

D.T1.2.3 WORK PAPER

Analysis of market potentials for rail freight transport in Slovenia

10.2020

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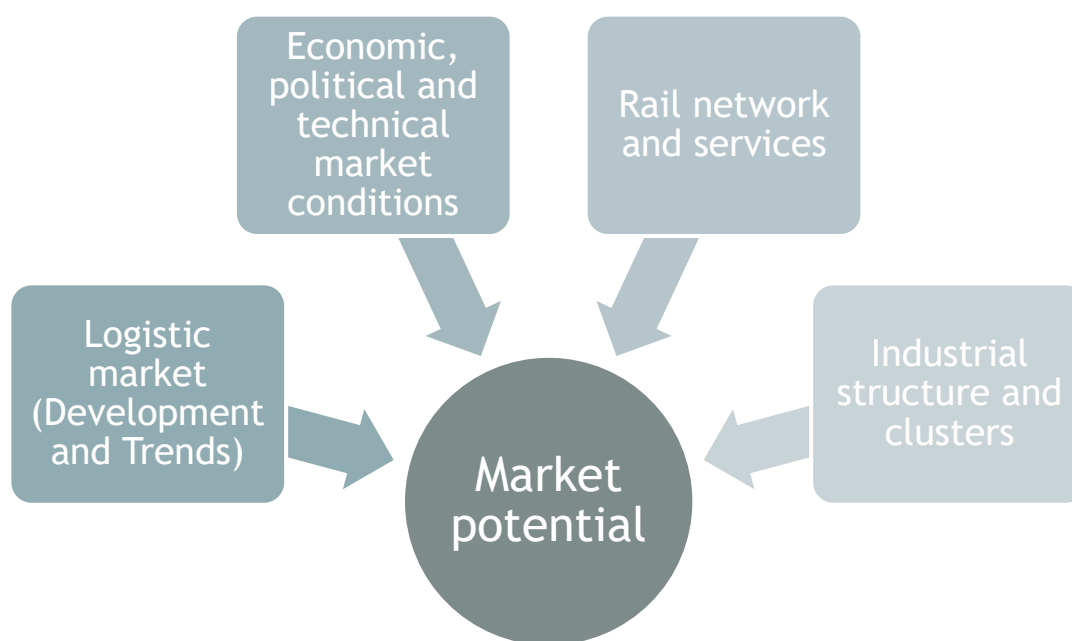
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I. Introduction

The deliverable “Methodology for analysis of market potentials for rail freight transport” (D.T1.2.1) defines a common methodology for analysing the main market potentials for rail freight transport and services in each pilot region. The work paper is agreed by all partners and serves as the basis for the deliverable “Analysis of regional market potential for rail freight services” in WP 1 (D.T1.2.3). All partner regions will apply and implement the methodology in the respective regional context.

Market potential is the total demand for a product or service in a given business environment. For that reason, it is very important to calculate the market potential and the actual value before a product or service can be implemented. Determining the main market potentials for regional rail freight transport and services is quite complex and goes beyond analysing only the market itself (the potential customers). The analysis shall help to find out the potential to shift goods transport from road to rail.

The following figure shall illustrate the impact of various factors on the market potential:



As every region and port examines different markets and analyses the individual and distinct market potential, this work paper drafts the frame in which every partner has to develop the own analysis with predefined chapters and main topics, but with suggested points to analyse. This can also be helpful if data is not available or relevant for the specific analysis of market potential.

Chapter 2.1. “Analysis of the rail network and services” and chapter 2.2. “Analysis of the logistic market (Development and Trends)” in this paper refer to a great extent to the analysis made in the regional baseline studies (D.T1.1.5) as a kind of summary of the baseline study and introduction for the analysis of the market potential.

Chapters 2.3. “Analysis of the economic, political and technical market conditions” and 2.4. “Analysis of the industrial structure and clusters” form the main part of the market potential analysis including the definition of rail suitable goods and industries for the territories (regions and countries) respective rail suitable loading units for the ports and their hinterland.

The paper concludes with a summary and recommendation of the main market potentials and chances for rail freight transport in the respective region or port (Chapter 3). The annex chapter should give the project partners the possibility to do an in-depth analysis if needed with the concentration on specialized issues that do not fit into other chapters or that are too detailed.

The work paper includes transport potential for two Slovenian REIF pilot areas: Port of Koper and Ljubljana urban region. Each chapter below is divided into two pilot areas accordingly.

II. Status quo Analysis of Market Potential

1. Port of Koper

1.1 Analysis of regional rail network and services

- **Existing railway lines in the port of Koper**

In the port of Koper there are 6 railway groups (the new 6th railway group on the north side of the port was recently built in March 2020).



Figure 1: Railway lines and crane tracks in the port of Koper (Source: GIS system)

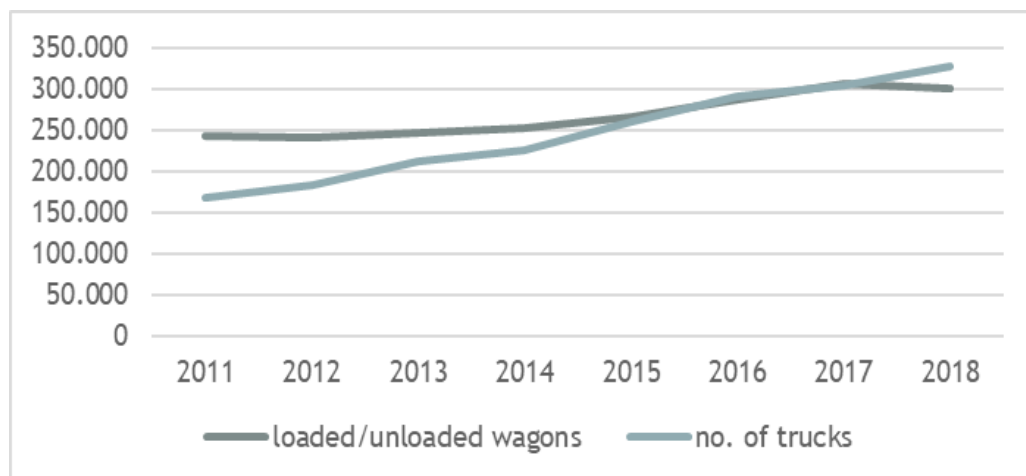
How many tracks are on each line?

- General cargo terminal: 4 tracks + 2 tracks
- Container terminal: 5 tracks
- Car and Ro-ro terminal: 2 tracks + 4 tracks (new in 2020)
- Dry bulk terminal: 11 tracks
- Silo terminal: 5 tracks
- Iron ore and coal terminal & liquid cargo terminal: 4 tracks
- Timber terminal: 3 tracks + 3 tracks
- 11 tracks on marshalling yard

Altogether there are 35 km of railway tracks in the port of Koper, which covers the area of 274 hectares.

- **Network utilisation/freight volume in the port of Koper**

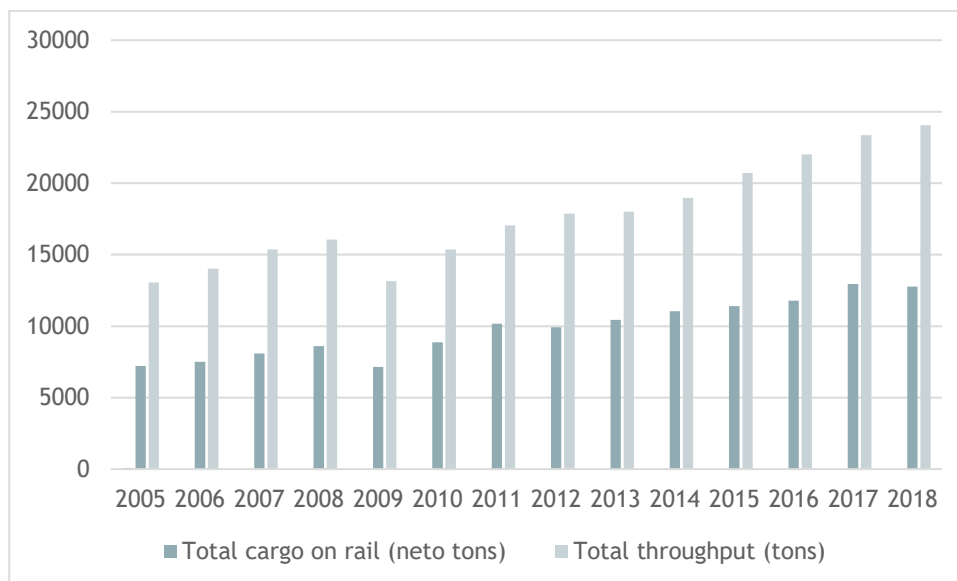
The total number of trucks and wagons/trains entering and departing the port is increasing, with a slight decrease in 2019. In 2019, port of Koper loaded and unloaded 288.705 wagons. In total, 22.329 trains arrived and departed from the port in 2019. To and from the port arrived 337.940 trucks.



Graph 1: No. of loaded/unloaded wagons and no. of trucks in the port of Koper

Year	Trains	Total cargo on rail (neto tons)	Total throughput (tons)
2005	14.220	7.216	13.066
2006	14.646	7.507	14.031
2007	15.654	8.093	15.363
2008	16.553	8.610	16.050
2009	13.690	7.146	13.144
2010	17.012	8.876	15.372
2011	19.121	10.163	17.051
2012	19.391	9.914	17.881
2013	20.118	10.430	18.000
2014	20.708	11.038	18.965
2015	21.520	11.408	20.712
2016	23.097	11.772	22.011
2017	23.812	12.941	23.367
2018	23.084	12.776	24.048
2019	22.329	13.448	22.793

Table 1: Number of trains, total cargo on rail and total throughput in the port of Koper (Source: Internal data Luka Koper d.d.)



Graph 2: Total cargo on rail in the port of Koper (2005-2018)

Based on a new study and its recommendations (made in 2018), Luka Koper and Slovenian Railways managed to speed up shunting procedures within the port and improved transit times to final destinations. First results in the port are shown:

- Average 2019: 61 cargo trains to/from the port per day,
- Current estimated capacity of the single-track Koper-Divača: 71-75 cargo trains/day (closures for maintenance works included) > +20 % capacities available today.

Only in Container Terminal, the container rail capacity increased in 2018 with the construction of 5 rail tracks (700 m length) and 3 RMG cranes delivered,

- Daily average 2019: 22-24 container trains/day,
- Current container terminal capacity: 30-32 container trains/day,
- 4th RMG to be delivered mid 2020 => further increased capacity.

To cater to the requirements of port of Koper, cargo transport on the Divača - Koper railway section has increased by 58% in the last decade. Since 2010, the track has been constantly modernized with the aim to reach the maximum normal throughput capacity of 90 trains per day and 14.0 mio net tons of cargo per annum. In 2017, the normal daily capacity in number of trains was already surpassed while the annual cargo throughput was at 12.8 mio net tons, resulting in track overutilization.

- **Network quality, e.g. number of tracks, electrification...**

In the port:

- Minimum radius is R 150 m, with exception of connecting track with R 125 m.
- Gradient: in the fall towards the seashore the gradient is 1,60‰ to 0,00‰, with exception of the start of track 62 where the incline is 9‰ and then decline 6,38‰.
- Maximum load is 22.5 kN per wagon axis and 64 kN per meter.
- Maximum speed is 10 km/h (on wagon weight stations is 5 km/h).
- There are 38 level crossings.

All lines/tracks are non-electrified, due to specific port processes and height of heavy machinery that also moves across the tracks. The one-track railway to Railway freight station in Koper is electrified.

- **Existing railway related services (“ecosystem” of rail, e.g. the Entity in Charge of Maintenance ECM, Operators, Infrastructural Management, maintenance of wagons, shunting trains...)**

The company Luka Koper is the owner of the sidings/industrial track in the port of Koper. Due to unified way of working on the industrial track of Luka Koper, the Cooperation Agreement has been signed (between Luka Koper and Slovenian Railways - public railway infrastructure operator). The agreement covers a shift in the delivery and removal of wagons at all delivery points, responsibilities and work fields, and health and safety at work. The contract covers also the conditions of public railway infrastructure operator.

The Rules of Procedure for the use of industrial track determine the technological process of work on industrial tracks, conditions for ensuring safe and orderly railway traffic, responsibility and competence in ensuring railway safety, maximum speed, special health conditions in accordance with the owner's internal rules/work instructions. The Rules of Procedure also cover the provisions of the "Agreement (with all carriers) on the arrival and departure of wagons to and from the area of the port of Koper", "Contracts on the provision of railway transport services in the area of the port of Koper", "Contracts on access to public railway infrastructure" at the Koper station freight for the provision of services - shunting, during the scheduling period and the "Written Agreement on joint protective measures to maintain safety and health when working at the joint site", mutual cooperation, maintenance of tracks and certain devices, in short, all those works that relate to the common interest of the port of Koper and the carriers.

The responsibilities for individual work related to the situation, organization, management and control of railway traffic on the industrial track of the port of Koper are also determined in internal regulations/work instruction: "Implementation of internal control of railway traffic".

Three major rail operators provide rail services in/to the port of Koper: Slovenian Railways (Slovenske železnice - SŽ), Rail Cargo Carrier (RCC) and Adria Transport (ADT). For the year 2018, 80% of rail services were provided by Slovenian Railways, 12% by Rail Cargo Carrier and 7% by Adria Transport.

Koper railway hub consists of:

- Koper passenger station,
- Koper rail freight station »Koper tovorna«, which consists of:
 - o Koper rail freight station “Tovorna postaja Koper - TPK”,
 - o Main port station “Glavna pristaniška postaja - GPP”,
 - o Shunting group “Ranžirna grupa - RG”,
 - o Industrial tracks:
 - Luka Koper d.d. - ITLK
 - Petrol d.d. - Instalacija Sermin

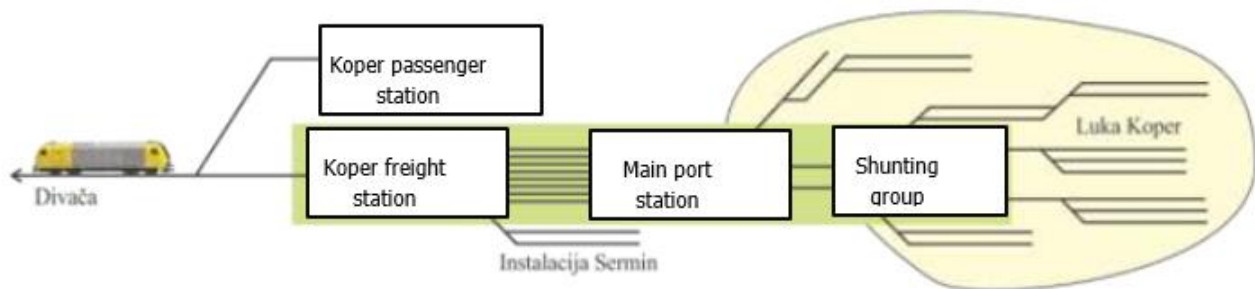


Figure 2: Koper railway hub



Figure 3: View on the entrance to the Koper railway hub (port of Koper on the left side)

Delivery points are the places on the owner's industrial track, where all loaded and empty wagons are handled between the carrier and the industrial track owner.



Figure 4: Delivery points on the industrial track

1.2 Analysis of the logistic market (Development and Trends)

The analysis of the logistic market directly follows with both the former development of (rail) freight transport and trends of (rail) freight transport performance including the analysis of current transport flows. Points to analyse are therefore the following:

- **Former development of (rail) freight transport (regional level)**

The port of Koper, which was founded in 1957, initially did not have a direct connection to the railway network. The cargo was transported by trucks from Podgorje and Hrpelje-Kozina and vice versa and transhipped to wagons or trucks. As traffic grew rapidly and costs were high, preparations soon began in order to build a line that would connect the port to the rail network. The line was built in 1967.

