



IDENTIFICATION OF ATTRACTIVE MULTIMODAL LOGISTICS LOCATIONS AND ELABORATION OF PROFILES FOR DEVELOPMENT IN THE REGION OF SOUTH MORAVIA AND SW SLOVAKIA

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1. INTRODUCTION

1.1. CORCAP

The CORCAP project is focused on the improvement of the connectivity between German seaports and Czech Republic, Slovakia, and Hungary on the Orient/East-Med TEN-T corridor (OEM corridor). The planning process started in 2019 and is expected to be finalized until 2023. Together 10 partners from 4 countries (Germany, Czech Republic, Slovakia, and Hungary) are involved in the project.

The lead partner, the Saxon State Ministry for Regional Development (SMR - former Saxon State Ministry of the Interior-SMI), coordinates the project progress and ensure the successful achievement of the project objectives. SRM will help to better understanding of the effects of the new railway line (Dresden - Prague) and to intensify cooperation between stakeholders from transport, logistics and regional development. In addition, new and innovative approaches for integration of transport planning and spatial development will be formed.

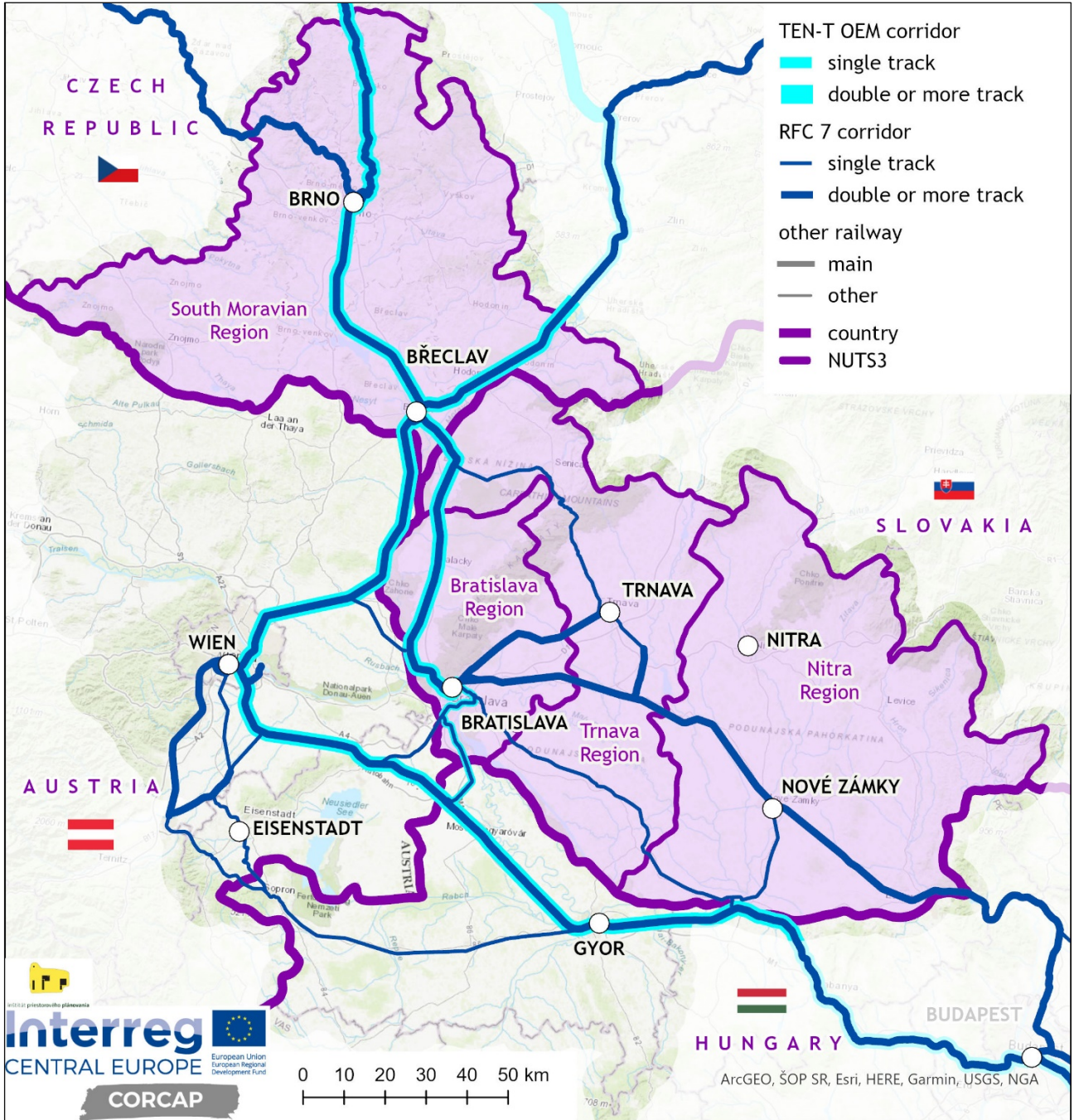
Orient/East-Med TEN-T corridor connects Central and South-East Europe. Due to the emerging bottlenecks of the Dresden-Prague section and limited capacity along alternative TEN-T corridors operated via the Vienna node the areas located along the OEM corridor are characterized by regional disparities in multimodal accessibility for efficient freight transport.

The target objective of the project is the facilitation of effective and environmentally friendly freight transport along the Rostock-Budapest section of the OEM corridor. New strategies and action plans will help to capitalize the new opportunities for regional development and logistics and ease the environmental impact by supporting the energy reduction and promoting environmentally friendly modes of transport. Furthermore, the new railway will strengthen the relations between the Free State of Saxony, the Usti Region and Prague.

Using better coordination of policies in the field of transport and spatial planning and better utilization of existing infrastructures will lead to sustainable development and contribute to the goal to make cities and regions in Central Europe (including areas of Czech Republic and Slovakia) better place to live and work. This initiative also follows up on activities aimed at creating the so-called "The New Silk Road."



Map 1. Area of interest



Source: IPP, TENtec (2020)



1.2. IPP & KORDIS

The **Institute of Spatial Planning** (Inštitút priestorového plánovania) is a 'think tank' dealing with spatial planning, regional development, ecology and the environment, geographical information systems, sustainable transport, and mobility. Within the CORCAP project, the IPP represents the interests of Slovakia and is responsible for the development of (i) Regional needs and challenges analysis for the Bratislava Region for efficient and environmentally friendly freight transport and identification of the OEM corridor potential for the regional development, (ii) Corridor Capitalisation Plan for the Southwest Slovakia and (iii) the Recommendations for the implementation of the Corridor Capitalisation Plan for the Southwest Slovakia.

KORDIS JMK is a public company founded by the South Moravian Region (SMR) and the city of Brno. KORDIS is responsible for the integrated public transport system in the South Moravian Region and provides comprehensive activities in all areas of public transport, e. g. conceptual planning, operational control, and public relations. KORDIS is responsible for the management, development, and maintenance of regional and urban public transport, including local and regional buses and trains. KORDIS has many years of experience in the field of intermodal transport, coordination of intermodal public transport hubs, passenger information services, use of satellite navigation for the Public Transport Control Centre, etc.

The two institutions share an output in the so-called **Pilot activity for the development of attractive multimodal logistics locations in the territory of the South Moravian Region (SMR) and Southwest Slovakia**. The submitted document represents the second part of the Pilot activity.

1.3. Objectives

At present, the potential of the rail network is underused, which is a pity. The EU has supported exploiting the potential of the railways in long-term, both in terms of passenger and freight transport. This is mainly related to the effort to improve the quality of the environment and the settlement environment. The project builds on the trend of further development of rail freight transport at the expense of mainly automotive transport, mainly long-distance truck transport. This makes it necessary to create an efficient system of a connection between railway terminal and logistics centre through the establishment of intermodal/multimodal hubs (IHUB).

The interest of the society or individual states, regions and municipalities is to modernize the rail transport system and to take advantage of its lower environmental burden on the territory, increasing transport speed, expanding capacity, and using the available lines and stations more efficiently. This is especially important when talking about an efficient transshipment of goods between rail and road transport.

Identification of sites attractive in terms of multimodal logistics together with their development profiles in the South Moravian Region (SMR) and the region of SW Slovakia (the territory of Bratislava, Trnava and Nitra Regions) represent the second of the partial outputs of the Pilot Activity for the development of attractive multimodal logistics sites in the territory of SMR and SW Slovakia.

The **main objective of this study** is thus:

- to determine the potentially most suitable locations of attractive inter/multimodal logistics centres-hubs (IHUBs) and to elaborate profiles for development of thus identified IHUBs
- for such locations create territorial reserves within the spatial planning procedures

in the region of South Moravia and SW Slovakia.



The main methods used were **network analysis** and a simple **scoring method**, through which the **attractivity index II.** was measured. This was composed of attractivity index (I.) - that was calculated already for the purposes of the first Pilot Activity study (MAPPING CROSS-BORDER ACCESSIBILITY IN THE CENTROPE REGION BY 2050) - and of 2 additional indicators. Based on the attractivity index II. a first-stage identification could be carried out. It was then followed by second-stage identification based on **expert evaluation (judgment)**.

1.4. Target groups/beneficiaries of the pilot action

STAKEHOLDER INVOLVEMENT:

- Regional authorities - Bratislava, Trnava and Nitra (Self-governing) Regions, South Moravian Region
- National authorities - Ministry of Transport and Development of the Slovak Republic
- Municipality of Bratislava
- Transport and logistics experts:
 - AROS - Association of Railway Operators of Slovakia
 - ŽSR [Slovak national railway company]
 - Verejné prístavy [Public ports]
 - Masaryk University Brno

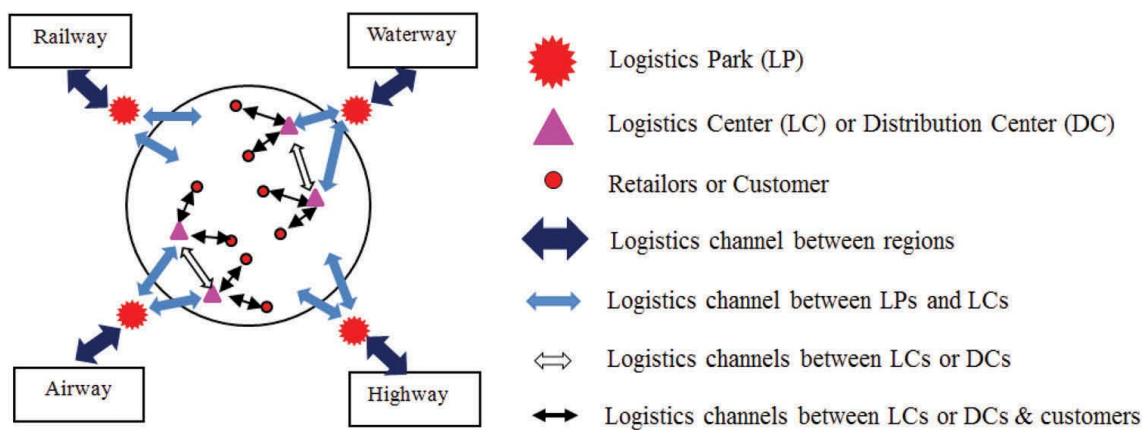


2. THEORETICAL BACKGROUND AND METHODOLOGY

2.1. Intermodal hubs identification and classification

The topic of **classification** of intermodal centres, hubs, terminals, or multimodal interfaces in the academic sphere is currently very scarce. Lu, Li, Zhao & Cook (2018) define modern **regional logistics hubs** that are “hierarchical functional facilities that manage cargo flows, transportation flows, information flows, and the flow of funds” (p. 1309). Regional logistics hub is usually comprised of logistics parks (LPs), logistics centres (LCs), distribution centres (DCs), and customer demand points. We will use this definition for inter/multimodal hub and from now on we will refer to it as **IHUB**.

Figure 1. Levels (echelons) in a regional logistics hub



Source: Lu, Li, Zhao & Cook (2018),

Note: The arrows represent logistical flows between particular elements of IHUB

Hierarchization of cargo terminal arrangement

Based on the expected volumes and direction of freight transport, schematic principles for the movement of freight transport in the conditions of Europe and its transport networks have been elaborated.

Crucial assumptions are that goods are imported into the European area by intercontinental transport (water and air transport), with water transport (about 90% of total volumes) being the maximum, mainly from Asian destinations.

This mode of transport is largely containerized, while the transport process is conducted through different types and stages of cargo-terminals.

In the freight transport process, we can distinguish at least 3 levels of logistics centres (cargo-terminals):

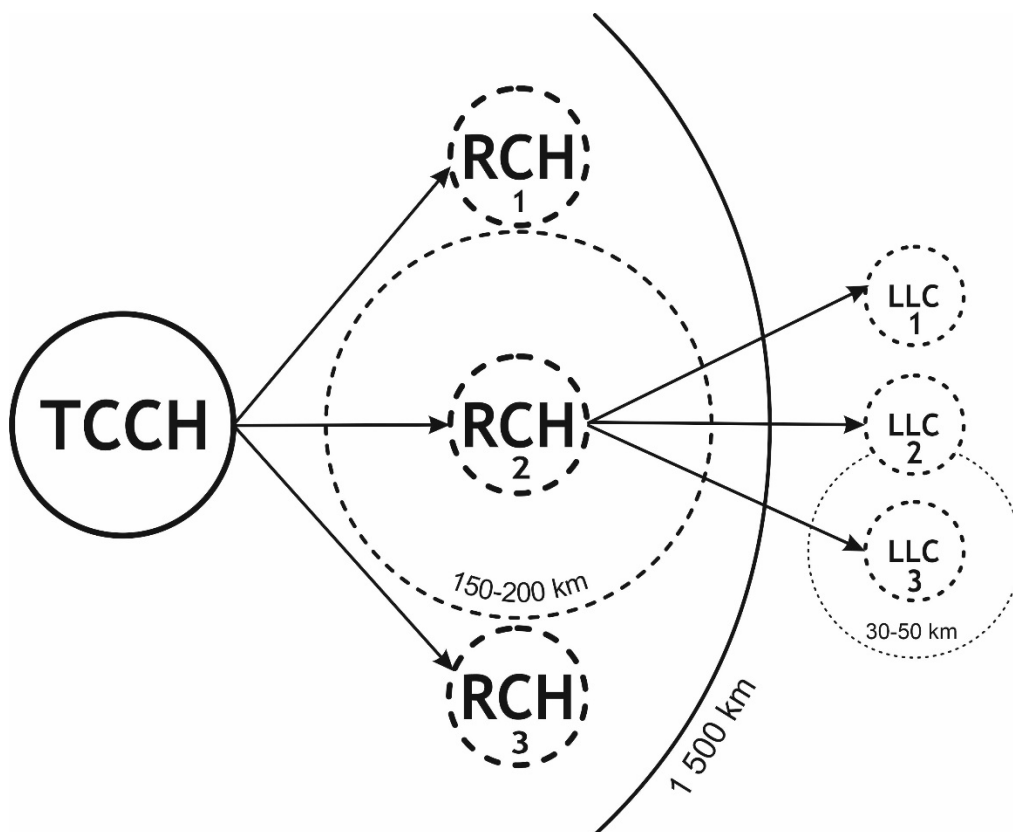
- **Transcontinental Cargo HUB (TCCH)** - localization in overseas ports of continental Europe, such as Hamburg, Rotterdam, or Athens. Out of these, containers are dispatched by rail and road to the whole of continental Europe. Their range is about 1,500 km. The main task of these TCCH is to transfer containers from ships to land modes of transport. Of these TCCH, transregional and regional cargo hubs (RCH) located in various parts of Europe are continuously being supplied. In the case of the implementation of the broad-gauge railway from Ukraine, Nové Zámky in SW Slovakia could acquire a quality level of TCCH, and for neighbouring states (HU and AT) this is a potential opportunity.



- Transregional and regional cargo HUB (RCH)** - its function is the transshipment of containers from long-distance vehicles, especially trains, but now also trucks for the main European distribution of goods to various parts of Europe. These RCH can also carry out supplies across EU national borders. Their range is about 150 to 200 km. The location of these logistics facilities must be in line with the needs of each region. RCH must also include equipment for handling piece (classic) consignments, which means folding piece goods from railway wagons to lorries, in most cases in medium tonnage of up to 12 tonnes. Local logistics centres as well as larger customers are directly supplied from RCH.
- Local Logistics Centre (LLC)** - has the function of direct distribution of goods from long-distance transportations to individual customers. The range is about 30-50 km. It is assumed that the goods will be imported into LLCs in most quantities by containers and then reallocated to smaller shipments and shipped directly to individual customers by trucks with tonnes of up to 12 tons. In this type of distribution, it is also necessary to count on a large number of small and medium trucks.

