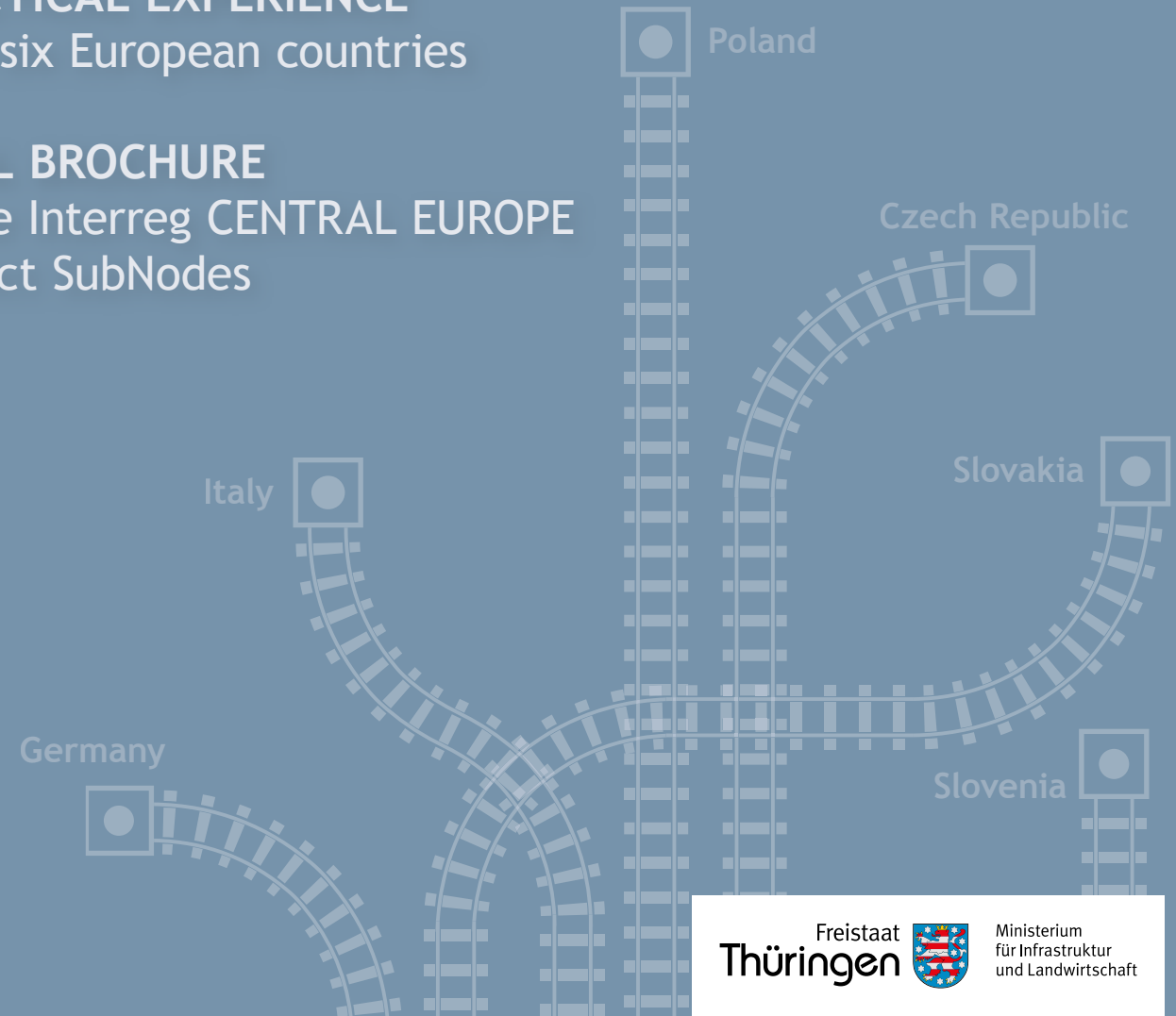
SUBNODES

A methodological approach to connecting the hinterland to the Trans-European Rail Transport Network

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
SubNodes

PRACTICAL EXPERIENCE
from six European countries

FINAL BROCHURE
of the Interreg CENTRAL EUROPE Project SubNodes



Freistaat Thüringen
Ministerium für Infrastruktur und Landwirtschaft

DEAR READERS

Thanks to the inaugurated railway project ‘German Unity No. 8’ and the development of Erfurt as a high-speed long-distance node, Thuringia is now connected to the European metropolises. A great achievement!

Such as Thuringia, also other European regions have made substantial investments in the Trans-European Transport (TEN-T) rail network in recent decades. The expansion and upgrading of this core network for long-distance transport has led to changes in the framework conditions for regional public transport. In this sense, all partners within the SubNodes project are convinced, that the resulting improvements are expected to provide noticeable benefits to large parts of their regions’ population.

In Thuringia it is a pronounced objective of the state government that all parts of the Free State benefit from the very good trans-regional rail connection. Therefore, the ‘State Development Programme Thuringia 2025’ envisages that the accessibility gains achieved by the high-speed railway node Erfurt will be utilized in large parts of the region. With the Interreg project SubNodes, we were able to approach this objective methodologically whilst drawing on the experiences of other regions within Central Europe.

I thank all project partners for this valuable and successful collaboration! This project has once again shown that cooperation within Europe, which is based on partnership, promotes mutual understanding and the development of a sense of community. With this brochure, we would like to share the experience of all project partners with you and encourage you to make use of the examples and maybe even start networking with the partner institutions.

Prof. Dr. Benjamin Immanuel Hoff
Thuringian Minister for Infrastructure and Agriculture

AT A GLANCE
APROACH AND FACTS

SubNodes tackles the weak intermodal integration of peri-urban hinterland regions to primary TEN-T rail hubs. Suitable medium-sized cities in these areas shall be developed into attractive intermodal secondary hubs – so called 'sub-nodes' – which better connect the hinterland to the TEN-T rail network and offer passengers a continuous travel chain.

