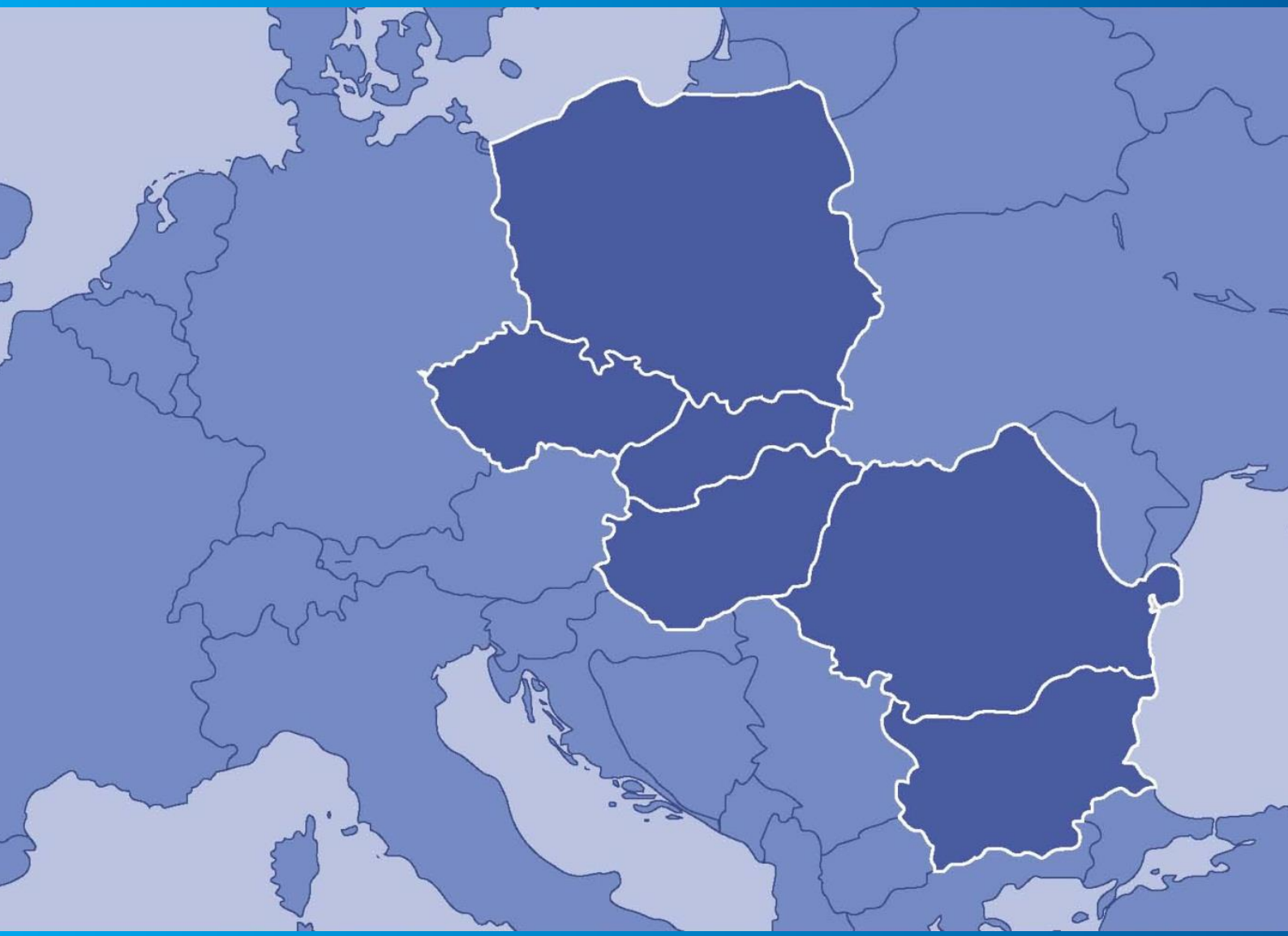
COMMON SPATIAL DEVELOPMENT STRATEGY OF THE V4+2 COUNTRIES



Common Spatial Development Strategy of the V4+2 Countries

Main working coordinator

Institute for Spatial Development, the Czech Republic

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I INTRODUCTION

1 Basic information

The Common Spatial Development Strategy of the V4+2 Countries (hereinafter also ***Common strategy***) is another milestone of our cooperation in the field of spatial development of the EU countries – the Czech Republic, Hungary, Poland, Slovakia (the Visegrád group – V4), Bulgaria and Romania (+2).

The Common strategy stems from the *Common Spatial Development Document of V4+2 Countries* (hereinafter also ***Common document***), which resulted in the Ministerial conclusions of the ministers responsible for regional development of the Visegrád four, Bulgaria and Romania, adopted on 29th March 2010 in Budapest.

In these conclusions, the ministers among other things acknowledged the work of the Steering group, its orientation towards the spatial development coordination of the countries in an international context and, in point 2, in the second dash of the Ministerial Conclusions, they called upon the Steering group: *"to formulate the common spatial development strategy of the V4+2 countries in a European context".*

The Ministerial conclusions on a common document also imposed to solve identified no-continuations of development axes and transport networks. Current state of the solutions is shown in Attachments 1 and 2 of *Common Strategy.*

The basis of the actual cooperation of the participating countries as well as its drive is the jointly shared idea that spatial development of countries and regions should it be successful and sustainable, cannot be isolated and without connections with neighbouring countries and regions. Spatial development without the knowledge of needs and possibilities of our neighbours is a contradiction.

Most important for a successful cooperation is mutual awareness, sharing of knowledge, joint communication and interconnectedness. In this context, it is apparent why the main topic of the existing spatial development coordination is ascertaining the obstacles which prevent joint communication, ascertaining the character of these barriers, if and how they can be overcome by joint effort and used for common benefit. In some cases, barriers on common borders of countries can be an impulse for collectively beneficial development of the territory, for the development of mutually supportive activities on both sides of the existing obstacles in mutual cooperation.

2 From the Common Spatial Development Document of the V4+2 Countries to the Common Spatial Development Strategy of the V4+2 Countries in the European context

The *Common Document* was elaborated as a background for the update of the national spatial development documents of the participating countries. In the *Common Document*, the following measures were taken:

- delineation and a unified expression of development poles, development axes and transport networks on the territory of the V4+2 countries resulting from valid national and European spatial development documents and international agreements,
- identification of cross-border (interstate) no-continuations of development axes and border (interstate) no-continuations within the individual transport networks on the territory of the V4+2 countries, i.e. pointing out the barriers interfering with the polycentric development and spatial cohesion on the territory of these states.

The elaboration of the *Common Strategy* required from the Steering group to:

- find an agreement in the understanding of spatial development,
- name common spatial development problems, which it is necessary to solve in a coordinated manner and in mutual cooperation and agreement
- determine the content and orientation of this strategy.

Spatial development

In this C*ommon strategy*, spatial development is understood as a development of values and possibilities within a territory, which brings profit to all involved. Such spatial development is the main idea/thought of this strategy. Ascertaining, overcoming of barriers and their utilisation for the common spatial development of neighbouring countries and regions, is the principal aim of the common strategy.

Naming of common spatial development problems

On the basis of a joined discussion, the Steering group determined the themes of the *Common strategy,* which are the content of chapter II. In this analytical part of the strategy, each theme is described in a/an:

- introduction to the subject matter,
- state of the problems and ascertained problems,
- limits and possibilities of solutions.

The territory of the participating countries is considerably extensive and there is no specific geographic characteristic or phenomenon that would unify it into a single geographic unit, which would substantiate the *Common Strategy*. Therefore, its reason cannot be e.g. just the Carpathian Mountains or Danube river valley, which are part of this territory only in some partner countries.

Problems that the participating countries have in common are caused especially by the separation of Europe into the so-called Eastern and Western block, for more than 40 years. Although, this political as well as economic barrier ceased to exist for more than 20 years, and even though the participating countries have been part of the EU already since 2004, or 2007, the consequences of this isolation are still significant. They manifest themselves not only in regions along the former "Iron Curtain", but also in regions within the territory of the participating countries and in other countries of the former Eastern block. Hence, solving of these problems requires a specific approach and endeavour not only from countries, participating on this Common Strategy, but also from the neighbouring EU member states, EU institutions as well as neighbouring countries outside the EU. In many cases, these problems produce other needs than what countries of the so-called Western Europe have.

European context of the *Common Strategy*

Since its specification in the year 2011, the European context has evolved during the elaboration of the *Common Strategy*. Of a crucial significance is the text of the *Territorial Agenda of the European Union 2020 – Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions*, agreed at the informal Ministerial Meeting of Ministers responsible for Spatial Planning and Territorial Development on 19th May 2011 in Gödöllő, Hungary (hereinafter also *TA EU 2020*).

3 Aim and utilisation of the Common Strategy

The *Common Strategy* focuses on the coordination of the solving of common spatial development problems and on the support of spatial cohesion in Europe. *The Common Strategy* is intended especially for the field of spatial planning and regional development, which is oriented on planning, preparation and implementation of changes within an area with the aim to provide it with necessary services of general interest[1].

The aim of the *Common Strategy* is to:

- contribute to the coordination and update of national spatial development documents and development of transport networks and technical infrastructure networks,
- support spatial cohesion in Europe (see *TA EU 2020* part I),
- facilitate the coordination of various sectoral policies, which influence spatial development,
- provide the V4+2 countries with arguments and support during discussions at the EU level regarding issues of spatial development policy, cohesion policy and transport and energy policies.

[1] See the Announcement of the European Parliament to the Council, the European Economic and Social Committee and the Committee of the Regions, KOM (2011) 900, in final wording, Brussels 20th December 2011.

II ADDRESSED TOPICS

1 Development poles and axes and their no-continuations

1.1 Introduction to the subject matter

In the *Common Spatial Development Document of the V4+2 Countries* (hereinafter *Common Document*) development poles and development axes on the territory of the V4+2 countries were defined in a unified manner and their no-continuations were identified.

From the Ministerial Conclusions adopted for this document, a challenge resulted for the Steering group to "lay stress upon the importance of the solution of no-continuations at different levels in order to identify development axes at the V4+2 level".

For the above mentioned reason, the subject matter of development poles and axes and their no-continuations is dealt with also in this document.

Development poles can be generally characterised as parts of spatial / settlement structure that are by certain characteristics attractive for investments and inhabitants. These include, for instance, higher number and density of population, above-average economic capacity, modern transport and technical infrastructure, highly qualified workforce, representation of sectors with high added value, concentration of research and development capacities and institutions of tertiary education (colleges and universities), and potential aiming to create innovations. The combination of these characteristics presents a development potential of these poles and gives them a high degree of competitiveness. Talking of them, one can imagine both cores of metropolitan regions or agglomerations as well as entire metropolitan regions or agglomerations. Development poles play a crucial role in relation to their wider surroundings, which include suburban and rural areas. The poles create development impulses, which are transmitted into their environment and thus affect its development. By their influence, they contribute to a functional integration of an area, to an efficient division of roles between the centre and hinterland.

Development axes can be generally characterised as strips of territory connecting development poles and possessing similar (identical) properties as development poles, but with a lower intensity of representation of these features. A characteristic feature of development axes is the occurrence of quality and capacity (transport and technical) infrastructure of a higher rank that influences the intensity of links among development poles.[2]

In each country of the V4+2, the national spatial development documents highlighted development areas (development poles and development axes) showing the above mentioned features. However, their apprehension is not always the same; they are delineated in various ways (on the basis of various criteria and methods) and also their names differ. Some countries have defined just one category of poles and axes; some have created their hierarchy (distinguished are poles and axes of European, national, trans-/interregional and regional importance or of the first, the second, possibly the third category), whereas the same category in one country does not have to correspond with the same category in another one. Some countries delineate only existing poles and axes, other countries the potential ones as well.

To delineate development poles and development axes on the territory of the V4+2 countries in the *Common document*, an approach has been used reposing on the takeover of development

[2] This definition of development axes is used in national documents and refers to national level. In case of defining development axes for the purposes of a spatial structure vision of a wider area, this definition is interpreted at a rather symbolical level.

poles and development axes from individual national spatial development documents, whereas the poles and also axes have been divided into two groups. The first group, so-called "Main development poles and main development axes" comprises poles and axes of the first (highest) category from the individual national documents, including the capital city – which sometimes forms a free-standing, so-called "zero category"). Another group, so-called "Secondary development poles and secondary development axes" is formed by poles and axes of the second (lower) category from the individual national documents.

Within the framework of the delineation of development axes, cross-border no-continuations were identified.

The occurrence of no-continuations is given by two reasons:
- absence of a development axis on one side of national border;
- interference of differing categories of axes on national borders.

1.1.1 European policy and documents

At present, for spatial development in the European context are crucial the provisions of the *Territorial Agenda of the European Union 2020*. This document, which was approved at an informal meeting of the ministers responsible for spatial planning and spatial development in 2011, results from the document *Territorial State and Perspectives of the European Union*. Both these documents lay stress, among others, on the promotion of spatial cohesion, mutual interlinking of regions, coordination of national spatial development policies and on an integrated spatial development. One of the possibilities how to fulfil the requirement of an integrated spatial development is also a coordinated approach to the setting of development poles and development axes on the territory of the V4+2 countries and a solution to their no-continuations.

1.1.2 Development poles and development axes in valid national spatial development documents of the V4+2 countries

Bulgaria

In Bulgaria, the *National Concept for Spatial Development for the period 2013–2025* (hereinafter also *NCSD*) has been adopted at the end of 2012 for the period of 2013–2025. The main purpose of this document is the coordination of the spatial development processes on the territory of a state by means of stipulating an integrated basis of spatial planning and a functional land use for the implementation of regional and sectorial policies at a national level in the context of the *European Spatial Development Perspectives* and of the *Territorial Agenda EU 2020*.

The *National Concept for Spatial Development* stems from the previously stipulated and it further develops the polycentric model of hierachically ranked centres and development axes in Bulgaria. The evaluation of core cities, ranked into 6 hierarchical levels, was created on the basis of a set of indicators related to demographic dynamics, administration, transport, health care, educational and cultural services, economic and touristic significance of cities.

The main development poles and axes (1st category) are as follows:
- metropolitan region of the capital Sofia (hierarchical levels 1, according to *NCSD*) and 6 core cities and agglomeration regions of international and national importance – Plovdiv, Varna, Burgas, Ruse, Stara Zagora and Pleven (hierarchical levels 2, according to *NCSD*);
- main development axes based on corridors according to the *Regulation of the European Parliament and of the Council (EU) No 1315/2013 of 11th December 2013, on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU* – hereinafter also TEN-T (the Pan-European corridor No 4, 7, 8, 9 and 10) and on other high-level transport infrastructure of a European importance.

Secondary development poles and axes (2nd category) consist of:

- secondary development poles of national and regional importance – Veliko Tarnovo, Vidin, Blagoevgrad, Gabrovo, Shumen, Dobrich, Haskovo, Pazardjik, Pernik, Kyustendil and Vratsa (hierarchical levels 3, according to *NCSD*);
- secondary development axes based on other transport infrastructure of national importance.

The Czech Republic

One of the priorities of the *Spatial development policy of the Czech Republic 2008* (hereinafter also *PÚR ČR 2008*), approved by the government in 2009, is the promotion of a polycentric development of the settlement structure. It delineates the so-called development areas and development axes, which are defined as areas, where due to the concentration of activities of international, national and trans regional importance, increased requirements for changes within the area are to be found. Development areas and development axes are not hierarchised (there is only one category). This causes a relatively higher number of main development poles in the Czech Republic, compared to other V4+2 countries.

The main development poles and development axes in the Common document consist of:

- 12 development areas: Brno, České Budějovice, Hradec Králové / Pardubice, Jihlava, Karlovy Vary, Liberec, Olomouc, Ostrava, Plzeň, Praha, Ústí nad Labem, Zlín (1st category);
- development axes (1st category).

Hungary

The National *Development 2030 – National Development and Territorial Development Concept (*hereinafter also *NDTDC)*, adopted by the Parliament in 2013, continues to promote a balanced polycentric development in Hungary. In order for the development not to be confined only to the area of the capital, but also throughout the whole territory of the country, it is necessary to involve the economic centres of the regions and the counties into the creation of a harmonious, polycentric and cooperative urban network system, into a developing economic area as a catalysers for strengthening the competitiveness.

The urban network consists of different levels of urban centres and functional urban areas:

- the metropolitan region of Budapest (category 0);
- Urban centres of (potential) international importance (1st category):
  Debrecen, Szeged, Miskolc, Pécs, Győr, Székesfehérvár;
- Urban centres of national importance (2nd category):
  Kecskemét, Veszprém, Szolnok, Tatabánya, Dunaújváros, Salgótarján, Eger, Nyíregyháza, Szekszárd, Szombathely, Kaposvár, Békéscsaba, Zalaegerszeg, Sopron, Nagykanizsa, Hódmezővásárhely;

The development axes are the following:

- international development axes (1st category);
- regional development axes (2nd category).

Axes of regional importance may also cross the state borders (in this sense, they are also international or cross-border axes).

Poland

The vision of the country´s spatial development as specified in the *National Spatial Development Concept 2030* (hereinafter also *KPZK 2030*), approved in 2011, defines the development of the Polish territory in 2030 on the basis of a polycentric metropolitan network, which consists of Polish metropolises, presenting its core, as well as of cities of regional importance.

According to the *KPZK 2030*, the metropolian network includes:

- metropolitan cities:
  - of European importance: capital city – Warszawa;
  - of national importance: Silesian agglomeration, Kraków, Łódź, tricity (Gdańsk, Sopot, Gdynia), Poznań, Wrocław, Bydgoszcz, Toruń, Szczecin, Lublin;
  - of cities that fulfil certain metropolitan functions: Białystok, Rzeszów, Zielona Góra, Kielce, Olsztyn, Opole, Gorzów Wielkopolski;
- primary functional axes;
- regional cities: Płock, Włocławek, Koszalin, Słupsk, Elbląg , Grudziądz, Bielsko – Biała, Rybnik, Częstochowa, Legnica, Wałbrzych, Tarnów, Radom, Kalisz, Ostrów Wlkp;
- additional functional axes.

Romania

In Romania, there is at present no official spatial development document at a national level, which would contain a delineation of development axes; however, it is being prepared. For development poles, the defined poles from government's decision no. 998/2008 were used. Based on the analyses, development poles and development axes were delineated on the territory of Romania by the National document procurer.

The main development poles and development axes in the Common document consist of:

- the capital city of Bucharest (category 0);
- 7 settlements of national importance: Braşov, Iaşi, Cluj-Napoca, Constanţa, Craiova, Ploieşti, Timişoara (1st category);
- main development axes defined on the basis of the links between development poles (1st category).

The secondary development poles in the Common document consist of:

- 13 settlements of trans regional importance: Arad, Baia Mare, Bacău, Brăila, Deva, Galaţi, Oradea, Piteşti, Râmnicu Vâlcea, Satu Mare, Sibiu, Suceava, Târgu Mureş (2nd category).

The secondary axes have not been delineated for the purpose of the Common document.

Slovakia

The *Spatial Development Concept of Slovakia 2001*, as amended by the *KÚRS 2011 (*hereinafter also *KÚRS 2011*), also lays emphasis on a polycentric development of its territory. Out of all the documents from the V4+2 countries, the Slovakian document deals with spatial / settlement structure in the most detailed way. The most important parts of the settlement system are the so-called settlement focal points three degrees) presented by agglomerations, groups of settlements and development axes (three degrees). The main development poles and development axes in the Common document consist of:

- 6 settlement focal points of the highest degree: banskobystřicko-zvolenské, bratislavsko-trnavské, košicko-prešovské, nitranské, trenčínské, žilinsko-martinské (1st category);
- development axes of the first degree (1st category).

The secondary development poles and development axes in the Common document consist of:

- 7 settlement focal points of the second degree, linked to settlement centres: Liptovský Mikuláš, Lučenec, Michalovce, Nové Zámky, Poprad, Považská Bystrica, Prievidza (2nd category);
- development axes of the second degree (2nd category).

1.2 State of the subject matter and ascertained problems

After preparing the *Common document*, Poland released a new national spatial development document – *KPZK 2030* and the Slovak document had been updated *KÚRS 2011*. This resulted in several cases to resolve pre-existing no-continuations. Members of the Steering group dealt with the solution of further no-continuations at the joint bilateral meetings. In several cases, the representatives of neighbouring countries agreed that the no-continuations would not be real in the true sense of the word (for an overall state of the solution of no-continuations from the *Common document* – see Attachment no. 1). However, there are still some no-continuations that prevail and the solution of which has not been found yet.

1.2.1 Persisting no-continuations identified in the *Common document*

a) Absence of a development axis on one side of national border

- between **Bulgaria and Romania**, direction **Vidin – Craiova – Timişoara** (no Romanian axis is connected to the main Bulgarian axis), see Fig. 1 – **X1**;
- between **Bulgaria and Romania**, direction **Varna – Constanţa** (no Romanian axis is connected to the Bulgarian secondary axis), see Fig.. 1 – **X3**;

b) Interference of various categories of axes on national borders

- between **Poland and Slovakia**, direction **Rzeszów – Prešov** (only a Slovakian secondary axis is connected to the Polish main axis).

  This axis has been promoted to the main axis in the updated *KÚRS 2011*, but conversely, in the *KPZK 2030* this axis was intended as a secondary one, particularly for a nature and landscape protection reasons.

  However, the development axis as a whole has been preserved, **it is not a no-continuation**, but there is a different perception of its importance in the individual countries.
- between **Slovakia and Hungary**, direction **Bratislava – Győr** (only a Hungarian secondary axis is connected to the Slovakian main axis);
- between **Slovakia and Hungary**, direction **Košice – Miskolc** (only a Hungarian secondary axis is connected to the Slovakian main axis);
- between **Romania and Hungary**, direction **Oradea – Debrecen** (only a Hungarian secondary axis is connected to the Romanian main axis);
- between **Romania and Hungary**, direction **Arad – Szeged** (only a Hungarian secondary axis is connected to the Romanian main axis).

1.2.2 New ideas that were not sufficiently discussed with a neighbouring state at the time of the completion of the work on the *Common document*

- between the **Czech Republic and Poland in the direction Wroclaw – Brno**, see Fig. 1 – **X1** (in the *KPZK 2030*, it is taken as a secondary axis, due to the expected North-South linkage Poznań – Wien. There is no development axis on the Czech side);
- between **Hungary and Romania** in the direction **Nyíregyháza – Satu Mare**, see Fig. 1 – **X2**.

1.2.3 Identification of new no-continuations arising from new/updated documents

- between Poland and Slovakia in the direction **Kraków – Prešov**
  The development axis was determined in the *KPZK 2030* as a main axis, in the *KÚRS* 2011 as a tertiary axis.

Nevertheless, both countries **do not consider this state as a no-continuation**, but as a different perception of the importance in the individual countries.

– Between Poland and the Czech Republic in the direction of **Krakow – Praha**, see Fig. 1 – **X4**
In *KPZK 2030* is incorporated secondary axis due to the expected east-west linking **Kraków – Praha.**
Czech partners will examine this issue during the *Updating of the Spatial development policy of the Czech Republic 2008* (hereinafter also *A-PÚR ČR*).

