



Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders

Final report



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ABSTRACT

“Missing links”, non-operational small-scale cross-border railway connections, within the European Union have gained political momentum in the past years. More cross-border railway passenger transport across additional cross-border connections could enhance mobility and economic development in the border regions.

As a first step, the present study provides an inventory of all cross-border rail connections along the EU and EFTA internal land borders, containing maps and data *inter alia* on the operational status, technical aspects and stakeholders of each connection. In a second step, the viability, network relevance and investment need and funding opportunities of possible new railway connections are analysed. Finally, the study proposes recommendations how to smoothen the implementation of cross-border railway connections.

Two main findings are to be highlighted:

1. Most of the small-scale cross-border railway connections do not belong to the TEN-T Core or Comprehensive Network and have previously mostly been disregarded from funding for investments.
2. Gaps in the cross-border passenger rail network are not necessarily caused by missing elements of infrastructure: In many cases even on operational railway infrastructure there is a lack of cross-border passenger services. Competent authorities of the Member states can play a crucial role for implementing cross-border passenger services on these lines.

Key words to facilitate web referencing of the study

Missing links; small-scale infrastructure; cross-border railway transport; cross-border passenger services; competent authorities

1 Introduction and objectives of the study

1.1 Introduction to the study

Despite the efforts of European integration and cohesion policies made over the past decades, many citizens in border regions of the EU still suffer from their spatial situation in certain aspects such as lacking, insufficient or low-quality public transport services. This issue manifests itself on three levels: 1) infrastructure connections, 2) service provision and 3) the quality of services¹. These problems become more obvious with a closer look at railway transport: A recent study by DG Regio pointed out that only 44 % of the population in all border regions has access to passenger rail services².

Despite limited progress towards technical interoperability, **railway transport across borders in Europe is still hindered by a variety of obstacles**: For example, specially adapted (and authorised) rolling stock or locomotive changes are required for most cross-border train services. In addition, many routes have been closed since the end of the Second World War, owing to the creation of new borders, the establishment of the 'iron curtain' between Western Europe and the Eastern Bloc and broader economic and societal changes such as mass motorisation and cheap air transport.

The "European railway area" consequently features numerous gaps on the continent's land borders, where the national railway networks are no longer properly connected. In the last few years the question of cross-border transport in general and these so-called "missing links" in particular have gained political momentum at the EU level thanks to initiatives such as that of the TRAN committee's former chairman Michael Cramer. Nevertheless, a holistic analysis of Europe's cross-border rail connections has not yet been carried out. In particular, there is no uniform basis for the assessment of potential projects that can enhance the connectivity of border regions and the competitiveness of the EU railway system.

The European Commission awarded a contract to a consortium led by KCW for the **comprehensive analysis of the existing cross-border transport connections and missing links on the internal EU borders** (2016CE160AT056). With a focus on rail connections and public transport, the current situation of all internal EU land border regions has been assessed and missing railway links were identified in order to make better use of investment streams.

1.2 Objectives of the study

The primary objective of this study is to provide decision-makers at all levels – local, regional, national and European – analytical support for the identification of promising cross-border railway projects, and thereby also as a basis for streamlining and prioritisation and financial support. The central result is a compilation of potentially conceivable projects, created on the basis of available information. In addition to technical specifications of the connections, information on their potential, benefits and operating costs were collated. In addition, national and European funding programmes such as CEF (Connecting Europe Facility) and EFSI (European structural and investment funds) were assessed for their suitability according to the principle that limited financial resources should be prioritised to achieve the greatest economic benefits. The focus of this study is on passenger rail transport, but road transport alternatives are also examined. Rail freight is not considered as part of the study as per the tender specification, although it can have a significant effect on the economic viability of railway lines.

¹ Boosting growth and cohesion in EU border regions, COM(2017) 534 final, p. 12

² Passenger rail accessibility in Europe's border areas, DG Regio WP 11/2017, p. 3

Three specific objectives of the study have been defined:

Objective 1:

- taking stock of all cross-border railway infrastructure connections per internal EU land border (+ Switzerland, Liechtenstein and Norway);
- provision of details about the infrastructure status including technical standards and cross-border interoperability of these connections;
- identification of "missing links", i.e. links which – if existent – could enhance exchanges between immediate border regions

Objective 2:

- analysis of the economic potential, viability, network relevance, governance issues and investment needs of "promising links" – useable existing cross-border rail routes that are not or insufficiently used – as well as "missing links" – unserviceable or missing railway infrastructure connections
- identification of alternatives (where appropriate)

Objective 3:

- provisions of conclusions and policy recommendations
- identification of "potentially most beneficial" projects with possible sources of funding/financing including the relevant actors

These three objectives were achieved in three corresponding tasks:

- **Task 2:** Inventory of cross-border rail connections and "missing links"
- **Task 3:** Analysis of demand, passenger train service concepts, infrastructure requirements, infrastructure and operating costs and stakeholder feedback
- **Task 4:** Policy conclusions and identification of "potentially most beneficial" projects

The methods and main results of each task are presented in the sections that follow.

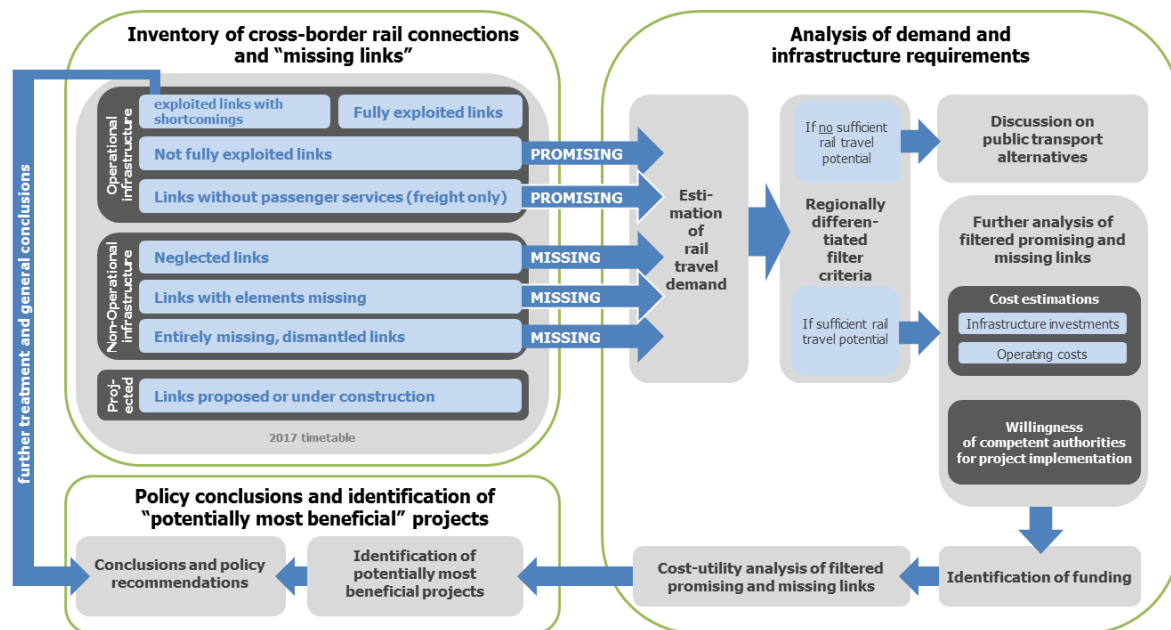


Figure 1. Structure of the study

2 Inventory of cross-border rail connections and “missing links”

2.1 Structure of the work

The first fundamental task of this study was the compilation of an inventory of all cross-border rail connections along internal EU land borders and the borders with the EFTA states Switzerland, Liechtenstein and Norway. Thus, there are 29 countries are in the scope of the study resulting in 43 land border sections under examination (see Annex 1 for a map of the land border sections). The existing or planned fixed connections of three maritime borders (FR/UK, DK/SE and FI/EE) were additionally recorded into the inventory.

The final inventory includes:

- operational cross-border connections: existing rail links where passenger train services are technically possible;
- non-operational cross-border connections: rail links which existed in the past („missing links”) without any traffic and
- projected cross-border connections: rail links which are expected to be implemented.

A comparable exhaustive analysis has not been carried out to date.

GIS data from ‘OpenStreetMap’ and Eurostat played an important role in the **spatial identification of cross-border rail connections** in the first step. Additional paper and electronic maps were used to supplement and double check information as appropriate. Relevant literature was screened especially in cases of connections which closed a long time ago and where documentation in current maps is inaccurate. Lines which run only in transit through an adjacent country without stop(s) in the transit country are not considered as cross-border rail connections and thus were not recorded in the inventory. Each registered cross-border rail connections received a unique ID for unambiguous identification in the inventory and related GIS application.

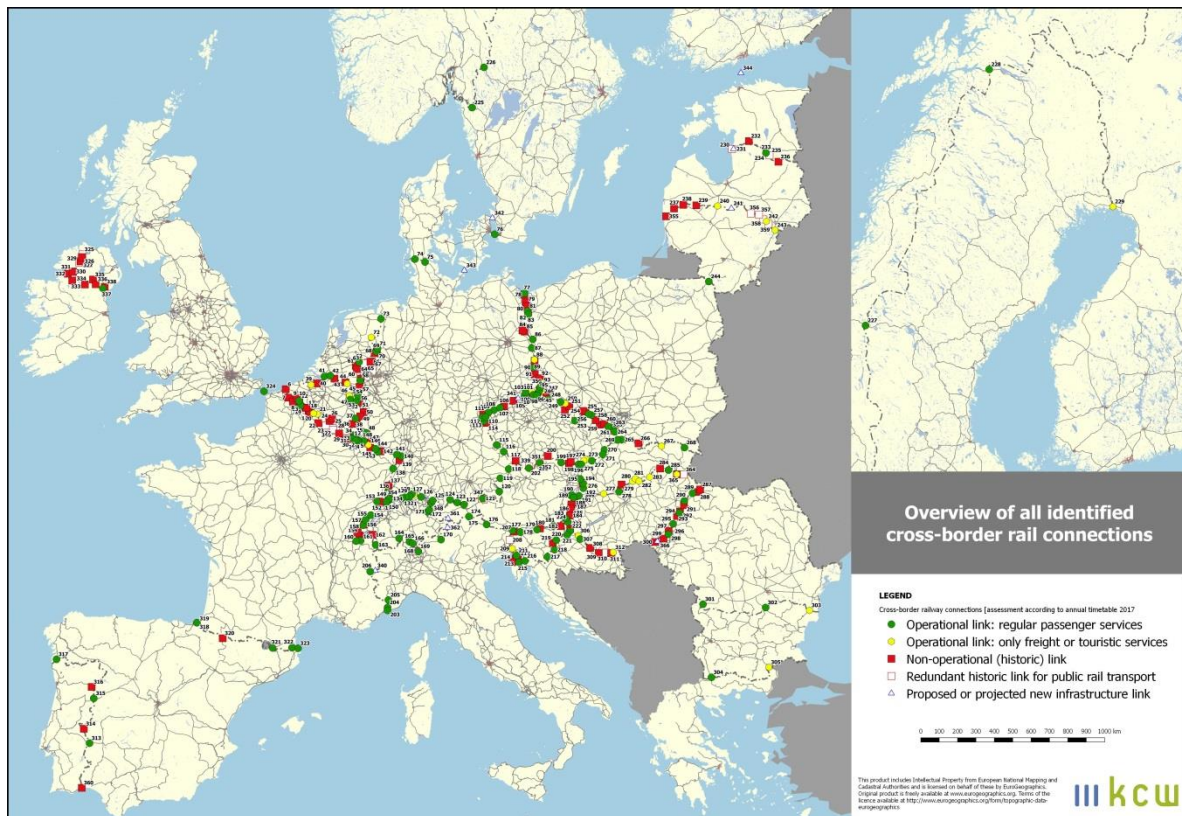
In addition **relevant stakeholders** on both sides of each border have been identified for each cross-border rail connection. The following stakeholders were compiled in the inventory:

- Transport ministries
- Infrastructure managers
- Railway undertakings for operating passenger services
- PSO competent authorities

While the importance of transport ministries and infrastructure managers for railway infrastructure is quite obvious, PSO contracting authorities also have a crucial role: in 2015 some 65% of all EU rail passenger km and almost 83% of passenger train km were covered by a public service obligation (PSO) according to Regulation (CE) No. 1370/2007 from these authorities³. Comparison with older figures shows that the amount of passenger services under PSO have increased in the past years⁴.

³ IRG-Rail (2017). Fifth Annual Market Monitoring Report, p. 11.

⁴ Report from the Commission to the Council and the European Parliament, Fourth Report on monitoring development of the Rail Market. Brussels, 13.06.2014, COM(2014) 353 final, p. 51



Map 1. Spatial inventory of all identified cross-border rail connections (see Annex 2 for high resolution version)

In some cases additional stakeholders were identified, such as regional and local authorities, e.g. planning departments, public transport associations, interest groups and other NGOs.

Additionally, further **data collection** was carried out in order to provide as much detailed information as possible on each of the identified cross-border connections. Hence the inventory includes basic information such as important route points, border stations, the status of operation, integration - if applicable - within TEN-T networks, opening and closure dates.

Regarding passenger flows, the sources of available statistical data are limited: Many railway undertakings and PSO competent authorities treat such data as confidential or offer only rather vague general information. The study team approached appropriate stakeholders (PSO contracting authorities, EPF network) to gather such data, but the results were unsatisfactory. The issue of data availability, especially on cross-border commuting, has also been addressed by other studies⁵.

Figures on the number of passenger trains on cross-border links were collected based on annual timetables in 2017. The lack of printed annual timetables in most countries hindered data collection as online timetable information generally does not provide a general overview of an entire timetable period.

Technical data with regard to interoperability issues such as the line gauge(s), number of tracks, electrification status/system and train control systems in use were obtained from infrastructure managers' network statements and map sources. As European Rail Traffic

⁵ The potential of closing the missing links of small scale infrastructure in Europe's border regions for growth and employment. Recommendations for the way ahead. Committee of the Regions 2016, p. 16; New ways of financing transport infrastructure projects in Europe. Study of the European Parliamentary Research Service. PE 614.540 2018, p. 10

Management System (ERTMS) is currently in operation on very few cross-border links, the remaining national technical systems are of significant importance⁶.

National issues are also relevant with regards to rail market organisation. Infrastructure managers are generally organised on a national basis whereas authorities for PSO passenger services are defined by national law. In most countries the incumbent national carrier rail operator dominates the market for passenger train services.

Additional information on the historical, political, demographic and/or economic situation of the line or border area have, where available and if relevant, been provided in brief and recorded under "additional information".

A **classification of the cross-border rail connections** was needed for subsequent steps of the study. This is based on the collected data and followed the study's general logic in order to identify "missing links" and "promising links".

General classification	Specific classification	Indicators for specific classification
Operational cross-border connections	Fully exploited	These three classifications refer to operational cross-border railway connections which had regular passenger services in the 2017 timetable. A description of their detailed assessment with regard to the travel speed and the service level is shown below (Figure 2).
	Exploited with shortcomings (service or speed)	
	Not fully exploited („ promising links ")	
	Freight only („ promising links ")	Line has only freight services
Non-operational cross-border connections („ missing links ")	Neglected	The line is still in place, but no services run on the line (e.g. due to administrative obstacles)
	Elements missing	No services due to missing infrastructure elements (e.g. bridge or tunnel missing/out of use, short gaps in track)
	Entirely missing: dismantled	The track is no longer in situ
Projected cross-border connections	Under construction	The infrastructure for this line is already physically in construction
	Proposed link	There are official, well-advanced plans for new railway infrastructure

Table 1. Classification of cross-border rail connections

The specific classification of operational rail connections with passenger services in 2017 as "fully exploited", "exploited with shortcomings" or "not fully exploited" required careful consideration and quantitative assessment.

Based on the collected data for each cross-border rail connection, differentiated benchmarks for the indicators "travel speed" and "service level" were developed.

⁶ A single European rail traffic management system: will the political choice ever become reality?, ECA special report 13/2017 (EN), p. 8

Regarding the indicator “service level”, the TEN-T/national/regional importance of the specific cross-border rail connection was taken into account.

The following assessment was thus carried out:

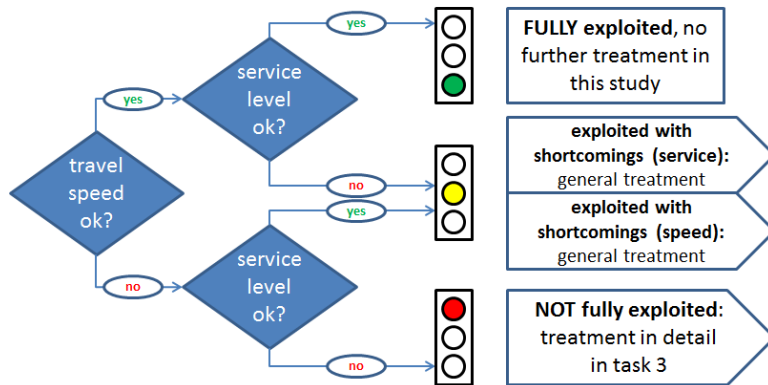


Figure 2. Defined service levels with regard to importance and geographical level

This combination of normative and descriptive classifications permitted the designation of cross-border railway connections as missing or promising links.

- **Missing links:** All non-operational cross-border railway connections which have not been classified as redundant for public rail transport (see below);
- **Promising links:**
 - Operational cross-border railway connections with passenger services in 2017 but which fail to meet minimum criteria for the indicators travel speed and service level;
 - Operational cross-border railway connections without regular passenger services in 2017 (freight only lines);

All these links were the subject of further examination in this study (task 3).

Cross-border railway connections that were classified as “exploited with shortcomings” in terms of travel speed or service level are considered at a more general level with related broader recommendations in task 4.

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An additional classification category was introduced for redundant railway lines in terms of their public transport function. For the purposes of completeness they are listed in the inventory (with reasons for the classification), but were not analysed further in subsequent steps of the study. Criteria for redundancy include:

- never in use for regular public passenger transport;
- impossible to rebuild the line due to physical circumstances;
- line closed very early before advent of mass motorisation;
- line was replaced by a parallel line serving the same transport needs;
- line was de facto light rail;
- the respective NUTS 3 regions are also linked by other (parallel) operational railways.

In most cases a combination of the above was regarded as reasonable to classify connections as redundant.

Known projected lines and lines under construction are listed for information purposes in the inventory but were not assessed in subsequent steps of the study because approval and funding are assumed to be secured.

2.2 Presentation of results

The figure below gives an overview on the different types of cross-border rail connections which were identified in the study.