The decision to build the line was not easy. It is a very difficult terrain and a large slope. The situation began to be studied as early as 1956 and about 20 variants of the connection were developed. Twelve versions were shortlisted, which provided for the connection to the Divača-Pula line, namely: two to Podgorje, two to Hrpelje-Kozina, one to Rakitovec, three to Prešnica and four more to other points of the Pula line. Apart from the needs of the future port, the route was justified by the needs of the coastal economy, which was burdened with high road transport costs.

After difficult discussions, the decision was made to connect to Prešnica, which cost 4.8 billion dinars at prices in 1960. The profitability of the line was expected to reach 1.5 million tons, which was projected for 1971. In addition to the cost of the line construction, it was necessary to invest once again so much funding for the freight station, port facilities, security and telecommunications facilities, and electrification. When the port's traffic reached 700,000 tons in 1964, the prevailing opinion was that further development of the port without a railway line was not possible. The key problem was financial resources and the dislike of the federal authorities. In order to speed up the construction, Luka Koper took over the investment in the project. The track was built in the first phase as siding/industrial track. After considerable difficulties, construction of the line began in 1964, but until 1966 work was carried out irregularly because funds were not provided. At the end of 1966, the works on the lower structure were mainly completed, so in January 1967 the first tracks were constructed, which were fully connected by 5 October. The construction of the

line was also obstructed by landslides, especially near Podpeč and Rižana. The inauguration took place on 2 December 1967.

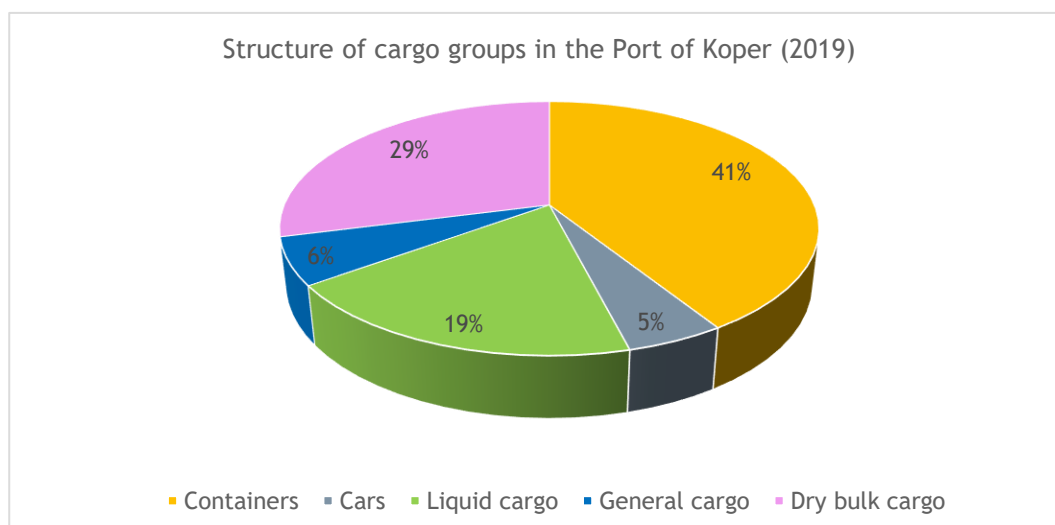
The section of the line between Prešnica and Koper has the characteristics of a mountain railway, with a very winding route and steep ascents. There are 116 culverts, 9 bridges, 5 overpasses, 15 underpasses and three tunnels between Prešnica and Koper. Trains on the line cannot develop higher speeds, and they need additional traction to overcome steep ascents. The greatest risk is posed by possible accidents on the line, which can cut off the port from the Slovenian and European railway network.



Figure 5: The construction of the railway line (Plazišče Loka)

- **Analysis of current transport flows: How are the chances of Modal shift?**

A good railway connection is important for the port of Koper not only from the point of view of connection with the world, but also from the point of view of internal logistics. There are as many as 35 km of industrial railway tracks in the port area, which lead to practically all operational shores and storage areas. Railway undertakings deliver wagons to the port to the agreed handover points, and the operational team of the internal railway transport of the port of Koper takes care of the transport of wagons to loading / unloading points.



Graph 3: Structure of cargo groups in the port of Koper (2019)



Figure 6: Main markets and market shares of the port of Koper

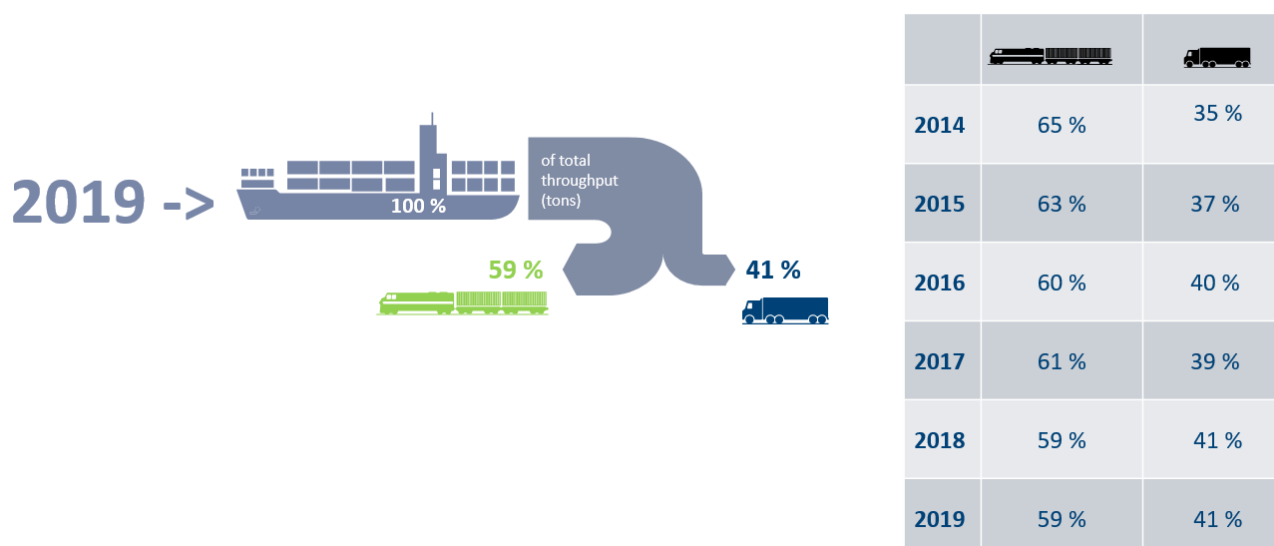
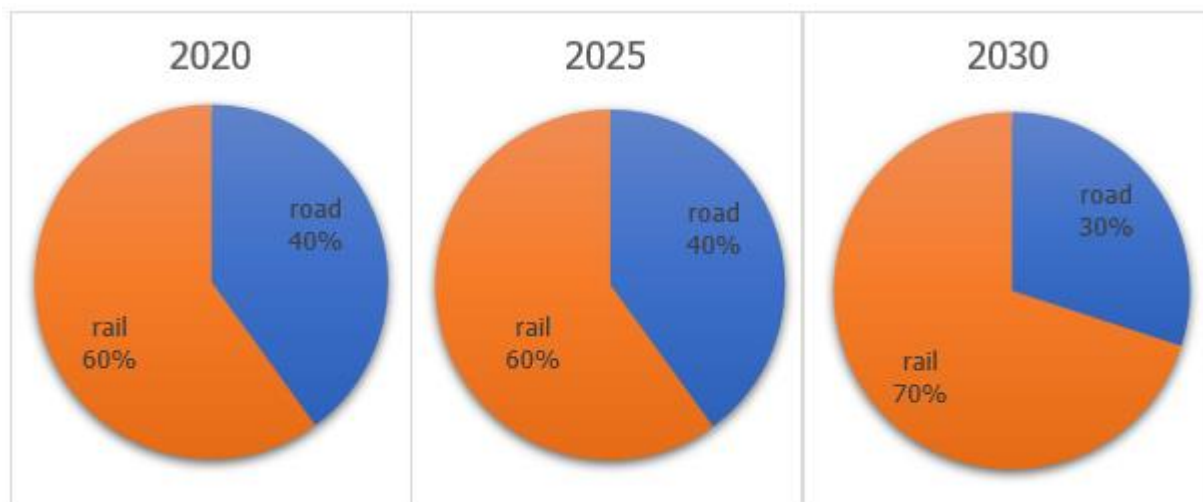


Figure 7: Modal split in port of Koper



Graph 4: Predictions of modal split in the port of Koper in the period 2020 - 2030

Despite the challenges with constraints on railway infrastructure, we anticipate that the modal ratio will remain the same until 2025. After the construction of the second track Koper-Divača, we anticipate that the share of rail transport will increase (towards the target value of 70% by 2030). Until then, it will be necessary to find all possible reserves/optimization solutions, including optimizations in the process of transporting trains from public railway infrastructure to industrial tracks of Luka Koper.

The announced maintenance and investment work in the coming years on various sections of the Slovenian railway network will, due to occasional closures, affect the quality of transport services, but the modernization of the railway network will have long-term positive consequences on the flow, capacity and reliability of railway transport. The announced maintenance and investment works must also be understood in the light of preparations for the new railway connection between Koper and Divača, which is to be built by 2026, as the port is the largest generator of throughput by rail. As a significant increase in the number of trains is forecasted after the construction of the additional track, it is necessary to modernize the remaining part of the Slovenian railway network in the meantime.

Luka Koper estimations are that improvements in infrastructure and processes will enable at least 4-5% growth in the capacity of the Koper-Divača railway gravel annually. In numbers, this means an increase from 90 to 104 trains per day until 2025, and in total the capacity of the line will increase by 14 pairs of trains per day until 2025 (also at the expense of new locomotives). The new railway capacities will be mainly dedicated to the needs of container transport, followed by cars, bulk, bulk and general cargo. We will continue to acquire new business further in the hinterland, where, due to longer distances, rail connections are more competitive and crucial for obtaining larger volumes.

Since the port of Koper is the only Slovenian cargo port and main economy and transport generator in Slovenia, most of the measures affecting modal shift are related to the sections directly connected to the port. On the other hand, some other measures are foreseen in terms of increasing modal shift towards more rail transport.

Modal shift measures on the state level (Source: Investment Feasibility Study, Second Track Divača - Koper, 2019):

On the state level, some of the modal shift measures include the following:

- Tolls for goods vehicles should include the charging of external costs through a policy of internalising external costs;

- Stimulation of the application of intermodal transport units;
- Modernisation of Slovenian intermodal terminals (rail-road, road-rail);
- Investments in rail infrastructure enhancement projects such as the second track Koper-Divača for the construction of a competitive railway network, because for the most part, the motorway network is already constructed and is competitive;
- Provision of incentives for commercial entities to reconstruct and re-use industrial tracks.

The key objective of construction of the second railway track is to remove the bottleneck on the Divača-Koper railway section to ensure the long-term capacity of railway transport infrastructure in Slovenia. The Project is a part of the Trans-European core TEN-T network and its construction is crucial to increase the competitiveness of the European economy as it will also affect other government or private investments (with a better rail link from port of Koper to landlock countries - to Austria, the Czech Republic, Slovakia and Hungary, the attractiveness of regions for greenfield investments will also increase). It is expected that by increasing the capacity of the corridor in question and shortening travel times, rail will become more competitive than road, and a part of freight transport, particularly at distances of over 300 km, will be diverted from road to rail. That means reduced environmental costs and carbon footprint, which will contribute to achieving the climate change objectives as laid down by the European Union. At the same time, interoperability will be ensured in accordance with European standards, while the capacity and efficiency of rail infrastructure will be optimized.

- **Forecast of (rail) freight transport performance and development (if available)**

For projects disproportionately affecting transport of goods, the key indicators affecting freight demand are production and consumption of commodities in the relevant markets (themselves dependent on demography, employment levels, technology etc.) and the associated import and export levels. Forecast of (rail) freight transport is closely connected with port of Koper performance and its throughput. All studies considered two main scenarios of port throughput development: with construction of the second track Koper-Divača, which is currently the main infrastructure bottleneck and the second scenario without construction of the second railway track Koper-Divača.

In 2016, the company PNZ svetovanje projektiranje, d.o.o. ("PNZ") prepared a single document combining results and findings from two of their previous studies ('Evaluation of Measures Regarding the Future Slovenian Transport Network', prepared in September 2014, and 'Sensitivity test of freight flows for construction of the Second Track Divača-Koper', prepared in June 2015). The models developed by PNZ are in Slovenia considered to be the national standard and are used in national transport strategies. The transport model developed by PNZ is made up of the basic CETRA model, upgraded with the maritime transport model. The CETRA model first involves the separation of cargo into 56 goods classes and then calculating for each goods class the quantities of transport generated in each zone based on local production and consumption and macro- and socio-economic forecasts. As the second step, a gravitation model distributes transport quantities among origin and destination zones to yield an origin destination matrix of commodity flows expressed in net tons per year. Projected future distribution of commodities is based on current distribution. The third level of the model is the assignment of a modal share to each goods class; the choice of transport means is considered to be a factor of time-related costs, distance-related costs and logistics costs. Finally, the cargo expressed in net tons is converted to number of vehicles. The forecast is then developed using the average growth rate from three external studies: a study forecasting container cargo in Northern Adriatic ports prepared by MDS Transmodal Limited, a Trans-European study on maritime transport prepared by PWC, and a study on future freight flows of port of Koper. Applying the rail bottleneck in the absence of the second track, the PNZ model yields a 32 mio net ton throughput in the port of Koper in 2030, 15 mio of which would go on rail. Was the Second Track to be constructed, PNZ predicts there to be 33.5 mio net tons of throughput in the port of Koper in 2030, 18.5 mio of which is expected to be carried

to Divača and onwards by rail. In the absence of the second track, 2 mio net tons of cargo that would otherwise go to the port of Koper would be handled by the port of Trieste. Using the same model PNZ predicts there to be 42.5 mio net tons of throughput in the port of Koper in 2040 should the second track be constructed (Source: PNZ Demand study, 2016).

MDS study was prepared in 2016, focusing on container cargo in the port of Koper (containers as strategic cargo group for the future). MDS shows that port of Koper will handle 20.8 mio net tons of containers in 2030. Additional 0.67 mio net tons of container cargo is expected to be diverted from road to rail. It concludes that the total impact of the second track is an additional 5.45 mio net tons handled by port of Koper in 2030, 35.5% more than in the alternative scenario. According to this model, 93% of container cargo would be carried by rail, 7 percentage points more than in the absence of the second track. (Source: MDS Transmodal study, 2016.)

1.3 Analysis of the economic, political and technical market conditions

The analysis of the economic, political and technical market conditions shall examine the framework conditions in these fields that can influence the market potential of rail freight transport. Aspects what will help to analyse are:

- **Analysis of current economic conditions: *What are the general chances of expected rail policies regional and transregional?***

The port of Koper is one of the most railway dependent ports in Europe, because as much as 59% of the goods are loaded on wagons or. unloaded from them. Container transshipment is particularly dependent on rail connections, especially in the case of Koper, which supplies many hinterland countries. In this area, the development of intermodality in Koper is crucial for the further growth of container traffic, which today is 52% dependent on rail transport. By comparison, the ports following Koper are Bremen, Gothenburg and Gdansk - which handle around 40% of container traffic by rail, while this share is significantly lower in other European ports.

