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Agriculture and Rural Development

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**RESEARCH FOR TRAN
COMMITTEE - CONNECTIVITY
AND ACCESSIBILITY OF
TRANSPORT INFRASTRUCTURE IN
CENTRAL AND EASTERN EUROPE**

IN-DEPTH ANALYSIS



DIRECTORATE-GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT B: STRUCTURAL AND COHESION POLICIES

TRANSPORT AND TOURISM

**Research for TRAN committee:
Connectivity and Accessibility of
Transport Infrastructure in Central and
Eastern European EU Member States**

IN-DEPTH ANALYSIS

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AUTHORS

M-Five GmbH Mobility, Futures, Innovation, Economics: Wolfgang Schade, Werner Rothengatter, Simon Mader

RESPONSIBLE ADMINISTRATOR

Marc Thomas
Policy Department B: Structural and Cohesion Policies
European Parliament
B-1047 Brussels
E-mail: poldep-cohesion@europarl.europa.eu

EDITORIAL ASSISTANCE

Virginija Kelmelyte

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ABOUT THE PUBLISHER

To contact the Policy Department or to subscribe to its monthly newsletter please write to:
poldep-cohesion@europarl.europa.eu

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Abstract

Since the pre-accession phases, the Member States located in Central and Eastern Europe have been receiving EU funding to be invested in transport infrastructure. These investments have improved connectivity and accessibility in these Member States substantially. This note shows, however, that gaps remain. It also analyses how current policy instruments could contribute to close such gaps, and how this policy could be improved.

CONTENTS

LIST OF ABBREVIATIONS	5
LIST OF TABLES	6
LIST OF FIGURES	6
EXECUTIVE SUMMARY	7
1 TRANSPORT INFRASTRUCTURE CONNECTIVITY IN CENTRAL AND EASTERN EUROPEAN EU MEMBER STATES	9
1.1 Connectivity along the TEN-T core network corridors	9
1.2 Connectivity in practice: travel times and speeds	10
2 TRANSPORT INFRASTRUCTURE ACCESSIBILITY IN CENTRAL AND EASTERN EUROPEAN EU MEMBER STATES	13
3 CONCLUSIONS	17
4 ANNEX: Figures 3 to 13	19
REFERENCES	31

LIST OF ABBREVIATIONS

CEF	Connecting Europe Facility
CEMS	Central and Eastern European EU Member States
CF	Cohesion Fund
CNC	Core Network Corridor
DG REGIO	EC Directorate-General for Regional and Urban Policy
EC	European Commission
ERDF	European Regional Development Funds
ESPON	European Spatial Planning Observation Network
EU-15	EU Member States before 2004 enlargement
GDP	Gross Domestic Product
MS	Member States
NUTS	Nomenclature of territorial statistical units
O-D	Origin-Destination
RFC	Rail Freight Corridor
TEN-T	Trans-European Transport Networks

LIST OF TABLES

Table 1:	
Travel times and speeds of selected European OD-pairs – by passenger rail services	11
Table 2:	
Travel times and speeds of selected European OD-pairs – by passenger road transport	12

LIST OF FIGURES

Figure 1:	
National potential accessibility to GDP by road freight transport	14
Figure 2:	
Connectivity of urban nodes to international destinations within 5 hours of road travel or less	15
Figure 3:	
Access to high-level passenger transport infrastructure at NUTS-3 level	19
Figure 4:	
Comparison of speeds of passenger rail services in the EU	20
Figure 5:	
Congestion on roads with speeds >100km/h in the vicinity of functional urban areas in the EU	21
Figure 6:	
Access to high-level freight transport infrastructure at NUTS-3 level	22
Figure 7:	
European potential accessibility to GDP by containerised rail freight transport	23
Figure 8:	
Regional and local accessibility by car in Poland	24
Figure 9:	
Regional and local accessibility by car in Baltic States	25
Figure 10:	
Regional and local accessibility by car in Czech Republic	26
Figure 11:	
Development of the Polish motorway network until 2011 – new connections more substantial in West-East directions	27
Figure 12:	
Development of travel speed on the core TEN-T road network from 1955 to 2012	28
Figure 13:	
Estimated impact on accessibility of EU co-financed investment in transport infrastructure until 2030 – percentage change to baseline	29

EXECUTIVE SUMMARY

Background and aim

This note provides an overview of connectivity and accessibility of transport infrastructure in the Central and Eastern European EU Member States (CEMS) – ‘from north to south’: Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Romania and Bulgaria. The note also highlights the major related issues and assesses the scope for improvements, including those related to the TEN-T policy and funding principles.

All CEMS are supported by TEN-T funds (CEF) and structural funds (ERDF and CF) with a view to improving their transport systems and connecting them better with the other Member States. Five of the new TEN-T ‘core network corridors’ (CNC) pass through them.

Findings

Three major gaps in connectivity have been identified by analysing the ‘work plans’ of the five ‘core network corridors’ concerned: (1) the missing North-South railway connection through the Baltic States and its linkage in Poland up to Warsaw with the EU railway network. (2) The triangle region between Poland, the Czech Republic and Slovakia suffers from gaps and bottlenecks, mainly in the rail network, but also in the case of a few road links. (3) The port of Koper suffers from insufficient hinterland connections by rail, leading inter alia to bottlenecks on the access roads. The work plans of the five CNCs report further bottlenecks.

Gaps and bottlenecks can also be identified by analysing long-distance travel times in CEMS and comparing them with travel times in the EU-15 Member States: on major connections, rail travel times in the EU-15 are twice to four times as fast as in the CEMS. In addition, using passenger rail transport for such major connections in the EU-15 is significantly faster than road transport, while in the CEMS the opposite is frequently true.

In terms of changes to the TEN-T guidelines two issues have been observed: (1) given the improved relationships with the Western Balkan countries consideration should be given to modifying the alignment of the Orient-East Med CNC to pass along a 300-km shorter route via Belgrade, connecting Greece with Hungary and Austria. (2) There should be an assessment of whether in Bulgaria and Romania there are ‘duly justified cases’ of sections for which it would be sufficient to implement them at lower standards than required by the TEN-T guidelines.

Areas with particularly weak accessibility have been identified in the Baltic States, in Northern Poland and to a lesser degree also in Eastern Poland, in the most eastern regions of Slovakia and Hungary, and in most of Bulgaria and Romania. If CEF co-funding is not applicable to such regions, the use of structural funds should be considered with a view to improving regional accessibility.

1 TRANSPORT INFRASTRUCTURE CONNECTIVITY IN CENTRAL AND EASTERN EUROPEAN EU MEMBER STATES

1.1 Connectivity along the TEN-T core network corridors

Regulation (EU) No 1316/2013¹ defines nine 'core network corridors' (CNC) which are the backbone of the TEN-T network. Five of these corridors cross the central and eastern European Member States (CEMS), namely:

- **North-Sea Baltic;**
- **Baltic-Adriatic;**
- **Mediterranean;**
- **Rhine-Danube;**
- **Orient-East-Med.**

The CNCs will be implemented by 2030 according to the relevant 'corridor work plans'² and the related 'corridor studies'³. For this purpose, corridor work plans and studies identify the major missing links and bottlenecks affecting connectivity along each CNC. As regards the five corridors crossing the CEMS, the following deficiencies have been identified that block or hinder transport flows^{4 5}:

- The North-South connection through the three Baltic States constitutes a gap, in particular for rail, as there are only 22 km of standard gauge rail tracks from the Polish border up to Sestokai (LT), forming the beginning of the future Rail Baltic. From Sestokai to Tallinn (EE), only wide-gauge tracks are available, and the whole line is not electrified. The parallel road, Via Baltica, is mainly implemented as a two-lane road that faces capacity bottlenecks in the vicinity of urban centres.
- The cross-border rail connections between Lithuania and Poland as far as Bialystok (PL) represent a second major bottleneck owing to severe speed and capacity restrictions. In 2015 not a single passenger train service was offered crossing the border between Poland and Lithuania. On the Polish side, speed restrictions resulting from poor track conditions bring down speeds to 30 km/h on several sections.
- A number of railway cross-border bottlenecks are reported between Poland, Slovakia and the Czech Republic. The connection between Katowice (PL) and Zilina (SK) seems to be the most crucial as it avoids a substantial detour through the Czech Republic. But the connections from both Opole (PL) and Katowice (PL) to Ostrava (CZ) are also underdeveloped.

¹ [Regulation \(EU\) No 1316/2013 establishing the Connecting Europe Facility](#)

² [2015 corridors work plans](#)

³ [2014 corridor studies](#)

⁴ The present paper focuses on the network gaps and bottlenecks, while issues related to technology (e.g. ERTMS, ITS) are reported in a separate paper (Rothengatter et al. 2016).

⁵ The analysis is based on the following sources: work plans of the five core network corridors crossing the CEMS and related corridor studies; phone interviews with the coordinators of the corridor studies and with advisors to the European Coordinators at the European Commission; studies of DG REGIO and the European Spatial Planning Observation Network (ESPON) on regional accessibility in the CEMS.

- Further railway cross-border connections constituting bottlenecks to the neighbouring EU-15 Member States and thus a barrier to connectivity are Bratislava (SK) to Vienna (AT), Graz (AT) to Maribor (SL) and Trieste (IT) to Divaca (SL).
- One road bottleneck seems to be of particular relevance between Brno (CZ) and Vienna (AT), and a second one is mentioned in the case of the road connection between Katowice (PL) and Zilina (SK).
- Ports and their railway connections to the hinterland are facing limitations at both ends of the Baltica-Adriatic corridor. Koper (SL) is only accessible by a single-track rail connection that was recently upgraded, and the implementation of the second track as far as Divaca (SL) is pending. The ports of Szczecin (PL) and Gdansk (PL) suffer from railway connections that lack maintenance and provide bad levels of service e.g. in terms of line speeds and axle loads and in terms of offering containerised services. As a result, road transport satisfies a large share of demand from the northern ports to the industrial centres in the south of Poland.
- The city of Budapest (HU) is referred to as a bottleneck with respect to road and rail transport. The overlaying of growing local/regional transport with also growing long-distance flows that are also growing is leading and will further lead to increasing congestion on both the road and rail networks around the city. In terms of rail transport, the city also hosts the two most important railway bridges in Hungary, crossing the Danube, connecting the Western and Eastern rail network areas of Hungary. Taking also into account the growing traffic, these bridges constitute a critical issue in the event of any interruption of their services.⁶
- In Slovenia, growing rail freight demand will cause a bottleneck around Ljubljana that would affect both the Baltic-Adriatic and the Mediterranean CNC. Further to the east along the Mediterranean CNC the rail line between Zagreb (HR) and Budapest is implemented as single track, with poor condition of infrastructure such that an upgrade is required.
- Along the Orient-East Med CNC, two other rail bottlenecks are reported around the cities of Brno (CZ) and Bratislava (SK), where long-distance and local rail traffic mix with rail freight traffic.
- The Rhine-Danube CNC reports as the most critical issue the navigability of the Danube, although with the Danube Strategy adopted in December 2014 the issue was acknowledged by the Member States along the river. The Danube-Bucharest Canal is highlighted as a missing link.

