



TRT TRASPORTI E TERRITORIO SRL

TRANSPORT STUDY FOR THE DANUBE MACRO-REGION

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**Limitatamente
alla sede di Milano*

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Outline

Presentation of study timeline and main outputs

Objectives and aim of the study

The approach

Action 1 Documents review to define a baseline scenario and indicative projections

Action 2 Identified Functional Region

Action 3 Identification of future projects

Remarks on identified future transport projects

Study timeline and main outputs

Timeline

- **Start September 2016**
- **End June 2017 (including 2 months of extension)**

Outputs

- **Three interim deliverables**
 - **Multimodal transport overview by Functional Region**
 - **Current transport priorities and developments**
 - **Identification of future transport projects**
- **Draft Final and Final reports**

Additional online interactive map for projects presentation



Objectives and aim of the study

Objectives

- **Conceived for Priority Area 1b**
- **Address mobility issues of intermodality, interconnection amongst modes, modernisation and extension of networks**
- **Identify opportunities for transport networks development**
- **Non-country centric approach**

Aim

- **Identify transport projects that are relevant for the Danube Macro-Region and achieve maximum geographical coverage**

The approach

Collect and analyse the large number of reports, studies, plans and strategies produced in the region

- **Main documents and reports reviewed:**
 - **Core Network Corridors studies (2014)**
 - **Updated REBIS and SEETO MAPs**
 - **Eastern Partnership transport study**
 - **Transport strategies and plans at country level**

Complement the analysis by other sources of information:

- **Current demand volumes:**
 - **Road and rail modes drawn from modelling exercises (TRUST and Eastern Partnership models)**
 - **Air, maritime and inland waterways modes from official databases**
- **Socio-economic, transport projections and safety levels:**
 - **EU Reference Scenario 2016**
 - **Other official databases**

The approach

Main documents, reports and databases screened in parallel to:

- **Build a database of main socio-economic drivers and transport characteristics at NUTS1 level**
- **Identify main transport bottlenecks, missing links and other specific transport problems**
- **Review of environmental and safety issues**
- **Identify linkages to inland waterways**
- **Collect information and elaborate lists of proposed transport projects in the Macro-Region for selection process**

Actions of the approach to fit study objectives and aim:

- 1. Sources review to define a baseline transport scenario of the region and outline indicative projections for future evolution**
- 2. Identify Functional Regions within the Danube Macro-Region**
- 3. Identify future transport project**



Action 1 Documents review to define a baseline scenario and indicative projections

Main activities

- **Overview of socio-economic characteristics**
- **Analysis of transport demand volumes by mode and recent trends (road, rail, air, maritime and inland waterways)**
- **Elaboration of indicatives projections of key socio-economic drivers and demand volumes until 2030 (road, rail and air) relying on available data**
- **Bottlenecks analysis (physical and non-physical)**
- **Environmental analysis (emissions and legislative framework)**
- **Safety (trends and main issues)**



Action 1 Documents review to define a baseline scenario and indicative projections

Main findings

- **Demand mostly domestic (short/medium distance nature)**
- **Road dominant mode. High-level estimation of road long distance demand (in transit through the region)**
- **Localisation of relevant flows patterns in the region**
- **Three main transport contexts to merge (six CNCs, SEETO comprehensive and Eastern Partnership strategic)**
- **Physical bottlenecks due to non-compliance with technical standards or localised at urban agglomerations**
- **Non-physical bottlenecks due to border crossing waiting time, customs and administrative procedures, low interoperability**
- **Environmental aspects to be addresses project-by-project**
- **Specific safety issues exists where networks are deteriorated or with low standards**



Action 1 Documents review to define a baseline scenario and indicative projections

Suggested indicative projections for the period 2015-2030

Heterogeneous picture obtained suggests to treat projections with caution:

- **Controversial trend for population. Positive growth for GDP, at different paces within the region**
- **Road keeps lion share, but could reduce depending on rail network developments**
- **Western countries generate the majority of the volumes, but at lesser growth pace compared to the past. Vice-versa for Eastern countries**
- **Western Balkans: highest projections on the extensions of TEN-T CNCs, overlapping Pan-European corridors Vc and X**
- **Eastern Partnership: flow patterns Odessa-Kiev and from L'viv to borders with Hungary and Romania**
- **Air transport would increase appreciably on annual basis**