Currently, long-distance road transport (both container and classic piece) is distributed from TCCH directly to the customer. However, the EU's intentions are massive reduction in the carbon footprint. This should lead to a significant reduction of the current type of road freight transport (in the form of long-distance lorry transport) and its substitution for rail freight transport.

Figure 2. Hierarchical arrangement of freight terminals



A special transport principle - outside this scheme - is the transport of generally bulk and liquid goods. These types of goods are transported from TCCH directly to the customer, without any intermediate points.



2.2. First-stage identification of attractive multimodal logistics locations

In the first stage of identification the main task is to calculate a complex indicator as an aggregation of several suitable indicators. This assessment is based on the accessibility evaluation of the municipalities of CE CENTROPE area that may be found in the previous study (IPP & KORDIS 2022). In this case only the area of South Moravia and SW Slovakia will be involved. The 5 calculated accessibility indicators to:

- TEN-T international airports
- TEN-T ports
- TEN-T & RFC railway lines
- Intermodal hubs/Multimodal interfaces
- Highways and Expressways

will be supplemented by 2 indicators of the:

- existence an area devoted to industry, logistics or transport in local (municipal) Spatial Plan
- population cluster

Accessibility assessment

- AREA OF ANALYSIS:
 - > Southwest Slovakia and South Moravia
- TYPE OF ASSESSMENT:
 - > Accessibility assessment - in minutes - using the road network of motorways and expressways, 1st, 2nd and 3rd class roads, ferries and - in case of larger cities - the local communications in ESRI ArcGIS Network Analysis environment. Each type of road was assigned different average speed. See the Table.

Tab. 1. Speed limits used for assessing accessibility in the current study (km/h)

Type of road	Average speed
Motorways (D)	90
Expressways (R)	90
Motorways and Expressways in built-up areas (D+R)	76
First-class roads	68
First-class roads in built-up areas	45
Second-class roads	50
Second-class roads in built-up areas	35
Third-class roads	48
Third-class roads in built-up areas	35
Local roads in built-up areas	35
(Car on a) Ferry	10



- **TEMPORAL CONDITIONS:**

- > current state (2020)
- > vision (2050)

- **ORIGINS AND DESTINATIONS OF ACCESSIBILITY ASSESSMENT:**

- > Municipalities to:

- **TEN-T international airports** - closest international airports as defined on TENtec Geoportal - Wien, Bratislava, Budapest, and Ostrava
- **TEN-T ports** - closest international airports as defined on TENtec Geoportal - Wien, Bratislava, Győr (Gyonyú), Komárno, Štúrovo and Budapest
- **TEN-T & RFC railway lines** - railway stations (passenger or freight) lying on the Core and Comprehensive TEN-T corridors or Main and Diversionary RFC corridors
- **Intermodal hubs/Multimodal interfaces** - closest existing intermodal terminal
- **Highways and Expressways** - entry points to the motorways/expressways

The main source of road network was <http://opentransportmap.info> (© OpenStreetMap contributors). The current (2020) and planned **road development** (by 2030 and 2050) was gathered from various data sources.

- In the Czech Republic:

- > Geoportál Jihomoravský kraj (2020) [Geoportal of the South Moravian Region] with links to the spatial plans of the municipalities with extended competences that together cover all the area of the South Moravian Region (Blansko, Boskovice, Brno, Břeclav, Bučovice, Hodonín, Hustopeče, Ivančice, Kuřim, Kyjov, Mikulov, Moravský Krumlov, Pohořelice, Rosice, Slavkov, Šlapanice, Tišnov, Vyškov, Znojmo and Židlochovice)
- > Brno city GIS portal - gis.brno.cz
- > Geoportál silniční a dálniční sítě ČR (geoportal.rsd.cz/web) (ŘSD 2020) - Ředitelství silnic a dálnic [Roads and Highways Authority]

- In Slovakia:

- > Regional Spatial Plans of Bratislava (Aurex 2017b), Trnava (Aurex 2014) and Nitra Regions (Aurex 2015c)
- > Národná diaľničná spoločnosť (ndsas.sk) - national highway company

- In Austria:

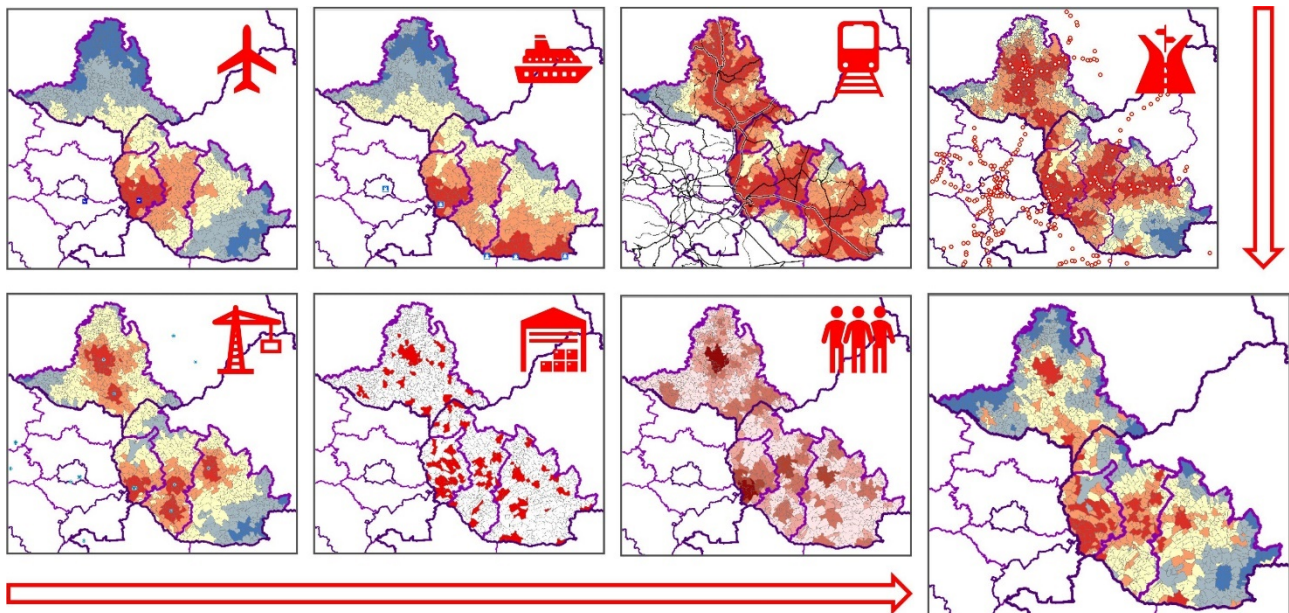
- > ÖBB (oebb.at) - Austrian national railway company
- > ASFiNAG (2020) - Autobahnen- und Schnellstraßen-Finanzierungs-Aktiengesellschaft - Austrian publicly owned corporation which plans, finances, builds, maintains, and collects tolls for the Austrian motorways.



- In Hungary:
 - > Conference on HSR Budapest - Warsaw - TRENCON (2020), Asbóth - Bersényi (2020)
 - > TEIR.hu - Országos Területfejlesztési és Területrendezési Információs Rendszer [National Spatial Development and Spatial Planning Information System]
 - > NIF.hu - NIF Nemzeti Infrastruktúra Fejlesztő Zrt [NIF National Infrastructure Development Ltd.]
 - > KTI Budapest

Furthermore, the results for the accessibility assessment were incorporated into the Web Map Application to be found at IPP's webpage <https://ipp-oz.sk/corcap>.

Figure 3. Multicriterial analysis - aggregation of 7 indicators



Multicriterial analysis of LAU2 units

Each municipality was assigned a value from 1 to 10 for each of the 7 indicators for the year 2050:

- Accessibility to the closest TEN-T international airport (from 4 min - 10 points to 199 min - 0 points)
- Accessibility to the closest TEN-T port (from 0 min - 10 points to 176 min - 0 points)
- Accessibility to the closest TEN-T or RFC railway line (from 0 min - 10 points to 123 min - 0 points)
- Accessibility to the closest Intermodal hub (from 1 min - 10 points to 150 min - 0 points)
- Accessibility to the closest Highway and Expressway (from 0 min - 10 points to 101 min - 0 points)
- Existence an area devoted to industry, logistics or transport in local (municipal) Spatial Plan - YES (10 points) / NO (0 points)
- 25 min Population cluster - number of inhabitants with 25-minute range from municipality (from 432,448 inhabitants - 10 points to 724 inhabitants - 0 points)



Finally, an overall aggregated **attractivity index** was calculated from the point values of all 7 indicators using the same “0 to 10 points” methodology.

Based on the first-level analysis, the TOP 5 locations for each region (South Moravian, Bratislava, Trnava and Nitra) were also defined, especially for 2020 and 2050.

2.3. Second-stage identification of attractive multimodal logistics locations

On the basis of the first-stage analysis, a second-stage analysis was subsequently carried out, for only 2050. It was set that one macrolocality may include 1 or more microlocalities (max. 4), while the distance between two macrolocalities should not be less than 10 km.

Based on an expert evaluation (judgement), using a simple scoring method (1 to 10; with 1 as least positive and 10 as most positive), **7 potential microlocalities** in **South Moravian Region** and **44 potential microlocalities** in the **region of SW Slovakia** were defined.



3. ATTRACTIVE MULTIMODAL LOGISTICS LOCATIONS

3.1. Identification of municipalities with suitable conditions for IHUBs localisation - 1st stage identification

The analysis included **1,367 municipalities** - 673 municipalities of South Moravian Region, 89 municipalities and city parts of the Bratislava Region, 251 municipalities of Trnava Region and 354 municipalities of the Nitra Region.

Based on the results of the aggregated **attractivity index**, 5 TOP locations were selected for each region. This was done separately for 2020 and 2050 scenarios, where - in the latter - transport development plans were considered in binding documents. The results of this analysis are shown on the following maps.

In the **South Moravian Region** city of Brno, some settlements in its immediate vicinity and the town of Břeclav were best placed. The situation for 2020 and 2050 is virtually unchanged.

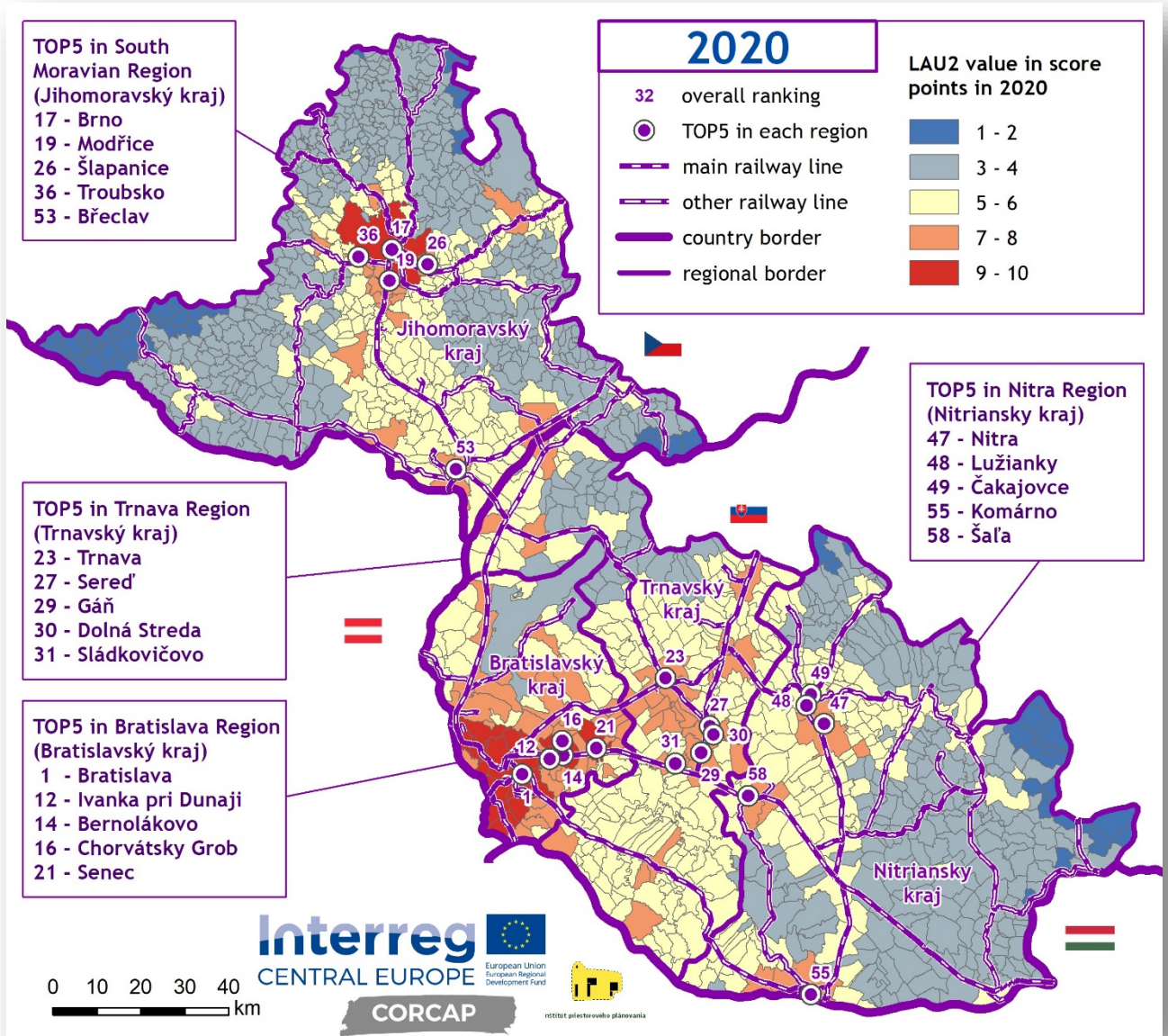
In the **Bratislava Region** the best value was achieved by city part MČ Bratislava-Ružinov. Although the city parts of Bratislava were analyzed as separate units, when determining the TOP 5 localities the city of Bratislava was considered as a single unit. This is followed by the villages located on the Bratislava - Senec corridor: Ivanka pri Dunaji, Bernolákovo, Chorvátsky Grob, and Senec. In 2050, after the expected completion of the infrastructure in the districts of Senec and Dunajská Streda, the situation changes and the town of Senec is replaced by the municipality of Dunajská Lužná.

There was also a fundamental change in **Trnava Region**, in 2020 the most suitable locations are located near the corridor Trnava - Galanta - Sládkovičovo (Trnava, Sereď, Gáň, Dolná Streda, Galanta and Sládkovičovo). In 2050, after the expected completion of the infrastructure in the districts of Senec and Dunajská Streda, the towns of Šamorín and Dunajská Streda and nearby municipality of Kostolné Kračany come to the fore. Only the town Sládkovičovo and Trnava city remain from the original list (2020).

In the **Nitra Region**, as with the South Moravian Region, the situation practically does not change between 2020 and 2050. The best values were achieved by municipalities around the industrial park north of Nitra city (Nitra, Čakajovce and Lužianky) and by towns of Šaľa and Komárno.