1.3 Limits and possibilities for solutions

The elaboration of the new *Strategy for Territorial Development of Romania* and the new Hungarian planning documents at a national and regional level offers a possibility to solve the identified and still persisting no-continuations. On the basis of an agreement of the participating parties regarding the delineation of development axes in these documents, a great deal of the no-continuations will be eliminated.

The axes concerned are:

– in the direction **Oradea – Debrecen**
The parties agreed to resolve this no-continuation and the Hungarian party has elevated the axis Debrecen – Oradea to a main axis in the *NDTDC* of Hungary, considering the fact that on the Romanian side it acts as a main axis, and will support cooperation between both cities during the elaboration of planning documents at county and city level;

– in the direction **Arad – Szeged**
The parties agreed to resolve this no-continuation and the *NDTDC* of Hungary incorporated the axis **Szeged – Arad – Timişoara**, considering the fact that on the Romanian side it acts as a main axis, and will promote cooperation between both cities during the elaboration of planning documents at county and city level;

– in the direction **Lučenec – Salgótarján**
The parties agreed to resolve this no-continuation and the *NDTDC* of Hungary incorporated the axis Lučenec – Salgótarján considering the fact that on the Slovakian side this route acts as a secondary axis, and will promote cooperation between both cities during the elaboration of planning documents at county and city level;

– in the direction **Varna – Constanţa**
The parties agreed to resolve this no-continuation with a recommendation that during the elaboration of the new *National Strategy for Territorial Development Romania*, the new axis on the Romanian border in the direction Constanţa – Mangalia – Varna will be incorporated;

– in the direction **Bratislava – Győr**
The parties agreed to resolve this no-continuation and the Hungarian party has elevated the axis Bratislava – Győr to a main axis in the *NDTDC* of Hungary and will support cooperation between both cities during the elaboration of planning documents at county and city level;

– in the direction **Košice – Miskolc**
The parties agreed to resolve this no-continuation and the Hungarian party has elevated the axis Košice – Miskolc to a main axis in the *NDTDC* of Hungary and will support cooperation between both cities during the elaboration of planning documents at county and city level;

– in the direction **Vidin – Craiova – Timişoara**
The parties agreed to resolve this no-continuation with a recommendation that during the elaboration of the new *Strategy for Territorial Development of Romania*, the new axis on the Romanian border in the direction Calafat – Craiova (or Timişoara) will be incorporated. Further, the TEN-T transport network and the new bridge across the river Danube, linking Calafat and Vidin, should be considered as well;

– in the direction **Nyíregyháza – Satu Mare**
  The parties agreed to examine the possibility of determining this development axis during the elaboration of the new Hungarian spatial planning documents and the new *Strategy for Territorial Development of Romania.*

The development axis in the direction **Wroclaw – Brno** still remains in solution. On the Czech side, only a railway connection was anticipated and railway has not got the development effect of such significance to allow a plan of a development axis. The task that would be discussed during the *A-PÚR ČR* is to examine the possibility of a road link and in relation with this to determine the development axis, which would link up with the Polish secondary development axis.

Figure 1: Delineation of development poles and development axes on the territory of the V4+2 countries and identified cross-border no-continuations of development axes

2 Transport networks and solutions to their no-continuations

2.1 Introduction to the subject matter

In the *Common spatial development document of the V4+2* countries (hereinafter also *Common document*), transport networks were delineated in a unified manner (based on the TEN-T agreement, the Treaty of Accession to the EU and on older, but valid EHK OSN agreements) and their no-continuations were identified within the framework of the national spatial development documents of the V4+2 countries.

From the ministerial conclusions, adopted for this document, a challenge ensued for the Steering group „to lay emphasis on the importance of resolving no-continuations of different levels for the purpose of identifying the transport networks at the V4+2 level". Concurrently, the ministers of transport of the individual V4+2 countries were called to consider the outputs of the *Common document* as a background material during the revision of their national transport policies and the TEN-T network.

For the above mentioned reasons, the subject matter of transport networks and their no-continuations is being dealt with also in this document, and further stated here are documents of European importance that ensure the European context.

Transport networks are divided according to means of transport to the following networks

1. railway;
2. road;
3. water;
4. air transport.

Railway network contains

1. classic conventional railway, that is part of the TEN-T and/or the EHK OSN[3] AGC agreements and/or the EHK OSN AGTC agreements;
2. high-speed railway (hereinafter also VRT);
3. broad-gauged railway.

Road network (distinguished according to capacity)

1. all highways, motorways and in Poland also express roads in the TEN-T, the accession and/or the EHK OSN AGR agreements;
2. main roads that are part of the TEN-T, EHK OSN AGR agreements;
3. other main highways, motorways and in Poland also express roads that are not part of the international agreements.

Inland waterways network, including ports and seaports

1. inland waterways that are part of the TEN-T, the accession and/or the AGN agreement;
2. inland ports that are part of the TEN-T, the accession and/or the AGN agreement;
3. seaports that are part of the TEN-T and the accession agreements.

Airports are divided into

1. airports that are part of the TEN-T and the accession agreement (3 levels – international, intercommunity, regional), however, there is also partly reflected a breakdown in the scheme, according to the TEN-T revision (see footnote [3] to Fig. 5).
2. other national airports with international traffic.

[3] the European Economic Commission of the UN (EHK OSN), namely the AGC agreement for railways, the AGR agreement for roads, the AGN agreement for inland waterways and the AGTC agreement for combined transport (railways, inland water and road transport)

Only the virtual air transport network is changeable in time, according to the newly established or cancelled connections between airports, where no spatial projection is needed, therefore the problem of spatial no-continuation is not being dealt with.

Other networks of railway, road and inland water transport are defined by so-called „no-continuations", given by two identified reasons:
a) absence of a relevant transport network on one side of a state border;
b) interference of different categories of a relevant transport network on state borders.

On the session on 19th November 2013, the European Parliament adopted and subsequently, on 11th December 2013, issued the „Regulation of the European Parliament and of the Council (EU) No 1315/2013, on Union guidelines for the development of trans-European transport networks and repealing Decision No 661/2010/EU" (hereinafter also „Regulation No 1315/2013" or, alternatively, the TEN-T revision). The proposal has changed further classification of TEN-T at all levels, some important traffic arteries have been added or removed. Changes introduced by the above mentioned regulation were partly (according to the processing time/update of national documents) taken into account in the *Common Spatial Development Strategy of theV4+2 Countries.*

2.1.1 European policy and documents

The basic starting point of the *Common document* was the so-called *„WHITE PAPER", the European Transport Policy for 2010: Time to decide*". This document was followed by the Decision of the European Parliament and of the Council No. 661/2010/EU on Union guidelines for the development of the trans-European transport network in an updated form. Considering the framework year 2010, which has already been completed, the „*WHITE PAPER*", was established and approved in Brussels in March 2011, together with the Roadmap to a Single European Transport Area – establishing a competitive transport system that would use resources effectively. This EU transport policy is followed-up by the TEN-T revision, contained in the Regulation of the European Parliament and of the Council (EU) No 1315/2013, which repeals the above stated Decision No 661/2010/EU.

Regular meetings of ministers of transport organised under the International Transport Forum are also of significance for the European transport policy.

For the time being, it is necessary to work also with the agreements that were brokered by the European Economic Commission of the UN (EHK OSN), namely the AGC agreement for railways, the AGR agreement for roads, the AGN agreement for inland waterways and the AGTC agreement for combined transport (railways, inland water and road transport), because these agreements are still part of the legislation of most of the participating countries and the TEN-T revision has not delineated itself towards them.

2.2 State of the subject matter and ascertained problems

Already during the finishing of the *Common document* it was known that works proceed on the new transport policy (White paper) and the individual countries or groups of countries are preparing the TEN-T revision (see also the Conclusions from the ministerial meeting on the *Common document*). At the same time, it is clear that preparations take place also for the coming periods in the EU for the years 2014–2020. The national spatial development documents show only a single elementary change, namely in Poland, with the creation of the document *National Spatial Development Concept 2030*.

In this part, only persisting no-continuations are defined as well as no-continuations where it was agreed that the problem will be resolved only after an update of development documents of the

individual countries (for the overall state of resolving the no-continuations from the *Common document* – see attachment 2).

It emerged that it is not possible to claim dogmatically that it is necessary to consider only the TEN-T revision, where a coordination of the most significant intentions of the transport infrastructure should be ensured. This assertion has not been proved, as e.g. the no-continuation on the Czech and Polish borders regarding the railway high-speed transport (VRT) is solved by *KPZK 2030*. The final decision regarding the construction of high-speed railway in Poland, the so-called „Y", will be made by the year 2020 (according to the Regulations in the *Strategy of Transport Development to 2020 (with perspective to 2030*). Similarly, new findings could show also in new documents from ministries of transport of the V4+2 countries (in the CR, it is e.g. the *Transportation Policy of the Czech Republic for 2014–2020* and a follow-up document *Transport Sector Strategies, 2nd phase,* hereinafter also *DSS II*). These documents cannot be completely omitted during the solving of the Common strategy.

Use of air transport in the new EU member states, which joined the EU in 2004 and later, is considerably lower than in other EU countries, but it has a rising tendency. A higher number of checked-in passengers at smaller airports are in bigger states (Poland, Romania) and at seaside airports. From among the capital cities within the V4+2 territory, the most frequented airports are in Praha and Warszawa, which still surpass the number of 10 million checked-in passengers per year, even though Praha has recently registered a certain stagnation. Other capital cities have between 7–9 million passengers per year. Crossing the border, confirmed by the Polish party in 2013, is to be expected at the airport in the capital Warszawa. A certain oddity present Bucharest and Warszawa, which have got two airports (in November 2013, the Warszawa-Okęcie airport exceeded the number of 10 million passengers). The situation is different at the airport in Bratislava in Slovakia, which recorded a yearly decrease of checked-in passengers by approx. 11 %. The reason for that might be the close proximity of an important international airport Wien-Schwechat with a good accessibility from Bratislava, which by contrast, experienced a significant increase in the number of passengers. One of the causes of setbacks of air transport might be the withdrawal of a low-budget airline company from the airport.

Also in Western Europe, due to the construction of high-speed railway, the trend shows a decrease of passengers at some airports of lesser importance and with a smaller turnover of passengers for flights on shorter and medium distances.

2.2.1 Persisting no-continuations identified in the C*ommon document*

a) Absence of a relevant transport network on one side of the state border

- between **Hungary** and **Slovakia** in the direction **Győr – Bratislava** (no Slovakian high-speed railway is connected to a Hungarian planned high-speed railway, see Fig. 2, no-continuation A);

b) Interference of different categories of transport networks on the state border

- between the **Czech Republic** and **Poland** in the direction **Mohelnice – Opole** (a Polish road of lesser importance is connected to a Czech planned other transnational main road);
- between **Hungary** and **Slovakia** in the direction **Esztergom – Štúrovo** (a Slovakian road of lesser importance is connected to a Hungarian planned motorway, see Fig. 3, no-continuation A);
- between **Hungary** and **Romania** in the direction **Békéscsaba – Chişineu Criş** (a Romanian road of lesser importance is connected to a Hungarian planned motorway, see Fig. 3, no-continuation B);

– between **Bulgaria** and **Romania** in the direction **Shumen – Călăraşi across Silistra** (a Romanian road of lesser importance is connected to a Bulgarian road of transnational importance, see Fig. 3, no-continuation C).

2.2.2 New incentive, which was opened at the meeting on no-continuations in the *Common document*

a) Absence of a relevant transport network on one side of the state border

– between the **Czech Republic and Poland** in the direction **Wrocław – Brno** (the *PÚR ČR 2008* does not metion this road, but the intention is stated in the Polish *KPZK 2030* document, see Fig. 3 no-continuation D. It is being examined within the framework of the *A-PÚR ČR*. In the CR, within the scope of regional documentation, a road of lesser importance I/43, is planned.

2.2.3 Identification of new no-continuations resulting from new / updated documents

In the inland water transport network were identified no-continuations, which emerged due to new provisions in the *KPZK 2030*, the *KÚRS* update and dealing with a task from the *PÚR ČR 2008*.

a) Absence of a relevant transport network on one side of the state border

High-speed railway Wrocław – Praha

– No-continuation is caused by the fact that in 2011 the document *KPZK 2030* was formulated in Poland, in *SDP CR* this intention is not mentioned (see Fig. 2, no-continuation B). The transport connection is being examined within the *A-PÚR ČR.*

Odra–Váh canal link

– The no-continuation arises from the approach to the solving of the **Odra–Váh canal link** (see Fig. 4, no-continuation A). After examining the project planning activities of the region on the Czech side, and making use of the canal link study of the Ministry of transport, it was stated that this canal link is very problematic due to its impacts on the territory (the canal gateway passing through the Karvinsko Region, the historical core of Český Těšín, further through the Třinec ironworks as well as considerable problems with water in the top parts of the Jablůnkov pass). The government of the CR imposed in the *Report on Implementation of the SDP CR 2008* to exclude this intention from the *A-PÚR ČR*. The Slovakian party considers this intention even after the KURS update, whereas the Polish party sees this intention as surpassed and takes it not into account in the *KPZK 2030*. In addition, the further described no-continuation B for the D-O-L canal link represents an obstacle also for the Odra–Váh canal link.

b) Interference of different categories of transport networks on the state border

Dunaj–Odra–Labe canal link (hereinafter also **D-O-L**)

– According to the *KPZK 2030*, the no-continuation emerges because the river Odra is for its most part (approximately from the mid section of the Odra on the borders with Germany) in the regional and not in the international category, which is demonstrated also in the TEN-T document, where it is marked neither in the accession agreement, nor in the TEN-T revision. Although the problem is not identified directly on the borders, it still creates a no-continuation, delimited for the territory of Poland (see Fig. 4, no-continuation B). The Polish document *KPZK 2030* still counts on the interconnection of the river Odra with the D-O-L canal link, which would be located mainly on the territory of the Czech Republic. In terms of the flood protection measures (carried out after the floods in 1997), the sailing class was upgraded to sailing class III in the section of the Brzeg Dolny – Wrocław – Opole

– Gliwický canal, which is still insufficient. There is a danger that due to the economic recovery a further shift to an international class will be possible only in a very distant outlook. According to the AGN agreement, which is respected also by the TEN-T, for international shipping on a river it is necessary to reach at least the sailing class IV, for an artificial waterway (canal) the class Vb., which evidently was not observed during the flood protection measures. This results in a no-continuation in the waterways´ sailing class. A possible successful solution of the D-O-L canal connection depends directly on the securing of an international navigability class throughout the entire length of the river Odra from its mouth to the Baltic Sea and to the contemplated canal link.

2.3 Limits and possibilities for solutions

Of crucial importance for the solving the identified and still persisting no-continuations of transport networks will be the adoption of the Hungarian *National Transport Strategy,* the *Strategy for Territorial Development Romania*, and also the prepared update of the *PÚR ČR 2008*. The newly adopted *Transport Policy of the CR for the period of 2014–2020* will likewise influence the solving of the no-continuations of these networks. According to the agreements of the concerned parties on the delineation of development axes in these documents, the vast majority of no-continuations will be eliminated. Nevertheless, it should be stated that it is likely that because of the development of the documents in the individual countries and despite all the efforts of the participating parties, new no-continuations might arise, as some intentions within the territory are unrealistic (e.g. the Odra–Váh canal link on the Czech side). Other no-continuations may emerge due to new intentions, which are not yet part of any international negotiations.

The main tasks of the V4+2 countries is to decrease difference in quantity and quality of transport infrastructure facilities compared to the EU countries (E15), and also to put a greater emphasis on the construction of an more environmentally friendly infrastructure. According to the documents, this concerns particularly the building of railway infrastructure and the related building of multimodal freight and logistics terminals (transhipment from trucks to railway for longer transport routes), building of river ports and development of shipping. Furthermore, the coordination of preparation works on new corridors for high-speed railway infrastructure and their effective networking through the territory, as well as securing the interconnection of important settlement areas in the EU, but also in connection with countries outside the EU, namely Turkey (Istanbul). It is also necessary to build multimodal terminals for passenger transport, connect TEN-T airports with railway transport, and segregate railway transport in big railway junctions, especially in metropolitan areas. Other transport infrastructures also need to be gradually completed.

Possibilities of solutions to no-continuations

Railway network

– Between Hungary and Slovakia in the direction **Győr – Bratislava** (no Slovakian high speed railway is connected to the planned Hungarian high speed railway) – the situation persists, no change is expected; this could be changed by the results of the TEN-T revision negotiations. A solution was found directly within the Bratislava railway junction (TEN-T VRT until 2015: Petržalka – Filiálka – Rača and Hlavná stanica – Nové Město – Letisko), which acts more as a link of important stations in Bratislava, but which does not solve the no-continuations to the neighbouring states.
The identified no-continuation still persists (see Fig. 2, no-continuation A).

– No-continuation arisen between Poland and Czech Republic (see Fig. 2, no-continuation B) – within the direction **Wrocław – Praha** (there is no continuation between Polish high-speed

railway defined by *KPZK 2030* and the Czech high- speed railway). With regard to the fact that checking of this intention is included in the TEN-T revision, in assembled regulation No. 1316/2013, and that the Report on implementation of SDP CR 2008 also refers to the TEN-T revision, this no-continuation is solved in *A-PÚR ČR*. After examining the effectiveness of the rail link this intention would be incorporated to the spatial development principles of relevant regions.

Road network

- Between the Czech Republic and Poland in the direction **Mohelnice – Opole** (a Polish road of lesser importance is connected to a Czech planned transnational other road). The Polish party is not considering a change of category of the related road. Within the framework of the *A-PÚR ČR*, the problem of no-continuations will be resolved by ending of the corridor before the border of the CR / Poland.
  No-continuation solved by the Czech side.
- Between Hungary and Slovakia in the direction **Esztergom – Štúrovo** (a Slovakian road of lesser importance is connected to a Hungarian planned motorway). During the period 2020-2030 a construction of a bridge between the above mentioned cities is to take place in this border area. On the Hungarian side it would be a motorway, on the Slovakian-max. a first class road, whereby the no-continuation would not be resolved. However, if the Hungarian party would – contrary to expectations – build only also a first class road, similarly as Slovakia, then the problem of no-continuation would be resolved.
  The identified no-continuation persists (see Fig. 3, no-continuation A). This problem will be possibly solved by the above mentioned Hungarian *National Transport Strategy*, which is momentarily in a process of completion.
- Between Hungary and Romania in the direction **Békéscsaba – Chişineu Criş** (a Romanian road of lesser importance is connected to a Hungarian planned motorway).
  No-continuation is being dealt with; both sides exchanged their points of view; negotiations continue (see Fig. 3, no-continuation B).
- Between Bulgaria and Romania in the direction **Shumen** – **Călăraşi** across **Silistra** (a Romanian road of lesser importance is connected to a Bulgarian road of transnational importance). It has not been decided, whether the no-continuation is just a matter of terminology discord or whether the Bulgarian "other road of transnational importance" is defined in the strategic documents as transnational. This is currently being the subject of further negotiations between the Bulgarian and Romanian party at the level of the Ministries of transport, which will subsequently submit reports to the ministries participating, on the V4+2 project. Despite this, both parties agreed that if the Romanian **road leading to Călăraşi will be** considered as a road of transnational importance, the absence of a bridge connecting Călăraşi and Silistra **will still cause a no-continuation** (see Fig. 3, no-continuation C).
- The first no-continuation (see Fig. 3, no-continuation D), ascertained from the new Polish document, was already discussed at the common meeting concerning no-continuations at the end of July 2012, namely the express road **Wrocław – Kłodzko – Polish border / CR – Králíky – (Brno**). This development intention is examined within the *A-PÚR ČR*.

Inland waterways network

Odra–Váh canal link

The common meeting (July 2012) did not bring an agreement, it was only stated that the interconnection between the Czech Republic-Slovakia as well as Poland-Slovakia is possible. The government of the CR in the *Report on implementation of the SDP CR 2008* imposed to exclude this intention from the *A-PÚR ČR*. Poland considers this intention to be surpassed and it cannot be found in the *KPZK 2030*. Slovakia, on the contrary, insists upon its preserving and

has it in its development documents. At the same time, this intention also reflects that in Poland the river Odra is not yet ready for international navigation (see the canal link D-O-L).
The problem of no-continuation (see Fig. 4, no-continuation A) **and also the whole intention will have to be tackled within the framework of the updates of national spatial development documents, possibly, within the spatial studies of border areas.**

Dunaj–Odra–Labe canal link

The *KPZK 2030* designates part of the river Odra as a regional waterway, mainly because of different technical conditions [lower achieved (II., or III.) of the sailing class on the river Odra, than the ones internationally stipulated by the EHK OSN AGN agreement, which is adopted also by the TEN-T] and limitations of the environment. In the valley of the river Odra concentrates the largest abundance of habitats and species in this part of Central Europe and many Natura 2000 sites are to be found here. That is why this regional part of the river Odra is not included in the TEN-T revision. Since the canal link is being prepared as an international connection, at least in Poland, this goal was not reached. The government of the CR by its resolutions imposed to defend the territory in form of territorial reserve in planning documentation. Particularly further defence of territory, when confirming the sustainability of the plan (e.g. after 2050) is problematic in the CR, because the territorial protection of the canal link has last for over 40 years and a considerable part of the territory is thus unusable. This problem is still being monitored in the CR, but it has not been decided yet. The government of the CR imposed within the *Report on implementation of the SDP CR 2008* to examine a usefulness of this canal connection. During the revision, the economic side of the solution has to be taken into account, together with significant interferences with the environment (e.g. the Poodří PLA, the Litovelské Pomoraví PLA etc.) Further part of the revision looks into the hydrological and hydrogeological conditions. It is also necessary to take into account the fact, that the Silesian territory with almost 5 million inhabitants, is the only such densely populated area with heavy industry in Europe, which has not a connection to an appropriate waterway. From the spatial development point of view, the update of the PÚR alone, cannot resolve the problem; however, it can facilitate the solving and concretization of this problem during international meetings and activities, as is the case also with this Common Spatial Development Strategy of the V4+2 Countries, and that is why, in this document, attention has been drawn to this canal link.

This intention has an all-European dimension, it exceeds the borders of the CR not only geographically, but also with its overall potential and regardless of whether it is decided for its implementation or against it, it is necessary, that the examination of usefulness will take place at an international level, including the resolving of the navigability problem of the river Odra at an international level from the sea towards the channel.