1.2 Connectivity in practice: travel times and speeds

Connectivity means that all nodes of the TEN-T are interlinked by an infrastructure which allows travel on all origin-destination connections within a reasonable range of time and without risk of major interruptions e.g. by low levels of service on selected network links. This section describes the gaps in connectivity by analysing passenger transport travel times (whereas in the case of freight transport reliability would be a more appropriate indicator).

⁶ The RFC7 market study reports that the Budapest Southern Bridge is « almost the only » connection between the western and eastern parts of the Hungarian rail network (RFC 2013). The North Rail Bridge (Északi összekötő vasúti híd) in the northern part of Budapest and the Türr István Bridge close to the city of Baja and the border to Serbia are obviously not regarded as adequate alternative routes by the RFC7.

This analysis is based on a number of origin-destination pairs (OD-pairs) between European cities both in the EU-15 Member States and in the CEMS. The OD pairs have been chosen to cover similar distances in order to allow for a simple comparison of travel times and speeds. Table 1 presents an overview of rail transport, for distances between 430 and 990 km. Times and distances have been taken from the online journey planner of the Deutsche Bahn using the fastest connections as a benchmark. We note that high-speed rail services in the EU-15 allow for average speeds of 150 to 180 km/h. Travellers can therefore conveniently cover distances of 500 to 600 km in 3 to 4 hours by rail. For similar distances in the CEMS, the fastest connection from Warsaw to Prague would take roughly twice this time, and when it comes to connections involving the Baltic States, Romania or Bulgaria, such a rail trip would take at least some four times as long (16 hours), with average speeds lying between 25 and 40 km/h. Often several changes of trains are required in the CEMS. Thus rail services are very inconvenient, which is among other things an issue of infrastructure supply. Furthermore, the frequency of service offered in the CEMS remains unsatisfactory, which of course is caused by low demand, which in its turn is not independent from supply.

Table 1: Travel times and speeds of selected European OD-pairs – by passenger rail services

Region	From	To	Distance	Duration	Changes	Type of trains	Territory	Frequency	Average velocity
			Km	h	#			x/day	Km/h
EU-15	Barcelona	Seville	990	5,5	0	AVE	Hilly	7	180
	Cologne	Paris	500	3,33	0	THA	Flat	6	150
	Paris	Frankfurt	570	3,8	0	ICE/TGV	Flat	5	150
	Munich	Verona	430	5,33	0	EC	Alpine	5	81
CEMS	Warsaw	Prague	630	7,33	1	EIC, EC, IC	Hilly	2	86
	Budapest	Bucharest	820	14,75	0	IC	Hilly	1	56
	Zagreb	Bratislava	440	8	1	EC, REX, OS	Flat	1	55
	Zagreb	Lublin	975	19,75	5	IC, R, EC, EN, TLK	Flat	1	49
	Bratislava	Sofia	950	23	2	OS, REX, EN, D	Flat	1	41
	Budapest	Sofia	760	18,8	0	D	Flat	1	40
	Sofia	Constanta	600	15	1	R	Flat	1	40
	Vilnius	Lublin	500	16,2	3	D, R, TLK	Flat	1	31
	Warsaw	Riga*	700	28	1	D	Flat	1	25

* only night trains available

Source: own compilation based on timetables from DB rail navigator

Table 2 compares the travel times by road for the same OD-pairs using the Here journey planner. For the high-speed rail links in the EU-15, average travel times are substantially higher by road than by rail (about 50%). Conversely, in the case of the CEMS we can conclude that, apart from Warsaw-Prague which has a comparably high average speed of rail, using the road would be roughly twice as fast as using rail. Road transport for OD-pairs involving the Baltic States, Romania or Bulgaria reveal about 30% lower average speeds than in the EU-15 Member States.

Table 2: Travel times and speeds of selected European OD-pairs – by passenger road transport

Region	From	To	Distance	Duration	on motorway *	Territory	Average speed	on motorway *
			Km	h	km		km/h	%
EU-15	Barcelona	Seville	1010	9,5	995	Hilly	106	99%
	Paris	Frankfurt	570	5,5	560	Flat	104	98%
	Cologne	Paris	490	4,9	473	Flat	100	97%
	Munich	Verona	430	4,7	416	Alpine	91	97%
CEMS	Zagreb	Bratislava	435	4,5	401	Flat	97	92%
	Warsaw	Prague	680	7,5	266	Flat	91	39%
	Zagreb	Lublin	1145	12,75	809	Flat	90	71%
	Bratislava	Sofia	960	11,8	780	Flat	81	81%
	Budapest	Sofia	770	9,75	592	Flat	79	77%
	Budapest	Bucharest	830	11,1	587	Hilly	75	71%
	Sofia	Constanta	600	8,2	280	Flat	73	47%
	Warsaw	Riga	700	9,8	9,7	Flat	71	1%
	Vilnius	Lublin	500	7,75	-	Flat	65	n.a.

* Distance or share of trip travelled on motorways

Source: own compilation based on maps.here.com

These samples of OD-pairs show that (1) there is a substantial gap in road travel times between the EU-15 and the CEMS, with the Czech Republic, Slovakia and parts of Poland being closer to EU-15 averages, while in the case of the Baltic States, Romania and Bulgaria the difference in speeds is higher. (2) In the case of rail transport the spread of average speeds is significantly greater, with higher rail than road speeds in the EU-15 and lower rail than road speeds in the CEMS.

Of course, the two-way interdependency between demand and supply should not be neglected. Current low demand for rail transport is one reason for insufficient (infrastructure) supply, while lacking (timetable) supply is decreasing demand and shifting it to road transport, as this is roughly twice as fast as rail transport in the CEMS.

As regards railway infrastructure, a systemic deficiency should also be mentioned: the traditional markets of railways such as coal and steel are expected to decline in the future. In contrast with bulk cargo such as this, the demand for unitised and containerised goods transport is expected to grow. However, the share of containerised goods transported by railway in the CEMS is very low. For example, in Poland about 4% of goods on rail are carried in containers. The infrastructure, including terminals, and rolling stock of railways should thus be developed to provide attractive offers for container transport too.

2 TRANSPORT INFRASTRUCTURE ACCESSIBILITY IN CENTRAL AND EASTERN EUROPEAN EU MEMBER STATES

There is no single standard definition of accessibility that can be expressed by means of indicators. In regional economics, accessibility is frequently defined as the generalised costs (time and/or operation costs) of travelling or carrying goods of regional origin to all destinations, averaged over all origins. This can be weighted by different regional characteristics such as population, employment, GDP and purchasing power. Furthermore, the result can be normalised in such a way that lower costs of travel or goods transport will lead to higher values of accessibility. In other fields accessibility is measured simply by average travel times to reach agglomerations or high-quality infrastructure such as high-speed rail, motorways and airports.

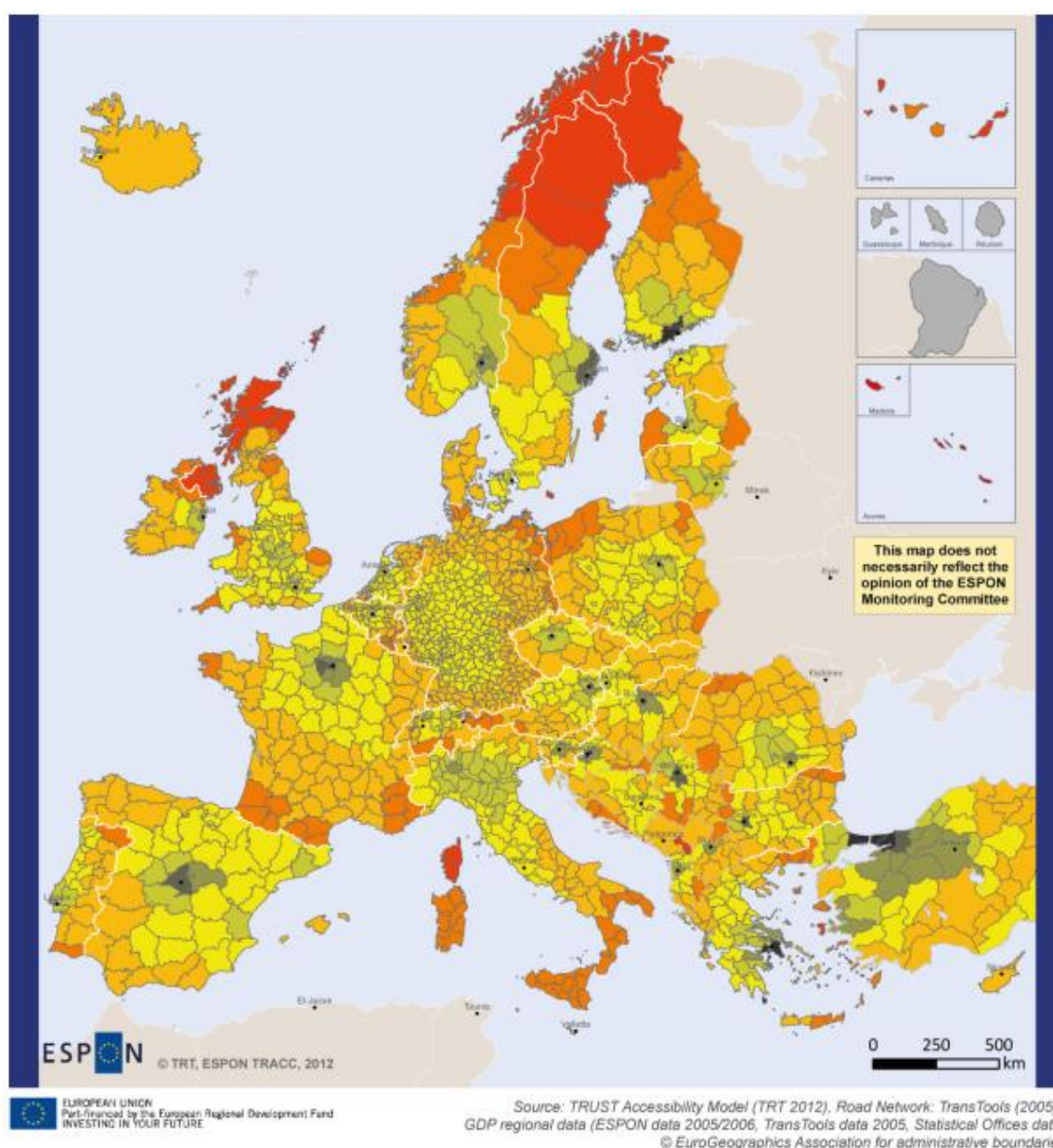
The results of accessibility analyses can be used to compare regions with respect to the quality of their connections to core areas. Higher distances to agglomerations and natural barriers such as mountains, rivers or sea negatively impact accessibility. Conversely, distance or geographical barriers can be mitigated/removed by good transport connections. Better accessibility widens regional options in terms of becoming more competitive and participating in a spatially more balanced growth of the economy.