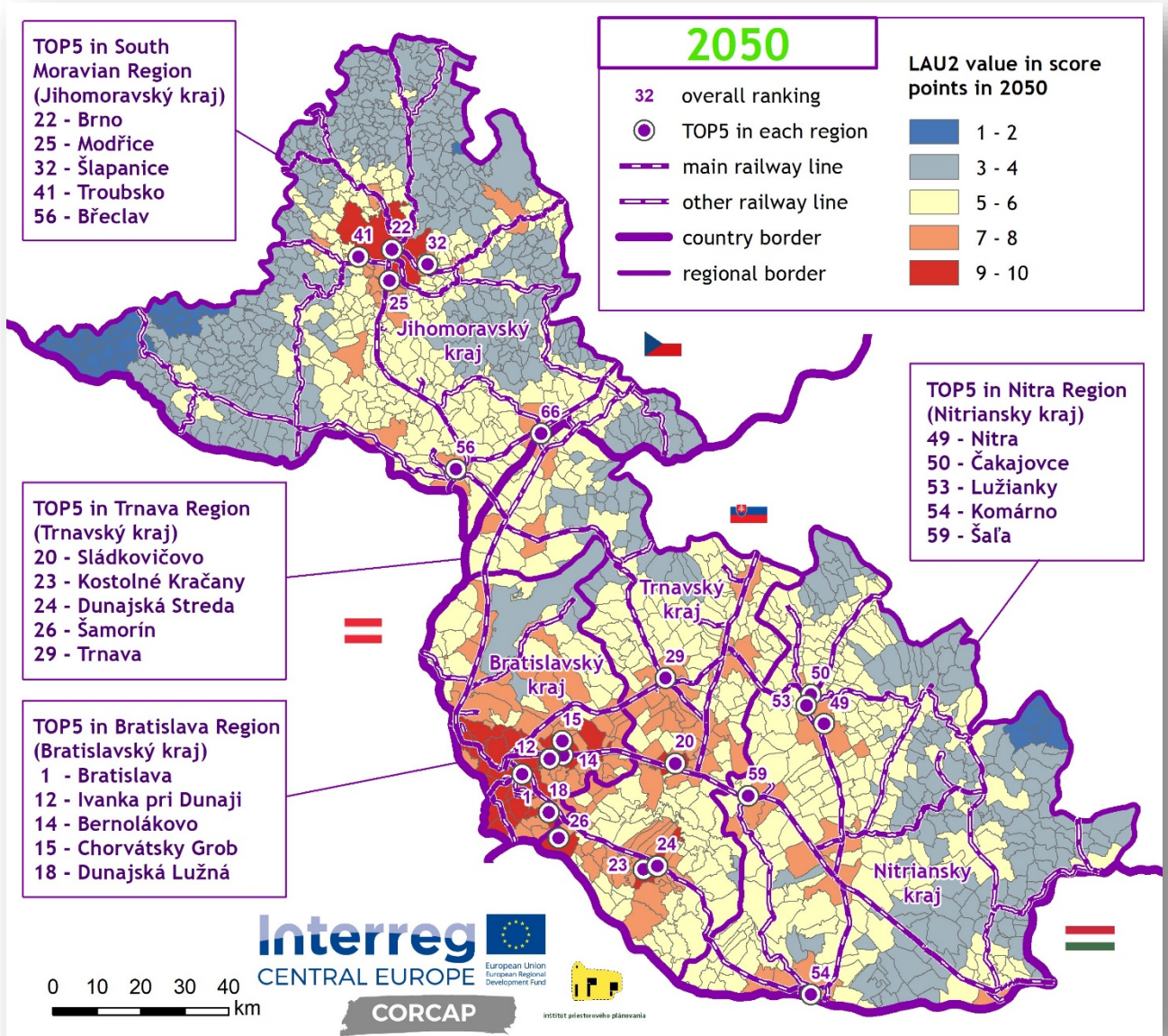


Map 2. Identification of potentially most suitable sites for IHUBs in 2020





Map 3. Identification of potentially most suitable sites for IHUBs in 2050





3.2. Identification of municipalities with suitable conditions for multimodal hubs localisation (identified in previous subchapter) - 2nd stage identification

Based on the second-level evaluation, a total of potential **31 macrolocalities** (5 in the Czech Republic and 26 in Slovakia) were defined. Almost exclusively the assessment for the 2050 - projection - was considered. Unlike the first-level classification, this was a less objective but more subjective evaluation.

It was further established that 1 macrolocality may include 1 or more microlocalities, the distance between the two macrolocalities being not less than 10 km. Based on the expert assessment, using the scoring method, **7 potential microlocalities in South Moravian Region** and **44 potential microlocalities in Region of SW Slovakia** were defined.

The following were excluded from the sites(s) identified at first instance. In:

- Bratislava Region - Ivanka pri Dunaji, Bernolákovo, Chorvátsky Grob - total or partial absence of adequate rail connection
- Trnava Region - Šamorín - partial absence of adequate connection by rail - was replaced in full by Dunajská Lužná (in the neighbouring Bratislava Region)
- Nitra Region - Čakajovce, Lužianky and Nitra were merged into one macrolocality Nitra-North, which is practically identical to the existing intermodal centre of ŽSR Lužianky.

New site was added. In:

- South Moravian Region (SMR) - The city of **Hodonín** was characterized by high values already in the primary analysis. In addition to the position on the international corridor it is located at the intersection of several local lines and is characterized by a suitable technical background.
- In Bratislava Region these were **Zohor - (Bratislava-) Devínska Nová Ves** and **Malacky - Veľké Leváre** - railway stations with facilities located on the main line of TEN-T OEM and RFC7 corridors
- Trnava Region: **Senica** - a potentially fast-growing centre of Northern Záhorie; **Kúty - Sekule** - railway stations with facilities located on the TEN-T OEM and RFC7 corridors' main lines; **Veľký Meder** - railway station with facilities located on the comprehensive TEN-T line and connecting line of RFC7; **Leopoldov, Piešťany** and **Skalica** - reserves defined mainly based on distance from other centres
- Nitra Region - **Nové Zámky** and **Štúrovo** - both cities were characterized by high values already in the primary analysis; **Tvrdošovce** and **Hurbanovo** - railway stations with facilities located on the main RFC7 line; **Topolčany, Zlaté Moravce, Levice, Želiezovce** and **Šahy** - reserves defined mainly based on distance from other centres

The following table shows the resulting list of macrolocalities and their related microlocalities.



Tab. 2. Potential macrolocalities and microlocalities in the SMR Region and in the region of SW Slovakia

MA code	MI code	type	macrolocality name	microlocality name	name of municipality	district name
CZ1	BO1	REGIONAL	Brno-South	Brno-Horní Heršpice	Brno	Brno-město
CZ1	BO2			Modřice	Modřice	Brno-venkov
CZ1	BO3			Popovice	Modřice	Brno-venkov
CZ2	SLA1	REGIONAL	Brno-East	Šlapanice	Šlapanice	Brno-venkov
CZ3	BV1	REGIONAL	Břeclav	Břeclav	Břeclav	Břeclav
CZ4	HO1	LOCAL	Hodonín	Hodonín	Hodonín	Hodonín
CZ5	ZN1	LOCAL	Brno-West	Troubsko	Troubsko	Brno-venkov
SK1	BT2	REGIONAL	Bratislava - východ	Bratislava - prístav	Bratislava-Ružinov	Bratislava
	BT1			Bratislava - ÚNS	Bratislava-Ružinov	Bratislava
	BT3			Bratislava-Vajnory	Bratislava-Vajnory	Bratislava
	BT4			Bratislava-Podunajské Biskupice	Bratislava-Podunajské Biskupice	Bratislava
SK2	DLU1	REGIONAL	Dunajská Lužná - Nové Košariská	Dunajská Lužná - Nové Košariská	Dunajská Lužná	Senec
SK3	MA1	LOCAL	Malacky - Veľké Leváre	Malacky - juh	Malacky	Malacky
SK3	MA2			Veľké Leváre	Veľké Leváre	Malacky
SK4	SC1	LOCAL	Senec	Senec	Senec	Senec
SK5	ZOH1	LOCAL	Zohor - Devínska Nová Ves	Zohor	Zohor	Malacky
SK5	ZOH2			Devínska Nová Ves	Bratislava-Devínska Nová Ves	Bratislava
SK6	DS1	LOCAL	Dunajská Streda	Dunajská Streda - intermodal hub	Dunajská Streda	Dunajská Streda
SK7	GA1	LOCAL	Galanta - Sládkovičovo	Galanta	Galanta	Galanta
SK7	GA2			Sládkovičovo - intermodal hub	Sládkovičovo	Galanta
SK7	GA3			Sládkovičovo-South	Sládkovičovo	Galanta
SK8	KUT1	LOCAL	Kúty - Sekule	Kúty	Kúty	Skalica
SK8	KUT2			Sekule	Sekule	Skalica
SK9	LEO1	LOCAL	Leopoldov	Leopoldov	Leopoldov	Hlohovec
SK10	PN1	LOCAL	Piešťany	Piešťany	Piešťany	Piešťany
SK11	SE1	REGIONAL	Senica	Senica	Senica	Senica
SK12	SI1	LOCAL	Skalica	Skalica	Skalica	Skalica
SK13	TT1	LOCAL	Trnava - Sered'	Trnava - Zavar	Trnava	Trnava
SK13	TT2			Sered'	Sered'	Galanta
SK14	VME1	LOCAL	Veľký Meder	Veľký Meder	Veľký Meder	Dunajská Streda
SK15	HUR1	LOCAL	Hurbanovo	Hurbanovo	Hurbanovo	Komárno
SK16	KN1	REGIONAL	Komárno	Komárno - Veľký Harčáš	Komárno	Komárno
SK16	KN2			Komárno - zriaďovacia stanica	Komárno	Komárno
SK16	KN3			Komárno - prístav	Komárno	Komárno
SK17	LV1	LOCAL	Levice	Levice	Levice	Levice
SK18	NR1	REGIONAL	Nitra - Sever	TIP Lužianky	Lužianky	Nitra
SK19	NZ1	SUPRAREGIONAL	Nové Zámky	Nové Zámky - terminál ŠRT	Nové Zámky	Nové Zámky

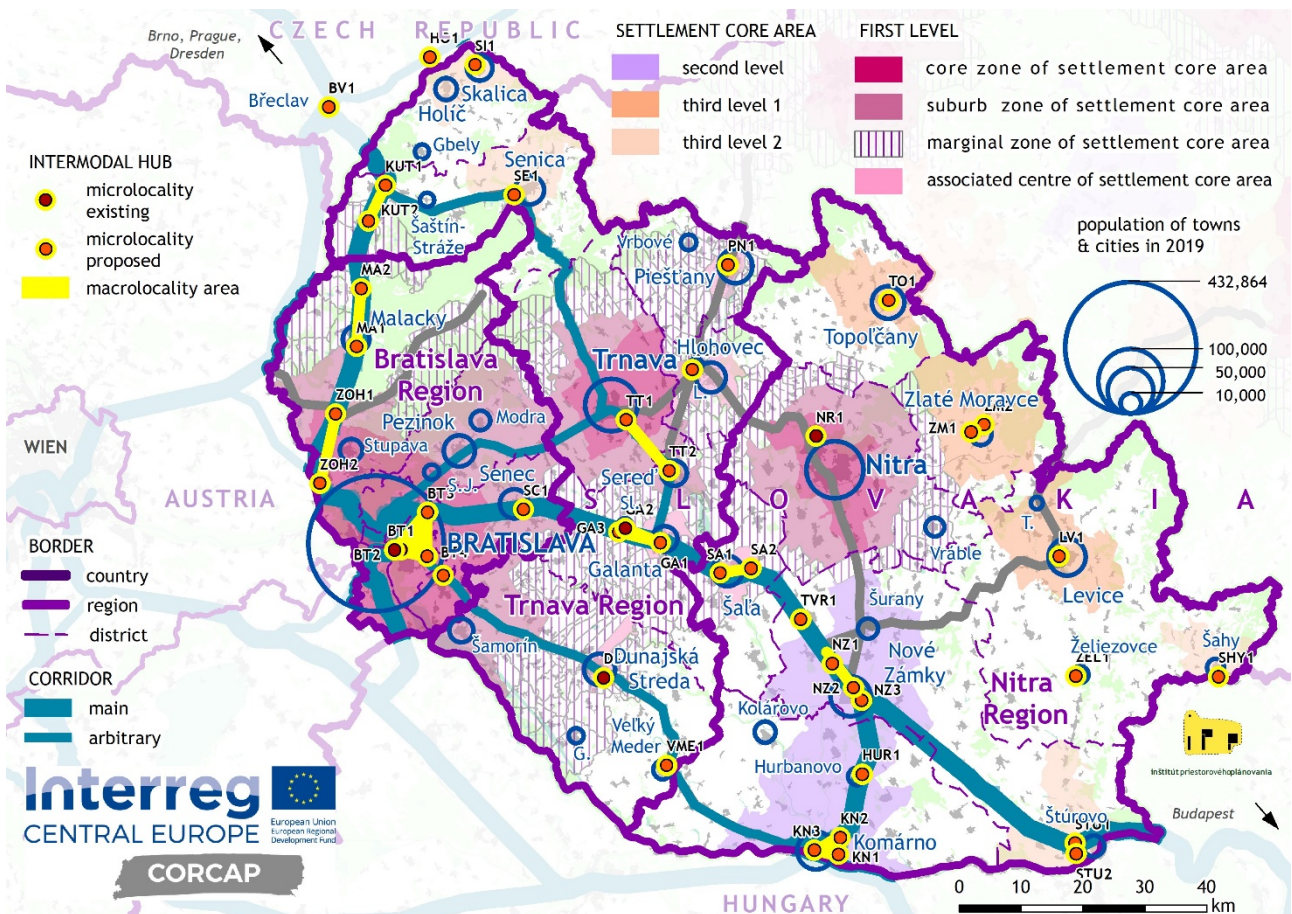


MA code	MI code	type	macrolocality name	microlocality name	name of municipality	district name
SK19	NZ2	LOCAL	Nové Zámky	Nové Zámky	Nové Zámky	Nové Zámky
SK19	NZ3			Nové Zámky - East	Nové Zámky	Nové Zámky
SK20	SA1	LOCAL	Šaľa - Trnovec nad Váhom	Šaľa	Šaľa	Šaľa
SK20	SA2			Trnovec nad Váhom	Trnovec nad Váhom	Šaľa
SK21	SHY1	LOCAL	Šahy	Šahy	Šahy	Levice
SK22	STU1	LOCAL	Štúrovo	Štúrovo	Štúrovo	Nové Zámky
SK22	STU2			Štúrovo - industrial area	Štúrovo	Nové Zámky
SK23	TO1	LOCAL	Topoľčany	Topoľčany	Topoľčany	Topoľčany
SK24	TVR1	LOCAL	Tvrdošovce	Tvrdošovce	Tvrdošovce	Nové Zámky
SK25	ZEL1	LOCAL	Želiezovce	Želiezovce	Želiezovce	Levice
SK26	ZM1	LOCAL	Zlaté Moravce	Zlaté Moravce	Zlaté Moravce	Zlaté Moravce
SK26	ZM2	LOCAL		Zlaté Moravce - závody	Zlaté Moravce	Zlaté Moravce

Note: MA code = macrolocality code; MI code = microlocality code

The following map shows the location of potential macrolocalities and microlocalities within the settlement centres as defined in the document Slovak Spatial Development Perspective (KÚRS - Aurex 2012).

Map 4. Potential macrolocalities and microlocalities in the SMR Region and in the SW Slovakia Region



Source: IPP, TENtec (2020), RFC 7 (2020); Note - abbreviations of towns: S.J. - Svätý Jur, G. - Gabčíkovo, T. - Tlmače, Sl. - Sládkovičovo



3.3. Profiles for development of identified IHUBs

For each potential **microlocality** so-called **reference sheets** were made. The reference sheets consist of detailed information on a given macrolocality:

- > NOMENCLATURE - name, codes, administrative affiliation, and type
- > PRIMARY ASSESSMENT - RANKING - YEAR 2050 - Rank in the first-stage identification
- > PRIMARY ASSESSMENT - VALUES - YEAR 2050 - Value based on first-stage identification
- > PRIMARY ASSESSMENT - POINTS - YEAR 2050 - Points based on first-stage identification
- > SECONDARY ASSESSMENT - POINTS - YEAR 2020 - Points based on first-stage identification
- > TEXT - text evaluation of the potential of particular microlocality

Reference sheets are part of a web map application (WMA) available at <https://ipp-oz.sk/corcap>. For a more detailed information about the content and usage of the app, click the "i" button at the bottom of the screen.

When planning the location of IHUBs, it will also be necessary to consider their appropriate dispersion and hierarchization in a network. The following map shows one of the possible ways of organizing a network of intermodal centres in the territory of the SW Slovakia.



3.4. Detailed localization of IHUBs

3.4.1. Detailed localization of IHUBs in the South Moravian Region

SOUTH MORAVIAN REGION

Thanks to its convenient location in the centre of Europe, the South Moravian Region is an important transit region connecting the south and north of Europe. The backbone of the freight transport infrastructure consists of the D1, D2, D46 and D52 motorways, the Brno-Tuřany International Airport. At the same time two main European RFC and TEN-T corridors pass through the region (RFC7/TEN-T Orient/East Med and (RFC5 /TEN-T) Baltic-Adriatic. According to the performance of freight transport, the dominance of road transport is clearly visible, the dominant performance is the transport of cargo within the region itself. More information can be found in the document IPP & KORDIS (2022).