Port of Koper carries out the basic port activity of transshipment and storage of goods for its hinterland. The Slovenian market represents less than a third of the total throughput, which is increasing from year to year, especially in the traditional and most important hinterland markets of Austria, Hungary, Slovakia, the Czech Republic, Italy, as well as Croatia, Serbia and Romania, Germany and Poland. Luka Koper also offers its services to overseas markets, where it promotes the port of Koper as an ideal entry and exit point for the hinterland markets through marketing promotional activities. The activities are thus regularly carried out mainly in the countries along the Mediterranean, the Near and Far East.

For the port of Koper, the cooling of the economy in 2019 was most felt in the automotive industry, the electronics industry and in the manufacture of iron products. Lower need for raw materials for these industries has meant lower demand for iron ore and coal, automotive components and lower shipment volumes of new cars, especially to Turkey. The year 2019 was also marked by a decline in the throughput of coal for energy purposes, mainly due to the decline in the competitiveness of energy from thermal power plants.

- **Macroscopic trends**

The geostrategic location of the port of Koper is extremely important for the markets of Central and South-Eastern Europe, as it offers good opportunities for the distribution of goods to the whole world. Despite the simultaneous establishment of new railway connections from neighbouring ports to our hinterland markets, the establishment of railway connections to new centres in the hinterland markets continues, which further expands the gravitational area of the port of Koper in Central Europe and South-Eastern Europe. This, in turn, increases the added value of the port of Koper, as the port thus reaches new markets, which in the past could not be reached due to limited land connections. In 2019, even larger container ships began

arriving in the port of Koper, as well as in other ports in the northern Adriatic. We follow a similar trend on all lines between Asia and Europe. The number of ships with a capacity > 23,000 TEU, which are introduced by shipowners on the lines between northern Europe and Asia, is increasing, which leads to the diversion of 'smaller' ships to the lines between Asia and the Mediterranean or the Adriatic. For the port of Koper as for the entire northern Adriatic, this means the possibility of larger capacities on lines with Asia and more possibilities for obtaining additional cargo from existing and new hinterland markets.

- **Changing in industrial landscape, e.g. are there changes in industrial sectors/branches (industry to service)?**

Maritime goods flows are the most important segment of international trade in the world. Ports represent an essential link between industrial, transport and trade hubs. Ports are strategic points, as they play an important role in relations between countries, and in addition, ports are the crossroads of different cultures are logistics hubs between land and sea transport. Currently, China is opening to the world with its 'One Belt, One Road' initiative and is looking for external markets that would boost economic growth in addition to domestic consumption. On the other hand, the United States wants to increase its presence in Europe through its intensive policy of opposing Chinese capital as well as Russian influence. European countries address relations with economic powers from other continents through various common cooperation platforms, backed by strong bilateral cooperation.

- Containers:

Container shipowners are increasingly expanding into the field of freight forwarding or integrating logistics departments into the shipping segment by taking over important shares of major logistics companies and at the same time taking on an increasingly important role in comprehensive offers of so-called transport 'door to door'. It can be noticed that the 'carrier haulage' model is playing an increasing role in international container traffic, according to which the shipowner also takes care of land transport. All indications are that the trend will continue in 2020, as this is the only way for shipowners to remain competitive globally. Forecasts suggest that there will be new cases of consolidation among shipowners over the next few years. The introduction of larger ships on lines for northern Europe will lead to the shift of current ships to other lines (the Mediterranean or the Adriatic) and thus likely to further reduce fares on the main lines and at the same time on the lines to the Mediterranean. The shift of current capacity to other lines means that larger container ships can also be expected in the Mediterranean and in the ports of the northern Adriatic.

In the container segment, due to the unstable economic environment, growth forecasts are constantly declining, and all indications are that a similar trend will continue in 2020. At the same time, all major container shipping companies expect to deliver new ULVC ships with a capacity of > 23,000 TEU, which will strongly mark the container transport market, as it is not in line with declining growth forecasts.

In 2019, Luka Koper company, recorded a 3% drop in container throughput compared to 2018, the majority in the handling of empty containers and a smaller share in the throughput of full ones. Nevertheless, the port of Koper remains the first container terminal in the northern Adriatic regarding transhipped TEUs.

- Cars and ro-ro:

The decline in vehicle production and sales was already evident in the last quarter of 2018 and continued in 2019, mainly because of the introduction of the WLTP39 test and the associated lack of suitable engines for installation. Globally, sales were reduced by 4% in 2019, which was also affected by the cooling of the economy in the European and global markets.

Passenger car sales in the United States fell by 1.4% in 2019. In Brazil, the results for 2019 were 8% higher than in 2018. Passenger car sales in India fell by 12.7%, weak sales were also recorded in the

Russian (-2.3%) and Japanese markets (-2, 1%). 21 million passenger cars were sold in China last year, which is 9.5% less than in 2018. The Chinese market was under great pressure in 2019, as it was influenced by factors such as China-US economic and trade frictions, adoption of stricter emission standards and reduction of subsidies for hybrid / electric vehicles.

Car sales in the EU were 1.2% higher on an annual basis compared to 2018. Sales growth in 2019 was recorded by Germany (+5%), France (+1.9%) and Italy (+0.3%), while demand fell in the UK (-2.4%) and in some markets, important for the port of Koper (Spain -4.8%, Czech Republic -4.4%, Austria -3.4%), which affected the decline in the number of transhipped cars. A significant reduction in throughput at the port of Koper in 2019 caused a decline in vehicle sales for the Turkish market and was further affected by the situation on the Chinese market.

In 2019, the share of sales of petrol cars in the EU market increased from 56.6% to 58.9%, while the share of diesel cars decreased from 35.9% to 30.5%. Electric vehicles accounted for only 3% of new car sales, one percentage point more than in 2018.

- **Political measures decided, e.g. coal phase-out, programs for strengthening rail, digitalisation...**

The EU supports the withdrawal of cargo from the roads. In 2011, the European Commission adopted a White Paper setting out strategic guidelines for the long-term achievement of transport policy objectives. It has set 10 goals for a competitive and resource-efficient transport system with greater use of more energy-efficient modes of transport. The main target is that by 2030, 30% of road freight transport over 300 km should be diverted to other modes of transport, such as rail or waterborne transport, and by 2050, more than 50% of road freight transport.

Public railway infrastructure in Slovenia is state owned. The Slovenian Infrastructure Agency is responsible for the construction, upgrading, renovation and maintenance of public railway infrastructure of 1,207 km of railway lines. The manager of the public railway infrastructure is the company Slovenian Railways (Slovenske železnice-Infrastruktura, d.o.o). The basic condition for Slovenia to maintain its involvement in international corridors in the future is the modernization of main lines so that they will meet the required European standards in terms of carrying capacity, speeds and communication systems.

Currently, 6 major projects of modernization of existing lines and construction of a new line Koper - Divača are underway on the Slovenian railway network. The modernization mainly includes the increase of the permitted axle load of the tracks to 22.5 tons, safety and technical upgrades and, in general, the renovation of lines and stations in accordance with European standards. The introduction of the European Train Control System (ETCS), which will enable cross-border rail traffic without stopping trains at the border, plays an important role. This will provide an additional competitive advantage in both freight and passenger transport, as the continuous cross-border traffic flow will reduce travel time. The projects are financed from EU funds (CEF, Cohesion Fund, European Regional Development Fund) and from the state budget, while the construction of the second track has a slightly different financial foundation.

The port of Koper is entering a new decade with a new Strategic business plan 2020-2025, which is focused on business growth, reorganization of work processes, digitalization, automation and all aspects of sustainable development. Although the port activity strongly depends on global and regional changes in logistics and the economic situation in the world, the port of Koper will respond to these challenges by investing in port facilities, which will strengthen the competitive position of the port of Koper in the region, especially after the construction of the second railway track to enable sufficient connection of the port with its hinterland. Within this period strong investment cycle is foreseen in all terminals of port of Koper.

1.4 Analysis of the industrial structure and clusters (potential customers)

Remark on methodology:

The given structure for 2.4 reflects an integrated assessment of the whole freight market (rail, road, waterways) in the given regional structure to then determine by suitable measures (e. g. check-list) the affinity of certain goods for rail shipment. This should help to identify potential fields of growth for rail traffic.

If for a region sophisticated transport models support a two-step approach with assessing the whole market in a first step and using other modules of the model to determine rail freight market share, the project partners providing the market potential analysis are free to define sub-chapters in this chapter to reflect that two step approach (see figure 1 in annex). This approach is also possible, if a region considers port and hinterland.

The analysis of the industrial structure and clusters shall give an insight of potential goods and customers (respective loading units for the ports) for the transport of freight on railway. First every partner shall analyse all freight and industries in general (including road suitable) to then define what is high rail freight suitability and which of the goods and industries (respective loading units for the ports) are high rail freight suitable. The table/check-list will help to give an overview of these goods and industries for regions and loading units for ports.

Aspects to analyse the industrial structure and clusters differ from port to regions, but mostly are:

- Location of major industries/companies (origin of resources/products) (size and branch) -> How is their rail accessibility/network access?
- Location of major logistic hubs (destination of resources/products) -> How is their Rail freight capacity / suitability?
 - e.g. existing connection, earlier (now closed) rail freight services and/or access points, production volume, 24/7 operation, bulk/heavy products/resources, present transport flows with/without intermodal transport, access to intermodal hubs...?
- Loading facilities
- Transport volume/quantity and group of goods
- Type of loading unit, e.g. container, trailer, general cargo in boxes...

In the analysis of market potentials for ports (Trieste, Koper) the ports themselves should be treated as origin/destination of goods whereas territories (regions, countries) should investigate businesses in their areas to receive/ship goods (with focus on industries prone to railway transport).

Port of Koper is recognised as a core port of the TEN-T European transport network, lying at the intersection of two important corridors:

- the **Baltic-Adriatic** corridor (BAC),
- the **Mediterranean** corridor (MED).

The port also lies on three main railways corridors:

- the rail freight corridor 5 (RFC 5),
- the rail freight corridor 6 (RFC 6),
- the rail freight corridor 11 (new Amber corridor).



Figure 8: Location of the port of Koper

The port of Koper area covers 274 hectares of land, including 50.7 hectares covered warehouses and 109 hectares of open storage areas. Along 179 acres of marine surface and 3,282 meters of shore, there are 26 berths. The port of Koper has more than 1.500 employees. Logistics services comprise:

- managing the port area,
- collection and distribution center services for all product groups,
- goods services (sorting, palletizing, sampling, security, labelling, weighing, cleaning, etc.) that goes hand in hand with the development of logistics services and upgrade customer demand,
- integrated logistics solutions.

Port of Koper, managed by Luka Koper d.d., is a multipurpose port. In the port of Koper, 5 profit centres (PCs) are established, altogether operating on 12 terminals:

- PC Container Terminal
- PC Car and Ro-ro Terminal
- PC General cargo Terminal
- PC Dry Bulk and Liquid Terminal
- PC Cruise Terminal

Car and Ro-ro terminal	Operative shore	800 m
	Berths	7
	Ro-Ro ramps	4
	Railway facilities	15 tracks, total length 7.1 km, loading/unloading ramps
	Open storage areas	600,000 m ²
	Covered storage areas	125,000 m ²
	Open air storage capacity	38,000 units
	Covered storage capacity	6,000 units



General cargo terminal	Operative shore	840 m
	Berths	6
	Sea depth	7 - 10 m (with prior arrangements up to 12.5 m)
	Multipurpose closed warehouses	139,400 m ²
	Roofed warehouses	3,600 m ²
	Open storage areas	40,000 m ²
Reefer terminal	Quayside	840 m
	Sea depth	6
	Berths	7 - 10 m (with prior arrangements up to 12.5 m)
	Warehouse with moisture regulating devices and temperature ranging from 0 to +20°C	25,800 m ²
	Refrigerated spaces for deep freezing down to -18°C	3,600 m ²
	Open storage areas	40,000 m ²
Timber terminal	Covered storage capacities	60,500 m ²
	Open storage capacities	90,000 m ²
	Annual capacity	1,500,000 cbm
Dry bulk cargo	Quay	525 m
	Sea depth	6 to 12,5 m
	Berths	3
	Closed and covered storing capacity	80.000 ton
	Open space storing capacities	40.000 ton
Silo terminal	Operative shore	500 m
	Sea depth	13.5 m
	Silo storage capacity	60,000 tons
	Flat stores storage capacity	55,000 tons
Alumina terminal	Operative shore	250 m
	Sea depth	14 m
	Berths	1
	Storage capacity	20,000 t
	Loading capacity	100 t/h
	Unloading capacity	220 t/h
Iron ore and coal terminal	Operative shore	630 m
	Berths	3
	Max. arrival draught	17.20 m
	No restriction till arrival draught	16.50 m
Liquid cargoes terminal	Total of 51 shore tanks with capacity from 300 to 20,000 m ³	203,000 m ³
	Berths	5
Livestock terminal	Number of stables	2
	Sea depth	4 to 8 m
	Berths	1+1
	Single storage capacity	1300 heads of cattle
Cruise terminal		

Table 2: Capacities of terminals in the port of Koper

Austria	Koper - Graz (Cargo Center Graz)	10x weekly
	Koper - Enns - Salzburg (TFG Transfracht)	2x weekly
	Koper - Villach - antenna to Vienna, Linz, Salzburg, Wolfurt (RCO/Adria Kombi)	up to 5 trains/week
	Enns - Koper (Maersk)	1x weekly
	Ybbs, Krems - Koper (Mettrans) - export trains (Mettrans)	2x weekly
	Linz - Koper (export trains) (Mettrans - export)	4x weekly
Hungary	Koper - Budapest BILK (Adria Kombi)	7 trains weekly
	Koper - Budapest Csepel - roundtrip trains (Mettrans)	12 trains / week
	Koper - Budapest Törökbálint (Integrail)	3 trains / week
Slovakia	Koper - Dunajska Streda - Koper (Mettrans) roundtrip trains with antennas to Kosice, Krems an der Donau, Ceska Trebova (Mettrans)	14 trains / week
	Koper - Bratislava - Terminal RCO (Adria Kombi)	4 trains / week
	Koper - Žilina (Mettrans)	3 trains / week
	Koper - Žilina (Adria Kombi / RCO)	up to 6x trains / week
	Koper - Bratislava - Spap Terminal roundtrip dedicated (Mettrans)	1x weekly
	Koper - Žilina (Raillex)	1x weekly
Czech Republic	Koper - Dobra u Fridku Mystku (Adria Kombi - dedicated)	4 trains/week
	Koper - Ostrava (Mettrans)	2x weekly
	Koper - Paskov (AWT dedicated)	1x weekly
	Koper - Dunajska Streda - Koper (Mettrans) (Mettrans - roundtrip trains with antennas to Ceska Trebova)	daily
	Koper - via Ostrava (CZ Terminal Senov) - South Poland (Mettrans)	7x weekly
Poland	Koper - Wroclaw (Siechnice) - Ostrava - Koper (Baltic Rail)	2 trains / week
Germany	Koper - Ljubljana - München (Adria Kombi)	5 trains/week
	Koper - München (Adria Kombi)	3x weekly (direct service)
Slovenia	Koper - Ljubljana - Celje - Maribor (Adria Kombi)	2 trains / day
Bulgaria	Koper - Sofia (Adria Kombi)	spot train
Romania	Koper - Arad (Adria Transport)	1 train / week
Italy	Koper - Padova (Adria Kombi dedicated)	1 train / week
Serbia	Koper - Novi Sad (via Budapest) (Adria Kombi / Transagent d.o.o.)	Weekly service
	Koper - Ljubljana - Beograd (Adria Kombi)	2x weekly
Croatia	Koper - Ljubljana - Zagreb (Adria Kombi)	2x weekly