Having regard to the aim that the development and upgrading of the TEN-T core network will provide noticeable benefits to large parts of the population, the following partner institutions from six Central European countries cooperated in the SubNodes project, lasting from September 2017 until August 2020:

Germany
- Thuringian Ministry for Infrastructure and Agriculture (Lead Partner)
- County of Soemmerda
- University of Applied Sciences Erfurt

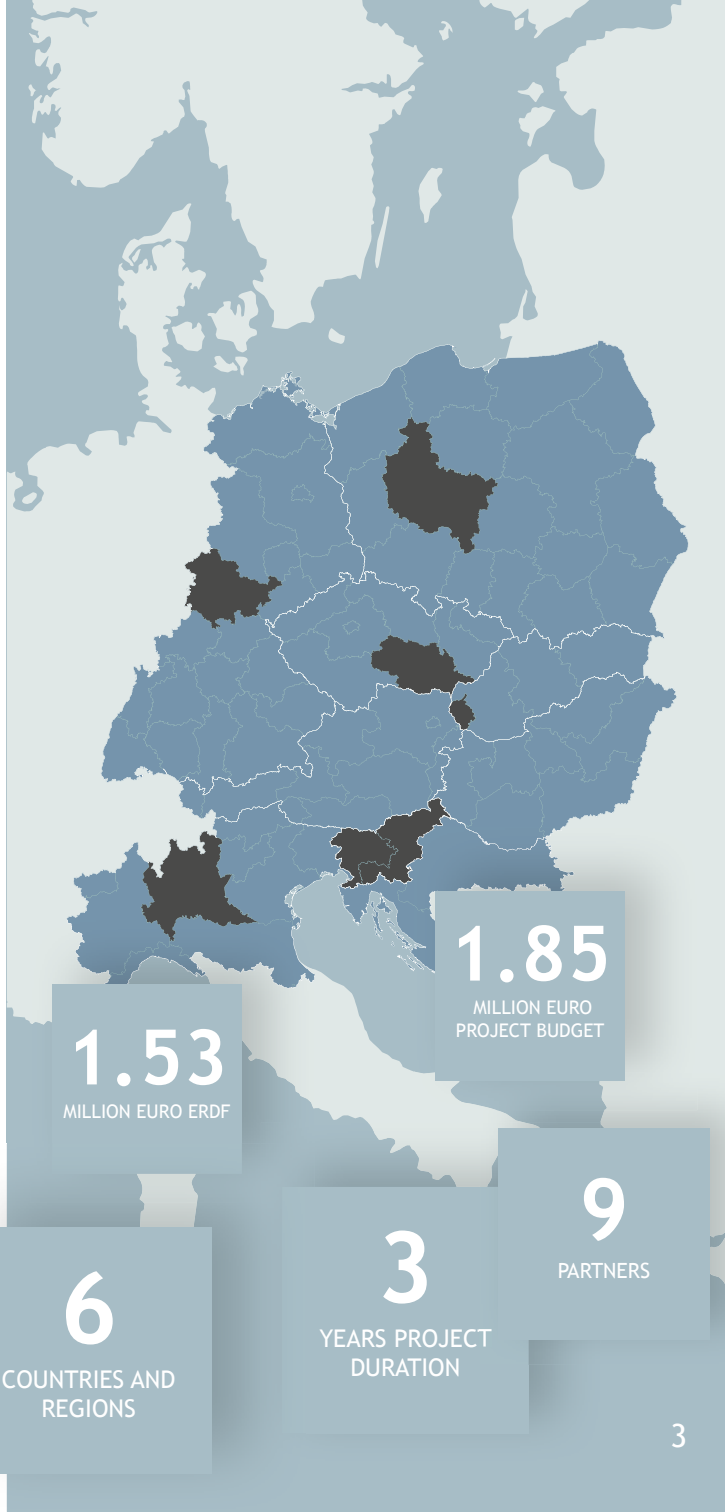
Czech Republic
- KORDIS JMK (Transport Association of the South Moravian Region)

Italy
- Lombardy Region

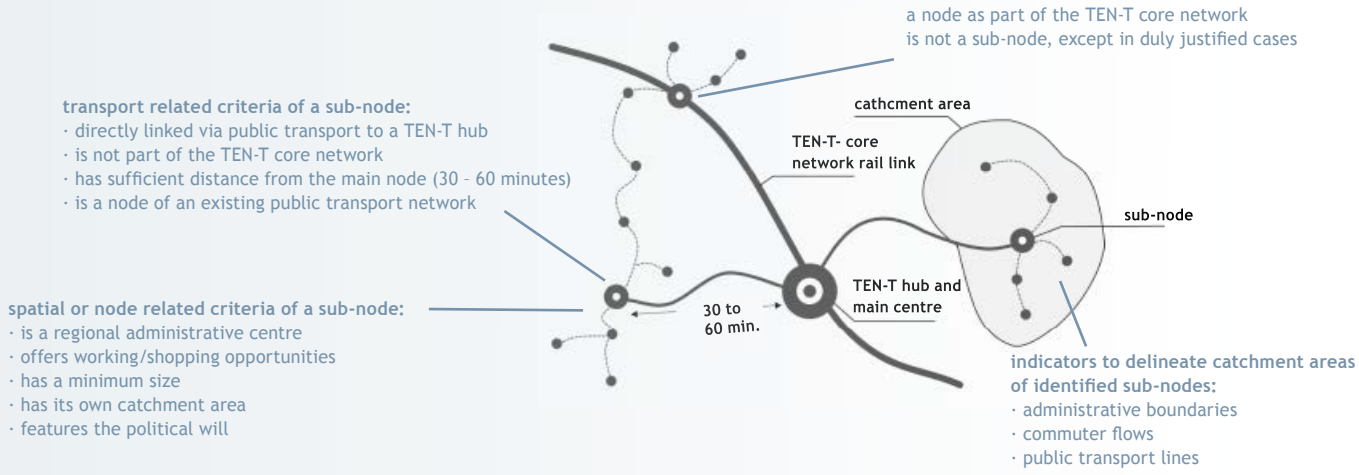
Poland
- Marshal's Office of the Wielkopolska Region