An important aspect of the past and future development of the freight transport within the South Moravian Region and within the city of Brno are logistics parks. In the future, the potential of Brno Airport may be increased by the adjacent and one of the most important logistics centres, which is **Brno Airport Park**. It is connected directly to exit 201 on the D1 motorway, but it also has a railway siding, which makes it ready for the use of various combinations of transport modes. To the south of Brno is another important logistics park, **Prologis Park Brno**, which is strategically located along the D52 motorway. Logistics centres are experiencing unprecedented development, both in Europe and in the Czech Republic. This is due to the greater popularity of shopping in e-shops that need warehouses for their goods. This trend has been reinforced by the coronavirus pandemic and the related further shift of shoppers away from brick-and-mortar stores in favour of online shopping.

In addition, there is a long-term operating **container IHUB** in Brno - **Terminal Brno**. Since its establishment in the 70s of the 20th century, it has undergone various development phases in terms of its importance depending on the development of demand for the transport of cargo by containers. Since 2007, it has been revived and at present this IHUB is flourishing thanks to the high demand for the transport of intermodal semi-trailers by rail.

Tab. 3. Potential IHUBs in the South Moravian Region

MA code	MI code	type	macrolocality name	microlocality name	name of municipality	district name
CZ1	BO1	REGIONAL	Brno - south	Brno-Horní Heršpice	Brno	Brno-město
CZ1	BO2			Modřice	Modřice	Brno-venkov
CZ1	BO3			Popovice	Modřice	Brno-venkov
CZ2	SLA1	REGIONAL	Brno - east	Šlapanice	Šlapanice	Brno-venkov
CZ3	BV1	REGIONAL	Břeclav	Břeclav	Břeclav	Břeclav
CZ4	HO1	LOCAL	Hodonín	Hodonín	Hodonín	Hodonín
CZ5	ZN1	LOCAL	Brno - west	Troubsko	Troubsko	Brno-venkov



Characteristics of individual IHUBs:

- **Brno-South** - Brno-Horní Heršpice - it is a functional and constantly developing container IHUB (Terminal Brno, see above). From the south, it is unilaterally connected to the main railway line 320A (002)¹. The connection to the motorway network (D1 and D2) takes place partly through residential urban areas. Alternatives (e. g. when its capacities are exceeded) can be the premises at the Modřice railway station, or the areas at the Popovice railway stop. Both alternatives are situated to the south of Brno.
- **Brno-Východ** - Šlapanice - the location is located directly at the Brno-Tuřany International Airport with logistics park with potential for development nearby (the above-mentioned Brno Airport Park). Direct connection to line 300 (Brno - Ostrava) and the D1 motorway. Not far away Brno Industrial Černovice Terrace and other logistics areas (Areal Slatina, CTPark Brno and others) are located.
- **Břeclav** - an important railway junction (directions Brno and Prague, Ostrava and PL, Vienna, and Bratislava). These are lines 320A (002) and 316A (330). A suitable location of the IHUB seems to be the area lying southeast from the railway station. It will be necessary to build a connection to the D2 motorway, respectively to the planned bypass I/55 (1st class road).
- **Hodonín** - regional railway junction with direct connection to the main line 320A (002) and local line 318C (255). In the view (about 2050), the adjacent road I/55 will be rebuilt into motorway (D55). Through line 316C, respectively through the planned road bypass 51, it is possible to serve the adjacent territory of Slovakia (Holíč, Skalica).
- **Brno-západ** - Troubsko - another alternative (reserve) for Brno at the D1 motorway (in direction to Prague). There is possibility to connect to the main railway line 322C (240 - direction to Jihlava), and along the planned high-speed line (VRT Vysočina).

¹ ID of tracks: non-public timetable (passenger timetable)



3.4.2. Detailed localization of IHUBs in SW Slovakia

Based on the analysis carried out and the calculation of the forecast of transport performances, it was possible to set the expected quantities of goods transhipped in future possible sites IHUBs in SW Slovakia. The expected capacities of selected IHUBs will vary according to the selected variant of the development of railway infrastructure.

BRATISLAVA REGION

Tab. 4. Potential IHUBs in the Bratislava Region

MA code	MI code	type	macrolocality name	microlocality name	name of municipality	district name
SK1	BT2	REGIONAL	Bratislava - východ	Bratislava - prístav	Bratislava-Ružinov	Bratislava
	BT1			Bratislava - ÚNS	Bratislava-Ružinov	Bratislava
	BT3			Bratislava-Vajnory	Bratislava-Vajnory	Bratislava
	BT4			Bratislava-Podunajské Biskupice	Bratislava-Podunajské Biskupice	Bratislava
SK2	DLU1	REGIONAL	Dunajská Lužná - Nové Košariská	Dunajská Lužná - Nové Košariská	Dunajská Lužná	Senec
SK3	MA1	LOCAL	Malacky - Veľké Leváre	Malacky - juh	Malacky	Malacky
SK3	MA2			Veľké Leváre	Veľké Leváre	Malacky
SK4	SC1	LOCAL	Senec	Senec	Senec	Senec
SK5	ZOH1	LOCAL	Zohor - Devínska Nová Ves	Zohor	Zohor	Malacky
SK5	ZOH2			Devínska Nová Ves	Bratislava-Devínska Nová Ves	Bratislava

Note: MA code = macrolocality code; MI code = microlocality code

Tab. 5. Share of imports and exports of goods in rail freight in 2015-2020 in % in the districts of Bratislava Region

district	2015	2016	2017	2018	2019	average
Bratislava I.-V. (Bratislava city)	86.6	83.3	92.1	90.6	85.9	87.7
Malacky	11.3	16.0	6.6	8.2	13.2	11.1
Pezinok	1.8	0.4	1.4	1.2	0.9	1.1
Senec	0.2	0.3	0.0	0.1	0.0	0.1
Total - BSK	100.0	100.0	100.0	100.0	100.0	100.0

There is a specific situation in Bratislava Region due to the fact that the majority of goods is being transported to or from Bratislava. From the urbanization point of view, it is not possible to anticipate a permanent increase in intra-Bratislava HUBs. This means that they will develop as regional HUBs at a closer and later at a more distant geographical position to Bratislava. In terms of turnover of goods in Bratislava HUBs there was a remarkable increase in the Bratislava - ÚNS IHUB. The turnover of goods flows in Bratislava HUBs is shown in the table below.



Tab. 6. Turnover of goods flows in the railway stations of Bratislava in 2020 in t/ year

railway station	t/year	%
Bratislava predmestie	127 497	4.6%
Bratislava - ÚNS (ústredná nákladná stanica)	1 376 722	50.5%
Bratislava-East	24 984	1.0%
Bratislava-Nové Mesto	48	0.0%
Bratislava-Pálenisko, port	690 469	43.8%
Bratislava in total	2 219 719	100.0%

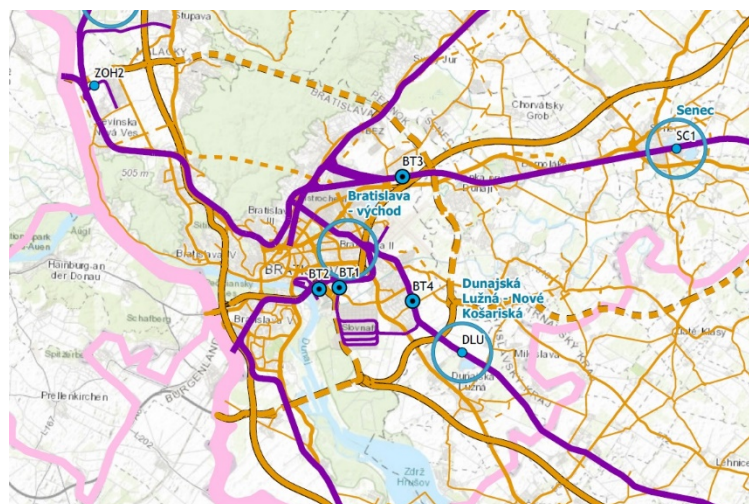
Forecast of IHUB development in BSK

The forecast of the turnover of goods in BSK for the years 2030, 2050 and 2070 was based on the primary assessment of the suitability of individual locations, the current modal split between the different IHUBs and the anticipated urban development. It is assumed that due to the spatial possibilities, IHUBs in broader Bratislava area will be developed at the expense of inner-city IHUBs such as Bratislava predmestie, Bratislava-Nové Mesto, ÚNS Bratislava, and Bratislava-Pálenisko (port). The last mentioned continues to have a positive trend in view of the possibility of transshipment for water transport.

Tab. 7. Distribution of freight transport between selected macrolocalities in Bratislava Region

nr.	macrolocality	increase in goods volumes (%)				volumes of goods in t/year			
		2021	2030	2050	2070	2021	2030	2050	2070
1	Bratislava-East	90	75	60	50	3 043 560	4 533 637	4 139 242	3 976 919
2	Dunajská Lužná (Nové Košariská)	0	7	10	14	0	423 139	689 874	1 113 537
3	Malacky - Veľké Leváre	6	5	8	10	202 904	302 242	551 899	795 384
5	Senec	0	5	8	9	0	302 242	551 899	715 845
6	Devínska Nová Ves - Zohor	4	8	14	17	135 269	483 588	965 823	1 352 152
	Bratislava Region in total	100	100	100	100	3 381 734	6 044 849	6 898 737	7 953 838

Figure 4. Localization of intermodal HUBs in BSK, shift from the urbanized areas of Bratislava to the outskirts





IHUBs in BSK

- **Bratislava-East** - There are two functional IHUBs in the territory of the city of Bratislava. They supply all the needs of the city and also carry out a connection to water transport on the Danube: Bratislava-Pálenisko (port) - currently its use is low, up to 15-20% of possible transshipment capacity; and the Terminal ÚNS (Central Freight Station). In the future it is expected that industrial and storage areas will move from the urban areas of housing, sport, and greenery to the outskirts. This intention will require the establishment of new IHUBs and logistics areas in the suburban zone of Bratislava (Vajnory, Podunajské Biskupice, Dunajská Lužná or Senec)
 - **Dunajská Lužná - Nové Košariská** - currently abandoned area of the former concrete and gravel works with direct connection to railway line 124 (131)², with sufficient tracks. R7 expressway and D4 motorway are only 5 and 7 km away.
 - **Malacky - Veľké Leváre** - direct link to the railway line 126 (110), developing Malacky-South industrial zone is within easy reach. It is necessary to complete the road connection between railway and the industrial zone, possibly also to the D2 motorway. From this location it is possible to supply the western part of Bratislava at a distance of about 30 km.
- Senec** - direct link to the railway line 130 (120), functional and still developing logistics park Senec is within range of about 7 km. In the railway station Senec it will be necessary to create suitable space for IHUB. It is necessary to complete the road connection between the potential IHUB and the logistics zone. From this location it is also possible to supply the eastern part of Bratislava at a distance of about 20 km.
- **Devínska Nová Ves - Zohor** - direct link to the railway line 126 (110), Volkswagen plant in Devínska Nová Ves and Lozorno Logistics Park are within easy reach. It is necessary to complete the road connection to the D2 motorway. From this position it is possible to supply the western part of Bratislava at a distance of about 10-20 km.

² Non-public [public] timetable line number



TRNAVA REGION

The forecast of the turnover of goods in Trnava Region for the years 2030, 2050 and 2070 was based on the primary assessment of the suitability of individual locations, the current modal split between the different IHUBs and the anticipated urban development. It is assumed that, due to the existing and anticipated economic activities and the geographical shape of Trnava Region, the development of IHUBs will be divided between the district towns of Senica, Galanta and Dunajská Streda and the regional city of Trnava.

Tab. 8. Potential IHUBs in the Trnava Region

MA code	MI code	type	macrolocality name	microlocality name	name of municipality	district name
SK6	DS1	LOCAL	Dunajská Streda	Dunajská Streda - intermodal hub	Dunajská Streda	Dunajská Streda
SK7	GA1	LOCAL	Galanta - Sládkovičovo	Galanta	Galanta	Galanta
SK7	GA2			Sládkovičovo - intermodal hub	Sládkovičovo	Galanta
SK7	GA3			Sládkovičovo-South	Sládkovičovo	Galanta
SK8	KUT1	LOCAL	Kúty - Sekule	Kúty	Kúty	Skalica
SK8	KUT2			Sekule	Sekule	Skalica
SK9	LEO1	LOCAL	Leopoldov	Leopoldov	Leopoldov	Hlohovec
SK10	PN1	LOCAL	Piešťany	Piešťany	Piešťany	Piešťany
SK11	SE1	REGIONAL	Senica	Senica	Senica	Senica
SK12	SI1	LOCAL	Skalica	Skalica	Skalica	Skalica
SK13	TT1	LOCAL	Trnava - Sered'	Trnava - Zavar	Trnava	Trnava
SK13	TT2			Sered'	Sered'	Galanta
SK14	VME1	LOCAL	Veľký Meder	Veľký Meder	Veľký Meder	Dunajská Streda

Note: MA code = macrolocality code; MI code = microlocality code

Tab. 9. Distribution of freight transport between selected macrolocalities in Trnava Region

nr.	macrolocality	increase in goods volumes (%)				volumes of goods in t/year			
		2020	2030	2050	2070	2020	2030	2050	2070
1	Dunajská Streda (IHUB)	4,9	5	5	5	34 969	46 899	39 356	41 980
2	Galanta - Sládkovičovo	11,5	12	13	14	82 070	112 558	102 326	117 544
3	Kúty - Sekule	0,2	0.5	0.5	1	1 427	4 690	3 936	8 396
4	Leopoldov	2,0	2.5	2.5	3	14 273	23 450	19 678	25 188
5	Piešťany	0,0	0	0	0	0	0	0	0
6	Senica	47,7	45	45	43	340 414	42 209	354 204	361 026
7	Skalica	0,3	0	0	0	2 141	0	0	0
8	Trnava - Sered'	33,4	35	34	34	238 361	328 295	267 621	285 463
9	Veľký Meder	0,0	0	0	0	0	0	0	0
	Trnava Region in total	100,0	100	100	100	713 656	937 985	787 121	839 595



IHUBs in Trnava Region

Due to the territorial extent and segmentation of Trnava Region several possible sites for the establishment of IHUBs were selected. Priority was given to the relationship railway - road. The most important IHUBs are located in Senica and Trnava. Other IHUBs will have rather local significance.

- **Senica** - an important site located on the railway line 128 (116). It has the potential of possible service area of two related districts - Senica and Skalica. This location is especially suitable for its relatively separate location from the rest of Slovakia and its proximity to the Czech Republic. In order to create better capacities for rail freight transport, a gradual reconstruction of line 128 (116) over its entire length will be necessary. The storage room should be located in the area near the existing Senica railway station.
- **Trnava - Sered'**:
 - **Trnava** - direct connection to the railway lines 125 (120) and 128 (133). The IHUB will serve the logistics centres in the background of the automotive PSA Peugeot plant in Trnava and also for the Trnava district's own needs
 - **Sered'** - direct connection to the railway line 128 (133), this IHUB is oriented for servicing the surrounding logistics centres Galanta, Gáň and Sered'. Ample space in Sered' railway station makes it possible to consider this site to be suitable for the needs of freight transport
- **Dunajská Streda** - functional IHUB of METRANS with direct links to the railway line 124 (131), I/63 first class road and the future R7 expressway. It is fully operational. Due to its size, it will have sufficient capacity in the long term for possible future development. The railway section Bratislava - Dunajská Streda is used primarily for suburban passenger transport at peak times. This intermodal IHUB is used predominantly by private trains of the third carriers. By 2025 it is expected that the track in its entire length up to Komárno will be doubled and electrified.
- **Sládkovičovo - Galanta** - direct connection to the railway line 120 (130), this IHUB is oriented for servicing the surrounding logistics centres Galanta, Gáň and Sered'. The existing IHUB located in the town of Sládkovičovo is currently not fully functional.
- **Kúty - Sekule** - this location on the railway line 126 (110) was selected as a reserve for possible future logistics operations.
- **Leopoldov** - location on the railway lines 125 (120) and 128 (133), this IHUB is oriented for servicing broader area, although even this site is considered as a reserve for the future.
- **Piešťany** - the location on the railway line 125 (120) was selected as a reserve for possible future logistics operations.
- **Veľký Meder** - location on the railway line 124 (131) was selected as a reserve for possible future logistics operations.
- **Skalica** - this location on railway line 129 (114) was selected as a reserve for possible future logistics operations.