Table 3: Rail connections from port of Koper (Source: <https://www.luka-kp.si/eng/railway-connections>)

Freight transport

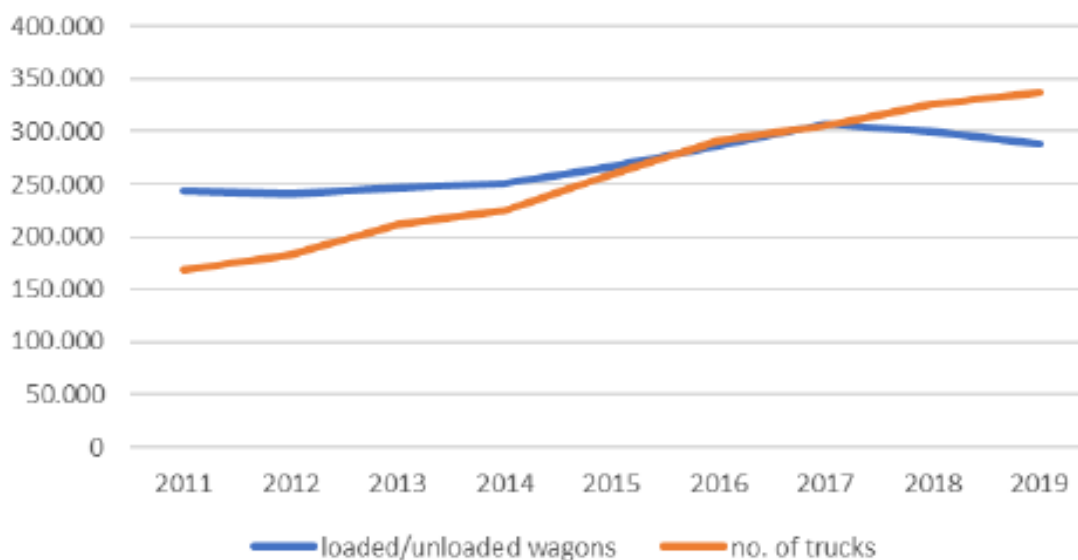
Port traffic is still very dynamic, especially for containers. The growth observed between 2010 and 2017 in the ports of the Mediterranean Corridor is higher than the average growth observed in the North Sea

ports over the same period. However, rail share for land access to the ports can still be improved with better rail connections and more efficient terminals.

Concerning freight transport, the global volume of goods transport would grow by 27% between 2016 and 2030 in the base scenario. The implementation of the whole TEN-T core network - reference scenario - would induce an increase of 29% of rail traffic (in tonnes-km) compared with the baseline scenario. Along the corridor alignment, the modal share of the rail is expected to raise from 18% to 22% in the reference scenario. It should be underlined that estimates of the impact of the implementation of TEN-T should be seen as a minimum, especially for freight, since some effects (gauge, train length etc.) are not considered in the applied models.

General info

The increase of volumes (mainly containers and cars) in the last decade has brought the transport mechanisms to their limits and considering that the railway system has its specifics and rigid logistics rules, it was the first transport mode through which it was evident that the need for an upgrade of the infrastructure is necessary. In other words, the road transport is more flexible than the rail transport and the increase of the volumes of cargo in last years has brought the railway in Slovenia to its natural limits, pushing for an increase of road transport to satisfy the market's demand. The trend is highlighted in the below, with the orange line showing how the transport by trucks is increasing at the expense of rail transport, which found some logistics and operative obstacles along the entire trip to the final destinations. The railways over EU are simply too busy to face the increasing volumes of cargo and it's tough to include new services on such obsolete infrastructures (for example, on some tracks, lacks linked to the electrification of rails are reducing transit times).



Graph 5: Transport modes from/to port of Koper in the period 2011-2019

Containers

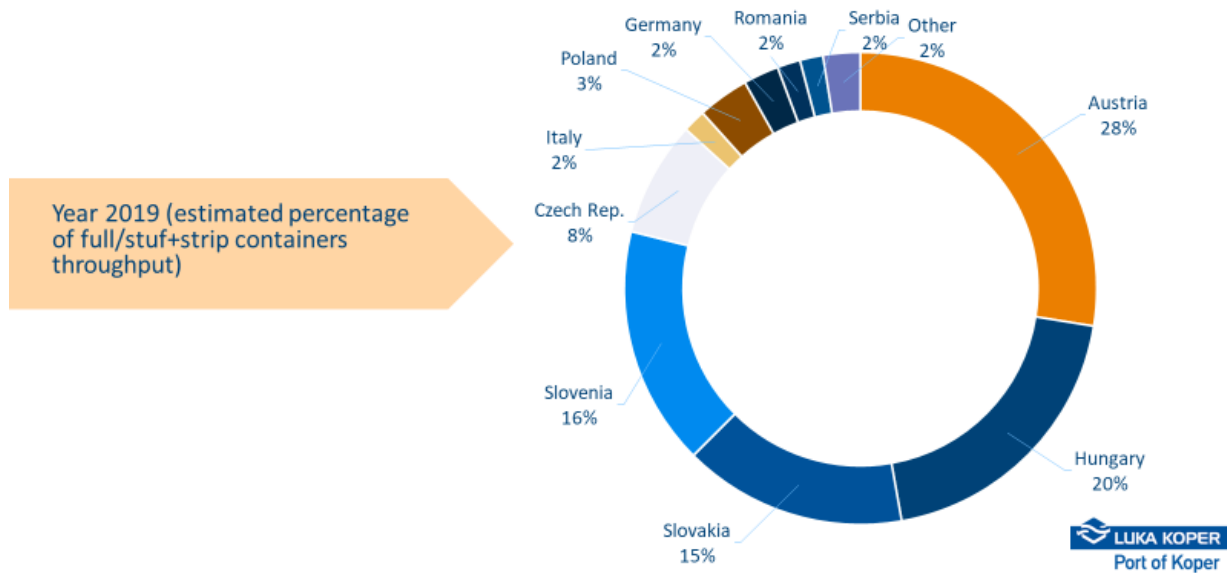


Figure 9: Hinterland container markets of port of Koper

Newly developed rail services for/to port of Koper

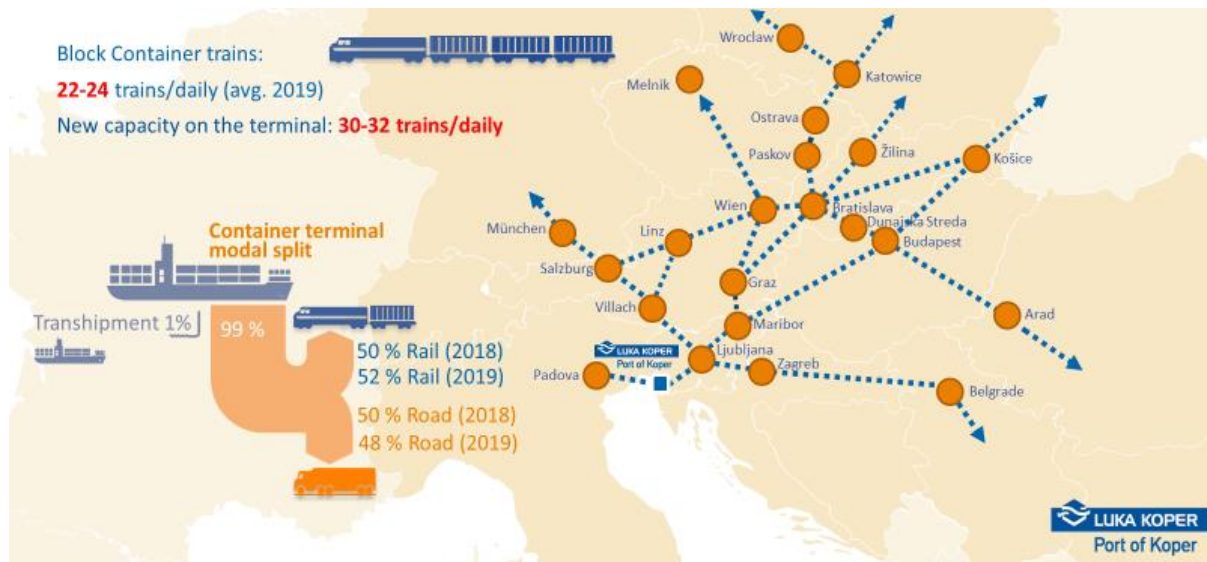


Figure 10: Developing efficient and competitive container railway services (Source: Luka Koper d.d.)

- **2016:**

Only in the last couple of years, several important railway services to/from port of Koper have been established. In 2016, new container block train on the Koper - Salzburg - Koper route was established. New direct service connects port of Koper to CTS Salzburg terminal.

- **2017:**

In 2017, new direct rail service to Budapest/to the Mahart terminal was established. The service connects the container terminal in the port of Koper and the Hungarian capital twice a week, thus increasing the offer on the railway transport market.

- **2018:**

In 2018, a direct line (three times a week) from port of Koper container terminal to Terminal Riem in Munich, Germany was established. It represents a significant improvement in the services of container transport, as so far, every container has had to be transhipped in Ljubljana, which has delayed the service and made it more expensive.

Furthermore, in 2018 a new container service to/from terminal in Melnik (40 km north of Prague, Czech Republic) was established. It is a service of the shipping company Maersk Line, which counts mainly on export quantities from the Czech Republic, which will travel via Koper to the Mediterranean and the Far East. The Czech Republic is considered to be the fourth most important container market in the port of Koper.

- **2019:**

A new railway connection between the Koper container terminal and Austria started operating in May 2019. The railway operator TFG Transfracht has started a regular container service on 13 May 2019, which is connecting Koper with the terminals in Enns and Salzburg on both the import and export routes. The connection, which operates twice a week, will further strengthen and expand the port's connection with the Upper Austrian market, which represents great potential for new flows of goods.

In 2019, also the rail service to/from Ploiesti (Romania) and port of Koper container terminal was established. The service operates once a week between Ploiesti and the BILK terminal in Budapest, and the connection from Budapest to Koper is provided 1-2 times a day. The connection opens up new opportunities, especially for Romanian exporters and exporters looking for time-efficient and diversified overseas connections from the Mediterranean to the Far East.

- **2020:**

In 2020, new railway service to/from Bratislava (Slovakia) for container transport has been established. In addition to short transit times, the service also offers truck deliveries to ports in Slovakia and the option of 'antenna' connections to the Czech Republic, Poland and Hungary. The service joins an extensive network of connections that connect Koper with various destinations in Slovakia daily.

Researching the market in North Adriatic Ports Association (NAPA) area ended with an outcome, where also a specific assumption for the allocation in Northern Adriatic ports was presented. It is interesting that besides an **annual cumulative potential of 6 million TEUs considered by year 2030 for all North Adriatic ports**, the biggest estimated share belongs to the port of Koper, which might achieve one third of it and is in line also with the other forecasts presenting for Koper 2 million of TEUs. In 2018 NAPA ports had altogether 2,47 million TEUs of throughput, Koper share representing 40%.

General cargoes

Timber and general cargoes are traditionally present at the port of Koper, where approximately 100 product groups are handled, but mostly: coffee, sugar, rice, paper, pulp, magnesite, aluminium, profiles, steel plates & coils, pipes, rails, household appliances, project cargo, etc.

Globally speaking, the containerization process that is inducing transportation of goods in containers, is affecting negatively most other traditional cargo groups, especially general cargoes which are easy to accommodate and transport in standardized container units. Nevertheless, at the port of Koper, due to collaboration between terminals and complementarity of cargo groups, new potentialities are being created also for the General Cargo Terminal, which is offering stuffing and stripping of containers, providing therefore an auxiliary service for the container terminal, improving also the port's offer from the market perspective.

Nevertheless, there are some specific cargo groups, for which it is expected not to be affected by the containerization process and shall remain handled in a traditional way:

- Steel coils: since there are well established cargo flows with new vehicles through the port of Koper with relevant potentials, also the related steel coils flows show relevant potentials.
- Timber on the other hand has been traditionally present at the port of Koper since its inception, due to its favourable climate. Although the traffic depends on economic stability of Middle East, area toward which timber is exported, quantities at the port of Koper remain important, so suitable space is needed for storage.

In the last years there is also arrival of greater quantities of other general cargoes (ex. sugar, coffee, cellulose and soy). Also, corn, beet pulp, fertilizers, paper and fast-moving consumer goods and raw materials for pharmaceutical industry have been identified as cargoes with potential growth for throughput in the future. Based on expected increase of these traffics, besides warehousing capacities, berthing and connecting infrastructure must be provided considering a comprehensive port development.

Liquid cargoes

The Terminal for liquid bulks is mainly dedicated to fuels and chemicals with 45 shore tanks and 200.000 m³ of total capacity. The port of Koper offers specialized facilities for handling and warehousing of chemicals, minerals and vegetable oils on two different terminal locations in the port of Koper. Both are equipped for loading and unloading of ships, wagons and trucks. For special requirements the company can provide also insulated and heated shore tanks, nitrogen blanketing and dedicated lines. With the proper equipment and with Luka Koper's status of authorized warehouse keeper, the company performs several services on goods such as: mixing of chemicals, denaturizing of alcohol, colouring of heating gas oil, adding biodiesel to the automotive gas oil as well as filtering, blending, etc., which also leads to an improvement in the products. The terminal is equipped with 4 RTC loading stations for trains besides 4 truck loading stations.

Potentials for liquid bulk, general cargoes and dry bulks are less prominent than those for containers, but nevertheless still important for the port development (considering its multi-purpose history and future orientation).

The demand of fuels and chemicals for the plastic industry is constant and even if in small percentages, the volumes are increasing, showing also positive forecasts for the next years.

Loading units (for ports)	High rail freight suitability	
	yes	no
containers	x	
cars	x	
general cargoes	x	
- in boxes		
- on pallets		
- project cargoes		
dry bulk cargoes	x	
liquid cargoes	x	

Table 4: Potential of rail freight loaded in port Koper

2. Central Slovenia Region

2.1 Analysis of regional rail network and services

Pilot in Central Slovenia region is a part of Western Slovenia (NUTS-2) and is located near Grosuplje rail station which is intermediate station on regional line no. 80 state border-Metlika-Ljubljana and at the same time the starting station on line no. 82: Grosuplje-Kočevje. This railway lines represents also a freight potential for REIF pilot and are described below.

Grosuplje railway station

The Grosuplje railway station is an intermediate station on regional line no. 80 state border-Metlika-Ljubljana and at the same time the starting station on line no. 82: Grosuplje-Kočevje.

The station Grosuplje is located at an altitude of 332 meters and is open for arrivals and departures of passengers and domestic traffic and is open for transport of goods on the basis of a special arrangement with the carrier. The maximum length of the train at the station is 557 m.

In the station area there are 9 tracks, 14 switches, 4 derails and a turntable on track no. 7, length 14.50 meters.