Statistics on the cross-border rail connections in the inventory

365 identified cross-border rail connections in the inventory

- 130 of these are within the TEN-T Core Network (Corridors) or the Comprehensive Network

202 cross-border rail connections are operational

- 156 of these had regular passenger services in 2017
 - 57 of these were assessed as “fully exploited”
 - 81 of these were assessed as “exploited with shortcomings”
 - 18 of these were assessed as “not fully exploited”
- 46 of these without regular passenger services in 2017 (freight only)

149 cross-border rail connections are non-operational

14 cross-border rail connections are projects or already under construction

34 cross-border rail connections assessed as redundant for public rail transport

176 cross-border rail connections assessed as missing or promising links

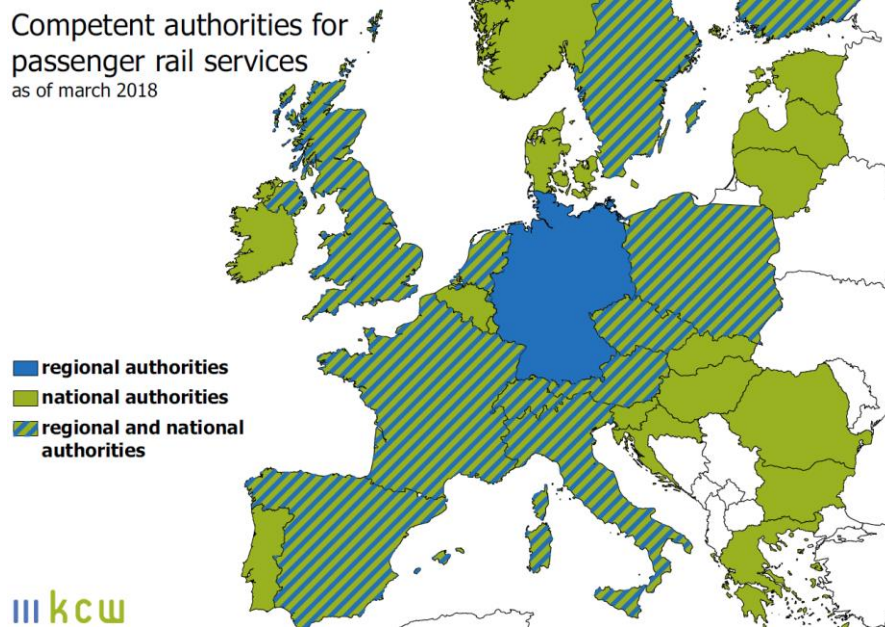
- of which 119 are missing links (non-operational infrastructure)
- of which 57 are promising links (not fully exploited or freight only links)
- of which 33 are within the TEN-T Core Network (Corridors) or the Comprehensive Network

Table 2. Overview of cross-border rail connections in the inventory

2.3 Summary of the results from this task

- 365 cross-border rail connections were identified in total of which 149 are non-operational today (41%).
- In addition to the non-operational “missing links”, the analysis also identified cross-border “promising links” that are operational but where the current passenger train service is insufficient (“not fully exploited”) or did not have regular passenger services in 2017 (“freight only”).
- Thus the reason for a lack of adequate passenger train services is not automatically missing or heavily neglected infrastructure: 64 of the identified cross-border rail connections were without regular passenger services in 2017 or were assessed as “not fully exploited”.
- Most “missing” or “promising links” are outside of TEN-T corridors or the Comprehensive Network.
- “Missing links” and “promising links” are not only an issue along the former iron curtain: cross-border rail connections without regular passenger services also exist in large numbers between Northern Ireland [UK] and the Republic of Ireland, France and Belgium, or Romania and Hungary.
- Passenger services have been withdrawn from several cross-border lines in recent years, e.g. Rusovce [SK] - Rajka [HU] in 2010, Jeumont [FR] - Erquelinnes [BE] and Elvas [PT] - Badajoz [ES] in 2012 and Beli Manastir [HR] - Magyarbóly [HU] in 2015.
- Some of them have been subsequently reinstated, e.g. Elvas [PT] - Badajoz [ES] and Rusovce [SK] - Rajka [HU] in 2017.
- Other “missing links” have additionally been put back into passenger operation in the last few years after long periods of closure, e.g. Szklarska Poręba [PL] - Harrachov [CZ] in 2010, Sebnitz [DE] - Dolní Poustevna [CZ] in 2014 or Selb-Plößberg [DE] - Aš [CZ] in 2015 (all closed after the Second World War).
- One entirely new cross-border rail connection was opened to passenger services in early 2018: Stabio [CH] - Arcisate [IT].
- While technical and administrative information on cross-border rail connections are regularly documented in public sources, information on passenger flows was difficult to obtain.

- Even PSO competent authorities that are responsible for the organisation of about 83% of European passenger rail services could not always deliver this information.
- The governance structure of PSO competent authorities varies significantly across Europe: While some only have one single PSO competent authority at the national level, others have mixed structures with competent authorities at the national and regional levels. Germany is the only EU member state with PSO competent authorities solely at the regional level.



Map 2. Governance structure of PSO competent authorities for rail in countries within the scope of the study

3 Analysis of possible new rail connections and discussion of alternatives

Structure of the work

The missing and promising links identified in task 2 were assessed in more detail as follows: firstly, potential passenger demand was estimated, followed by the development of service concepts on routes for which a threshold level of demand would be expected. Infrastructure requirements were then assessed before infrastructure and operating costs were calculated. Following these steps, the results of the study were discussed with competent authorities. Alternatives were assessed for routes with insufficient passenger demand potential to justify new or enhanced train services. Finally, targeted recommendations were provided for all promising and missing links based on the previously conducted analysis.

3.1 Estimation of rail travel demand

Method

Transport demand is determined mostly by demographic, economic and spatial factors. In order to estimate potential cross-border rail demand across the EU/EFTA it was originally proposed to use a classic four-step transport model adapted to the specific characteristics of cross-border travel demand.

However, this was not possible owing to the limited availability and quality of the Eurostat statistics required to calibrate the *trip generation* element of the model, an experience shared with other researchers.⁷ It was therefore decided to begin with the second step of the four-step model, *trip distribution*, taking as a basis empirical total rail pkm demand data from Eurostat. This approach then permitted the third step, *mode choice*, to be omitted, proceeding instead directly to the final stage, *route assignment* on the rail network.

Calculations have been made at the NUTS 2 level with the exception of NUTS 2 regions on national borders, for which the NUTS 3 level was used, maximising the level of disaggregation in border regions.

Trip distribution

In 2015 there were 466 billion rail passenger km in the EU+EFTA according to Eurostat statistics. A gravity model approach was used to distribute this empirical rail demand between each pair of NUTS 2/NUTS 3 regions in the EU/EFTA. This model is based on Newton's law of gravitation in which the attraction between places is directly proportional to the product of their trip-generating potential and inversely proportional to the square of their distance (or travel time) from each other.

Route Assignment

The next task was to assign this demand to the passenger train network by means of the transport planning software VISUM in 'best route' mode, based on the fastest possible route according to timetable-derived passenger train speeds. The average speed of all routes was assigned to routes for which VISUM contained no route-specific speed. It should be noted that the major demand-influencing factors *frequency* and *interchange* were not taken into account, i.e. the sum of travel times on each route segment is the sole criterion for assigning demand (waiting time = 0).

An electronic map of the passenger rail network was used as the basis for the VISUM modelling, to which the centres of each NUTS region were automatically connected, with an average distance of 12 km between cell centre and rail network access point. In the

⁷ DG MOVE (MOVE/D3/2014-261) (2016) Comprehensive Study on Passenger Transport by Coach in Europe; EU Joint Research Centre TRANSTOOLS transport model project

next step, missing links and freight-only lines from the inventory (task 2) were added to the electronic map within VISUM. Finally, these links were 'opened' individually within the model, thus capturing the maximum possible demand potential for each of them.

Upon inspection of the full set of results, it became apparent that several routes had been assigned implausibly high or low demand potential. Among the factors in the control of the investigators (as opposed to the quality and availability of empirical data), this could be traced to the large size of many NUTS regions and/or the complexity of the rail network within them⁸. This led to the decision to split 218 of the 317 NUTS 3 border regions into up to ten parts. The trip distribution and route assignment steps of the modelling were then repeated in full with the resulting, significantly larger trip matrix.

Discussion

It should be noted that the use of empirical rail demand data as the basis of the modelling implicitly assumes that modal split will remain as it is now; additional demand in the model occurs solely through the increased accessibility of regions when routes currently without passenger trains are added to the network. A further constraint is that the model effectively takes fixed mode share at the national level, disguising large variations between routes that can occur as a result of differing levels of service quality and competition with other modes. The model also does not take into account the special situation of cross-border commuting to cities with disproportionately high ratios of workplaces to residents e.g. Luxembourg, and/or high costs of living e.g. Basel, Copenhagen⁹. However, such routes are - by and large - well served by cross-border rail and therefore not the focus of this part of the study. Factors such as long-term changes to population, the macro-economic situation and broader transport policy have not been applied in the model, thereby closely reflecting the reality of the status quo.

3.2 Filtering missing links and promising links

The construction of entirely new infrastructure or major upgrades can only be justified when it results in relevant level of traffic. Similarly, there is no economic, social or environmental benefit from running empty trains even on operational lines. For this reason it was necessary to develop an initial screening method to assess which of the 176 missing and promising links identified in task 2 warrant further analysis purely on the basis of demand potential.

A differentiated threshold demand potential for each border section was calculated on the basis of the estimated usage of existing regional cross-border trains at the border section level, reflecting the current reality across Europe rather than setting an arbitrary 'one size fits all' threshold. These differentiated benchmark filter values could then be used to assess each promising and missing link.

However, this process led to extremely low threshold values in some parts of southern and eastern Europe (e.g. 19 passengers per day for LT-PL). Conversely, threshold values greater than 1000 were obtained for four border sections in western Europe, i.e. higher than the stringent federal guidelines for reactivations in Germany. Finally, the filter for new infrastructure was raised wherever the border-specific value was lower than 500. In summary, filter values were adjusted as follows:

- a minimum of 100 passengers / day where no significant new infrastructure is required;
- a minimum of 500 passengers / day where significant new infrastructure is required;
- a maximum of 1000 passengers / day.

⁸ Critique on the diversity of the NUTS 3 regions across Europe, hampering quantitative analysis of border area, has regularly been addressed by several studies, e.g. Passenger rail accessibility in Europe's border areas, DG Regio WP 11/2017, p. 2

⁹ See also for the critique on data availability on cross-border commuting in Footnote No. 5

A full list of threshold values for each border section can be found in Annex 4. A total of 41 missing and promising links met or exceeded their corresponding filter threshold values. The method reflects regional diversity and helped identify a number of 'small-scale' projects across Europe.

3.3 Analysis of alternatives

For missing links that did not satisfy the threshold demand criteria – and therefore considered as having insufficient potential a rail reactivation – yet with a demand potential of at least 20 passengers per day, the suitability of alternatives such as bus or ferry services was briefly examined by desktop research. This was also undertaken for routes for which a negative or no opinion was received as part of the stakeholder consultation for shortlisted missing and promising links (see below).

New public transport routes were suggested wherever no existing bus services could be found. Alternatives for each route were then classified as follows: *bus (existing)*, *bus (new)*, *train (alternative existing route)* and *train + bus (see additional information)*.

Alternatives were not suggested for promising links classified in task 2 as *freight-only* or *not fully exploited* where the infrastructure is operational and it might be expected that passenger services could be introduced or improved at low marginal cost on the existing railway lines. In such cases it is recommended that competent authorities and railway undertakings are brought together to discuss 'quick win' solutions that could be implemented in the short-term given the political will.

It should be noted that missing or substandard road infrastructure was found to be an issue preventing the introduction of attractive road-based public transport in only two cases. A far greater challenge is likely to be that of persuading competent authorities and/or commercial bus operators to start new bus routes or improve existing services as proposed.

Summary information can be found in the expanded fact-sheets for each border section.

3.4 Further analysis of shortlisted missing and promising links

The next step involved a more detailed analysis of the costs and measures required to deliver a level of service to satisfy the potential demand identified in the modelling. Firstly, the 41 shortlisted routes were screened for peculiarities affecting their suitability for further analysis, leading to the exclusion of:

- ID 54 Aachen-Vetschau [DE] – Bocholtz [NL]: museum line that duplicates a proposed new route (ID 55) at an advanced stage of planning;
- ID 214 Secovlje [IT] – Salvela [HR]: dismantled narrow gauge route for which the alignment is unsuitable for rebuilding as a standard gauge route; rebuilding as a narrow gauge line is unviable on the grounds of both interoperability and an uncompetitively low line speed;
- ID 276 (Bratislava-Petržalka [SK] –) Rusovce [SK] – Rajka [HU]: freight-only in 2017 timetable but featuring 5 passenger train pairs per day in 2018, resulting in a change of classification to exploited with shortcomings.

This left a total of 38 missing and promising links for subsequent detailed examination according to the principle of the specification of a passenger train service concept and the provision of infrastructure to enable its delivery.

Shortlist of missing and promising links for detailed examination	
ID 7: Hazebrouck [FR] - Poperinge [BE]	ID 216: Ilirska Bistrica [SI] - Šapjane [HR] (- Rijeka [HR])
ID 8: Armentières [FR] - Comines/Komen [BE] (- Kortrijk [BE])	ID 219: Imeno [SI] - Harmica [HR] - Savski Marof [HR]
ID 9: (Lille Flandres [FR] -) Comines(France) - Comines/Komen [BE]	ID 220: (Stranje [SI] -) Sveti Rok ob Sotli [SI] - Đurmanec [HR] (- Zabok [HR])

Shortlist of missing and promising links for detailed examination	
ID 16: (Valenciennes [FR] -) St-Amand-les-Eaux [FR] - Antoing [BE] (- Tournai [BE])	ID 237: Priekule [LV] - Skuodas [LT] - Kretinga [LT] (- Klaipeda [LT])
ID 19: (Le Quesnoy [FR] -) Bettrechies-Bellignies [FR] St. Ghislain [BE] (- Mons [BE])	ID 238: (Liepaja [LV] -) Priekule [LV] -) Vainode [LV] - Ritine [LT] - Bugeniai/Ruzgai [LT] - Mažeikiai [LT]
ID 20: Maubeuge [FR] - Quévy [BE] (- Mons [BE])	ID 239: (Riga [LV] -) Reņģe/Ruba [LV] - Mažeikiai [LT]
ID 39: (Gent [BE] -) Wondelgem [BE] - Terneuzen [NL]	ID 240: (Riga [LV] -) Meitene [LV] - Joniškis [LT] (- Šiauliai [LT])
ID 40: Sint-Niklaas [BE] - Terneuzen [NL]	ID 242: (Daugavpils [LV] -) Eglaine [LV] - Obeliai [LV] - Panėvežys [LT]
ID 43: (Antwerpen [BE] -) Turnhout [BE] - Tilburg [NL]	ID 243: (Daugavpils [LV] -) Kurcums [LV] - Turmantas [LT]
ID 44: (Hasselt [BE] -) Heerpelt [BE] - Achel [BE] - Borkel en Schaft [NL] - Eindhoven [NL]	ID 277: Komárno [SK] - Komárom [HU]
ID 45: Mol [BE] - Roermond [NL]	ID 304: Sofia [BG] - Kulata [BG] - Promachon [EL] - Thessaloniki [EL]
ID 57: (Mönchengladbach [DE] -) Dalheim [DE] - Roermond [NL]	ID 306: (Varazdin [HR] -) Kotoriba [HR] - Murakeresztúr [HU]
ID 59: Geldern [DE] - Straelen (DE) - Venlo [NL]	ID 307: (Zagreb [HR]-) Koprivnica [HR] - Botovo [HR] - Gyékényes [HU] (-Budapest [HU])
ID 60: Goch [DE] - Gennep [NL] (- Nijmegen [NL])	ID 308: Virovitica [HR] - Barcs [HU]
ID 61: (Krefeld [DE] -) Kleve [DE] - Kranenburg [DE] - Groesbeck [NL] - Nijmegen [NL]	ID 312: (Osijek [HR] -) Beli Manastir [HR] - Magyarbóly [HU] (- Villány [HU] - Pécs [HU])
ID 66: (Wesel [DE] -) Bocholt [DE] - Winterswijk [NL]	ID 313: (Entroncamento [PT] -) Elvas [PT] - Badajoz [ES]
ID 68: Ahaus [DE] - Alstätte [DE] - Broekheurne [NL] - Enschede [NL]	ID 316: (Pocinho [PT] -) Barca de Alva [PT] - Fregeneda [ES] (- Salamanca [ES])
ID 178: Rosenbach bei Villach [AT] - Jesenice [SI]	ID 317: Porto [PT] - Vigo [ES]
ID 212: Trieste [IT] - Hrpelje-Kozina [SI]	ID 360: (Faro [PT] -) Vila Real de Santo António [PT] - Ayamonte [ES] (- Sevilla [ES])

Table 3. Shortlist of missing and promising links for detailed examination

Service concept

For all categories of promising and missing links under further investigation a passenger service was developed based on the train pairs required to carry the predicted number of passengers identified in the modelling and/or service standard norms in each country. Start, end and intermediate stations of the proposed service concepts were chosen on an individual basis, including possible new stations on missing links. Rolling stock requirements were assessed in terms of the estimated *additional* number of train service diagrams required, taking into account journey and turnaround times, and in the general assumption that these could be resourced from existing fleets (unless information to the contrary was available). Finally, interoperability requirements were considered: would additional train safety and/or traction current systems be required for the proposed rolling stock for the routes in question?

Routes ID 59 and 60 were subsequently combined to reflect the proposed service pattern.

Infrastructure requirements and costs

Infrastructure investment costs were calculated for all shortlisted missing and neglected links as well as for new/reactivated stations. Cost estimates explicitly include planning, labour costs and a risk reserve of up to 33% as well as materials. The basis for the calculations is the RHDHV standardised cost database supplemented by current material costs in the DB Kostenkennwertekatalog (KKK) Version 2016 as used by DB Engineering

and Consulting in international infrastructure projects. It was assumed these unit costs are broadly the same across Europe, with competitive tendering keeping costs in check in western Europe while major western contractors are also increasingly active in central and eastern Europe, where labour costs might otherwise be expected to be lower.

The following key assumptions were made unless stated otherwise in the infrastructure fact-sheets (Annex 5) or expanded fact-sheets for each border section (Annex 6):

- routes are single-track and non-electrified (unless stated otherwise) with a design speed of 80 km/h and a passing loop every 30 km (unless stated otherwise);
- currently *freight-only* and *not fully exploited* lines do not require infrastructure investment unless stated otherwise;
- track, level crossings and signalling that have been unused for 10 or more years must be replaced;
- where signalling systems are lacking or have to be replaced this is done on the basis of the installation of ETCS Level 1;
- level crossings are replaced with grade-separated crossings for all primary roads; other level crossings are to be eliminated or replaced on a case by case basis;
- bridges and tunnels older than 20 years old were visually inspected by means of Google Maps and Google Earth then classified as new, requiring substantial rebuild, requiring refurbishment or no modification necessary;
- noise barriers must be erected only where lines are in extremely close proximity to private property.

Operating costs and farebox revenues

Key cost drivers in the provision of passenger train services are staff salaries, staff efficiency, energy, train maintenance, infrastructure usage and overhead costs. A standardised model used to calculate costs in regional rail concessions in Germany served as the basis of operating cost calculations, adjusted by means of Eurostat-derived indices to obtain country-specific costs per train km for each route.

In order to simplify the analysis for the purposes of estimating operating costs, two types of reference rolling stock were used to calculate energy consumption and light maintenance costs. Note that the actual rolling stock proposed can be found in the expanded fact-sheets (Annex 6); it should be noted that older types can be less energy-efficient and require increasingly scarce spare parts.

Average track access and station usage charges for each country were taken from the Fifth IRG-Rail Market Monitoring report (2015 data) if available or the most recently published infrastructure manager Network Statements (2016-17 or 2017-18). Fare revenues per passenger km were also taken from Fifth IRG-Rail Market Monitoring report (2015 data) or derived from the German regional rail figure (according to own data) by means of indexed Eurostat purchasing power statistics with manual adjustment in several countries to account for fare policy.

Explicitly excluded from the analysis are all rolling stock costs other than energy use and light (routine) maintenance. A fundamental assumption in the study is that existing, largely well-amortised rolling stock is or could be made available, in most cases by incumbents with vehicle reserves. Other than in Latvia, where the competent authority delegated its consultation response to the incumbent RUs, statements contradicting this assumption had not been received as part of the stakeholder consultation (see below) at the time of finalising this report. Rolling stock procurement, leasing, depreciation and heavy overhaul costs are therefore *not* included in the figures presented within this study.

3.5 Stakeholder consultation

The PSO competent authorities (CAs) of the shortlisted links were contacted in writing with the route, service and cost estimate information calculated as part of this task. They were asked to comment on the findings, the potential willingness to commit to further studies, their potential willingness to finance operations over a ten-year period as well as any other cross-border routes they consider to have potential. Where provided, previous studies were reviewed and findings compared with this study.

It quickly became clear that the consultation CAs is a crucial point of the study: although the infrastructure investment or operating cost calculations from task 3.5 were not doubted for most routes, competent authorities often showed little interest in the shortlisted links:

- Explicitly positive feedback was received from CAs on both sides of the border for only one of the 38 cross-border rail connections: ID 45 Hamont [BE] – Weert [NL].
- In most other cases CAs provided negative feedback on the reestablishment of rail connections for different reasons:
 - The reconstruction of the historical alignment is impossible (ID 68 Ahaus [DE] – Alstätte [DE] – Broekheurne [NL] – Enschede [NL] or ID 212 Trieste [IT] – Hrpelje-Kozina [SI]). The authorities instead put more emphasis on improvements to existing infrastructure connections in the region (e.g. ID 69 instead of ID 68, ID 211 instead of ID 212)
 - For ID 44 (Hasselt [BE] – Neerpelt [BE] – Valkenswaard [NL] – Eindhoven [NL] and ID 61 Kleve [DE] – Nijmegen [NL] the Dutch side favours improved bus services over the reactivation of rail infrastructure
- Feedback from CAs was in many other cases rather cautious, in some cases owing to waiting for the evaluation of recent reactivations on other lines (e.g. ID 277 Bratislava-Petrzalka [SK] – Hegyeshalom [HU])

Given that positive feedback from competent authorities is a prerequisite for the successful implementation of cross-border rail projects, and that positive feedback on the shortlisted 38 lines was scarce, the stakeholder consultation was expanded to not previously contacted CAs for border sections on which at least one missing or promising link exists. This ensured that stakeholders had the opportunity to provide input into the study and challenge the results of the modelling and/or filtering as appropriate. The expanded consultation led to more positive feedback on cross-border rail connections that had not been previously examined in the study. This feedback is summarised in the expanded fact-sheets for each border section (Annex 6).