The problem of the no-continuation (see Fig. 4, no-continuation B) **and the whole plan as well as its time horizons will have to be discussed.**

Figure 2: Delineation of railway networks on the territory of the V4+2 countries and identified cross-border no-continuations

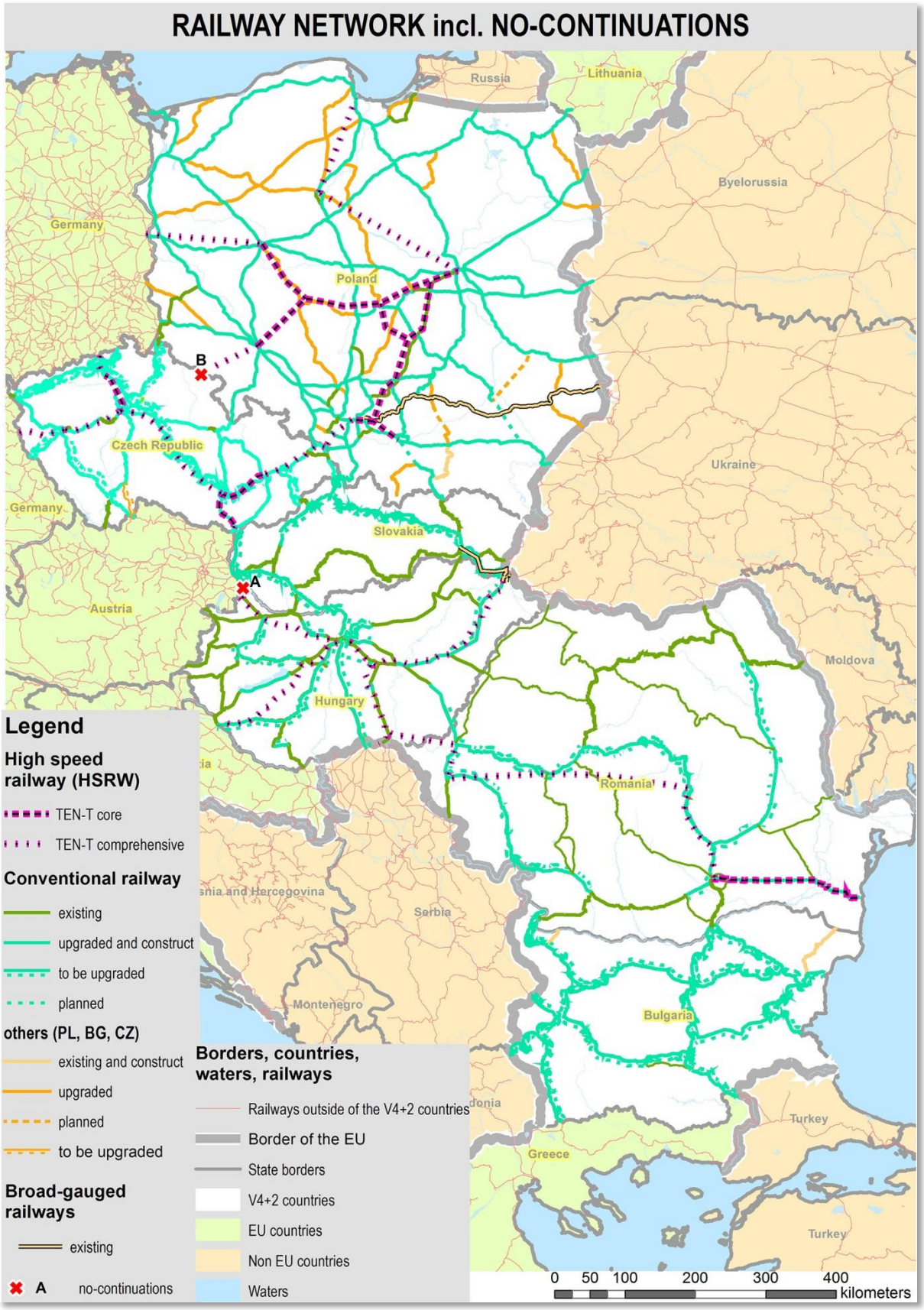


Figure 3: Delineation of road networks on the territory of the V4+2 countries and identified cross-border no-continuations

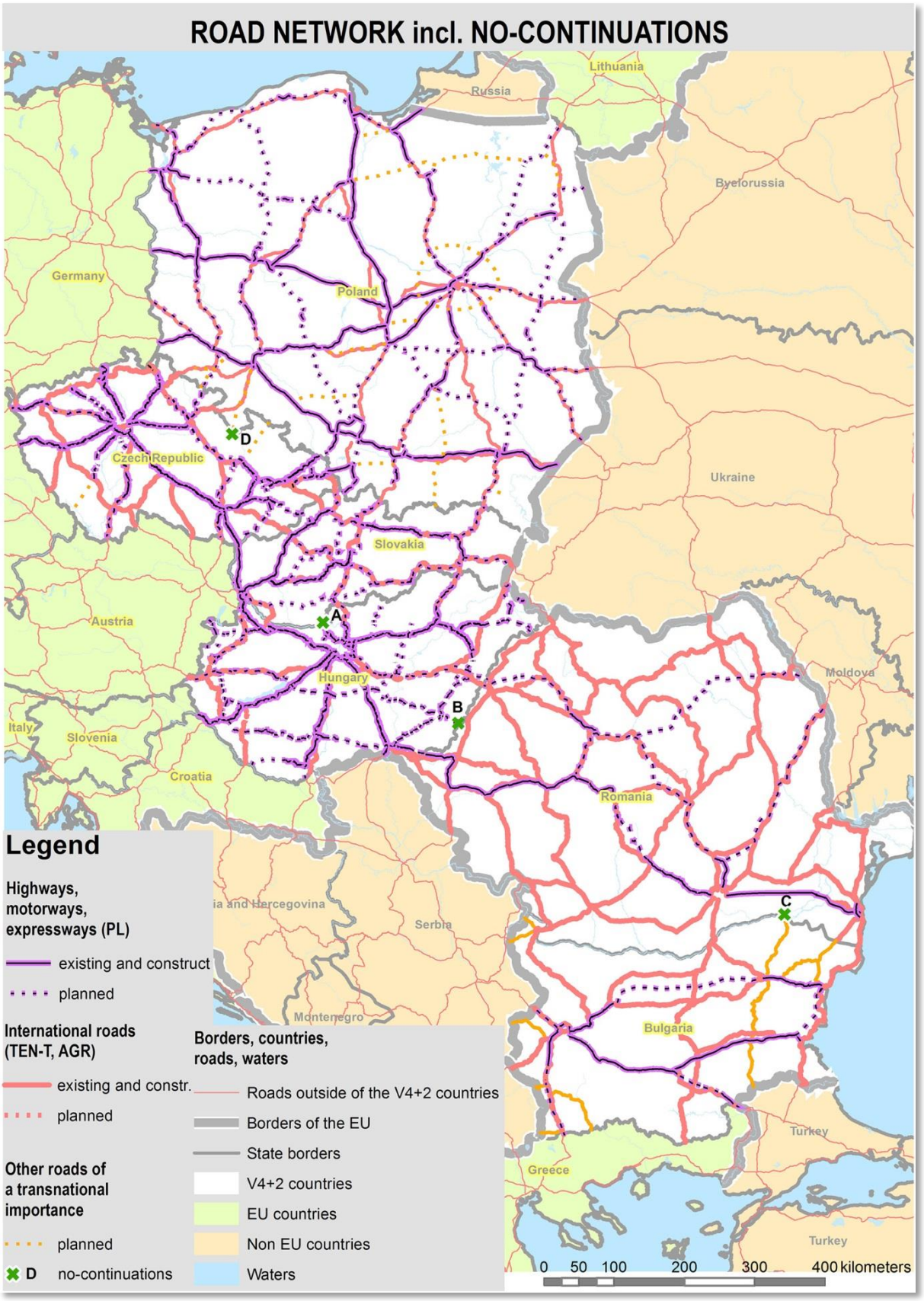


Figure 4: Delineation of inland waterways on the territory of the V4+2 countries and identified cross-border no-continuations

Figure 5: Airports on the territory of the V4+2 countries[4]

[4] Due to time sequence, in which not all development documents could take into account the proposal for the new „Regulation No 1315/2013" (see chapter 2.1), a compromise was reached between the graphic presentation of the „Decision of the European Parliament and of Council No 661/2010/EU" and the „Regulation No 1315/2013".
The ★ mark is where there is a difference between the Decision …… and the Regulation …… , it contains all airports of the main (core) TEN-T network according to the „Regulation No 1315/2013", regardless of the real turnover of passengers at the airport per year, and also of the global (comprehensive) network according to the „Regulation No 1315/2013" – all airports, which in 2012 showed a bigger turnover than 1 million passengers per year.

3 Technical infrastructure

3.1 Introduction to the subject matter

The subjects of interest are transport systems of strategic energetic media: electricity, gas and crude oil. In terms of importance, only international systems´ transit pipelines of technical infrastructure have been chosen. For a better orientation in the subject matter, each country stated a brief overview of the main systems of technical infrastructure.

The individual networks consist of the following types of technical infrastructure:

Electrical Energy Networks and Installations

- 750 kV transmission lines of especially high voltage;
- 400 kV transmission lines of very high voltage;
- 220 kV transmission lines of high voltage;
- 750/400, 400/220 kV electrical substations of voltage transformation with a function in the international transport system.

Gas Transmission Network

- transit gas pipelines;
- VTL gas pipelines, if they cross the state border;
- underground gas storage of the capacity of 1 bill. m^3 and bigger;
- LNG[5] terminals.

Crude Oil Transmission Network

- international crude oil pipelines;
- terminal for the transhipment of oil, oil storages.

To each of the above mentioned technical infrastructure network, the cross-border no-continuations are stated and in part 3.3. Limits, possibilities and challenges of solutions their planned development within the framework of the V4+2 territory as well as important development plans within the EU.

3.1.1 European policy and documents

By the regulation of the European Parliament and of the Council (EC) No 713/2009 of 13th July 2009 the **Agency for the Cooperation of Energy Regulators** (ACER) has been established.

The agency should monitor regional cooperation between the operators of transmission or transport systems in the sectors of electricity and natural gas, as well as the implementation of tasks of the European Network of Transmission System Operators (ENTSO "network" for electricity) and of the European Network of Transmission System Operators for Gas (ENTSOG "network" for natural gas). The involvement of the agency is vital for ensuring that the cooperation between the operators of transmission or transport operators runs in an effective and transparent manner to the benefit of the internal markets in electricity and natural gas.

In line with the regulation (EC) No 714/2009 the **European Network of Transmission System Operators for Electricity** (hereinafter also ENTSO-E) has been established. Its goal and mission is to promote important aspects of the EU energy policy with respect to important challenges:

- Security – it monitors coordinated, reliable and safe operations of electricity transmission systems.

[5] Terminal for receiving of liquefied natural gas transported by ships.

- Adequacy – supports the development of the interconnected European network and investments for a sustainable energy system.
- Business – offers a space for the market by designing and implementing of a standardised trade integration and a transparency of frameworks, which facilitate competitive and truly integrated wholesale and retail markets on a continental scale.
- Sustainability – facilitates a safe integration of a new generation of resources, especially the growing amount of energy from renewable resources and thus helps to achieve a reduction of greenhouse gases in the atmosphere, which is one of the goals of the EU.

The aim of the ENTSO-E is to become a communication space in matters of European, technical, business and political questions, related to transmission system operators (TSO), in the interconnection with the users of the energy systems, EU institutions, with regulators and national governments. ENTSO-E System´s products contribute to safe supplies, to a smooth Pan-European electricity market, to a safe integration of renewable resources and to a reliable, future-oriented electrical network aiming to achieve the objectives of the energy policy.

By the regulation of the European Parliament and of the Council (EC) No. 715/2009 of 13th July 2009 the **European Network of Transmission System Operators for Gas** (hereinafter also ENTSOG) was established.

The organisation works with the aim to help the completion and functioning of the inner market and of the cross-border gas trade as well as to ensure an optimal management, so that the operation is coordinated and the European gas transmission system develops technically in a sound way.

This network was founded on the 1st December 2009 and currently consists of 39 transmission system operators and of 2 associated partners from 24 European countries and of 3 operators from partner countries of the EU with the aim to secure a fast progress towards a unified market.

ENTSOG´s goals are:

- to contribute to the development of a fully open and functional European transmission system;
- to strengthen cross-border transmission, accessibility and support of gas trade;
- to support interoperability of the European transmission systems;
- to support policy development for the endorsement of market solutions and the provision of supplies;
- to contribute to the setting of a stable public political framework;
- to contribute to a safe and reliable European transmission system suitable for the fulfilment of current and future transport needs.

During the course of the works on the V4+2 document, a Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing and repealing Decision No 1364/2006 EC and amending the Regulation (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009. By this Regulation, the European Union institutions respond to the development in the field of energetics in the European as well as the worldwide context.

To create a strategic, action framework for spatial development in Europe, the *Territorial Agenda EU 2020* was established, with a link to national spatial development concepts. One of the aims of this strategy is also the promotion of energy infrastructure development, which will enable the development of an energy market and an integration into the existing European structures. It is necessary to strive for energetically sustainable solutions, as is e.g. using the potential of renewable energy resources.

3.2 State of the subject matter and ascertained problems

3.2.1 Brief overview of energy systems of the V4+2 countries

Bulgaria

The energy sector in Bulgaria is characterised by a high degree of dependence and imported energy resources. Bulgaria uses 70 % of its energy consumption from imported resources. Dependency on supplies of gas, crude oil and nuclear fuel is total and oriented unilaterally on Russia. Dependency on electricity is lower – 54 %, which is due to the use of domestic produce of lignit (brown coal) and electricity from hydraulic power stations.

Out of the total energy consumption, Bulgaria has a 12,6 percentage share of renewable energy sources and according *Europe 2020 Strategy*, this share will reach 16 %.

The Czech Republic

The current energetic mix of the CR is based on a high usage of domestic resources of primary energy. The share of domestic resources in final energy is about 50 %. A high degree of self-sufficiency is shown in the produce of electricity, where the clean production of electricity from domestic resources virtually fully covers domestic consumption (from about 96 %). An intention of extending the nuclear power stations Temelín and Dukovany is to be examined.

In the field of gas transmission systems, the interconnection with the Federal Republic of Germany and Slovakia is secured and in the East/West direction the international gas transmission is being provided long-term. Within the *European Energy Programme for Recovery* (hereinafter also EEPR), the transmission system reverse flows were implemented enabling the transport of gas from West to East, and also the interconnection between the Czech and Polish transmission system, called the STORK gas pipeline. In the field of crude oil pipelines, the import capacity of the Friendship pipeline (Slovakia, Ukraine, Belarus, Russia), which transports crude oil from the East, makes 9 mil. tons/year and the TAL/IKL crude oil pipeline (Italy, Germany), which transports crude oil via a southern route from the Terst sea terminal, makes 11 mil. tons/year.

In the Czech Republic, the share of renewable energy production makes 10,3 % of the total energy consumption.

Hungary

Hungary has relatively limited reserves (of low quality) of its own energy resources. It imports fossil fuels, especially crude oil and natural gas. To cover the needs for electric energy, nuclear power from the Paks power station (approx. 42 %) is being used. In an international comparison, a nuclear power station is currently one of the safest power stations, thanks to measures carried out in the year 1990, which markedly improved the conditions of their safe operation. The remaining demand for energy is covered partially by outdated and inefficient large power stations running on fossil fuels, further by smaller power stations (gas) and to a small extent by power stations running on renewable resources. The share of renewable energy, from the total energy consumption, made 7,4 % in 2010. Renewable energy resources in Hungary come especially from agricultural and forest biomass, biofuels on agricultural basis, geothermal and thermal energy, and then from solar, wind and hydroelectric energy.

Poland

Poland has large deposits of coal, which – in regard to the dependency of our country on the import of natural gas (in almost 70 %) and crude oil (over 95 %) will play a vital role in stabilising

the energy security of Poland. The transit gas pipeline on Polish territory is part of the Yamal pipeline, running from Russia across Belarus and Poland into western Europe. Electricity is produced in the domestic system with limited possibilities of an international exchange – at present, it is less than 10 %. The *National Spatial Development Concept 2030* applies, eventually also to issues concerning the energy policy and the development of technical infrastructure. It suggests necessary measures, which will increase the energy security of Poland, particularly the possibility of constructing two nuclear power stations, it will increase the production of natural gas (including shale gas) and it will also increase the production of energy from renewable resources.

Romania

The Romanian energy system is based on mixed energy resources, including the use of primary sources: coal (pit coal and lignite), natural gas, renewable sources (hydro power, photovoltaic and wind power), nuclear power (2 functional reactors at Cernavodă), but also on important imports of energy (almost 1/3 of the energy was imported in 2007). Most of the power plants using traditional energy sources (coal, natural gas) are outdated (more than 50 % of the plants are 30 years old or more) and have an efficiency of 65–70 % compared to modern power stations. The future perspective includes an increase of the importance of nuclear power (2 more reactors) and an increase of use of renewable energy sources (with use of biofuels along hydro, photovoltaic and wind power sources).

Slovakia

Slovakia is highly dependent on the import of energy and has also a low diversification of this import. An important fact is that Slovakia has to import approximately 90 % of fuel-energy resources. Domestic resources count only lignite, electricity from hydroelectric power stations and a small amount of extracted gas and crude oil. The performance of electricity in Slovakia in 2010 was 7 780 MW. Nuclear power stations shared in this performance with 23,4 %, thermal power stations with 44,8 % and hydroelectric power stations reached the 31,9 % share.

Some kinds of renewable energy resources (wind and photovoltaic) can present a threat to the stability of transmission network also on a Europe-wide scale. The following table shows the list of these resources, installed in the V4+2 countries as of the year 2010. In accordance with the intentions of national documents and territorial conditions, it is necessary to plan renewable energy sources. It is necessary to ensure a more resistant transmission system, particularly against the risk of of the so-called "black out".

Table 1: Installed performance from renewable energy resources in the year 2010[6]

	Photovoltaic power stations *(MW)*	**Wind power stations** *(MW)*
Bulgaria	32	500
The Czech Republic	1 959	215
Hungary	0	295
Poland	2	1 180
Romania	2	462
Slovakia	185	3

[6] Data about photovoltaic and wind power stations were drawn from the Statistical data of the Hungarian Power System 2011. They show the installed performances of electric energy resources for the EU member states for the year 2010 (page 32). Source: Enerdata – Global Energy & CO.

3.2.2 Electric energy networks and installations

Bulgaria

Current state

Interconnection of the transmission line between Bulgaria and Romania:

- Kozloduy NPP – Ţânţăreni (400 kV; 2 lines);
- Varna – Isaccea (400 kV, 750 kV);
- Dobrudzha – Isaccea (400 kV).

No-continuations

No-continuations have not been detected. The transmission system of Bulgaria is connected through cross-border lines to systems of all neighbouring states and so cooeperates synchronously with the entire electricity system of continental Europe.

The Czech Republic

Current state

Electricity transmission system of 400 and 220 kV serves for the distribution of power from large power stations to the entire territory of the Czech Republic, and at the same time it is part of the international interconnections in Europe.

Interconnection of the Czech Republic with the neighbouring V4+2 countries:

The Czech Republic – Poland:

- Nošovice – Wielopole (400 kV);
- Albrechtice – Dobrzeń (400 kV);
- Lískovec – Kopanina (220 kV);
- Lískovec – Bujaków (220 kV).

The Czech Republic – Slovakia:

- Nošovice – Varín (400 kV);
- Sokolnice – Križovany (400 kV);
- Sokolnice – Stupava (400 kV);
- Lískovec – Považská Bystrica (220 kV);
- Sokolnice – Senica (220 kV).

(The Považská Bystrica and Senica electric stations are not marked in the scheme.)

No-continuations

No-continuations have not been detected. The CR transmission line is interconnected through cross-border lines to systems of all neighbouring states and thereby cooperates synchronously with the entire system of continental Europe.

Hungary

Current state

The import capacities of the Hungarian transmission network reach the ENTSO-E standards, ensuring a performance of up 1 500 MW or, under extreme conditions, more than 2 000 MW. The transmission network has a transit capacity increase of 3 000 MW.

- **220 kV transmission lines** – further development at this level should be prevented, however, the supply for Budapest depends on the 220 kV system.
- **400 kV transmission lines** – this is the preferred voltage level for the transmission system, where the development focuses on international integrity and first-class safety standard.

Interconnection of Hungary with the neighbouring V4+2 countries:

Hungary – Slovakia:

- Győr – Gabčíkovo (400 kV);
- Göd – Levice (400 kV).

Hungary – Romania:

- Sándorfalva – Arad (400 kV);
- Békéscsaba – Nădab (400 kV).

No-continuations

No-continuations have not been detected. The transmission system of Hungaria is connected through cross-border lines to systems of all neighbouring states and so cooeperates synchronously with the entire electricity system of continental Europe.

Poland

Current state

At the end of 2010 the installed capacity of Polish power stations was 36058.2 MW in total, out of which 3 486,7 MW was produced in hydroelectric power stations and 32 571,5 MW in conventional power stations. Most of the transmission lines of 400 kV and 220 kV are over 40 years old and are in need of urgent modernisation.

Interconnection of Poland with the neighbouring V4+2 countries:

Poland – the Czech Republic:

- Wielopole – Nošovice (400 kV);
- Dobrzeń – Albrechtice (400 kV);
- Kopanina – Lískovec (220 kV);
- Bujaków – Lískovec (220 kV).

Poland – Slovakia:

- Krosno – Iskrzynia – Lemešany (double lines of 400 kV).

No-continuations

No-continuations have not been detected. The transmission system of Poland is connected through cross-border lines to systems of all neighbouring states and so cooeperates synchronously with the entire electricity system of continental Europe.

Romania

Current state

Most of the high voltage lines is 40-50 years old, with technology from the past era. However, according to the National society for energy transport, there is a clear programme aimed at the modernisation and update of the technology network; a lot of such maintenance works were done during the past decade.

Interconnection of Romania with the neighbouring V4+2 countries:

Romania – Hungary:

- Arad – Sándorfalva (400 kV);
- Nădab – Békéscsaba (400 kV).

Romania – Bulgaria:

- Isaccea – Dobrudzha (400 kV);
- Isaccea – Varna (400 kV, 750 kV);
- Ţânţăreni – Kozloduy NPP (2 lines, each of 400 kV).

No-continuations

No-continuations have not been detected. The transmission system of Romania is connected through cross-border lines to systems of all neighbouring states and so cooeperates synchronously with the entire electricity system of continental Europe

Slovakia

Current state

At the international and national level, the transmission system in Slovakia consists of networks of extra-high voltage of 400 and 220 kV. It is planned that the 220 kV system is maintained in a good state until the end of the service life. Gradually, it will be substituted by a 400 kV system, or by an expansion of the 110 kV distribution systems.

Interconnection of Slovakia with the neighbouring V4+2 countries:

Slovakia – the Czech Republic:

- Varín – Nošovice (400 kV);
- Križovany – Sokolnice (400 kV);
- Stupava – Sokolnice (400 kV);
- Lískovec – Považská Bystrica (220 kV);
- Sokolnice – Senica (220 kV).

(The Považská Bystrica and Senica electric stations are not marked in the scheme.)

Slovakia – Hungary:

- Gabčíkovo – Győr (400 kV);
- Levice – Göd (400 kV).

Slovakia – Poland:

- Lemešany – Krosno – Iskrzynia (double lines of 400 kV).

No-continuations

No-continuations have not been detected. The transmission system of Slovakia is connected through cross-border lines to systems of all neighbouring states and so cooeperates synchronously with the entire electricity system of continental Europe.

3.2.3 Gas transmission network

Bulgaria

Current state

There is one entry (from Russian resources) for the transit gas network in Bulgaria and three output directions (points): to the Balkans: Turkey, Greece and Macedonia.

No-continuations

In terms of importance for the project: there are no no-continuations between Bulgaria and Romania.

The Czech Republic

Current state

The transit gas pipeline system ensures the international transport of natural gas for foreign business partners and simultaneously the transport of natural gas for the supplies in the CR. It consists of gas pipelines of a total length of 3 813 km. For the supplies of natural gas a relatively significant capacity of underground gas storages is secured, both on the territory of the CR and abroad. Some storages work together as one virtual gas storage.