Slovakia
- Bratislava Integrated Transport (Transport Association of Bratislava Region)

Slovenia
- Institute of Traffic and Transport Ljubljana (Prometni institut)
- Scientific Research Centre Bistra Ptuj



TRANSNATIONAL RESULTS:
THE SUBNODES-STRATEGY



Classification of sub-nodes within the hierarchical transport network. source: Dr. Mathias Wilde, University of Applied Sciences Erfurt, 2018

Sub-nodes are an integrating element within a hierarchical transport network. They form the important link between small-scale regional transport and large-scale long-distance transport. In this sense the term sub-node doesn't apply to a single location rather than to a city as a whole. Typically, those cities are of a small or medium size and equate to the middle-order centers in state spatial plans.

The figure shows the criteria to identify sub-nodes.

With the sub-nodes strategy, the project partners propose a four-step process in order to identify and assess the possibilities and obstacles of better integrating the hinterland to the TEN-T network:

1. Defining and identifying cities as sub-nodes based on spatial and transport-related criteria (see figure).
2. Delineating the catchment area of a sub-node based on suitable indicators (see figure).
3. Qualitatively assessing the public transport service and identifying bottlenecks (especially in the fields of timetable integration, travel time ratio, built infrastructure, information and tariff).
4. Developing and implementing appropriate measures to qualify and / or improve sub-nodes as intermodal transport hubs to long-distance passenger transport. Possible fields of action are planning and participation, infrastructure, services and digitalization.

TRANSNATIONAL RESULTS: THE JOINT DECLARATION

In 2019 political representatives of the partner regions signed a joint declaration, in which they agreed on the following key statements.

1. A polycentric spatial development and the reinforcement of regional public transport systems contribute to equivalent living conditions.
2. Suitable small and medium-sized cities in Central Europe are to be developed as sub-nodes.
3. To take full advantage of a functional hierarchical transport network, the following objectives shall be taken into account:
   - the creation of new or upgrading of existing connections between the regional public transport network and the TEN-T network,
   - the collaboration of regional authorities in charge of public transport, in order to plan and organise coordinated interchanges,
   - the consideration not only of buses and trains, but also of pedestrians, bicycles and motorised private transport,
   - the supply of real-time information,
   - a tariff and pricing design aiming at different target groups and enabling a unified, end-to-end ticket.
4. In order to strengthen territorial cohesion within and between Europe's regions, an adequate support of secondary transport networks is necessary to the same extent as for the TEN-T core networks.

REGIONAL RESULTS:
THURINGIA AND COUNTY OF SOEMMERDA

Train station surroundings in Soemmerda city
(photo by: county administration of Soemmerda)

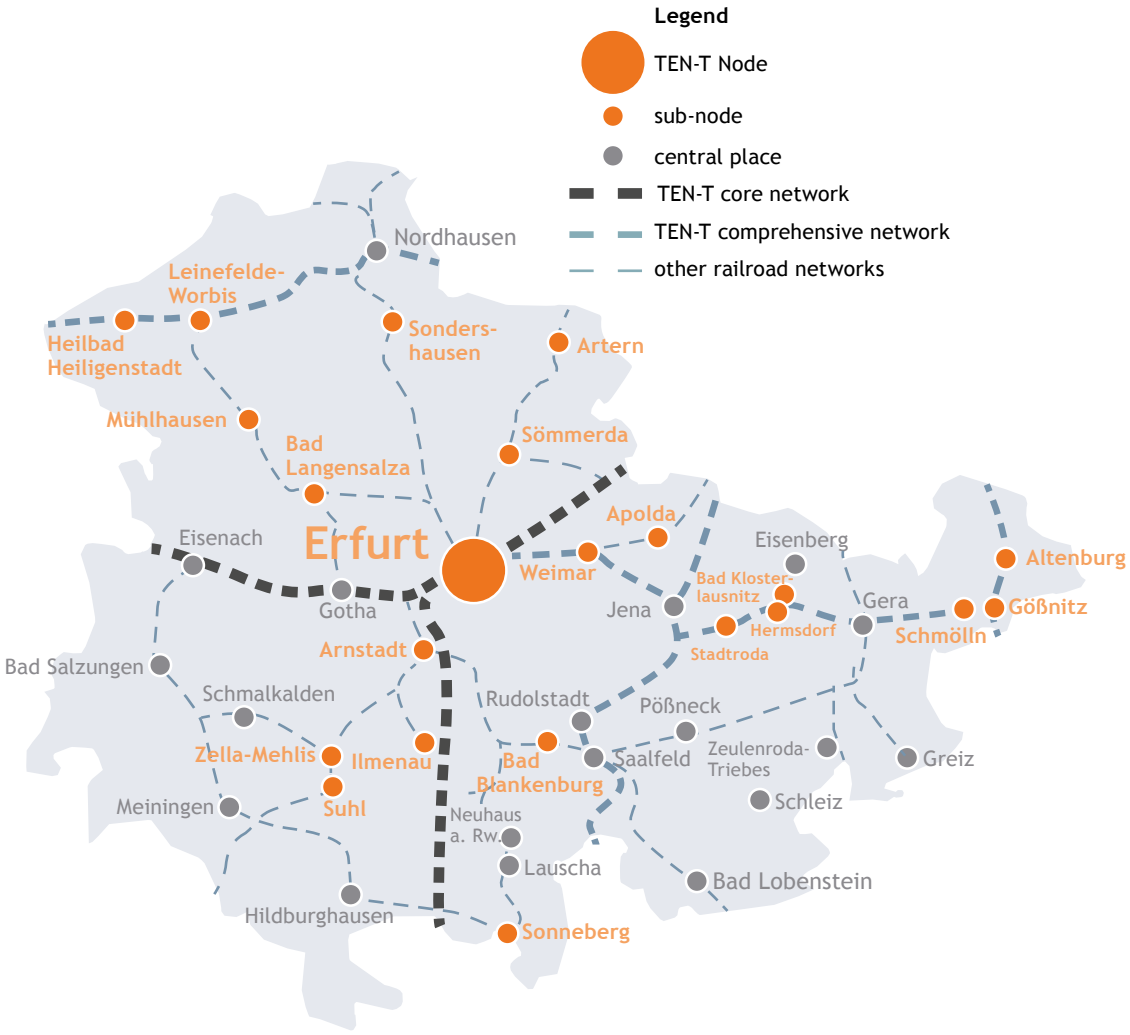
Historical town wall of Soemmerda
(photo by: county administration of Soemmerda)