NITRA REGION

Tab. 10. Potential IHUBs in the Nitra Region

MA code	MI code	type	macrolocality name	microlocality name	name of municipality	district name
SK15	HUR1	LOCAL	Hurbanovo	Hurbanovo	Hurbanovo	Komárno
SK16	KN1	REGIONAL	Komárno	Komárno - Veľký Harčáš	Komárno	Komárno
SK16	KN2			Komárno - zriaďovacia stanica	Komárno	Komárno
SK16	KN3			Komárno - prístav	Komárno	Komárno
SK17	LV1	LOCAL	Levice	Levice	Levice	Levice
SK18	NR1	REGIONAL	Nitra - Sever	TIP Lužianky	Lužianky	Nitra
SK19	NZ1	SUPRAREGIONAL	Nové Zámky	Nové Zámky - terminál ŠRT	Nové Zámky	Nové Zámky
SK19	NZ2	LOCAL	Nové Zámky	Nové Zámky	Nové Zámky	Nové Zámky
SK19	NZ3			Nové Zámky - East	Nové Zámky	Nové Zámky
SK20	SA1	LOCAL	Šaľa - Trnovec nad Váhom	Šaľa	Šaľa	Šaľa
SK20	SA2			Trnovec nad Váhom	Trnovec nad Váhom	Šaľa
SK21	SHY1	LOCAL	Šahy	Šahy	Šahy	Levice
SK22	STU1	LOCAL	Štúrovo	Štúrovo	Štúrovo	Nové Zámky
SK22	STU2			Štúrovo - industrial area	Štúrovo	Nové Zámky
SK23	TO1	LOCAL	Topoľčany	Topoľčany	Topoľčany	Topoľčany
SK24	TVR1	LOCAL	Tvrdošovce	Tvrdošovce	Tvrdošovce	Nové Zámky
SK25	ZEL1	LOCAL	Želiezovce	Želiezovce	Želiezovce	Levice
SK26	ZM1	LOCAL	Zlaté Moravce	Zlaté Moravce	Zlaté Moravce	Zlaté Moravce
SK26	ZM2	LOCAL		Zlaté Moravce - závody	Zlaté Moravce	Zlaté Moravce

Tab. 11. Distribution of freight transport between selected macrolocalities in Nitra Region

nr.	macrolocality	increase in goods volumes (%)				volumes of goods in t/year			
		2021	2030	2050	2070	2021	2030	2050	2070
1	Hurbanovo	0.0	0	0	0	0	0	0	0
2	Komárno	2.1	2.3	2.4	2.8	24 449	33 434	45 207	56 257
3A	Levice	1.8	2.1	2.2	3	21 229	30 527	41 439	60 275
3B	Nové Zámky - terminal BGL	0.0	0	3	5	0	0	720 000	1 250 000
4	Nové Zámky (excl. BGL)	19.9	21	21.5	22	232 342	305 270	404 976	442 020
5	Nitra-North (TIP Lužianky)	7.5	9	9	9.5	87 257	130 830	169 525	190 872
6	Šaľa - Trnovec nad Váhom	63.9	60	58.5	56.5	747 561	872 200	1 101 911	1 135 188
7	Šahy	0.0	0	0		0	0	0	0
8	Štúrovo	0.7	0.4	0.9	0.5	8 193	5 815	16 952	10 046
9	Topoľčany	0.7	0.9	1	1.2	7 958	13 083	18 836	24 110
10	Tvrdošovce	0.0	0	0	0	0	0	0	0
11	Želiezovce	0.0	0.5	0.5	0.5	0	7 268	9 418	10 046
12	Zlaté Moravce	3.6	3.8	4	4	41546	55240	75 344	80 367
	Nitra Region in total	100	100	103	105	1 170 314	1 453 667	1 883 608	2 009 182
	Broad-gauge line (BGL) - expected capacity							24 000 000	



IHUBs in Nitra Region

- **Komárno** - potentially trimodal IHUB in close proximity to the Danube. The site is connected to roads I/63 and I/64 with overlap to Hungary. There will be a need to modernize the lines 124 (131) and 120 (135). In case of the construction of the broad-gauge line (BGL), the IHUB will be even of greater importance.
- **Levice** - site lying on the railway lines 121 (150), and 119 (152) that will need reconstructions. It is well connected to the first-class road I/75 and future R7 expressway. The construction of the IHUB will certainly support the development of this region
- **Nitra-north (Lužianky Terminal)** - This existing IHUB is of great importance for the supply of industrial areas in Nitra as well as the city of Nitra and its surroundings. In the long term, a new railway link is to be built between Nitra and Trnovec n. V. with direct connection to the line 120 (130) Bratislava - Galanta - Nové Zámky - Štúrovo
- **Nové Zámky** - a significant distribution point connected to the future upgraded line 120 (130) and also the extended R7 expressway in the near future. In the case of the construction of broad-gauge line (BGL), Nové Zámky node will become an extremely important IHUB of national importance and also with direct links to the northern part of Hungary, including Budapest. Assuming that 5 % of the transported goods by means of BGL will be transhipped for the needs of Southwest Slovakia, in Nové Zámky it will be a volume of about 1.250 mil.t annually.
- **Šaľa - Trnovec n. V.** - the site has a unique position in the region because special goods are supplied by the DUSLO Šaľa plant. The site is directly connected to line 120 (130) that is to be upgraded in the near future
- **Zlaté Moravce** - building of IHUB in this locality will support the economic growth of the region. However, it will require the modernisation of all adjacent railway lines as well as a feeder for the R1 expressway
- Other locations - **Štúrovo, Šahy, Hurbanovo, Topolčany, Tvrdošovce, and Želiezovce** - have been selected as reserves for possible future logistics operations



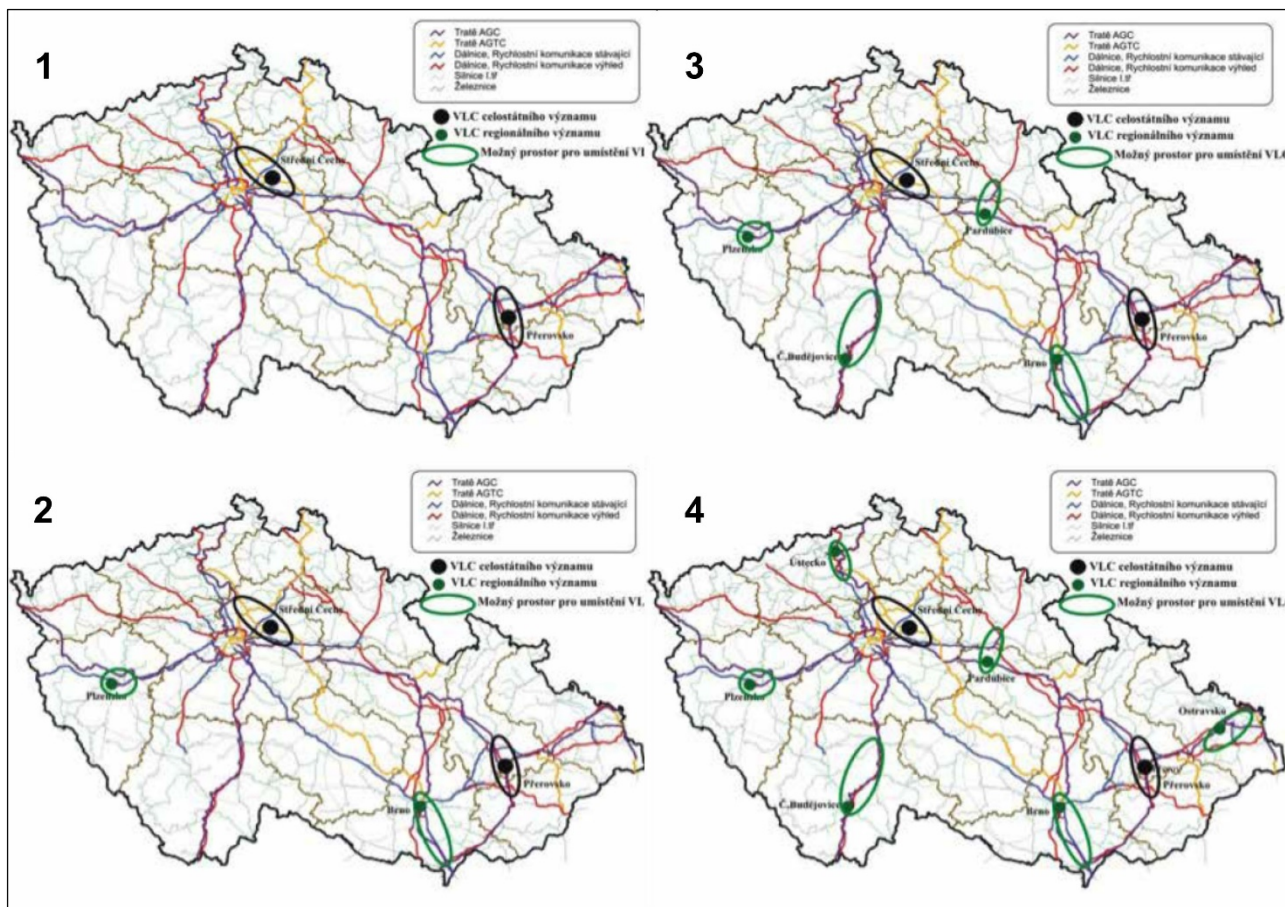
3.5. IHUB Hierarchization

3.5.1. Proposal of IHUBs development in the SMR

In the **Czech Republic**, the Concept of freight transport for the period of 2017-2023 with a view to 2030 (Ministry of Transport of the Czech Republic - MD ČR 2022) is a fundamental document, which is dealing with the optimization of the density of the IHUB network. "Decisions on specific areas ... must be done in the regions on the basis of business plans, in most cases it will be the use of existing facilities, otherwise brownfields should be used. This identification will also be an input for the updating of the Territorial Development Policy and the Transport Sector Strategy document, to ensure territorial protection enabling the possible development of these facilities and to identify financial needs to support the development of these facilities, provided that this is in accordance with the rules of public support" (p. 84). The document also defines the distances - ranges, to which it is desirable to adhere when locating an IHUB. In the case of the IHUB of national (supra-regional) importance it is about 220 km, in the case of regional importance about 150 km.

In the area of **South and Eastern Moravia**, place of national IHUB should be in the area of Přerov (phase 1). Regional IHUB is to be located in Brno - Břeclav area (phase 2).

Figure 5. Localities suitable for the establishment of public terminals of combined transport - phases 1. - 4.



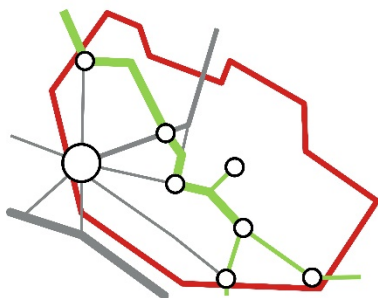
Note: the black dots represent proposed IHUBs of national importance, the green dots represent proposed IHUBs of regional importance. Source: MD ČR (2022)



3.5.2. Construction of IHUBs in the SW Slovakia

Maps below possible development of IHUB network based on variants.

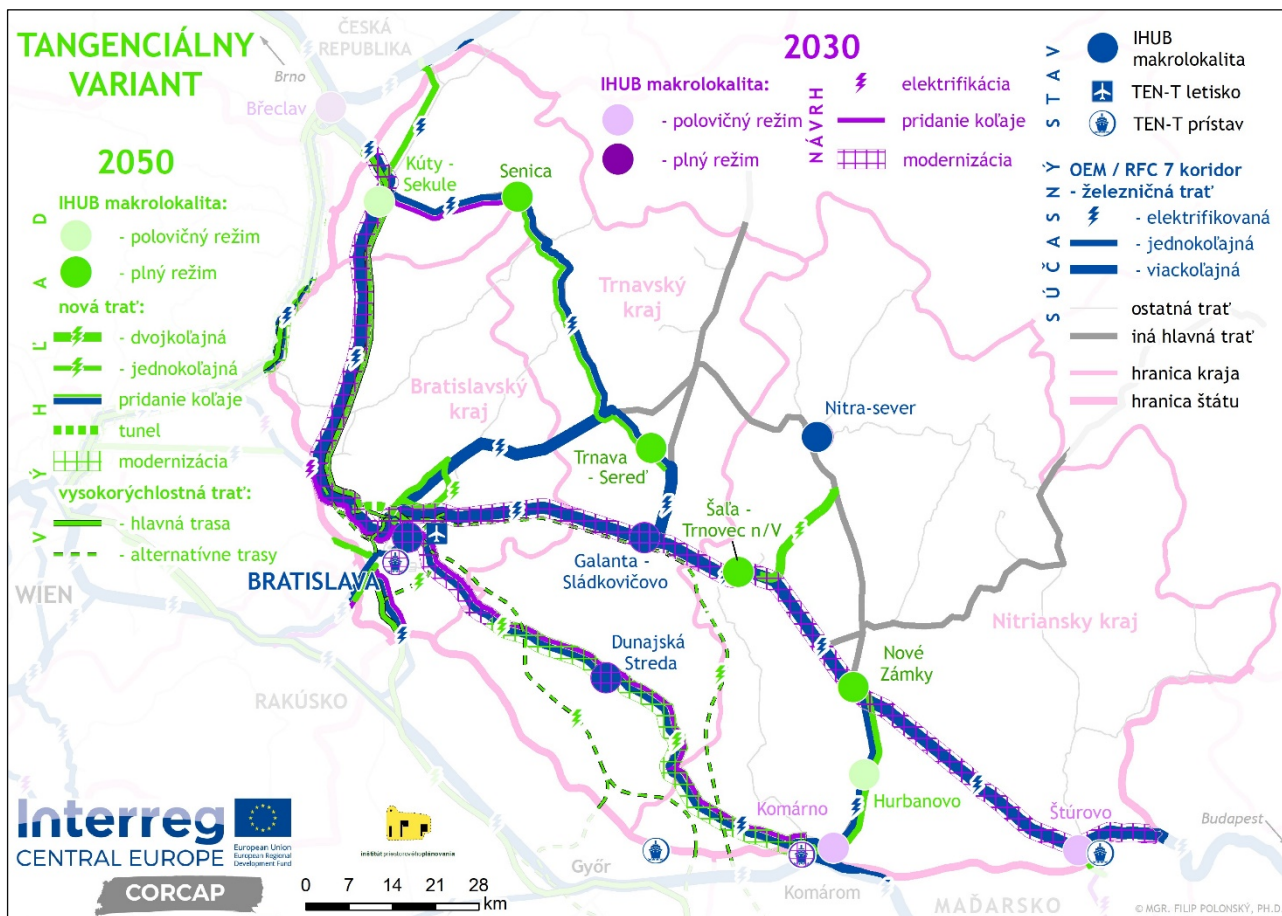
Tangential Variant of IHUBs development



In line with this variant the development of IHUBs will be concentrated along the prioritised tangential railway lines nr. 128 (116 and 133), 120 (130 and 135). Along these lines potential IHUBs were localised in Senica, Trnava - Sered', Galanta - Sládkovičovo, Nové Zámky (direct link to broad-gauge line), Komárno (port on the Danube), and Štúrovo (port on the Danube).

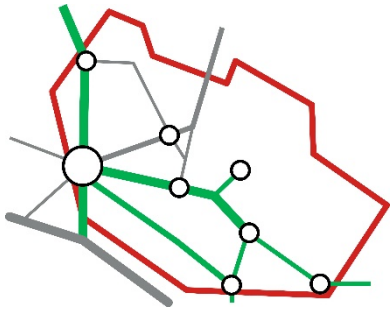
The functional state of operation on the **Tangential Variant** in 2050 presumes complete modernization of above-mentioned lines, which means their increased throughput and also transport speeds. This should make this direction very attractive especially for long-distance transit freight transport.

