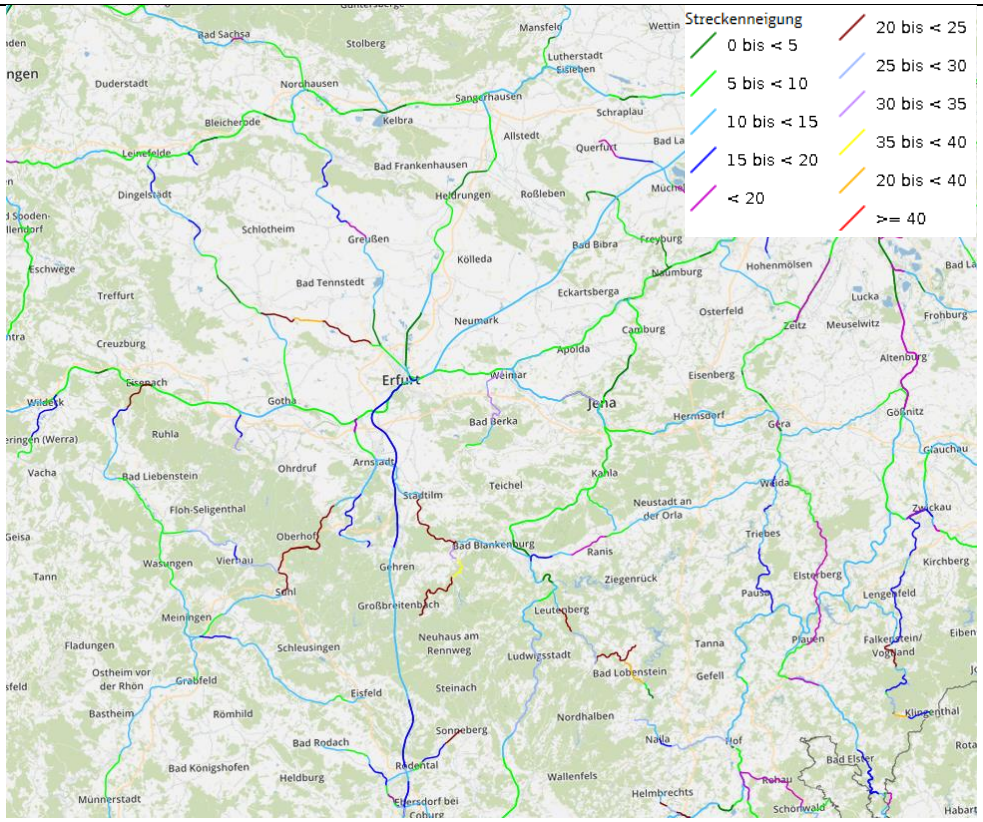
Rail infrastructure	There has been an immense quantity of railway line shutdowns and closures in Thuringia in the last decades. Since 1994 41 lines has been closed which makes an overall length of 466.9 km of closed lines. Meanwhile some of them were reactivated, but only 27 km of railway lines for freight transport and 61 km for passenger transport in Thuringia.  Source: Allianz pro Schiene

- tracks	The regional railway network in Thuringia has an overall length of tracks of 2.352 km, of which 1.339 km are single tracks (including sidings; blue in the map) and 1.013 km are multi-tracks (red in the map).  Number of tracks in Thuringia. Source: GeoViewer/Infrastrukturregister, DB Netze
- electrification	The regional railway network of Thuringia currently comprises 1.521 km of lines, of which 452 km are electrified and 1.069 km are non-electrified. Hence, only 30 % of all tracks in Thuringia are electrified, which is below the average of Germany as a whole (54 %). In Germany the railway electrification system using alternating current (AC) at 15 kilovolts (kV) and 16.7 Hertz (Hz) is applied.