Regional overview and background

Located in the middle of Germany, the Free State of Thuringia with its roughly 2.1 million inhabitants on an area of over 16,200 km^2 is one of the smaller federal states of of Germany.

Its public transport is structured into regional rail passenger transport, running mostly every one to two hours, and local bus transport for accessing the wider area. The federal state is in charge of rail transport and provides for an Integrated Synchronised Timetable throughout the entire region. When it comes to bus transport, the single counties and municipalities are the responsible authorities. Defined bus routes of state-wide interest are financially supported by the federal state.

The connections between rail and bus transport work well along those routes of state-wide interest. However, apart from that there are qualitative deficiencies regarding the connection and integration of bus and rail. The more the single bus lines are dominated by transport from and to schools, the higher the shortcomings. This is also the case for the county of Soemmerda. This county north of Thuringia's capital and TEN-T hub Erfurt posed as the project's pilot area within Thuringia.



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REGIONAL RESULTS:
THURINGIA AND COUNTY OF SOEMMERDA

Regional approach

Within the project a Thuringian action plan was elaborated. In the first step it analyses the specific situation of public transport connections at 13 potential sub-nodes. On this basis the plan derives quality requirements for Thuringian sub-nodes and names superordinate as well as location-specific fields of action and measures to optimize the integration.

In the specific case of the county of Soemmerda, the objective was pursued to develop Soemmerda as a sub-node in such a way that Erfurt as the main node will be accessible from all parts of the county, either by bus or by train. As a pilot action, a feasibility study for implementing an integrated synchronised timetable for local busses was conducted. The main prerequisites identified are: suitable physical interchange points (e. g. at the Soemmerda railway station and bus terminal) as well as timetables that allow connections to and transfers between different means of transport.

Next steps

At the state level, the recommended measures of the action plan will be considered when updating the state development programme as well as the state plan for regional rail passenger transport, and when further defining funding guidelines for public transport and the Public Transport Act.

The integrated synchronised timetable designed for the Soemmerda district will be put into practice in several steps. In a first step, the integrated synchronised timetable will be integrated as an important target for future bus services in the local transport plan 2021-25 for the county of Soemmerda.

This is the basis for planning the further development of the local transport supply. In order to be able to initiate detailed planning for a revised supply concept, the next step required will be an implementation concept for the integrated synchronised timetable. This will be followed by further preparatory work up to a gradual change of the bus timetables in the county.

At the same time, further plans and projects are being developed that create additional mobility supply in smaller municipalities of the county.

Recommendations

For a successful development of local public transport services, it is also important to think about inter-regional connections and to enable them by improving the accessibility of nodes within the network, including TEN-T nodes and sub-nodes.

By a constant and far-reaching exchange, outstanding issues could be answered in the course of the project. It was also shown that several discussions with partners of other regions, a constant dialogue with local stakeholders and a pre-developed work plan can form a good basis for generating extensive knowledge in a short time, forming networks and working structures and initiating processes that go beyond the project and have subsequent effects.

Harald Henning, Soemmerda County Commissioner

> SUBNODES HELPED US TO CONSIDER LOCAL BUS TRANSPORT AS ONE PART OF A EUROPEAN TRANSPORT NETWORK. IT IS NOW UP TO ALL STAKEHOLDERS TO FURTHER DEVELOP THIS NETWORK. THE REGIONAL AND FEDERAL AUTHORITIES AS WELL AS THE EU ARE IN CHARGE OF CREATING THE FINANCIAL AND LEGAL FRAMEWORK FOR IT.

REGIONAL RESULTS:
LOMBARDY REGION

Milan Malpensa airport (photo by SEA S.p.A.)

Regional train along Lago di Iseo on its way to Brescia (photo by Lombardy region)

Regional overview and background

Lombardy, with its 10 million inhabitants, is characterized by a high per capita income and strong economic and industrial development. These framework conditions have led to a high motorization rate and the dominance of motorized private transport. In view of the fact that three TEN-T core network corridors cross Lombardy, and that in Lombardy many railway hubs and interchanging nodes are located, there is the general claim of promoting the use of public transport.

The main focus of the project was to better connect the three largest and most important airports – Malpensa, Linate and Bergamo – with regional public transport. This is to be achieved by developing the urban agglomerations of Bergamo, Brescia, Como and Varese as sub-nodes, in which, above all, the linkage of modes of public transport is fostered.