In order to strengthen the diversification of transport routes of natural gas to the EU countries, the project Gazelle has been prepared and implemented. The expected launch is for the year 2013. Within the framework of the EEPR programme, the interconnection of the Czech and Polish transmission system through the gas pipeline STORK has been completed.

No-continuations

In terms of importance to the V4+2 project, there are no no-continuations between the neighbouring states.

Hungary

Current state

Hungary is strongly dependent on the imports of natural gas (particularly from Russia), because the domestic produce of natural gas covers the consumption only partially.

Currently there are three gas extraction points, where an import is possible. The **„ Brotherhood "** gas pipelineis connected at the Ukrainian border (Beregdaróc) and operates as a **main import and transit route**. Two additional connections play a role in the diversification of supplies from Western markets (Hegyeshalom AT 4,5 bill. m^3) and from a potential Croatian LNG terminal (Drávaszerdahely HR 6,5 milliard m^3). However, such capacities of these gas pipelines are for domestic consumption, therefore it is necessary to extend them in these directions.

The storage capacities that are presently in operation are 5.8 milliard m^3.

No-continuations

The gas system is connected to the V4+2 neighbouring country – Romania. Currently there is no direct link between Hungary and Slovakia. In 2015 a new gas pipeline between Vecsés and Veľké Zlievce will be launched.

Poland

Current state

Transit gas system [SGT] on the Polish territory is part of the Yamal gas pipeline. In Poland there are 2 gas extraction points: Włocławek – with a capacity of about 8,4 million m^3/day and Lwówek – with a capacity of about 3,6 million m3/day. Poland has underground natural gas storage with a capacity of 1,6 milliard m^3, the total length of the gas transmission network is 9 853 km.

In addition, the transmission system is supplied with gas from international gas pipelines from Ukrainian, Belarusian and German operator.

Currently, the building of the LNG terminal in Świnoujście (viewed as Poland´s strategic investment) is ready for implementation. Its construction is supported also from the EU funds; its completion is expected in the year 2014. The estimated increase in the production of shale gas in Poland will require development and modernisation of the national gas pipeline network.

No-continuations

There is no interconnection with Slovakia.

Romania

Current state

The interconnection with Hungary was completed in 2010, in the Szeged – Arad direction, its length is 109 km. Romania has seven gas storages.

No-continuations

No-continuations do not exist. The interconnection to Hungary and Bulgaria was implemented.

Slovakia

Current state

Slovakia is reliant on the import of natural gas and this currently represents 98 % of the gas consumption. Slovakia has underground natural gas storages, which are situated in the south-western part of the country.

No-continuations

The gas system of the SR is interconnected with the system of the Czech Republic. There is no interconnection with Poland and Hungary.

3.2.4 Crude oil transmission network

Bulgaria

Current state

On the territory of Bulgaria, there is no crude oil pipeline with crude petroleum and petroleum products. The only functioning refinery (LUKOIL Burgas) receives crude oil supplies from the sea.

No-continuations

There are no interconnections with neighbouring countries, including Romania.

The Czech Republic

Current state

The Czech Republic is supplied by two crude oil pipelines – the Friendship pipeline and the IKL pipeline. The Friendship pipeline secures the supplies of crude oil from Russia. The IKL pipeline is connected through Vohburg (Germany) and provides crude oil supplies from Trieste via the TAL pipeline. The capacities of both crude oil pipelines are sufficient. The Czech Republic has crude oil storages – the central tank point has a storage capacity of the crude oil tankers of 1 550 thousand m^3.

The crude oil system connects stocks and headquarters through a pipe with two refineries. The system enables a direct piping and supplying between its individual refineries. The CR disposes also of a complex products pipeline system of 1100 km, interconnecting Czech refineries with 18 fuel warehouses. This system is connected across borders also to the Slovakian Slovnaft Bratislava refinery.

No-continuations

The crude oil system is interconnected with Slovakia. There is no direct interconnection of the crude oil networks of the CR in the direction of Poland, and neither is it planned.

Hungary

Current state

Apart from the marginal domestic production, crude oil comes mainly through Ukraine and the Friendship II pipeline, whose capacity is about 8,0 million of tons per year. The connecting plumbing of the crude oil pipeline Friendship I from Slovakia (3,5 Mt/year) and the crude oil pipeline Adria from Croatia (10 Mt/year) provide sufficient transport routes, by which they improve the security of supplies, however the pipeline Friendship I transports also Russian resources and the pipeline Adria is used for the transit of Russian crude oil for Croatian refineries. Hungary also has an internal crude oil pipeline with a capacity of 2,0 Mt/year, which connects the country´s oil fields in the Algyő Region with the Duna refinery.

The Hungarian transmission product network (1 356 km) has only one connecting point with Ukraine, where mostly petrol is imported. In Hungary, there is no crude oil port, but there is a possibility of export / import of refined products through the crude oil tanker from localities in Komárom and Százhalombatta. A great share of the export of refined products is transported by a tanker on the river Danube.

No-continuations

There is no interconnection with Romania. To Slovakia leads the connecting Friendship I pipeline.

Poland

Current state

The dependency of Poland on the import of crude oil is more than 95 %. The main resource and direction of crude oil supply and of liquid fuels for Poland is Russia. The transport of crude oil and

petrol products is carried out through the crude oil pipeline „Friendship“. In the case of an unexpected disruption in oil supplies from Russia, alternative supplies to Polish refineries are possible across the sea through the crude oil terminal in Gdańsk.

No-continuations

There is no interconnection of the transit crude oil pipeline with the Czech Republic or Slovakia.

Romania

Current state

The Romanian transmission network for crude oil, petrol and ethane has a 3 800 km long pipeline, out of which it has a 1 450 km internal sub-system for crude oil transport and the capacity of 10 mil. tons/year, and the crude oil import sub-system is 1 200 km long with the capacity of 18 mil. tons/year. Crude oil is imported through the Black Sea to the port of Constanţa.

No-continuations

There is no crude oil pipeline interconnection with Bulgaria or Hungary.

Slovakia

Current state

Slovak crude oil system consists of two crude oil pipelines – the Friendship and Adria pipelines. The transport capacity of the Slovak section of the crude oil pipeline Friendship is 20 million tons per year. The second crude oil pipeline is the original branch of the pipeline Friendship running from Šiah to Hungary. On the Hungarian territory, this branch is connected with the Adria pipeline. The Adria pipeline was built because of a possible diversification of crude oil resources and it was launched in 1980.

No-continuations

There is an interconnection with the neighbouring V4+2 countries – the Czech Republic, Hungary; there is no interconnection with Poland.

3.3 Limits and possibilities for solutions

3.3.1 Electric energy networks and installations

Projects with an international impact on the transmission network

In connection with the completion of two blocks - JE Mochovce (SK), it will be necessary to build a new transmission line. The following intentions are being commissioned:

Slovakia – Hungary interconnection:

- 2x400 kV Gabčíkovo – Gönyű line;
- 2x400 kV Rimavská Sobota – Sajóivánka line;
- 2x400 kV Veľké Kapušany – Hungary line (the location is not specified);

Slovakia – Poland interconnection:

- 2x400 kV Varín – Byczyna line;

In the future development of Poland, the following no-continuation appears. In the *KPZK 2030*, Poland plans a connection of the transmission network in three further links to Slovakia. The Slovak party is not considering these connections.

Slovakia – the Czech Republic:

- 2x400 kV Považská Bystrica – Otrokovice line.

Prepared reconstructions or reinforcement of the lines at an interstate level for increased security of the transmission network

- reinforcing (duplication) of the existing line 400 kV Nošovice – Varín (CZ – SK);
- reconstruction of the transmission line Isaccea – Varna (RO – BG);
- reconstruction of the transmission line Isaccea – Dobrudzha (RO – BG);
- reconstruction of the transmission line Tântăreni – Kozloduy (RO – BG).

3.3.2 Gas transmission network

To secure diversification of natural gas supplies to Europe, the following transnational projects are being prepared

- **South stream gas pipeline** (the source will come from reservoirs in Russia, the route will run under the Black Sea across Bulgaria. The northern branch will run through Serbia, Hungary, Slovenia to Austria.)
- **Nabucco gas pipeline** (the source comes from reservoirs in the Caspian Sea, the route runs along the landmass from Azerbaijan across Turkey, Bulgaria, Romania and Hungary to Austria, with a possibility of supplies also for Slovakia and the Czech Republic). The project of Nabucco pipeline has been currently suspended.

Projects of the individual V4+2 countries

- A strategic investment for th**e LNG terminal in Świnoujście** (PL) is prepared for implementation**.** In connection with this project, it is being looked into the possibility of a link between the gas pipelines in the direction North-South, following the route Poland – Slovakia – the Czech Republic – Hungary as far as the proposed LNG terminal Adria in Croatia, the so-called Noth-South natural gas Corridor.
- The intention „MORAVIA – VTL gas pipeline“ with a link to Poland Děhylov – Hať – CR border / Poland is being examined.
- The intention of the route VTL Olešná – Náchod – CR border / Poland (Kudowa-Zdrój) and the intention STORK II gas pipeline is being examined.
- The interconnection of gas pipelines of Hungary and Slovakia in the direction **Vecsés – Veľké Zlievce.**
- Bulgaria (Chiren and Galata), the Czech Republic (Podivín – Prušánky, Břeclav, Uhřice II and Dambořice) and Poland (Kosakowo, Mogilno, Wierchowice, Strachocina) are preparing an extension of their storage capacities.

3.3.3 Crude oil transmission network

Projects of international character

- Plans are being prepared for a crude oil pipeline, which would transport crude oil from the crude oil terminal in Constanta across Romania to the Pancevo refinery (Serbia). **A part of this crude oil pipeline already exists (Constanta – Pitesti), further part of the route (440 km) is being prepared.**
- Extension of the crude oil pipeline Odessa – Brody as far as Płock will interconnect the crude oil pipeline Friendship with the crude oil pipeline from the Caspian Sea.
- The CR has prepared the construction plan of the crude oil interconnection Litvínov – Spergau (Germany). This project gained the PCI status (Projects of Common Interest EU).

Projects of national character

- Construction of a crude oil terminal is being prepared in Gdańsk in Poland.

- The Czech Republic delineated a corridor for the doubling of the crude oil Friendship, including the area for the building of storage tankers near Velká Bíteš.
- Further, the Czech Republic plans to double the pipeline leading to the crude oil pipeline IKL, including the area for storage tankers near Benešovice. The aim of both these intensions is a diversification of crude oil transport across the CR territory and an increase of storage capacities.
- The CR has prepared the construction plan of the product pipeline between the fuel storages Loukov and Sedlnice, with a connection to the Ostrava airport Mošnov.

It would be beneficial if the participating parties solved the common problems with the instability of the transmission network, caused by a discontinuous activity of renewable resources of electricity, in relation with other European countries. Further, the states could participate on a common project of diversification of gas and crude oil supply and thus ensure a reliability of these supplies of important sources of energy from remote deposits.

Figure 6: Electric energy networks and installations

Legend: Electrical transformation stations – interconnection of the V4+2 countries

Map marking	State	Station name	Voltage (kV)	Station connection	State
1	BG	Kozloduy NPP	400	Ţânţăreni (Double lines)	RO
2	BG	Varna	400, 750	Isaccea	RO
3	BG	Dobrudzha	400	Isaccea	RO
4	CZ	Nošovice	400	Wielopole, Varín	PL, SK
5	CZ	Albrechtice	400	Dobrzeń	PL
6	CZ	Lískovec	220	Kopanina, Bujaków	PL
7	CZ	Sokolnice	400	Križovany, Stupava	SK
8	HU	Győr	400	Gabčíkovo	SK
9	HU	Göd	400	Levice	SK
10	HU	Sándorfalva	400	Arad	RO
11	HU	Békéscsaba	400	Nădab	RO
12	PL	Wielopole	400	Nošovice	CZ
13	PL	Dobrzeń	400	Albrechtice	CZ
14	PL	Kopanina	220	Lískovec	CZ
15	PL	Bujaków	220	Lískovec	CZ
16	PL	Krosno – Iskrzynia	400	Lemešany (Double lines)	SK
17	RO	Arad	400	Sándorfalva	HU
18	RO	Nădab	400	Békéscsaba	HU
19	RO	Isaccea	400, 750	Dobrudzha, Varna	BG
20	RO	Ţânţăreni	400	Kozloduy (Double lines)	BG
21	SK	Varín	400	Nošovice	CZ
22	SK	Križovany	400	Sokolnice	CZ
23	SK	Stupava	400	Sokolnice	CZ
24	SK	Gabčíkovo	400	Győr	HU
25	SK	Levice	400	Göd	HU
26	SK	Lemešany	400	Krosno – Iskrzynia (Double lines)	PL

Figure 7: Gas transmission network

Legend: Existing and planned underground gas storages with a capacity above 1 mld. m^3

Map marking	Name	State	Note
1	Chiren	BG	
2	Galata	BG	planned
3	Lobodice	CZ	
4	Dolní Bojanovice	CZ	used SK
5	Třanovice	CZ	
6	Štramberk	CZ	
7	Háje	CZ	
8	Tvrdonice	CZ	
9	Uhřice	CZ	
10	Dolní Dunajovice	CZ	
11	Szőreg	HU	
12	Hajdúszoboszló	HU	
13	Kardoskút – Pusztaszőlős	HU	
14	Zsana – Nord	HU	
15	Pusztaederics	HU	
16	Husow	PL	
17	Strachocina	PL	
18	Wierzchowice	PL	
19	Mogilno	PL	
20	Bonikowo	PL	
21	Daszewo	PL	
22	Brzeznica	PL	
23	Swarzow	PL	
24	Kosakowo	PL	planned
25	Świnoujście	PL	LNG Terminal - planned[7]
26	Balaceanca	RO	
27	Urziceni	RO	
28	Bilciuresti	RO	
29	Ghercesti	RO	
30	Sarmasel	RO	
31	Tirgu-Mures	RO	
32	Cetatea de Balta	RO	
33	Nades – Prod – Seleus	RO	
34	Láb	SK	
35	Dambořice	CZ	planned

[7] The terminal is in the process of construction; it will serve the intake of liquidised natural gas transported by ships.

Figure 8: Crude oil transmission network

4 Socio-economic conditions of the V4+2 countries

4.1 Introduction to the subject matter

In order to broaden the scope of the Common Strategy, social and economic aspects must be taken into account since there is neither spatial development nor territorial cohesion without social cohesion and economic convergence. All the incorporated features identifies socio-economic conditions which are relevant to at least the majority of the V4+2 countries and have spatial characteristics as well. Therefore these common spatial features show not only similar socio-economic conditions, but also a similar territorial structure of the V4+2 countries. The chapter aims to identify limits and possibilities, which might be a basis for common policy actions to enhance the spatial development of V4+2 countries.

The chapter is based on a preliminary analysis, which identified the common features of the V4+2 countries. The chapter is primarily based on Eurostat database for the years between 2003 and 2012 (or the latest data available). Using European data source gives the possibility to assess the V4+2 countries in the European context and to compare the region to the EU27 average.

4.2 State of the subject matter and ascertained problems

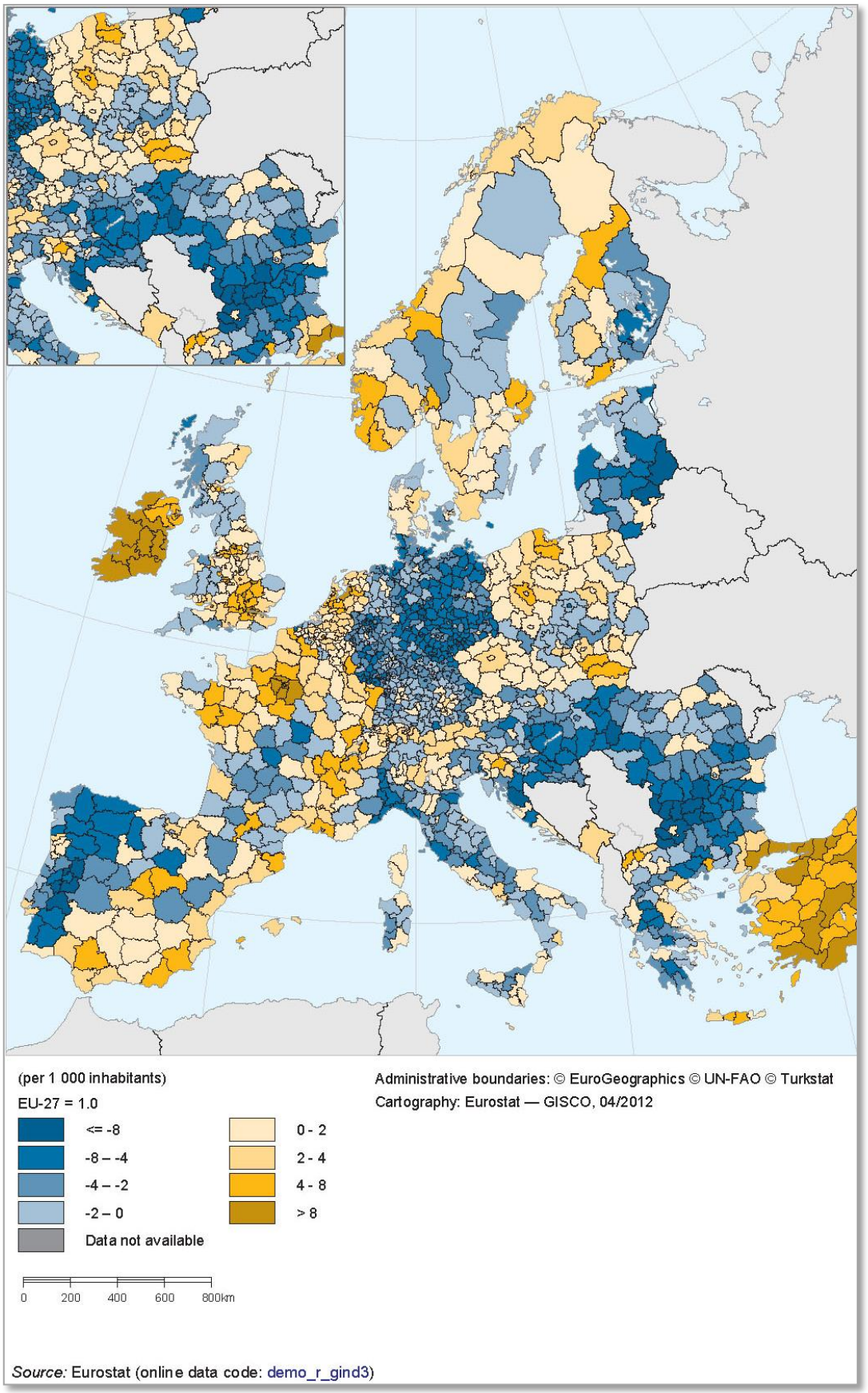
4.2.1 Common demographic and social features of the V4+2 countries in the European context

Demographic processes are determined by basically two factors: natural population change (births minus deaths) and net migration (immigration minus emigration). Regarding the long-term demographic trends, the whole V4+2 area may face the problems of ageing and declining population. There are only a few regions (mostly capital regions and development poles), where the demographic situation is expected to stay favourable mostly due to a positive migration flow, caused by attractive job opportunities. In other regions, stagnating or negative natural population growth coupled with a negative migration flow results in population decline and in an unbalanced age structure.

Natural population change

In comparison to the EU27 average (0,45 ‰ in 2012), the level of natural population change in most of the V4+2 countries is lower, although the V4+2 countries show significant differences. Slovakia, the Czech Republic and Poland have positive natural population change, while Romania, Hungary and Bulgaria are among the worst in Europe. However the natural population growth rate shows a decreasing tendency in Poland and also in the Czech Republic. Even the fertility rate in the V4+2 countries is lower than the EU-27 average (1,57 ‰ in 2011), which contributes to a worsening demographic situation.

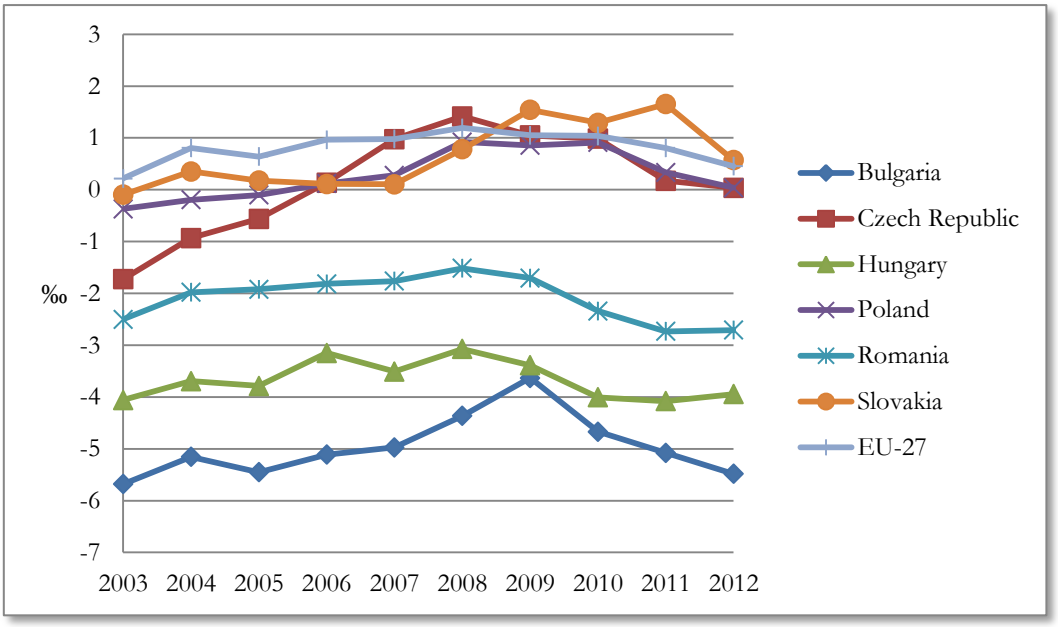
Figure 9: Natural population change in Europe by NUTS 3 regions, 2010 (per 1 000 inhabitants)



Source: EUROSTAT

Graph 1: Natural population change in the V4+2 countries, 2003–2012

*The crude rate of natural change is the ratio of the natural change during the year (live births minus deaths) to the average population in that year. The value is expressed per 1 000 inhabitants.



Source of data: EUROSTAT

Ageing, Health and Life expectancy

As well as for the whole EU, ageing and decrease of the working age population is one of the most important demographic – and even economic – challenges for the V4+2 regions and countries, even though the V4+2 countries – except for Bulgaria – have a lower proportion of elderly people aged 65 and over, than the EU27 (17,82 % in 2012), and these countries are in a relatively favourable situation. Moreover, Slovakia currently has one of the youngest populations in the EU. The most serious problems can be recorded in Bulgaria, which is ranked among the top ten most aging countries in the world. However, the increase of the proportion of the population aged 65 and over can be observed in all of the V4+2 countries, which burdens the social services heavily.