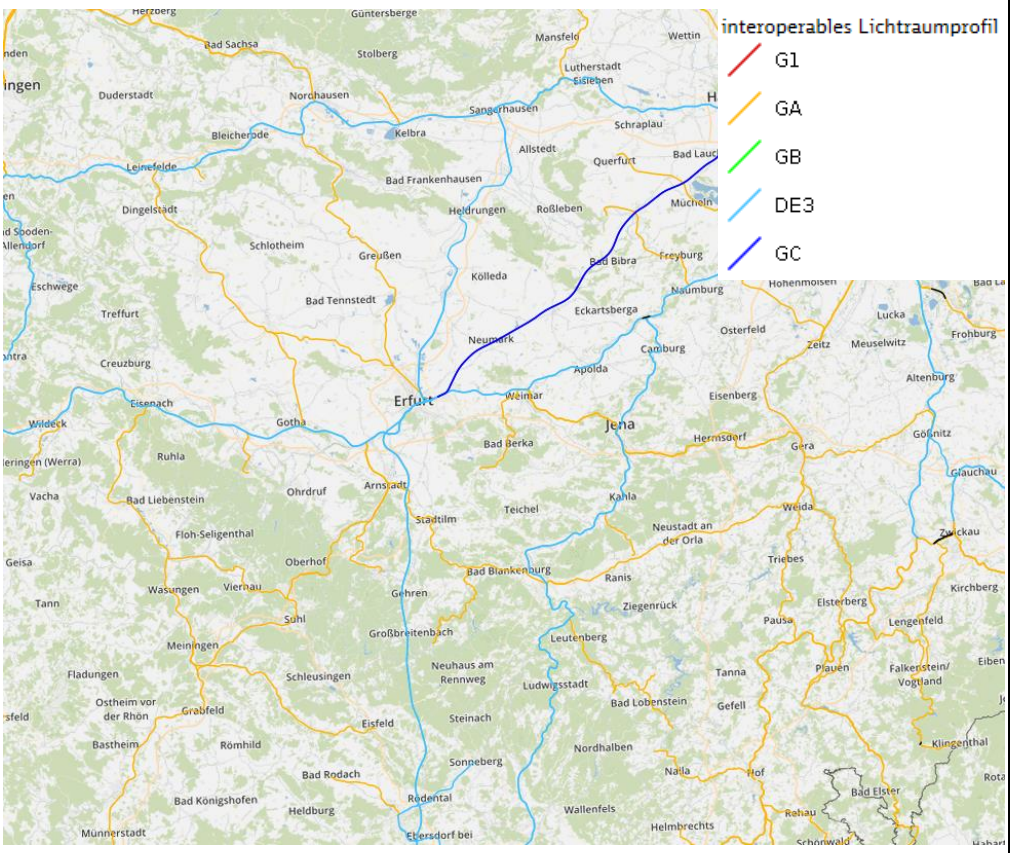


Source: adapted from Nahverkehrsservicegesellschaft Thüringen mbH 2011

- freight suitability

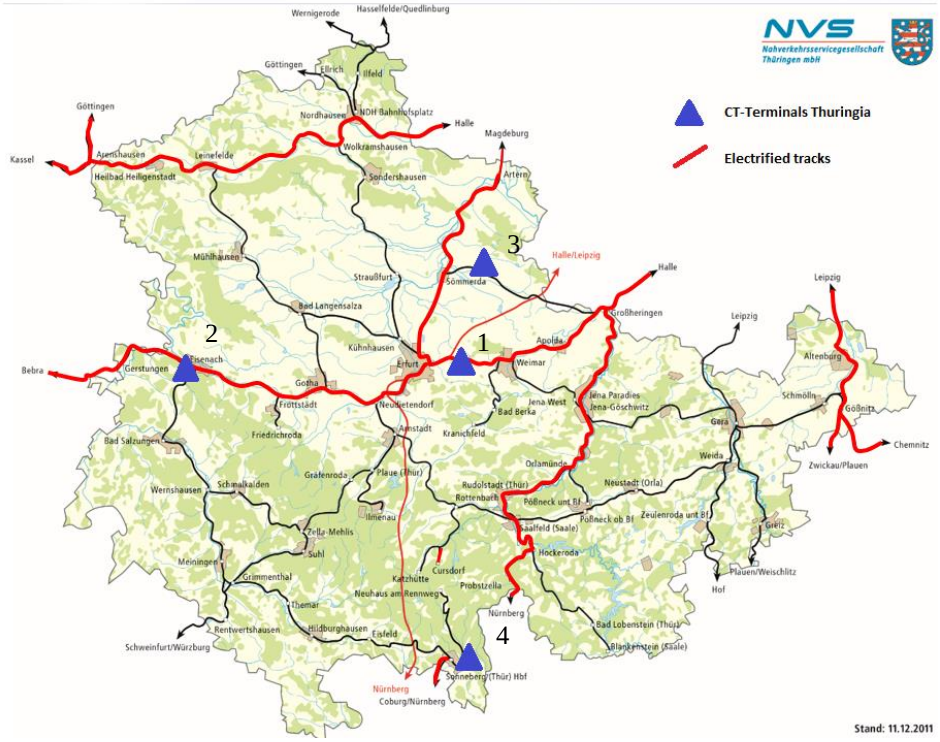


Gradient of railway lines (in per mille). Source: GeoViewer/Infrastrukturregister, DB Netze

	Thuringia predominantly has a clearance gauge of GA (for container transport) and DE3 (for German railway network and the network of neighbour countries). There is one line between Erfurt and Halle with a clearance gauge of GC (recommended for reconstruction and new construction). The clearance gauge G2 (Central Europe) can be found extensively in Thuringia.  Clearance gauge. Source: GeoViewer/Infrastrukturregister, DB Netze
Intermodal facilities	Loading points of DB Netz AG in Thuringia: - Altenburg - Arnstadt Hbf - Bad Salzungen - Ebersdorf-Friesau - Eisenach - Erfurt Gbf - Gera Hbf - Immelborn - Kölleda - Leinefelde - Lobenstein - Saalfeld/Saale - Themar - Walldorf (Werra)

CT-Terminals in Thuringia:

1. Erfurt-Vieselbach (EV)
2. Eisenach
3. Koelleda (meanwhile closed)
4. Sonneberg East (meanwhile closed)



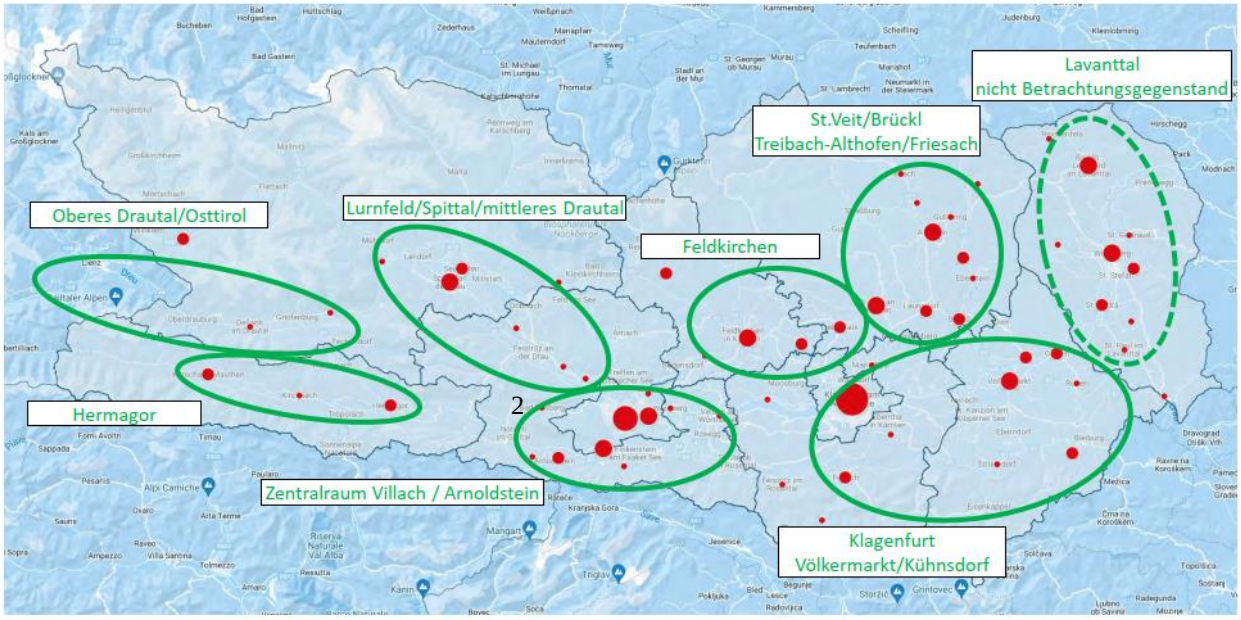
Source: own representation, adapted from Nahverkehrsservicegesellschaft Thüringen mbH 2011

Carinthia (AT)

3

LOGISTIK CENTER Austria Süd

Shippers of goods in Carinthia



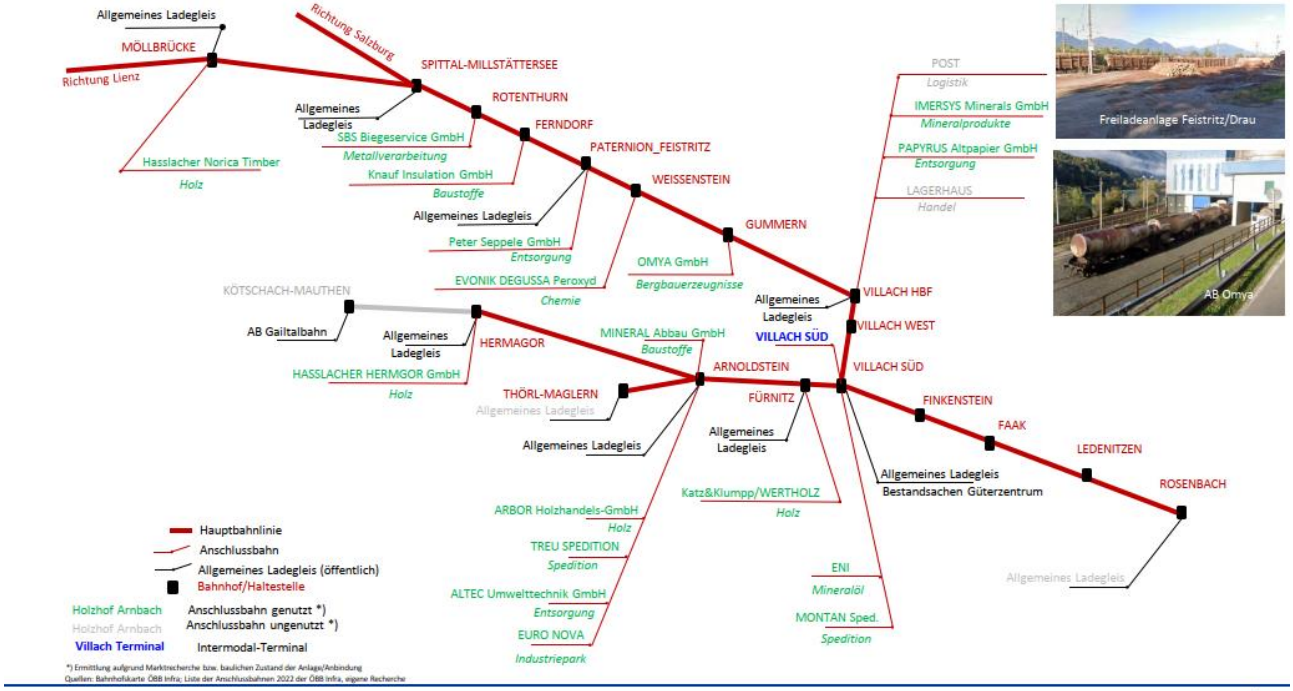
Quelle Karte: Industrielandkarte, IV

There are currently 37 general loading points available in Carinthia.