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REGIONAL RESULTS:
LOMBARDY REGION

Regional approach

At the heart of the regional action plan is the construction and expansion of the rail infrastructure for trains and metro between the sub-nodes and the airports. In particular, a new eastern rail access gate near Linate would improve the accessibility for users travelling from sub-nodes and catchment areas of Bergamo and Brescia, avoiding longer travel times to reach Linate via Milano. Some measures to improve the rail service are also foreseen, for example the extension of the regional rail services from Bergamo to Malpensa Terminal 2 and the adaptation and coordination of the services after the completion of some planned infrastructures. In addition, cross-sectional measures are derived which aim at making the use of public transport more attractive overall:

- better linking of different modes of transport;
- integrated, simple and smart ticketing through fully integrated systems, incorporating the option to travel to the airports;
- improving the quality of stay, travel information and guidance at the train stations;
- the creation of mobility offers for the first and last mile (especially bicycle parking spaces, car-, bike- and scooter sharing);
- and developing some Mobility as a service-platforms.

Next steps

The measures outlined in the action plan will be integrated into the “Regional Plan for Transport and Mobility” (RPMT) in Lombardy, which will be updated. In order to achieve this, the proposed measures are discussed in advance with important interest groups in a working meeting. The Regional Government will approve a resolution for the endorsement of the draft revised RPMT. The full version of revised RPMT will be approved by the Regional Council after the project is completed, after the requested Strategic Environmental Assessment (SEA).

Recommendations

We recommend to compose a well-assorted and motivated team, and always work in a group to exchange ideas and suggestions, choosing some external experts having experience in European projects, to build a good and useful action plan. It is also important to set up the work so as to be oriented towards the future vision of the region and to be clear about the objectives to be achieved. Last but not least, it is essential to participate in all meetings with other project partners, to work together and also be inspired by the work of others.

Aldo Colombo,
General Director for
Infrastructures, Transports
and Sustainable Mobility in
Lombardy Region

"We were proud to participate in the SUBNODES project and to sign the joint declaration with other partners. Lombardy Region pays attention to the improvement of the connections to its sub–nodes and to the enhancement of users experience on regional public transport."

REGIONAL RESULTS:
SOUTH MORAVIAN REGION

South Moravia is the most important region for agriculture and wine-growing in Czechia (photo by: Květoslav Havlík)

Public event on the occasion of the inauguration of the new rail track starting in Židlochovice (photo by: Květoslav Havlík)

Regional overview and background

The South Moravian Region with its capital Brno is one of 14 regions in the Czech Republic and borders on Austria in the south and Slovakia in the east. Around 1.19 million people live there. All public transport in the region is integrated into one transport system with KORDIS JMK company as its coordinator.

The overall goal within the SubNodes project was to increase the use of local public transport by daily commuters. For this purpose, slow bus lines that are prone to congestion should be replaced by fast and comfortable train connections.

The focus of the project work was on the cities of Židlochovice with 4,000 inhabitants and Hustopeče with 6,000 inhabitants. Both are not far from the TEN-T rail network, only 5 kilometers away, but had no direct local rail connection. At the beginning of the project, the reactivation and electrification of the rail tracks to connect the cities to the TEN-T corridor and the district's capital Brno was just beginning.

lockable wooden cycle boxes at the sub-node Židlochovice (photo by: M. Tulke, TMIL)

Legend

- TEN-T Node
- sub-node
- central place
- TEN-T core network
- TEN-T comprehensive network
- other railroad networks

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REGIONAL RESULTS:
SOUTH MORAVIAN REGION

Regional approach

Before the new sections could go into operation, the timetable and the coordination between bus and train were still pending. In order to develop the most effective timetable, the mobility needs of the residents in the cities and their catchment areas were identified. For this purpose, public information and discussion events were held. It has been tested to send the questionnaires to regional companies and their employees. But the repsonse has been very low.

The commissioning of the new section from Židlochovice in December 2019 was celebrated in a big and public way with a festive event in the presence of the Czech Minister of Transport. In combination with a press conference and the sending of the new timetable as a newspaper supplement to all households in the region, the new offer was advertised intensively.

A passenger survey yielded the result that 93% of the passengers on the train route had previously taken a bus and that 5% now forego their car.

Next steps

Similar activities as in Židlochovice will continue in Hustopeče out of the frame of the SubNodes project until the end of 2020. The public activities implemented in Židlochovice or Hustopeče separately or in cooperation with the municipalities have shown the way for further similar modernization projects and shall be used in the future.

Recommendations

The examples from the South Moravian Region have shown that there is still possibility to find the way how to push car users to more sustainable transport modes. But the transport changes should be properly discussed and explained before the start of their operation.
On the other hand, no big need for public discussion has been detected. Users start to take care only closely before or after the changes. It is necessary to be prepared for immediate reactions.

Bc. Roman Hanák,
Deputy governor for transportation,
South Moravian Region

> THE SUBNODES PROJECT SHOWED THE IMPORTANCE OF BOTH: PROMOTION OF THE NEWLY OFFERED PUBLIC TRANSPORT SERVICES AND COMMUNICATION WITH RESIDENTS.

REGIONAL RESULTS:
WIELKOPOLSKA VOIVODSHIP

Warta river (photo by: UMWW)

Regional overview and background

The Wielkopolska voivodship is one of the biggest regions in Poland with a population of 3.46 million inhabitants and an area covering 29,826 square kilometre. Poznań is the region's capital, its biggest city and a transportation hub.

Based on the SubNodes Strategy, the city of Wagrowiec was identified as a subnode. Wągrowiec is located about 50 km north of Poznań, and it is the residence of the Wągrowiec County. There is a direct and regular connection to Poznań by rail. Within the county busses dominate public transport.

The timetables of the various transport companies are largely coordinated with one another, but there was no common database, so that simple communication and information between the companies and customers was not possible.