3.6 Identification of funding opportunities for shortlisted promising and missing links

Both capital investment and ongoing operating costs are possible candidates for funding in railways. European and national sources of funding were therefore assessed for their suitability for the shortlisted missing and promising links. However, operating costs are generally not covered by classical funding instruments, even though revenue support is crucial for PSO competent authorities to secure non-profitable regional and inter-regional cross-border railway services on the vast majority of routes.

In order to identify relevant European sources of funding, a comprehensive analysis of EU programmes available to support rail projects was carried out, including subsidies, private funds, financial instruments and loans. Of these, funding sources with the most potential for supporting small-scale cross-border projects were examined:

- Programmes that were not suitable for funding infrastructure works were excluded at this stage. These include research programmes such as Horizon 2020 and Shift2Rail.
- Funding sources not suitable in their current form, but showing potential if adapted, were selected as relevant sources for the purposes of this study.

For each funding source, a basic suitability analysis was undertaken and possible improvements were identified in some cases. Generally the spatial location of a cross-border rail connection determines possible eligibility for existing EU funding programs. However, the assessment revealed that:

- Only four of the 38 shortlisted missing and promising links are located on TEN-T corridors in the Core Network: one on each of the North Sea – Baltic, Orient/East – Med, Mediterranean and Atlantic corridors.
- A further 13 cross-border rail connections belong to the Comprehensive Network.
- However, only two of these 17 cross-border rail connections in the Core or Comprehensive Networks are eligible for CEF funding: one short-listed promising

link (ID 39, implementation study of the optimisation of cross-border rail infrastructure in the port area Ghent – Terneuzen) was already funded under the CEF call 2016. The others not eligible for CEF unless infrastructure enhancements are required, which would be the case for the electrification of the Dutch part of ID 45 Hamont [BE] – Weert [NL].

- The situation is similar for Cohesion funding: Only 9 of the 38 cross-border rail connections are eligible for this type of funding where infrastructure measures are needed and they are located in (at least) one Member State eligible for Cohesion funds.

To summarise, CEF, Cohesion Funds, ERDF and Interreg programmes were identified as relevant funding sources for cross-border infrastructure investments, with Interreg potentially also suitable for supporting operations. EFSI, EIB loans, guarantees and project bonds, Equity and Funds investment and CEF financial instruments are also suitable for cross-border rail projects.

3.7 Cost-utility analyses of shortlisted promising and missing links

Cost-utility analysis (CUA) can be used to assess and compare the short-listed projects in non-monetary terms on the basis of scores [standardised values] for pre-defined indicators.

Six relevant indicators as basis of this simplified type of CUA for the assessment of cross-border railway connections were identified and applied to the 38 shortlisted missing and promising links identified as having sufficient potential to justify reinstatement/enhancement:

- Absolute passenger potential [passengers per day]
- Absolute infrastructure investment required [€]
- Absolute annual subsidies required [€ per year]
- Average population growth 2006-2014 in the respective NUTS3 border regions [%]¹⁰
- Average GDP growth 2006-2014 in the respective NUTS3 border regions [%]¹¹
- Competent authorities' (CA) willingness to implement the project implementation

A critical factor here, given the need for operating subsidies for most of the shortlisted missing and promising links, is competent authorities' willingness to support project implementation.

Figure 3 shows a typical cost-utility spider web diagram for illustrating the results of the assessment of four sample projects, where each indicator is normalised on a scale from 0 to 1 and the best score is the outer point of the axis, e.g. highest passenger potential, greatest willingness and lowest costs are at the outer points. Although the purple project has high passenger potential, low investment costs and needs low annual subsidies, the responsible competent authority is unwilling to implement it. In comparison the orange and the green projects both have significantly lower passenger potential, but owing to greater willingness these projects are much more likely to be implemented.

¹⁰ "Average annual population to calculate regional GDP data (thousand persons) by NUTS 3 regions" from EUROSTAT (nama_10r_3popgdp)

¹¹ "Gross domestic product (GDP) at current market prices by NUTS 3 regions" from EUROSTAT (nama_10r_3gdp)

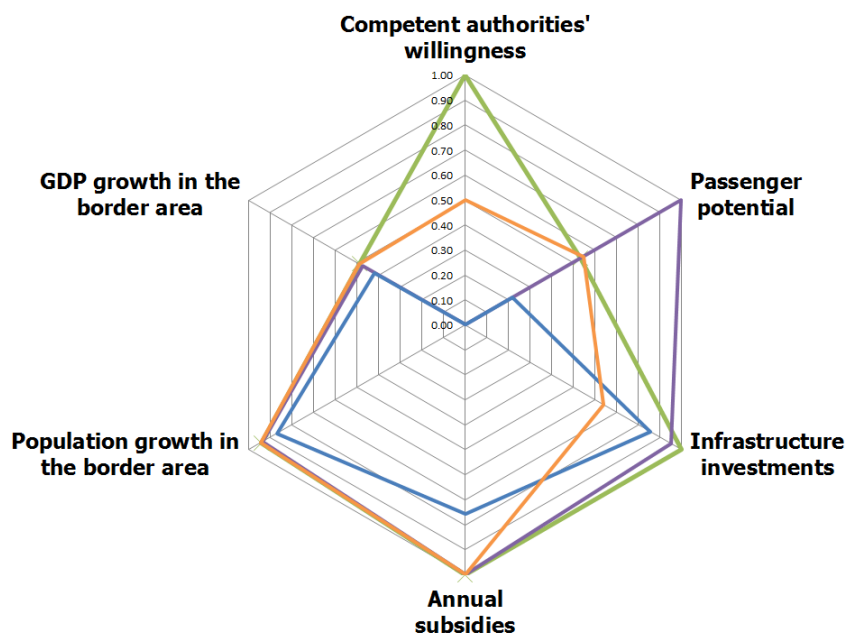


Figure 3. Exemplary cost-utility analysis spider web diagram

Results in spider web diagrammatic form also as can be found in the expanded fact-sheets per border section (Annex 6).

3.8 Presentation of results

The key findings of this task are illustrated in expanded fact-sheets (see Annex 6) for each of the intra-EU/EFTA borders other than Norway/Finland (no railways), Denmark/Sweden and France/UK (no land borders according to tender specifications). They present the following information for each border section:

- an overview table of all cross-border railway connections;
- fact boxes for all 38 shortlisted missing and promising links for which sufficient demand potential has been identified and no explicitly negative stakeholder opinion was received:
 - key data, including cost-utility scores in spider web diagrammatic form
 - suggested service concept, required infrastructure measures and rolling stock
 - estimations of demand, infrastructure costs and subsidy requirements
 - stakeholder assessments
 - possible public transport alternatives
- possible public transport alternatives for all other missing links along the border-section;
- a summary table of targeted recommendations for all missing and promising railway links.

3.9 Summary

- Out of 176 missing and promising links, a shortlist of 41 cross-border rail connections was identified by means of a passenger potential demand model and the application of region-specific passenger thresholds.
- One of these cross-border rail connections was already reactivated during the study: ID 276 (Bratislava-Petržalka [SK] –) Rusovce [SK] – Rajka [HU]). Two others were excluded from further analysis owing to route duplication or route alignment issues.
- 38 shortlisted cross-border rail connections were thus analysed in detail within this task, including the development of service concepts, estimations of infrastructure investment and operating costs, and a stakeholder consultation.
- Most of these 38 shortlisted cross-border rail connections do not belong to the Core or the Comprehensive Network of TEN-T:

	Number	Share
Shortlisted cross-border rail connections within the Core Network/on TEN-T corridors	4	11%
Shortlisted cross-border rail connections within the Comprehensive Network	13	34%
Other shortlisted cross-border rail connections	21	56%
Total	38	100%

Table 4. Shortlisted cross-border rail connections by TEN-T categories

- Detailed existing studies exist for only a handful of these connections.
- A total investment sum of 4 436 100 000 € was estimated for 22 of the 38 shortlisted cross-border rail connections. The other 16 would not require infrastructure investment for the operation of passenger services in the short-term.
- A total sum of 15 155 000 € of annual revenue support was estimated for passenger train operations on 28 of the 38 cross-border rail connections. Only 10 routes could be operated without subsidies on both sides of the border, under the assumption that existing, largely well-amortised rolling stock is or could be made available on a cost-free basis. This assumption was generally not contested during the consultation, but it should be noted that this could change in the future due to the gradual withdrawal of incumbents' rolling stock.
- Investment and subsidy requirements broken down by TEN-T categories are shown in the following tables:

	Number	Estimated infrastructure investment required
Shortlisted cross-border rail connections within the Core Network/on TEN-T corridors	0 of 4 (0 %)	0 €
Shortlisted cross-border rail connections within the Comprehensive Network	3 of 13 (23 %)	130 100 000 €
Other shortlisted cross-border rail connections	19 of 21 (90 %)	4 306 000 000 €
Total	22 of 38 (58 %)	4 436 100 000 €

Table 5. Infrastructure investment estimates broken down by TEN-T categories

	Number	Estimated annual subsidies
Shortlisted cross-border rail connections within the Core Network/on TEN-T corridors	2 of 4 (50 %)	1 795 000 €
Shortlisted cross-border rail connections within the Comprehensive Network	10 of 13 (77 %)	5 100 000 €
Other shortlisted cross-border rail connections	16 of 21 (76 %)	8 260 000 €
Total	28 of 38 (74 %)	15 155 000 €

Table 6. Subsidy estimates broken down by TEN-T categories

Considering these annual subsidy requirements and the need to invest in rolling stock in the medium- to long-term, a crucial factor is the willingness of competent authorities to support project implementation. The legal framework for PSO arrangements on public passenger transport services is set out in Regulation (EC) No. 1370/2007, the recent amendments of which underline the importance of effective and non-discriminatory

access to suitable rolling stock, to be made available by competent authorities in accordance with national law and in compliance with state aid rules as necessary.¹²

Competent authorities' willingness to support implementation of the 38 shortlisted links is summarised in table in Annex 7. Full feedback on all cross-border rail connections is shown in the expanded fact-sheets per border section (Annex 6).

¹² Article 5a (2) of Regulation (EC) No. 1370/2007 amended by Regulation (EU) 2016/2338

4 Identification of “potentially most beneficial” projects and policy conclusions

4.1 Identification of “potentially most beneficial” projects

From both the cost calculations and the stakeholder consultation in task 3, it became clear that competent authorities’ willingness is crucial for project implementation for subsidising railway services under a PSO arrangement in line with Regulation (EC) No. 1370/2007, as the existence of commercial “open access” services on regional cross-border railway connections is highly unlikely.

Bearing in mind the dubiety of pure numbers and related top-down assessments, the identification of “potentially most beneficial” projects was not exclusively based on the afore-mentioned study’s calculation or available statistical data. In fact, the identification was carried out as a **bottom-up-approach**, integrating the results of stakeholder consultation on the 38 shortlisted projects with further annotations on missing and promising cross-border railway connections which competent authorities do consider for further action. Hence, the stakeholder consultation widened the view of the study and brought fruitful results into it also on such cross-border railway connections which were not examined before, due to the mentioned limitations of a data based top-down approach. Some additionally mentioned aspects by competent authorities were:

- **Enhance cross-border labour mobility:** A field which is difficult to be assessed with today’s data¹³, but which was mentioned several times by various stakeholders across different border sections and which was also the reason for recently implemented reactivations (e.g. ID 276 (Bratislava-Petržalka [SK] – Rusovce [SK] – Rajka [HU])).
- **Improve connectivity of TEN-T corridors:** This was a major issue for the “Rhine-Alpine” and “North Sea-Mediterranean” corridors during the Rastatt disruption in summer 2017, when the right bank Rhine railway line Karlsruhe [DE] - Basel [CH] parallel to the German-French border has been disrupted for months and – regardless of interoperability issues – alternative routes were missing.
- **Alleviate structural spatial effects:** Regarding ID 25 Givet [FR] - Dinant [BE], the French Region Grand Est pointed out that this line could help to close a gap of about 250 km along the French-Belgian border line where no passenger rail services exist.
- **Promote sustainable and eco-friendly mobility:** This topic was a crucial issue for the project “MI.CO.TRA” (“MIglieramento dei COLlegamenti TRAnsfrontalieri”) launched under “Interreg IV A Italy–Austria” in 2012, representing a pilot cross-border rail line, linking Udine in Italy with Villach in Austria and providing a much needed connection between the two towns and bringing economic, social and environmental benefits: “Aiming at a modal shift from the street to the rail in the area, the project has led to an increase in sustainable mobility and a reduction in CO2 emissions. It has also brought benefits in terms of socio-economic development and increased cohesion between the partner regions Friuli Venezia Giulia and Carinthia. Launched in June 2012, MI.CO.TRA has brought the first rail connection between the towns since the international EuroCity train service was cancelled several years ago. Thanks to the new rail line, tourist numbers at various historic and archaeological sites across the region have risen. [...] The tourists also appreciate that they are permitted to travel with their bicycles, or skis in winter, on the train.”¹⁴ Impressive passenger numbers demonstrate the project’s success and its sustainability, thus it was extended beyond June 2013, its planned end date. During the stakeholder consultation of this study, Friuli

¹³ See also for the critique on data availability on cross-border commuting in Footnote No. 5

¹⁴ http://ec.europa.eu/regional_policy/en/projects/austria/rail-link-project-between-austria-and-italy-promotes-transnational-sustainable-and-eco-friendly-mobility

Venezia Giulia stated that it wants to adapt the “MI.CO.TRA” model also for a cross-border rail connection between Italy and Slovenia.

These examples show how important local and regional assessment, and especially the commitment of relevant stakeholders, is for project implementation. Though, the stakeholders’ willingness in a certain number of cases is ambiguous, especially when assessments vary from one side of the border to the other. Nonetheless, it can be assumed, that if at least one competent authority is in favour of a certain project, it will try to convince stakeholders from the other side of the border as well.

Against this background, 48 cross-border rail connections were assessed as potentially most beneficial projects when:

- significant railway potential was identified by this study and the study’s assumptions were not rejected by competent authorities from both sides OR
- at least one competent authority stated its willingness to implement the (infrastructure) project.

The following tables give overviews on characteristics of the 48 potentially most beneficial projects:

	Number	Share
Potentially most beneficial projects within the Core Network/on TEN-T corridors	3	6%
Potentially most beneficial projects within the Comprehensive Network	19	40%
Other potentially most beneficial projects	26	54%
Total	48	100%

Table 7. Potentially most beneficial projects by TEN-T categories

	Number	Share
Potentially most beneficial projects within the Core Network/on TEN-T corridors	0 of 3	0%
Potentially most beneficial projects within the Comprehensive Network	6 of 19	32%
Other potentially most beneficial projects	18 of 26	69%
Total	24 of 48	50%

Table 8. Potentially most beneficial projects with assumed infrastructure investments by TEN-T categories

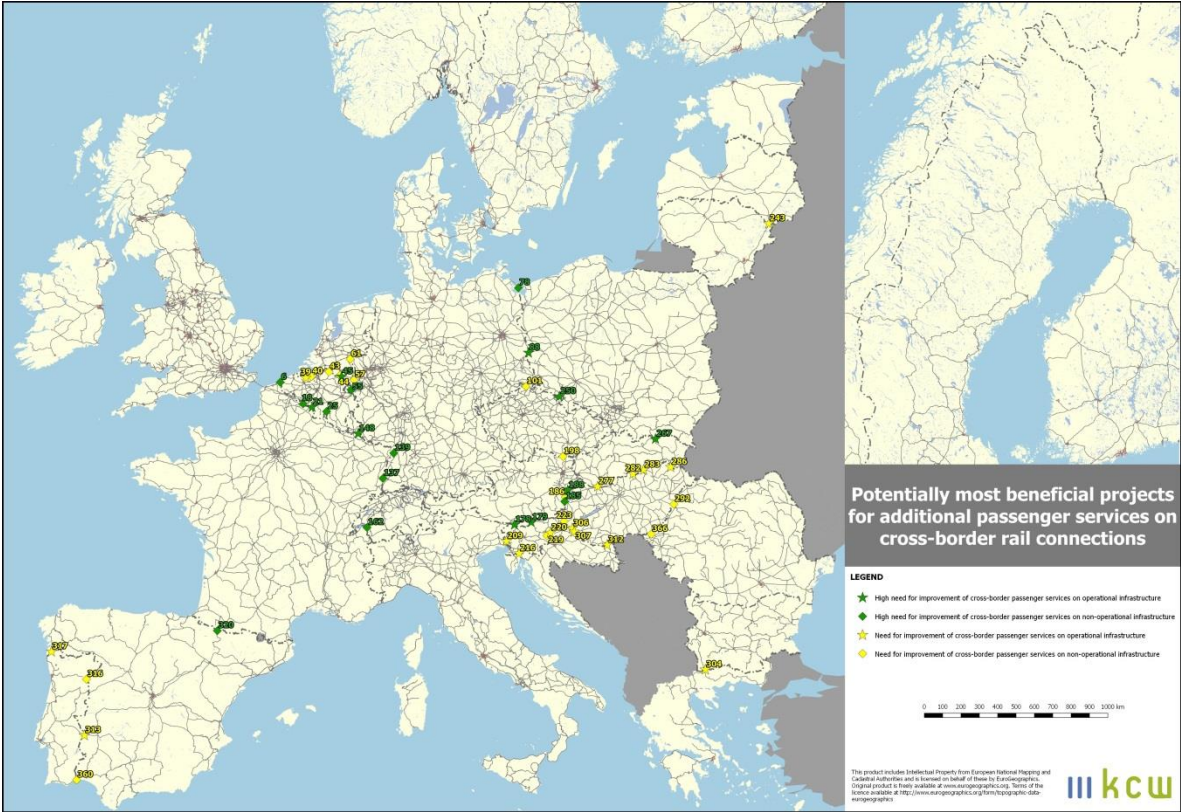
Observation which could already be made among the shortlisted missing and promising links in the Task 3 are still true when looking at the potentially most beneficial projects:

- About 6% belong to the TEN-T Core Network.
- Approximately 40% belong to the TEN-T Comprehensive Network.
- The majority of the potential projects is out of the TEN-T categories.
- Also, most infrastructure investments are assumed to be taken outside the Core Network or the Comprehensive Network of TEN-T.
- The half of the potentially most beneficial projects is supposed to require infrastructure investments.
- The other half of the potentially most beneficial projects where the infrastructure is already operational is supposed to create European added value at low marginal cost immediately by offering additional passenger rail services. Though, the more crucial issue is to ensure financing of operating costs as it has to be assumed that most of the potentially most beneficial projects will need public subsidies comparable to estimations made for the shortlisted rail connections in task 3.

Among the full range of missing and promising links, there might be further potentially beneficial projects, especially in the aforementioned case where the infrastructure is already operational. Thus, targeted recommendations for *all* missing and promising links were given in the expanded fact-sheets per border section (see Annex 6).

A long list of the 48 potentially most beneficial projects can be found in Annex 8. It contains *inter alia* an assessment of their specific alleviation of structural spatial effects and possible improvements of connectivity between TEN-T corridors. For all potential projects, it can be assumed that they also would enhance cross-border labour mobility and promote sustainable and eco-friendly mobility.

The following map shows the spatial distribution of the 48 potentially most beneficial projects across Europe:



Map 3. Potentially most beneficial projects (see Annex 9 for high resolution version)

4.2 Impact of new trends in transport and future EU regulatory framework

Current trends and revision of the regulatory framework

Trends in transport and evolutions of regulatory measures at EU level can directly impact public transport authorities. It is therefore necessary to anticipate such developments and how they could affect identified missing links that could be considered for investment in the future.

Depending on the type of cross-border links examined in our study, the impact of EU rules and new trends may vary.

a) Expected evolutions in the transport sector

Between 2010 and 2050, it is estimated that passenger transport will grow by about 42% and freight transport by 60%¹⁵.

¹⁵ Impact Assessment accompanying the Proposal for a Directive amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures, 31/05/2017: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52017SC0180>

There is a direct correlation between the competitiveness of road and rail sectors. Expected developments **in the road sector** are therefore key to identify how the rail sector may evolve.

- Road is expected to maintain its dominant position in the citizen's personal transportation sector and in the freight sector between 2010 and 2050.
- On the other hand, passenger cars' modal share could be affected by the following inefficiencies: road is a major contributor to air pollution and Europe's greenhouse gas emissions, high congestion levels, increase in fossil fuel prices in the long term, higher use of collective transport modes and safety issues.