- For 8 loading points, the technical condition and thus the usability is very doubtful.
- The vast majority of the loading points are used exclusively for loading timber.
- In the large district towns of Villach, Spittal, Feldkirchen, St.Veit/Glan and Klagenfurt there are larger loading stations available, which could be of interest as a logistics platform for the waste disposal industry, for example.
- The other loading points usually have short loading tracks (max. 3 to 4 wagons) and only very limited handling areas (less than 750m²).
- A special situation arises at Viktring station with a large number of sidings and loading points, all of which are no longer in operation or no longer used.
- A transshipment facility for mineral oil is available in Klagenfurt East.
- In combination with the Arnoldstein industrial park, the Villach South site has considerable bundling and market potential, particularly in the waste disposal sector.
- There is a need for clarification along the new southern line in the Völkermarkt / Bleiburg / lower Lavanttal area, as there is considerable market potential here from industry and waste disposal.

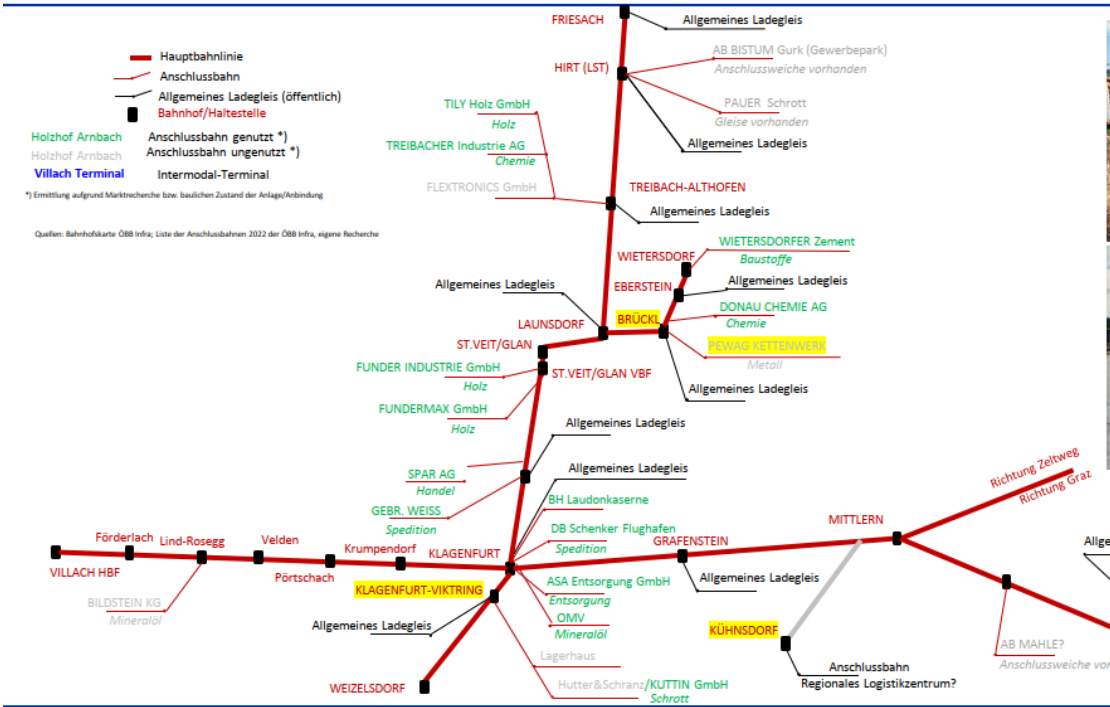
Region Spittal - Villach - Thörl-Maglern / Rosenbach

LOGISTIK CENTER Austria Süd



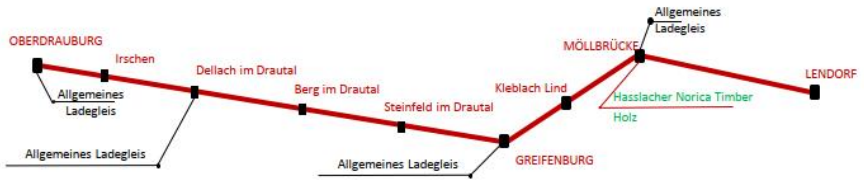
Region Klagenfurt / Friesach / Wietersdorf / Jauntal

LOGISTIK CENTER Austria Süd



Oberes Drautal: Oberdrauburg - Lendorf

LOGISTIK CENTER Austria Süd



Hauptbahnlinie
Anschlussbahn
Allgemeines Ladegleis (öffentlich)
Bahnhof/Haltestelle

Holzhof Arnbach — Anschlussbahn genutzt *)
Holzhof Arnbach — Anschlussbahn ungenutzt *)
Villach Terminal — Intermodal-Terminal

*) Ermittlung aufgrund Marktrecherche bzw. baulichen Zustand der Anlage/Anbindung

Quellen: Bahnhofskarte ÖBB Infra; Liste der Anschlussbahnen 2022 der ÖBB Infra, eigene Recherche