Map 5. Railway lines and IHUBs development in the Tangential Variant in SW Slovakia



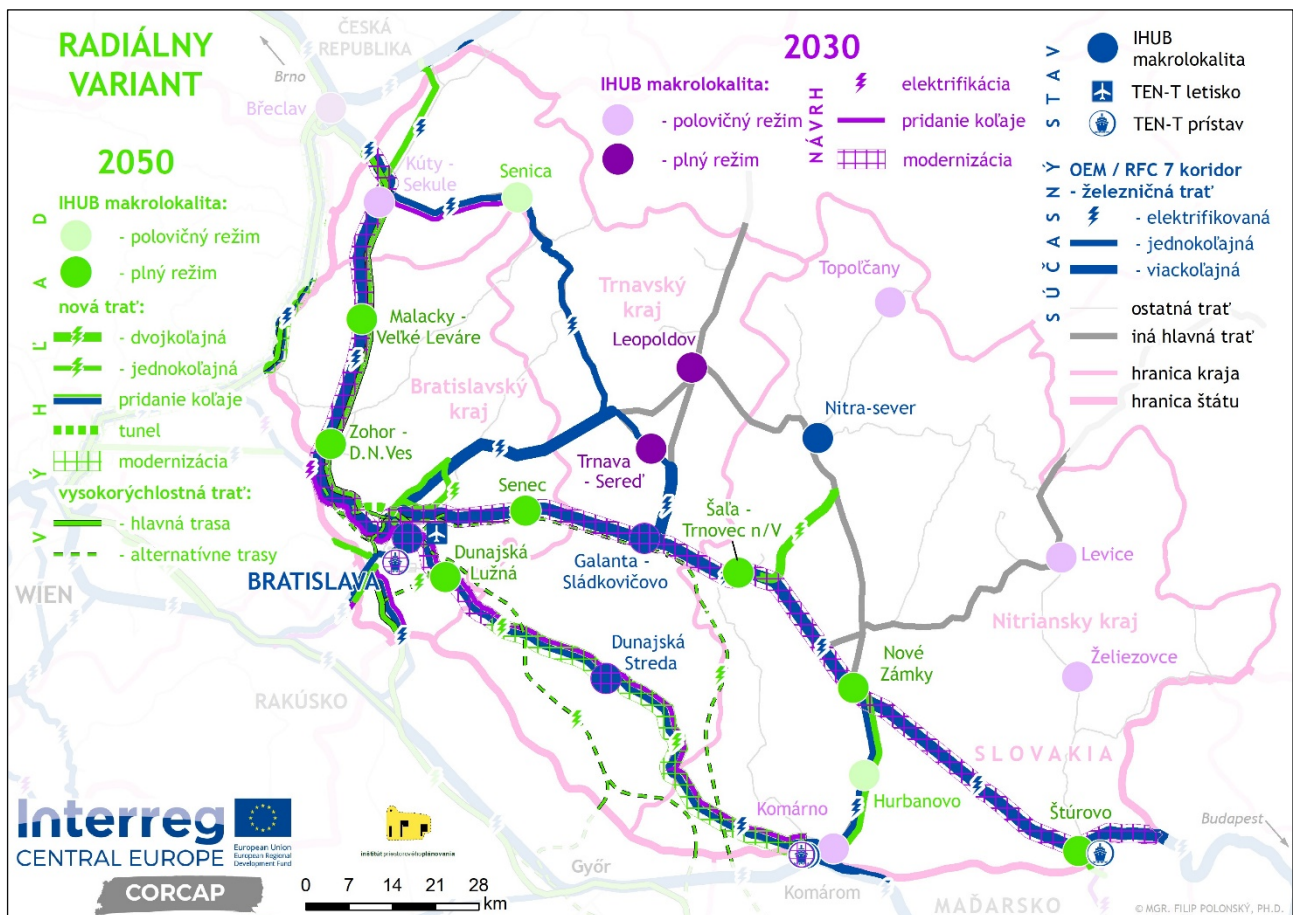


Radial Variant of IHUBs development



In **Radial Variant** the emphasis will be placed on the development of IHUBs related to the radial lines 126 (110), 120 (130) a 124 (131). The basic element of the variant is the modernization of the above-mentioned lines and the construction of a tunnel between Bratislava-Lamač and Bratislava-Nové Mesto.

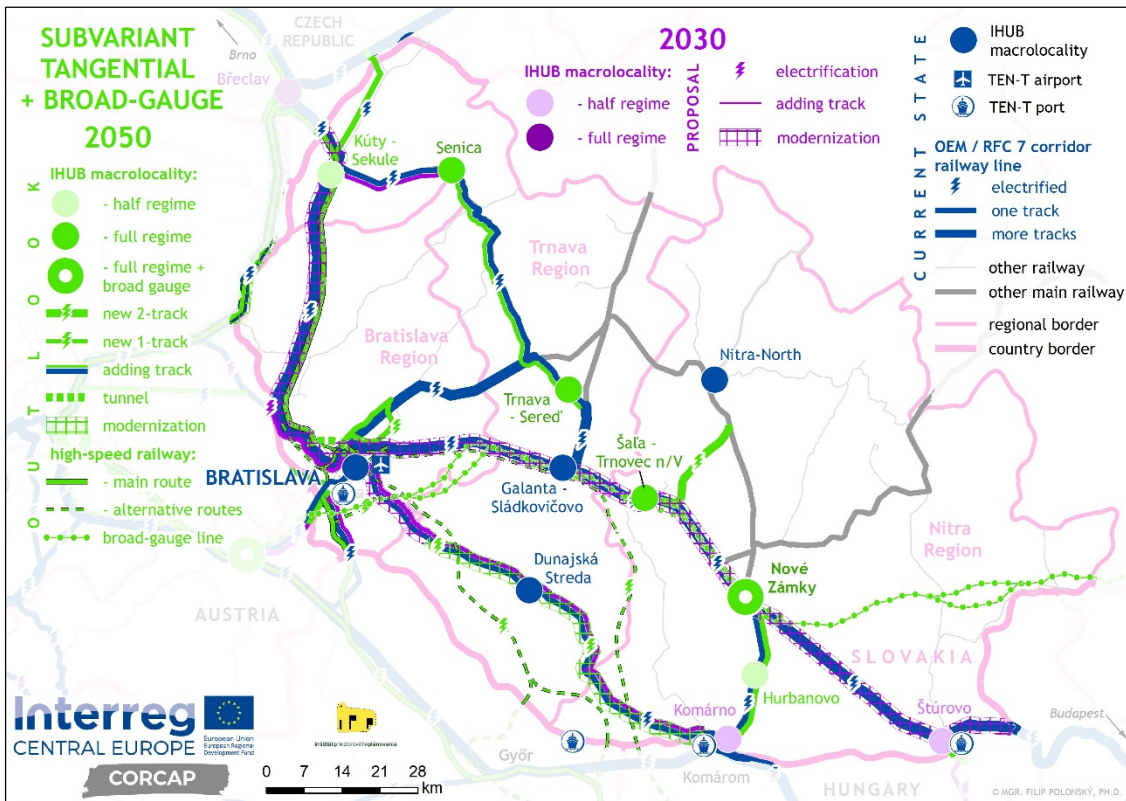
Map 6. Railway lines and IHUBs development in Radial Variant in SW Slovakia



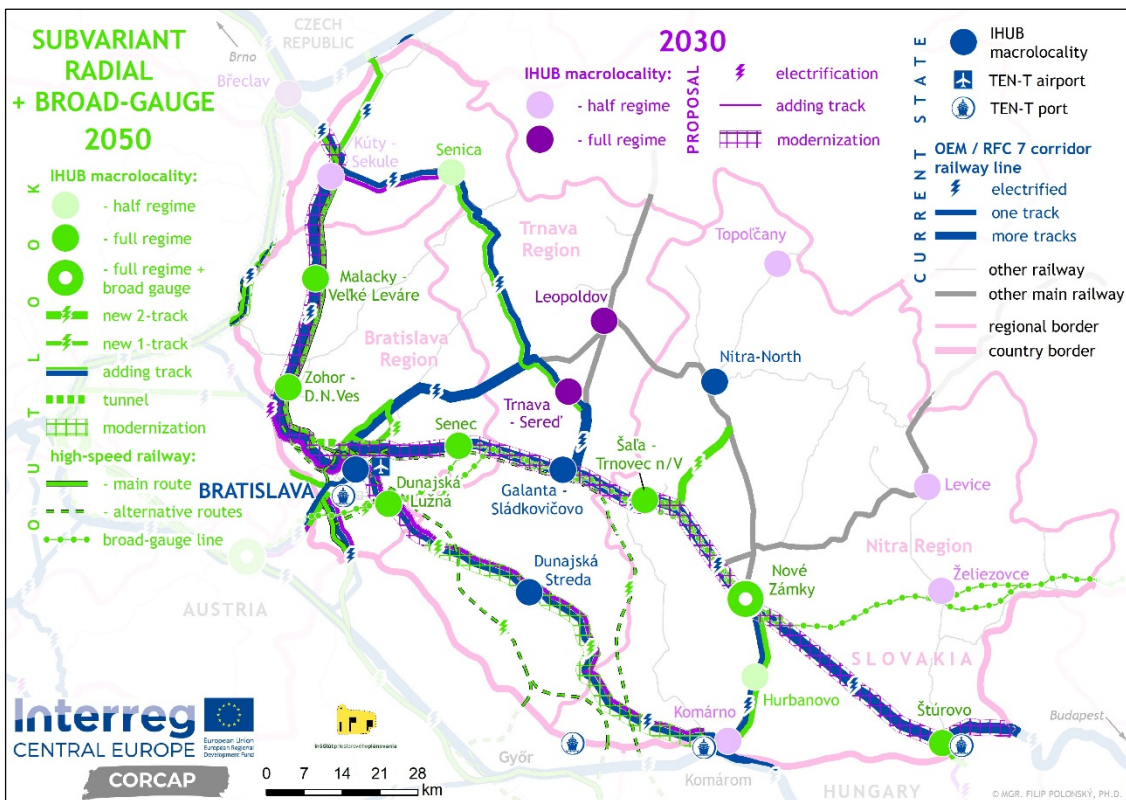
The following maps show the **Subvariant Tangential + BGL** and **Subvariant Radial + BGL** which means the situation when including the broad-gauge line (BGL) project.



Map 7. Railway lines and IHUBs development in the Subvariant Tangential + BGL in SW Slovakia



Map 8. Railway lines and IHUBs development in the Subvariant Radial + BGL in SW Slovakia



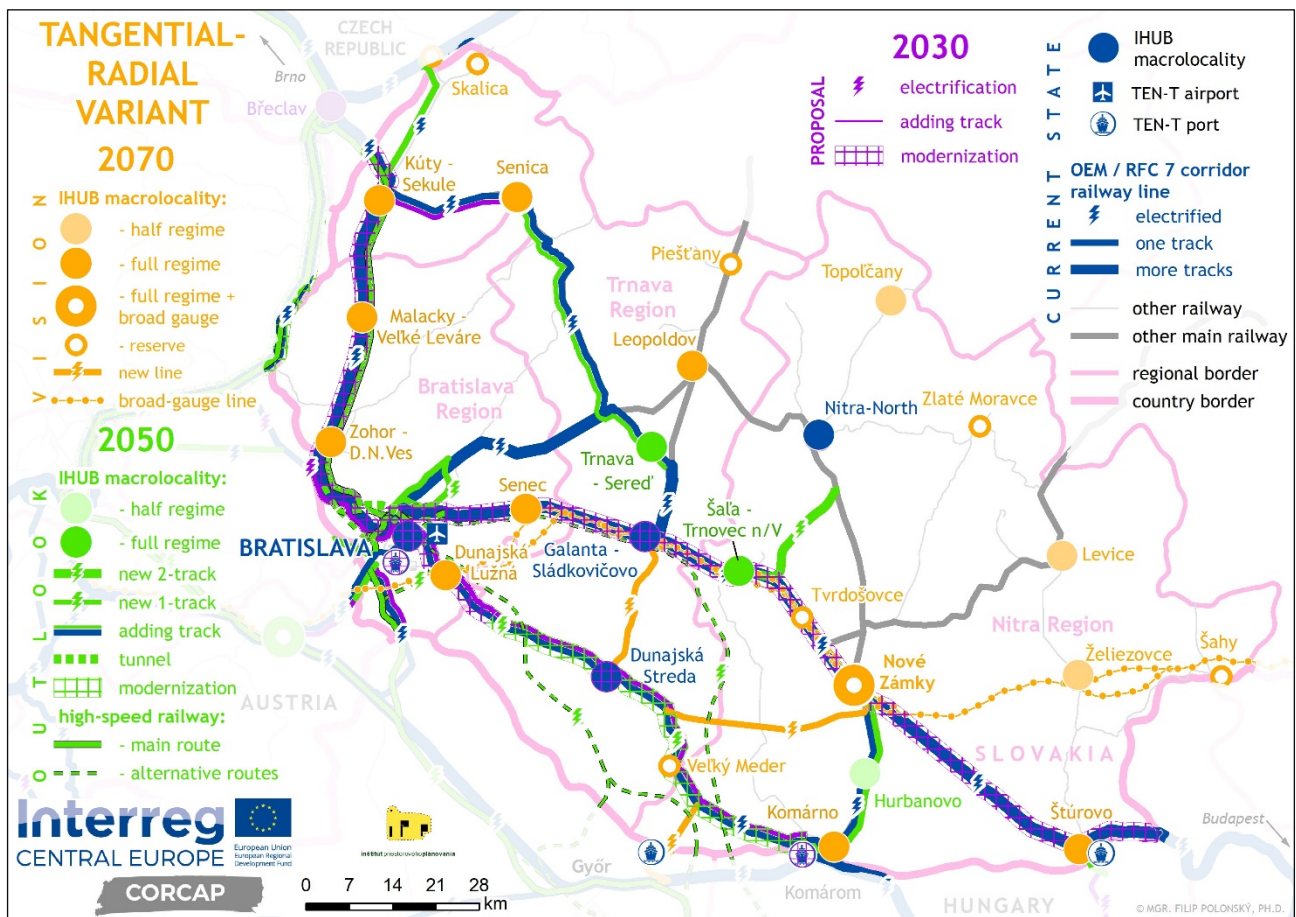


Development of IHUBS in the Tangential-Radial Variant

The Tangential-Radial Variant of the development of railway infrastructure combines the main elements and advantages of both previous presented variants. This combined variant will offer sufficient variability and representativeness of individual sections of railway infrastructure in SW Slovakia.

The stage and hierarchy of future IHUBS will also be adapted to the real state of railway operation on the Tangential-Radial Variant. The necessity of the construction of individual IHUBS will also be strongly supported by the state and development of the regional economy concerned.