The inefficiencies of the road sector are also among the drivers for the **improvement of rail competitiveness**, together with the effective completion of the Trans-European Transport (TEN-T) Core network by 2030 and the Comprehensive network by 2050. As an alternative to road for long distance trips, high speed rail also contributes to improving rail competitiveness. According to the EU Reference Scenario 2016 "Energy, transport and GHG emissions Trends to 2050", passenger rail activity is projected to increase by 76% between 2010 and 2050 and increase its modal share from 7.7% to 9.7%. High-speed rail volumes are also expected to increase significantly¹⁶.

Similarly, **market opening** (detailed below), may have a positive impact on railways.

Consumer behaviour and demand patterns must not be forgotten as they directly impact the performance of a transport service, especially in a context where citizen's attitude towards mobility is rapidly changing and demand is growing. Some current trends in large cities are rather in favour of a greater use of public transport coupled with more demanding users in terms of service quality and flexibility.

- Mobility is increasingly regarded as a "service".
- Renting and sharing mobility services are becoming more popular for the new generation than owning a private vehicle.
- Consumers wish to be able to shift between different transport modes and to have access to user-friendly travel information.

However, such trends are not realistic outside large cities. The connections between two cross-border low populated areas will usually grant road transport with a dominant position compared to rail. There are obvious factors to this unbalance:

- Limited congestion in rural areas
- Low quantity of public transport offer.

The new Eurobarometer survey on rail customer satisfaction that the European Commission plans to conduct¹⁷ will also be a good indicator of the potential for use of rail services by customers in the future.

Technological innovation is also shaping the future of transport. New trends are here to stay such as digitalisation of services and operations, e-ticketing, emergence of alternative fuels and related infrastructures, new on-line platforms for freight operations and car sharing, smartphone applications offering real time data. Automated vehicles and their future regulatory framework, both for freight and passengers, is another key

¹⁶ 15/07/2016: https://ec.europa.eu/energy/sites/ener/files/documents/ref2016_report_final-web.pdf p. 57

¹⁷ "Finally, this report has highlighted several gaps and shortcomings in rail market data which the Commission services plan to address in cooperation with various stakeholders. In particular by [...] conducting a new Eurobarometer survey on rail customer satisfaction" RMMS report December 2016, p.104: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0427&from=EN>

evolution that will inevitably disrupt our transport system. The private sector being the main driving force behind technological innovation, such trends are unlikely to develop as fast in the rail sector as in transport sectors like air or road. The liberalisation of passenger rail transport could however support technological uptake.

Eventually, most of the recent pieces of legislation or legislative proposals relevant to the freight and passenger transport sectors, are/will be driven by the goal of a **low carbon economy**, as the initiatives presented in the context of the "Europe on the Move" Packages show¹⁸. Most of these initiatives are impacting the road sector, but may also have a positive side-effect on rail, for instance:

- the revision of the Eurovignette directive¹⁹ which aims at internalising the road sector's external costs (congestion, noise, accidents...), thus supporting a shift from road to rail. The current Eurovignette only addresses HGV traffic. Its new version may be extended to coaches and private cars to take their CO₂ emissions into account. At least, that is the ambition of the Commission's proposal. Importantly, parts of the benefit from this new road charge should be earmarked to transport policy.
- In order to reap the maximum modal shift potential of the Eurovignette reform, the negotiations between the three EU institutions should lead to earmarking of revenues for rail investments or rail operational costs.

An uptake by public transport and cleaned vehicles will also be stimulated by:

- further liberalisation of the coach market²⁰, aims at stimulating the development of bus connections, offering alternative to the use of private cars and increasing the use of public transport modes;
- measures to support investment for the deployment of alternative fuels infrastructure such as electricity, natural gas and hydrogen²¹;
- revision of the Clean Vehicles Directive²² to boost public demand for this type of vehicles in the EU;

On a more local level, several cities are taking initiatives to prevent the most polluting vehicles to circulate or are applying a congestion charge as in London.

The market share of road transport should continue to increase in the coming years, mainly driven by technological innovation. As a result, there may be little room left for the rail sector, in particular cross-border rail services, to develop, unless its performance and attractiveness are improved, especially in comparison with road services. This approach was confirmed on 1st February 2018 by the Report of the *Conseil d'Orientation des Infrastructures* in France²³. Even if it focusses only on investments in France, it comes as a confirmation of a more general **trend to give up on imposed modal shift** and focus on the most efficient mode.

¹⁸ 1st Package presented by the European Commission on 31 May 2017: https://ec.europa.eu/transport/modes/road/news/2017-05-31-europe-on-the-move_en; 2nd Package presented by the European Commission on 8 November 2017: https://ec.europa.eu/transport/modes/road/news/2017-11-08-driving-clean-mobility_en

¹⁹ Proposal for a directive amending Directive 1999/62/EC [on the charging of heavy goods vehicles for the use of certain infrastructures](#), as well as [certain provisions on vehicle taxation](#)

²⁰ Proposal for a regulation amending Regulation (EC) No 1073/2009 on common rules for access to the international market for coach and bus services: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017PC0647>

²¹ Towards the broadest use of alternative fuels - an Action Plan on Alternative Fuels Infrastructure: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017DC0652>

²² Proposal for a Directive amending Directive 2009/33/EU on the promotion of clean and energy-efficient road transport vehicles: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017PC0653>

²³ https://www.ecologique-solidaire.gouv.fr/sites/default/files/2018.02.01_rapport_coi.pdf

b) Recent changes and regulatory trends in the rail sector

The European legislator has designed building blocks to improve cross-border connections in the EU and complete the Single European Rail Area. The EU regulatory framework focuses on three main areas: 1) opening the rail transport market to competition, 2) improving interoperability and safety, 3) developing rail transport infrastructure.

The “technical” pillar of **the 4th Railway Package** is in theory an important step in particular for cross border services²⁴.

It is meant to harmonise safety standards among Member States. For example, cross-border train services will no longer have to get safety authorisation from several national authorities as this can be centralized by the European Union Agency for Railways (EUAR). Besides, ERTMS is supposed to replace all national existing signalling systems - at some point in time. However, its deployment is also a synonym of high costs, deteriorating short term cost-efficiency of cross-border rail services. Council conclusions of 29 January²⁵ on ERTMS are partly useful in this regard as they acknowledge the need:

- to better target EU funding available for ERTMS projects: focus on cross-border sections and core network corridors when allocating trackside equipment;
- to adapt CEF funding procedures to better reflect the life-cycle of ERTMS projects.

Other technical measures covered by technical specifications for interoperability, which are regularly updated, contribute to fostering cross-border rail connections by improving the interoperability of the rail system in the EU. For instance: rules governing rail noise, operation, access to persons with reduced mobility, energy. However, also some of these measures come at high costs, especially where rail traffic is limited and cannot trigger a critical mass.

Similarly, the adoption of the “market” pillar of **the 4th Railway Package** in December 2016 will influence the way in which rail service contracts are organised, attributed and financed in the near future.

Examples of existing and upcoming rules that will impact cross-border services:

- Directive 2012/34²⁶ allows Member States to negotiate cross-border agreements in order to facilitate the provision of cross-border rail services. These agreements are subject to compliance checks by the European Commission. So far DG MOVE did not prevent any such agreement and would rather assist two Member States in increasing their exchanges.
- Regulation 2016/2338²⁷ on regional rail market opening:
 - allows the direct award of rail contracts under relatively generous conditions until 25 December 2023. Even after this date, competent authorities may be able to award contracts without tendering when they fulfil the conditions for application of one of the exemptions specified in Regulation (EC) No. 1370/2007 or on the ground of sufficient performance.

²⁴ The 4th Railway Package is a set of 6 legislative texts designed to complete the single market for Rail services (Single European Railway Area): https://ec.europa.eu/transport/modes/rail/packages/2013_en

²⁵ Council conclusions on European Court of Auditors' Special Report No 13/2017: "A single European rail traffic management system: will the political choice ever become reality?", 29/01/2018: <http://data.consilium.europa.eu/doc/document/ST-5584-2018-INIT/en/pdf>

²⁶ Directive 2012/34 establishing a single European railway area (recast), 21/11/2012: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0034>

²⁷ Regulation 2016/2338 amending Regulation (EC) No. 1370/2007 concerning the opening of the market for domestic passenger transport services by rail 14/12/2016: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R2338>

- clarifies, on the other hand, that Public Service Obligations can be defined at cross-border level. Its new article 1.2 reads as follows: Subject to agreement of the competent authorities of the Member States on whose territory the services are provided, public service obligations may concern public transport services at cross-border level, including those covering local and regional transport needs. The potential of such a provision will need to be tested against the reality on the ground.
- sets an obligation for competent authorities to publish an assessment whether non-discriminatory access to rail rolling stock (article 5a), is provided, for instance by foreseeing that two competent authorities can cooperate in order to create a larger pool of rolling stock.
- Under Directive 2016/2370²⁸, it remains important to ensure that the economic equilibrium of public service contracts is protected, if necessary by limiting the right of access to the market.
 - In practice, the operation of a cross-border rail service may be limited or prevented if a test run by the regulatory body reveals that the economic equilibrium of an existing public service contract is at risk.
 - However, this problem is less likely to arise for cross-border rail services than for purely domestic ones²⁹.
 - An implementing act, planned for adoption in June 2018, is currently being discussed.
- The recently adopted implementing act on access to service facilities³⁰ could also contribute to facilitating cross-border rail services. Indeed, it sets out basic rules concerning the “provisions on access rights, core procedural rules on handling of requests and requirements on publication of information apply to all service facilities”.
- The ongoing evaluation of the Train Drivers Directive may lead to updates in the coming years and could address operational barriers affecting cross-border services³¹.
 - Some stakeholders consider that the question of a common operational language should be within the scope of such revision.
 - It has been suggested that English should be the single operational language for international rail traffic³².

Also in relation to market opening, increased cooperation between DG MOVE and DG COMP in the rail sector³³, as well as the launch of infringement procedures regarding the transposition of Directive 2012/34³⁴ may lead to a better functioning of the market for cross-border services.

²⁸ Directive 2016/2370 amending Directive 2012/34/EU as regards the opening of the market for domestic passenger transport services by rail and the governance of the railway infrastructure, 14/12/2016: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L2370>

²⁹ ALLRAIL press release, “ALLRAIL urges Commission to challenge Slovakia Government to comply with 4th Railway Package and encourage Above Rail competition”, 14/09/2017: http://www.erfarail.eu/uploads/e170914_ALLRAIL_Press_Release_on_Slovak_EET_issue.pdf

³⁰ Commission Implementing Regulation 2017/2177 on access to service facilities and rail-related services, 22/11/2017: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.307.01.0001.01.ENG&toc=OJ:L:2017:307:TOC

³¹ Directive 2007/59 on the certification of train drivers operating locomotives and trains on the railway system in the Community, 23/10/2007: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0059>

³² ERFA input to the Evaluation of the Train Drivers’ Directive, 12/2016: http://www.erfarail.eu/uploads/ERFA_input_paper_on_Single_operational_language.pdf

³³ “The European Commission’s (EC) directorate generals for competition and transport have jointly carried out a screening of the bloc’s railway sector, an exercise that may lead to new antitrust as well as state aid investigations, PaRR has learned”, PaRR competition news and analysis, 30/08/2017; As a concrete output, on 23rd January, the Commission opened in-depth investigation into restructuring aid for Polish Regional Railways: http://europa.eu/rapid/press-release_IP-18-394_en.htm

³⁴ Letter of formal notice against Romania on 7th December 2017 in particular concerning a new international passenger service

Other rail regulations may similarly impact railway undertakings and their ability to operate cross-border rail services. The ongoing revision of the passenger rights Regulation³⁵ illustrates how rail regulation can be a double-edged sword. It can make rail transportation more attractive to clients, especially as the European Commission is proposing to remove existing exemptions from the application of this regulation to urban, suburban and regional services that operate across borders.

On the other hand, these types of regulatory adaptations can also mean extra-costs for railway undertakings which can act as a deterrent to launch new cross-border services.

This is one of the reasons for the Commission not to have proposed an obligation for railway undertakings to distribute through-tickets³⁶ that include passenger rights for all segments of a journey. Under the Commission recent proposal to revise the Rail passenger rights Regulation³⁷ could have been useful to promote cross-border rail traffic.

From a more general point of view, the ongoing process to **simplify TEN-T rules** could have a positive impact on cross-border activities and especially on the 24 of 48 potentially most beneficial projects which belong to the Core or the Comprehensive Network of TEN-T.

- The study on permitting and facilitating the preparation of TEN-T core network projects³⁸ identified public procurement and permitting procedures as major barriers for the implementation of TEN-T projects, cross-border projects in particular, and proposed several solutions to address this issue, including their simplification.
- The consultation on streamlining the implementation of TEN-T projects³⁹ aimed at gathering information to confirm, or not, the key issues identified, and solutions proposed in the above study. The results are not available yet.
- The European Commission plans to adopt an initiative by April/May 2018. It is not clear yet whether it should be legislative or not⁴⁰.

While well-intentioned by the European legislator, the potential of the new regulatory framework for cross-border railway services still needs to be tested against the reality on the ground.

c) Trends of European funding policy

Recent developments and experiences in European funding policy may also have a positive impact for the reestablishment of further cross-border rail connections:

- In October 2016, the European Commission launched a 100 million EUR call for proposals under the Connecting Europe Facility (CEF) to fund cross-border missing links. The investment budget was raised to 140 million EUR because of the expected impact of the selected projects, the high oversubscription rate and the high quality of proposals received by INEA. It was the first time that CEF funding was also granted to cross-border rail connections on the TEN-T Comprehensive network. For the improvement of cross-border rail transport, funding was granted

³⁵ Proposal for a Regulation on rail passengers' rights and obligations (recast), 29/09/2017: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2017:548:FIN>

³⁶ 'through-ticket' means a ticket or tickets representing a single transport contract for successive railway services operated by one or more railway undertakings

³⁷ https://ec.europa.eu/info/law/better-regulation/initiative/114577/attachment/090166e5b55d47d3_en

³⁸ DG MOVE report, 12/2016: <https://ec.europa.eu/transport/sites/transport/files/2016-12-permitting-facilitating-ten-t.pdf>

³⁹ Consultation launched from 01/08/2017 to 09/11/2017:

https://ec.europa.eu/transport/themes/infrastructure/consultations/2017-ten-t-implementation_en

⁴⁰ Inception impact assessment, "Streamlining the implementation of the Trans-European Transport Network (TEN-T)", 29/06/2017: http://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3272163_en and takeaways from workshop on efficient permitting for TEN-T projects, 17/10/2017

e.g. for the electrification of the Belgian part of ID 45 Mol [BE] - Roermond [NL] or for the rehabilitation (study) of ID 320 Zaragoza [ES] - Canfranc [ES] - Pau [FR] cross-border section.

- While this chapter draws conclusion that can apply to a vast majority of connections regarding global trends, this study also examines the potential for reforming Interreg regulatory framework. Indeed, Interreg can also play a role for (re)implementing cross-border rail services, especially on operational infrastructure (see Italian-Austrian "MI.CO.TRA" case in section 4.1). Friuli Venezia Giulia stated that it wants to adapt the "MI.CO.TRA" model also for a cross-border rail connection between Italy and Slovenia. Against this background, those potentially most beneficial projects where rail infrastructure is already operational were checked in terms of Interreg eligibility. It was shown that many Interreg programmes could enhance the (re)implementation of cross-border rail services on these connections, while some cannot in the current funding period. The full assessment is shown in Annex 10.

Recent developments and experiences of European funding policy seem to favour the (re)implementation of cross-border rail projects. However, it is not secured if this trend will continue, or if it will even gain more momentum, in the upcoming European funding period between 2021 and 2027. Moreover, even though Interreg programmes are well placed to address the transport needs of cross-border regions, they only have limited resources to bridge the "small-scale gaps".

d) Remaining challenges

Despite harmonisation and simplification efforts, barriers to cross-border projects will remain in the medium term. They can be classified under the following categories⁴¹:

- **Administrative and legal:**
 - different authorisation, concession and procurement rules in Member States;
 - difference in legislation such as the award of public service obligation contracts and the application of passenger rights.
- **Political:** unaligned political priorities (which is a key issue for the success of small cross-border projects).
- **Planning process** / low local acceptance levels (e.g. whether local citizens support the project or not).
- **Technical:** implementation of harmonised technical rules still lacking, leading to different standards applicable to rail lines and rolling stock.
- **Operational:** different languages, heterogeneous performances of services on two sides of the border, various approaches to infrastructure charging, difficulties with cross-border ticketing and access to service facilities.

4.3 Conclusions and policy recommendations

4.3.1 Findings

Findings linked to the role of EU funding policies

F1: Attention has been given to the question of missing transport links at the EU level but this is not shared by all Member States

- **November 2015:** project "Mind the Gap!" led by the Greens/EFA political group in the European Parliament, at the initiative of Michael Cramer (Member of the

⁴¹ Commission staff working document accompanying the 5th report on monitoring developments of the rail market: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0427&from=EN>

Transport and Tourism committee of the European Parliament), identifying 15 missing links that are worth investing in⁴².

- **February 2016:** European Commission (DG MOVE) study on the “State of play of cross border railway sections in Europe” scrutinizing the 98 projects identified as missing links via the initiative of Michael Cramer⁴³.
- **February 2017:** opinion of the Committee of the Regions “Missing transport links in border regions”⁴⁴ making useful recommendations on the funding, implementation and governance of cross-border projects.
- **25 July 2017:** for the first time, support for small cross-border infrastructure projects on the TEN-T comprehensive and core network (in addition to pre-identified projects on the core network in the transport sector in annex I of CEF Regulation⁴⁵) is being granted through CEF⁴⁶.
 - The call was oversubscribed and the demand, quality and the expected impact of the selected projects led the Commission to increase the original envelope by € 40 million.
 - These results can be analysed as positive signs in favour of greater budgets dedicated to such projects in the current and upcoming funding period.
 - This was also the result of good inter-institutional cooperation.

Findings linked to the role of the competent authorities

F2: Gaps in the passenger train network are often not the result of missing or unserviceable infrastructure. In many cases, even on main lines, there are severe shortcomings concerning the passenger train service.

As the study revealed, more than half of all the cross-border rail connections are operational, while 72% of operational lines have an inadequate service level for the type of route concerned.

In recent years there has been a considerable reduction in long-distance international passenger trains, especially at the Pan-European level (serving more than two countries), only partly compensated by international partially-interoperable high-speed trains typically running over shorter distances. Regional services have also been suspended as a result of changes to PSOs by competent authorities. Common to almost all the links that have lost services is their short-term unattractiveness to commercial operators without revenue support: it is therefore imperative that competent authorities commit to providing financial support for the vast majority of cross-border services.

The following are just two examples of small gaps in the passenger network that could be filled immediately given the will of the competent authorities to cover the marginal costs:

- Erquelines [BE] – Jeumont [FR] (2 km); and
- Beli Manastir [HR] – Magyarbóly [HU] (11 km).

A related issue is the lack of through services at some border crossings, forcing passengers to change trains and thus significantly reducing the attractiveness of the offer. Typically this is caused by the replacement of rolling stock that could operate in both countries with vehicles of limited interoperability and/or subject to operational restrictions as a condition of co-financing. Examples include:

⁴² « Mind the gap ! » project, 15 railway projects for a better connected Europe, November 2015: http://www.michael-cramer.eu/fileadmin/documents/Publikationen/MissingLink_EN_Plakat_2015_www.pdf

⁴³ Not available online.

⁴⁴ European Committee of the Regions opinion “missing transport links in border regions”, 02/2017: <http://cor.europa.eu/en/activities/opinions/pages/opinion-fact-sheet.aspx?OpinionNumber=CDR%204294/2016>

⁴⁵ CEF Regulation 1316/2013: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R1316>

⁴⁶ Selection Decision of the 2016 calls for proposals under the Annual Work Programme : <https://ec.europa.eu/transport/sites/transport/files/c2017-5080-annex.pdf> and <https://ec.europa.eu/transport/sites/transport/files/c2017-5080.pdf>

- České Budějovice – České Velenice [CZ] – Gmünd NÖ [AT] – Vienna: new multiple unit trains on each side lack type authorisation for the other country;
- Wrocław – Kłodzko [PL] – Lichkov [CZ] – Pardubice – Prague: new multiple unit trains in Poland currently without type authorisation for the Czech Republic.

F3: Most passenger train services in the EU (83%) are organised on the basis of PSO contracts. This fact also applies to many of the cross-border rail connections that the study has analysed.

Of the shortlisted routes analysed in this study, most would require revenue support for the proposed train service on at least one side of the border, in the assumption that amortised rolling stock were already available. Subsidies would be greater if at a future time rolling stock procurement and leasing costs are taken into account.