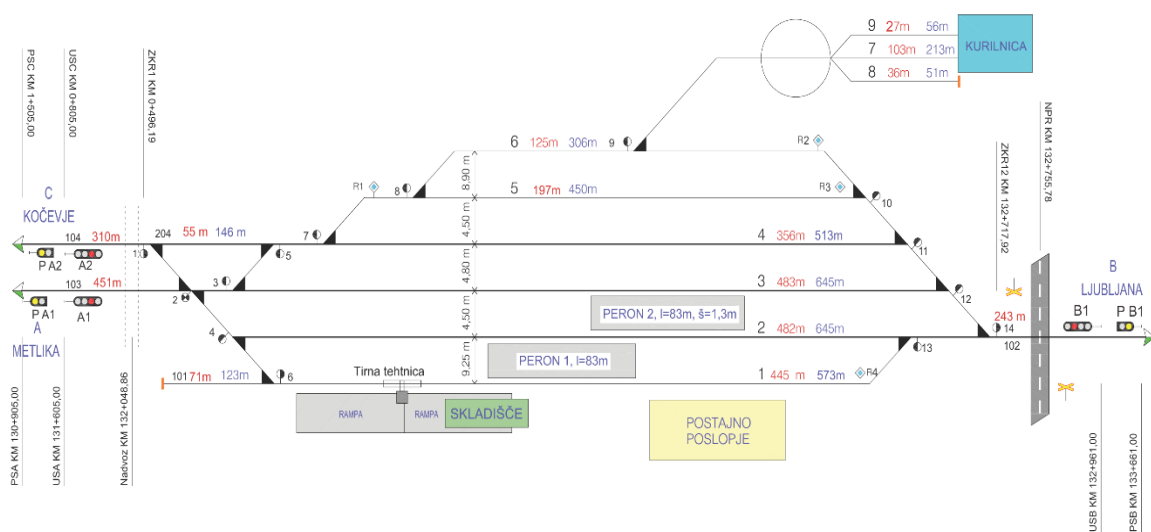


Figure 11: Station Grosuplje (Source: PIL d.o.o.)

Regional line 80: State border-Metlika-Ljubljana

The railway line between Metlika and Ljubljana was constructed along sections in several stages between 1893 and 1914. The regional, single line track is 123 km long, non-electrified and equipped with relay and mechanical signalling safety devices.

Line is divided into five sections: Ljubljana-Grosuplje, Grosuplje-Trebnje, Trebnje-Novo mesto, Novo mesto-Metlika and Metlika-Metlika state border (s.b.). The maximum speed on the line is 85 km/h and the braking

distance is 700 metres. The line is declared for 20 t axle load (category C2). On the regional line s.b.-Metlika-Ljubljana there are 13 stations, 4 loading points and 18 stops. In the following, it make sense to consider only the sections to the Novo mesto station.

On the line s.b.-Metlika-Ljubljana there is regular passenger and freight transport.

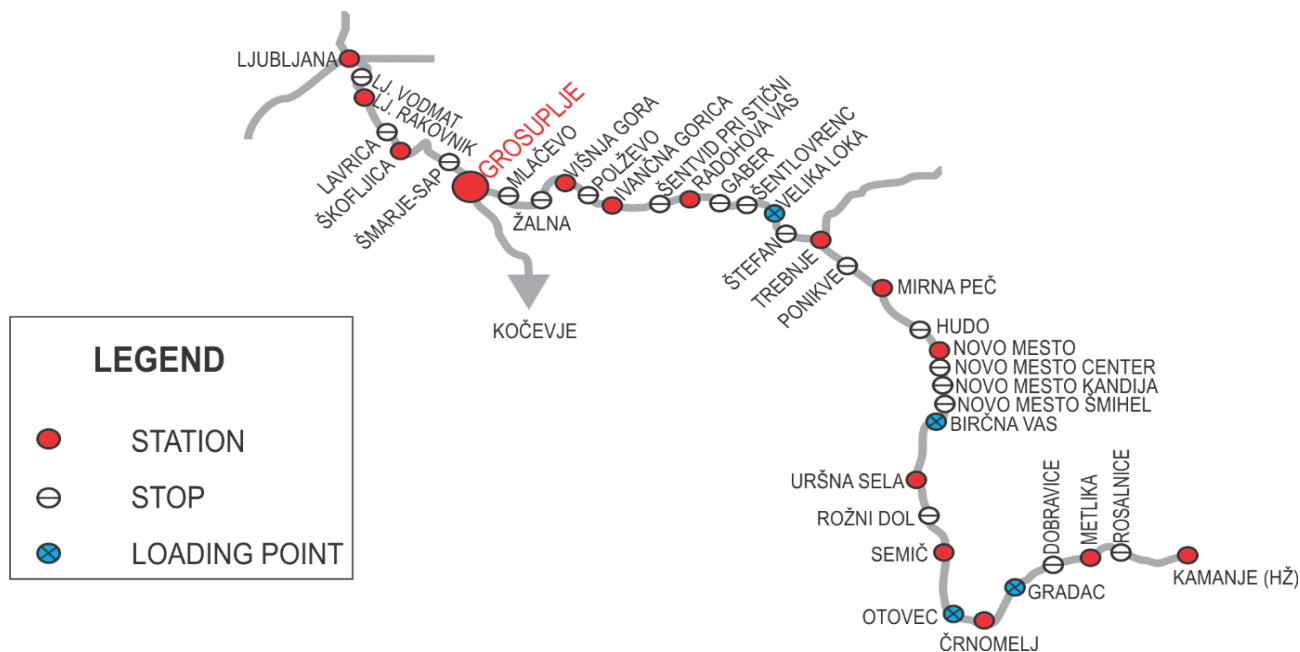


Figure 12: Regional line 80 state border-Metlika-Ljubljana with stations and stops (Source: PIL d.o.o.)

Regional line 82: Grosuplje-Kočevje

The regional railway line Grosuplje-Kočevje, also called the Kočevska line, was constructed in 1893 as part of the line Ljubljana-Grosuplje-Kočevje. It connects TEN-T corridor through Ljubljana.

The line is single track and non-electrified, is 48.6 km long and declared for 22.5 t axle load and the speeds on the line is 100 km/h.

The line is intended for freight transport under special conditions. Passenger traffic is currently being established.

On the regional line Grosuplje-Kočevje there are 4 stations, and 5 stops.

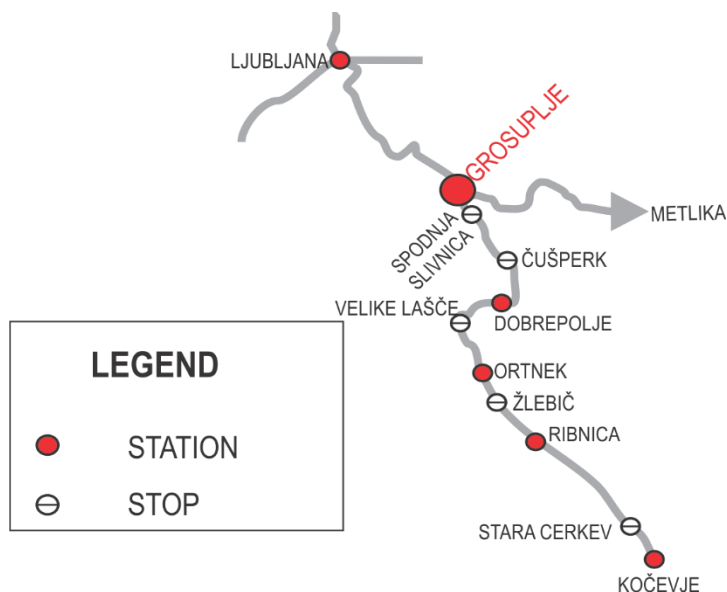


Figure 13: Regional line 82 Grosuplje-Kočevje with stations and stops (Source: PIL d.o.o.)

The line has been renovated in the last 10 years. The overhaul is planned from 2008 to 2019. In 2020, signal safety devices were arranged. In 2021, an operating permit is obtained. Planned traffic volume: 8 pairs of passenger trains and one pair of freight trains per day.

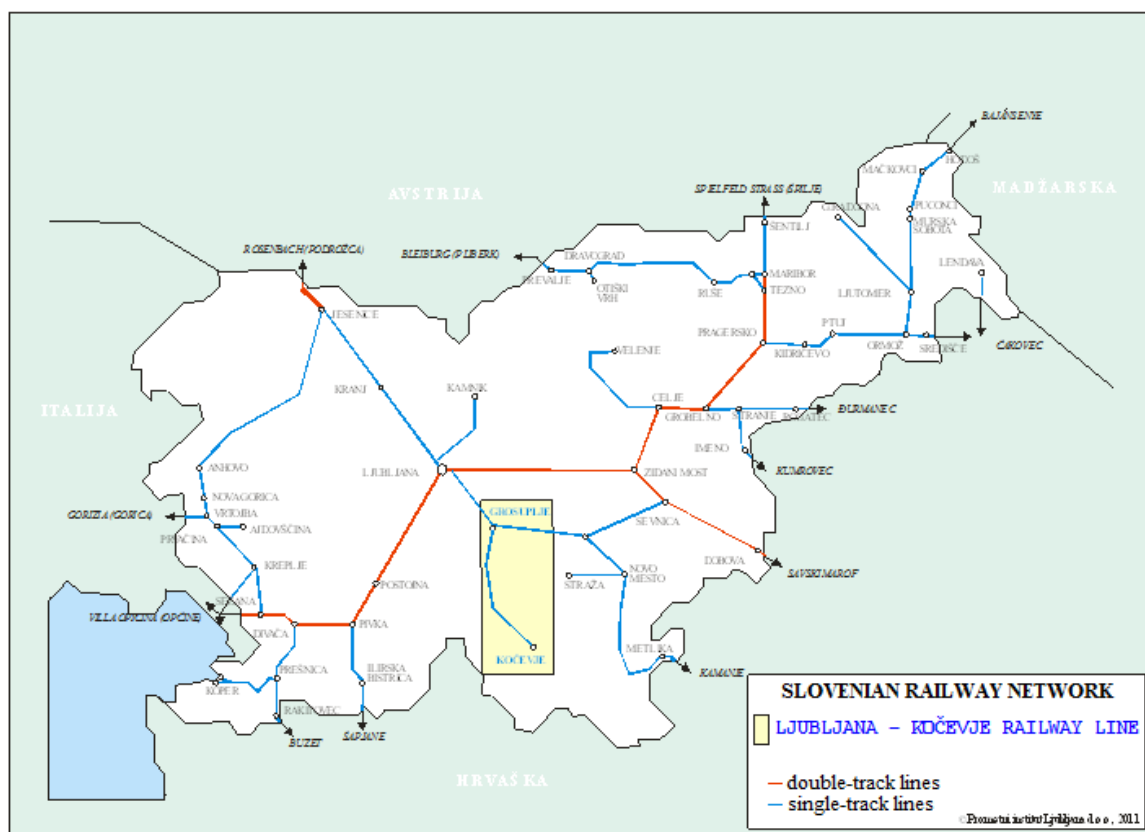


Figure 14: Regional railway line no. 82 Grosuplje-Kočevje (Source: PIL d.o.o.)

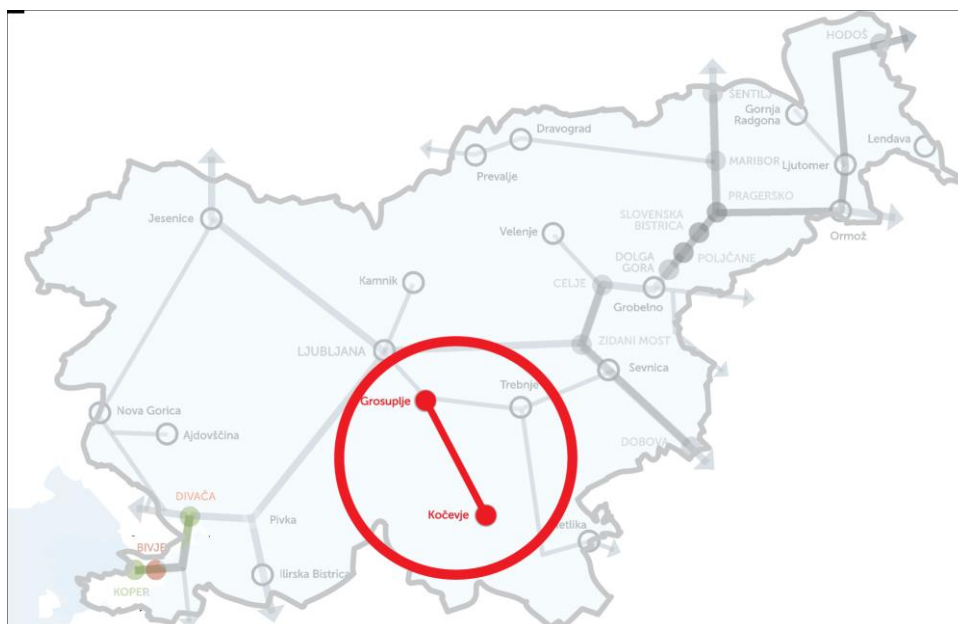


Figure 15: Location of railway line Grosuplje-Kočevje in Slovenian railway network (Source: PIL d.o.o.)

Industrial tracks

Railway station Grosuplje itself does not have any private industrial sidings, but some other railway stations on the connecting regional lines does. Agency of the Republic of Slovenia for Commodity Reserves has its own sidings at Novo mesto, Kočevje and Ortnek. Industrial sidings for wood industry are located at the stations: Škofljica, Ribnica, Kočevje and Novo mesto. Industrial sidings for automobile industry are located in Novo mesto. Novo mesto as a regional centre has more additional industrial sidings, which supported different types of industry production.

Within the Grosuplje station is planned an industrial track of the car logistics centre owned by the company "Avtotransporti Kastelec". Preparation for the documentation (including design) for construction of an industrial side track is planned within REIF pilot activities. A track construction is not part of the pilot.

The company Avtotransporti Kastelec has acquired the basis for the track connection of its parking and other business areas with the railway line no. 80 s.b.-Metlika-Ljubljana on the rail section before the station Grosuplje, where the upgrade is being carried out. A connection with a split switch on the open line of the railway line section or a connection directly from the Grosuplje station is planned. Two connection variants have been made.

In the first variant, the industrial track branches off from the line on the section before the station, which is approximately 80 m in premium. It is carried out with two switches and a shield rail. The industrial track is then adapted to the parking lot along the track and ends with a concrete track end, which is clamped in the loading and unloading ramp. The usable length of the industrial track is 250 m.