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REGIONAL RESULTS:
WIELKOPOLSKA VOIVODSHIP

Regional approach

The subject of the project work in Wągrowiec was the acquisition and introduction of a computer-aided operations control system or “Intermodal Transport Control System” (ITCS). This went hand in hand with the standardization and unification of data as well as passenger information in the vehicles and at the Wągrowiec sub-node.

The ITCS enables, on the one hand, more effective planning and management of regional public transport by collecting, storing and sharing transportation data and, on the other hand, the visualization of timetable data.

Next steps

At the moment, the buses and trains in Wągrowiec have devices registering their geographical location. However, this information is only used internally for the needs of transport service and in a residual form is made available to passengers in the form of stop information. Meanwhile, carriers would be able to provide vehicle location information to the IT platform. This would allow for analysis of data by both carriers and local government units when designing the transport connections network. Passengers could also benefit from vehicle location information for more precise trip planning.

After completing all the integration activities, Wągrowiec will become a full subnode.

Recommendations

As the regional administration, we see our task in creating the technical prerequisites for the integration of timetables in the form of an ITCS and making this available to the transport companies. When it comes to displaying the data in the form of a travel planner for passengers, we recommend cooperating with large, widespread providers, such as Google Maps, and to forego a separate, own solution.

The „Elf" - a new regional train by the Polish constructor PESA Bydgoszcz (photo by: Włodzimierz Finke)

Inside the train station of Wągrowiec (photo by: Piotr Kupczyk)

REGIONAL RESULTS:
BRATISLAVA SELF-GOVERNING REGION

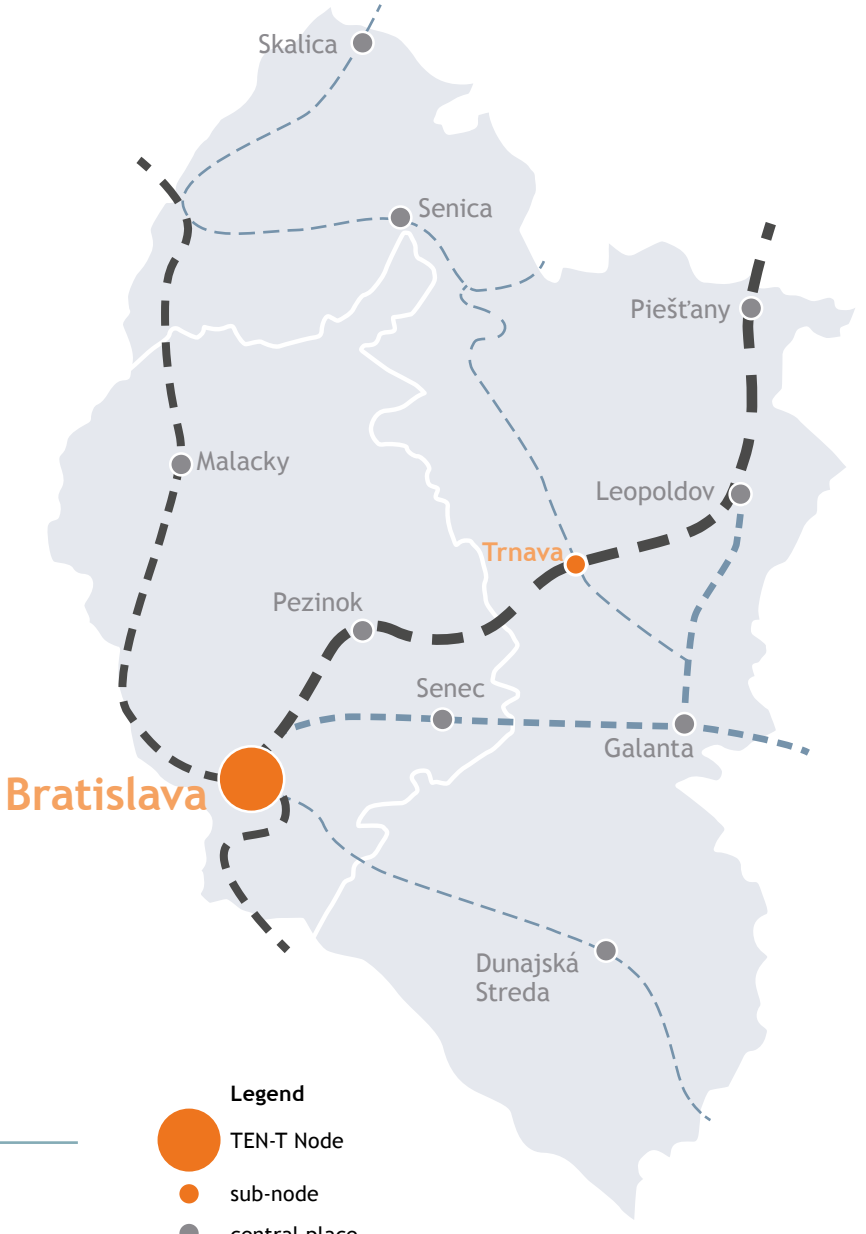
Panoramatic photo of Bratislava (photo by: bratislava-city.pano3d.eu)

Regional overview and background

Bratislava as the capital city of Slovakia is an important transport node for the country and for the wider area of Central Europe. It is the capital of the Bratislava region, which is the smallest region in Slovakia in terms of area, but economically very strong and the home to many public institutions.