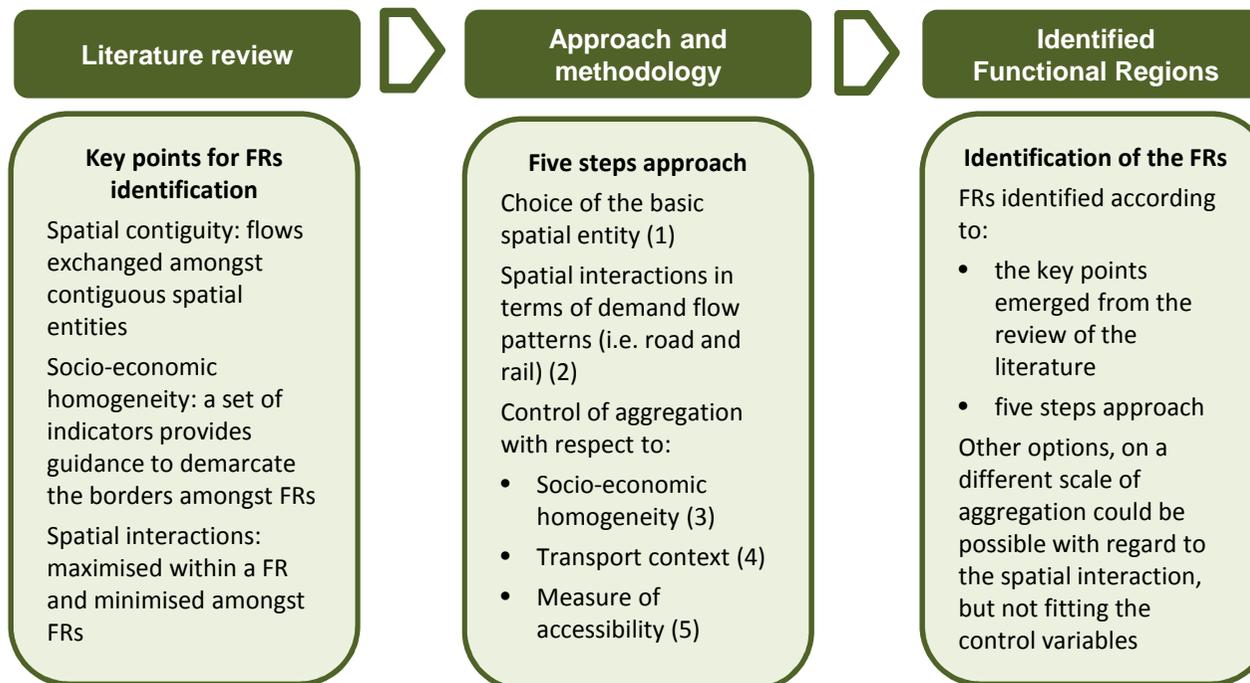
Action 2 Identified Functional Regions

Relying on the work done of Action 1, the Functional Regions have been identified

Building blocks within the Danube Macro-Region

Non-country centric approach embedding future transport projects

Stepwise methodology



Action 2 Identified Functional Regions

Based on the findings emerged from the literature review and following the five steps designed, nine Functional Regions have been identified

Number	Functional Region
1	Southern Germany and Western Austria
2	Eastern Austria and Slovenia
3	Czech Republic and Slovakia
4	Hungary
5	Croatia and Bosnia and Herzegovina
6	Montenegro and Serbia
7	Bulgaria
8	Western Romania
9	Eastern Romania, Moldova and Ukraine



Functional Regions	TEN-T Corridors	TEN-T Network	Eastern Partnership Network	SEETO Network
1 5 9	Road ———	⊕ Airport Core	✈ Airports	— Road
2 6	Rail - - - -	✈ Airport Compr.	⊕ Ports	⋯ Rail
3 7	IWW	⊕ Port Core	⋯ Railways	
4 8	— Orient/East - Med corridor	⊕ Port Compr.	— Roads	
	— Rhine - Danube corridor	⊕ RRT Core		
	— Rhine - Alpine corridor	⊕ RRT Compr.		
		⊕ IWW Port		

Elaboration based on:
 TEN-T Core & Comprehensive Network: [GIS DYNAMIC MAPS - TENtec, EC (DG MOVE)]
 ESPON TRACC project [Road/Rail: TransTools 2005 / ETIS 2010, IWWA/RRT: RRG GIS Database 2011, Maritime: TRUST network model]