The results of accessibility analyses are usually presented on maps which use the standard European NUTS nomenclature, i.e. NUTS 0 to 3.⁷ This study assesses a set of such accessibility maps covering the 11 CEMS and encompassing various indicators. Two maps are commented on in the following paragraphs; ten more are shown in the Annex.

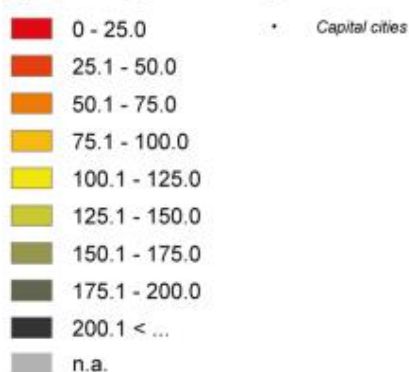
Figure 1 is a map showing potential accessibility to GDP by road freight transport, by NUTS 3 zones. The study was published in 2015 (though GDP and network data refer to 2005, and the analysis was seemingly carried out in 2012). Usually in the CEMS the largest share of GDP is generated in and around the capital city. Therefore it can be expected that regions distant from the economic centres will show low levels of accessibility to GDP (representing an indicator of economic activity) – which in this map is indicated by red and orange zones, while the best levels of accessibility are coloured in grey. As expected, some zones close to the borders of CEMS reveal the worst national accessibility for freight transport in relation to GDP, e.g. in the west and east of Latvia, in the north-west/-east and south-east of Poland, in the north-west and west of Romania and in the north-east of Bulgaria.

⁷ The Nomenclature of Territorial Units for Statistics (NUTS) is used to subdivide EU Member States for statistical purposes. NUTS-3 comprises zones between 150 000 and 800 000 inhabitants (i.e. approximately county level).

Figure 1: National potential accessibility to GDP by road freight transport



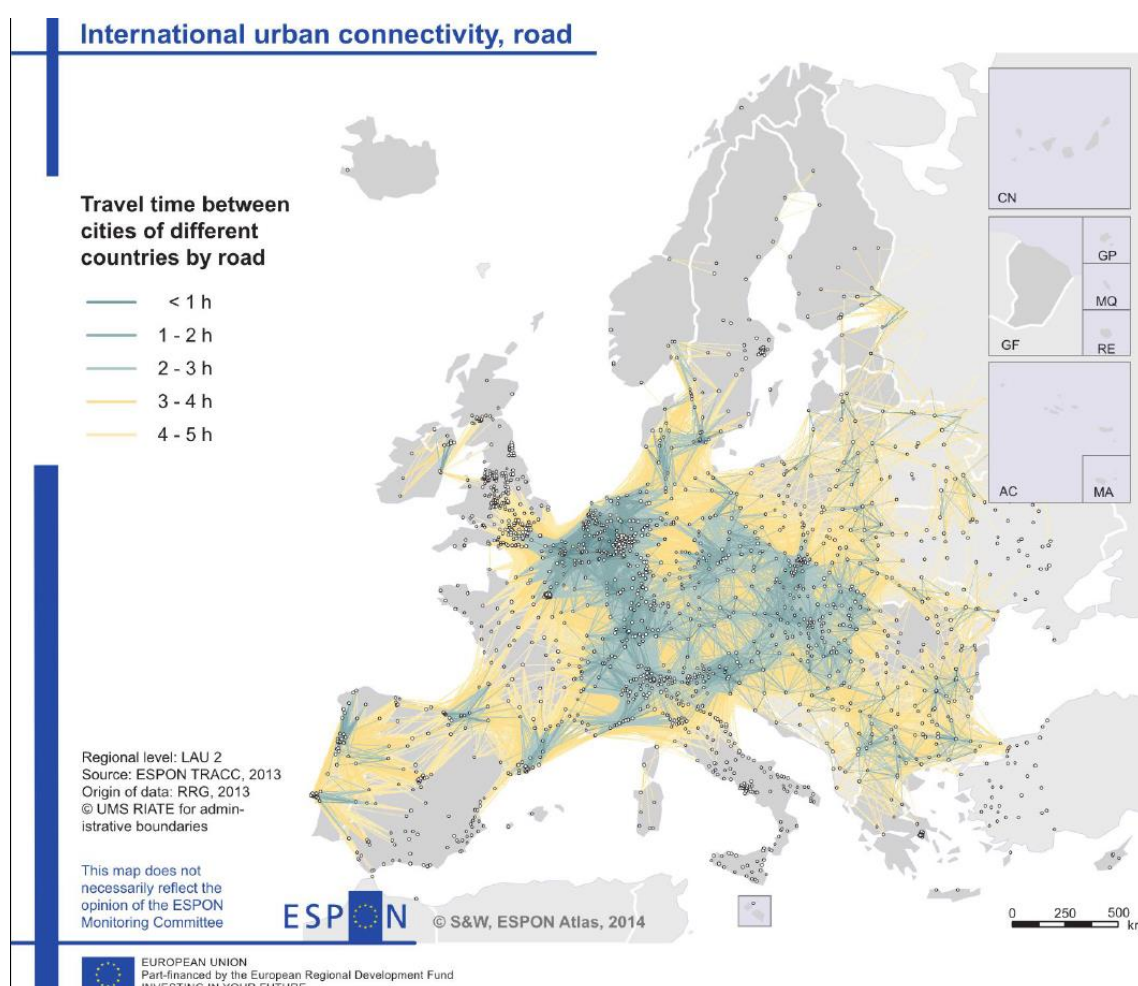
National potential accessibility freight (2011):
Accessibility potential to National GDP by road
(percentage of average accessibility by road of all areas of the same country)



Source: Spiekermann et al. 2015: [Transport Accessibility at Regional Scale in Europe TRACC Scientific Report](#). Luxembourg: ESPON.

Figure 2 shows the international connectivity of urban nodes by road. This can be regarded as an indicator of opportunities to establish trade and tourism connections to foreign countries. The connectivity depends on infrastructure available and distance to urban nodes abroad. The green areas indicate travel times of less than 3 hours, the yellow areas of between 3 and five hours. Grey areas are not connected to other countries within a travel time of 5 hours. Figure 2 shows that the following three areas are poorly connected with international neighbours: (1) Estonia and Latvia, (2) central and northern Poland, and (3) central and northern Romania. Similarly, large parts of south-east Spain and western France are not connected to other countries within 5 hours because of: the distance to foreign urban nodes (which is also affected by the size of the country), the terrain between the nodes and the quality of the infrastructure.

Figure 2: Connectivity of urban nodes to international destinations within 5 hours of road travel or less



Source: http://atlas.espon.eu/pages/5_3_1/5_3_1_6/figure.html

The Annex also shows the following accessibility maps related to transport infrastructures and transport services:

- Access to high-level passenger transport infrastructure at NUTS-3 level;
- Comparison of speeds of passenger rail services in the EU;

- Congestion on roads with speeds over 100km/h near EU functional urban areas;
- Access to high-level freight transport infrastructure at NUTS-3 level;
- European potential accessibility to GDP by containerised rail freight transport;
- Regional and local accessibility by car in Poland;
- Regional and local accessibility by car in the Baltic States;
- Regional and local accessibility by car in the Czech Republic;
- Development of the Polish motorway network until 2011;
- Development of average road travel speed on core TEN-T network 1955 to 2012.

An important issue regarding accessibility is referred to in several 'corridor studies' and mentioned in a World Bank report on Polish transport policy (2011): it is the poor maintenance of, in particular, railway infrastructure.

From the 1990s the national priority for transport infrastructure investment in the CEMS was road transport, while underinvestment in rail maintenance prevailed, so that many rail links are in poor condition, causing major speed restrictions. The 'corridor studies' frequently mention speed limits of about 40 km/h, which may also hold for tracks with original design speeds of 120 km/h. Investing in railway maintenance should be a primary issue on such tracks, with priority for links with both poor conditions and significant importance for rail transport and the railway network.

In Poland a particular issue is the emphasis in the last two decades in infrastructure investment on establishing east-west connections rather than north-south connections. This was a reasonable approach in order to connect the country with the EU-15 and strengthen mutual (economic) relationships after a long period of separation. It would now be advisable, however, to assess whether this initial orientation of infrastructure improvements should not shift more towards prioritising north-south links in the next planning period.