Südbahn II: Lavanttal

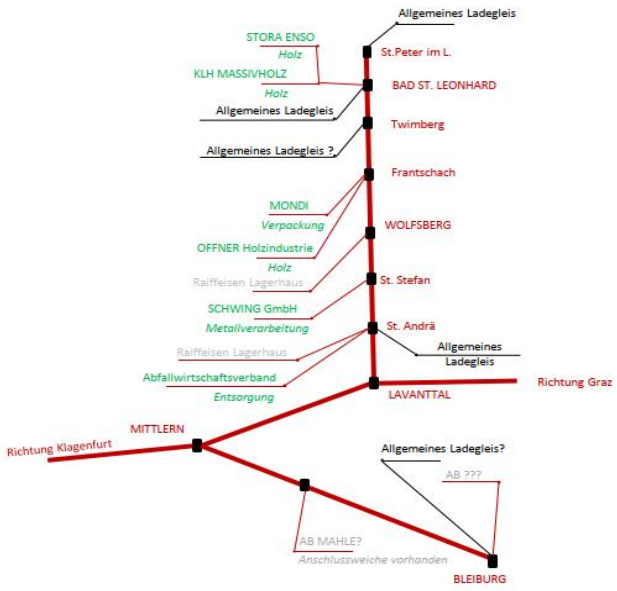
LOGISTIK CENTER Austria Süd

Hauptbahnlinie
Anschlussbahn
Allgemeines Ladegleis (öffentlich)
Bahnhof/Haltestelle

Holzhof Arnbach — Anschlussbahn genutzt *)
Holzhof Arnbach — Anschlussbahn ungenutzt *)
Villach Terminal — Intermodal-Terminal

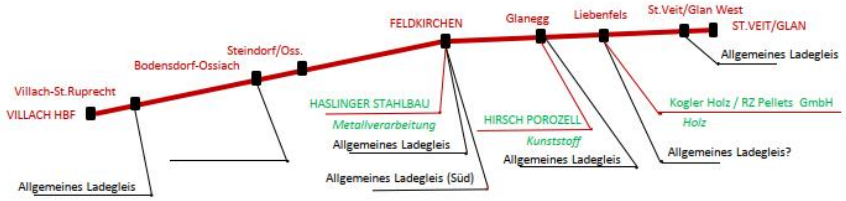
*) Ermittlung aufgrund Marktrecherche bzw. baulichen Zustand der Anlage/Anbindung

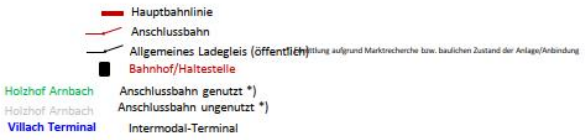
Quellen: Bahnhofskarte ÖBB Infra; Liste der Anschlussbahnen 2022 der ÖBB Infra, eigene Recherche