From the north, east and south the region is surrounded by the Trnava region. These basic facts form conditions, thanks to which tens of thousands of commuters travel daily between the two regions. The close spatial ties between the Bratislava and Trnava region, together with the fact that the Trnava region lacks public transport integration, were the main reasons for selecting the capital of the Trnava region, the city Trnava, as a sub-node.

regional train at Trnava railway station
(photo by: Miroslav Staník)



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REGIONAL RESULTS:
BRATISLAVA SELF-GOVERNING REGION

Regional approach

The company Bratislavská integrovaná doprava, a. s. (BID) organizes and coordinates public transport in the Bratislava region and manages the Integrated Transport System in the Bratislava Region (IDS BK). Within the SubNodes-project, an expansion of the IDS BK on the railway to the city Trnava was exemplarily carried out as a pilot action. This meant securing a common fare and ticketing system for commuters travelling between the two regions by train. Following the objectives and results of the Pilot Action, the Action Plan concentrates on the possibilities of expanding the IDS BK to the rest of the Trnava region. The document will serve as a basic manual for creating a common integrated public transport system in both regions.

Next steps

Transforming the proposals for public transport integration presented in the Action Plan into reality will largely depend on the political will for interregional cooperation. Attention should be focused at first at coordinating the regional bus lines crossing the regional border and creating duplicate parallel services. A full integration of all modes of public transport in a small area of the Trnava region is suggested as one of the steps to be taken before embarking on integrating all public transport in the whole Trnava region. The Action Plan also suggests dividing the region into several smaller areas and thus integrating the whole region in several separate phases. Parallel to these activities talks should start with municipalities on integrating the city public transport systems.

Recommendations

Although we recommend dividing public transport integration in a larger area into more phases, it is wiser to procure necessary hardware (or any infrastructure items) in larger quantities, since price efficiency is usually higher when procuring in larger numbers at once. This applies especially for specialised hardware, such as travel ticket validators, which often need to be custom-made combining various technologies. Public transport integration is a relatively complicated process, even if it may seem easy at first glance. The implementation of the SubNodes activities proved, that this kind of integration needs a lot of planning, communication with stakeholders and at the end of the day also patience and willingness to go the extra mile.

Mgr. Juraj Droba, MBA, MA,
Chairman of the Bratislava Self-Governing Region

> "TRANSPORT BETWEEN THE TRNAVA AND BRATISLAVA REGIONS IS VERY INTENSIVE. WE ARE NOT TALKING ONLY ABOUT THE REGIONAL CAPITALS, BETWEEN THE CITIES TRNAVA AND BRATISLAVA, BUT IT IS ALSO VERY VIVID BETWEEN OTHER PARTS OF THE REGIONS."

REGIONAL RESULTS:
SLOVENIA

Ptuj at Drava river (photo by Ciril Ambrož)

Intermodal display in Grosuplje (photo by: Blaž Jemenšek)

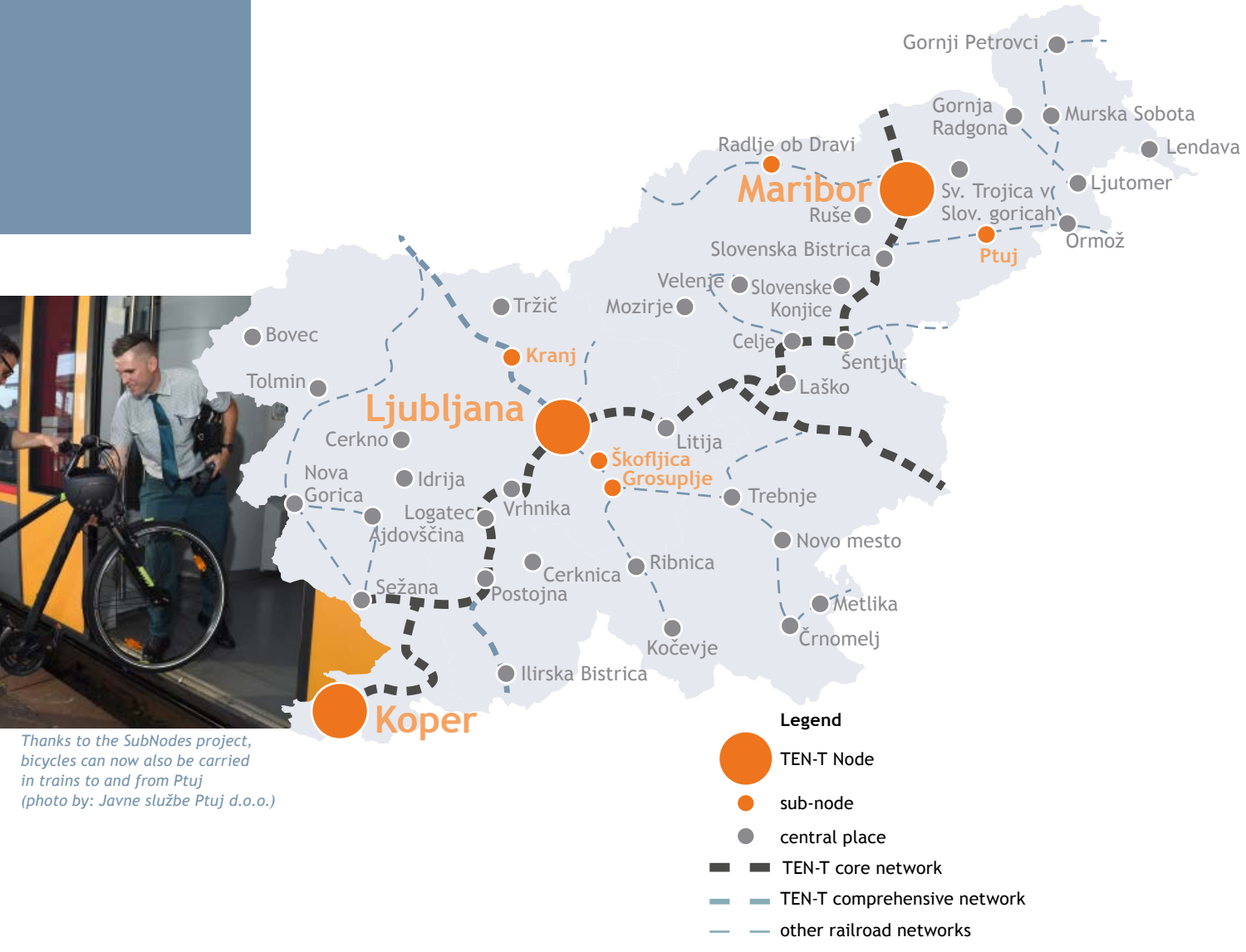
Regional overview and background

Within Slovenia, the SubNodes project looked at two sub-regions: the central area around the capital Ljubljana and the Podravje region in the east of the country with the regional center Maribor.