When one looks at the various accessibility maps presented in this note and its annex, the pattern that emerges is that certain regions suffer more than others from weak accessibility. Starting from the north, the three Baltic States perform weakly in terms of accessibility, with specific weaknesses in the eastern and western border regions of Latvia. In Poland, the northern part along the Baltic Sea shows the lowest levels of accessibility, followed by the eastern part, which in particular suffers from weak connections to higher-quality freight transport infrastructure. Further to the south, Romania and Bulgaria have general accessibility problems, most severe in the north-east of Romania, whereas the Czech Republic, Slovakia, Slovenia and Hungary have improved their accessibility, apart from cross-border links and the most eastern regions of Slovakia and Hungary⁸.

⁸ The Croatian situation is difficult to assess because of, notably, less complete data than for the other Member States: many of the underlying data use 2005 as a baseline.

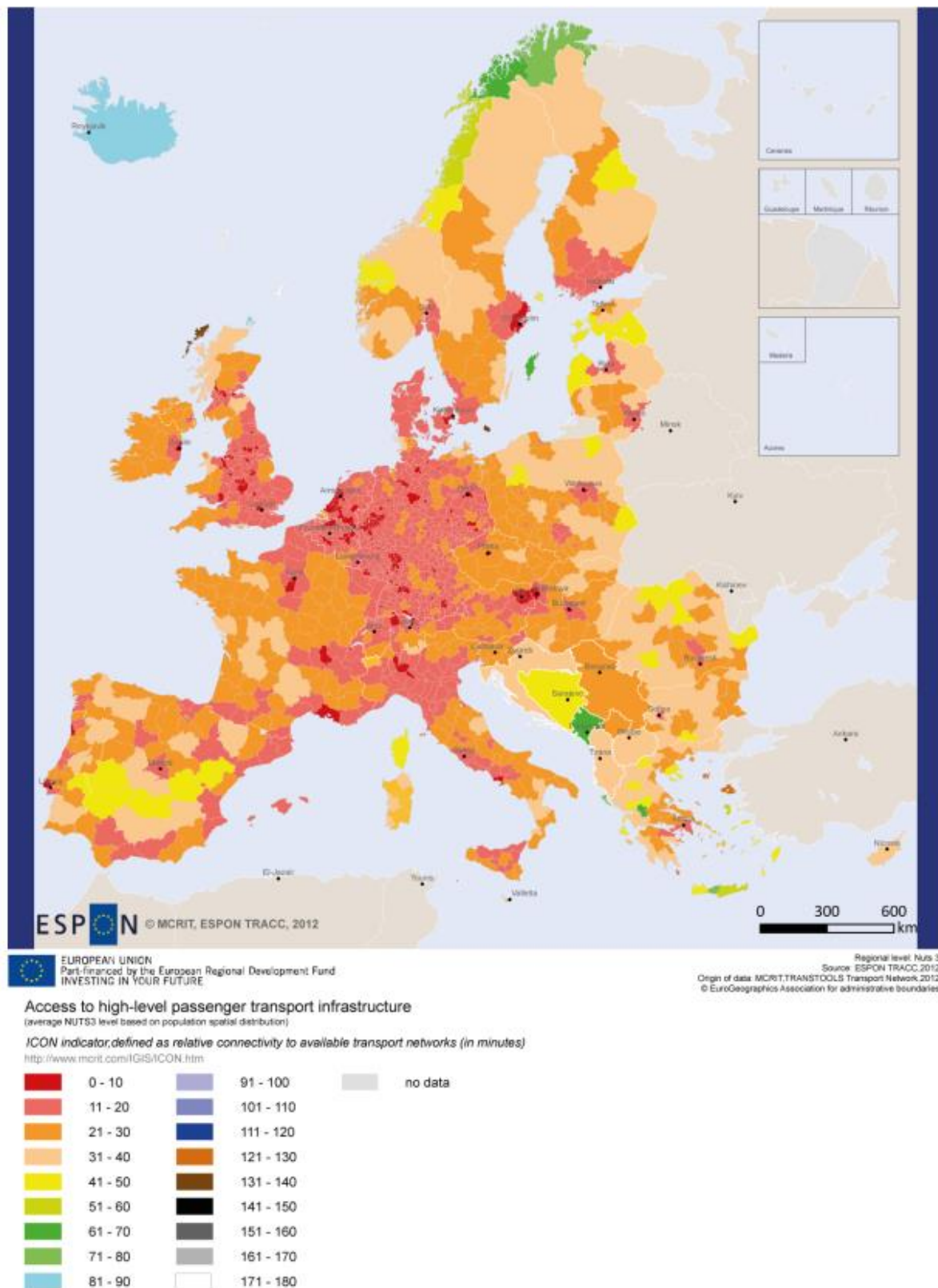
3 CONCLUSIONS

- The single most important gap seems to be the missing **north-south railway connection through the three Baltic States** (so-called Rail Baltic), which should be implemented in standard gauge, enabling high-quality rail services between the three states and connecting them, via Bialystok and Warsaw, to the railway network of the other Member States. The track on the Polish side also requires significant upgrades and extensions in order to offer a competitive quality of service.
- Further significant gaps and bottlenecks exist in **the triangle region between Poland, the Czech Republic and Slovakia**. This concerns in particular cross-border railway connections and a road link between Katowice (PL) and Zilina (SK).
- The **port of Koper** is facing a severe bottleneck in its railway hinterland connection towards Divaca, which needs to be upgraded towards a double-track connection. Further north, around Ljubljana, freight trains could face a second bottleneck in the near future.
- An important and immediate improvement in accessibility could be achieved by improving and **investing in the maintenance of railway tracks** in the CEMS, for instance in Poland, Slovakia, Romania and Bulgaria.
- Restructuring of goods markets with decreasing demand for bulk cargo and increasing demand for containerised transport requires an adaptation of the **railway infrastructure and rolling stock to accommodate effective transport and transshipment of containers**.
- Given the improved relationship with the Western Balkan countries, it seems reasonable to consider that in parallel with the southern branch of the Orient-East Med (OEM) corridor, there exists a well-developed rail line connecting Austria and Hungary with Greece via Belgrade. This line saves 300 km of travel distance compared with the OEM alignment, so it would make sense to **adapt the alignment of the OEM** on this section.
- In central areas of the CEMS, it can definitely be argued that the infrastructure standards required by the TEN-T regulation are needed to accommodate (future) demand. However, in more peripheral and sparsely populated regions, in which bundling of flows from different origins is less to be expected, consideration should be given to implementing railway infrastructure at lower standards, e.g. by reducing the maximum speed requirement. The TEN-T regulation allows for lower standards to be implemented for new infrastructures in 'duly justified cases'. However, it should be taken into account that electrification and speeds competitive with road transport are important assets for a robust railway system. It seems that **'duly justified cases' for implementing infrastructure at lower standards** are given in connection with, for example, links in Romania and Bulgaria.
- In **Poland** in particular, the last two decades have seen an east-west orientation for infrastructure improvements. Consideration should be given to shifting the orientation of structural funds towards putting more emphasis on **improving the north-south connections**, whereas the TEN-T funds should remain dedicated to implementing the core network.

- **Weak accessibility indicators** are observed in the case of the three Baltic States, with particular weaknesses in the eastern and western border regions of Latvia. The northern part along the Baltic Sea reveals the lowest levels of accessibility in Poland, followed by the eastern part, which suffers in particular from weak connections to higher-quality freight transport infrastructure. The most eastern regions of Slovakia and Hungary are facing accessibility deficits. To the south, Romania and Bulgaria have general accessibility problems, the most severe being in the north-east of Romania.

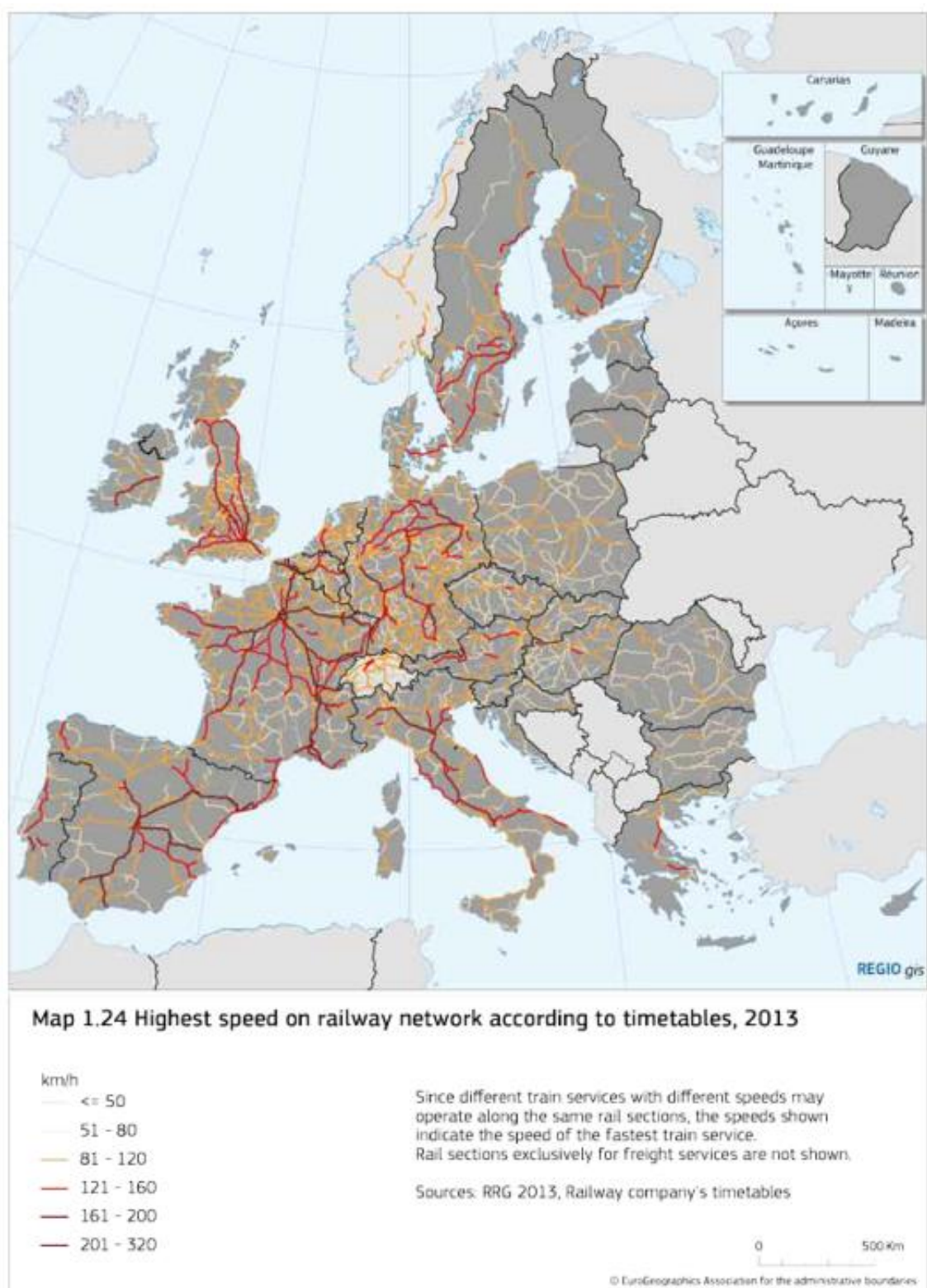
4 ANNEX

Figure 3: Access to high-level passenger transport infrastructure at NUTS-3 level