Ossiacher See: Villach – St.Veit/Glan

LOGISTIK CENTER Austria Süd



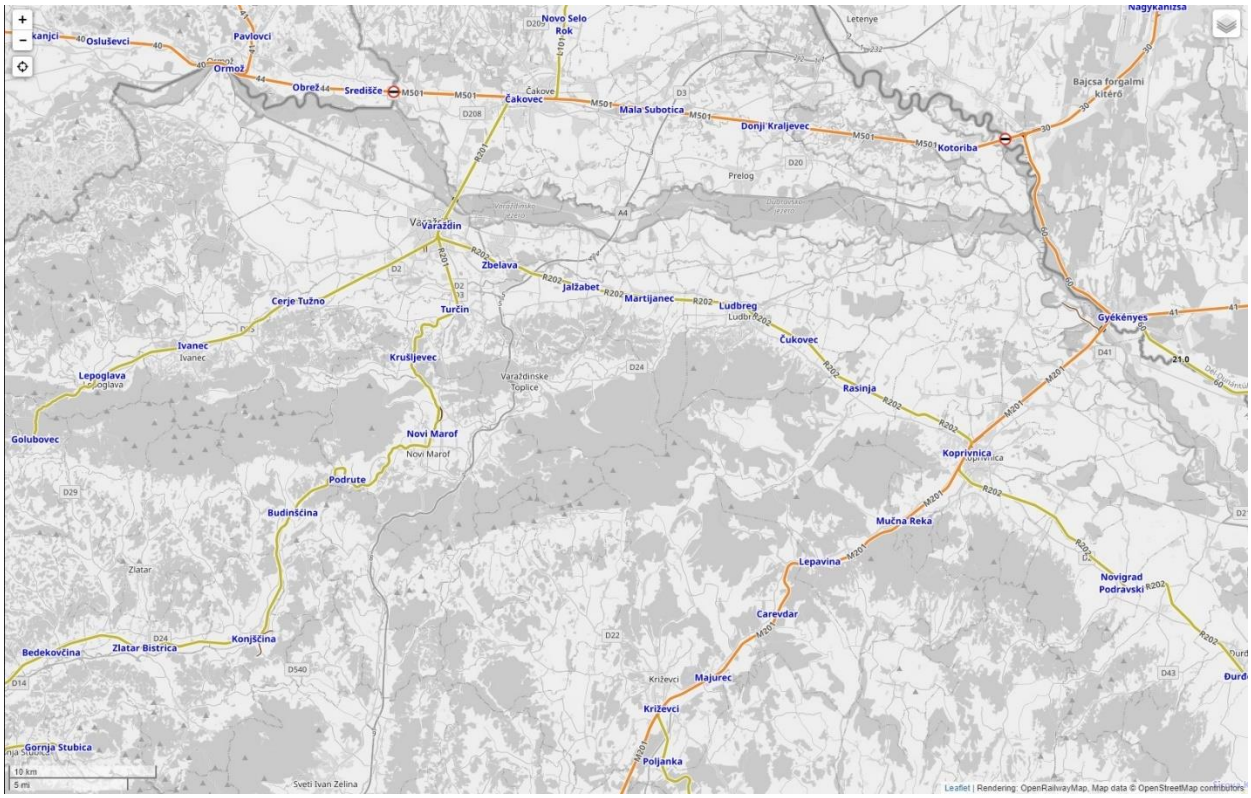


Northern Croatia (HR)

In the region of northern Croatia, comprising mostly of Varaždin County, Međimurje County, Koprivnica-Križevci County and partly Bjelovar County and Krapina-Zagorje County, there is a dense railway network still existing today, and more than a half of it are regional and local railway lines. There are many railway stations in that region that have being loading and unloading goods to and from rail wagons.

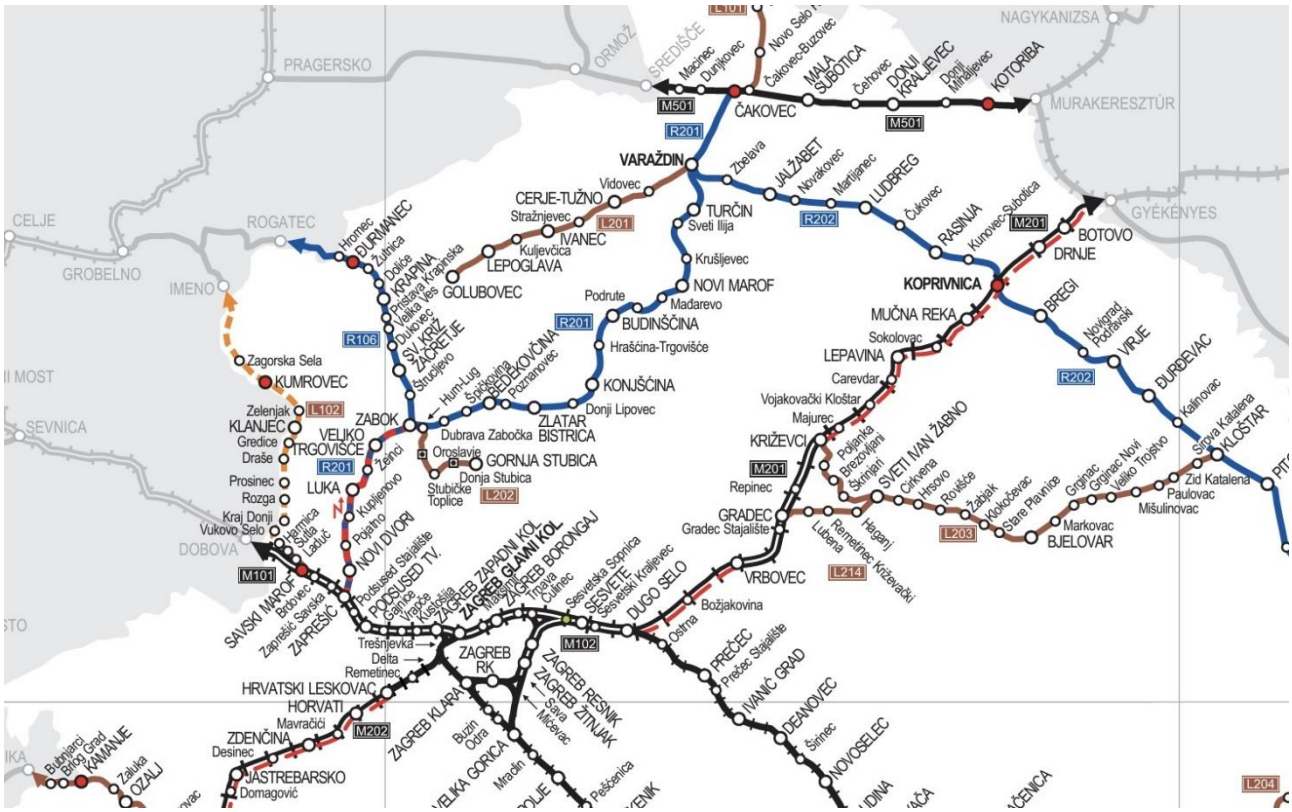
The map of the area can be seen on figures HR 1 and HR 2.

Figure HR 1 - Railway lines in the region of northern Croatia.



Source: OpenRailwayMap, 2024.

Figure HR 2 - Offical railway network map of the railway lines in the northern Croatia.



Source: HŽ Infrastruktura d.o.o. (HŽ Infrastructure Ltd), 2024.