Table 2: Share of population aged 65 years or over*

*Population on 1st January

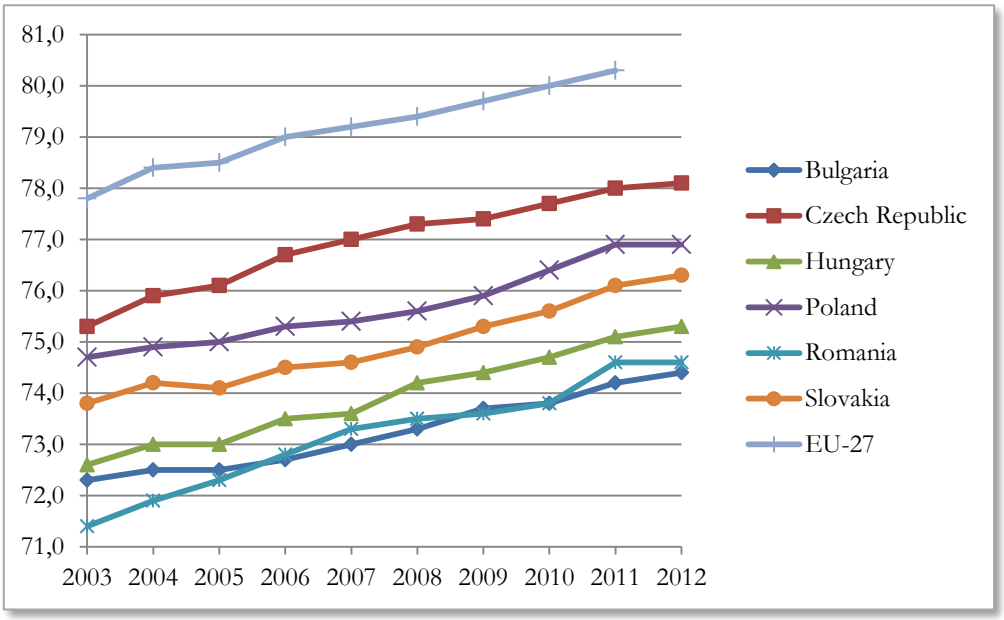
	2011	2012
Bulgaria	18,46%	18,85%
Czech Republic	15,61%	16,20%
Hungary	16,74%	16,88%
Poland	13,47%	13,82%
Romania	14,88%	15,01%
Slovakia	12,58%	12,78%
European Union	17,53%	17,82%

Source of data: EUROSTAT

The lower share of elderly population correlates with the bad overall health condition of the population of the macro region. V4+2 countries show higher risks of mortality, compared to the western European countries. Despite the increasing tendency during the past years, life

expectancy (both of male and female) is significantly below the EU27 average (80,4 years in 2011) and the gap between the V4+2 countries and the EU27 average remained the same. Insufficient, out-dated illness-centred health services and the lack of health consciousness are also responsible for the low life expectancy.

Graph 2: Life expectancy in the V4+2 countries, 2003–2012



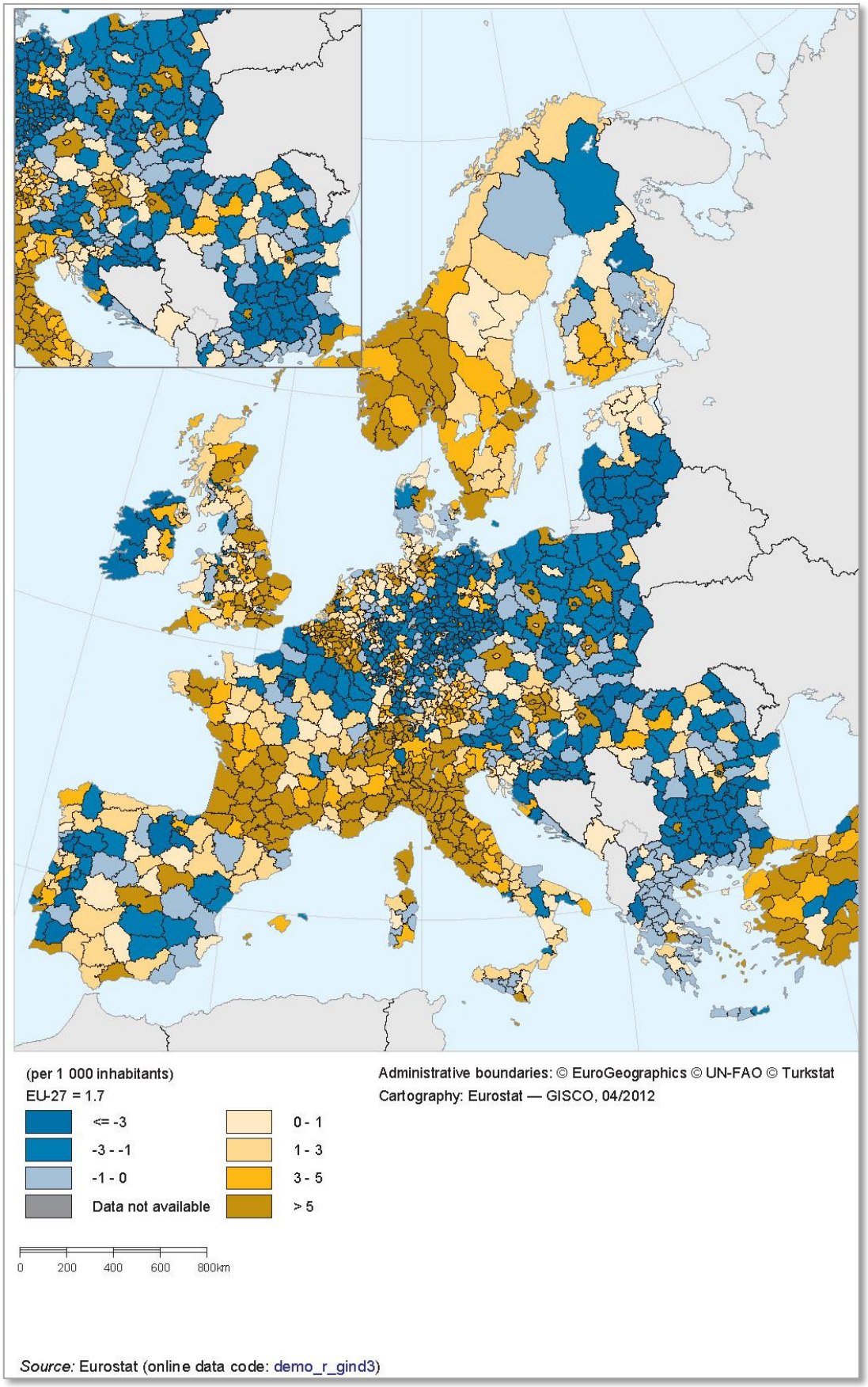
Source of data: EUROSTAT

Migration

Besides natural population change migration is the other important factor describing the countries demographic processes. Moreover it also affects the age structure and other features, such as birth rates and ageing, because in most of the cases the working age population is the most mobile group. Free movement of labour inside the EU can lead to a negative migration balance, which is typical in the V4+2 countries especially in the less developed regions of Poland, Romania, Hungary and Bulgaria. Labour migration is partly caused by the highly skilled workforce leaving the country, who could otherwise be the engine of growth in the home country (brain drain). Although not only the high-skilled workforce can be labour migrants but the unemployed low-skilled workers (e.g. from Bulgaria) also try to find jobs in other countries.

Looking at migration flows within the V4+2 countries, metropolitan areas (e.g. Praha, Bratislava, Warszawa, Budapest, Bucharest, Sofia, etc.) are favoured targets of national and international migrants as well, which turns the overall national net migration balance to positive in some of the V4+2 countries (the Czech Republic, Hungary, Slovakia). On the other hand old industrial sites and rural areas are the least attractive regions and exposed to depopulation due to declining population and migration towards the capitals and other more developed centres.

Figure 10: Net migration in Europe by NUTS 3 regions, 2010 (per 1 000 inhabitants)



Source: EUROSTAT

Education and skills

Despite commitments by EU Member States to promote equity in education and training, major geographic disparities persist in educational opportunities and outcomes across, but also within EU Member States, while the V4+2 countries' performance in this sector seems to be rather similar and generally slightly below the EU average values.

Although the educational attainment (those aged 25–64 with at least an upper secondary education) in almost all V4+2 countries is significantly higher than the EU27 average (46,5 % in 2012), while the tertiary education attainment (% of population aged 30–34) in these countries (between 21,8 a 29,9 %) were much lower than the EU27 average (35,8 %). The only exception is Poland, where it is outstandingly high (39,1 %) in comparison with the region and rest of EU as well. In case of the V4+2 countries it is due to the significant segregation as well as the relatively low quality of tertiary education institutions. Still, the performance of the primary and secondary education system in V4+2 countries is performing relatively well in European comparison, which is confirmed by the fact that the proportion of early-school leavers (% of population aged 18–24) in V4+2 countries (witrh the exception of Romania) is lower than the EU27 average (12,8 % in 2012).

4.2.2 Common economic features of the V4+2 countries in the European context

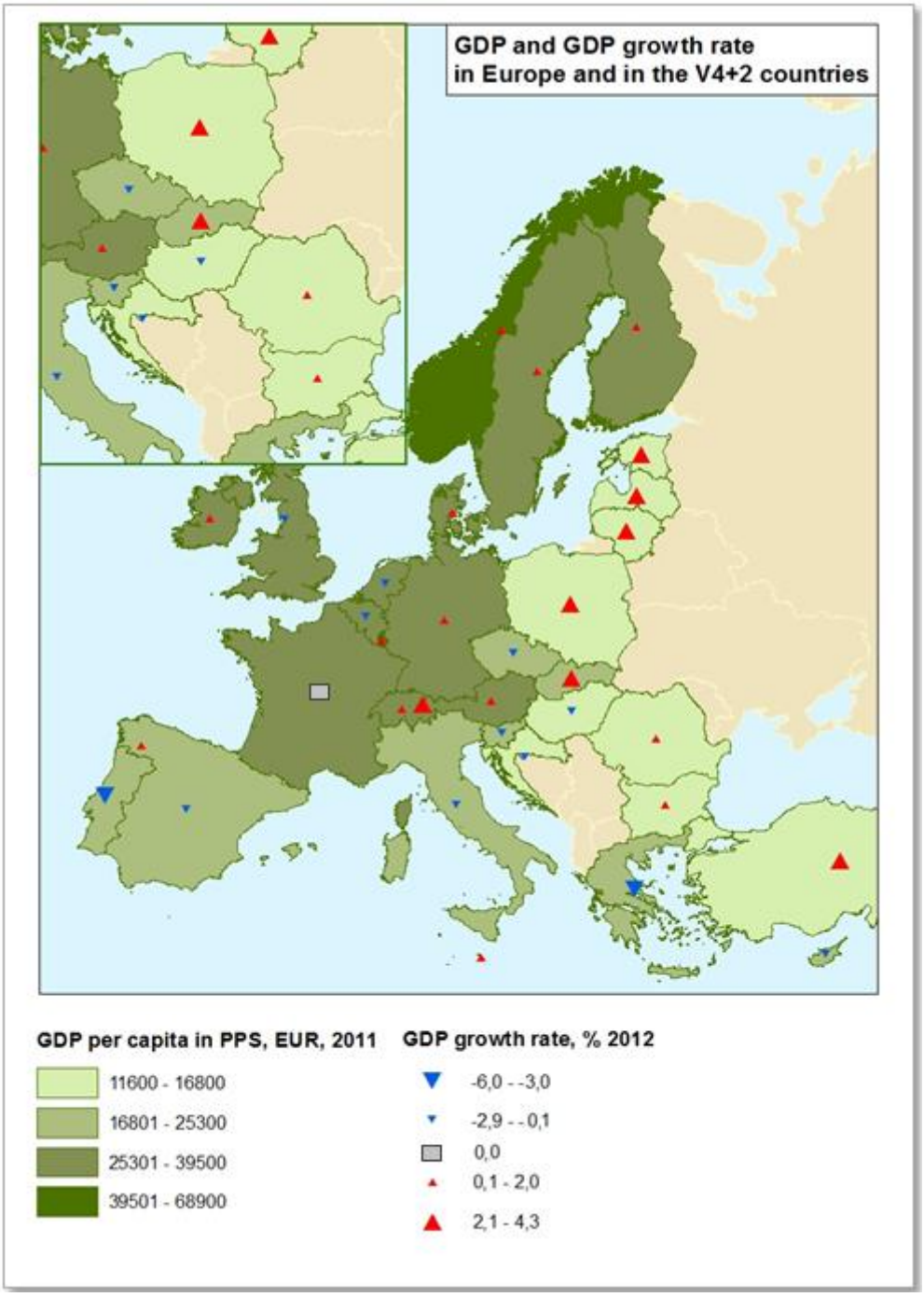
Main economic indicators

GDP per capita (PPS) of the V4+2 region is significantly – with more than 30 % – below the EU27 average (25 600 PPS in 2012). The best economic performance is that of the Czech Republic, while Bulgaria has the weakest economy in the aspect of GDP per capita (PPS). At NUTS 2 level – apart from three capital city regions (Bratislava, Praha, and Közép-Magyarország) – the GDP was below the 75 % of the EU average at the enlargement in 2004 and 2007, thus these regions had been registered as convergence regions. Since then both the Warszawa capital region (Mazowieckie) and Bucharest capital region (Bucureşti-Ilfov) have exceeded the 75 % of the EU27 average and came out of the less developed category in the new EU financial period 2014–2020.

Besides the more developed capital regions, East-West disparity defines the territorial structure of the V4+2 countries regarding GDP per capita (PPS), which confirms the theory about the existence of an East-West slope within the region. While GDP per capita in 2010 was below 10 000 PPS in the eastern regions of Romania, Bulgaria, and Hungary, it exceeded 16 000 PPS in most regions of the Czech Republic and in the western part of Poland (Dolnośląskie 17 200 PPS, Śląskie 16 400 PPS) and Slovakia (western part of Slovakia 16 700 PPS).

The major proportion of the GDP is produced by service sector in all NUTS 3 regions of the V4+2 countries but its composition is different in certain countries. The share of agricultural sector is higher in Bulgaria and Romania, but the potential of the agricultural sector is also high in the whole region. The high share of industry from GDP is common in traditional industrial areas in the V4+2 countries.

Figure 11: Economic performance in Europe (2011, 2012)



Source of data: EUROSTAT

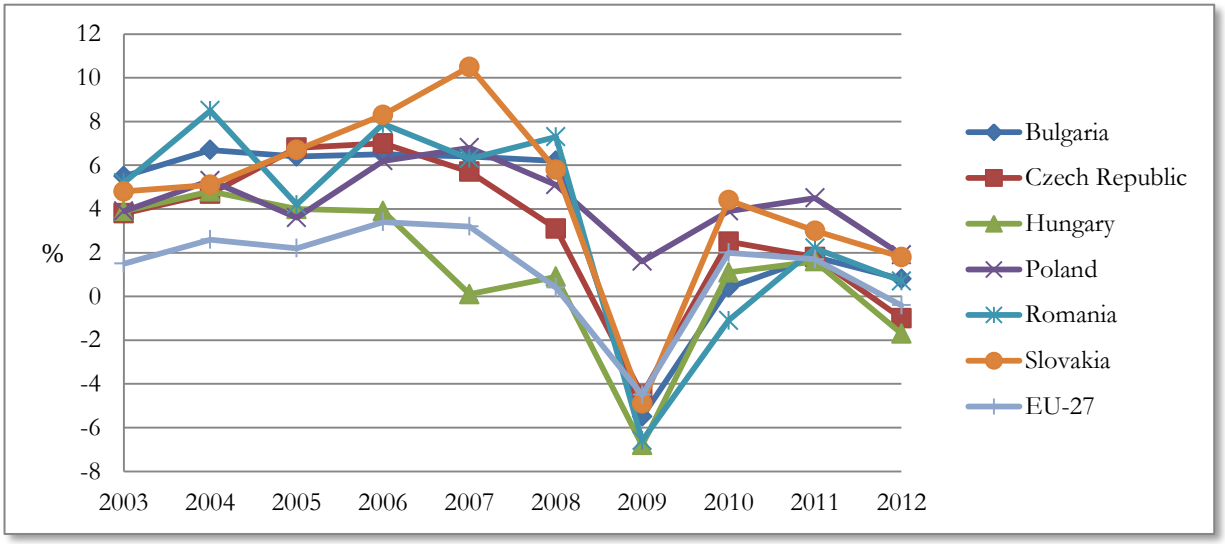
In the years before 2008, economic development was more dynamic in some of the peripheral countries of Europe than in the developed core areas. The GDP growth rate of the V4+2 countries exceeded the EU average. Moreover, their economies were also restructured in the previous decades: the material, energy, and transport intensity of the economies decreased substantially, while the share of services in the GDP increased significantly and the economies became more open. Between 2000 and 2006 regional disparities in GDP per capita over Europe decreased by 8 % pointing to economic convergence among EU regions. Right before the crisis the highest growth rate was measured in Slovakia, however Poland, Romania, Bulgaria, and the Czech Republic experienced a dynamic economic growth as well, while Hungary was the least dynamic at that time.

Due to the global economic crisis, GDP growth rate fell back in whole of Europe. However the different countries and regions in Europe have been hit differently and are exposed to specific combinations of elements of the crisis. Those developed regions, which were strongly embedded into the global economy, were much more vulnerable than those which were less involved in the global economy and consumer networks. On the other hand, these regions have also better ability to restore after a hard economic period. In general, those places that have faced the biggest economic challenges since 2008 were the fastest growing countries and regions in the previous period.

The global economic crisis had the slightest effect on Poland, where even in 2009 1,7 % growth was measured, while the biggest throw-back was in Romania and in Hungary. Nowadays Poland and Slovakia show a relatively dinamic, while Romania and Bulgaria a moderate growth and both groups perform over the average growth rate of the EU27. On the contrary, Hungary and the Czech Republic have bigger difficulties in boosting their economy after the worst period of the crisis.

Graph 3: GDP growth rate in the V4+2 countries, 2003–2012

* Gross domestic product (GDP) is a measure of the economic activity, defined as the value of all goods and services produced less the value of any goods or services used in their creation. For measuring the growth rate of GDP in terms of volumes, the GDP at current prices are valued in the prices of the previous year and the thus computed volume changes are imposed on the level of a reference year; this is called a chain-linked series. Accordingly, price movements will not inflate the growth rate.

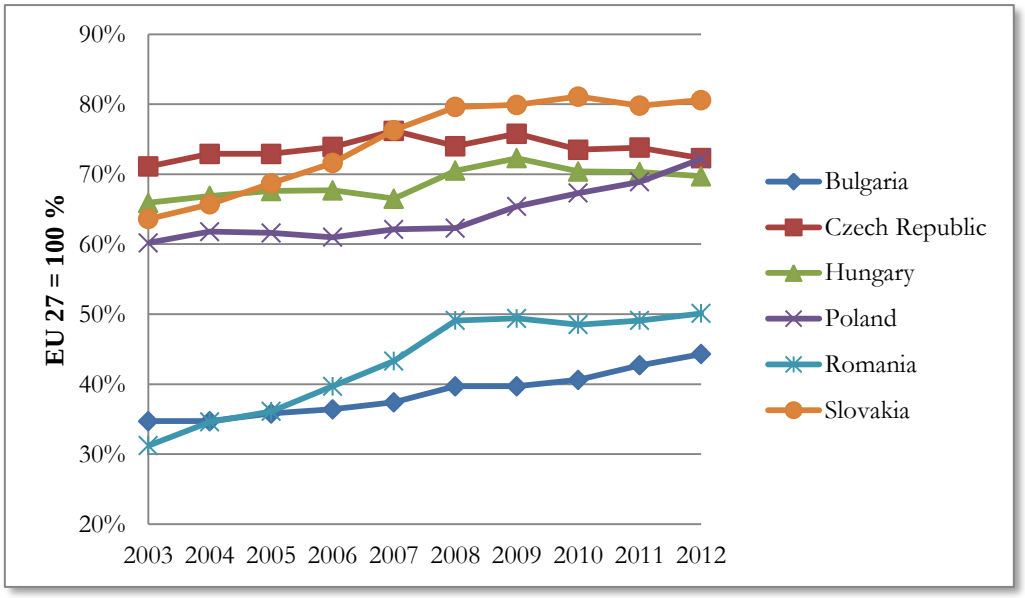


Source of data: EUROSTAT

Productivity and investments play an important role in economic growth. Labour productivity (GDP / person employed) shows significant similarities to the overall economic performance (GDP per capita) in the V4+2 countries. All of these countires are lagging behind the EU27 average, however the gap is not as wide as for GDP per capita (PPS). Similar to the GDP the original four countries of the Visegrad Group have better performance between 70-80 %, while Romania and Bulgaria are below the 50 % of the EU27 average. The V4+2 countries could reduce their distance from the EU27 average in the examined period, however the Czech Republic and Hungary experienced only a moderate convergence in labour productivity, which also shows simirarities to the overall economic development (GDP per capita).

Graph 4: Labour productivity in the V4+2 countries, 2003–2012

*Labour productivity is measured by gross domestic product (GDP), expressed in terms of the purchasing power standard (PPS), relative to the number of employed people.

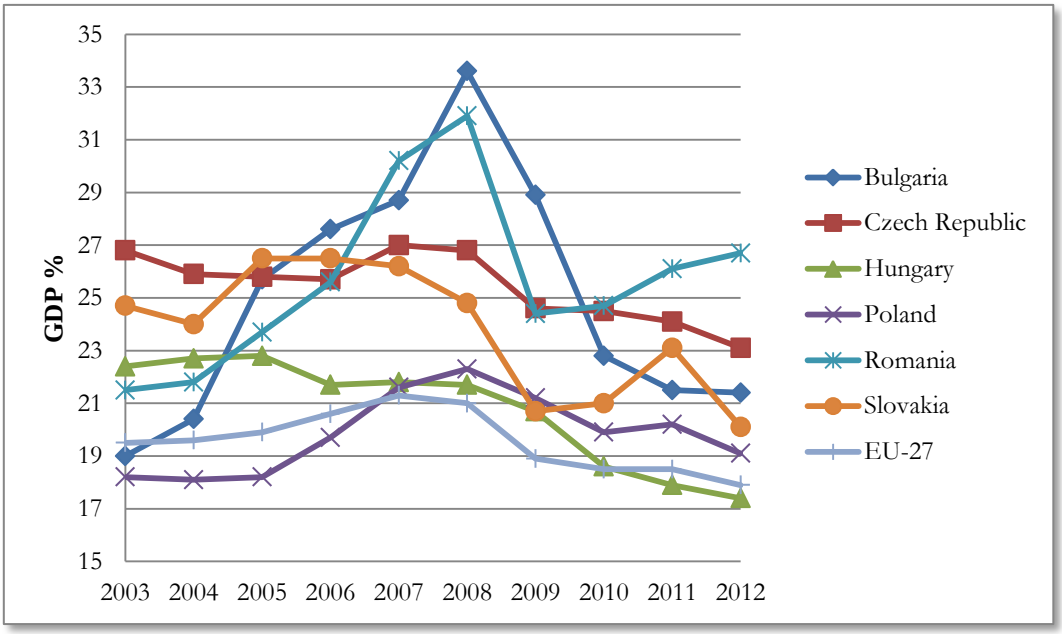


Source of data: EUROSTAT

On the other hand the level of investment in all of the V4+2 country – except Hungary since 2010 – is above the EU27 average. In most of the countries the peak of the investment level was in 2008 during the examined period, but the economic crisis affected heavily the level of the investmens as well. In 2008 the most outstanding country was Romania and Bulgaria and these countries experienced the most significant throw-back after the crisis. The values of Hungary, Slovakia, Poland, and the Czech Republic decreased less dinamically. After the crisis only Romania, Slovakia and Poland could at least temporary increase their investment rates, and the whole macroregion must face the slowdown of the investment rates.