F4: A number of regional cross-border connections have been reopened or inaugurated in recent years thanks to the commitment of competent authorities

Numerous routes have had their passenger services restored in recent years thanks to the commitment of regional and/or national stakeholders.

Lines such as Wissembourg [FR] – Winden [DE] (reopened in 1997) or Szklarska Poręba [PL] – Harrachov [CZ] (2010) would not have been reactivated without the financial support of the competent authorities involved. In addition, one entirely new cross-border rail connection opened to regional passenger train services in January 2018: Stabio [CH] – Arcisate [IT].

All these cases are operated under PSO and are dependent on revenue subsidies. The line Badajoz [ES] – Elvas [PT] was the subject of political intervention at the national level in Portugal in 2016, following several years of start-stop financing and consequent breaks in the passenger service. This led to the reinstatement of a limited service in August 2017.

Nevertheless, on a number of new or modernised cross-border railway links only very few passenger trains are operated.

F5: Interreg funding has enabled the competent authorities to subsidise a service during the start-up phase.

In 2012 the Autonomous Region of Friuli Venezia Giulia [IT] in collaboration with the Land Carinthia [AT] launched a cross-border passenger rail connection between Udine [IT] and Villach [AT] in the frame of the Interreg IV A project “MI.CO.TRA”. The project included, as a pilot initiative, the reactivation of the route⁴⁷. Impressive passenger numbers demonstrated the project’s success and its sustainability, thus it was extended beyond the planned end date of June 2013.

Service improvements for the 2018 annual timetable between Bleiburg [AT] and Maribor [SI] will also be implemented and evaluated by a cross-border initiative to improve regional transport within the Interreg-Central Europe project “TRANS-BORDERS”.

F6: From most of the competent authorities contacted during the study no positive feedback on cross-border connections on their territory has been received

As some of them did not even reply, it might be helpful to support decision-making processes (see related governance recommendation).

Findings linked to rolling stock

F7: Locomotive-hauled trains have been widely replaced by multiple unit train sets. This mode of operation has increased the costs of interoperability.

⁴⁷ <http://www.regione.fvg.it/rafvfg/cms/RAFVG/infrastrutture-lavori-pubblici/infrastrutture-logistica-trasporti/FOGLIA21/>

Since the 1920s, international agreements on the mutual use of passenger coaches ("Regolamento Internazionale delle Carrozze", RIC) have eased train operations throughout Europe. Only locomotives had to be changed at the borders, thus the question of interoperability was limited to the locomotives.

Following the general trend away from locomotive-operated trains involving locomotive changes at the border in favour of tailor-made multiple units, it has become necessary to equip rolling stock for operation under all the overhead electrification systems and train safety systems encountered on the routes of operation. In turn this had led to significant increases in the cost of rolling stock procurement and operation, offset only by reduced personnel requirements where extra staff would otherwise be employed specifically to attach/detach locomotives.

F8: Interoperable train sets are more costly than non-interoperable train sets

Taking the example of a 5-car Stadler Flirt3 EMU, the extra costs for dual-voltage and triple-voltage capability are ca. € 1 million and €2 million respectively. The cost of retrofitting a 3-car German DMU with the Polish automatic safety system SHP has been estimated at €275 000 – €450 000 per train set for prototypes and €75 000 – €90 000 for serial installation.⁴⁸

The issue is not just limited to train safety systems which might be solved one day thanks to ERTMS: it will remain for multiple-voltage equipment due to different power supply systems in the Member States.

F9: Thanks to newly acquired rolling stock equipped to operate in both countries some rail connections have been reactivated in recent years

The two findings above discuss the negative impact that bespoke rolling stock can have on cross-border passenger services. However, there are some positive examples where new, high-frequency services have been introduced thanks to investment in new, interoperable fleets, albeit involving significant additional costs. One example is the Düsseldorf – Emmerich [DE] – Arnhem [NL] route with hourly PSO regional services launched in April 2017, requiring specially-procured vehicles for three electrification and three train safety systems.

A lack of investment in new rolling stock on the other hand can lead to the requirement for passengers to change trains at the border station or even to gaps in the passenger network.

Findings linked to rail infrastructure

F10: On several cross-border routes the offer is inadequate because the responsible authorities have not agreed on improving infrastructure to enable delivery of better services

In some cases an attractive service cannot be provided without infrastructure enhancements to raise line speeds and/or increase capacity and/or attract long-distance services. Examples include:

- a missing second track and electrification of the Angermünde – Tantow [DE] – Szczecin [PL] line (ID 83)⁴⁹; and
- the upgrade of the Zittau [DE] – Hrádek nad Nisou [CZ] line (ID 90) in transit through Poland from 40 km/h to at least 80 km/h to enable the implementation of a new service concept;

⁴⁸ Cross-border rail cars between Poland and Germany: Core Output, INTER-Regio-Rail Project, Removing barriers to regional rail transport:
http://www.central2013.eu/fileadmin/user_upload/Downloads/outputlib/InterRegioRail_3.2.8_3.2.9_Cross-border_railcars.pdf

⁴⁹ During the finalisation of the study, there were ongoing discussion of upgrading this line:
<https://www.rbb24.de/wirtschaft/beitrag/2018/02/woidke-fordert-zweigleisigen-bahnausbau-berlin-stettin.html>

This issue is not limited to cross-border sections: many routes are unattractive to potential passengers and/or operators because feeder lines are subject to severe speed restrictions owing to the poor condition of the infrastructure. Examples include:

- Craiova [RO] – Golenti [RO] leading to the “New Europe Bridge” (formerly “Danube Bridge 2”); and
- Rail Baltica between Białystok [PL] and Suwałki [PL].

F11: Administrative obstacles and technical codes of infrastructure managers or Member States in some cases make cross-border transport more expensive and complicated

National rules often do not ease cross-border rail transport, sometimes they actually create new obstacles.

In the context of the French tax reform in 2010, the national incumbent SNCF was exempted from business taxation, but at the same time a flat tax (“IFER”) on rolling stock was introduced, to be paid by all railway undertakings, including those of neighbouring countries. Exemptions for cross-border services, where foreign RUs run into France, were only introduced after protests from German competent authorities.

For ID 45 Hamont [BE] - Weert [NL] the Dutch infrastructure manager requires a switch of the electrical supply system on the border as rules do not allow the Belgian system on the territory of the Netherlands. This also happened when the traction supply system on the Dutch Betuweroute was extended to Germany in 2015. The extension of the German system into the Netherlands would have been more reasonable. Instead, trains running on ID 62 Emmerich [DE] - Zevenaar [NL] - Arnhem [NL] now require equipment to run under three electrical supply systems. However, pragmatic solutions were formerly permitted, as demonstrated by ID 58 Kaldenkirchen [DE] - Venlo [NL], which is entirely electrified with the German system, including parts of Venlo station itself.

In other cases historic rules are a problem: on route ID 323 Port-Bou [ES] - Cerbère [FR] on the Spanish-French border, an outdated border arrangement leads to the situation that many cross-border trains are not usable by passengers, because trains have to return empty to their country of origin.

F12: In some cases cross border services pay higher track access charges than domestic services

Some Infrastructure Managers have differentiated track access charges and/or station usage fees for cross-border and domestic train services. For example the network statements of RFI [IT] and ADIF [ES] contain higher charges for international trains than for domestic traffic. These adversely affect the economic viability of cross-border services.

Other findings

F13: The situation on cross-border rail connections is constantly changing

The present study gives a picture of the situation in the annual timetable of 2017. However, recent developments show that the picture is constantly changing. New cross-border services have been introduced in the 2018 timetable on ID 243 Kurcums [LV] - Turmantas [LT] and ID 276 Rusovce [SK] - Rajka [HU]. On the other hand, there have also been deteriorations such as the loss of the long distance night train services Berlin [DE] - Vienna [AT] / Budapest [HU] in December 2017. Furthermore, the Greens/EFA’s “Mind the Gap!” list of 2015 is no longer up-to-date due to recent developments (e.g. new services on ID 112 Selb-Plößberg [DE] - Aš [CZ]).

F14: Data availability hinders a top-down approach

The non-availability of data for the study’s transport model was a significant challenge. This can be traced to differing statistical data collection methodologies in the Member States and variations with regard to the inclusion or exclusion of different types of passenger train and bus traffic.

The lack of reliable data on European cross-border transport posed a huge challenge for the assessment of both the current situation and future demand potential.

“Such data could be used in economic and financial assessments of cross-border transport needs”⁵⁰ but their unavailability at the European level means that top-down approaches cannot adequately represent the situation at the regional level.

For interventions at the regional level, taking into account specific local and regional situations and needs, a bottom-up approach is generally preferable.

4.3.2 Recommendations

Strategic recommendations:

R1: The implementation of a stable long-term planning and financing framework for “small-scale” cross-border railway projects is needed.

Such a long-term framework should be based on a “bottom-up” approach where Member States or their regional stakeholders can submit their current cross-border projects to calls for projects.

Until now there has only been a long-term framework for the TEN-T Core and Comprehensive Network cross-border connections, but most “small-scale” cross-border projects are outside of these networks. The latter could be part of national or regional Transport Plans in order to qualify⁵¹.

R2: Regular reports should be produced by local staff members of the Committee of the Regions and the European Parliament regarding the development of cross-border missing links.

Such a bottom-up approach is currently severely lacking. Using the knowledge from local staff could be useful, in particular to disseminate best practices.

R3: Transport data should be gathered much more carefully by Eurostat in order to be useful for European transport modelling. Data on cross-border rail traffic should be included in the next revision of the regulation on rail transport statistics.

Transport modelling requires accurate data. The model developed as part of this study encountered severe limits because data on some modes of transport - notably for bus and rail - were either inconsistent or incomplete. In order to identify whether investment in small-scale cross border projects is justified, sufficient data availability is an essential prerequisite.

The study therefore proposes that the regulation should be amended following the approach of the European Parliament, which, in the context of the ongoing revision of this regulation, has pushed for Eurostat to provide statistics on cross-border traffic⁵².

Furthermore, the lack of sufficient data is not an issue specific to cross-border projects but rather relates to transport infrastructure in general. Indeed, the 2016 Rail Market Monitoring Scheme recommended to enhance “data availability on the state of infrastructure and its capabilities”.

⁵⁰ New ways of financing transport infrastructure projects in Europe, European Parliamentary Research Service (2018), page 10.

⁵¹ As set out in Annex XI of Regulation 1303/2013, and elaborated in the EU Guidance on Ex Ante Conditionality: Part II, the Transport Ex-Ante Conditionality in fact is considered to be fulfilled when it achieves the following outcomes:

- Existence of a Comprehensive Transport Plan for transport investment in various modes;
- The Plan complies with legal requirements for Strategic Environmental Assessment;
- The Plan sets out the contribution to the Single European transport Area;
- A realistic and mature pipeline of projects for which support from the Cohesion Fund and ERDF is envisaged;
- Measures to ensure the capacity of intermediate bodies and beneficiaries.

⁵² <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+REPORT+A8-2016-0300+0+DOC+XML+V0//EN>

Budget-related recommendations

R4: Funding for cross-border infrastructure projects should also be available for lines that are not part of the Core and the Comprehensive network of TEN-T.

The study revealed that that many possible cross-border rail connections are outside of the TEN-T network. The aforementioned long-term framework for "small-scale" cross-border railway projects should enable their consistent funding. Against this background targeted calls with an increased budget should be dedicated to cross-border "small-scale" projects in the future. In order to consider the current needs of cross-border transport, the framework should be revised regularly respecting the existing EU funding periods.⁵³

R5: For the opening or reopening of a new railway line in many cases the full passenger potential is only addressed after a start-up phase of several years. Seed funding can help operators or competent authorities to launch such services.

According to the experiences of competent authorities and railway undertakings there is a typical delay of up to several years for the full passenger demand of new transport offers to develop⁵⁴. The reason for this is that the information about the new offer needs to be communicated, its benefits have to be understood by the potential passengers, and the latter have to change their mobility behaviour - which takes time.

Accordingly during the start-up phase of new offers the fare revenues are often below the medium term estimates, and additional subsidies are needed to cover the operating costs. For this reason the MI.CO.TRA project (see above) provided start-up funds for the reopening of the Udine-Villach line.

The award of such seed funding of course has to be in line with the Fourth Railway Package and State Aid rules.

R6: The authors emphasise: Funding for rolling stock used on cross-border railway connections could help revive cross-border services, either by reducing the amount of subsidies necessary to operate the services - or by enabling the services to be run in "open access" mode.

This recommendation is based on the common experience that no passenger rail services are offered if neither an open access service is economically viable, nor the competent authorities in charge have sufficient budget at their disposal to subsidise the services. For this reason it is desirable to bring down operating costs under the control of authorities.

The authors of this study therefore propose funding for rolling stock for use on selected cross-border lines. This would of course have to be in line with the Fourth Railway Package and State Aid rules (i.e. the services have to be competitively awarded). This would be expected to facilitate additional services under PSO or in open access mode.

In order to avoid confusion it needs to be clarified that rolling stock funding is not to be awarded to railway undertakings, as this would distort the market during a subsequent competitive award of services. Public funding should instead be used to establish rolling stock pools to be managed by public bodies.

It is vital that the relevant stakeholders cooperate to ensure sufficient interoperability and willingness to physically and contractually enable the use of rolling stock in neighbouring countries.

R7: Make better use of opportunities provided by existing Interreg A, which can play an important coordination role and help solve cross-border mobility challenges.

⁵³ See Study of the European Parliamentary research Service : [New ways of financing transport infrastructure projects in Europe](#) , February 2018

⁵⁴ Allianz pro Schiene, Stadt, Land, Bahn, Berlin 2008 / 2010.

Interreg is not subject to restrictions on the use of funds for small cross-border connections, unlike CEF or ERDF national and regional OPs. It is therefore to be explored as a means to address operational challenges on these connections. Many relevant Interreg programmes identified were identified by the study (see Annex 10).

R8: Enable small-scale infrastructure to be funded as part of cross-border cooperation programmes (Interreg A) by means of budget increases.

- a. The underlying reason is that there is no requirement in Interreg A that projects must be linked to TEN-T (located on the TEN-T or secondary connectivity⁵⁵) to be eligible for co-funding.
- b. Such programmes focus on cross-border aspects.
- c. To make sure that the money is properly invested, this increased budget should be coupled with measures to **convince Member States** to invest in cross-border projects, rather than focusing on purely national priorities. This is a key challenge.
- d. Further **“regionalisation”** of transport budgets to put focus on local needs. To maximise the impact of such measures on cross-border rail projects, earmarking of money to rail cross-border projects may be needed.

Recommendations to address operational issues

R9: The position of the system interchange point between the railway systems of Member States should be specified according to the characteristics of each border crossing and its traffic flows.

As well as measures to increase interoperability, the reasonable locations of system changeover points can also contribute significantly to smoothing cross-border rail operations. From the stakeholder consultation within this study it became clear that there are examples of system interchange points (signalling, electrification) that do not favour cross-border transport. For instance, if a transport node is located close to the border, but the interchange point is installed on the border itself, the border section cannot be served by less expensive single-system rolling stock. In these cases a positioning of the system interchange point in one of the transport nodes close to the border would be to be more favourable.

As a result, no one-size-fits-all decision should be taken by infrastructure managers. Instead, the interchange point should be placed according to the needs of cross-border transport. This issue is also tackled by the Committee of the Region’s proposal to allow the application of one country's infrastructure rules in the neighbouring region of another country.⁵⁶

Recommendations to ease governance/cooperation aspects

R10: The authors emphasise the creation of a dedicated coordinator for small cross-border projects beyond the TEN-T network.

When political backing is lacking, the coordinator’s role should assist in working with local authorities on the ground to ease the decision process on small cross-border projects that show potential.

The interventions of European Coordinators have so far proven to be cost-effective and beneficial for the implementation of TEN-T corridor projects (e.g. the Rail Baltica project). We strongly believe that the work of a dedicated coordinator for small scale cross-border projects could be helpful for the promotion of such projects. Such an approach will also help gather quality data on projects located outside TEN-T. A dedicated coordinator could

⁵⁵ “There is no legal definition of “Secondary connectivity” in the EU legislation. However, this should be interpreted in the light of Article 5(7)(b) of the ERDF Regulation as connections to the TEN-T infrastructure.”, *FAQ on ex ante conditionalities relating to transport*:

⁵⁶ http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/6_faq_transport.pdf
<http://cor.europa.eu/en/news/Pages/More-investment-in-missing-links-can-transform-border-regions-in-smart-growth-hubs.aspx>

also give support to assess compliance with public procurement rules for smaller cross-border projects, not only for large ones.

R11: The competence of local, regional and central administrations of the framework for project preparation and implementation should be improved.

An improved understanding of the existing legal framework for project preparation and implementation should help:

- to assist project promoters, by creating a network of entities capable of providing technical assistance. This is essential to enhance the quality of projects and therefore encourage investment;
- to foster a greater involvement of the public.

Training sessions for those administrations could be made available. JASPERS-like assistance could be used not only for major projects. Such training could ensure that applicants do not disregard funding opportunities out of ignorance or limited knowledge, taking into account the high need for funding of cross-border projects. The need to improve technical assistance is highlighted in relevant literature, but also shown in the poor feedback received from some European countries during the stakeholder consultation of this study.

R12: In order to ensure that cross-border projects are accepted at the local level and receive sufficient political backing, citizens should be involved at an early stage.

Infrastructure projects often receive strong criticism from local residents or even the wider public. While the former are mostly concerned by negative impacts on their personal environment, the latter can also oppose such use of public money.

As at the same time the expectations of citizens in terms of public participation are rising, the authors of this study highly recommend involving citizens at an early stage.

The Progress report on making the best use of new financial schemes for European transport infrastructure projects explains that “public acceptance of infrastructure projects should be given special attention”.

R13: Cooperation structures should be set up and used to support implementation of cross-border projects.

In September 2017 the Commission launched the “Border Focal Point” to unlock the full economic potential of EU border regions. This is a good idea as long as it:

- addresses border obstacles in a holistic way (economic, technical, administrative); and
- benefits from sufficient resources and expertise.

The contribution to public transport systems in border regions has been pointed out as one key issue of the “Border Focal Point”⁵⁷. Hence, the Border Focal Point could also establish a “best practice database” with examples on how to overcome barriers to cross-border rail services.

The potential of the European Grouping of Territorial Cooperation (EGTC) and the European Economic Interest Group (EEIG) could be further used to strengthen cooperation with regard to cross-border rail services. (See also the table comparing cooperation tools in Annex 11). This idea is supported by the Luxembourg proposal for European cross-border conventions⁵⁸.

⁵⁷ http://europa.eu/rapid/press-release_IP-17-3270_en.htm

⁵⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015IR4286>

R14: The authors emphasise the devotion of sufficient resources to the European Union Agency for Railways (ERA) for assisting project promoters of small cross-border connections

The technical pillar of the Fourth Railway Package grants ERA sufficient powers to assist cross-border service promoters at the levels of infrastructure or rolling stock for safety and interoperability matters. However, resources might prove to be limited considering the amount of additional work that will be taken over from National Safety Authorities.

ERA has already made several public statements related to the mismatch between its goals and resources. Dedicated resources should therefore be earmarked for cross-border projects.

Recommendations to improve the attractiveness of cross-border rail transport

R15: Make information on cross-border rail connections available to potential passengers

It might appear obvious that timetables and tariff information on cross-border connections must be made available to inform passengers of their existence and encourage the use of cross-border passenger train services, but many European railway undertakings have in fact reduced such information. In comparison with other means of transport rail travel across borders has become more difficult, not less. A centrally coordinated timetable database ostensibly exists in the form of the UIC MERITS system, but the information it contains is not centrally published, leading to different levels of information provision between Member States, which in turn hinders cross-border trip planning.

Although the efforts of the Committee of the Regions on integrated cross-border timetabling issues⁵⁹ are to be welcomed, a prerequisite is that timetable information provision should also be integrated right across Europe.

The authors of this study therefore recommend that the relevant obligations in Regulation (EC) 1371/2007 referring to passenger information and through ticketing are tightened to ensure that all timetable and ticketing information is easily available to all potential passengers.

R16: "Quick wins" should be realised wherever possible

On a number of cross-border connections trains could easily be operated without costly upgrades of the infrastructure. In many cases existing rolling stock could be used to run across the border, and European added value be harvested at low marginal cost. Thus existing resources can be better used, leading to a boost of regional connectivity. "Quick wins" are also to be realised where defunct rules are still in place (e.g. Cerbère-Port Bou cross-border connection).