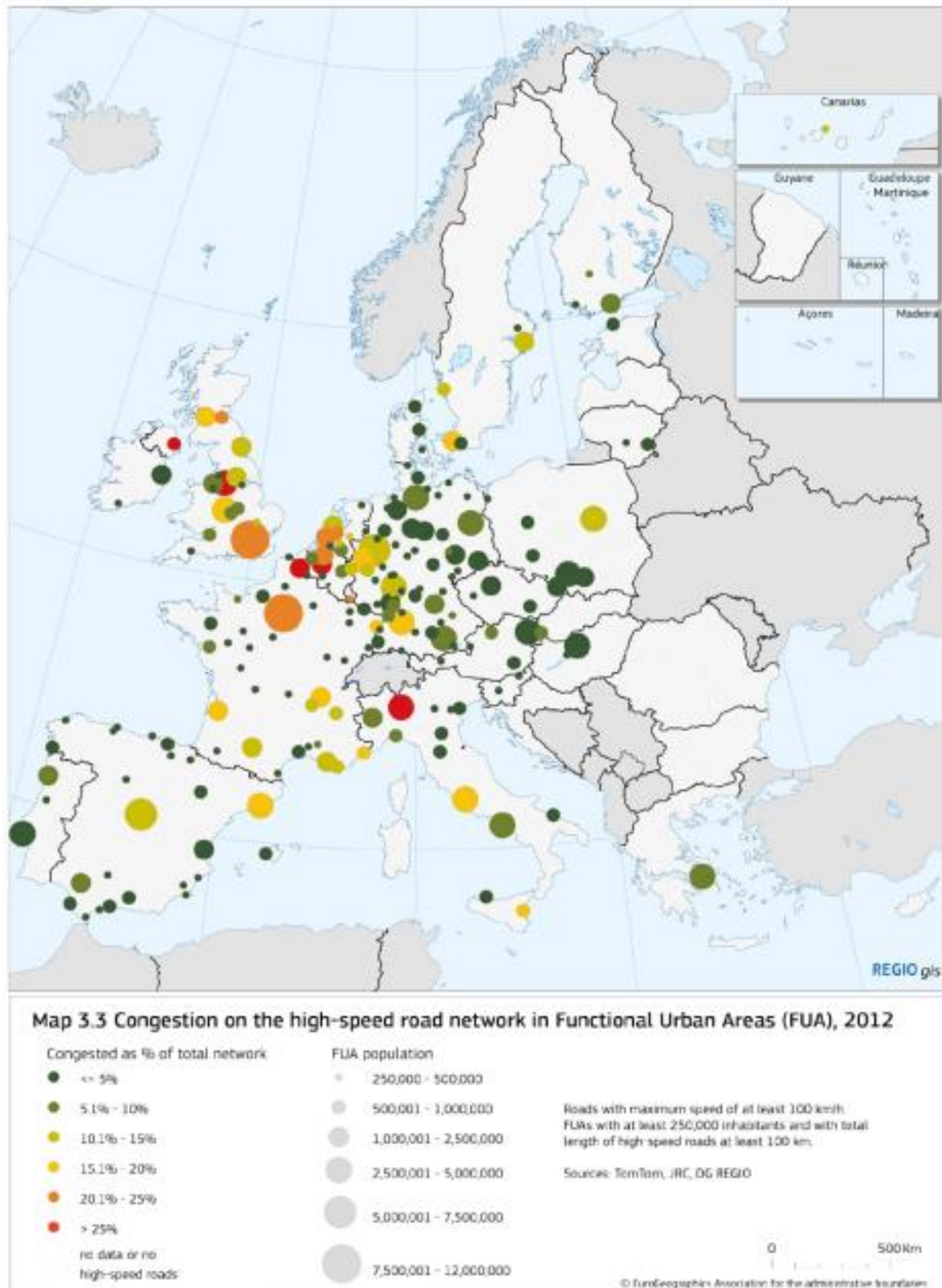
Source: Spiekermann et al. 2015: [Transport Accessibility at Regional Scale in Europe TRACC Scientific Report](#).
Luxembourg: ESPON.

Figure 4: Comparison of speeds of passenger rail services in the EU



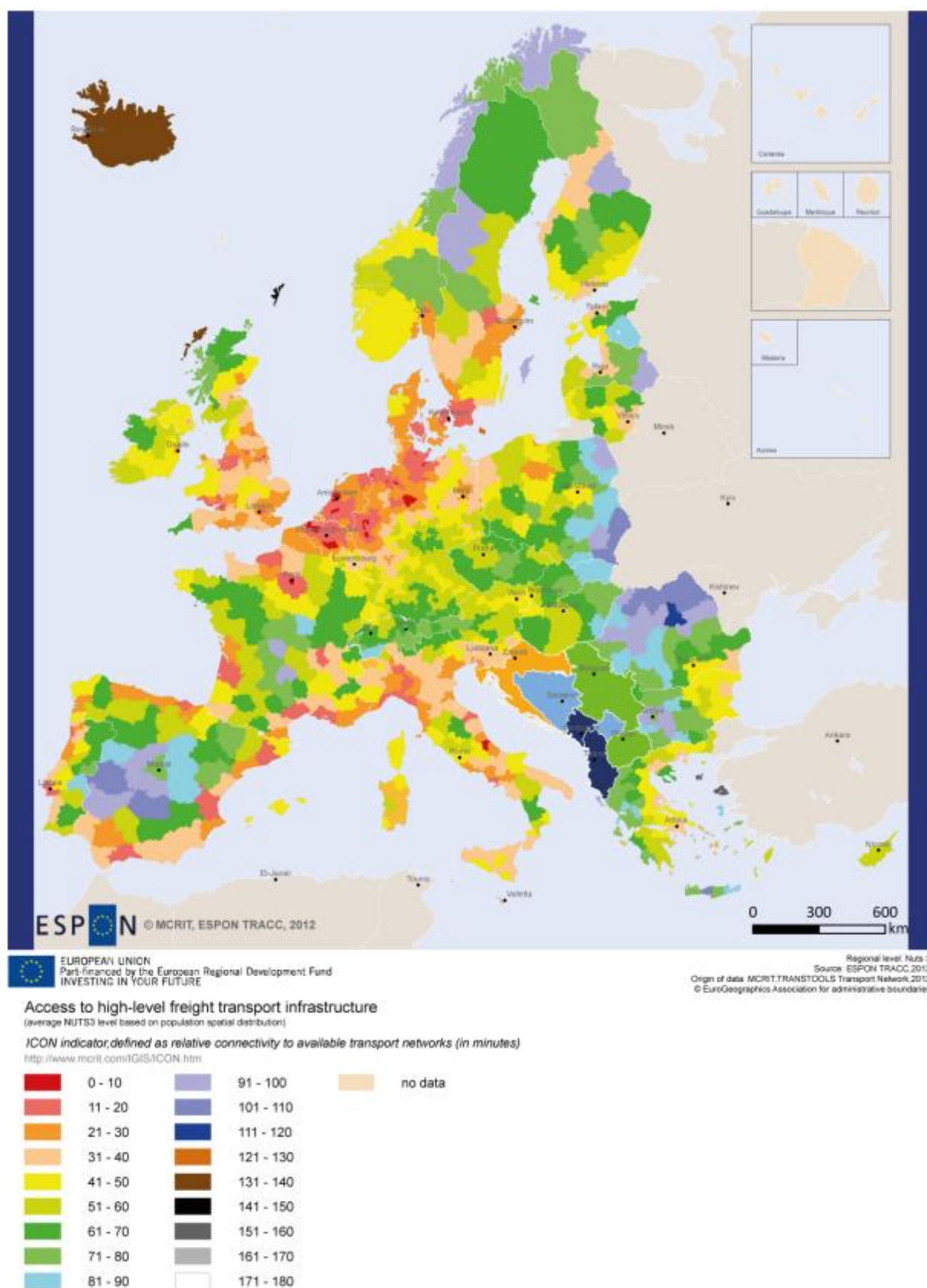
Source: Dijkstra & European Commission 2014: 6th Cohesion Report, 2014

Figure 5: Congestion on roads with speeds >100km/h in the vicinity of functional urban areas in the EU