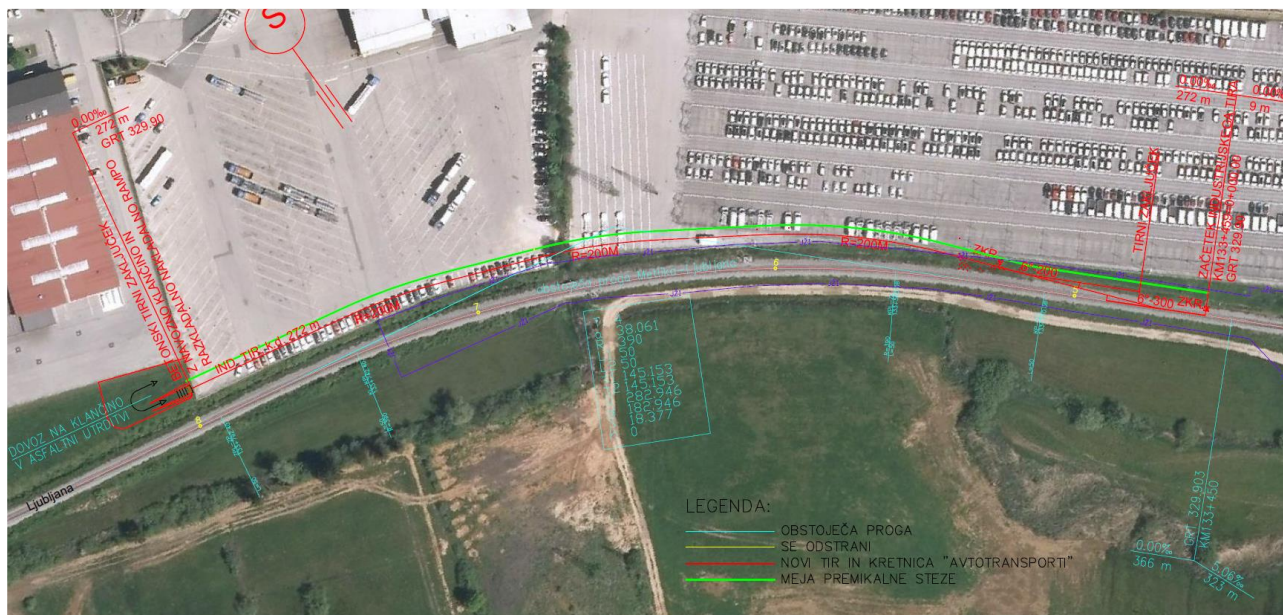


Figure 16: The area of the industrial track, which branches off from the regional line in premium, variant 1 (Source: Technical report - Industrial track Avtotransporti Kastelec, 2017)

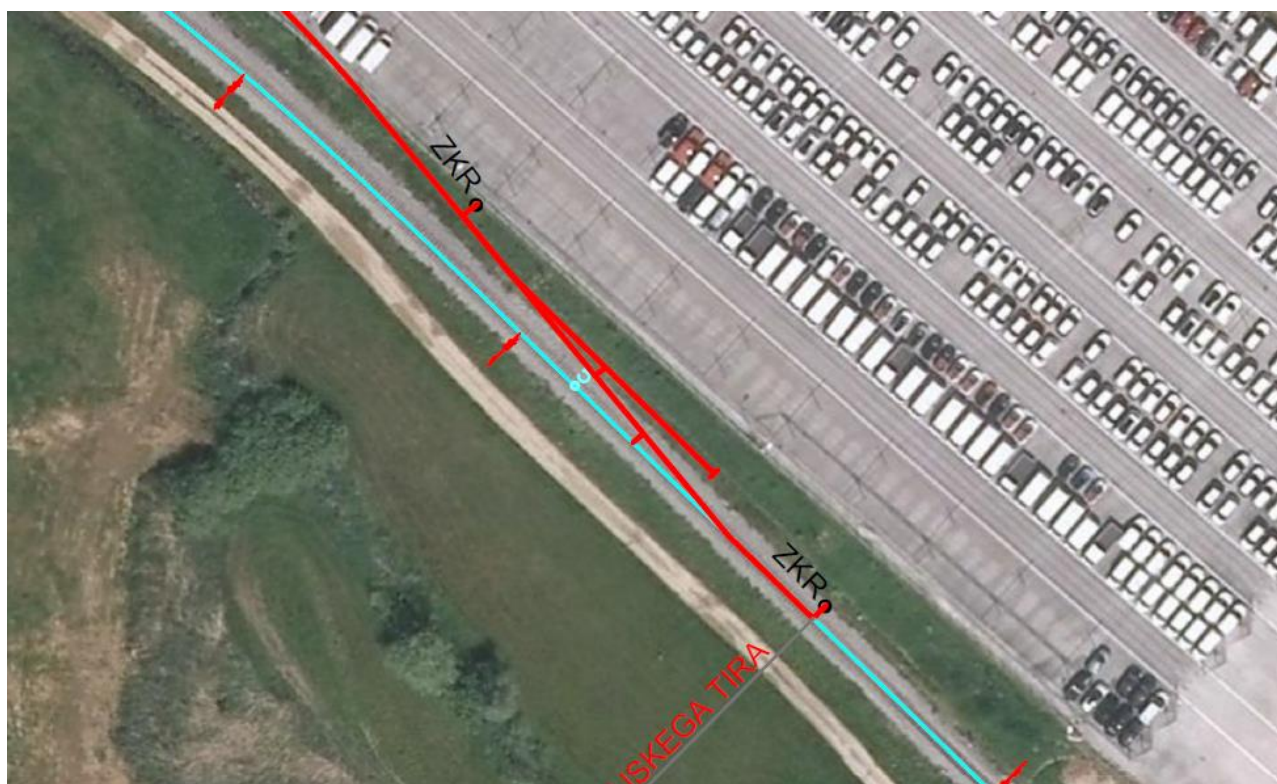


Figure 17: The area of connection of the industrial track to the regional line, variant 1 (Source: Technical report - Industrial track Avtotransporti Kastelec, 2017)

The second variant envisages the construction of a new track, which runs to connection to the existing line (from the Grosuplje station to direction Ljubljana in the length of approximately 1.100 m). This track will serve as the second track of the open line. In this case, the currently existing line is diverted to the asphalt

plateau of the company and serves entirely as an industrial track. This significantly prolongs the useful length of the industrial track (approximately 500 m).



Figure 18: The area of the industrial track starting from the station, variant 2 (Source: Technical report - Industrial track Avtotransporti Kastelec, 2017)

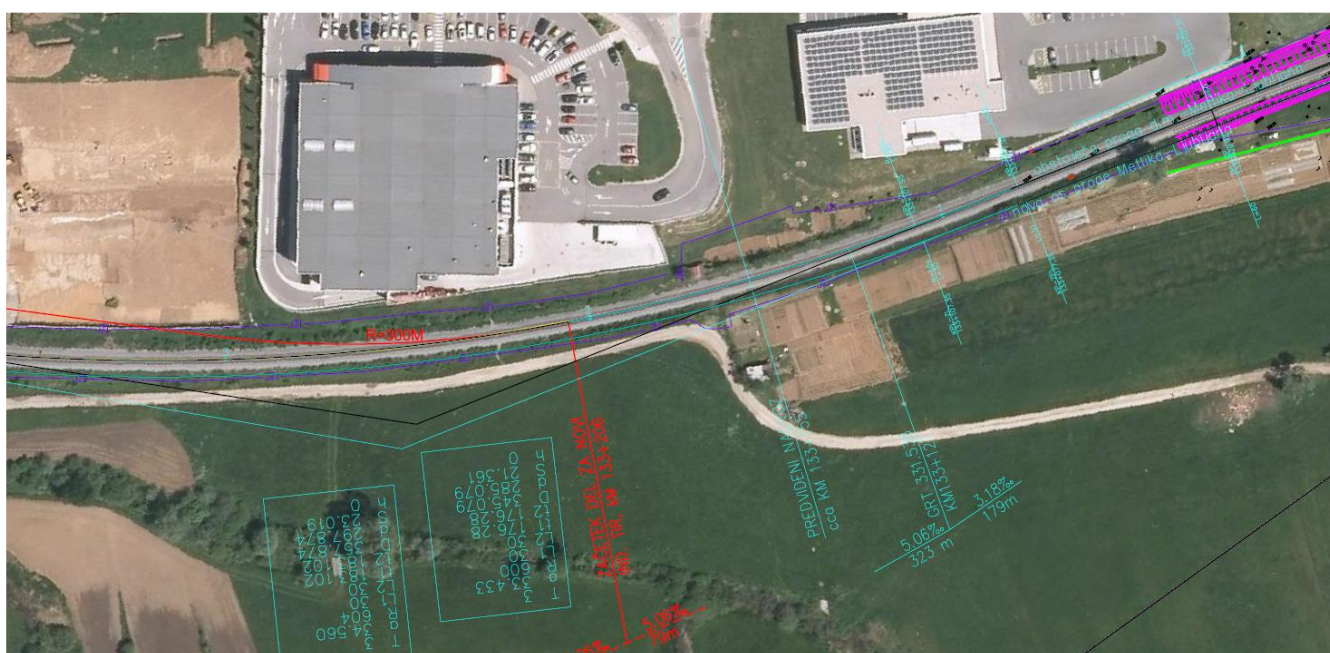


Figure 19: The area of the industrial track continuing from the existing regional line and a new parallel second track, variant 2 (Source: Technical report - Industrial track Avtotransporti Kastelec, 2017)

2.2 Analysis of the logistic market (Development and Trends)

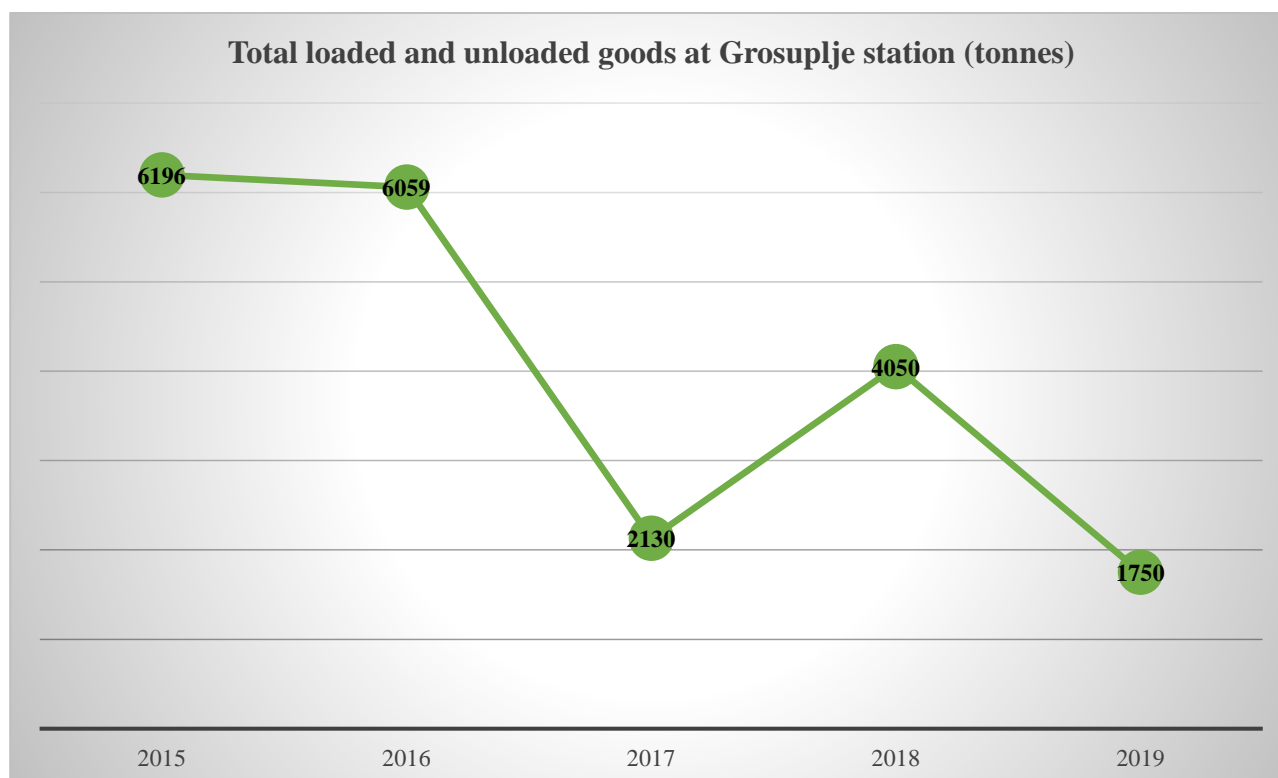
Transport volume at Grosuplje station

In 2015-2019, Grosuplje station recorded significant fluctuations in the transport volume. The highest transport volume was recorded in the first observed year 2015, with a total of 6,196 tonnes of goods, while the least loaded and unloaded goods were in year 2019, when a total of 1.750 tonnes of goods were loaded and unloaded, the growth index is 0.32.

The following table and figure show the extent of station work at the Grosuplje station during the observed 5-year period (2015- 2019). The volume of freight traffic is falling and the volume of passenger traffic is rising.

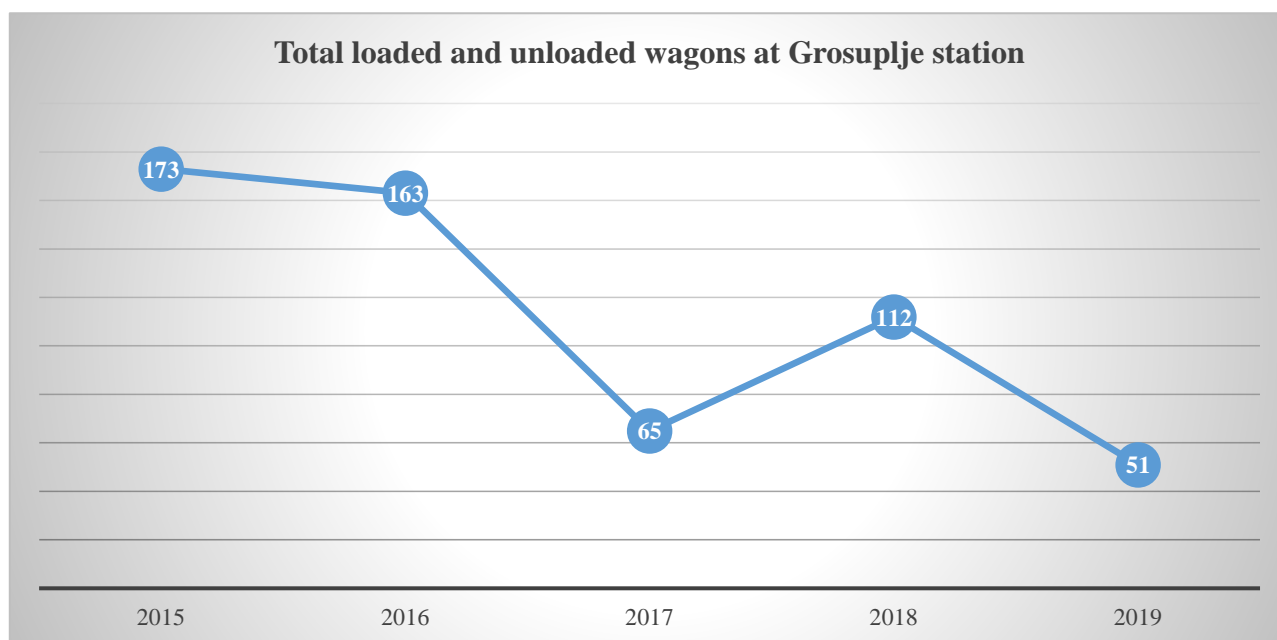
Loaded/unloaded goods	2015	2016	2017	2018	2019	growth index 2019/2018
Total loaded and unloaded goods (tons)	6,196	6,059	2,130	4,050	1,750	0,43
Total loaded and unloaded wagons	173	163	65	112	51	0,46
Loaded (tons)	6,099	5,334	1,828	3,921	1,244	0,32
Loaded wagons	159	145	56	105	33	0,31
Unloaded (tons)	97	725	302	129	506	3,92
Unloaded wagons	14	18	9	7	18	2,57

Table 5: Volume of station work at Grosuplje railway station in 2015-2019 (Source: Slovenian railways, Sector for informatics, 2020)



Graph 6: Total loaded and unloaded goods in tonnes at Grosuplje station (Source: PIL d.o.o.)

Most of loaded and unloaded goods was in 2015, and the lowest quantity in 2019. It is similar with the number of wagons, the most in 2015 and the least in 2019.