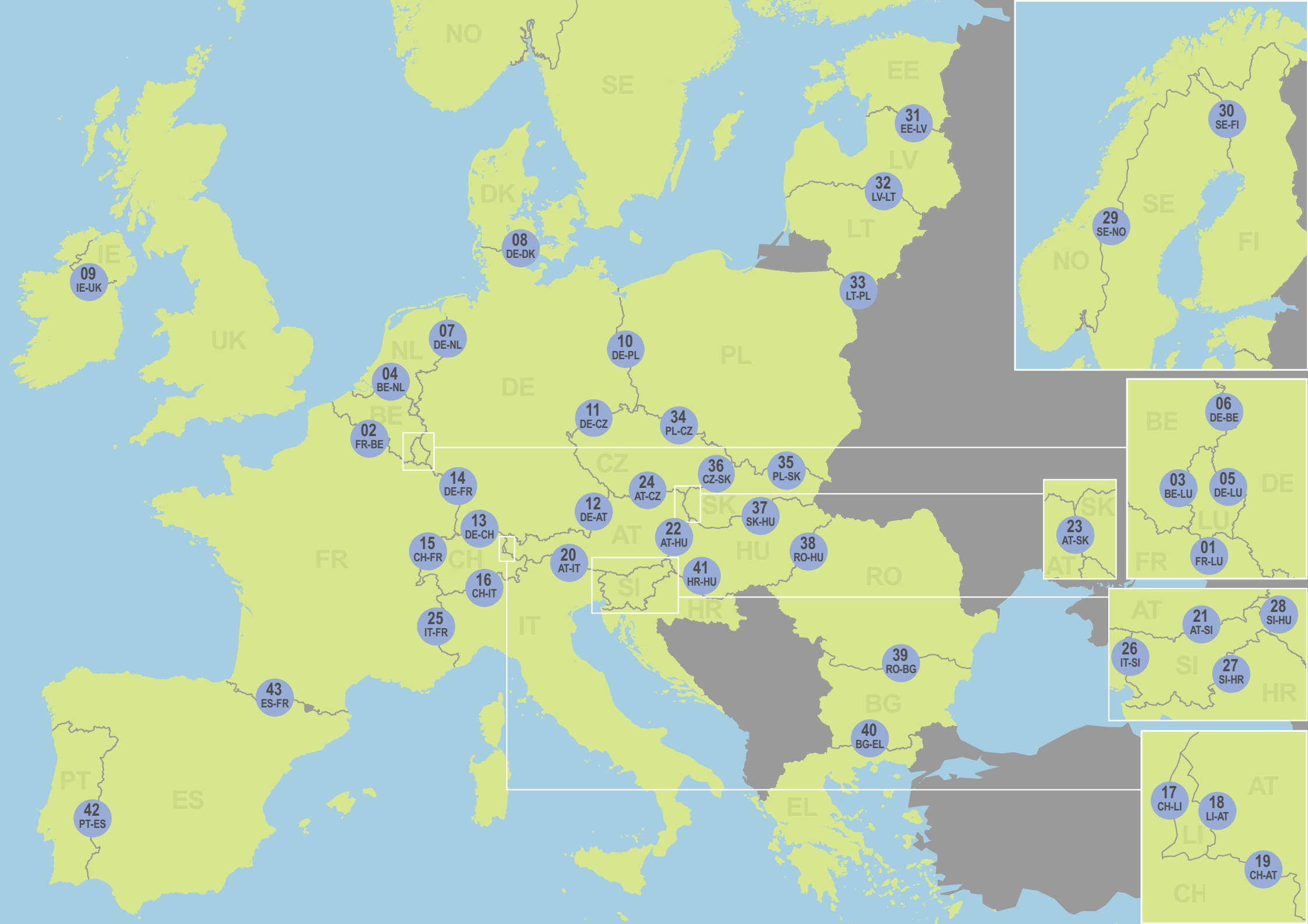
Recommendation for being up-to-date

R17: "Nothing is carved in stone": Monitoring of the cross-border rail connections is necessary in order to stay up-to-date

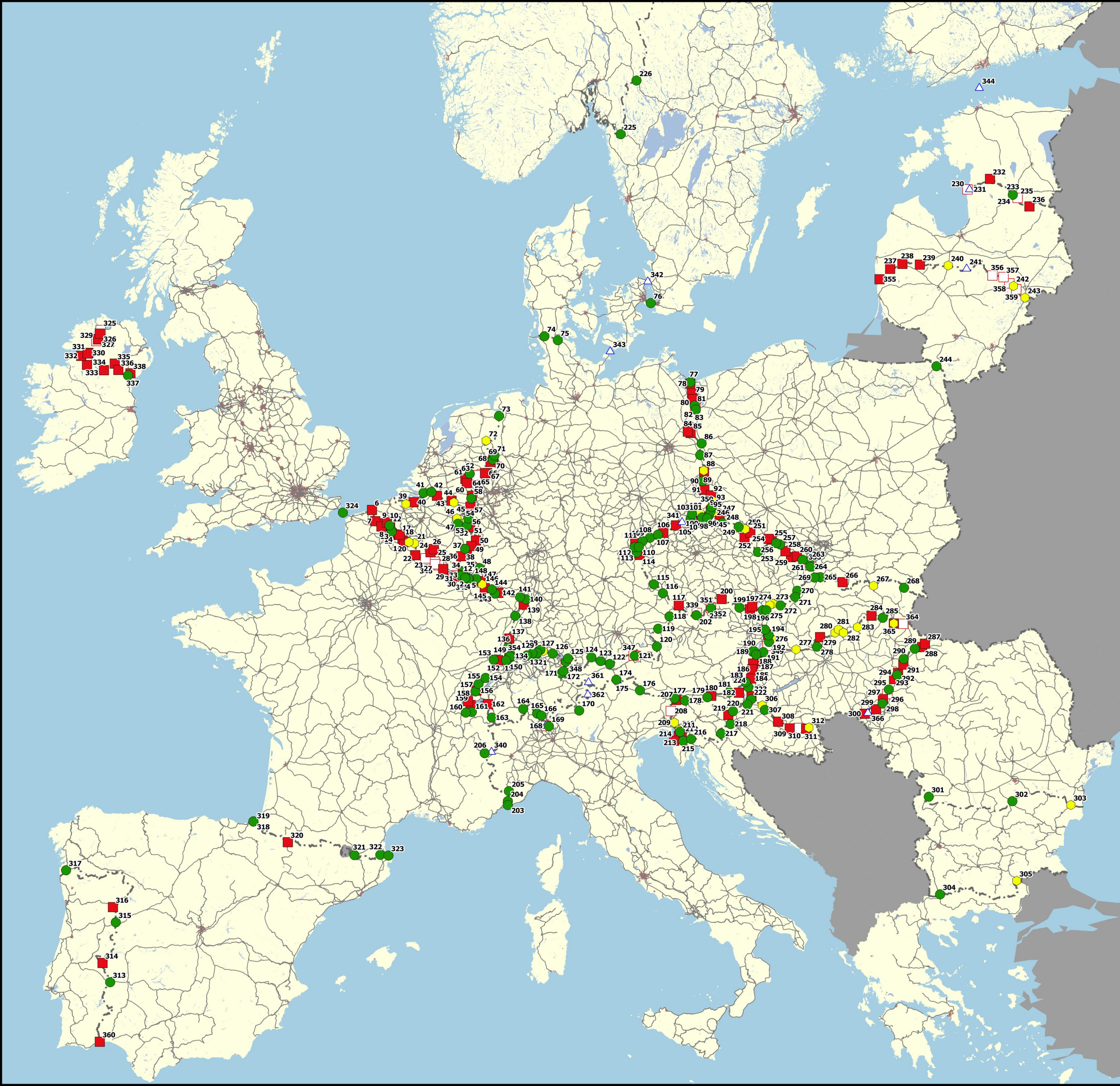
The situation of the cross-border rail connections is constantly changing. This study has been elaborated on the basis of the 2017 timetable, but a number of changes were introduced in the 2018 timetable, and many more will follow in the coming years. In order to avoid the study's inventory becoming obsolete and to track the success of the implementation of the recommendations, a regular update of the dataset of cross-border railway connections is strongly recommended.

⁵⁹ <http://cor.europa.eu/en/news/Pages/More-investment-in-missing-links-can-transform-border-regions-in-smart-growth-hubs.aspx>

ANNEX 1: MAP OF THE LAND BORDER SECTIONS IN THE SCOPE OF THE STUDY



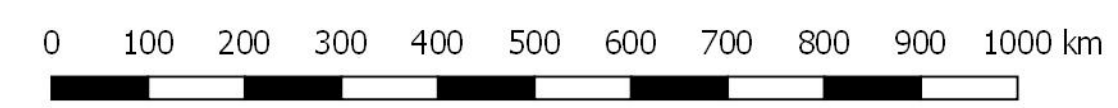
ANNEX 2: SPATIAL INVENTORY OF ALL IDENTIFIED CROSS-BORDER RAIL CONNECTIONS



Overview of all identified cross-border rail connections

LEGEND

- Cross-border railway connections [assessment according to annual timetable 2017]
- Operational link: regular passenger services
 - Operational link: only freight or touristic services
 - Non-operational (historic) link
 - Redundant historic link for public rail transport
 - △ Proposed or projected new infrastructure link



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Annex 4: Regional filter threshold values for each border section

Border section	Threshold value for new infrastructure	Threshold value for all other lines	Border section	Threshold value for new infrastructure	Threshold value for all other lines
AT/HU	500	451	EE/LV	500	100
AT/IT	573	573	ES/PT	500	100
AT/LI	500	231	FR/BE	946	946
AT/SK	636	636	FR/CH	1000	1000
AT/SI	500	100	FR/DE	915	915
AT/CH	941	941	FR/IT	607	607
BE/LU	775	775	FR/LU	1000	1000
BE/NL	773	773	FR/ES	980	980
BG/EL	500	107	HU/HR	500	166
CH/IT	874	874	HU/RO	500	100
CH/LI	500	231	IT/SI	500	217
CZ/AT	500	165	LV/LT	500	100
CZ/SK	500	140	PL/CZ	500	219
DE/AT	750	750	PL/LT	500	100
DE/BE	630	630	PL/SK	500	156
DE/CH	1000	1000	RO/BG	500	100
DE/CZ	530	530	SE/FI	500	100
DE/DK	500	355	SE/NO	500	100
DE/LU	653	653	SI/HR	500	100
DE/NL	1000	1000	SI/HU	500	100
E/PL	515	515	SK/HU	500	253
DK/SE	845	845	UK/IE	1000	1000

ANNEX 7: SHORTLIST OF PROJECTS EXAMINED IN DETAIL

Shortlist of projects examined in detail in Task 3

Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders

ID	Name of the rail connection	TEN-T: Corridor/ Core Network or Comprehensive Network	Classification according to 2017 timetable	Importance for the border region	Importance for the countries concerned	Importance on TEN-T level	NUTS3 in country A	NUTS3 in country B	Estimated infrastructure investment required	Estimated annual subsidies country A	Estimated annual subsidies country B	Estimated annual subsidies in both countries	Stakeholders' assessment of study proposals	Possible public transport alternative
7	Hazebrouck [FR] - Poperinge [BE]	-	Entirely missing: dismantled	Medium	No	No	FRE11	BE258	186 000 000 €	110 000 €	360 000 €	470 000 €	Negative. Belgian and French sides see low or no potential	New bus services (ca. 24km, 40min) linking Hazebrouck [FR] and Poperinge [BE]
8	Armentières [FR] - Comines/Komen [BE] (- Kortrijk [BE])	-	Entirely missing: dismantled	Medium	No	No	FRE11	BE324	178 000 000 €	-120 000 €	-620 000 €	-740 000 €	Negative. Belgium considers this line as a very poor case	See ID 9
9	(Lille Flandres [FR] -) Comines(France) - Comines/Komen [BE]	-	Entirely missing: dismantled	Medium	No	No	FRE11	BE324	28 000 000 €	-2 870 000 €	50 000 €	-2 830 000 €	Negative. France: estimated number of daily passengers seems to be exaggerated	New bus services (ca. 2km, 8min) linking Comines(France) and Comines/Komen [BE]
16	(Valenciennes [FR] -) St-Amand-les-Eaux [FR] - Antoing [BE] (- Tournai [BE])	-	Entirely missing: dismantled	Medium	No	No	FRE11	BE327	99 000 000 €	-1 040 000 €	-50 000 €	-1 090 000 €	Negative. Belgium: poor cost-to-potential ratio	New bus services (ca. 21km, 40min) linking Orchies [FR] and Tournai [BE]
19	(Le Quesnoy [FR] -) Bettrechies-Bellignies [FR] St. Ghislain [BE] (- Mons [BE])	-	Entirely missing: dismantled	Medium	No	No	FRE11	BE323	83 000 000 €	-120 000 €	630 000 €	510 000 €	Negative. Belgium: poor cost-to-potential ratio	Reactivation of passenger services on ID 18 Valenciennes [FR] - Mons [BE] preferred by Belgian side
20	Maubeuge [FR] - Quévy [BE] (- Mons [BE])	Comprehensive Network	Freight only	Medium	Low	Low	FRE11	BE323	0 €	-250 000 €	60 000 €	-190 000 €	Negative. Belgium: poor cost-to-potential ratio	Railway is operational and thus passenger trains could be operated with relative ease if potential meets authorities' expectations
39	(Gent [BE] -) Wondelgem [BE] - Terneuzen [NL]	Comprehensive Network	Freight only	Medium	No	Low	BE233	NL341	5 100 000 €	1 820 000 €	30 000 €	1 850 000 €	Cautious. Both sides referred to ongoing CEF study chapter "Study on the possibility of passenger transport by rail"	Enhanced existing bus services between Gent and Terneuzen
40	Sint-Niklaas [BE] - Terneuzen [NL]	-	Entirely missing: dismantled	Medium	No	No	BE236	NL341	348 000 000 €	250 000 €	-310 000 €	-60 000 €	Negative [BE] to Cautious [NL]. While the Belgian side sees passenger trains on Gent - Terneuzen line as a more realistic proposition, the Dutch side sees perspectives for this line, but studies have not been conducted	Existing, well-coordinated bus services between Sint-Niklaas, Hulst and Terneuzen
43	(Antwerpen [BE] -) Turnhout [BE] - Tilburg [NL]	-	Entirely missing: dismantled	Medium	No	No	BE213	NL412	373 000 000 €	400 000 €	-1 140 000 €	-740 000 €	Cautious. Belgian side sees a degree of potential, Dutch side has not previously considered the route for reactivation	Existing frequent bus services between Turnhout and Tilburg; rail services between Antwerpen and Tilburg (with interchange in Breda) expected to be accelerated by ca. 20 minutes from April 2018
44	(Hasselt [BE] -) Heerpelt [BE] - Achel [BE] - Borkel en Schaft [NL] - Eindhoven [NL]	-	Entirely missing: dismantled	Medium	No	No	BE222	NL414	209 000 000 €	800 000 €	-1 090 000 €	-290 000 €	Cautious [BE] to negative [NL]. Dutch side prefers improved bus services via motorway	Improvements to existing bus services to reduce interchanges (already under consideration according to Dutch side)
45	Mol [BE] - Roermond [NL]	Comprehensive Network	Freight only	Medium	High	Low	BE222	NL414	0 €	20 000 €	-540 000 €	-520 000 €	Positive. High benefit-cost ratio from qualitative assessment	-
57	(Mönchengladbach [DE] -) Dalheim [DE] - Roermond [NL]	Comprehensive Network	Neglected	Medium	Low	Low	DEA29	NL422	59 000 000 €	20 000 €	-270 000 €	-250 000 €	Positive in [DE] and negative in [NL]. Reopening is part of regional German transport plan, but Dutch side is against historic route through Meinweg National Park (Natura 2000)	Existing bus services between Heinsberg [DE] and Roermond [NL] or existing passenger trains between Mönchengladbach [DE] and Venlo [NL]
59	Geldern [DE] - Straelen (DE) - Venlo [NL]	-	Entirely missing: dismantled	Low	No	No	DEA1B	NL421	161 000 000 €	770 000 €	-340 000 €	430 000 €	Negative. Difficult to implement owing to development on former track bed	Existing bus services between Geldern [DE] and Venlo [NL]
60	Goch [DE] - Gennep [NL] (- Nijmegen [NL])	-	Entirely missing: dismantled	Low	No	No	DEA1B	NL421	222 000 000 €	770 000 €	-340 000 €	430 000 €	Negative. Difficult to implement owing to development on former track bed	Existing bus services Goch [DE] – Gennep [NL] and Gennep – Boxmeer [NL] or the rail activation of ID 61
61	(Krefeld [DE] -) Kleve [DE] - Kranenburg [DE] - Groesbeck [NL] - Nijmegen [NL]	-	Elements missing	Medium	No	No	DEA1B	NL226	183 000 000 €	960 000 €	230 000 €	1 190 000 €	Positive in [DE] and negative in [NL]. German side sees high potential through extension of existing domestic services to/from Nijmegen [NL]. Dutch side regards planned enhancements to existing bus route Kleve – Nijmegen as most cost-effective measure	Existing bus services Kleve [DE] - Nijmegen [NL] (enhancements already in planning)
66	(Wesel [DE] -) Bocholt [DE] - Winterswijk [NL]	-	Entirely missing: dismantled	Low	No	No	DEA34	NL225	162 000 000 €	330 000 €	80 000 €	410 000 €	Negative. Costs too high	Recently introduced bus services Bocholt [DE] – Aalten [NL]
68	Ahaus [DE] - Alstätte [DE] - Broekheurne [NL] - Enschede [NL]	-	Entirely missing: dismantled	Low	No	No	DEA34	NL213	176 000 000 €	460 000 €	120 000 €	580 000 €	Negative. Former track bed is no longer available, a parallel rail route already exists	Improvements to existing cross-border passenger trains on route ID 69 Ahaus [DE] – Gronau [DE] – Enschede [NL]
178	Rosenbach bei Villach [AT] - Jesenice [SI]	Comprehensive Network	not fully exploited	High	Medium	High	AT211	SI042	0 €	-280 000 €	-700 000 €	-980 000 €	Positive [AT] and cautious [SI]	Railway is operational with existing PSO passenger train services, additional services could thus be operated with relative ease if potential meets authorities' expectations
212	Trieste [IT] - Hrpolje-Kozina [SI]	-	Entirely missing: dismantled	Low	Low	No	ITH44	SI044	210 000 000 €	-50 000 €	-180 000 €	-230 000 €	Negative [IT and SI]: Route has been converted into an attractive bicycle path	Existing cross-border rail connection ID 211 Trieste [IT] – Sežana [SI] - Ljubljana [SI], expected to see improvements to passenger services in 2018
216	Ilirska Bistrica [SI] - Šapjane [HR] (- Rijeka [HR])	Comprehensive Network	not fully exploited	Low	High	Low	SI018	HR031	0 €	-430 000 €	-420 000 €	-850 000 €	Cautious [SI] and none [HR]: Slovenia confirmed that the line is operational, but investments would be needed to keep the existing condition. No feedback was given with regard to the proposed service level. No feedback from Croatian authority.	Railway is operational with existing PSO passenger train services, additional services could thus be operated with relative ease if potential meets authorities' expectations
219	Imeno [SI] - Harmica [HR] - Savski Marof [HR]	-	Neglected	Medium	Low	No	SI034	HR043	262 000 000 €	-170 000 €	100 000 €	-70 000 €	Cautious [SI] and none [HR]: The feedback from the Slovenian Ministry of Infrastructure was rather cautious; no detailed feedback was given with regard to the proposed service level. No feedback from Croatian authority.	If there is no rail reactivation, authorities could provide additional services (without the need to change trains in the border station) on existing line ID 220
220	(Stranje [SI] -) Sveti Rok ob Sotli [SI] - Đurmanec [HR] (- Zabok [HR])	-	not fully exploited	Medium	Low	No	SI034	HR043	0 €	-420 000 €	-40 000 €	-460 000 €	Cautious [SI] and none [HR]: The feedback from the Slovenian Ministry of Infrastructure was rather cautious; no detailed feedback was given with regard to the proposed service level. No feedback from Croatian authority.	Railway is operational with existing PSO passenger train services, additional services could thus be operated with relative ease if potential meets authorities' expectations
237	Priekule [LV] - Skuodas [LT] - Kretinga [LT] (- Klaipėda [LT])	-	Neglected	Low	No	No	LV003	LT003	292 000 000 €	300 000 €	360 000 €	660 000 €	Negative: high operating costs	Existing long-distance commercial bus route between Liepāja [LV] and Klaipėda [LT], but this neither runs daily nor does it serve Priekule