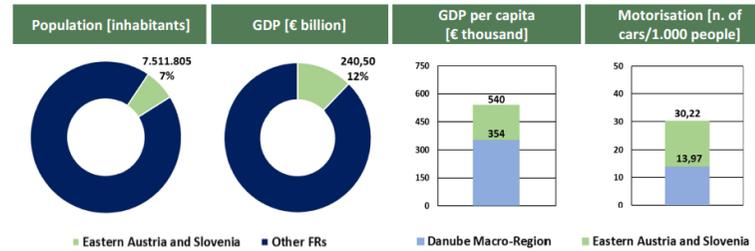
MAP of FUNCTIONAL REGIONS

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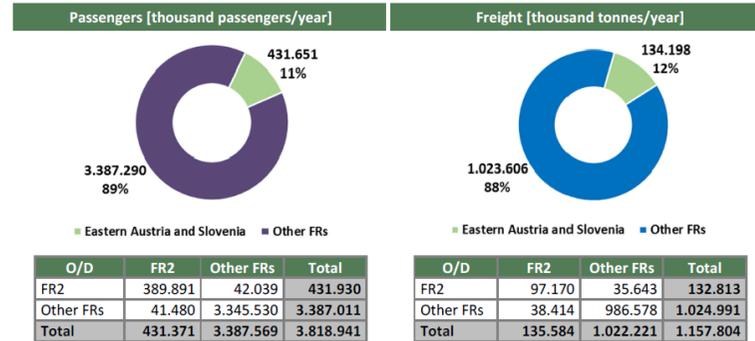