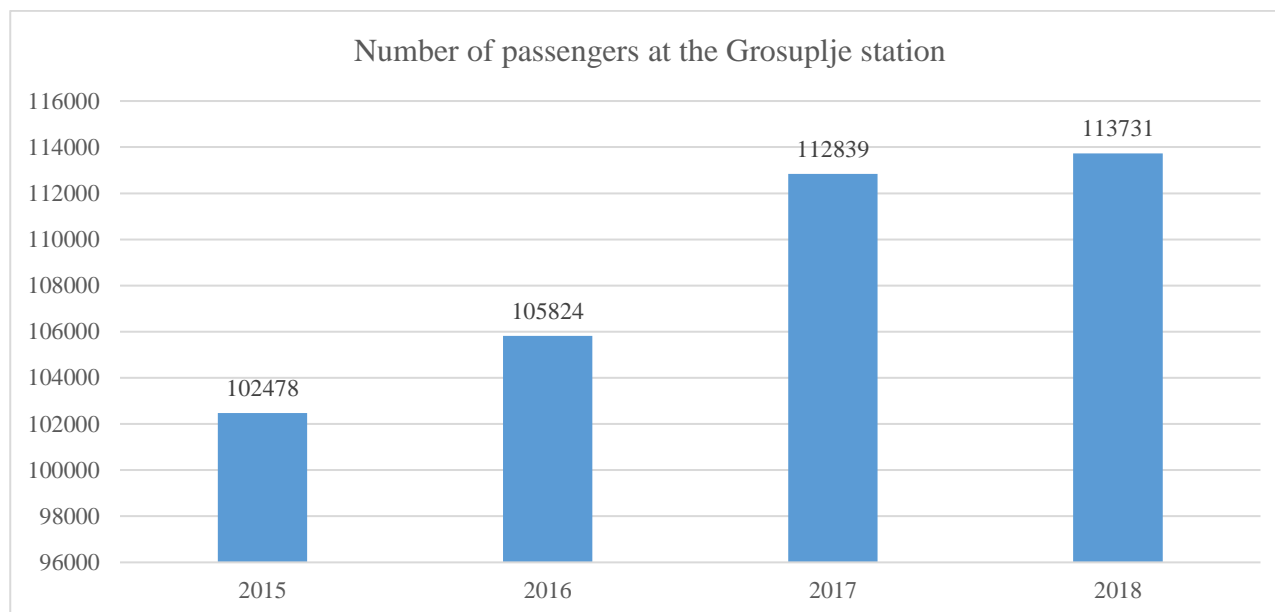
Graph 7: Total loaded and unloaded wagons at Grosuplje station

Passenger traffic is not directly relevant for REIF pilot project but it is important from rail infrastructure capacity point of view. High dense passenger traffic could be a barrier for freight transport growth and development (congested railways line), for this reason also passenger transport volume is roughly presented below.

The demonstration of the volume of passenger transport includes an overview of the number of departed passengers at Grosuplje station in the period 2015-2018. The following table and figure show the number of departed passengers at the Grosuplje station during the observed 4-year period (2015- 2018).

Year	2015	2016	2017	2018
Number of departed passengers at the station	102,478	105,824	112.839	113,731

Table 6: Number of departed passengers at the Grosuplje station during the period 2015 - 2018 (Source: Slovenian railways, Sector for informatics, 2020)



Graph 8: Number of departed passengers at the Grosuplje station during the period 2015 - 2018 (Source: PIL d.o.o.)

Freight transport on the line sections

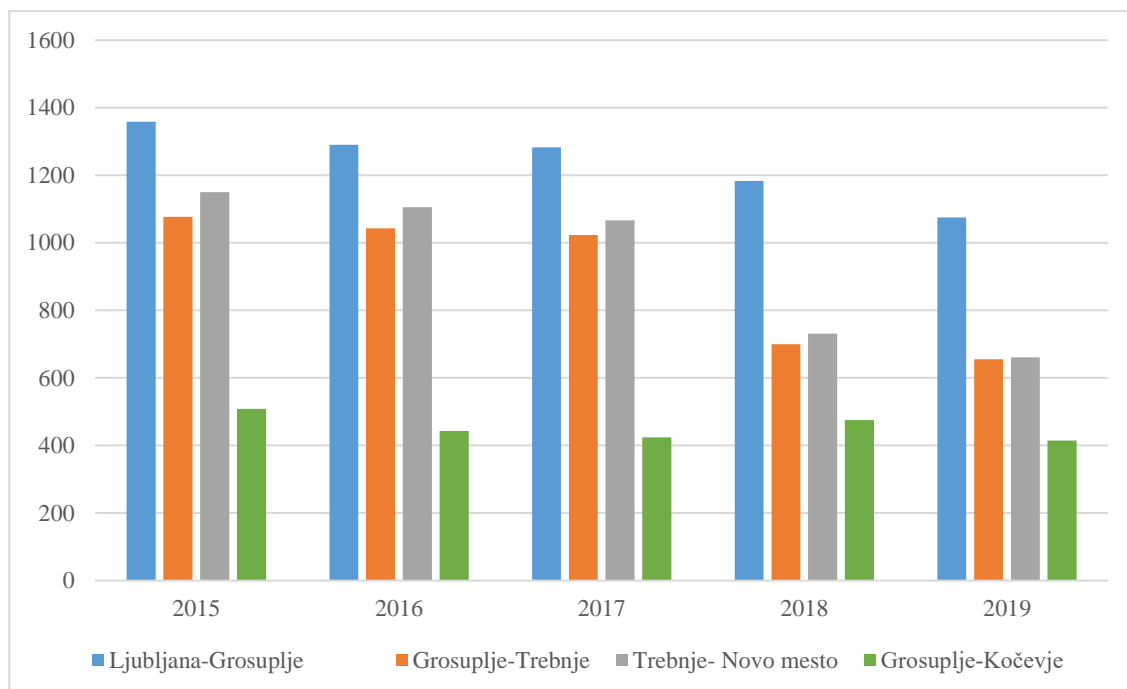
An overview of freight transport on the line sections includes number of freight trains and carried net tonnes in period 2015-2019.

The following tables and graphs show the number of freight trains and the quantity of goods transported on sections Ljubljana-Grosuplje, Grosuplje-Trebnje, Trebnje-Novo Mesto and on line Grosuplje-Kočevje.

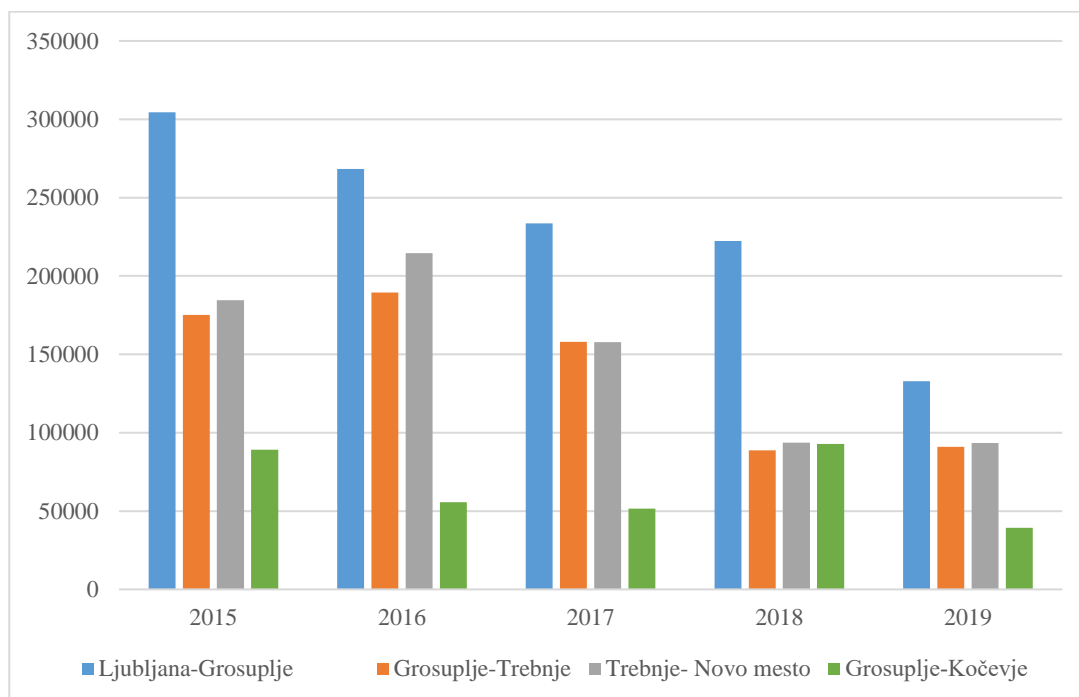
line section	number of freight trains	2015	2016	2017	2018	2019
	net tonnes					
Ljubljana-Grosuplje	number of freight trains	1,359	1,290	1,283	1,183	1,075
	net tonnes	304,503	268,250	233,567	222,276	132,851
Grosuplje-Trebnje	number of freight trains	1,077	1,043	1,023	700	655
	net tonnes	175,196	189,503	157,973	88,722	91,039
Trebnje-Novo mesto	number of freight trains	1,150	1,106	1,067	731	661
	net tonnes	184,552	214,651	157,753	93,657	93,496
Grosuplje-Kočevje	number of freight trains	508	443	424	475	415
	net tonnes	89,138	55,665	51,501	92,858	39,280

Table 7: The number of freight trains and the quantity of goods transported in 2015 - 2019 on line sections (Source: Slovenian railways, Sector for informatics, 2020)

The biggest freight transport volume is on the section Ljubljana-Grosuplje, the least on Grosuplje-Kočevje. On all line sections, the number of freight trains and net tonnes decreased from 2015 until 2019. One exceptions for number of freight train was on section Grosuplje-Kočevje in 2018. The same goes for net tonnes on this section in 2018. Two more exceptions regarding net tonnes were for sections Grosuplje-Trebnje-Novo mesto in 2016.



Graph 9: The number of freight trains in the period 2015 - 2019 on line sections



Graph 10: The quantity of goods (net tonnes) transported in the period 2015 - 2019 on line sections

Volume of passenger transport on regional lines state board-Metlika-Ljubljana and Grosuplje-Kočevje

The demonstration of the volume of passenger transport work includes an overview of the number of passenger trains on sections.

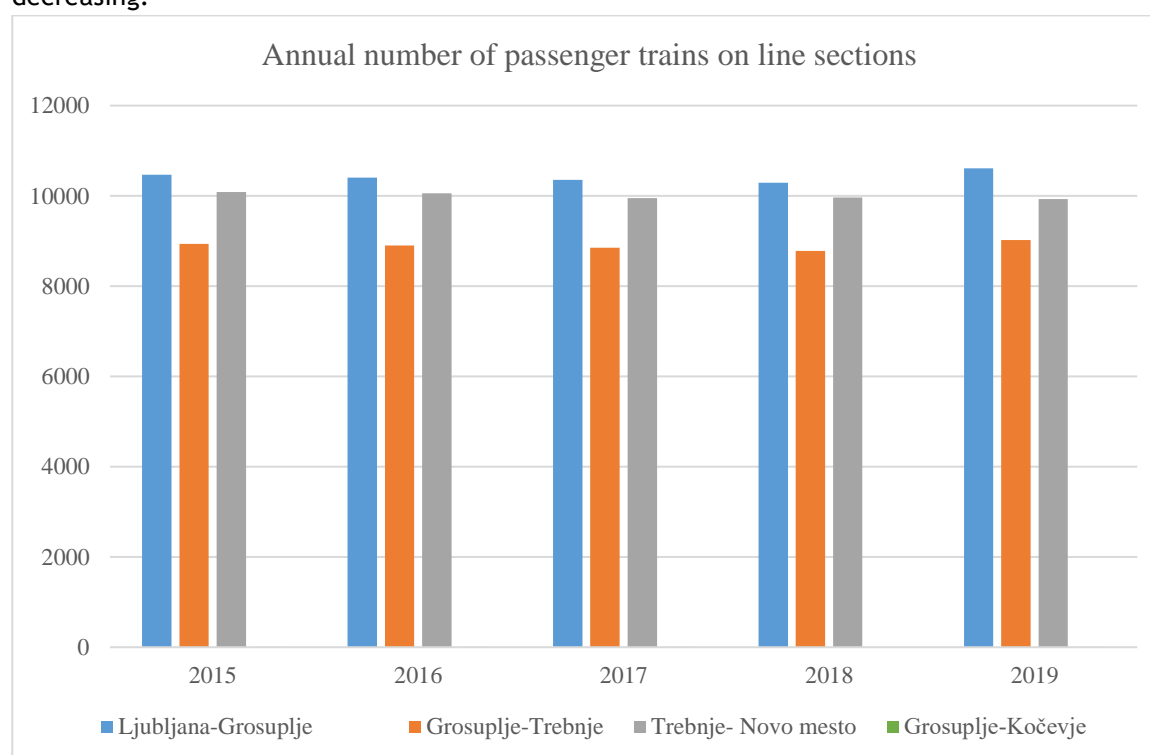
From the station Grosuplje passenger trains run in both direction (to Ljubljana and Metlika), and only freight trains in the direction of Kočevje (until 2021). The passenger transport is in the process of setting up in this direction.

The following table shows the number of passenger trains on sections Ljubljana-Grosuplje, Grosuplje-Trebnje, Trebnje-Novo Mesto and on line Grosuplje-Kočevje in the period 2015-2019.

Line section	2015	2016	2017	2018	2019
Ljubljana-Grosuplje	10,469	10,401	10,352	10,290	10,613
Grosuplje-Trebnje	8,938	8,903	8,848	8,778	9,018
Trebnje-Novo mesto	10,082	10,059	9,948	9,965	9,930
Grosuplje-Kočevje	0	0	0	0	0

Table 8: Annual number of passenger trains on line sections in the period 2015 - 2019 (Source: Slovenian railways, Sector for informatics, 2020)

The most passenger transport volume is on the sections Ljubljana-Grosuplje and Trebnje-Novo mesto, the least on Grosuplje-Trebnje. On all line sections, the number of passengers is similar in all years from 2015 to 2019. From Ljubljana to Grosuplje the volume is slightly increasing, from Trebnje to Novo mesto is slightly decreasing.



Graph 11: Annual number of passenger trains on line sections in the period 2015 - 2019 (Source: Slovenian railways, Sector for informatics, 2020)

2.3 Analysis of the economic, political and technical market conditions

Economic development of Grosuplje pilot area

Grosuplje is one of the fastest growing municipalities in region. The municipality of Grosuplje is a medium-sized Slovenian municipality located on the south-eastern edge of the Slovenian capital. It has 134 km² and around 20.000 inhabitants. The town Grosuplje is a centre of Municipality and an administrative, economic and transport centre.

Grosuplje has very good geo-strategic position, it is connected with the city of Ljubljana (TEN-T hub) by motorway (20 min) and train (half an hour). Ljubljana is capital of Slovenia and centre of the Central Slovenia region (NUTS 3).

Grosuplje is known for its rich cultural and historical heritage and as a developed craft and industrial city. It is capable of serving as a local economic centre with adequate working and shopping opportunities for the surrounding area.



Figure 20: Position of pilot area in Slovenia (Grosuplje) (Source: PIL d.o.o.)

The municipality of Grosuplje is an economically highly developed municipality. There are seven industrial or craft-entrepreneurial zones in the municipality.

It has a favourable geographical location for economic activity, fast and short connections to all major and important cities, well-organized infrastructure and great potential of economic entities - both domestic and foreign investors.

Highly economically developed area represents also good potential for rail transport.

Further, important advantage in terms of rail transport potential is ongoing modernization of railway sector (modernization of stations, new trains,...) which improves railway position towards road.

Project for upgrading of the Grosuplje railway station in years 2021-2022

The Grosuplje railway station is the junction of the regional railway line no. 80 state border-Metlika-Ljubljana and regional railway lines no. 82 Grosuplje-Kočevje. Its current limited throughput capacity poses a major problem in traffic management. The upgrade of the Grosuplje railway station will eliminate the bottleneck at the railway station.