Shortlist of projects examined in detail in Task 3

Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders

ID	Name of the rail connection	TEN-T: Corridor/ Core Network or Comprehensive Network	Classification according to 2017 timetable	Importance for the border region	Importance for the countries concerned	Importance on TEN-T level	NUTS3 in country A	NUTS3 in country B	Estimated infrastructure investment required	Estimated annual subsidies country A	Estimated annual subsidies country B	Estimated annual subsidies in both countries	Stakeholders' assessment of study proposals	Possible public transport alternative
238	(Liepāja [LV] - Priekule [LV] -) Vainode [LV] - Ritine [LT] - Bugeniai/Ruzgaj [LT] - Mažeikiai [LT])	-	Neglected	Low	No	No	LV003	LT008	483 000 000 €	560 000 €	250 000 €	810 000 €	Negative: high operating costs	New bus services. A new long international route between Liepāja [LV] and Mažeikiai [LT] (approx. 100 km, 1h55) would be a matter for commercial bus operators
239	(Rīga [LV] -) Reņģe/Ruba [LV] - Mažeikiai [LT])	-	Entirely missing: dismantled	Low	No	No	LV003	LT008	0 €	250 000 €	100 000 €	350 000 €	Negative: high operating costs	In accordance with a legal ruling in late 2017, the European Commission has demanded reinstatement of infrastructure on this line, which is expected to commence shortly. Passenger trains could then be provided relatively easily under PSO
240	(Rīga [LV] -) Meitene [LV] - Joniškis [LT] (- Šiauliai [LT]))	North Sea - Baltic	Freight only	Medium	Medium	Low	LV009	LT006	0 €	620 000 €	1 170 000 €	1 790 000 €	Negative: high operating costs	Railway is operational and thus passenger trains could be operated with relative ease if potential meets authorities' expectations
242	(Daugavpils [LV] -) Eglaine [LV] - Obeliai [LV] - Panėvežys [LT])	Comprehensive Network	Freight only	Low	No	Low	LV005	LT005	0 €	480 000 €	1 590 000 €	2 070 000 €	Negative: high operating costs	Railway is operational and thus passenger trains could be operated with relative ease if potential meets authorities' expectations
243	(Daugavpils [LV] -) Kurcums [LV] - Turmantas [LT])	Comprehensive Network	Freight only	Low	Medium	Low	LV005	LT009	0 €	620 000 €	50 000 €	670 000 €	Negative [LV] and cautious [LT]	The Lithuanian incumbent RU LG began serving Daugavpils again in January 2018, initially by extending two pairs of Vilnius [LT] – Turmantas [LT] services to/from Daugavpils at weekends only. Continuation of this service to be confirmed. It is recommended to provide at least two train pairs also on weekdays.
277	Komárno [SK] - Komárom [HU]	Comprehensive Network	Freight only	Medium	Medium	Low	SK023	HU212	0 €	-100 000 €	30 000 €	-80 000 €	Both cautious: Hungary estimates that the number of passengers would start at a quite small level, growing gradually up on a 5-10 years horizon, in connection with the developing of job opportunities on both sides	Railway is operational and thus passenger trains could be operated with relative ease (within the turnaround times of existing Slovak domestic services) if potential meets authorities' expectations; Passenger trains on the nearby route ID 276 were reinstated in December 2017, providing an alternative
304	Sofia [BG] - Kulata [BG] - Promachon [EL] - Thessaloniki [EL])	Orient/East - Med	not fully exploited	Medium	High	Medium	BG413	EL526	0 €	0 €	-560 000 €	-550 000 €	Cautious [BG] and none [EL]	Railway is operational with existing passenger train services (under PSO in Greece) that are "temporarily suspended" on Greek cross-border section. These and additional services could be operated with relative ease given the willingness of the RU and Greek PSO authority
306	(Varazdin [HR] -) Kotoriba [HR] - Murakeresztúr [HU])	Comprehensive Network	Freight only	Low	Low	Low	HR046	HU223	0 €	-20 000 €	10 000 €	-10 000 €	Cautious [HU] and none [HR]. Hungary says preliminary examinations of Croatian-Hungarian railway links have already started, but no results yet	Railway is operational. Passenger train services could be provided with relative ease if potential meets authorities' expectations
307	(Zagreb [HR]-) Koprivnica [HR] - Botovo [HR] - Gyékényes [HU] (- Budapest [HU])	Mediterranean	not fully exploited	Low	High	Medium	HR045	HU232	0 €	-430 000 €	-10 000 €	-440 000 €	Cautious [HU] and none [HR]. Hungary says preliminary examinations of Croatian-Hungarian railway links have already started, but no results yet	Railway is operational with existing PSO passenger train services, additional services could thus be operated with relative ease if potential meets authorities' expectations
308	Virovitica [HR] - Barcs [HU]	-	Entirely missing: dismantled	Medium	Low	No	HR048	HU232	73 000 000 €	-70 000 €	20 000 €	-50 000 €	Negative [HU] and none [HR]. Hungary estimates high costs for infrastructure works	If there is no rail reactivation, a new bus route (approx. 20 km, 32 mins) would be needed to link Virovitica [HR] and Barcs [HU] railway stations
312	(Osijek [HR] -) Beli Manastir [HR] - Magyarbóly [HU] (- Villány [HU] - Pécs [HU])	Comprehensive Network	Freight only	High	Medium	Low	HR04B	HU231	0 €	0 €	30 000 €	30 000 €	Cautious [HU] and none [HR]. Hungary says preliminary examinations of Croatian-Hungarian railway links have already started, but no results yet	Railway is operational. Passenger train services could be reinstated with relative ease (within the turnaround times of existing domestic services) if potential meets authorities' expectations
313	(Entroncamento [PT] -) Elvas [PT] - Badajoz [ES])	Atlantic	not fully exploited	Low	High	Low	PT186	ES431	0 €	-6 070 000 €	-80 000 €	-6 150 000 €	None, from both sides	Railway is operational with existing passenger train services (under PSO at least in Portugal), additional services could be provided if potential meets the expectations of RUs and competent authorities
316	(Pocinho [PT] -) Barca de Alva [PT] - Fregeneda [ES] (- Salamanca [ES])	-	Neglected	Medium	Medium	No	PT16E	ES415	578 000 000 €	-120 000 €	-240 000 €	-350 000 €	None, from both sides	Existing Spanish long-distance bus services link Salamanca and Lumbrales twice daily. A new cross-border bus route could be provided to connect Lumbrales with Pocinho, connecting with buses to/from Salamanca and trains between Pocinho and Porto
317	Porto [PT] - Vigo [ES]	Comprehensive Network	not fully exploited	Medium	High	Low	PT111	ES114	0 €	-550 000 €	-1 770 000 €	-2 330 000 €	None, from both sides	Railway is operational with a mix of PSO and commercial passenger services. Services could be improved with relative ease if potential meets expectations of RUs and/or competent authorities
360	(Faro [PT] -) Vila Real de Santo António [PT] - Ayamonte [ES] (- Sevilla [ES])	Comprehensive Network	Entirely missing: dismantled	Medium	High	No	PT150	ES615	66 000 000 €	20 000 €	320 000 €	340 000 €	None, from both sides	Extension of bus services in Ayamonte beyond bus station to/from ferry terminal (ca. 1.2 km), thus eliminating a significant gap in the public transport chain between Faro [PT] and Huelva [ES]

ANNEX 8: LONGLIST OF THE POTENTIALLY MOST BENEFICIAL PROJECTS

List of potentially most beneficial projects

Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders

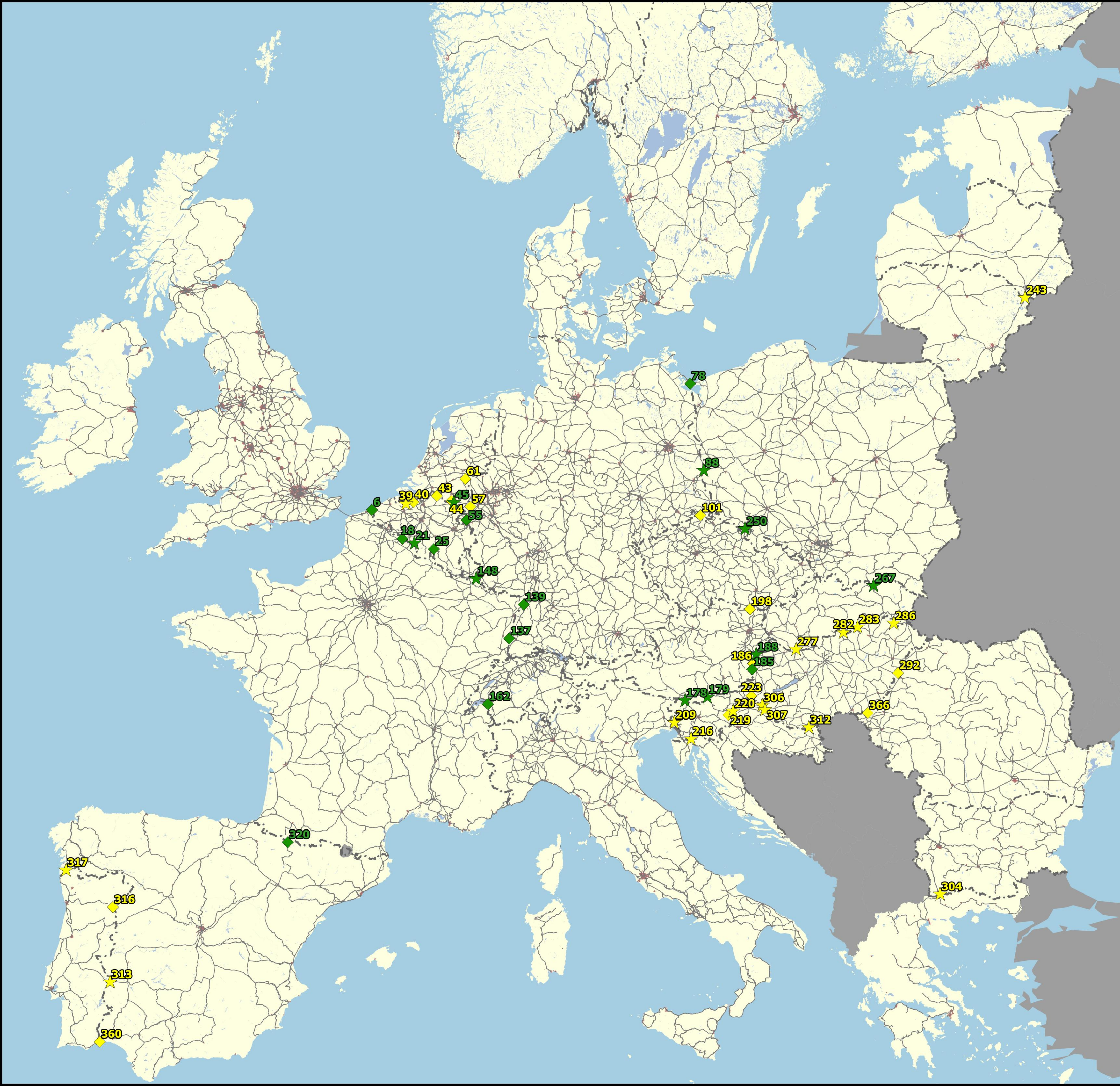
ID	Name of the rail connection	TEN-T: Corridor/ Core Network or Comprehensive Network	Classification according to 2017 timetable	Importance for the border region	Importance for the countries concerned	Importance on TEN-T level	NUTS3 in country A	NUTS3 in country B	The connection could improve TEN-T connectivity between...	The connection could alleviate the following structural spatial effects	Stakeholders' assessment
6	Dunkerque [FR] - De Panne [BE]	-	Elements missing	Medium	Low	No	FR301	BE258	-	Connection would be an additional link north of Lille the, along the French-Belgian coast	Rather positive
18	Valenciennes [FR] - Mons [BE]	Comprehensive Network	Entirely missing: dismantled	Medium	Low	Low	FR301	BE323	-	Connection would be an additional link south of the Lille area where no rail connection with passenger services between FR and BE exist today (gap of approx. 230 km)	Rather positive
21	Maubeuge [FR] - Charleroi [BE]	Comprehensive Network	Freight only	Low	Medium	Low	FR301	BE326	-	Connection would be an additional link south of the Lille area where no rail connection with passenger services between FR and BE exist today (gap of approx. 230 km)	Rather positive
25	Charleville-Mézières [FR] - Givet [FR] - Dinant [BE]	-	Entirely missing: dismantled	Medium	Low	No	FR211	BE353	Comprehensive Network/North Sea-Mediterranean	Connection would be an additional link south of the Lille area where no rail connection with passenger services between FR and BE exist today (gap of approx. 230 km)	Rather positive
45	Mol [BE] - Roermond [NL]	Comprehensive Network	Freight only	Medium	High	Low	BE222	NL414	-	Connection would be an additional link in the border area between Breda and Maastricht where no rail connection with passenger services between BE and NL exist today (gap of approx. 100 km)	Rather positive
55	Aachen [DE] - Maastricht [NL]	-	Proposed link	Medium	Low	No	DEA2D	NL423	North Sea-Baltic/Rhine Alpine/Comprehensive Network	-	Rather positive
78	Ducherow [DE] - Świnoujście Centrum [PL]	-	Entirely missing: dismantled	High	Medium	No	DE80N	PL428	-	Connection would ease the access from Berlin to the Polish and also the German part of the Island Usedom	Rather positive
88	Guben [DE] - Czerwieńsk [PL] - Zielona Góra [PL]	-	Freight only	Medium	Low	No	DE40G	PL432	Comprehensive Network	-	Rather positive
137	Freiburg [DE] - Colmar [FR]	-	Entirely missing: dismantled	High	Low	No	DE132	FR422	Rhine-Alpine/North Sea-Mediterranean	-	Rather positive
139	Rastatt [DE] - Roeschwoog [FR] - Haquenau [FR]	-	Elements missing	High	Low	No	DE124	FR421	Rhine-Danube/Rhine Alpine/Comprehensive Network	-	Rather positive
148	Trier [DE] - Thionville [FR] - Metz [FR]	Comprehensive Network	not fully exploited	High	Medium	Low	DEC02	FR413	-	Improved direct connection would ease rail transport between Trier and Metz. Today detour via Luxembourg or Saarbrücken necessary.	Rather positive
162	St-Maurice [CH] - Évian-les-Bains [FR]	-	Neglected	High	Low	No	CH012	FR718	-	Connection would improve public transport on the southbanks of Lake Geneva where no passenger rail services exist today	Rather positive
178	Rosenbach bei Villach [AT] - Jesenice [SI]	Comprehensive Network	not fully exploited	High	Medium	High	AT211	SI042	-	-	Rather positive
179	Klagenfurt [AT] - Bleiburg [AT] - Maribor [SI]	-	not fully exploited	Medium	Low	No	AT213	SI033	-	-	Rather positive
185	Oberwart [AT] - Szombathely [HU]	-	Entirely missing: dismantled	Medium	Low	No	AT111	HU222	-	Connection would be an additional link in the border area between Sopron and Szentgotthard where no rail connection with passenger services between AT and HU exist today	Rather positive
188	Deutschkreutz [AT] - Sopron [HU]	Comprehensive Network	not fully exploited	High	Medium	Low	AT112	HU221	-	-	Rather positive
250	Walbrzych [PL] - Meziměstí [CZ]	-	Freight only	Medium	Low	No	PL517	CZ052	-	-	Rather positive
267	Muszyna [PL] - Plaveč [SK]	Comprehensive Network	Freight only	Medium	Low	No	PL218	SK041	-	Connection would be an additional link in the border area of Poland and the Slovak Republic where only few railway connection with passenger services exist at all	Rather positive
320	Zaragoza [ES] - Canfranc [ES] - Pau [FR]	Comprehensive Network	Entirely missing: dismantled	Medium	Medium	Low	ES241	FR615	-	Connection would be an additional link in the border area of Spain and France where only few railway connection with passenger services exist at all	Rather positive
39	(Gent [BE] -) Wondelgem [BE] - Terneuzen [NL]	Comprehensive Network	Freight only	Medium	No	Low	BE233	NL341	-	-	Rather cautious
40	Sint-Niklaas [BE] - Terneuzen [NL]	-	Entirely missing: dismantled	Medium	No	No	BE236	NL341	Rhine-Alpine/Comprehensive Network	-	Rather cautious
43	(Antwerpen [BE] -) Turnhout [BE] - Tilburg [NL]	-	Entirely missing: dismantled	Medium	No	No	BE213	NL412	North Sea-Baltic/North Sea-Mediterranean/Comprehensive Network	Connection would be an additional link in the border area between Breda and Maastricht where no rail connection with passenger services between BE and NL exist today (gap of approx. 100 km)	Rather cautious
44	(Hasselt [BE] -) Neerpelt [BE] - Achel [BE] - Borkel en Schaft [NL] - Eindhoven [NL]	-	Entirely missing: dismantled	Medium	No	No	BE222	NL414	Comprehensive Network	Connection would be an additional link in the border area between Breda and Maastricht where no rail connection with passenger services between BE and NL exist today (gap of approx. 100 km)	Rather cautious
57	(Mönchengladbach [DE] -) Dalheim [DE] - Roermond [NL]	Comprehensive Network	Neglected	Medium	Low	Low	DEA29	NL422	-	-	Rather cautious
61	(Krefeld [DE] -) Kleve [DE] - Kranenburg [DE] - Groesbeck [NL] - Nijmegen [NL]	-	Elements missing	Medium	No	No	DEA1B	NL226	Comprehensive Network	Connection would ease the access from the German Lower Rhine region towards the Dutch Province Gelderland and could connect university location in Kleve and Nijmegen	Rather cautious
101	Seifhennersdorf [DE] - Rumburk [CZ]	-	Proposed link	Medium	Low	No	DED2D	CZ042	-	-	Rather cautious
186	Deutschkreutz [AT] - Szombathely [HU]	-	Entirely missing: dismantled	Low	No	No	AT111	HU222	-	Connection would be an additional link in the border area between Sopron and Szentgotthard where no rail connection with passenger services between AT and HU exist today	Rather cautious
198	Laa an der Thaya [AT] - Hrušovany nad Jevišovkou [CZ]	-	Entirely missing: dismantled	Low	No	No	AT125	CZ064	-	Connection could serve as direct link between Vienna and Brno	Rather cautious
209	Gorizia [IT] - Nova Gorica [SI]	-	Freight only	Medium	Medium	No	ITH43	SI043	-	Connection could link two the directly adjacent cities	Rather cautious
216	Iliška Bistrica [SI] - Šapjane [HR] (- Rijeka [HR])	Comprehensive Network	not fully exploited	Low	High	Low	SI038	HR031	-	Improved connection would ease rail transport between Ljubljana and Rijeka	Rather cautious
219	Imeno [SI] - Harmica [HR] - Savski Marof [HR]	-	Neglected	Medium	Low	No	SI034	HR043	Baltic-Adriatic/Mediterranean	-	Rather cautious
220	(Stranje [SI] -) Sveti Rok ob Sotli [SI] - Đurmanec [HR] (- Zabok [HR])	-	not fully exploited	Medium	Low	No	SI034	HR043	-	-	Rather cautious
223	Lendava [SI] - Zalaegerszeg [HU]	Comprehensive Network	Entirely missing: dismantled	Medium	Low	Low	SI031	HU223	-	Connection could link the outmost eastern part of Slovenia where Hungarian-speaking people live with Hungary	Rather cautious