Action 2 Identified Functional Regions

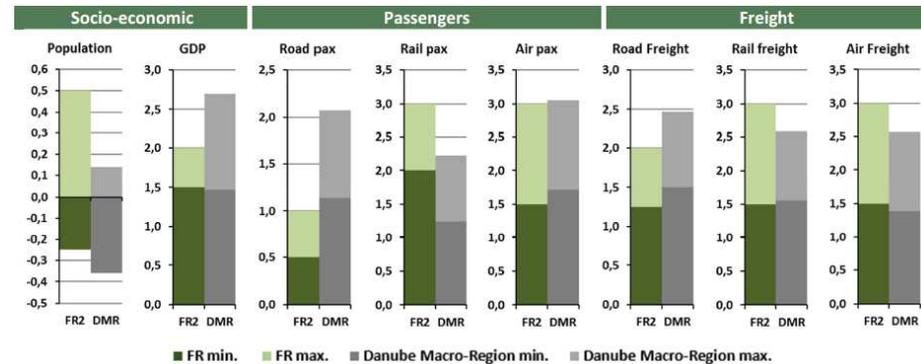
Socio-economic characteristics



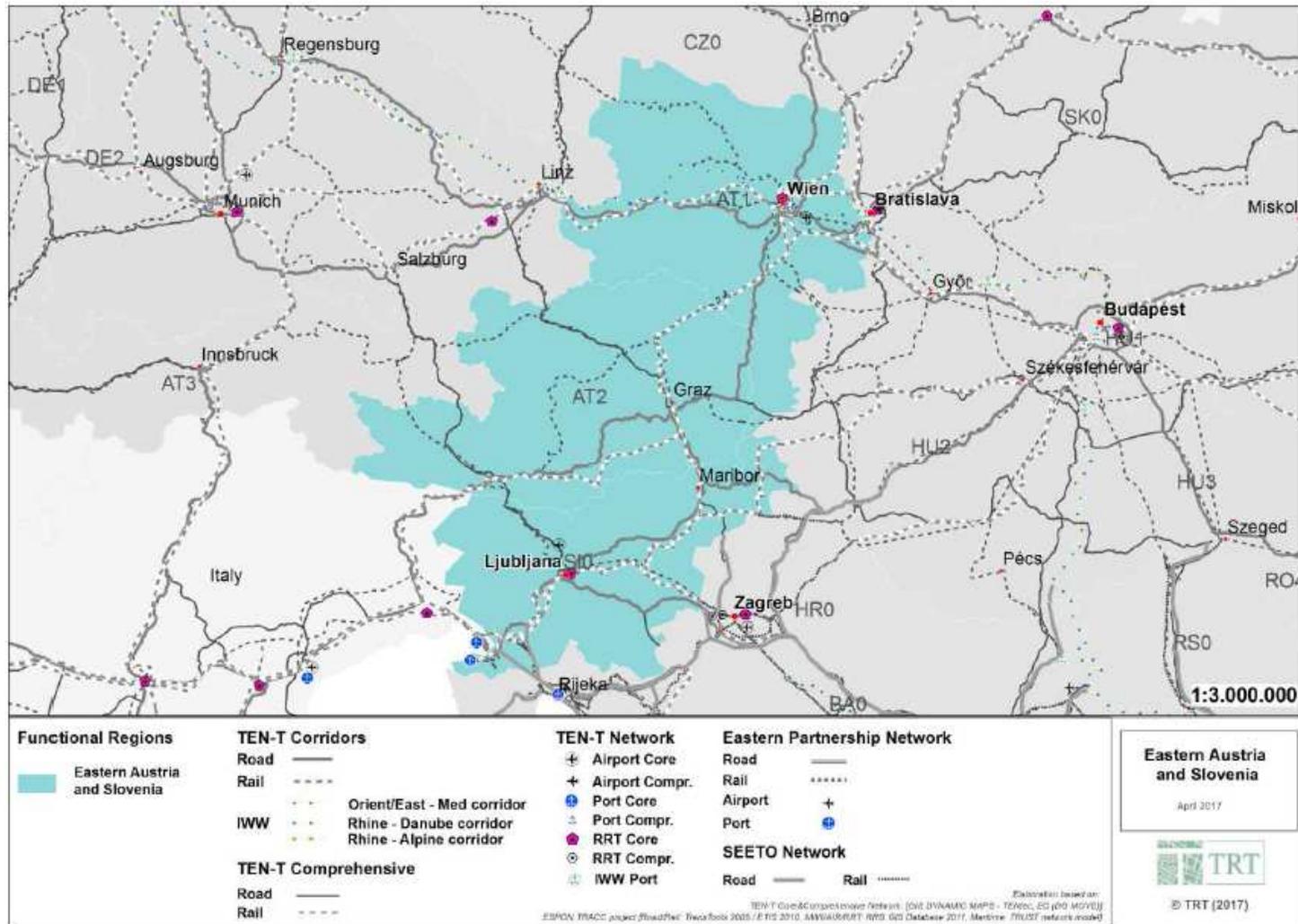
Current transport demand volumes



Elaboration of indicatives projections of key socio-economic drivers and demand volumes until 2030



Action 2 Identified Functional Regions



Action 3 Identification of future projects

Stepwise approach conceived to screen the list of projects identified reviewing documents and reports

- **Preparation of the long list: application of preliminary criteria**
 - **Not yet financed, estimated investment cost > € 25 million, completed project removed, adjacent sections merged**
 - **279 projects**
- **Preliminary selection from existing studies: application of general and relevant criteria**
 - **Available information on investment cost and timing, estimated investment cost > € 50 million, estimated starting date before 2023**
 - **85 projects**
- **Preliminary stakeholders consultation and other projects suggested by the key experts of the team**
 - **108 projects**

Action 3 Identification of future projects

- **Application of criteria for selection**
 - **Addressing bottlenecks, sections where TEN-T CNCs overlap, estimated investment cost > € 50 million, estimated starting date before 2023, relevance for the Danube Macro-Region, part of national transport plans, maximum geographic coverage and modal balance**
 - **Application of criteria not homogeneous across Functional Regions. Adaptations to address geographical and modal balance**

List of 51 pre-identified projects starting point for stakeholders consultation (34 main and 17 reserve)

Minimum target of 20 projects

Functional Region					Total
Southern Germany and Western Austria	1	1	0	0	2
Eastern Austria and Slovenia	3	1	1	2	7
Czech Republic and Slovakia	4	3	0	0	7
Hungary	4	5	0	0	9
Croatia and Bosnia and Herzegovina	3	4	0	2	9
Montenegro and Serbia	2	1	1	1	5
Bulgaria	1	4	1	0	6
Western Romania	1	1	0	0	2
Eastern Romania, Moldova and Ukraine	2	1	0	1	4
Total	21	21	3	6	51

Action 3 Identification of future projects

Identified future projects outlined according to a fiche template

Presentation with respect to:

- **General information**
- **Technical description**
- **Project implementation timeline**
- **Transport demand**
- **Financial analysis**
- **Economic analysis**
- **Environmental analysis**
- **Safety levels**

Project fiches elaborated for each project in form of short (2 max pages) and long (max 10 pages) versions