Graph 5: Investments* in the V4+2 countries, 2003–2012

* Gross fixed capital formation consists of resident producers' acquisitions, less disposals, of fixed tangible or intangible assets. This covers in particular machinery and equipment, vehicles, dwellings and other buildings.



Source of data: EUROSTAT

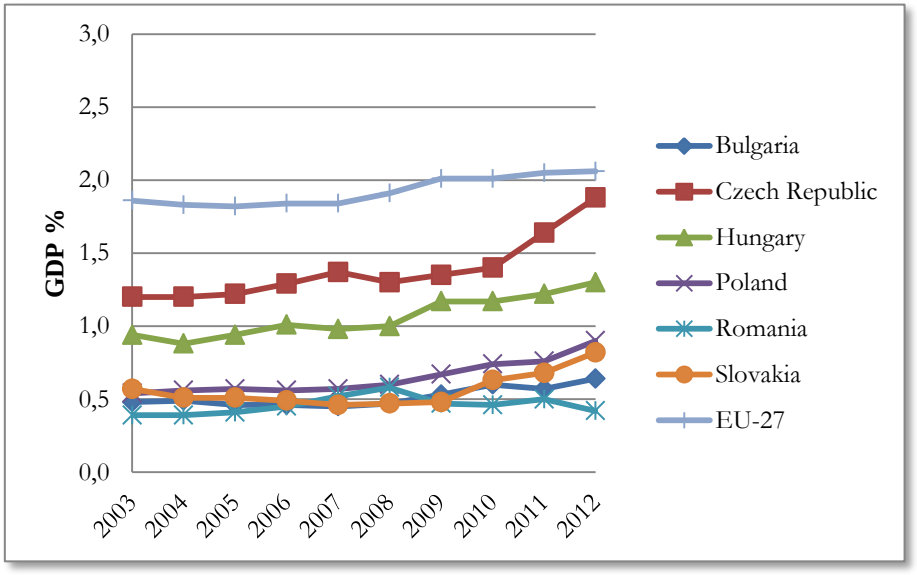
Innovation, knowledge economy, smart specialisation

Smart growth means developing an economy based on knowledge and innovation. In spite of being an important element for boosting Europe's economy (one of the EU 2020 targets is also to increase the share of GDP spent on R&D), innovation and its main indicator the gross R&D expeditures is currently below 2 % of GDP in the whole V4+2 territory. In addition to this there are huge territorial disparities in R&D activities. The metropolitan areas especially capital regions concentrate the R&D expenditure. Bratislava, Budapest or Praha are ranked with Göteborg, Toulouse or Lyon. Small and medium-sized cities and rural areas can be also very important in applying knowledge and in creating new innovations. A large number of medium-sized urban areas (especially academic centres) display also a high share of R&D expenditures. Creative, attractive areas are hotspots, which attract business investments and highly qualified professionals, who can be their potential employees.

Comparing the R&D expeditures to the economic performance (GDP per capita) there are several regions which, despite their relatively high share of gross R&D expeditures, indicates the need for competitive business innovators and the improvement of the innovation system as a whole. Making use of existing knowledge and results of R&D activities depends on the socio-economic and institutional features of a particular area. The concept of smart specialisation emphasises an increase in innovation and competitiveness based on endogenous potential of regions. Smart specialisation is dedicated to each region regardless of a share of R&D, innovation or high technology in the structure of their economy as there are different patterns of innovation activities.

Graph 6: Gross R&D expenditure (GERD) in the V4+2 countries, 2003–2012

* R&D expenditures include all expenditures for R&D performed on the national territory during a given period, regardless of the source of funds.



Source: EUROSTAT

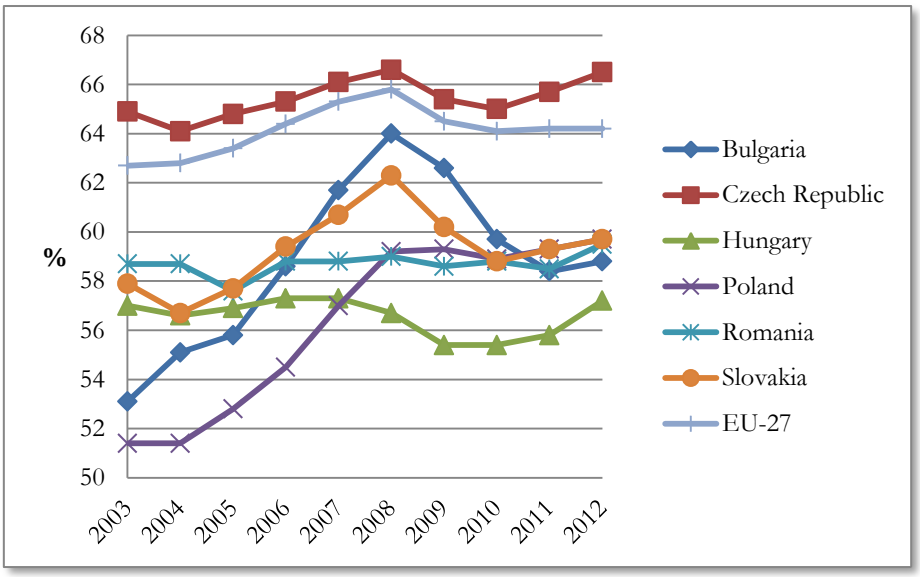
Labour market

In the case of the employment rate the V4+2 countries are showing significant differences. Except for the Czech Republic all other countries of the region are below the EU27 average (64,2 % in 2012) in employment, and Hungary has one of the lowest employment rates in the EU27.

The employment growth of the V4+2 countries was influenced by the economic crisis as well. Except for Hungary and Romania, all of the countries showed a dynamic growth until the recession but after 2008 only Poland could avoid the decline in employment rate.

Graph 7: Employment rate in the V4+2 countries, 2003–2012

*Employment rate represent persons in employment as a percentage of the population of working age (15- 64 years).

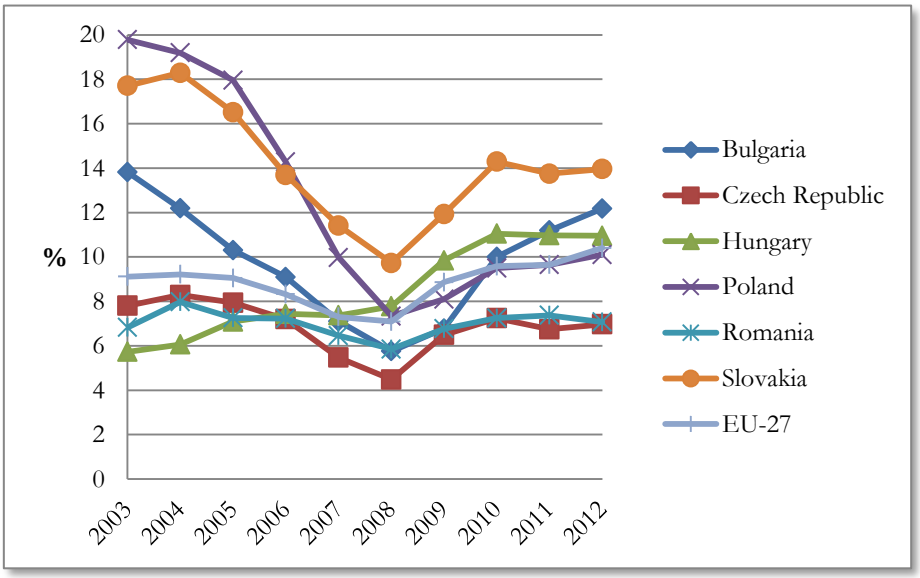


Source of data: EUROSTAT

By 2012 all countries have returned to a growing employment rate. Since 2008, Hungary and the Czech Republic have had the biggest increase in employment rate, while the other countries show only marginal increase or even stagnation similar to the EU27 average.

During the second part of the 2000s the V4+2 countries – except Hungary – had continously decreasing unemployment rate until the crisis in 2008. The unemployment rate decreased with the highest rate in Slovakia and Poland. On the other hand in these countries the share of unemployed persons was the highest before. The crisis had the greatest impact on the unemployment rates of Slovakia, Bulgaria and Hungary, while the situation of Romania barely changed before and after the crisis.

Graph 8: Unemployment rate in the V4+2 countries, 2003–2012

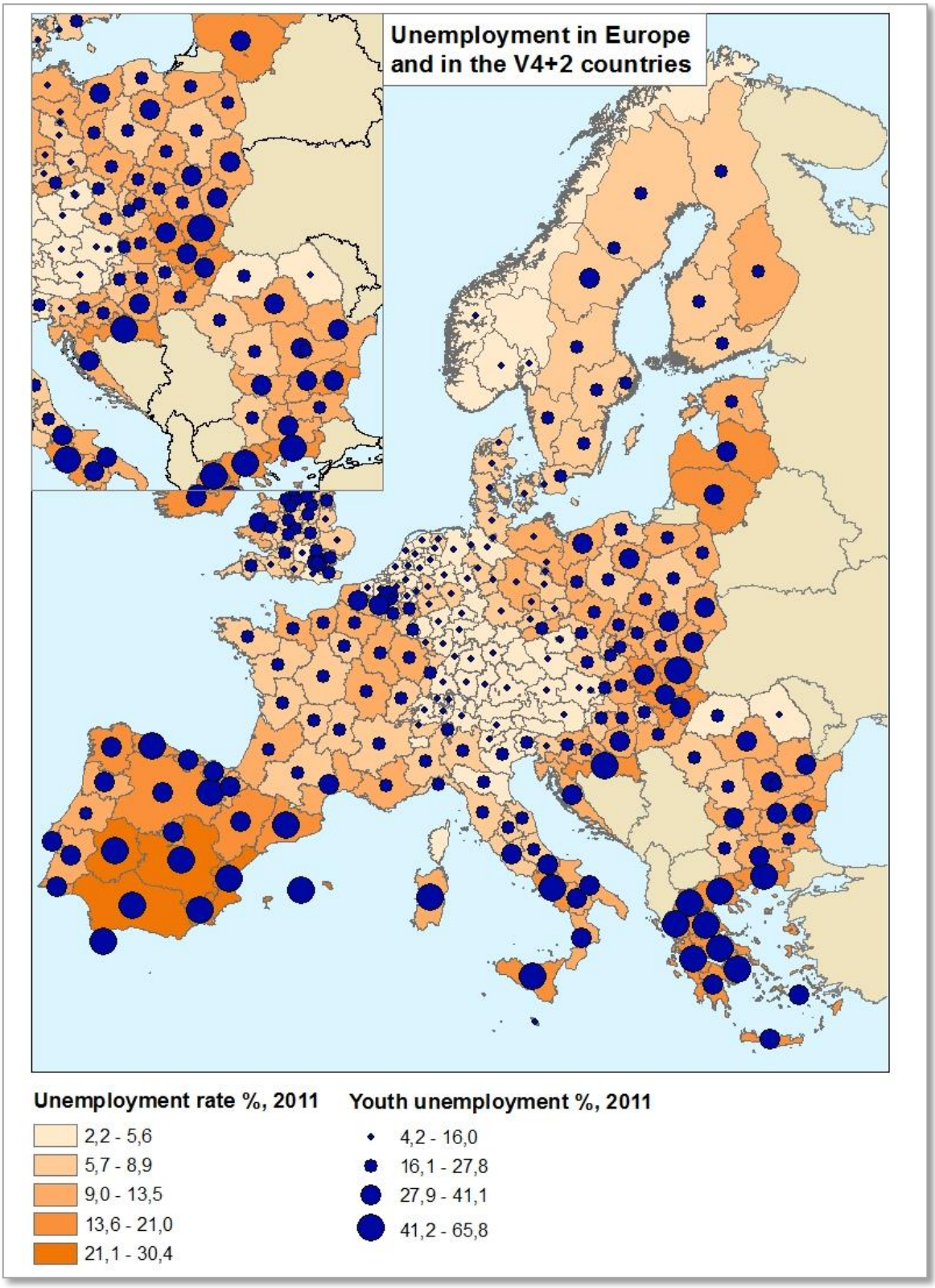


Source of data: EUROSTAT

Youth unemployment (between 15 and 24 years) is one of the biggest challenge in the V4+2 countries. The Czech Republic has the lowest youth unemployment rate in 2012, and together with Romania are below the EU27 average (22,1 %). On the other hand Slovakia has the highest

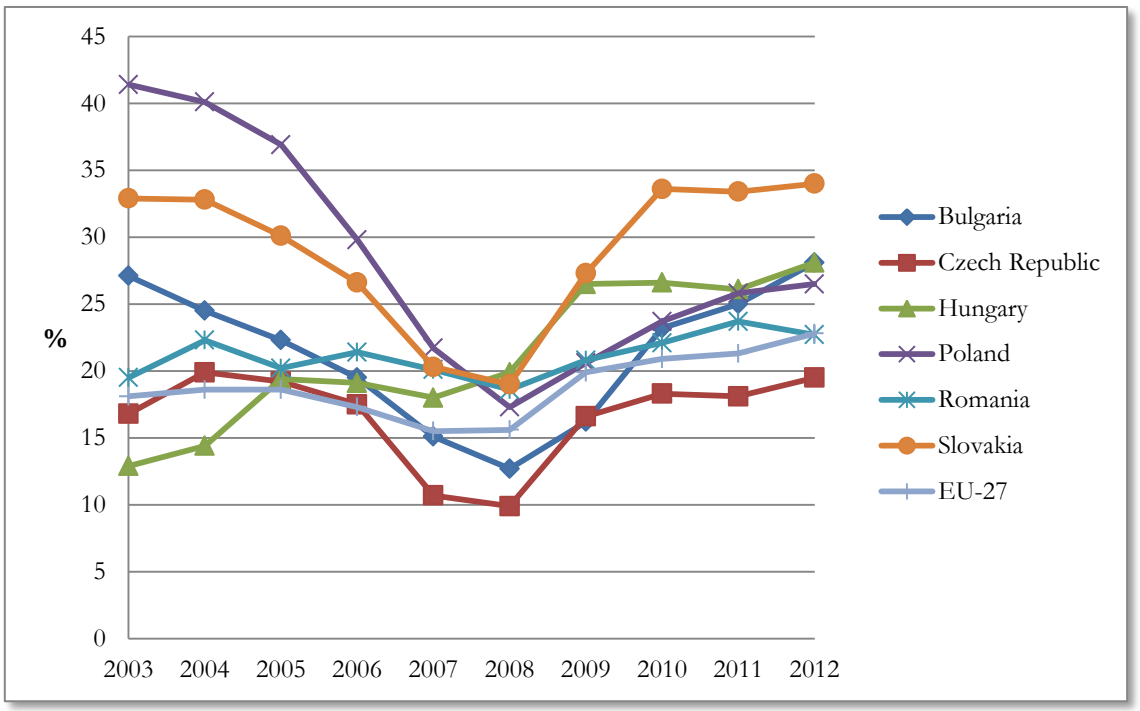
rate with 34 %, but the rate is not as high as in the Southern European countries. Apart from several regions in Romania and in the Czech Republic youth unemployment rate exceeds 16 % in all of the NUTS 2 regions of the V4+2 countries and there are several regions where it exceeds even 28 %.

Figure 12: Unemployment and youth unemployment rates in the European Union, 2011



Source of data: EUROSTAT

Graph 9: Youth unemployment rate (15 and 24 years) in the V4+2 countries, 2003–2012



Source of data: EUROSTAT

4.2.3 Territorial structure of the V4+2 countries

Development poles, growth areas and axes

Development poles and growth areas are spatial structures that concetrates economic performance, innovation capacities, attractive job opportunities, and therefore they are the most attractive places for investments and for migration. In Europe these functions are concentrated in the core area and in Northern Europe as well as in a number of urban agglomerations outside the core. Most of metropolitan regions of the V4+2 countries are directly connected to the European core area through development axes. Development axes are bands of territory connecting development poles and disposing of similar / same properties. A characteristic feature of development axes is the occurrence of quality and capacity (transport and technical) infrastructure of a higher rank that influences the intensity of links among development poles. In some places these ties are advocated despite the quality of the transport network.

Rural areas

As elsewhere in Europe most of the rural areas of V4+2 countries can be described with unfavourable demographic and migration processes. The rural areas are being gradually depopulated and there can be seen negative phenomena such as „brain drain“ from rural peipheries or economically motivated migration to development poles of the home country and to the more developed EU15 countries. Negative international migration concerns especially Poland, Romania and Bulgaria. Another important trend is the structural change, namely the process of economic diversification away from the traditional focus upon primary or land-based industries, towards secondary and tertiary activities and in metropolitan regions also towards research and high-tech industries. The role of small and medium size cities in the rural areas is important for the regional development therefore it is necessary to develop appropriate policies which would support urban-rural partnership.

Regions in industrial transition

After the transition to market economy the industrial performance of V4 +2 countries had sharply fallen and the proportion of industrial sector in the employment structure was also suppressed. In Eastern Central Europe a certain part of labour force, which became unemployed because of to these processes, could be absorbed by the tertiary sector. Nevertheless in the South-Eastern European states the collapse of oversized and outdated industry has led to structural crisis on large scale resulting in massive unemployment which the services sector could only partially absorb, especially in smaller urban centres. The one-sided industrial areas with their large companies of the socialist heavy industry have lost their favourable position. The socialist industrialization policy has developed several times a profile that did not fit either the history or traditions, nor natural resources or the size and needs of national market of the countries. This led to economic and demographic decline of cities and regions, as well as certain environmental problems (though some indices improved due to the stop of industrial production), and these regions are lagging completely behind from the development level of global market. Despite the signals of the crisis there are still prominent industrial areas that have managed to cope with problems relatively well like the Polish Upper Silesia and there are regions struggling with serious pollution like Ostravsko Region in the Czech Republic and, Košice in Slovakia.

Cross-border regions and agglomerations

The thematic features of the typologies of the cross-border regions differ widely, geographical or political border characteristics are also used. In case of V4+2 spatial typology the term of cross-border region is defined according to the political border characteristics. These regions are those territories which directly share a political border (both internal and external EU borders) and are based on deep-seated and long-standing historical and cultural links. Border areas of the macro-region are traditionally less developed and sparsely populated. This unfavourable situation is related to the strict isolation politics of the former communist regime creating a network of 'iron-curtain' border situations. The areas marked by such characteristics have been even under new circumstances in disadvantaged start-up position, with limited cooperation culture. Cross-border agglomerations are of special importance concerning cooperation actions. Due to border modifications during the 20th century within the V4+2 countries some functional urban areas suddenly became divided by political borders. Political changes, EU integration, opening of the labour market created new possibilities for the previously isolated areas. In parallel, the process of globalisation enlarged the catchment areas of huge cities, which often overpass the borders. In spite of the new circumstances development of these border areas are often limited both in terms of actions and scope, because of the classical "border effect": differences in legislation, language and administration, economic and spatial disparities, etc. The existing and potential cross-border regions and agglomeration areas of the V4+2 countries are e.g. Győr –Bratislava – Vienna, Komárom / Komárno, Esztergom – Štúrovo, Košice – (Miskolc), Oradea – (Debrecen), Arad, Satu Mare, Szczecin, Ózd – Putnok, Balassagyarmat, Ruse – Giurgiu, Eurocity Guben / Gubin, Eurocity Görlitz / Zgorzelec, Frankfurt (Oder) – Słubice, Cieszyn / Český Těšín, Hodonín – Holíč – Strážnice – Skalica.

Carpathian Mountains as a common V4+2 interest area

The Carpathian Mountains is a unique mountain area streching from the Austrian-Czech border on the West to the Romanian-Serbian border on the Southeast, through the Czech Republic, Poland, Slovakia, Ukraine, Romania, and with lower hills in Hungary. While the Carpathian Mountains represent an exceptional natural habitat and cultural heritage at the heart of Europe, there are also a few serious socio-economic and ecological problems being similar in all of the affected countries. The depopulation is accelerating throughout the mountain range since it is characteristically a rural area with low polulation density. The growth of urban centres located

within the range represent not only a threat to the sensitive ecological balance but the depopulation encumbers the profitable exploitation of the natural resources of the mountains. The Carpathian Mountains, particularly their highest ridges in Slovakia, Poland and in Romania form significant natural barriers for infrastructure, and thus also for spatial development. Intensive transport concentrated in several mountain passes, and tourism (at the most frequented locations) are alerady causing serious pollution, while the other economic activities (e.g. forestry) should be also facilitated and controlled carefully in order to maintain the ecological balance. On the other hand the majority of the population of mountain areas faces typical rural problems: unemployment, unfavourable accessibilty to education, social, healthcare and cultural services, thus preserving the unfavourable trends of mountain communities.

The Carpathian Mountains are however, from a larger part, an almost untouched natural area, preserving unique biotopes, traditional mountain pasturage, including a follow-up of scattered settlements, which together form singular landscape sceneries. It is therefore an area, which - if being optimally used in a sustainable way, focused on nature friendly tourism – has, like the Alpine Region, a high potential for specific development.

4.3 Limits and possibilities for solutions

The level of population growth in the V4+2 countries is much lower than in the EU. **Decreasing population with fast rate of emigration together with a dropping fertility rate** characterised most of the V4+2 regions. Rural and peripheral areas are more significantly affected by these challenges, which have several consequences for social cohesion, provision of services of general interest, and labour markets. There is a clear territorial pattern of polarisation causing **increasing demographic imbalances between urban and rural, central and peripheral areas** of the V4+2 territories.

- In many parts of V4+2 region the working age population has been declining for a long time. An **increasing proportion of the population aged 65 and over** can be observed, which burdens the social services heavily. The most serious problems can be seen in Bulgaria, which ranks among the top ten of the most aging countries in the world.
- V4 +2 countries reflect **the higher risks on mortality and a bad health condition** compared to the western European countries. **Life expectancy** (both of males and females) is significantly **below the EU average**; still it has an increasing tendency. **Insufficient, outdated healthcare** system focusing generally on medicating not on prevention and the lack of health consciousness are also responsible for this problem.
- Free movement of labour force inside the EU can lead to a negative migration balance, which is typical in the V4+2 countries especially in the less developed regions of Poland, Romania, Hungary and Bulgaria. **Labour migration** is **characteristic of highly skilled workforce, who could otherwise be the engine of growth in the home country** (**brain drain**).
- Metropolitan areas (e.g. Praha, Bratislava, Warszawa, Budapest, București, Sofia, etc.) are the most favoured targets of immigrants, while older industrial and rural areas are less attractive. Except for the Czech Republic and Poland, the dominance of the capital cities in the V4+2 countries reflects their rather mono centric urban systems.

Social inequality has been growing and disadvantaged social classes has been widening constantly. The disadvantaged groups of inhabitants can be characterised by **high unemployment rate, low qualification, poverty, poor health, high fertility and mortality. These problems have also territorial features.** The territorial concentration of social and economic problems is coupled with lower access to welfare and public services. Significant lag at certain components of the information and innovation society can be observed in the macro region. This raises serious problems, particularly in regions with small villages and borderline areas with no town centres.