Map 9. Railway lines and IHUBs development in the Tangential-Radial Variant in SW Slovakia





3.5.3. Intermodal Networks

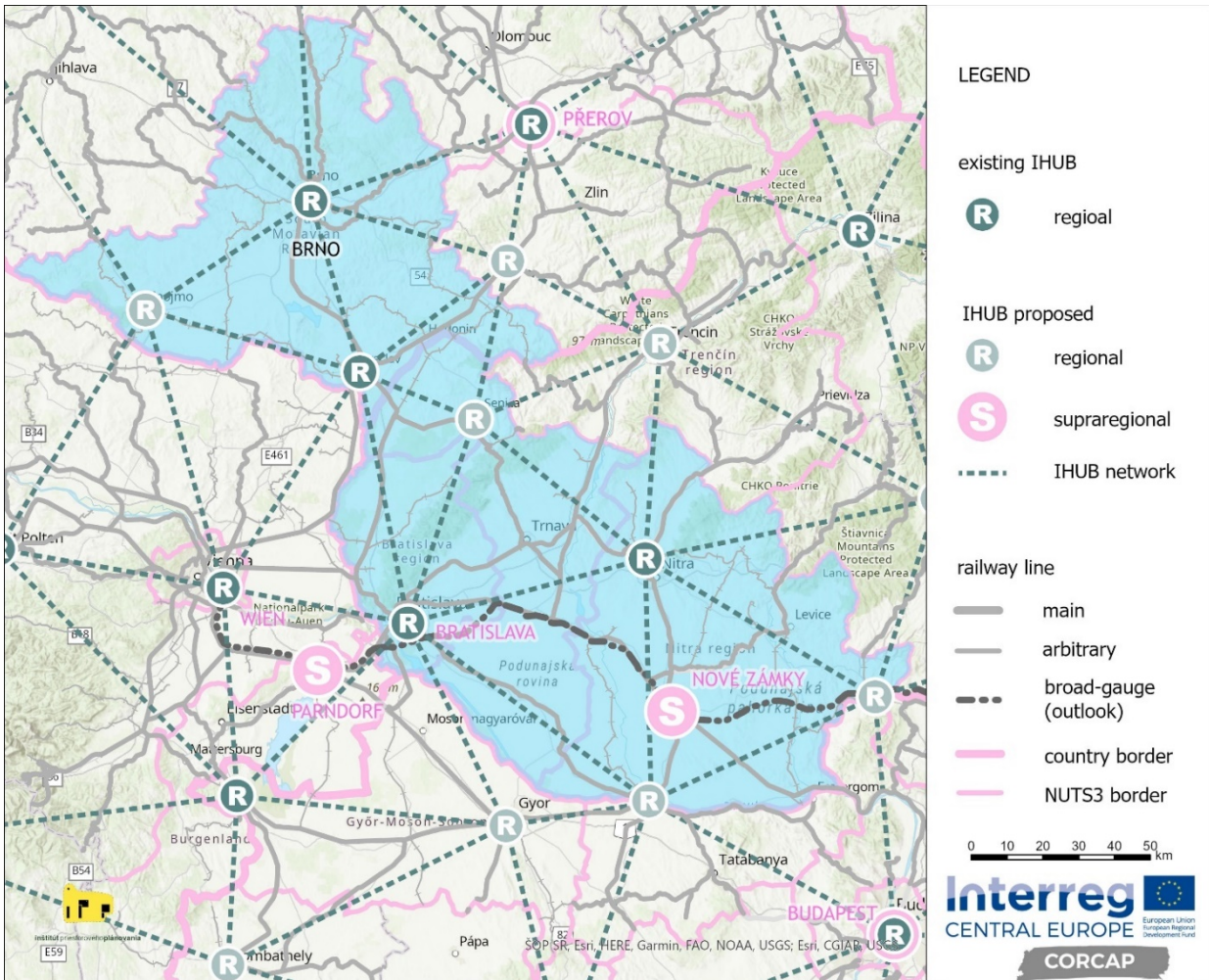
Before building of IHUBs, we recommend keeping in mind the problem of **density** (dispersion or location optimisation) and **hierarchy**. The following map just illustrates the possible arrangement of IHUB in terms of their proximity and hierarchy. However, the **recommendatory nature of such an arrangement should be emphasized**. However, similar considerations must always be placed in a broader, Central European, context and should be part of further studies in cross-border cooperation.

For the territory of the **SMR Region**, we should stay in line with the afore-mentioned Concept of freight transport (MD ČR 2022). Based on this the regional IHUB should be localized in area between **Brno** and **Břeclav**, which is more-or-less in line of our assessment.

For the territory of the **SW Slovakia**, we propose to respect the structure of local IHUB - range up to 50 km, Regional IHUB - range 50-150 km, and Transregional IHUB - range over 150 km. It seems appropriate to build/use regional IHUBs in the macrolocalities **Bratislava-East**, and **Nitra-North**, where existing hubs are already located. These two should be complemented by the IHUBs in **Senica**, and **Komárno**, and in the far view also **Šahy**. The map also shows the project of extending the **broad-gauge railway (BGL)** from Eastern Slovakia, through southern and SW Slovakia to Parndorf and Vienna. In case of its construction, it is envisaged that **Nové Zámky** and **Parndorf** (in Austria) should become new IHUBs of transregional/international importance. In combination with port (**Komárno** or **Vienna / Bratislava**) one of these has potential serving as a Transcontinental IHUB.



Map 10. Possible arrangement of a network of IHUBs in a wider area



3.6. Environmental Assessment

The development of logistics centres and adjacent infrastructure, whether transport or production, affects the current state of environmental components and natural conditions. The environmental impact occurs not only by the operation of logistics itself, but also during the construction of the planned works. It is therefore important to know the basic state of the natural conditions, protected areas and environmental components. The area of environment and nature protection has strict legislative conditions in terms of the development of the territory and its functioning. Such conditions may be considered as territorial limits. Important limits are different categories of protected nature areas, various protection zones (e. g. forest protection zones, protection zones of cultural and historical values), important water management areas, environmental burdens, landfills, or mining areas.

3.6.1. Natural conditions

Natural conditions in the South Moravian Region

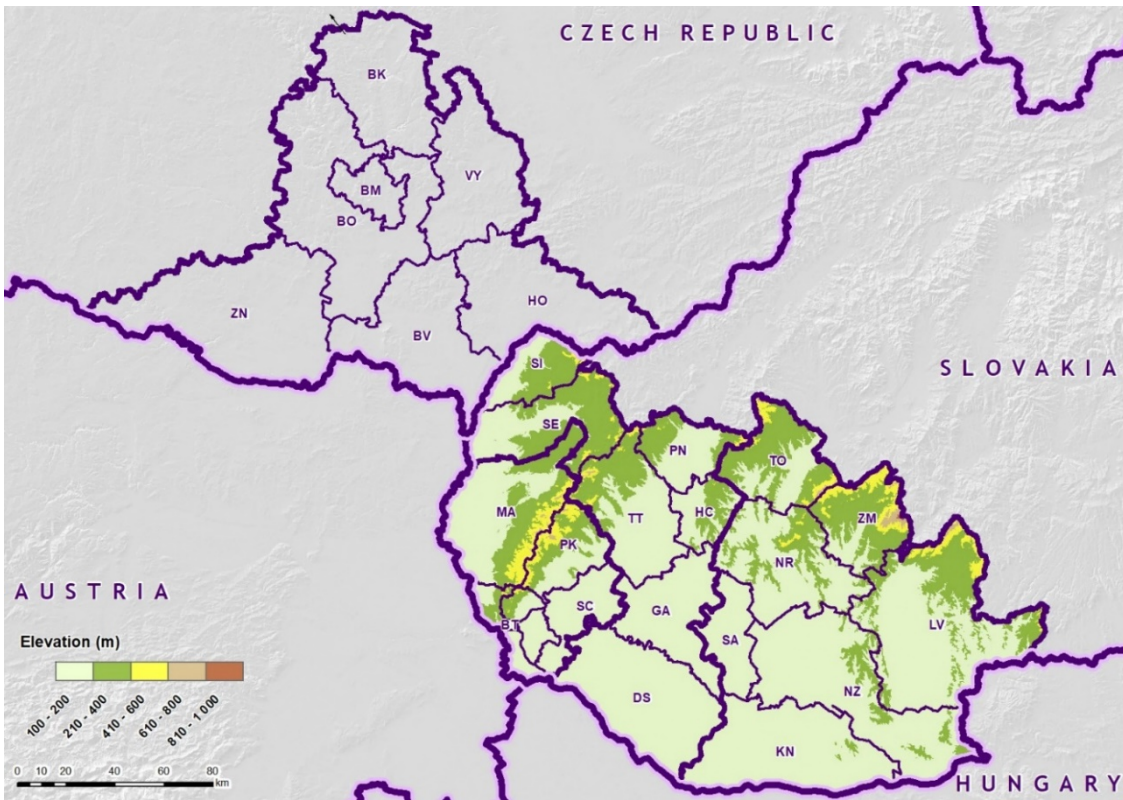
The South Moravian Region is situated on the border of the Czech Highlands and the Carpathian System. The landscape of the South Moravian Region gradually decreases to the east and south from the edges of the Bohemian-Moravian Highlands to the Dyje-Svratka and Lower Moravian valleys. These areas are among the most fertile. The main water management axis consists of the Morava River with a right-bank tributary of the Dyje river and its tributaries Jihlava and Svratka. The highest peak of the region is Durda (842 m above sea level). The territory of the South Moravian Region ranks among the climatically warmest areas of the Czech Republic.

Natural conditions in the SW Slovakia

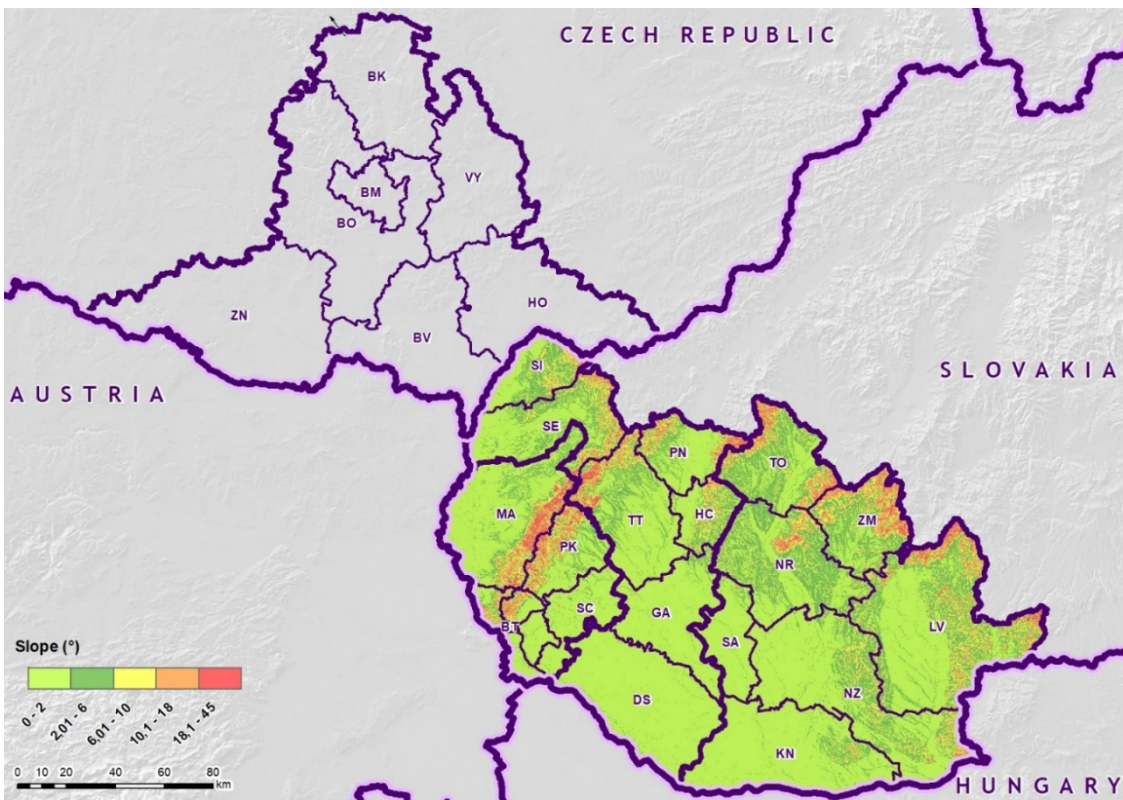
From the view of relief, the Slovak part of the territory can be characterized as predominantly lowland. The lowland part of the area is situated in the eastern part mainly on the Danube Lowland and the western part on the Záhorská Lowland. The border with the Czech Republic is located - geomorphologically - on the South Moravian Basin. From the view of further development of the territory, it can be concluded that the natural barrier between the Danube and Záhorská Lowlands represent the Mountains of the Little Carpathians that stretch between Bratislava and Trnava Regions. From the north more rugged geomorphologic units gradually enter the area. These include Myjava Hills, Považský Inovec, Trábeč, Pohronský Inovec, Štiavnické Vrchy, and in the southeasternmost part Burda.



Map 11. Elevation zones (m a. s. l.)



Map 12. Inclination (°)



Source: EC (2022) - Natura 2000 data and maps



3.6.2. Natural conservation

The area of interest contains several legally defined nature and landscape protected areas belonging to the national network of protected areas or the common European network of Natura 2000. In different countries, different categories of protected areas were set within the national network due to different legislation in the field of nature protection. Worldwide IUCN categorisation can be used to compare and unify types of protected areas between different countries.

Nature conservation in the South Moravian Region

Další z chráněných krajinných oblastí CHKO Bílé Karpaty byla v roce 1996 také zařazena do rezervací UNESCO.

The Podyjí PLA (protected landscape area) and NP (National Park) is located between Znojmo and Vranov nad Dyjí at the state border with neighbouring Austria. The area of Podyjí NP is 63 km². Podyjí National Park is the smallest in the Czech Republic. Another important protected landscape area is the Moravian Karst. This area is located not to the north of Brno. The most interesting parts of the Moravian Karst PLA are stalactite caves. The caves of Punkevní, Kateřinská, Balcarka, Sloupsko-šošůvské and Výpustek are open to the public. The Pálava PLA was declared in 1976. It is located on the Czech-Austrian border in the southernmost part of Moravia. Pálava is the most visited area in the South Moravian Region. The highest peak of Děvín with the ruins of Dívčí Hrady is also the northernmost point of Pálava, which then suddenly slopes down to the water surface of the Novomlýnské reservoirs. Another PLA of the White Carpathians was also included in the UNESCO reservations in 1996.

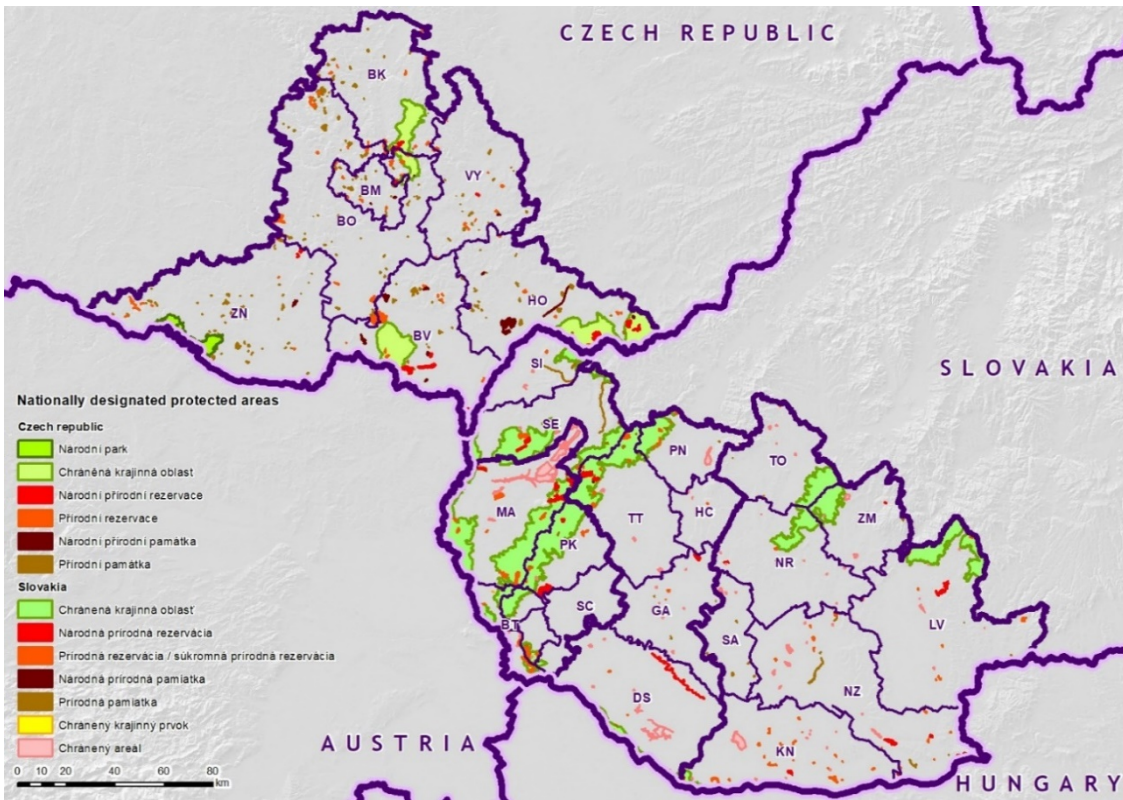
There are 20 nature parks (PřP) in the South Moravian Region: PřP Baba, PřP Bobrava, PřP Halasovo Kunštátsko, PřP Jevišovka, PřP Lysicko, PřP Mikulčický luh, PřP Niva Dyje, PřP Niva Jihlavy, PřP Oslava, PřP Podkomorské lesy, PřP Rakovecké údolí, PřP Rokytná, PřP Řehořkovo Kořenecko, PřP Říčky, PřP Strážnické Pomoraví, PřP Střední Pojhlaví, PřP Svratecká hornatina, PřP Údolí Bílého potoka, PřP Výhon and PřP Ždánický les. One of the political intentions is the establishment of a new natural park Soutok. These are the remains of an alluvial forest of primeval character located about 8 km south of Lanžhot, in the area of the confluence of the Morava and Dyje rivers. The confluence is a unique landscape with valuable ecosystems.