Action 3 Identification of future projects

Purpose of the stakeholders consultation

- **Check correctness and relevance of pre-identified projects**
- **Drop projects no longer in the pipeline**
- **Discuss other projects deemed relevant at country level**
- **Enlarge the scope outside the CNCs (comprehensive or national networks)**
- **Obtain and collect suitable documentation for projects presentation**

Contacts opened with national transport ministries, infrastructures managers, SEETO, JASPERS and TEN-T CNC advisers

Type of consultation finalised by the team of experts

Consultation period from February to April in form of meetings and phone conference calls

Continuous exchange of information once the projects have been identified to elaborate and finalise the presentation

Action 3 Identification of future projects

Outcome of the stakeholders consultation

- **36 projects dropped from the pre-identified list.**
- **Main motivations:**
 - **Loans not considered as project non-revenue generating**
 - **Implementation phase already started**
 - **EIB or other IFIs/countries already involved**
 - **Financed with other sources (CEF, Cohesion Fund)**
 - **Content of the dossier cannot be disclosed or insufficient information**
 - **Not a priority for the country**
- **8 new projects emerged:**
 - **7 during the stakeholders consultation**
 - **1 from updated CNC work plan**
- **Research of new air projects necessary to address specific issues emerged during the consultation**

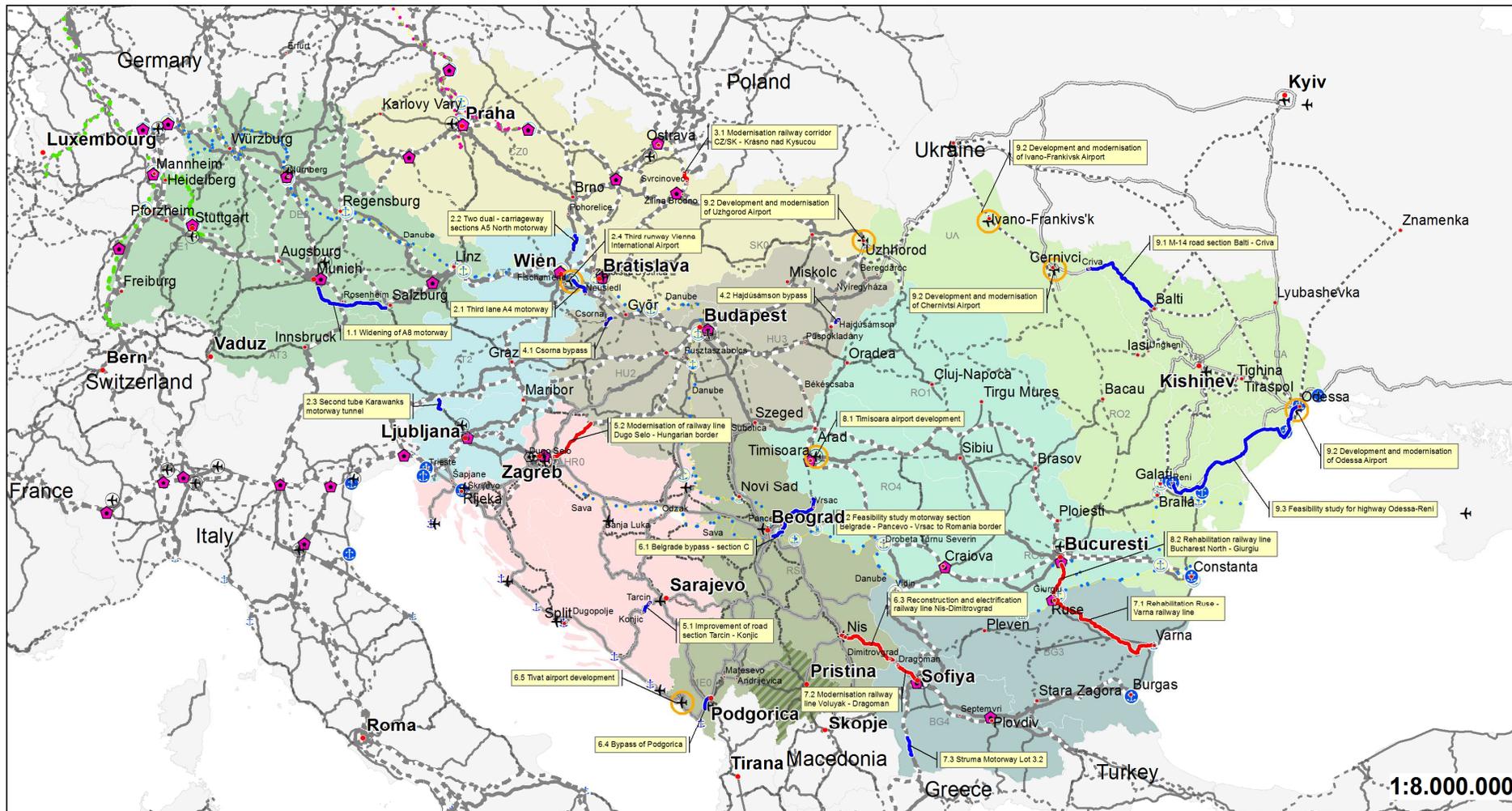
Action 3 Identification of future projects