- While there is an increasing share of inhabitants with completed secondary education and university graduates, and the share of people with primary education and without education decreases (e.g. in Hungary, Slovakia, Romania), the efficiency of education is not improving as it is expected. A very few individuals actually learn 'lifelong', improving, but still low language skills, etc.
- The high level of youth and long-term unemployment combined with the low level of tertiary educated people, are characteristic features of the V4+2 countries' labour market.
- The overall economic performance of V4+2 countries is much weaker and vulnerable than the EU average.
- Both employment rate and labour productivity is below the EU average.
- The share of areas with high agricultural employment rate is significant in the V4+2 countries. Agriculture is still a significant employer in the V4+2 countries, especially in Romania, Poland, and Hungary.
- Better use of R&D and innovations, and growing centres of knowledge has outstanding importance for the V4+2 countries as well as for the whole of EU. The V4+2 macro region is lagging behind Europe in terms of business innovations, adopting ICT-s and in creation of information society.
- In order to support smart specialisation in the V4+2 countries it is neccessary to develop a specific regional innovation policies that can be described as smart innovations policies, which increase the innovation capacity of a region by increasing the efficiency of accumulated knowledge and identifies endogenous potentials for socio-economic development, in particular: development potential, unique capitals, specializations or economic clusters.

5 Environmental conditions

5.1 Introduction to the subject matter

The territory of the Visegrad Group – V4+2 (Poland, the Czech Republic, Slovakia, Hungary, Romania and Bulgaria) cover an area of more than 880,000 square kilometres, which constitutes approximately 20 % of European Union's total area. Joint evaluation of environmental conditions of V4+2 Group countries is influenced, inter alia, by various methodologies of environmental monitoring adopted in individual countries, as well as by national legislations that declare categories of protected areas.

The following text offers a brief overview of environmental conditions, which form a cornerstone determining spatial development and cross-border spatial relations. Environmental conditions are one of the conditioning and limiting factors of spatial development that need to be evaluated and considered in joint development intentions. The significance of development within the context of environmental conditions is highlighted also by a number of international agreements and EU guidelines.

5.2 State of the subject matter and ascertained problems

5.2.1 Physical-geographic characteristics

The territories of the Visegrád Group (V4+2) are part of Central Europe (Poland, the Czech Republic, Slovakia and Hungary) and of South-Eastern Europe (Romania and Bulgaria). Slovakia and Hungary form a centre point of the region. Slovakia, the Czech Republic and Hungary are landlocked states of Central Europe. Poland, located in Central Europe by the Baltic Sea, is seated within the European Plain – between the Baltic Sea, the Carpathian arc and Sudeten Mountains. Romania and Bulgaria are located in South-Eastern Europe. To the East they are bordered by the coastline of the Black Sea. Most part of Romania is situated between the Carpathians, the Danube and the Black Sea, and an important part is within the Carpathian arc; whereas Bulgaria is located at the eastern part of the Balkan Peninsula. Areas of the individual countries are stated in Table 3.

Table 3: Areas of the individual countries

	Country	Area (in km^2)	Share of the V4+2 Total Area (%)
Visegrád Group (V4)	**The Czech Republic**	78 866	8,93
	Hungary	93 034	10,54
	Poland	312 679	35,41
	Slovakia	49 036	5,55
Countries outside the V4	**Bulgaria**	110 971	12,57
	Romania	238 391	27,00
	Together	882 977	100,00

Source: Environmental conditions in V4+2 countries – partial project reports

Poland is the largest country with an area that exceeds 35 % of V4+2 region's total area, whereas Slovakia is the smallest, with less than 6 % of V4+2 region's total area. The area is located between 41° and 54° N. latitude (parallels); and between 12° and 29° E. longitude (meridians). The area has direct access to two seas – the Baltic Sea to the North and the Black Sea to the South-East.

Northern part of the region is formed by Nizina Wschodnioeuropejska, which is on the Polish territory divided into Pojezierze Pomorskie, Pojezierze Warmińsko-Mazurskie, Wielkopolska and Mazowiecka Nizina. As the area draws near the Czech and Slovak borders, the terrain is gradually morphing from uplands to high mountains – significant examples are Krkonoše and Jeseníky, on/or in proximity of the Czech-Polish border and Tatras on the Polish-Slovakian border. The topography of the Czech Republic and Slovakia gradually declines in the eastward direction, on the Slovakian territory the Carpathian arc is already visible. The South-Western part of Slovakia's territory is formed by areas belonging to Pannonian Basin (Podunajská nížina and Záhorská nížina), which makes its way through Hungary towards the Hungarian-Romanian border area. The arc formed by the Carpathian Mountains (Eastern Carpathians and Southern Carpathians) splits the territory of Romania into two parts – lowland territory (Câmpia Română) to the South-East, and a more hilly and mountainous area (Depresiunea Transilvaniei, Dealurile de Vest) to the North-West. Romania's border with Bulgaria is formed naturally by the river Danube, while this area is mostly characterized by lowlands. Among Bulgaria's most significant mountain ranges are Rila, Pirin, Rodopi and mountain range Stará planina, which stretches across the Bulgarian lowland areas. Bulgaria´s territory is part of the Balkan Peninsula. The highest peak of Poland is the north-western peak of Rysy (2 499 meters a.s.l.), Sněžka / Śnieżka (1 603 meters a.s.l.) in the Czech Republic, Gerlachovský štít (2 654 meters a.s.l.) in Slovakia, Kékes (1 014 meters a.s.l.) in Hungary, Moldoveanu (2 544 meters a.s.l.) in Romania and peak Musala (2 925 meters a.s.l.) in Bulgaria, the latter being the single highest point of the V4+2 region.

Considering the size and location of the region in the middle of Europe, there is a strategic access both to the eastern and western parts of Europe. The whole region is bordered by Germany, Austria, Slovenia, Croatia, Serbia and Macedonia to the West; Greece and Turkey to the South; and Ukraine, Moldavia, Belarus, Lithuania and Russia to the East.

Natural conditions of this vast territory are very diverse, which is indicated also by the definition of five biogeographic regions within the territory – the Black Sea Region, the steppe region, the Panonnian Region, the Continental Region and the Alpine Region. Representation of these biogeographic regions is in the enclosed Figure 13.

Figure 13: Biogeographic regions of V4+2 member states

Source: European Environment Agency (EEA)

5.2.2 Geological characteristics

Geological development of the V4+2 region had been heavily affected by tectonic processes that occurred in Proteozoic, Palaeozoic and Tertiary. Mountains were formed mostly by Alpine folding and Hercynian folding, whereas the remaining territory is formed by old peaks, plateaus laid on Palaeozoic-folded foundations, Alpine slab-end deformations and intermountain basins.

Among the basic geological features, which are dominating this vast area, are: Hercínsky front, Český masív, Donska panva, Panonská pánev / Panónska panva / Kárpát-medence / Câmpia de Vest, significant mountain system of Karpaty / Kárpátok / Carpați, Dinaridy, Rodopi and Moeska platforma.

Rich geological structure of the V4+2 territory is the fundament for the utilisation of rock and mineral resources. Copper and silver ore and pit-coal (but, particularly the Upper Silesian Coal Basin/ Hornosliezská uhoľná panva) are one of the most important mineral resources of Poland, right after brown coal, lead and zinc. Significant deposits of black coal (Ostravsko) and brown coal (Mostecká a Sokolovská panva) are located in the Czech Republic. Hungary's natural resources include bauxite, brown coal, manganese and uranium; whereas limestone, iron and magnetite are characteristic for Slovakia. Romania's rich natural resources are oil reserves, such as around Ploieşti, iron ore deposits, salt, manganese and bauxite. Bulgaria possesses deposits of a wide range of ores, including lead, copper, zinc, manganese, molybdenum or silver.

5.2.3 Waters

Watercourses in the V4+2 region drain waters into four seas, i.e. the Baltic Sea, the North Sea, the Black Sea and the Mediterranean Sea. Poland and smaller parts of the Czech Republic and Slovakia belong to the drainage area of the Baltic Sea. The westernmost part of the Czech Republic is the sole water contributor to the drainage area of the North Sea. Slovakia, Hungary, Romania, eastern part of the Czech Republic's territory and northern part of Bulgaria belong to the drainage area of the Black Sea. The only territory belonging to the V4+2 region, which is part of the drainage area of the Mediterranean Sea is the southern part of Bulgaria.

The major rivers of the V4+2 territory are as follows: Labe (the Czech Republic), Odra (Poland and the Czech Republic), Visla / Wisła (Poland and a small part of Slovakia), Danube (part of the Czech Republic, Slovakia, Hungary, Romania and part of Bulgaria) and Marica (southern part of Bulgaria).

Among significant water bodies in the region there are larger freshwater lakes, such as the Lake Balaton (592 square kilometres) located in Hungary. Mountain lakes, which were formed by the decline of mountain iceberg, are characteristic for high-altitude Carpathian areas.

There are significant reservoirs of groundwater in the region and this fact is well exemplified by the Žitný Ostrov in Slovakia, which is considered the largest ground water reservoir of drinking water in Central Europe. Poland is on the other side of the spectrum, with one of the lowest water sources reserves in Europe. Moreover, the existing Polish water sources are spread unevenly, which results in numerous areas experiencing periodic water shortages.

In the whole region, there are unevenly spread mineral and thermal springs, which in various parts of the Pannonian Basin and sub-mountainous areas, originated in spa cities (PL – Zakopane, Msczonów, Uniejów; CZ – Karlovy Vary, Mariánské Lázně, Luhačovice; SK – Piešťany, Sliač, Dudince, Trenčinske Teplice, Rajecké Teplice, Turčianske Teplice; HU – Budapest, Bükfürdő, Hajdúszoboszló, Hévíz; RO – Baile Herculane, Băile Felix, Vatra Dornei; BG – Velingrad, Bankja, Hissarja, Pomorie and many more).

5.2.4 Climatic conditions

The climate of the V4+2 region is affected by various factors, such as its location and latitude, distance from the ocean, ocean currents, prevailing winds, structure of mountain chains and altitude.

The whole region lies in the temperate climate zone and in the Atlantic-Continental area, whereas in the higher-altitude mountainous areas, characteristic mountain climate prevails. Rugged terrain and various distances from the sea affect the climate, making the whole territory to exhibit significant differences in air temperature, humidity, cloudiness and precipitation. There is a a mixture of oceanic and continental climates, which causes swift changes of air masses and frequent rainfall. Table 4 depicts selected climate indicators, which show gradual warming of the territory apparent in the north-south direction.

Table 4: Selected climate indicators of V4+2 countries

Country	Average temperature (°C)	Range of average monthly temperatures (°C)	The warmest period / The warmest average max (°C)	The coolest period / The coolest average min (°C)	Average annual precipitation (mm) / Monthly average (mm)
The Czech Republic	7,8	21,0	July /23	January /-5	508/42
Hungary	11,1	22,0	July, August /27	January /-3	630/53
Poland	7,7	22,0	July /24	January /-6	471/39
Slovakia	8,7	23,0	July /26	January /-7	605/50
Bulgaria	10,5	23,0	July /27	January /-5	621/52
Romania	11,5	26,5	July, August /30	January /-6	579/48

Source: http://www.climatemps.com/

The highest average temperature was recorded in Romania, while the lowest in Poland. Hungary received the highest level of precipitation, whereas Poland received the least amount.

Higher mountains and valleys act as inhibitors or boosters for movements of air masses, causing significant contrast in weather patterns over relatively small distances. Continental climate is apparent during winters in terms of rich snow cover, while the effect of Mediterranean climate is apparent in high summer's dry and warm weather.

5.2.5 Flora and fauna

The flora and fauna of such an extensive region (V4+2) exhibits high biodiversity. Several countries managed to keep their original flora and fauna on numerous meadows, wetlands, forests and pastures, which remained almost intact. Current level of natural vegetation exemplifies significant ecological diversity.

The influence of the Continental biogeographic region is characteristic to the Czech Republic and Poland. Agricultural lands are dominating this area and the climatic conditions are viable for deciduous and mixed forests zones (beech, hornbeam, oak). The Continental biogeographic region is further apparent in the territories of Romania and Bulgaria.

The Alpine biogeographic region stretches from Slovakia to Romania and it also incorporates Bulgarian mountains (Stará planina and Rodopy). Sub-mountainous forests are dominated by durmast oak, whereas in mountainous forests mixed communities of beech can be found – fir, which in higher-altitude forests retreat to spruce – limba combination. Among numerous endemic tree species characteristic for Stará planina are, e.g.: Pinus peuce, Abies borisii-regis and Pinus heldreichii. The Carpathian Mountains serve as a major traditional migration route for wildlife and their strategic dispersal eastwards and westwards.

The Pannonian biogeographic region encompasses the whole territory of Hungary, as well as peripheral areas of Slovakia, the Czech Republic and Romania. The significance of this region lies essentially in birdlife. Numerous species, which are endangered elsewhere in the EU, are still nesting here in large numbers, e.g.: Otis tarda. Large number of shallow wetlands and alkaline lakes make this region an absolute paradise for waterfowl and migratory birds.

Among the V4+2 countries, the Steppic Region is to be found only in the eastern part of Romania. Characteristic biotopes, such as steppes, deciduous dense shrubs and oak forests are scattered with only isolated occurrences in otherwise cultivated land. Part of the Danube Delta lies also in the region and offers natural floodplain ecosystems of importance. Steppic region hosts numerous brackish and saline lakes, such as Balta Alba and Jirlau near the city of Buzau, which play an important role in bird migration.

The protection of rare species of fauna and flora in the individual countries of the V4+2 region is enforced by legal instruments, which can declare an area protected to various degrees. Despite this fact, some highly valuable ecosystems face gradual degradation, or even their total destruction on the expense of artificial built-up areas.

5.2.6 Land use

For the evaluation of current land use, this document uses data from Cadastre Authority and CORINE Land Cover project.

Data from the Cadastre Authority comprehensively lists land, real property and ownership rights thereof, in accordance with national laws of the individual countries concerned. However, there are cases in which legal information recorded in the Cadastre might not accurately reflect actual land use (due to unsettled ownership disputes, noncurrent land use change, etc.). For this reason,

it is interesting to compare data with CORINE Land Cover project, the aim of which was to create a land cover database using unified methodology for every European country.

There are land cover map collections of CORINE Land Cover project for three time periods (1990, 2000 and 2006). The outputs of the project are often updated. A new version for the year 2010 is currently being prepared. While utilising specialised GIS tools, individual mapping versions can be compared and hence any gains or losses in selected types of land cover can be exposed.

5.2.6.1 Land use evaluation based on the national cadastre data

Data from national Cadastre authorities are gathered for three separate time periods (1991, 2001 and 2011), allowing to compare changes that occurred within two decades. Major reasons driving the land use changes are fall of Communism, land ownership changes, economic growth of major urban centres and elevation of living standards. Economic growth has fuelled the expansion of cities with new built-up areas created at the expense of arable land. Such a trend is visible in all six countries of the V4+2 region.

Since 1991, there has been a 1,3 % decline in agricultural land cover on the V4+2 territory. At the same time, however, arable land areas have been reduced by 4 %, which is a negative phenomena from the viewpoint of sustainable development. Direct payments for arable lands affected the situation in Bulgaria, where the arable land areas shrunk by as much as 13 %.

There is a concern in the V4+2 countries, that valuable national biotopes will be altered, which could result in loss of both natural resources and biodiversity, therefore the countries adopt various legal provisions in environmental policy to avert it.

The whole territory exhibits relatively high forest coverage as all countries demonstrate a forest cover of at least 20 %, while the forest areas have been generally increasing since 1991. Preserved communities of floodplain forests (at the bank of the river Danube, the Danube Delta) are very valuable, as they serve various functions i.e.: anti-flooding, anti-erosion, stabilisation and landscape function, among others.

Table 5: Areas of individual land classes and their corresponding share on the territory of the V4+2 region

Class of land	Area in km^2 per years			Share of the total region's area		
	1991	2001	2011	1991	2001	2011
Agricultural land	530 326	521 941	519 131	60,06	59,13	58,79
– of which arable land	379 188	374 999	352 920	42,94	42,48	39,97
Forest land	255 162	256 439	263 131	28,90	29,05	29,80
Water surfaces	14 103	21 286	21 114		2,41	2,39
Built-up areas	13 381	47 705	53 088		5,40	6,01
Other areas	22 313	19 510	17 925		2,21	2,03
Total area of the region	883 005	882 768	882 977		100,00	100,00

Source: Environmental conditions in V4+2 countries – partial project reports

Graph 10: Overall structure of land classes in the V4+2 countries as of 2011

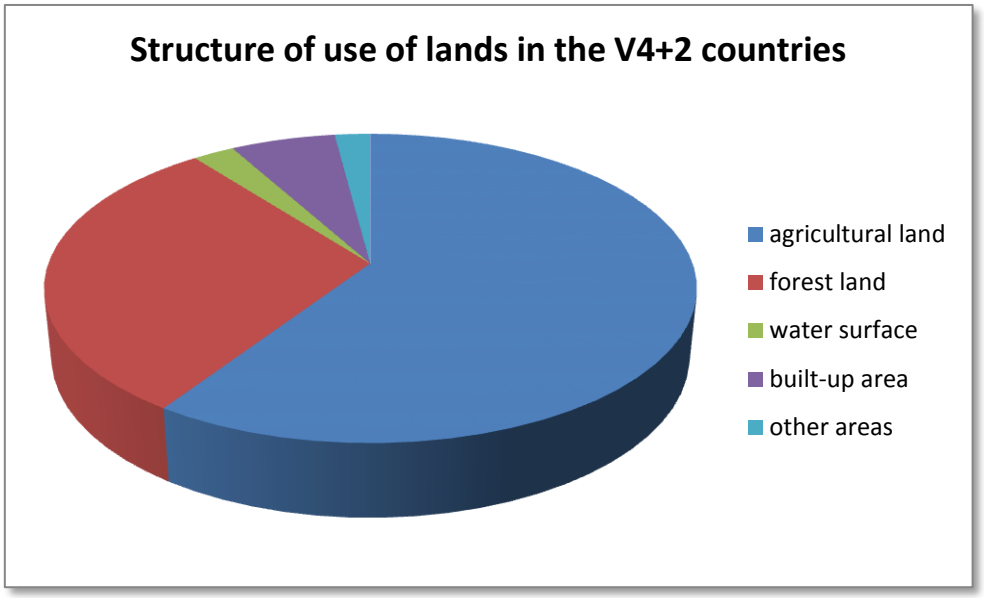


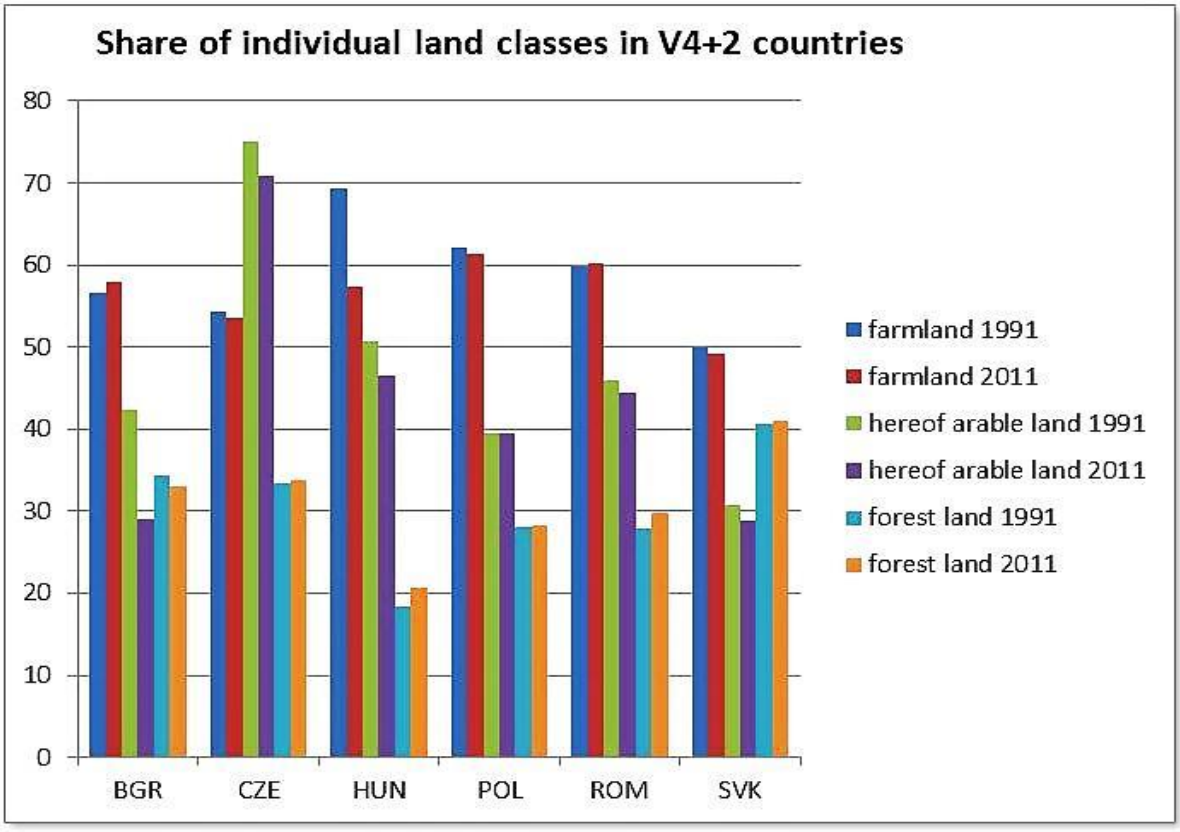
Table 6 lists areas of individual land classes for each country of the V4+2.