With a population of around 284,000, Ljubljana is Slovenia‘s largest city and also TEN-T hub. The small town of Grosuplje, which was identified as a sub-node within the project, is located in its south-eastern area around 30 minutes away. The second sub-node, here: Ptuj, also has a direct rail connection to the TEN-T core network in Maribor. Ptuj itself is an administrative center with a high number of commuters.

At both of the sub-nodes and in their catchment areas, private transport in cars dominates the daily traffic of commuters. This is due, among other things, to short distances and well-developed roads. Public transport, on the other hand, is comparatively slow.

Thanks to the SubNodes project, bicycles can now also be carried in trains to and from Ptuj (photo by: Javne službe Ptuj d.o.o.)



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REGIONAL RESULTS:
SLOVENIA

Regional approach

In order to make public transport more attractive overall, two different approaches were tested: the introduction of new services and the expansion of the digital information offer.

In cooperation with Slovenian Railways, from April 2019 on trains are operating within the Podravje region, mainly between Maribor and Ptuj, which allow bicycles to be taken along. Eight pairs of trips operate each day, offering this new service.

Digital information displays have been installed in Grosuplje. These serve to provide timetable or integrated travel information for buses and trains, arrivals and departures in real time, as well as useful additional information such as weather forecasts.

Next steps

Both measures were absolutely new in Slovenia and are now to be expanded to and further developed by other municipalities.

With regard to the digital information displays, this requires dissemination and advertising beyond the duration of the project.

With regard to the possibility of taking bicycles on train, it has been shown that this is mainly used by tourists and day trippers. The service is gladly accepted due to the nearby Drau cycle path. Due to the positive response, the Slovenian Railways have meanwhile also introduced bicycle transport to other connections in the country.

In order to attract more commuters to travel by train, further extras such as free WiFi are to be worked on.

Recommendations

In order to convince stakeholders of the advantages of the respective measures, intensive communication and involvement are necessary.

Dr. Peter Verlic, president of the Public Transport Committee of the Ljubljana Urban Region

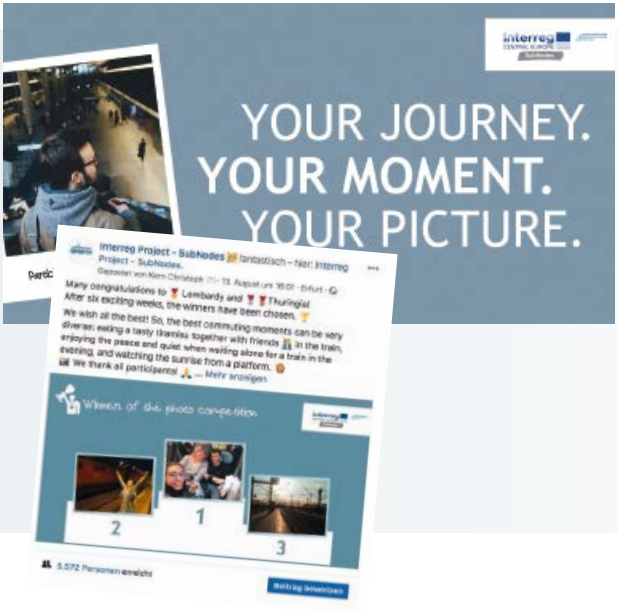
> "I'M CONVINCED THAT BETTER SERVICE QUALITY, DEMONSTRATED FOR EXAMPLE BY SMART INTERMODAL DISPLAYS, WILL ATTRACT NEW PASSENGERS AND CONTRIBUTE TO AN OPTIMIZED CONNECTION OF NODES AND REGIONS. THIS IS THE OPPORTUNITY TO IMPLEMENT THE SAME OR SIMILAR MEASURES IN OTHER LOCATIONS OF SLOVENIA."

COMMUNICATION AND PARTICIPATION

The new strategic sub-nodes approach called for explanation, awareness and persuasion. Hence, the project partners addressed diverse target groups. These stretch from political decision-makers, planning authorities, transport operators and associations, up to today's and tomorrow's passengers.

Transnational photo competition "Your best commuting moment"

Organized on Facebook from July until August 2018. The campaign reached 933,142 persons within the six countries of the project partners.



Transnational Stakeholder events and site-visits: exchange of experiences with regional experts in public transport

August 2018, Wągrowiec, PL: participatory concepts and awareness raising in public transport

February 2019, Brno, CZ: smart intermodal tools for a smooth interchange at nodes

May 2019, Erfurt, DE: simplification of tariff and ticketing

panel discussion on the latest findings on participatory concepts (photo by: M. Tulke, TMIL)

speech on the innovative design of tariffs in regional public transport (photo by: Christian Schneider-Bröcker)

European Public Transport Conference „Mobility creates opportunities“

Hosted on 21 May 2019 in Erfurt.

Exchanges between the project partners, their regional political representatives and the interested specialist public regarding ways of optimizing the design of public transport systems across different modes of transport and different planning authorities.

transnational panel discussion

site-visit of the ICE node und ICE-city Erfurt

keynote address by Prof. em. Heiner Monheim
photos by: Christian Schneider-Bröcker

www.interreg-central.eu/subnodes

Editor

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