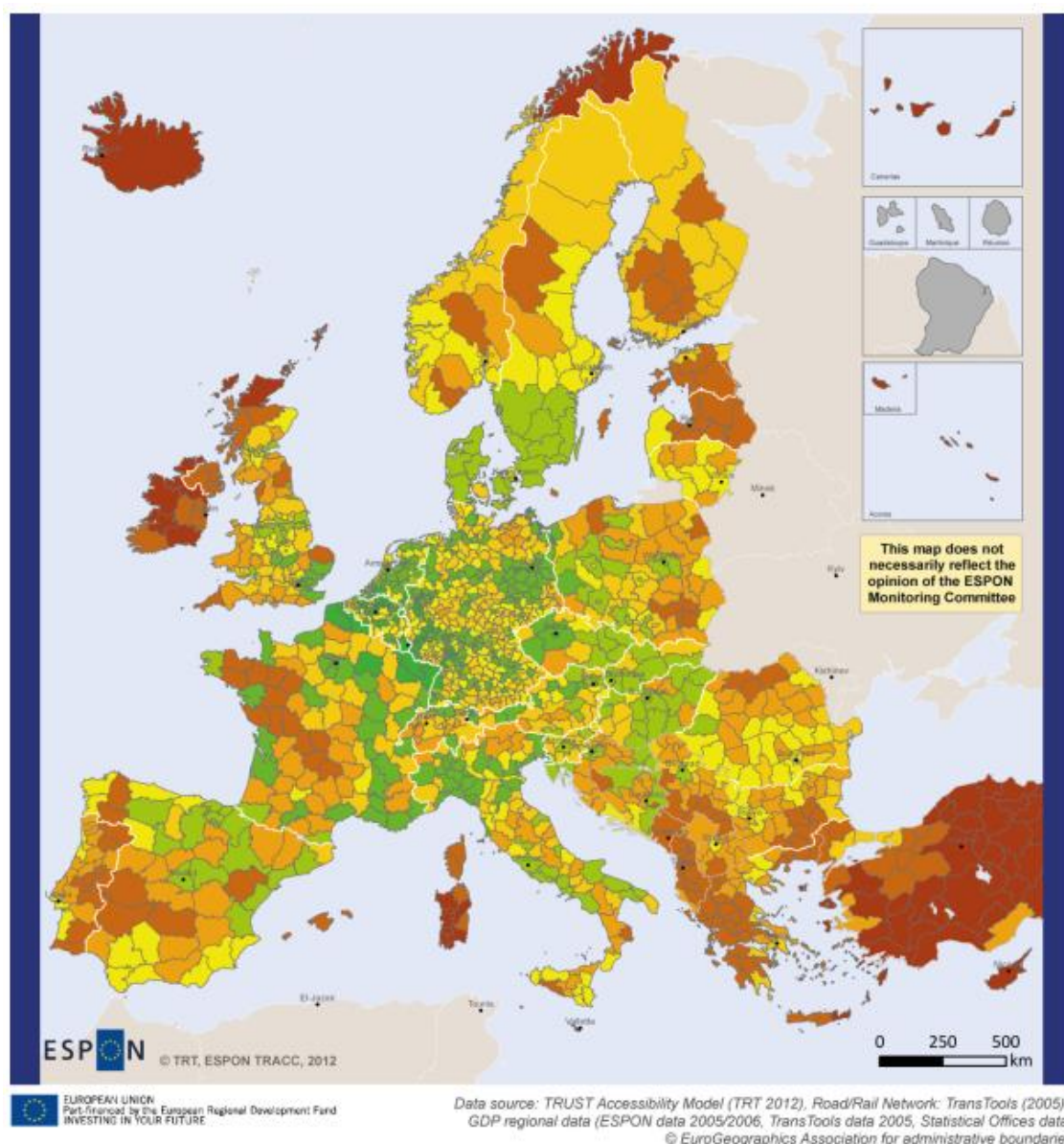
Source: Dijkstra & European Commission 2014: 6th Cohesion Report, 2014

Figure 6: Access to high-level freight transport infrastructure at NUTS-3 level

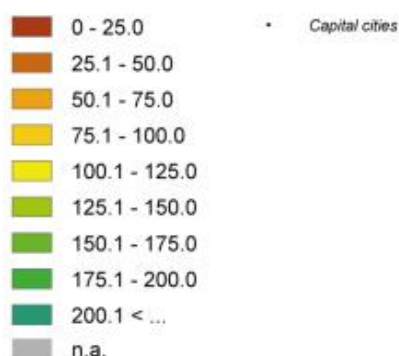


Source: Spiekermann et al. 2015: [Transport Accessibility at Regional Scale in Europe TRACC Scientific Report](#).
Luxembourg: ESPON.

Figure 7: European potential accessibility to GDP by containerised rail freight transport



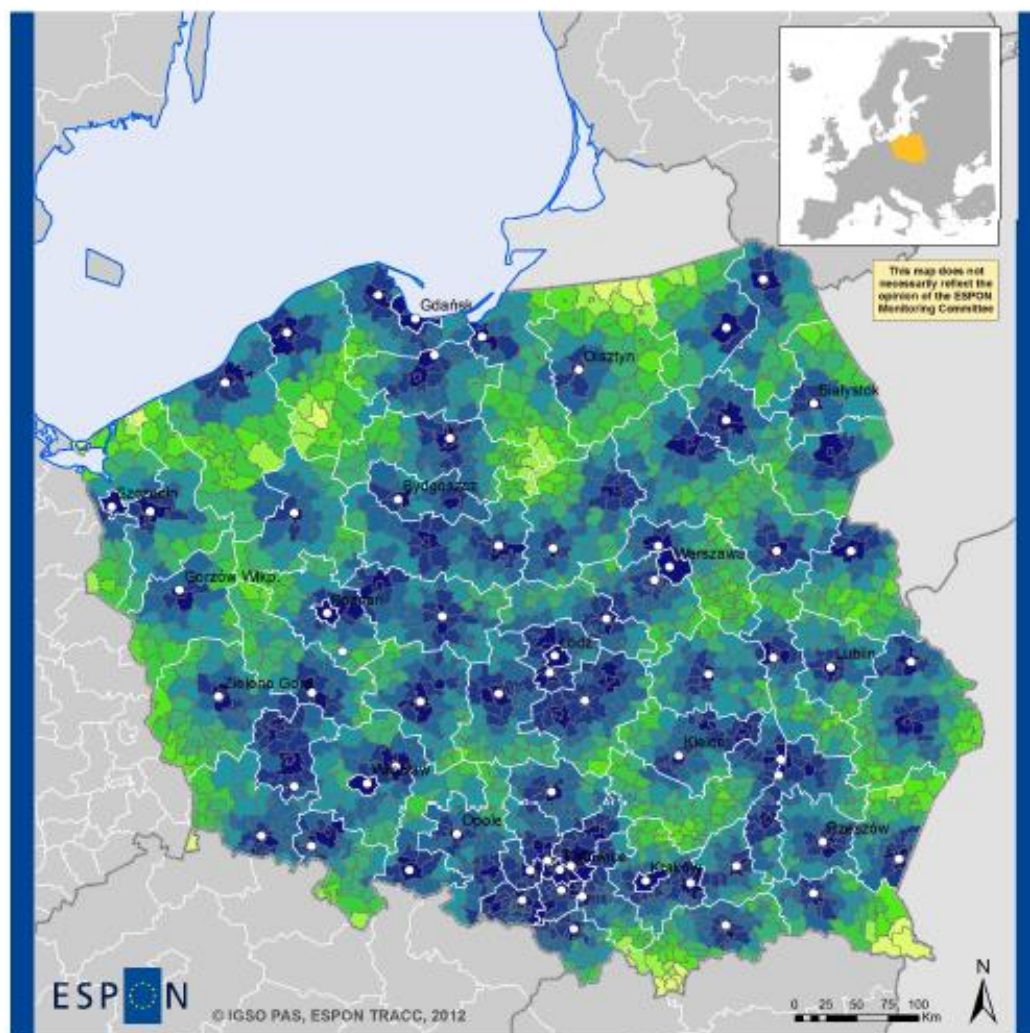
European potential accessibility freight (2011):
Accessibility potential to GDP by rail (unitised)
(percentage of average accessibility by rail (unitised) of all areas)



Source: Spiekermann et al. 2015: [Transport Accessibility at Regional Scale in Europe TRACC Scientific Report](#).
 Luxembourg: ESPON.