Distribution of the identified future transport projects

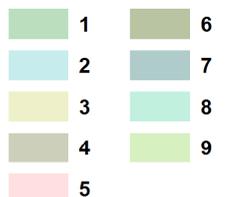
Functional Region				Total	of which	
					new	non-CNC
Southern Germany and Western Austria	0	1	0	1	0	0
Eastern Austria and Slovenia	0	3	1	4	1	1
Czech Republic and Slovakia	1	0	0	1	0	0
Hungary	0	2	0	2	2	2
Croatia and Bosnia and Herzegovina	1	1	0	2	0	0
Montenegro and Serbia	1	3	1	5	2	Not app.
Bulgaria	2	1	0	3	1	1
Western Romania	1	0	1	2	1	1
Eastern Romania, Moldova and Ukraine	0	2	1	3	1	Not app.
Total	6	13	4	23	8	5

Action 3 Identification of future projects

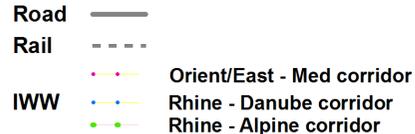
Functional Region	Project
1 - Southern Germany and Western Austria	1.1 - Widening of A8 motorway South of Munich to the German-Austrian border
2 - Eastern Austria and Slovenia	2.1 - Construction of the third lane on the A4 motorway (sections Fischamend-West Bruck and West Bruck-Neusiedl)
	2.2 - Construction of two dual-carriageway sections as continuation of the A5 North motorway
	2.3 - Construction of a second tube for the Karawanks motorway tunnel
	2.4 - Construction of the third runway of the Vienna International Airport
3 - Czech Republic and Slovakia	3.1 - Modernisation of railway corridor VI State border Czech Republic/Slovak Republic- Čadca-Krásno nad Kysucou
4 - Hungary	4.1 - Construction of Csorna bypass section, motor road M86-M85
	4.2 - Construction of Hajdúsámson bypass section, road 471
5 - Croatia and Bosnia and Herzegovina	5.1 - Improvement of road section Tarčin-Konjic of Corridor Vc
	5.2 - Modernisation of the railway line Dugo Selo-Hungarian border (sections Dugo Selo-Križevci and Križevci-state border)
6 - Montenegro and Serbia	6.1 - Construction of the Belgrade bypass - section C
	6.2 - Feasibility study of the motorway section Belgrade-Pancevo-Vrsac to Romania border
	6.3 - Reconstruction and electrification of the railway line Niš-Dimitrograd
	6.4 - Construction of the bypass of Podgorica
	6.5 - Tivat airport development
7 – Bulgaria	7.1 - Rehabilitation of the Ruse-Varna railway line
	7.2 - Modernisation of the railway line Volujak-Dragoman
	7.3 - Construction of the Struma Motorway Lot 3.2
8 - Western Romania	8.1 - Timisoara airport development
	8.2 - Rehabilitation of the railway line Bucharest North-Giurgiu
9 - Eastern Romania, Moldova and Ukraine	9.1 - Construction of the M-14 road section from Balti to Criva
	9.2 - Development and modernisation of four airports
	9.3 - Feasibility study of the construction of the highway Odessa-Reni



Functional Regions



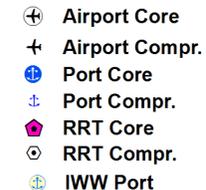
TEN-T Corridors



TEN-T Comprehensive



TEN-T Network



Eastern Partnership Network



SEETO Network



Identified future projects



Localisation of identified future transport projects of Danube Macro-Region

April 2017



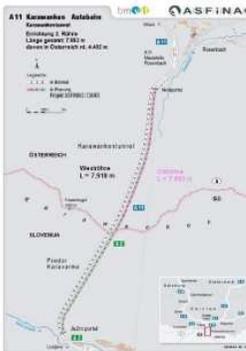
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Action 3 Identification of future projects