List of potentially most beneficial projects

Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders

ID	Name of the rail connection	TEN-T: Corridor/ Core Network or Comprehensive Network	Classification according to 2017 timetable	Importance for the border region	Importance for the countries concerned	Importance on TEN-T level	NUTS3 in country A	NUTS3 in country B	The connection could improve TEN-T connectivity between...	The connection could alleviate the following structural spatial effects	Stakeholders' assessment
243	(Daugavpils [LV] -) Kurcums [LV] - Turmantas [LT]	Comprehensive Network	Freight only	Low	Medium	Low	LV005	LT009	-	Improved connection would ease rail transport between Lithuania's capital Vilnius and Daugavpils which is the second-largest city in Latvia	Rather cautious
277	Komárno [SK] - Komárom [HU]	Comprehensive Network	Freight only	Medium	Medium	Low	SK023	HU212	-	Connection would be an additional link in the border area between Bratislava/Rajka and Sturovo/Szob where no rail connection with passenger services between SK and HU exist today (gap of approx. 125 km). Many Hungarian-speaking people on both sides of the border	Rather cautious
282	Filiakovo [SK] - Hatvan [HU]	-	Freight only	Medium	Low	No	SK032	HU313	Mediterranean/Comprehensive Network	Connection would be an additional link in the border area between Kosice/Miskolc and Sturovo/Szob where no rail connection with passenger services between SK and HU exist today (gap of approx. 200 km). Many Hungarian-speaking people on both sides of the border	Rather cautious
283	Lenartovce [SK] - Bánréve [HU]	-	Freight only	Medium	Low	No	SK032	HU311	Mediterranean/Comprehensive Network	Connection would be an additional link in the border area between Kosice/Miskolc and Sturovo/Szob where no rail connection with passenger services between SK and HU exist today (gap of approx. 200 km). Many Hungarian-speaking people on both sides of the border	Rather cautious
286	Slovenské Nove Mesto [SK] - Szerencs [HU]	-	Freight only	Medium	Medium	No	SK042	HU311	Rhine-Danube/Mediterranean	Connection could link the outmost eastern part of Slovakia where Hungarian-speaking people live with Hungary	Rather cautious
292	Oradea [RO] - Nagykeréki [HU] - Debrecen [HU]	-	Entirely missing: dismantled	High	Low	No	RO111	HU332	Comprehensive Network/Mediterranean	Connection could serve as direct link between Oradea and Debrecen. Many Hungarian-speaking people on both sides of the border. Today detours necessary.	Rather cautious
304	Sofia [BG] - Kulata [BG] - Promachon [EL] - Thessaloniki [EL]	Orient/East - Med	not fully exploited	Medium	High	Medium	BG413	EL526	-	Improved connection would ease rail transport between Bulgaria's capital Sofia and Thessaloniki which is the second-largest city in Greece	Rather cautious
306	(Varazdin [HR] -) Kotoriba [HR] - Murakeresztúr [HU]	Comprehensive Network	Freight only	Low	Low	Low	HR046	HU223	-	-	Rather cautious
307	(Zagreb [HR]-) Koprivnica [HR] - Botovo [HR] - Gyékényes [HU] (- Budapest [HU])	Mediterranean	not fully exploited	Low	High	Medium	HR045	HU232	-	Improved connection would ease rail transport between the two capitals Zagreb and Budapest	Rather cautious
312	(Osijek [HR] -) Beli Manastir [HR] - Magyarbóly [HU] (- Villány [HU] - Pécs [HU])	Comprehensive Network	Freight only	High	Medium	Low	HR04B	HU231	-	Connection could link the outmost eastern part of Croatia where Hungarian-speaking people live with south Hungary. Universities in Osijek and in Pécs	Rather cautious
313	(Entroncamento [PT] -) Elvas [PT] - Badajoz [ES]	Atlantic	not fully exploited	Low	High	Low	PT186	PT186	-	Improved connection would ease rail transport between the regions Alentejo and Extremadura. There is no other cross-border rail connection in the border area	Rather cautious
316	(Pocinho [PT] -) Barca de Alva [PT] - Fregeneda [ES] (- Salamanca [ES])	-	Neglected	Medium	Medium	No	PT16E	PT16E	-	Connection could link the Guarda district with the province of Salamanca. There is no other cross-border rail connection in the border area	Rather cautious
317	Porto [PT] - Vigo [ES]	Comprehensive Network	not fully exploited	Medium	High	Low	PT111	PT111	-	Improved connection would ease rail transport between the regions Viana do Castelo and Galicia. There is no other cross-border rail connection in the border area	Rather cautious
360	(Faro [PT] -) Vila Real de Santo António [PT] - Ayamonte [ES] (- Sevilla [ES])	Comprehensive Network	Entirely missing: dismantled	Medium	High	No	PT150	PT150	-	Connection could link the outmost southern part of Portugal (Algarv) with Andalucia. No cross-border rail connection south of Elvas/Badajoz (gap of approx. 200 km).	Rather cautious
366	Arad [RO] - Szeged [HU]	Comprehensive Network	Proposed link	High	Medium	Medium	RO421	HU333	-	Connection could serve as direct link between Arad and Szeged where detours are necessary today. Many Hungarian-speaking people on both sides of the border	Rather cautious

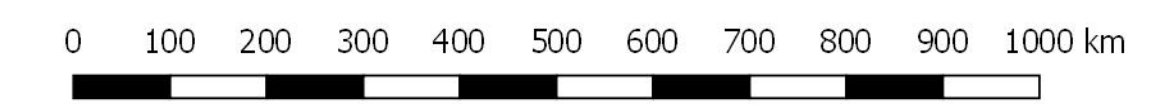
ANNEX 9: MAP OF POTENTIALLY MOST BENEFICIAL PROJECTS



Potentially most beneficial projects for additional passenger services on cross-border rail connections

LEGEND

- ★ High need for improvement of cross-border passenger services on operational infrastructure
- ◆ High need for improvement of cross-border passenger services on non-operational infrastructure
- ★ Need for improvement of cross-border passenger services on operational infrastructure
- ◆ Need for improvement of cross-border passenger services on non-operational infrastructure



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ANNEX 10: INTERREG ANALYSIS FOR POTENTIALLY MOST BENEFICIAL PROJECTS WITH OPERATIONAL INFRASTRUCTURE

Interreg Analysis

Cross-border rail connection	Relevant Interreg programmes (geographical)	Relevant Interreg programmes (priorities)
Maubeuge [FR] - Charleroi [BE]	<ul style="list-style-type: none"> ▪ Interreg BE-FR ▪ Interreg North West Europe 	<ul style="list-style-type: none"> ▪ Interreg BE-FR: relevant ▪ Interreg North West Europe: relevant (but requirement of link with TEN-T must be fulfilled)
(Gent [BE] -) Wondelgem [BE] - Terneuzen [NL]	<ul style="list-style-type: none"> ▪ Interreg des Deux Mers ▪ Interreg BE-FR ▪ Interreg North Sea ▪ Interreg North West Europe <p>(All include also Gent)</p>	<ul style="list-style-type: none"> ▪ Interreg des Deux Mers: no priority relevant for cross-border rail projects in cooperation programmes → not relevant ▪ Interreg BE-FR: relevant ▪ Interreg North Sea: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ one of the priorities of the cooperation programme focuses on transport: priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures » ○ 7c: developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility ○ Specific objectives: <ul style="list-style-type: none"> - 1/ develop demonstrations of innovative and/or improved transport and logistics solutions with potential to move large volumes of freight away from long-distance road transportation (focused on freight) - 2/ stimulate the take-up and application of green transport solutions for regional freight and personal transport (both freight and passengers) ▪ Interreg North West Europe: relevant (but requirement of link with TEN-T must be fulfilled)
Mol [BE] - Roermond [NL]	<ul style="list-style-type: none"> ▪ Interreg Euregio Meuse-Rhin ▪ Interreg BE-NL ▪ Interreg North West 	<ul style="list-style-type: none"> ▪ Interreg Euregio: no priority relevant for cross-border rail projects → not relevant ▪ Interreg BE-NL: one of the priorities of the cooperation programme focuses on labour mobility, but improvement of cross-border local transport links is not part of the scope → not relevant

	Europe	<ul style="list-style-type: none"> ▪ Interreg North West Europe: relevant (but requirement of link with TEN-T must be fulfilled)
<p>Guben [DE] - Czerwieńsk [PL]</p>	<ul style="list-style-type: none"> ▪ Interreg Germany / Brandenburg - Poland ▪ Interreg Central Europe 	<ul style="list-style-type: none"> ▪ Interreg DE/Brandenburg – PL: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7b “enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes”: not relevant in this case as it focuses on road transport ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility” ○ Specific objective: improving cross-border eco-friendly mobility <ul style="list-style-type: none"> - relevant but only for passengers (output and result indicators are passenger oriented) ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7b “enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes”: <ul style="list-style-type: none"> - Specific objective: to improve planning and coordination of regional passenger transport systems for better connections to national and European transport networks - Result and output indicators focused on passengers ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility”: <ul style="list-style-type: none"> - Specific objective: to improve coordination among freight transport stakeholders for increasing multimodal environmentally-friendly freight solutions - Result and output indicators focused on freight

<p>Trier [DE] - Thionville [FR]</p>	<ul style="list-style-type: none"> ▪ Interreg Grande Région ▪ Interreg North West Europe 	<ul style="list-style-type: none"> ▪ Interreg Grande Région: relevant ▪ Interreg North West Europe: relevant (but requirement of link with TEN-T must be fulfilled)
<p>Rosenbach bei Villach [AT] - Jesenice [SI]</p>	<ul style="list-style-type: none"> ▪ Interreg AT-SI ▪ Interreg Danube ▪ Interreg Central Europe ▪ Interreg Alpine Space 	<ul style="list-style-type: none"> ▪ Interreg AT-SI: no priority related to mobility or transport → not relevant ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility” ○ Specific objective: support environmentally-friendly and safe transport systems and balanced accessibility of urban and rural areas. Improve planning, coordination and practical solutions for an environmentally-friendly, low-carbon and safer transport network and services in the programme area contributing to a balanced accessibility of urban and rural areas. <ul style="list-style-type: none"> - But result indicator partially relevant: “intensity of cooperation of key actors in the programme area in order to strengthen environmentally-friendly, safe and balanced transport systems” ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Alpine space: relevant <ul style="list-style-type: none"> ○ Cooperation programme includes priority 4 “supporting the shift towards a low-carbon economy in all sectors” ○ 4e: “promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures”. ○ Specific objective: increase options for low carbon mobility and transport ○ Result and output indicators relevant <ul style="list-style-type: none"> ▪ Result indicator: level of potential to access and use low carbon mobility and transport options ▪ Output indicator: number of supported transnational cooperation structures and developed strategic elements increasing options for low carbon mobility

		and transport / developed implementation elements for low carbon mobility and transport
Bleiburg [AT] - Maribor [SI]	<ul style="list-style-type: none"> ▪ Interreg AT-SI ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg AT-SI: no priority related to mobility or transport → not relevant ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
Deutschkreutz [AT] - Sopron [HU]	<ul style="list-style-type: none"> ▪ Interreg AT-HU ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg AT-HU: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7b “enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes” ○ Specific objective: improving cross-border connectivity of regional centres to the TEN-T network → very relevant <ul style="list-style-type: none"> ▪ One of the output indicators is very relevant: total length of reconstructed or upgraded railway line ▪ Result indicator: average travel time (individual transport) to a node with TEN-T network connection ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility” ○ Specific objective: enhancing sustainable mobility on the local and regional level ○ But result and output indicators only partially relevant <ul style="list-style-type: none"> ▪ Result indicator: intermodal public transport nodes ▪ Output indicator: jointly developed strategies, transport concepts and actions / joint schemes for promoting environmentally friendly transport ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
Gorizia [IT] - Nova Gorica [SI]	<ul style="list-style-type: none"> ▪ Interreg IT-SI ▪ Interreg Adriatic - Ionian ▪ Interreg Alpine Space 	<ul style="list-style-type: none"> ▪ Interreg IT-SI <ul style="list-style-type: none"> ○ Cooperation programme includes priority 4 “supporting the shift towards a low-carbon economy in all sectors » ○ 4e: “promoting low-carbon strategies for all types of territories, in particular for urban

	<ul style="list-style-type: none"> ▪ Interreg Central Europe ▪ Interreg Mediterranean 	<p>areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures”</p> <ul style="list-style-type: none"> ○ Specific objective partially relevant: promotion of implementation of strategies and action plans to promote energy efficiency and to improve territorial capacities for joint low-carbon mobility planning. ○ Result and output indicators also partially relevant (focused on innovative services for smart low carbon mobility + targeted to the public sector) <ul style="list-style-type: none"> ▪ Interreg Adriatic-Ionian: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility” ○ Specific objective: enhance capacity for integrated transport and mobility services and multimodality in the Adriatic-Ionian area ○ Result and output indicators relevant: <ul style="list-style-type: none"> ▪ result indicator: level of capacity of organisations in the field of transport and mobility to transnationally plan and implement sustainable and multimodal transport and mobility solutions ▪ output indicator: number of supported transnational cooperation networks and of strategies and action plans developed in the field of environment-friendly and low-carbon transport systems ▪ Alpine space: relevant ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Interreg Mediterranean: relevant <ul style="list-style-type: none"> ○ Cooperation programme includes priority 4 “supporting the shift towards a low-carbon economy in all sectors » ○ 4e: “promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures” <ul style="list-style-type: none"> - Specific objective: to increase capacity to use existing low carbon transport systems and multimodal connections among them - Result and output indicators relevant
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<p>Ilirska Bistrica [SI] - Šapjane [HR] (- Rijeka [HR])</p>	<ul style="list-style-type: none"> ▪ Interreg Central Europe (including Rijeka) ▪ Interreg Danube (including Rijeka) ▪ Interreg Mediterranean 	<ul style="list-style-type: none"> ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled) ▪ Interreg Mediterranean: relevant
<p>(Stranje [SI] -) Sveti Rok ob Sotli [SI] - Đurmanec [HR] (- Zabok [HR])</p>	<ul style="list-style-type: none"> ▪ Interreg Adriatic - Ionian ▪ Interreg Central Europe ▪ Interreg Danube ▪ Interreg Mediterranean 	<ul style="list-style-type: none"> ▪ Interreg Adriatic-Ionian: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled) ▪ Interreg Mediterranean: relevant
<p>(Daugavpils [LV] -) Kurcums [LV] - Turmantas [LT]</p>	<ul style="list-style-type: none"> ▪ Interreg LT-LV ▪ Interreg Baltic Sea 	<ul style="list-style-type: none"> ▪ Interreg LT-LV: no priority related to mobility or transport → not relevant ▪ Interreg Baltic Sea: relevant (but requirement of link with TEN-T must be fulfilled)
<p>Wałbrzych [PL] - Meziměstí [CZ]</p>	<ul style="list-style-type: none"> ▪ Interreg Central Europe ▪ Interreg CZ-PL 	<ul style="list-style-type: none"> ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Interreg CZ-PL: no priority related to mobility or transport → not relevant
<p>Muszyna [PL] - Plaveč [SK]</p>	<ul style="list-style-type: none"> ▪ Interreg PL-SK ▪ Interreg Central Europe 	<ul style="list-style-type: none"> ▪ Interreg PL-SK: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7b “enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes” <ul style="list-style-type: none"> - Specific objective: increasing cross border mobility by improving cross border mergers - But output indicator focused on newly built or upgrades roads ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility” <ul style="list-style-type: none"> - Specific objective: increasing the cross-border area availability through the

		<p>development of multi-modal transportation</p> <ul style="list-style-type: none"> - Result indicator: quality of cross border mergers implemented in multi-modal transportation system in the cross-border area - Output indicator: number of new cross-border sustainable public transport services and/ or cases to better integrate existing services <p>▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled)</p>
<p>Komárno [SK] - Komárom [HU]</p>	<ul style="list-style-type: none"> ▪ Interreg SK-HU ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg SK-HU: relevant (but requirement of link with TEN-T must be fulfilled) <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7b “enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes” <ul style="list-style-type: none"> - Specific objective: increasing the density between border crossing points along the Hungarian-Slovak border - But output indicator focused on newly built roads → not relevant ○ 7c “developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports, multimodal links and airport infrastructure, in order to promote sustainable regional and local mobility” → relevant <ul style="list-style-type: none"> - Specific objective 1: improving cross-border public transport services (focused on passengers) <ul style="list-style-type: none"> ➢ Result indicator: change in the volume of cross-border public transport ➢ Output indicator: number of new public transport services started within the framework of the programme - Specific objective 2: improving cross-border logistic services (focused on goods) <ul style="list-style-type: none"> ➢ Result indicator: change in the volume of cross-border good transport ➢ Output indicator: number of new logistic services started within the framework of the programme <p>▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled)</p> <p>▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)</p>
<p>Filiakovo [SK] - Hatvan</p>	<ul style="list-style-type: none"> ▪ Interreg SK-HU 	<ul style="list-style-type: none"> ▪ Interreg SK-HU: relevant (but requirement of link with TEN-T must be fulfilled)

[HU]	<ul style="list-style-type: none"> ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
Lenartovce [SK] - Bánréve [HU]	<ul style="list-style-type: none"> ▪ Interreg SK-HU ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg SK-HU: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
Slovenské Nove Mesto [SK] - Szerencs [HU]	<ul style="list-style-type: none"> ▪ Interreg SK-HU ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg SK-HU: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
Sofia [BG] - Kulata [BG] - Promachon [EL] - Thessaloniki [EL]	<ul style="list-style-type: none"> ▪ Interreg BG-EL (does not include Sofia) ▪ Interreg Balkan-Mediterranean 	<ul style="list-style-type: none"> ▪ Interreg BG-EL: not relevant because focused on roads <ul style="list-style-type: none"> ○ cooperation programme includes priority 7 “promoting sustainable transport and removing bottlenecks in key network infrastructures” ○ 7b “enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal nodes” <ul style="list-style-type: none"> - Specific objective: improve cross-border accessibility - But output indicator focused on newly built roads ▪ Interreg Balkan-Mediterranean: no priority related to mobility or transport → not relevant
(Varazdin [HR] -) Kotoriba [HR] - Murakeresztúr [HU]	<ul style="list-style-type: none"> ▪ Interreg HU-HR ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg HU-HR: no priority related to mobility or transport → not relevant ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
(Zagreb [HR]-) Koprivnica [HR] - Botovo [HR] - Gyékényes [HU] (-Budapest [HU])	<ul style="list-style-type: none"> ▪ Interreg HU-HR (But Budapest not included) ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg HU-HR: no priority related to mobility or transport → not relevant ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)
(Osijek [HR] -) Beli Manastir [HR] - Magyarbóly [HU] (- Villány [HU] - Pécs [HU])	<ul style="list-style-type: none"> ▪ Interreg HU-HR ▪ Interreg Central Europe ▪ Interreg Danube 	<ul style="list-style-type: none"> ▪ Interreg HU-HR: no priority related to mobility or transport → not relevant ▪ Central Europe: relevant (but requirement of link with TEN-T must be fulfilled) ▪ Danube: partially relevant (but requirement of link with TEN-T must be fulfilled)

<p>(Entroncamento [PT] -) Elvas [PT] - Badajoz [ES]</p>	<ul style="list-style-type: none"> ▪ Interreg PT-ES ▪ Interreg South West Europe 	<ul style="list-style-type: none"> ▪ Interreg PT-ES: no priority related to mobility or transport → not relevant ▪ Interreg South West Europe: no priority related to mobility or transport → not relevant
<p>Porto [PT] - Vigo [ES]</p>	<ul style="list-style-type: none"> ▪ Interreg PT-ES ▪ Interreg South West Europe 	<ul style="list-style-type: none"> ▪ Interreg PT-ES: no priority related to mobility or transport → not relevant ▪ Interreg South West Europe: no priority related to mobility or transport → not relevant

ANNEX 11: COMPARISON OF COOPERATION TOOLS

Annex – Cross–Border Coordination tools

Tools	Legal basis	Purpose	Assets	Drawbacks
EGTC	Regulation 1302/2013, modifying Regulation 1082/2006 National legislation (law of the place of registered office applicable)	Facilitate and promote cross-border cooperation For instance, management of EU funds	EGTCs allow to formalise and maintain cooperation between project partners by setting up a common structure with legal personality Public undertakings can be part of it Useful during the project preparation, investment and implementation phases, to take advantage of the different types of European funding It is also useful to optimise the combination of public procurement procedures on both sides of the border	Legal and administrative burdens: <ul style="list-style-type: none"> - Lengthy procedure for its creation (more than a year) - Any modification of the partnership (membership or withdrawal) requires an amendment of the convention and the statutes, as well as the approval of all Member States concerned - Strong mobilization of EGTCs members required to ensure its proper administrative functioning. - The rules governing financial contributions by members must be provided in the statutes of the EGTC: each member must contribute to the financing of the EGTC; unilateral funding by one national authority only could amount to illegal state aid.
EEIG	Regulation 2137/85 National legislation (law of the place of registered office applicable)	Facilitate or develop the economic activity of its members, and improve or increase the earnings from that activity Exclusion of purely administrative activities	Membership of legal or natural persons possible depending on chosen legal basis: allows for a broad and diversified partnership Legal autonomy Easy to set-up	Missions limited to promotion, lobbying and research activities Cannot substitute to regional or local authorities in the exercise of their powers
Corridors & European Coordinator	EU Law	Market research and structuring of interactions between partners under	Long term and on the ground support, including during the operational phase	In its current state: adapted to large projects, for discussions between Member States and the European

		the umbrella of the European Commission	and when using an intermediary Allows to avoid many bilateral meetings	Commission
Border Focal Point	Communication from the European Commission , 20/09/2017 "Boosting growth and cohesion in EU border regions"	Supports regions to remove barriers to investment and access to jobs in a cross-border context, while taking into account their specific needs Centralisation of best practices	Holistic approach towards border obstacles	Must benefit from sufficient resources and expertise Border Focal Point set up in January 2018: no information on its results available yet

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