Figure 8: Regional and local accessibility by car in Poland

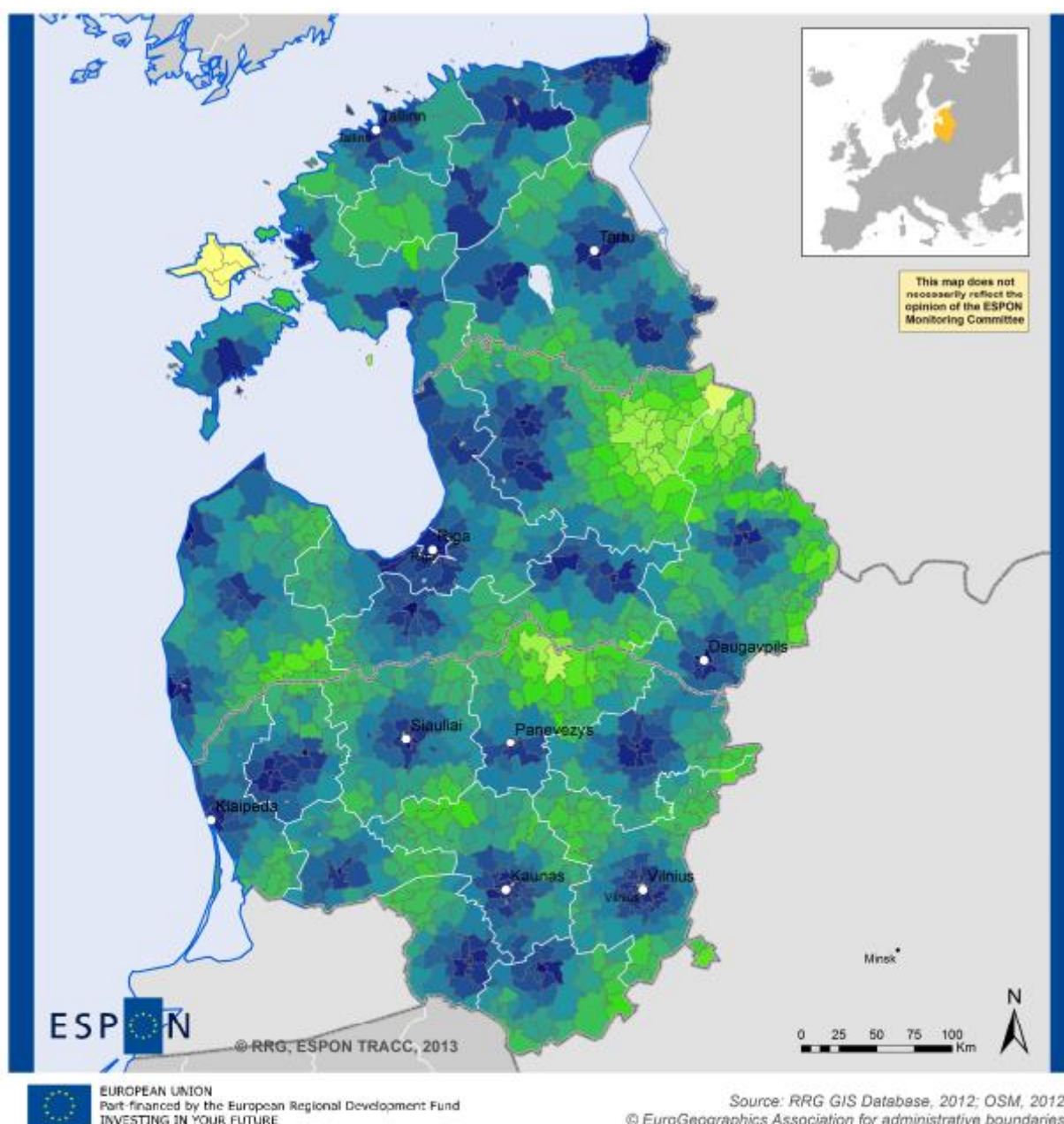
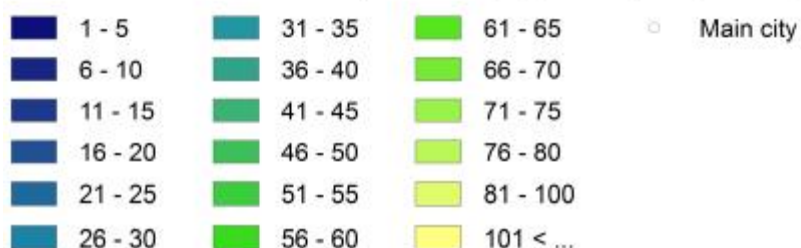
Figure 8 shows that in most Polish regions, the next regional centre can be reached within 20 minutes by car. There seem to be some regions in the north that are particularly disconnected from their regional centres. So is the case in the south-east, though besides infrastructure quality this also depends on the distance to the next regional centre, which is greater in these regions. Accordingly, the accessibility is high in regions between Warsaw, Lodz and Katowice, as well as towards Poznan and Wrocław.



Poland Case Study Travel time by car to next regional centre



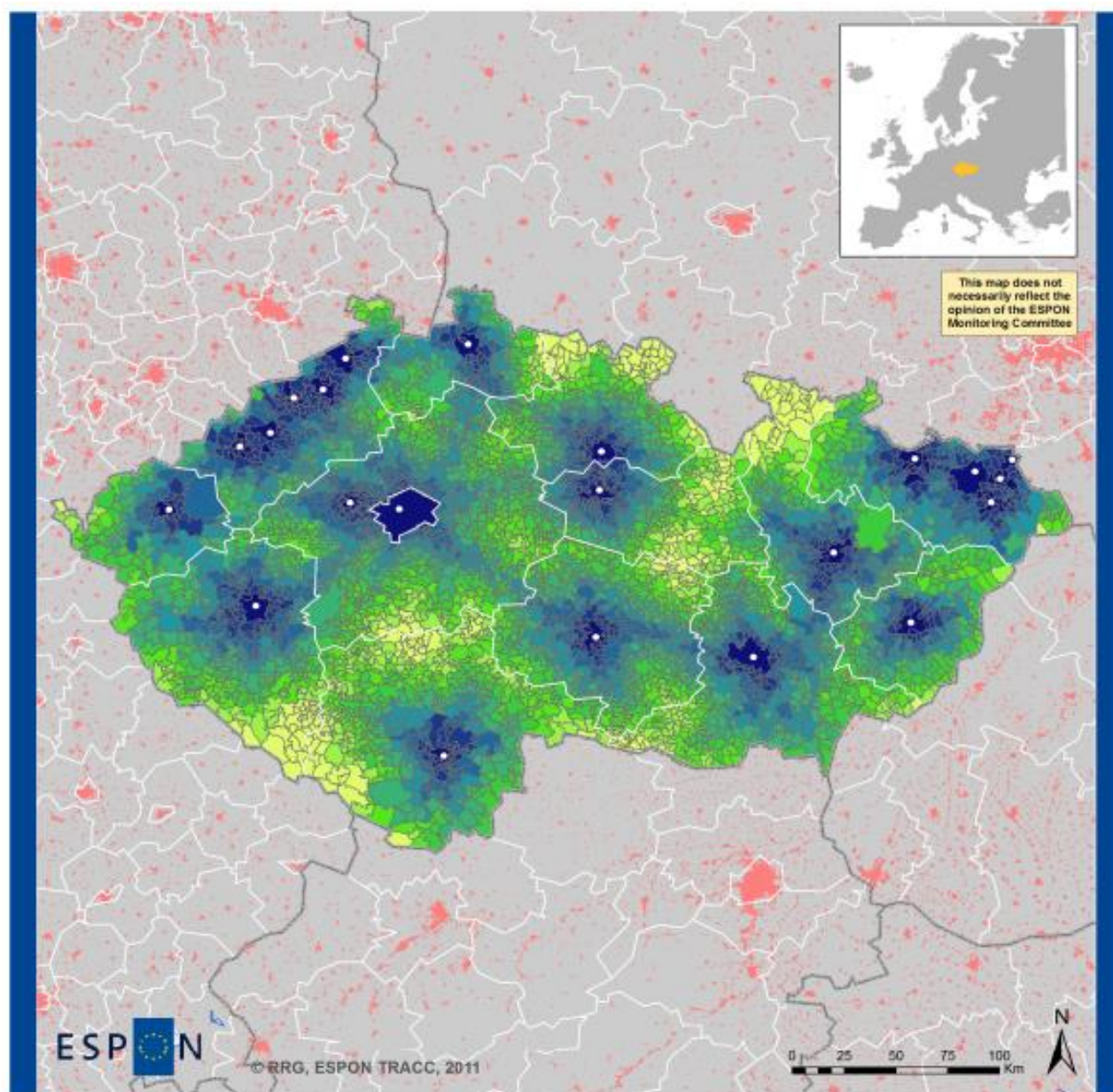
Source: TRACC Transport Accessibility at Regional/Local Scale and Patterns in Europe – Volume 3 TRACC Regional Case Study Book – Part E Poland case study (2013)

Figure 9: Regional and local accessibility by car in Baltic States**Baltic States Case Study****Travel time to nearest regional city by road (min; LAU-2), 2012**

Note:
LAU-2 figures calculated as weighted
averages over 2.5x2.5 km raster grid cells.

Source: TRACC Transport Accessibility at Regional/Local Scale and Patterns in Europe – Volume 3 TRACC Regional Case Study Book – Part E Poland case study (2013)

Figure 10: Regional and local accessibility by car in Czech Republic



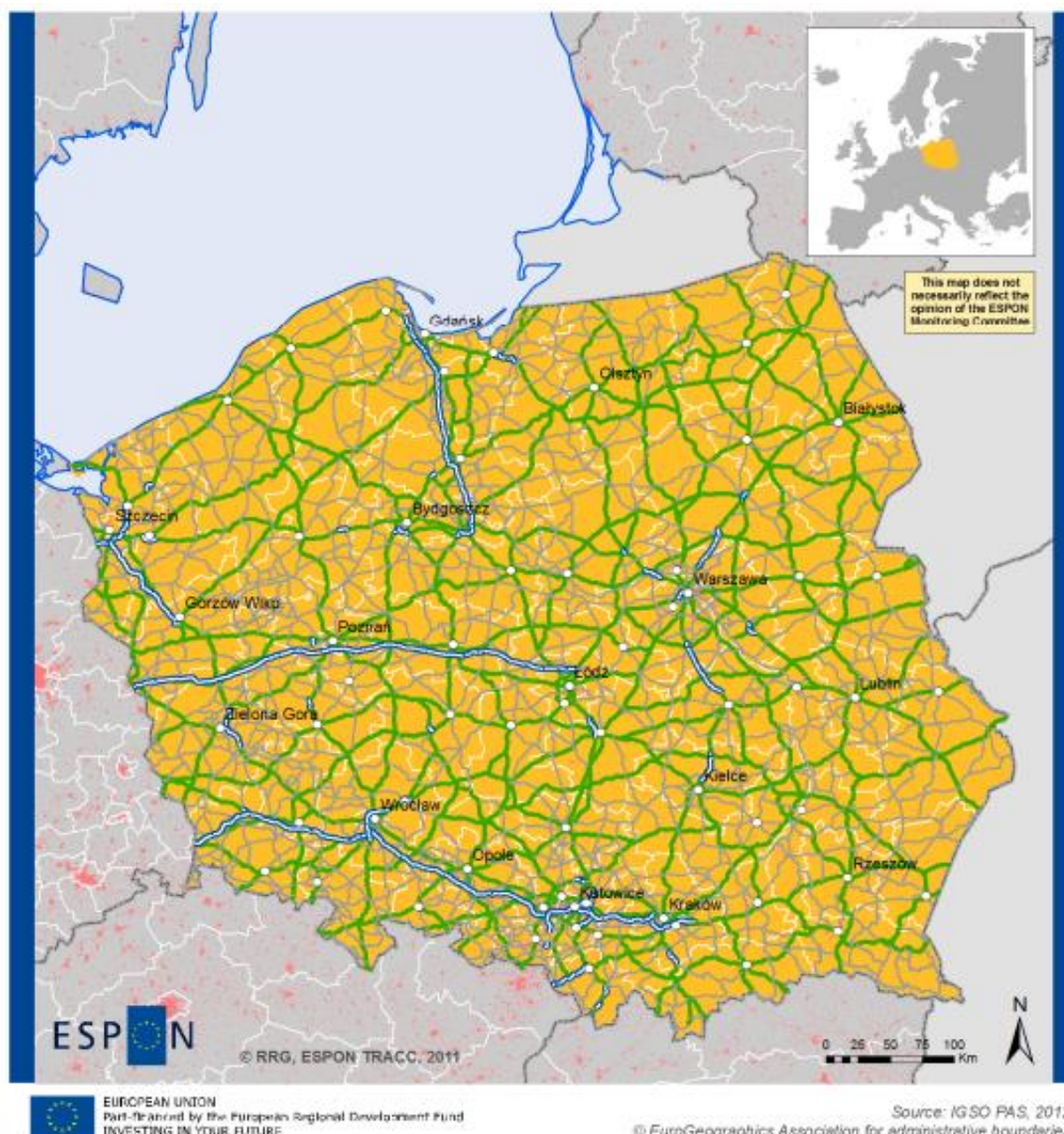
Source: PrF UK Prague - accessibility model CAR
Origin of data: ESPON Databank Project, 2010/2011
© EuroGeographics Association for administrative boundaries