Ludbreg railway station in the city of Ludbreg

Ludbreg railway station is located in the small city of Ludbreg, on the regional railway line R201 Varaždin – Koprivnica – Osijek – Dalj. It is a single track, non-electrified track, without block signalling. Most of the equipment for the traffic regulation and safety is outdated but well maintained and functional.

Ludbreg has around 8.500 inhabitants and it has several small sized and medium sized industry that produces pharmaceutical products, wooden, metal, machinery and electrical products. The area also produces a lot of agricultural products like grains, vegetables and flowers.

The railway station is having two tracks for regular traffic, one through track for freight manipulation and one more dead-end siding also for freight manipulation.

Company Žitni terminali d.o.o. has been shipping corn from Ludbreg every year. The shipments are usually being sent to the port of Split in the Adriatics.

In 2022. In overall 32.000 tonnes were loaded onto wagons and shipped from Ludbreg, which is around 800 wagons.

In 2023. In overall 12.800 tonnes were loaded onto wagons and shipped from Ludbreg, which is around 320 wagons.

All transport was carried out by one operator, HŽ Cargo, a state-owned freight transport company.

There's a lot more potential to receive and ship good via rail from Ludbreg. The city has plans on building a small multimodal terminal right next to the railway station by adding to more siding for loading and unloading containers and other types of freight.

The position of the station in the city and the station layout can be seen in Figure HR 3.

Figure HR 3 – The position of the railway station Ludbreg and the station layout.

Source: OpenRailwayMap, 2024.

Golubovec railway station in the Municipality of Novi Golubovec

Golubovec railway station is located near the settlement Novi Golubovec, in the Novi Golubovec municipality, at the end of the local railway line L201, Varaždin – Ivanec – Golubovec. The L201 line is a local line, non-electrified line, with no modern signalling systems, which affects maximum speed and the overall capacity of the line. The line is 32 kilometres long. Novi Golubovec is located in Krapina-Zagorje County, but due to transport infrastructure and some geographical constrains, it mostly gravitates to a nearby Varaždin County which is only 2 kilometres away from the county border.

Although Novi Golubovec has some small sized industry, the biggest producers are two nearby quarries. One is Golubvečki kamenolomi d.o.o. (at the territory of Krapina-Zagorje County) and another is owned by Holcim Group (at the territory of Varaždin County). The goods transported by rail from both quarries are gravel and crushed stone. The goods are being loaded on open track on the Lepoglava – Golubovec section, very close to the Golubovec railway station.

The numbers for HŽ Cargo operator are showing the amount of transport in the last three years.

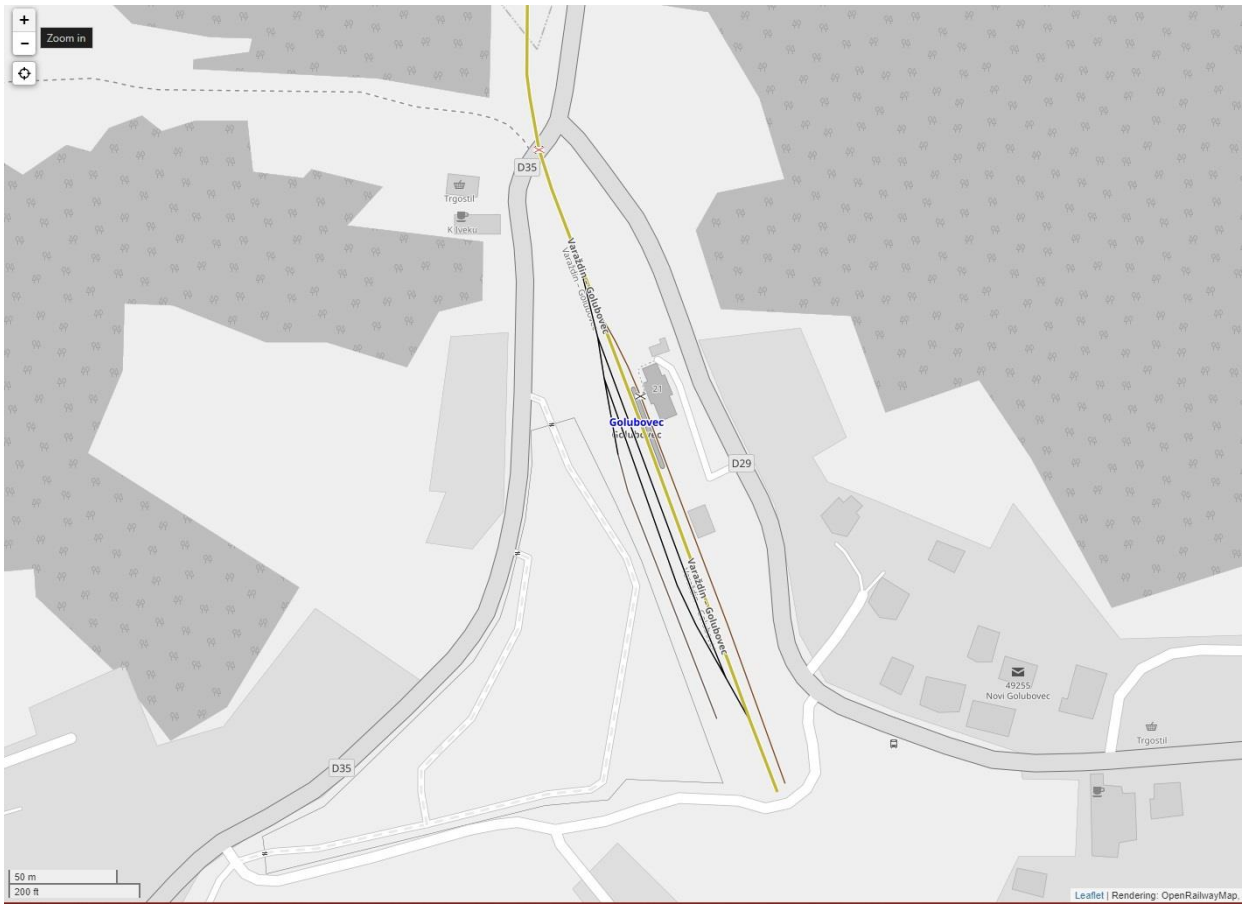
During 2021 there were 116.800 tonnes loaded and shipped from Golubovečki kamenolomi. In 2022 there were 122.700 tonnes loaded and shipped from Golubovečki kamenolomi and 79.000 tonnes from Holcim