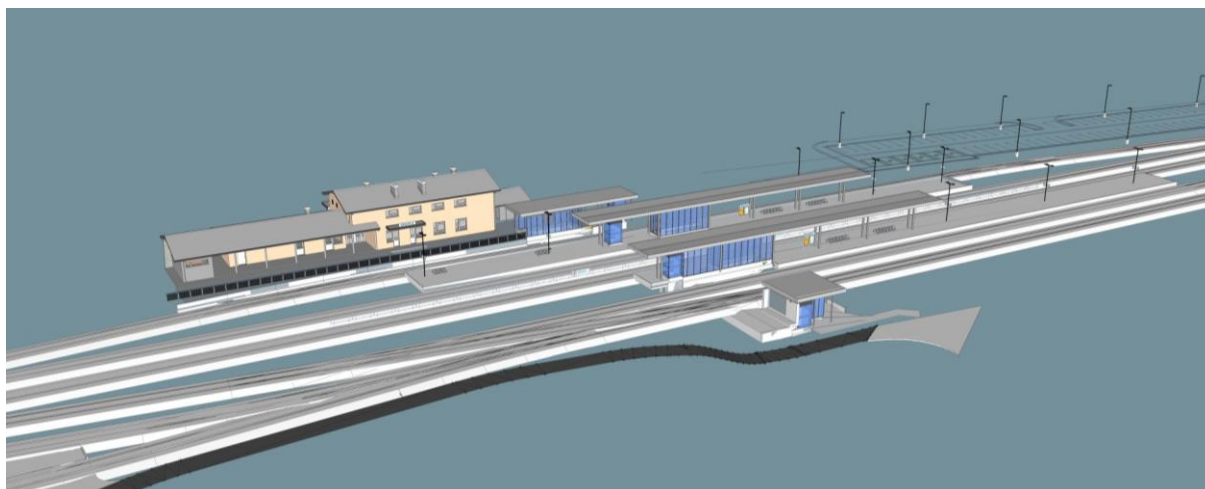
Project goals:

- Upgrade the category of station tracks to D4 (225 kN / axle, 80 kN / m),
- enable parallel import of trains from all directions,
- increasing the transport and throughput capacity of the station and lines,
- Increase traffic safety.

Scope of work:

- upgrading of tracks and track devices,
- construction of two new island platforms with arranged canopies,
- implementation of the approach to the platform infrastructure with elements or devices for the functionally handicapped and disabled under all station tracks so that access is possible from both sides of the station,
- implementation of an additional underpass for access of the local population under the line on the B side of the station
- arrangement of the station building (implementation of thermal insulation, hydro insulation, replacement of joinery and construction of the facade, renovation of the interior of the ground floor of the station building, toilets for passengers and waiting room)
- arrangement of other belonging areas in the area of the railway station (demolition of the loading ramp, warehouse, etc.),
- construction of car parking along Taborska street on the east side of the station with regulated access to the platforms and the station building,
- implementation of two culverts and a supporting wall,
- implementation of noise protection in the station area.





Figures 21 and 22: Visualisation of the upgraded railway station Grosuplje (Source: <http://www.krajsamorazdalje.si/projekti/nadgradnja-zelezniske-postaje-grosuplje>)

Future plans for line sections towards Ljubljana and Novo mesto.

The basic strategic document for the development of transport in the Republic of Slovenia is the Strategy for the Development of Transport in the Republic of Slovenia until 2030, which was adopted by the Government of the Republic of Slovenia at its session on 29 July 2015 by resolution no. 37000-3 / 2015/8. The basis of the national strategy is to ensure the sustainable development of Slovenia, which includes, among other things, improved mobility and accessibility, improved supply of the economy, improved traffic safety and security, reduced energy consumption and reduced environmental impact. In the field of railways, the basic goals are: harmonization and ensuring the connectivity of the Slovenian railway network with the EU network, introduction of interoperability, modernization of the existing and construction of new transport infrastructure.

Based on the strategy for the development of transport in the Republic of Slovenia, a Resolution on the national program for the development of transport in the Republic of Slovenia for the period up to 2030 was prepared in 2016 (Official Gazette of the Republic of Slovenia, No. 76/2016). development of transport and transport infrastructure in the Republic of Slovenia for the medium-term period 2016-2020 and the longer-term period 2022-2030. The national program follows the national strategic direction of ensuring sustainable mobility and, among other things, sets the central goals as improving the mobility and accessibility of transport systems, improving the supply of the economy and improving traffic safety and security.

The Resolution also states the renovation, upgrade or new construction of other, including regional routes. Measures states the connection s.b.-Metlika-Ljubljana. It is envisaged that the Ljubljana-Grosuplje section will be equipped with additional line blocks, the stations on the line will be upgraded, new stations will be built, the ERTMS system will be introduced, a second track will be built on the Ljubljana-Novovo mesto section and electrification will be carried out.

"Preparation of expert bases and feasibility studies for the upgrade of regional railway lines in the Republic of Slovenia and the railway network in the field of LUR" is in progress. The study will cover the analysis and necessary measures of existing regional lines (including line Ljubljana-Grosuplje-Novovo mesto) and provide measures to improve the state of railway infrastructure.

It is anticipated that in the coming years it will be necessary to comprehensively arrange the Grosuplje-Ljubljana railway section, as it is impossible to introduce additional passenger and freight trains on this section, especially during peak hours, due to lack of capacity.

Given that the regional line Ljubljana-Novo mesto-Metlika-s.b. (including the Grosuplje railway station) with the continuation to Karlovac and further towards Zagreb is in poor condition, a joint appearance in the form of the European Grouping of Territorial Cooperation (EGTC) would be possible in order to obtain additional co-financing for the reconstruction of the line.

2.4 Analysis of the industrial structure and clusters (potential customers)

Potential users of rail freight transport are companies who produce or harvest a lot of heavy natural goods or make a lot of heavy products. These goods for rail transport are: cars, wood, petroleum products, chemicals, building material, insulation material, joinery etc. In town Grosuplje there is a logistics centre carrying thousands cars per year, mostly carried by trucks and is a big opportunity for shifting cargo to rail.

Potential companies in Grosuplje and on the regional rail line Grosuplje-Kočevje are the following:

- AvtoTransporti Kastelec (Grosuplje)
- Revoz (Novo mesto)
- Trimo (Trebnoje)
- Urso (Trebnoje)
- Melamin (Kočevje)
- SIDG (kjer so nakladalne rampe)
- Blagovne rezerve (Ortnek)
- Yaskava (Ribnica, Kočevje)
- RIKO (Ribnica)
- LIK (Kočevje)

Logistics centre “AutoTransporti Kastelec”

Next to the rail station Grosuplje a car park of the company “Avto Kastelec” covers a larger area along the rail line 80 d.m.-Metlika-Ljubljana. An industrial track connection is planned before arriving at the station Grosuplje, seen from the direction of Ljubljana.

The company that operates the area (Avto Kastelec) has more than 120 specially equipped road trucks for transportation of cars, vans and light trucks, 250.000 cars carried per year (of which 70.000 are handled directly via Grosuplje logistics centre).

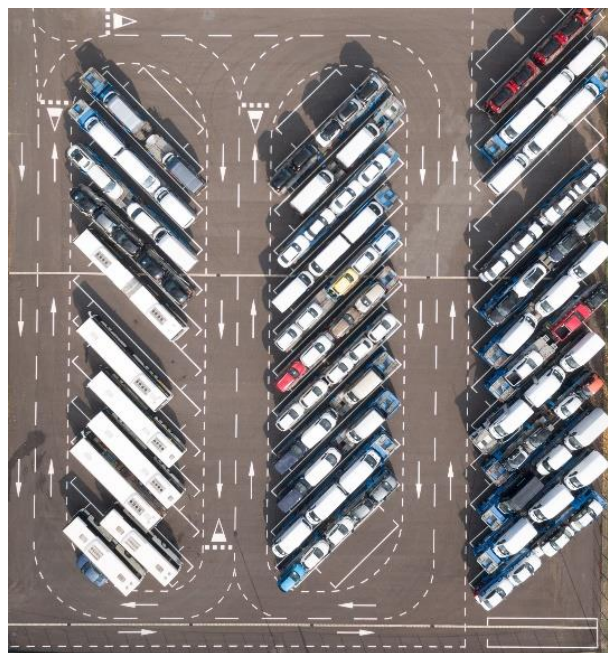


Figure 20: Location of parking lot AutoTransporti Kastelec near Grosuplje (Source: photo credit Brane Petrovič)



Figure 24: Parking lot AutoTransporti Kastelec, workshops and service facilities (Source: <https://at-kastelec.si/>)

The company transports vehicles throughout Europe and the Balkans. It also distributes vehicles of various brands throughout Slovenia. It offers storage of vehicles in a fenced, technically and video-protected warehouse, mostly covered with a hail protection net and properly lighted, and the possibility of renting parking for all types of commercial vehicles. In the parking lot, technical security is provided with video surveillance cameras.



Figures 25 and 26: Vehicle storage and truck parking (Source: <https://at-kastelec.si/>)

Other services provided by the company are: preparation of vehicles before their issuance, workshops for various repairs, car wash and truck laundry, vehicle dismantling, spare parts and sale of used vehicles.



Figure 27: The area of the intended industrial track, variant 1 (Source: Technical report - Industrial track Avtotransporti Kastelec, 2017)

Main actors or stakeholders involved in the activities to be carried out within the pilot action.

STAKEHOLDER	ROLE/ACTIVITIES
Local company	It will be the main user of the track

Local municipalities	approve changes of local plans
Rail transport operators	cooperation as potential carrier
Ministry of infrastructure and its departments	they will confirm the documents, also they will approve operating permit
Infrastructure managers	they will confirm the documents
Development institutions at local or regional level	project promotion

Table 9: Main stakeholders involved in the activities

Rail transport potential of Logistics centre “AutoTransporti Kastelec” is huge. Due to unexisting rail infrastructure for loading/unloading car (no ramps, no sidings), currently no cars are being transported in Grosuplje. Assuming that if a half of the cars currently being transported by road via logistics centre (35.000 out of 70.000) would be shifted to rail via REIF siding, that would equal to approximately 200-250 trains per year or 1 per working day. This would mean more than 4.000 trucks less on road or 12 in average per day.

Potential companies for rail freight transport

Other companies who use railway lines for freight transport and companies with potential freight to be carried by railway:

- Revoz d.d. (Novo mesto): The only producer of cars in Slovenia, located in Novo mesto, 99% of all products makes for export, which is carries partly by rail freight transport in partly by road. Potential rail cargo are cars.
- Trimo d.o.o. (Trebne): This construction company from Trebnje produce walls, facades, roofs, modular spatial solutions and steel structures. Potential rail cargo are different construction elements.
- Melamin d.d. Kočevje (Kočevje): This firm from Kočevje is one of the most important manufacturers of modified melamine resins and finishing films; supplier of resins for the paper and construction industries and impregnated decorative papers for the furniture industry, products for the paint and rubber industry. The long-term goal of the company is to redirect the purchase and sale route from the road to the railway traffic. Potential cargo are various chemical products.
- Slovenski državni gozdovi, d.o.o. (SiDG) (where loading ramps; Kočevje) and other wood industry: The state-owned forest management company (SiDG) carries out woodworking activities by collecting and processing wood from Slovenian state forests. There are also many smaller timber industry manufacturers in this area that use rail transport. Timber is loaded onto trains at those stations where there are loading ramps (all stations and loading bays on lines no. 80 and 82). Potential cargo is wood, mostly logs.
- Skladišče naftnih derivatov Ortnek (SND Ortnek): The Institute of the Republic of Slovenia for Commodity Reserves manages the Petroleum Products Warehouse in Ortnek, which is intended for the acceptance, storage and issuance of petroleum products for the needs of state and obligatory reserves. Manipulation of petroleum products is carried out occasionally by rail. Potential cargo is petroleum products.
- Yaskawa Slovenija d.o.o. (Ribnica): This company from Kočevje manufactures among others robots, AC drives and elements needed at producing environmental energy. Potential cargo could be robots, machine elements and electrical products.



- Riko Ribnica (Ribnica): This company produces road machinery products such as plows, mowers, choppers etc. Potential cargo is machine equipment.
- Riko Hiše d.o.o. (Ribnica): This company from Ribnica builds houses, public buildings, wooden facades and mobile homes. Potential cargo are different components of houses or buildings.
- LIK Kočevje (Kočevje): This firm from Kočevje is a manufacturer of a school furniture and pre-school furniture. Potential cargo are wood industry products like furniture.

Some companies already use railway for their freight transport in a greater or lesser proportion of the total volume of transport. Annual freight volume varies (tonnes / wagons) for each company using rail freight transport. These products represent some potential for transport by rail in the future.

Advantages of rail transport compared to road transport:

- Lower freight prices;
- Delivery or dispatch of a large quantity of goods at once;
- Safer, which is crucial from the point of view of transporting dangerous goods;
- Less pollution of the environment with emissions;
- Reduced possibilities of delays in the delivery of raw materials and products due to congestion on the transport route.

III. Summary and recommendation

1. Port of Koper

The analysis of the market potential shall conclude with a summary and a recommendation for the further work in the REIF project by referring and answering the following question:

➤ **What are the main market potentials and chances for rail freight transport?**

For the port of Koper, the regular railway connections are of top-most importance for the competitiveness in the container business, in particular for distribution on a distance of over 200 km. Such reason can explain the good modal split in favour of the railway (59%) that is maintained between the port and its hinterland markets. Also, future market potential is based mainly on railway logistics solutions, serving distant (not national) markets and therefore appropriate connecting railway infrastructure capacities are essential.

Luka Koper, the company developing the port and operating all the terminals in the port of Koper, is therefore investing intensively to assure additional port capacities to be able to accommodate additional traffic. According to the Strategic Business Plan (2020-2025) Luka Koper is investing in the whole port, but mostly in the upgrade of the container terminal capacity and improving the quality of services.

The socio-economic trends for the next years are showing an important increase of GDP in countries from Eastern Europe and even if very low, also a growing GDP in larger Western European countries, which allows the analysts to believe in a growth of volumes of cargo, especially through the container transport¹.

As conclusion, the following cargo groups have been identified for further growth and possibility to transport it on the rail:

- **Containers** as strategic cargo group in the port of Koper, including the process of containerization (where intermodal freight transport is using intermodal containers which begin to replace older forms of transportation).
- General cargoes, as **steel coils** (for automotive industry), **timber**, **fast-moving consumer goods**, **raw materials** for pharmaceutical industry.

All of the above has to be taken into the consideration in a way that moving goods on rail has several environmental benefits (less CO₂, cleaner environment, less pollution...), which will be even greater importance in the future.

2. Central Slovenia Region

Railway station Grosuplje is a crossroad point of two regional lines Metlika-Ljubljana and Grosuplje-Kočevje. Station Grosuplje and regional lines represent a certain potential for rail transport (passenger and freight). Freight traffic runs on the renovated Kočevska line. Passenger and freight traffic on a larger scale will start when all works on the line are completed, expected in 2021.

Rail connection Ljubljana-Kočevje and car logistics centre Grosuplje represent the main potential for increased rail transport. Industrial side track (siding) is a missing link between private (logistics centre) and public part of rail infrastructure. This pilot helps with preparation of documentation and design for constructing of industrial track.

¹ The forecasts differ due to COVID-19 crisis.

Pilot project REIF will develop a documentation for connecting a missing link between car logistics centre in Grosuplje and public rail infrastructure. Only for the logistics centre rail transport potential is huge. If a half of cars currently being transported by road through logistics centre would be shifted to rail via REIF siding, that would be approximately 200-250 new trains per year or 1 per working day. This would be equivalent of more than 4.000 trucks less on road or 12 per day.

However, there are also several other companies from local industry that are potential users of planned industrial siding.

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