Example of short project fiche

Transport Study for the Danube Macro-Region – Identified Future Transport Projects	
<p>PROJECT Construction of a second tube for the Karawanks motorway tunnel</p> <p>GENERAL INFORMATION</p> <p>The project regards the construction of a second tube for the Karawanks motorway tunnel on the cross-border section between Austria and Slovenia.</p>  <p>The Karawanks motorway tunnel connects the A2 motorway in Slovenia and the A11 motorway in Austria¹ and is part of the TEN-T comprehensive network, linking the Baltic-Adriatic and the Mediterranean CNCs. As shown in the figure, the Karawanks motorway tunnel is single-tube and two-lane of approximately 8 km, of which 44% in Slovenia and 56% in Austria. It represents an important transport connection for major economic areas, linking two hubs of the comprehensive and core transport networks (i.e., Villach-Klagenfurt and Ljubljana).</p> <p>In summer months, long queuing on both sides is observed and traffic diversion may be necessary. This has consequences for the subordinate road network and are often the cause of serious traffic accidents. The main goals of the project are (i) to improve capacity and traffic safety levels and (ii) to reduce the environmental impacts on the adjacent areas.</p> <p>Regarding the relevance of the project, the construction of a second tube is in line with the Directive 2004/54/EC, it is envisaged in the Transport Development Strategy of the Republic of Slovenia (2015) and it is listed in the annex to the Austrian Federal Roads Act.</p> <p>The Austrian Federal Ministry of Transport, Innovation and Technology and the Slovenian Ministry of Infrastructure are the promoters, ASFINAG and DARS the implementing bodies.</p> <p>TECHNICAL DESCRIPTION</p> <p>The Karawanks tunnel has a total of 16 breakdown bays at intervals varying between 749 and 1.060 metres. There are no escape routes or emergency exits. With the project, a two-lane unidirectional traffic will be established² with a design speed of 100 km/h and the existing tube will be subject to refurbishment works. Emergency turn-offs will be arranged and transversal passages will be regulated for the passage of users and ventilation.</p> <p>Technical alternatives have been analysed for compliancy with Directive 2004/54/EC, the Austrian legislation on road tunnel safety and the technical standards and requirements for road tunnel design in Slovenia. Alternatives were taken into consideration and risk assessments carried out. The total estimated cost of the chosen alternative is € 317,1 million³. Maintenance costs for double-tube tunnel have been estimated at € 1,8 million year (Snizek + Partner, 2017).</p> <p>PROJECT IMPLEMENTATION</p> <p>In Austria, all prerequisites and authorisations are already in place. For Slovenia, the governmental Decree on National Spatial plan has been adopted and the preparation of detailed designs is in the final stage. The conclusion of the building permit is foreseen in June 2017. The date foreseen to start the works is 1 January 2018. Construction works are expected to last three years. Information on the schedule of the preparatory activities and procedures before the start of the construction works is available in the consulted documents.</p>	<p>TRANSPORT DEMAND</p> <p>Limited information exists on demand. The average daily volume is around 10.000 vehicles/day, (15% are HGVs). On summer weekends, during the peak tourism, traffic increases up to 34.000 vehicles/day, exceeding the threshold for which the double-tube is necessary (i.e., 20.000 vehicles/day). Additional information on specific counts, forecasted trends and evolution of demand components (i.e., diverted from alternative paths and modes or induced) is not available.</p> <p>FINANCIAL ANALYSIS</p> <p>The financial performance of the project has been carried out in terms of financial profitability. The documents made available do not report on financial sustainability analysis.</p> <p>As regards profitability, the appraisal period is 95 years (from 2021 to 2115) and a discount rate of 4% was applied. Concerning the revenues, tolls charged at the Karawanks tunnel are expected to remain unchanged. The FNPV obtained is equal to € -196,4 million. The FIRR cannot be determined. The elaborations do not present additional information on sensitivity and risks analyses carried out.</p> <p>The funding mechanism foresees that ASFINAG and DARS provide own resources for 90% of the costs from tolls, commercial loans and other sources. The possibility of EIB loans is envisaged. A CEF grant of € 24,97 million has been requested through application to the annual programme of 2016.</p> <p>ECONOMIC ANALYSIS</p> <p>In terms of appraisal period, the economic analysis relied on the assumption of the financial analysis. With regards to the reference and investment scenarios, the single-tube tunnel served as the reference scenario, but it incorporated also the construction of a new escape tunnel, in compliance with the minimum safety requirements of Directive 2004/54/EC. The investment scenario added the second tunnel tube.</p> <p>The economic analysis (i.e., at 4%) shows an ENPV is equal to € 82,9 million and the EIRR is equal to 5,8%.</p> <p>ENVIRONMENTAL ANALYSIS</p> <p>With respect to the EIA procedure, (i) in Austria it is reported that this is not necessary⁴ and in Slovenia the EIA procedure was carried out and adopted on 16 May 2016. In order to keep the environmental impact as minimal as possible, extensive geological and hydrogeological investigations have been carried out.</p> <p>SAFETY LEVELS</p> <p>Basically, the implementation of the second tube is expected to have a beneficial effect on safety.</p>
<p>¹ Between the toll stations of Rosenbach (Austria) and Hrušica (Slovenia).</p> <p>² According to project design, the tubes will be connected through cross cuts.</p> <p>³ There is not information available to break out the costs and the amount of contingency included. This cost component could be high to address cost overruns expected for a tunnel project.</p> <p>⁴ According to section 4 of the Federal Roads Act.</p>	