Group, which in overall makes 201.700 tonnes. During 2023 there were 54.800 tonnes loaded and shipped, and the only railway customer was Golubovečki kamenolomi.

These numbers look rather good, but the production in Golubovec area is much bigger and there is still potential to transport even more materials by rail.

The position and the layout of the Golubovec station can be seen on Figure HR 4.

Figure HR 4 - The position and the layout of the Golubovec railway station.



Source: OpenRailwayMap, 2024.

Conclusion

The region of northern Croatia, with its dense railway network show a good potential for the goods to be transported by rail. There are two good examples that even regional and local tracks can ship good via rail in the region, railway stations in Ludbreg and Golubovec. Although the numbers are good, there is still a lot of potential to ship even more goods by rail, since there's a lot of small and medium sized industries in the area, and they all need to get materials and transport its products.

H. The specific tools proposed for the development of loading points

Brochure

A thematic brochure will be developed with the specific measures that can be undertaken in European regions to develop fully functional loading points on railway stations and terminals in order to fully utilize the railway freight transport. These measures will target the development of the infrastructure, development and acquiring of the loading and handling equipment, systematization of personnel needed the organization of loading activities, and the organization of the railway operations need for the success of such facility.

The brochure will put strong emphasis on smaller regions and smaller terminals in order to fully connect them with the main corridors and bigger rail ports and sea ports, meaning other multimodal terminals and similar nodes.

The brochure will be produced in the way that target groups can easily get all the necessary information for the success of such loading points, it will be attractive, with nice graphs, photos and infographics. It will also have some parts where more regarding development of loading points will be explained (like "who wants to know more" parts). Such document should not exceed some 20 to 24 pages.

Website

Similar to the brochure a web content will be developed, so all the info contained in the brochure could be available via a web page. The page will be suitable for mobile devices also. It will contain many options that certain emphasised parts, graphs, photos and infographics can easily be downloaded and shared via social media or easily implemented into other articles on the web or printed.

Video

A short video material, with real video footage, animated parts and with narration will be produced to emphasise the key issues regarding the development of successful loading points.

Conference papers and articles

The findings of the project will be shared via conference papers and articles on scientific transport conferences and will be published in the scientific journals in order to support the findings of the project from the scientific standpoint too. A paper regarding the research work and the measures to improve the loading points will also be produced, published and presented.

Articles in popular sector magazines and websites

Also, popular articles regarding the topic of transport multimodality and the utilization of railways in smaller regions will be published in magazines covering the topics of railway and logistics. These articles will help to spread the findings of Rail4Regions regarding loading points to wider target audiences.

I. Conclusions

Regional infrastructure concepts should be implemented in which local authorities, regional planning authorities, regional administrations, state governments, infrastructure operators and the shipping industry work hand in hand to identify, plan and finance suitable infrastructure measures so that rural regions can also be provided with the infrastructure they need for rail freight transport.

On the basis of the data

- on demand,
- on existing infrastructures and
- from the determination of requirements from regional and urban land-use planning (planned commercial and industrial areas)

it can be determined whether and where there are infrastructure bottlenecks for new and additional traffic in a region.

An essential prerequisite for improving access for freight transportation by rail is the availability of suitable loading points.

Regional loading points must be integrated into the existing rail network or be able to be integrated at reasonable expense by reactivating lines or by new sidings and connecting tracks.

The specific requirements for this vary greatly, as can be seen from the previous analyses.

Nevertheless, there are some general requirements for the planning of loading points.

Loading points must be conveniently located to the departure and destination points of rail-related goods in order to optimize the so-called last mile.

Such anchor points could be:

- Important industry locations and industrial areas
- Mines and quarries
- Wood storage yards
- Storage facilities.

Furthermore, it is important that these loading points are technically equipped in such a way that they can optimally fulfil the loading tasks.

Examples of these can be:

- Gantry cranes
- Number and length of loading tracks
- Reach stacker
- Bulk material systems
- Container storage spaces
- Temporary storage facilities
- …

The initial conditions identified in this paper form the basis for the development of a toolbox for the planning of new loading points and the use of existing ones, which is planned for the remainder of the project.