Czech Republic Case Study
Travel time to regional centre by car [min]



Source: TRACC Transport Accessibility at Regional/Local Scale and Patterns in Europe – Volume 3 TRACC Regional Case Study Book – Part E Poland case study (2013)

Figure 11: Development of the Polish motorway network until 2011 – new connections more substantial in West-East directions

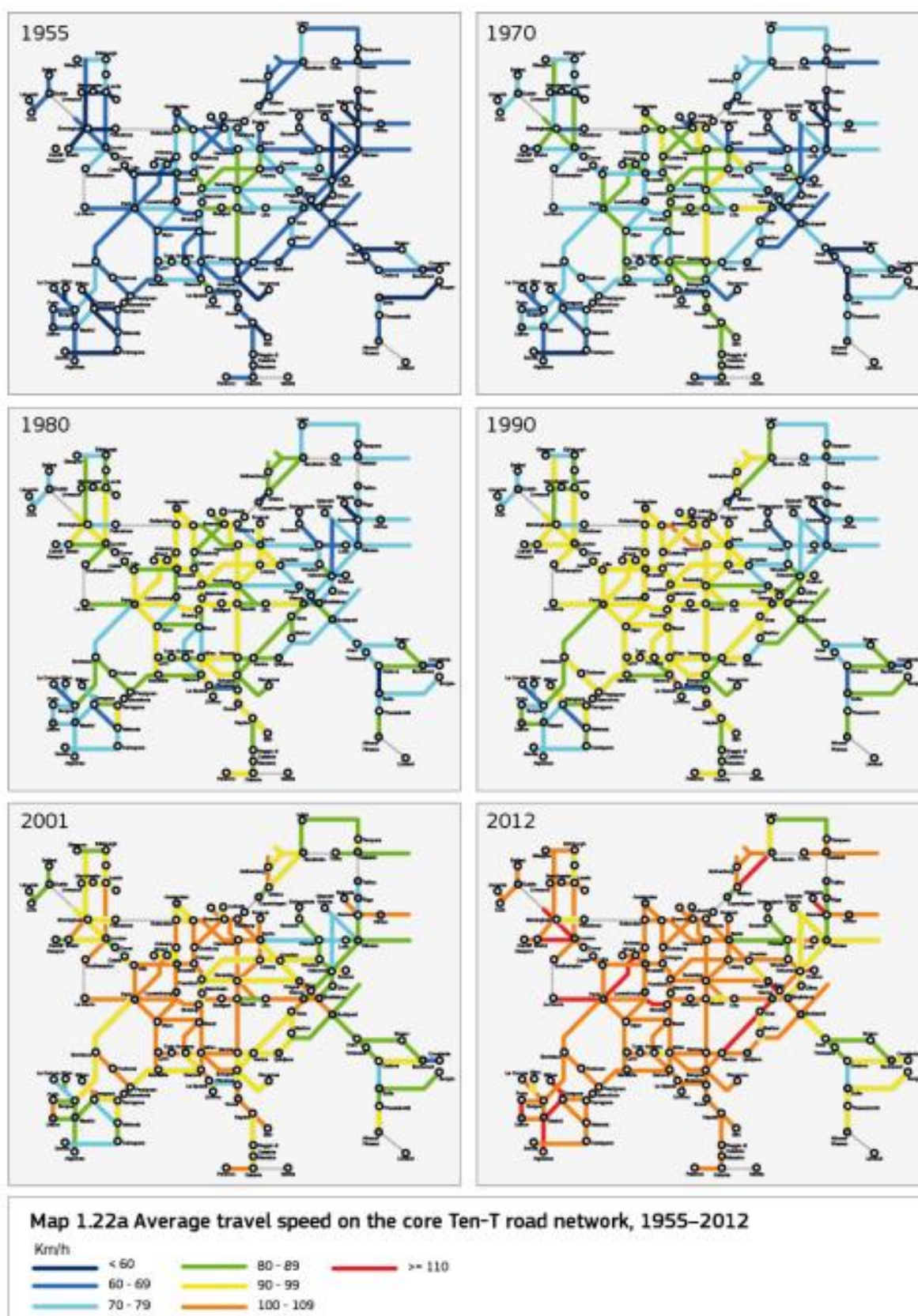


Poland Case Study Private transport network

Road category	○ NUTS 3 Capital
— Motorways	■ Settlement area
— Primary roads	■ Maco-region: municipalities
— Secondary roads	

Source: TRACC Transport Accessibility at Regional/Local Scale and Patterns in Europe – Volume 3 TRACC Regional Case Study Book – Part E Poland case study (2013)

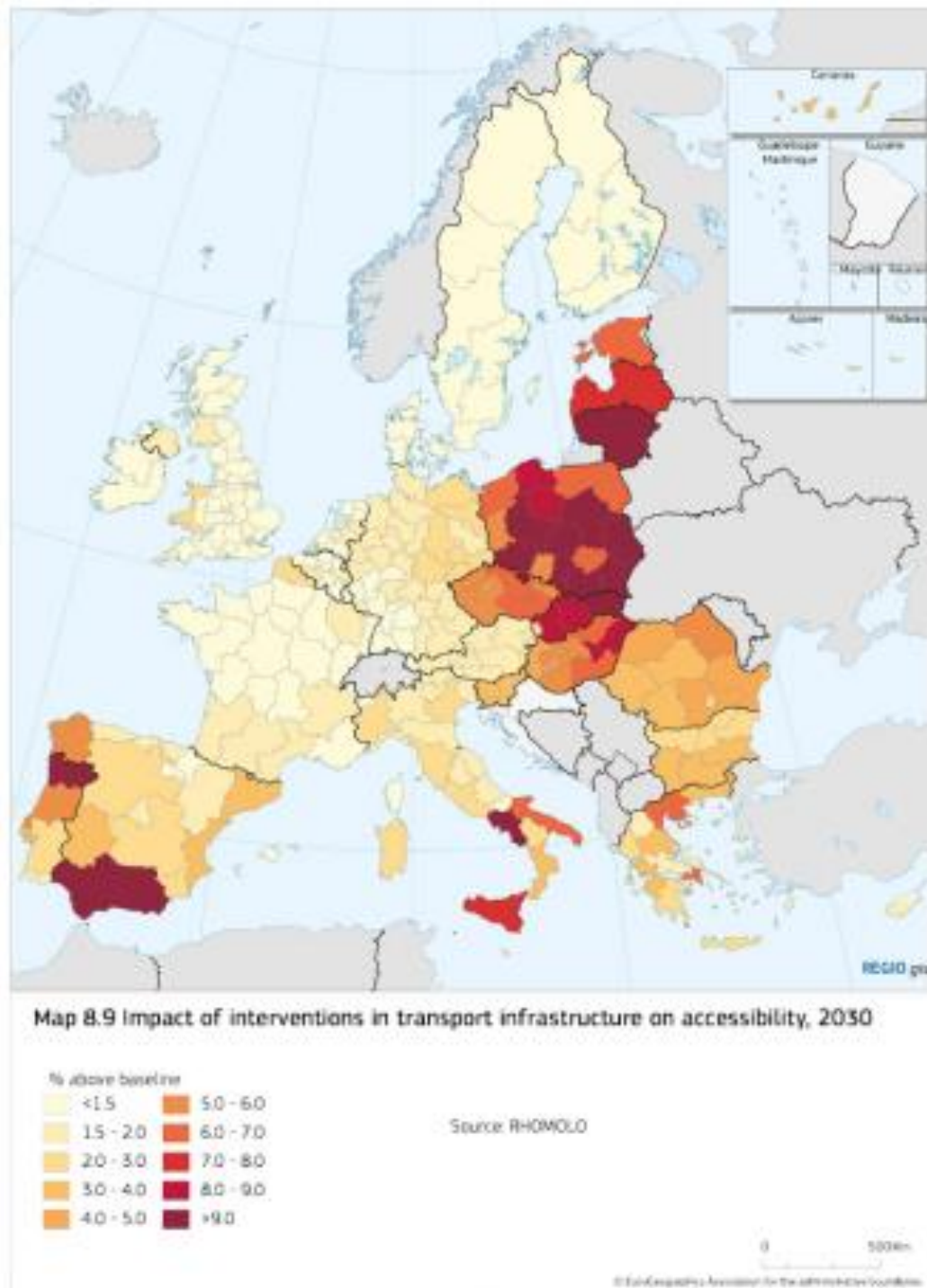
Figure 12: Development of travel speed on the core TEN-T road network from 1955 to 2012



Source: Dijkstra & European Commission 2014: 6th Cohesion Report, 2014

Figure 13: Estimated impact on accessibility of EU co-financed investment in transport infrastructure until 2030 – percentage change to baseline

Figure 13 provides a prospective analysis of accessibility until 2030. It shows the changes in accessibility due to transport infrastructure investments co-financed by the EU until 2030 and compares the resulting accessibility with a baseline without such interventions. Obviously, specific EU-15 MS and CEMS benefit from the transport policy. Among the EU-15, in particular Northern Portugal, South-West Spain and Southern Italy benefit. Among CEMS, the Baltic States, Poland (the South-East more than the North-West), Slovakia and Eastern Hungary see the largest improvement of their accessibility.



Source: Dijkstra & European Commission 2014: 6th Cohesion Report, 2014

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