Nature conservation in the SW Slovakia

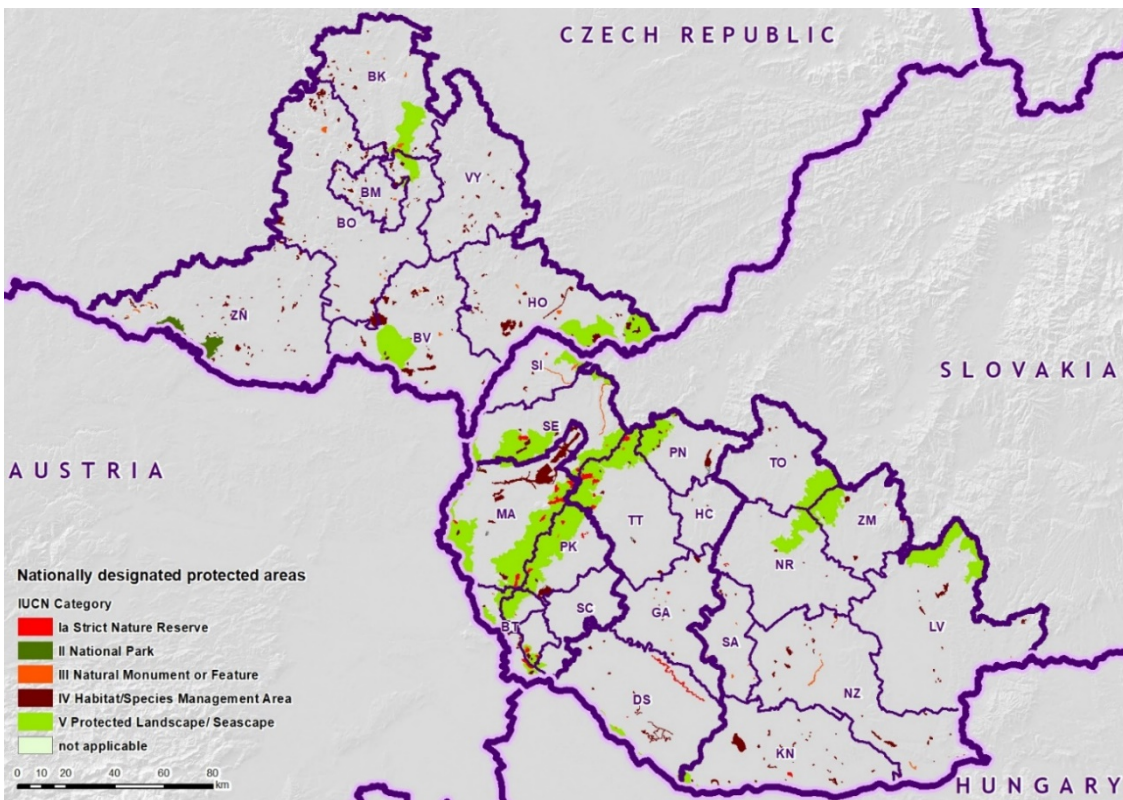
Interestingly, the highest share of the national network of protected areas and Natura 2000 areas from the total area of the region is achieved by the Bratislava Region. This may be caused by the smaller area of the region with a huge portion covered by the Little Carpathians mountains that form a large area of the protected landscape area. Similar situation exists with the Natura 2000 protected areas. Nitra and Trnava regions are predominantly lowland territories with high shares of agricultural land, resulting in a smaller proportion of protected areas.



Map 13. National Network of Protected Areas – national categorisation



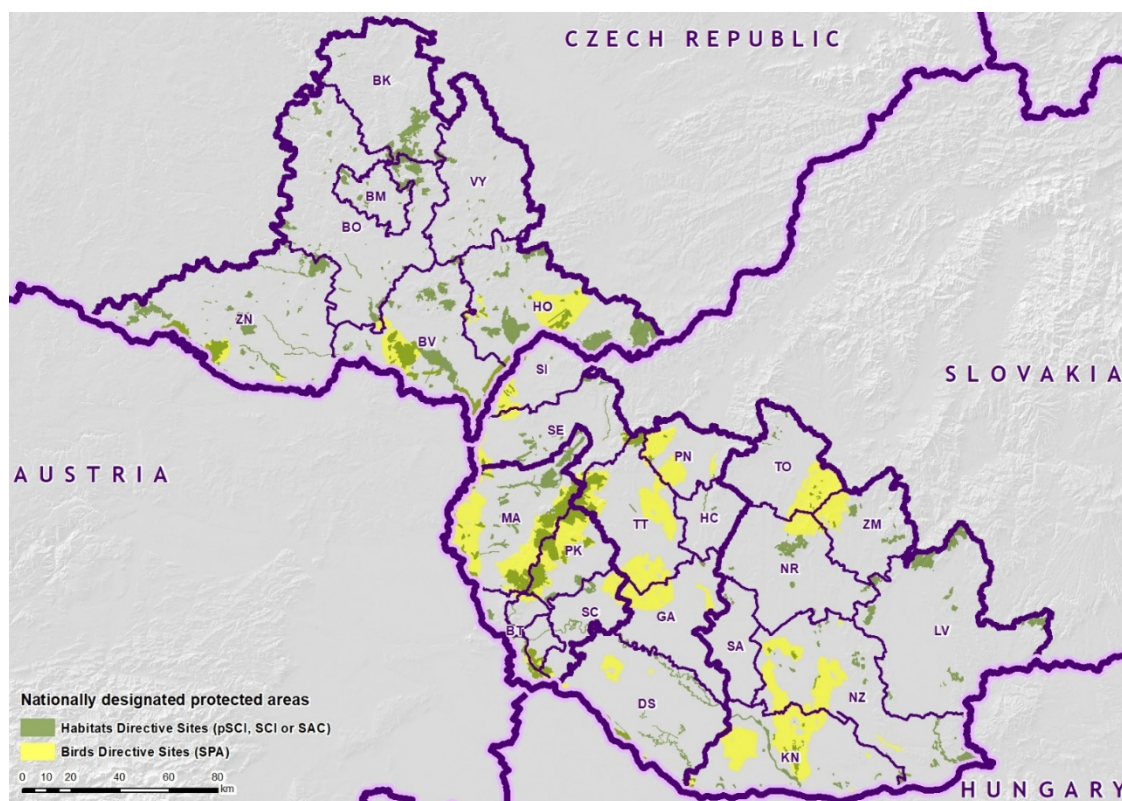
Map 14. National Network of Protected Areas – IUCN Categorisation



Source: EC (2022) - Natura 2000 data and maps



Map 15. Common Network of Natura 2000 Protected Areas



Source: EC (2022) - Natura 2000 data and maps

4. CONCLUSIONS AND RECOMMENDATIONS

The study represents one of the partial outputs of the Pilot Activity aimed at the development of attractive multimodal logistics locations on the territory of the South Moravian Region and the region of Southwestern Slovakia along the TEN-T Orient/East-Med Corridor. The main objective of this study was to identify (design) the attractive inter/multimodal logistics (IHUB) locations and to develop profiles for their development and to create territorial reserves under spatial planning procedures for the sites thus identified/proposed.

Attractive IHUB locations in the SMR and SW Slovakia

- > In the **framework of the first-stage identification of IHUBs**, a **multicriterial analysis** of the basic territorial units (LAU2) was carried out on the basis of 7 accessibility indicators (network analysis method) to the selected transport entities, and on the basis of population potential and the existence of relevant spatial planning documentation. For each region (South Moravian, Bratislava, Trnava and Nitra), the TOP 5 locations were defined, separately for 2020 and 2050
- > The **second-level identification of IHUBs - based on first-stage analysis** (outlook for 2050) - as well as further expert assessment, **subsequently identified 4 macrolocalities in the South Moravian Region and 26 macrolocalities in the region of Southwestern Slovakia**. At the same time, minimum distances between macrolocalities were set. A more detailed assessment defined specifically 1 to 4 suitable **microlocalities** within each macrolocality, namely 6 in the South Moravian Region and 42 in the region of SW Slovakia
- > Part three includes IHUB development profiles via **reference sheets**. These are available online in the WMA (web map application) available on <https://ipp-oz.sk/corcap>

IHUB building sequence in the SW Slovakia

- > The proposed IHUB sites were confronted with **road and rail freight development scenarios** for the Southwestern Slovakia (2050 and 2070), as defined in the previous study. Graphics show possible procedure for building IHUBs by variant
- > Environmental assessment

Within the individual regions of the South Moravian Region and Southwestern Slovakia, we recommend focusing on the preparation and implementation of railway infrastructure projects, IHUBs and logistics centres that are also mentioned in the document CORRIDOR CAPITALISATION PLAN.

Increasing the attractiveness of rail freight transport will have a positive impact on the social and economic development of the municipalities concerned, which must be supported by the preparation or updating of the relevant planning documents (these are the sites of intermodal network of local, regional, and transnational importance).

5. ANNEXES

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5.2. Abbreviations

- AT - Austria (Österreich)
- BA - Bratislava
- BGL - broad-gauge railway line
- BSK - Bratislava Self-governing Region
- CE CENTROPE - Part of CENTROPE region defined in this study
- CENTROPE - Region in Central Europe
- CZ - Czech Republic
- DE - Germany (Deutschland)
- EIA - Environmental Impact Assessment
- HU - Hungary (Magyarország)
- IHUB - inter/multimodal hub
- IPP - Spatial Planning Institute (Inštitút priestorového plánovania, o.z.)
- MDVaRR SR - Ministry of Transport, Construction and Regional Development of the Slovak republic
- NSK - Nitra Self-governing Region
- OEM - TEN-T Orient/East-Med corridor
- PL - Poland (Polska)
- SMR - South Moravian Region
- SR - Slovak Republic (Slovenská republika)
- SSC - Slovenská správa ciest (Slovak Road Administration)
- ŠÚ SR - Statistics Office of the Slovak republic
- TEN-T - Trans-European Transport Networks
- TIOP - Terminal of Integrated Passenger Transport
- TTSK - Trnava Region
- UA - Ukraine (Україна)
- ÚPNR BSK - Regional Spatial Plan of the Bratislava Self-Governing Region
- VRT - vysokorychlostní trať - high-speed line
- ZSSK - Slovak Railway Company (Železničná spoločnosť Slovensko, a.s.) - joint stock company - national railway carrier of passenger transport
- ŽSR - Slovak Railways (Železnice Slovenskej republiky)
- ŽST - railway station



5.3. Summary of requirements for the development of IHUBs in the territory of the SW Slovakia

The following table contains the decisive indicators for selected 26 macrolocalities of the IHUBs in the SW Slovakia. There are also links to related logistics areas as well as the necessary investment activities for ensuring the smooth functioning of rail freight transport in three regions of the SW Slovakia.

Tab. 12. IHUBs macrolocalities according to the expected use

nr.	macrolocality	VÚC	Performance in 1,000 t/annually			necessary actions by mode of transport			notes
			2030	2050	2070	railway	road	IHUB	
1	Bratislava-East	BSK	453	414	398	modernization of track nr. 120 (130) / reconstruction of line 124 (131) - adding of 2 nd track, electrification	connection to D1 / D4 motorway	IHUB in operation	gradual reduction of performances at inner IHUBs of the city, transfer to the suburban zone
2	Dunajská Lužná	BSK	423	690	1114	reconstruction of ŽST Nové Košariská, line 124 (131) - adding of 2 nd track, electrification	feeder to R7 or R1 expressway	construction of the IHUB and its technology	alternative IHUB supplying Bratislava
3	Malacky - Veľké Leváre	BSK	302	552	793	modernization of track nr. 126 (110)	reconstruction of the feeder / connection to D2 motorway	construction of the IHUB and its technology	supply of the industrial park Malacky-south
4	Senec	BSK	302	552	716	modernization of track nr. 120 (130)	reconstruction of II/503, connection to I/62 road	construction of the IHUB and its technology	supply of the logistics centre Senec (direction Viničné)
5	Zohor - Devínska Nová Ves	BSK	484	966	1352	modernization of track nr. 126 (110)	reconstruction of the III/1105 road / connection to II/505 road & D2 motorway	construction of the IHUB and its technology	supply of the VW complex and the Lozorno logistics centre
6	Dunajská Streda	TTSK	469	393	421	line 124 (131) - adding of 2 nd track, electrification, completion of the triangle at Komárno	feeder to R7 expressway	IHUB in operation	property of METRANS company
7	Galanta - Sládkovičovo	TTSK	113	102	117	modernization of line nr. 120 (130)	connection to I/75 / I/62 roads	construction of the IHUB and its technology	supply of the Gáň and Sered' logistics centre
8	Kúty - Sekule	TTSK	5	4	8	modernization of line nr. 126 (110)	connection to I/2 road and D2 motorway	construction of IHUB in reserve	
9	Leopoldov	TTSK	23	20	24	modernization of line nr. 125 (120)	reconstruction of the feeder to D1 motorway (II/513)	enhancement of the transshipment technology	
10	Senica	TTSK	43	35	36	Modernization of line nr. 128 (116) - adding of 2 nd track	connection to the I/51 road bypass	construction of the IHUB and its technology	
11	Trnava - Sered'	TTSK	272	221	235	modernization of lines nr. 125 (120) a 128 (133)	reconstruction of the feeders to D1 a R1	construction of the IHUB and its technology	supply of the Sered' and Gáň logistics centre



nr.	macrolocality	VÚC	Performance in 1,000 t/annually			necessary actions by mode of transport			notes
			2030	2050	2070	railway	road	IHUB	
12	Komárno	NSK	33	45	56	line 124 (131) - adding of 2 nd track, electrification, completion of the triangle to HU	connection to I/64 road	construction of the IHUB and its technology, construction of the port on Danube	multimodal hub on the Danube, connection to BGL and to HU
13	Levice	NSK	31	41	60	modernization of lines nr. 121 (150) a 119 (152)	reconstruction of I/51 road, feeder to R7 expressway	construction of the IHUB and its technology	support for the city of Levice and its surroundings
14	Nitra - sever	NSK	131	171	191	modernization of lines nr. 122 (140), 123 (141), building of a new line Trnovec n. V. - Nitra		enlargement of the existing IHUB	supply of industrial areas, the city of Nitra and its surroundings
15	Nové Zámky	NSK	306	405	442	modernization of line nr. 120 (130)	connection to I/75 road	construction of the IHUB and its technology	
15A	Nové Zámky + BGL	NSK	0	720	1250	modernization of line nr. 120 (130)	connection to I/75 road and R7 expressway	construction of the IHUB and its technology	
16	Šaľa - Trnovec nad Váhom	NSK	872	1102	1135	modernization of line nr. 120 (130)	reconstruction of the I/75 road	reconstruction /construction of the IHUB and its technology	expansion of a specialized transshipment point for the DUSLO Šaľa plant
17	Zlaté Moravce	NSK	8	10	10	modernization of line nr. 123 (151)	connection to I/65 road & R1 expressway		it is not proposed to significantly expand the IHUB
18	Piešťany	TTSK	0	0	0	modernization of line nr. 125 (120)	connection to D1 motorway	construction of IHUB in reserve	
19	Skalica	TTSK	0	0	0	modernization of line nr. 129 (114)		construction of IHUB in reserve	
20	Veľký Meder	TTSK	0	0	0	line 124 (131) - adding of 2 nd track, electrification, completion of the triangle at Komárno	connection to I/63 road	construction of IHUB in reserve	
21	Hurbanovo	NSK	0	0	0	modernization of line nr. 120 (135)	connection to I/64 road bypass	construction of IHUB in reserve	
22	Šahy	NSK	0	0	0	modernization of line nr. 119 (153)	connection to I/66 road and R3 expressway	construction of IHUB in reserve	
23	Štúrovo	NSK	0	0	0	modernization of line nr. 120 (130)	connection to I/63 road	construction of IHUB in reserve	
24	Topolčany	NSK	0	0	0	modernization of line nr. 122 (140)	connection to I/64 road	construction of IHUB in reserve	
25	Tvrdošovce	NSK	0	0	0	modernization of line nr. 120 (130)	connection to I/75 road	construction of IHUB in reserve	
26	Želiezovce	NSK	0	0	0	modernization of line nr. 119 (152)	connection to I/76 road bypass	construction of IHUB in reserve	



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