Action 3 Identification of future projects

Development of an additional online interactive map

- **Webpage displaying identified Functional Regions and future transport projects**
- **Pop-ups of projects short fiche**
- **Online interactive map accessible at:**
→ <http://trt.serverlet.com/Danube/map.php>

Remarks on identified future transport projects

- **Characteristic of the information obtained**
 - heterogeneous picture (quantity and quality of the information)
 - good concerning general information and technical description
 - timeline for implementation depends on the level of maturity
 - demand analysis and forecasts available for the majority of the projects (projections to 2025-2030)
 - information of financial and economic analyses more limited
 - analysis of the environmental impacts case-by-case and depending on national requirements
- **Projects presented in the frame of a fiche template**
- **Content of the fiches verified by the consulted stakeholders**

Remarks on identified future transport projects

Address a broad scope of issues:

- **Bottlenecks**
- **Missing links**
- **Operational capacity**
- **Poor infrastructure standards influencing safety levels**

Modal distribution unbalanced towards road infrastructures, possibly in the light of its projected modal share

Majority of the projects conceived to develop infrastructures already operating. This could be an advantage for future developments (lower uncertainty of costs estimation and demand)

Remarks on identified future transport projects

Modal distribution

Road

- **Construction of new sections envisaged where traffic forecasts are more intense (main axis and urban agglomerations)**
- **Addressing low technical standards and degradation influencing safety levels**
- **Two suggested projects need feasibility studies**

Rail

- **Rehabilitation and modernisation measures to solve technical limitations**
- **Suggest some common interest of bordering countries**

Air

- **Measures addressing a mix of improvements, developments and modernisation**
- **Aim is enhance efficiency and operational capacity on the air (i.e., runways and aprons) and land (i.e., terminal buildings) sides**

Remarks on identified future transport projects

Geographical distribution

- Road projects evenly distributed across the Functional Regions
- Rail projects in Functional Regions of Western Balkans and Eastern EU, reflecting need of interventions where appropriate standards are lacking
- Air projects localised where demand currently concentrates and growth would be projected more intense

Transport network context distribution

- Projects on CNCs that more extensively cross the region. Rhine-Alpine and Scandinavian-Mediterranean CNCs marginal
- Projects localised on Pan-European Corridors Vc and X of SEETO network, where relevant flow patterns have been observed and forecasted
- 4 on comprehensive network and 1 on national network

Intermodality did not result from the list of the future projects, but in one case only

Remarks on identified future transport projects

Comprehensive description of 23 future transport projects, but information available does not allow to address all the topics in a systematic manner

23 future projects representative of the current and future transport problems

The approach and actions could be a useful starting points if followed up with further and specific analyses and could be easily repeated to create a lively pipeline of relevant projects

The framework of the identified Functional Regions could provide additional guidance

The projects fiches in form of both long and short versions could help in standardising the information

Online interactive map designed to be updated with new future projects



Thank you for the attention

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