Table 6: Land class areas of the V4+2 countries and their respective share on the total territory of the region

Class of land	Area in km^2 per years 1991, 2001 and 2011								
	Bulgaria			The Czech Republic			Hungary		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Agricultural land	62 781	63 765	64 304	42 875	42 774	42 292	64 597	58 653	53 373
of which arable land	46 931	49 769	32 272	32 190	30 752	30 004	47 142	45 161	43 223
Forest land	38 104	37 158	36 569	26 295	26 389	26 598	17 012	17 733	19 217
Water surfaces	2 048	2 010	2 010	1 581	1 595	1 634	2 181	2 441	2 524
Built-up areas	4 139	4 603	4 637	1 264	1 307	1 317	9 242	14 207	17 920
Other areas	3 930	3 466	3 451	6 879	6 799	7 025			
Total area of a country	111 002	111 002	110 971	78 866	78 865	78 866	93 032	93 034	93 034
Class of land	Romania			Poland			Slovakia		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Agricultural land	147 983	148 523	146 355	187 600	183 924	188 699	24 490	24 302	24 108
of which arable land	94 235	94 015	94 050	143 600	140 952	139 215	15 090	14 350	14 156
Forest land	66 801	66 057	67 576	87 060	89 156	93 048	19 890	19 946	20 123
Water surfaces	8934	8 684	8 336		5 629	5 661	940	926	948
Built-up areas		10 183	11 170		15 26	15 724		2 179	2320
Other areas	14 673	4 944	4 953		2 863	959	3710	1 438	1 537
Total area of a country	238 391	238 391	238 391	312 685	312 685	312 679	49 030	48 791	49 036

Class of land	Percentage share of country's total area								
	Bulgaria			The Czech Republic			Hungary		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Agricultural land	56,60	57,40	57,90		54,24	53,62	69,44	63,04	57,37
of which arable land	42,30	44,80	29,10		71,89	70,95	50,67	48,54	46,46
Forest land	34,30	33,50	33,00		33,46	33,73	18,29	19,06	20,66
Water surfaces	1,80	1,80	1,80		2,02	2,07	2,34	2,62	2,71
Built-up areas	3,70	4,10	4,20		1,66	1,67	9,93	15,27	19,26
Other areas	3,50	3,10	3,10		8,62	8,91			
Total area of a country	100,00	100,00	100,00		100,00	100,00	100,00	100,00	100,00
Class of land	Romania			Poland			Slovakia		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Agricultural land	62,08	62,30	61,39	59,90	61,30	60,30	49,95	49,81	49,16
of which arable land	39,53	39,44	39,45	45,90	45,10	44,50	30,78	29,41	28,87
Forest land	28,02	27,71	28,35	27,80	28,50	29,70	40,57	40,88	41,04
Water surfaces	3,75	3,64	3,50		1,80	1,80	1,92	1,90	1,93
Built-up areas		4,27	4,69		4,87	5,00		4,47	4,73
Other areas	6,15	2,07	2,08		0,90	0,30	7,57	2,95	3,13
Total area of a country	100,00	100,00	100,00		100,00	100,00	100.00	100,00	100,00

Graph 11: Share of individual land classes in the V4+2 countries



5.2.6.2 Land use evaluation according to the CORINE Land Cover project

Table 7 states calculated shares of respective land cover types (in percentages) of CORINE Land Cover's first hierarchical level (1 – artificial surfaces, 2 – agricultural areas, 3 – forests and semi natural areas, 4 – wetlends and 5 – water)—out of the whole area of the state, for years 1990, 2000 and 2006 and for all countries of the V4+2.

The obtained results suggest that a relatively large part of the V4+2 territory (almost 90 % of the state area) is covered by agricultural areas, forests areas and semi natural areas. Hungary has recorded the highest values (highest percentual share) of agricultural areas, whereas Slovakia is placed last in this category. However, calculations based on CORINE LandCover data suggest that Slovakia has the highest percentage share of forest areas – as opposed to Hungary, which recorded the lowest values in this category of all the V4+2 countries. Ahead of all other the V4+2 countries, the Czech Republic shows the highest percentage share of artificial anthropogenic surfaces. This value slightly exceeded 6 %. On the other hand, Poland exhibites the lowest values in this category. An important and a rather rare stabilising element in a landscape present wetlands that have the highest percentage share in Romania, with Slovakia taking up the last spot in this indicator.

Table 7: Percentage share of the individual land cover types of the V4+2 countries´ total area

CLC code	1 artificial surfaces			2 agricultural areas			3 forests and semi-natural areas		
Year	1990	2000	2006	1990	2000	2006	1990	2000	2006
BGR	4,87	4,90	5,01	51,74	51,70	51,74	42,51	42,51	42,32
CZE	6,00	6,06	**6,31**	57,95	57,82	57,25	35,25	35,30	35,59
HUN	5,59	5,68	6,00	**68,34**	**67,86**	**66,94**	***23,13***	***23,48***	***24,25***
POL	***3,28***	***3,33***	***4,00***	64,51	64,40	62,90	30,43	30,48	31,29
ROM	**6,25**	**6,28**	6,30	56,83	56,81	56,99	33,94	33,94	33,70
SVK	5,61	5,62	5,45	***50,20***	***49,73***	***48,34***	**43,61**	**43,97**	**45,51**

Table 7: – continuation

CLC code	4 wetlands			5 water		
YEAR	1990	2000	2006	1990	2000	2006
BGR	***0,10***	0,10	0,10	0,78	0,78	0,83
CZE	0,11	0,11	0,13	0,68	0,70	0,72
HUN	1,11	1,12	0,92	**1,83**	**1,87**	**1,89**
POL	0,37	0,35	0,34	1,41	1,44	1,47
ROM	**1,59**	**1,58**	**1,41**	1,39	1,39	1,60
SVK	0,12	***0,09***	***0,06***	***0,46***	***0,59***	***0,64***

Note: maximum values are marked in bold, minimum values in italics
Source: www.eea.eu

Table 8 portrays changes in the landscape structure as they occurred within two observed time periods – from 2000 to 2006 and from 1990 to 2006. There is a negative phenomenon associated with decline in agricultural areas, whose place is gradually being forced out by residential and industrial areas. In some cases, long-time unused agricultural areas are consequently being transformed into a forest.

Table 8: Land cover changes of the V4+2 countries as recorded in time periods of 2000–2006 and 1990–2006

CLC code	1 artificial surfaces		2 agricultural areas		3 forests and semi-natural areas		4 wetlands		5 water	
YEAR	00-06	90-06	00-06	90-06	00-06	90-06	00-06	90-06	00-06	90-06
BGR	0,11	0,14	0,04	0,01	**-0,19**	**-0,19**	0,00	0,00	0,05	0,05
CZE	0,25	0,32	**-0,57**	**-0,70**	0,29	0,34	0,02	0,01	0,01	0,03
HUN	0,33	0,41	**-0,93**	**-1,40**	0,77	1,12	**-0,20**	**-0,19**	0,03	0,06
POL	0,67	0,72	**-1,50**	**-1,61**	0,81	0,86	**-0,01**	**-0,03**	0,04	0,06
ROM	0,03	0,05	0,18	0,16	**-0,24**	**-0,25**	**-0,17**	**-0,17**	0,21	0,21
SVK	**-0,17**	**-0,16**	**-1,39**	**-1,86**	1,54	1,90	**-0,03**	**-0,06**	0,05	0,18

Note: decreases in land cover are marked in bold
Source: www.eea.eu

5.2.7 Nature conservation and landscape protection

5.2.7.1 Nature conservation and landscape protection from the viewpoint of national and international commitments

Designated areas of high biological and ecological value can be, based on status and vulnerability level of their biotopes, declared protected under one of protected areas categories or are subject to individual protection, in accordance with national legislations of the individual V4+2 countries. Apart from this, the concerned countries have already ratified numerous agreements and conventions of importance, which aim to improve the protection of world's heritage on Earth (Biosphere Reserve territories, sites on UNESCO's list of World Heritage, *The Ramsar Convention on Wetlands*, EU's coherent network of protected areas NATURA 2000 and others).

Generally, it can be concluded that the last two decades have seen an increase of protected areas in the V4+2 countries, both in terms of quantity and size. Biosphere Reserve of the Danube Delta forms a very significant and interesting territory, where numerous layers of protection are in place simultaneously (NATURA 2000, Biosphere Reserve, wetland of international importance and site of Natural World Heritage).

Table 9 lists protected areas and their shares on the total areas of the corresponding V4+2 countries. Protected area categories differ from country to country, therefore the table lists only categories consistent among all concerned countries. All categories of protected areas are comparable according to the IUCN methodology (International Union for Conservation of Nature).

Table 9: Number of protected areas and their share on the total area of the V4+2 countries

	BGR		CZE		HUN		POL		ROM		SVK	
	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%
National Parks	3	1,70	4	1,52	10	5,18	23	1,00	13	1,33	9	6,61
Protected Landscape Areas	849	0,80	25	13,78	38	3,60	386	22,6	15	3,24	14	10,91
Nature Parks	11	2,30	141	9,49	6	2,91						
Geoparks			4	6,78	1	1,34	3		1	0,42	3	2,21
Biosphere reserves	18	0,40	6	5,85	5	1,45	10	1,50	3	2,79	4	5,04
Ramsar Convention sites	11	0,30	14	0,7	29	2,62	13	0,50	8	2,85	14	0,87

Source: Environmental conditions in the V4+2 countries – partial project reports

There is a worldwide problem, apparent also in Europe, of having highly diverse sets of legal norms that govern protected areas and hence their harmonisation is an extremely difficult task. The IUCN World Commission on Protected Areas offers its expertise on protected areas classification. This resulted in a Directive on effective management and categorisation of protected areas, which attempts to bring an order (comprehensibility) into the abundance of various categories. This directive is a result of several-years long process. Currently available are the categories I to VI, which are used to classify protected areas. Names of respective categories and sums of all protected areas listed within each IUCN category are stated in table 10 for the whole area comprised by the V4+2 countries.

Table 10: Classification of protected areas of the V4+2 countries based on IUCN's nature protection categories

Category	BGR	CZE	HUN	POL	ROM	SVK	together	%
Ia – strict (nature) reserves	2	3	0	1	68	0	74	**1,12**
Ib – wilderness areas	54	0	0	0	0	603	657	**9,97**
II – national parks	3	2	5	16	13	10	49	**0,74**
III – natural monuments or phenomena	771	264	0	0	211	289	1 535	**23,28**
IV – protected habitat/species areas	47	1 460	91	1 239	608	166	3 611	**54,77**
V – protected landscapes/seascapes	11	26	37	124	14	14	226	**3,43**
VI – protected areas with sustainable use of natural resources	0	0	0	0	0	0	0	**0**
Undefined protected areas	65	18	34	256	9	59	441	**6,69**
IN TOTAL	**953**	**1 773**	**167**	**1 636**	**923**	**1 141**	**6 593**	**100,00**

Zdroj: http://protectedplanet.net

Categories of protected areas should differ, especially based on the subject of their protection. However, some subjects of protected areas are commonly overlapping, which can sometimes complicate their classification. Some areas remain undefined.

The IUCN directive on protected area management aims mostly to:

I. strict protection (strict nature reserve / wilderness area)

- Ia strict (nature) reserve – landscape or seascape areas with exceptional or representative ecosystems, geological or physiological features and/or species, the management of which is oriented primarily on scientific research and/or monitoring of the environment;
- Ib wilderness area – an extensive intact or slightly altered landscape and/or seascape with a preserved natural character, without a permanent or more significant settlement, the protection and managment of which serves for the preservation of its natural state.

II. protection of ecosystems and promotion of recreation (national park)

- natural landscapes or seascapes, declared for the protection of ecological integrity of one or more ecosystems for the benefit of today´s and future generations, ending of exploitation or unsuitable use, which prevents reaching of goals. Sites having the potential to promote experiences of mind, as well as providing the visitor with scientific, educational and recreational benefits, while being in harmony with nature and culture;

III. protection of natural phenomena (natural monuments)

- areas encompassing one or more extraordinary or unique natural or natural-cultural creations that are valuable because of their rarity, representativeness, esthetic quality or cultural significance.

IV. manage protection of particular habitats or species (protected habitat / species areas)

- landscape or seascape areas in which interferences occur with the aim to ensure further existence of the biotope and/or that satisfy the needs of a certain kind.

V. protection of landscapes or seascapes and promotion of recreation (protected landscape / seascape areas)

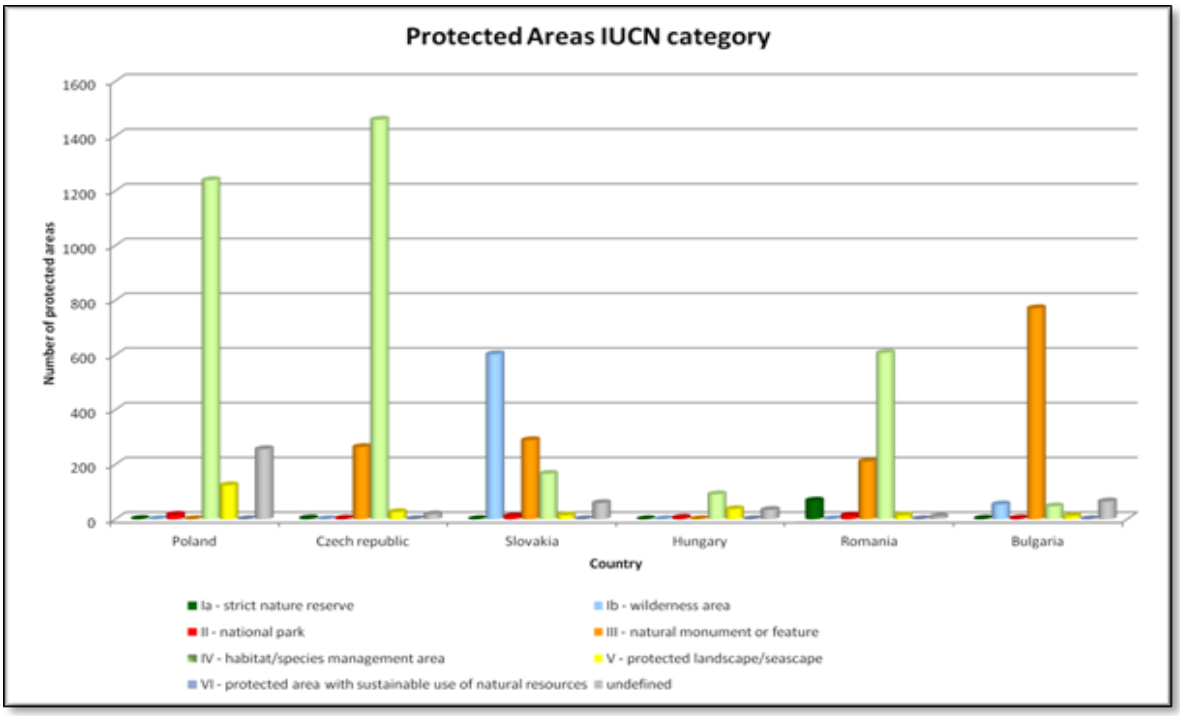
- lanscape, coastal or seascape areas, which obtained, due to long-term activities of man and nature, a specific character – esthetic, ecological and/or cultural values, often having a unique biodiversity. For the protection, preservation and further development of such area, an undisturbed traditional cohabitation is necessary.

VI. sustainable utilisation of natural ecosystems (protected areas with sustainable use of natural resources)

- areas encompassing especially natural systems in their original state and the management of which ensures a lasting protection and preservation of biodiversity while it provides also natural products and services meeting the needs of society according to the principle of sustainability.

To attain better means of comparison, the results were graphically interpreted in the following graph, which illustrates well the significant variety of protected area types among the individual V4+2 countries. Table 10 suggests that the strategy of the V4+2 countries is focused on the protection of rare species of flora and fauna, with almost 55 % of the protected areas belonging to the IUCN category IV. Roughly 23 % of the areas are focused on the protection of national monuments or features (IUCN's category III).

Graph 12: Protected areas classified by the IUCN categories in the V4+2 countries



Source: developed from http://protectedplanet.net

In Poland, the Czech Republic, Hungary and Romania predominate mostly protected areas of category IV, which comprises particularly the protection of valuable species and their habitats. Bulgaria exhibits supremacy of category III, through protection of natural features, whereas in Slovakia, the category Ib prevails, which focuses on the protection of intact and slightly altered habitats.

5.2.7.2 NATURA 2000 – coherent European network of protected areas

NATURA 2000 establishes a coherent network of protected areas on the territory of the European Union, the main objective of which is natural heritage protection that is vital not only to any respective member state, but especially to the EU as a whole.

NATURA 2000 consists of two types of sites:

- Special Protection Areas (SPA) – declared in accordance with Directive 79/409/EEC of 2nd April 1979 on the conservation of wild birds (also known as the Birds Directive);
- Sites of Community Importance (SCI) – areas declared in accordance with Council Directive 92/43/EEC of 22nd May 1992 on the conservation of natural habitats and of wild fauna and flora (also known as the Habitats Directive).

In the V4+2 countries, respective national ministries are responsible for managing the NATURA 2000 network. Special Protection Areas are more extensive than Sites of Community Importance and their overlapping is quite common. NATURA 2000 sites are commonly part of areas declared protected under national legislation. The procedure of adding new NATURA 2000 sites is rather time-demanding and national lists of proposed sites can be subject to change. Overall numbers, areas and shares of NATURA 2000 sites from the total areas of the individual states are listed in the following table. Bulgaria has the largest coverage of NATURA 2000 sites, where Special Protection Areas and sites of Community importance extend over one third of the state's territory (which is almost twice as much as the EU's average). Slovakia follows second, where NATURA 2000 sites cover almost one third of the state's territory as well. However, the actual size of these territories is substantially smaller than in the case of Bulgaria (given Slovakia's total area). Out of the V4+2 countries, the Czech Republic is placed last with only 14 % of NATURA 2000 sites coverage.

NATURA 2000, the network of protected areas, has several land use limitations and can even pose as a barrier. Protection of species and biotopes in concerned areas should constitute a priority for the society and therefore should be elevated above all human activities. This however does not mean total exclusion of activities of economic nature from the given reserves. Rather, the emphasis should be on ensuring that concerned protected areas do have a detailed plan of their management, specifying the extent and type of activities that should be allowed to meet objectives of long-term protection, as well as activities which the protection in place should prohibit. In case of agriculture, the restrictions could include, i.e.: usage of fertilizers, pesticides and certain types of soil management. Losses incurred due to these restrictions should be compensated according to the current legislation.

Table 11: Overview of the selected statistical indicators of the NATURA 2000 network in the V4+2 countries

Countries	Quantity (number of areas)		Area (km^2)		Share (%)		
	SPA	SCI	SPA	SCI	SPA	SCI	Together
Bulgaria	118	231	25 666	33 912	22,60	30,00	34,30
The Czech Republic	41	1075	7 034	7 856	8,92	9,96	14,03
Hungary	55	466	13 514	13 974	14,53	15,02	20,96
Poland	145	825	55 752	37 950	17,80	12,10	21,80
Romania	148	383	36 944	41 522	15,50	17,41	23,37
Slovakia	41	473	13 109	5 840	26,59	11,85	29,62
EU-27 countries	5 347	22 594	517 340	583 888	12,50	14,00	17,50

Source: Environmental conditions in the V4+2 countries – partial project reports

SPA – Special Protection Areas – Natura 2000
SCI – Sites of Community Importance – Natura 2000

Graph 13: Shares of the NATURA 2000 network sites in the V4+2 countries

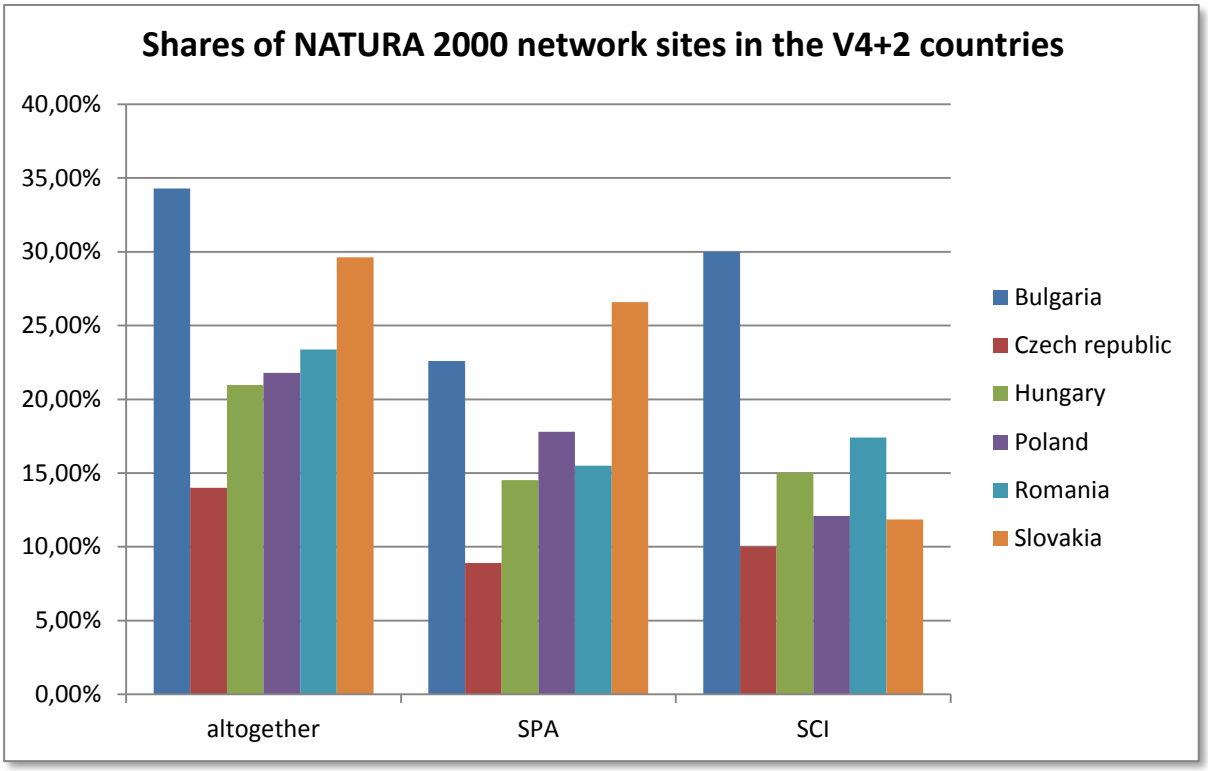


Table 11 and graph 13, which list and graphically interpret data on NATURA 2000 sites, show that the largest presence of Sites of Community Importance (SCIs) is in Bulgaria (30 %), where this indicator is twice as high as in the other V4+2 countries. Results further indicate that Special Protection Areas (SPAs) are most abundantly located in Slovakia; where (considering the size of the country) Special Protection Areas cover almost 27 % of the country's total area.

5.3 Limits and possibilities for solutions

The territory of the V4+2 countries is from the viewpoint of natural and environmental conditions very diverse. One of the basic problems is the fact that there are different legislatives on protected areas in the individual countries, and therefore it is rather difficult to compare some of the characteristics of the entire area together. An overview of protected areas within the V4+2 territory showed that there are specific categories of protected areas, which are not listed in other countries. Protected areas in Europe, as well as in other parts of the world, can be classified according to the Directive on the management of Special Protected Areas, however, even this classification carries certain risks of subjective evaluation within the given country. It is therefore advisable to focus on the EU-wide network of nature protection area defined in NATURA 2000, as most of the areas overlap with national networks. The NATURA 2000 sites, as they are declared and being prepared to be declared, are the most appropriate groundwork for a common evaluation of the environmental condition and for considering the basic development concepts of the V4+2 countries. Despite the fact that the share of NATURA 2000 sites in the individual countries is different (which is due to different national criteria for their classification), they form a basic framework of protected natural areas, which is mutually comparable at a common level. Protection of these areas in accordance with EU Directives creates, apart from their ecological, landscape and thus also touristic value, also certain barriers of spatial development. Development of whichever activities in relation with these areas needs to be specifically evaluated according to the given conditions. The advantage of NATURA 2000 classification lies in the forming of certain

criteria by which to define them at a Europe-wide level, as well as in common negotiations during this definition.

The development of land use in the last 20 years in the individual countries, has shown a slightly different development in the share of variuos types of land, but generally, a decrease in the share of agricultural land and arable land can be established.

In the field of land use it is necessary to focus especially on the maintaining of the types of agricultural land of the highest quality and prevent them from being used differently. This concerns especially the uncoordinated built-up of areas as well as afforestation, or a one-sided use of some industrial crops. This issue has to be tackled at a national level, where proposed measures may have a greater impact.

Climate change presents a global environmental problem, which has impacts on the whole territory and its negative effects can be solved through cooperation. An important factor is to decrease the vulnerability of ecosystems and enhance their resistance while maintaining indigenous habitats.

Figure 14: Scheme of protected areas network according to national legislation

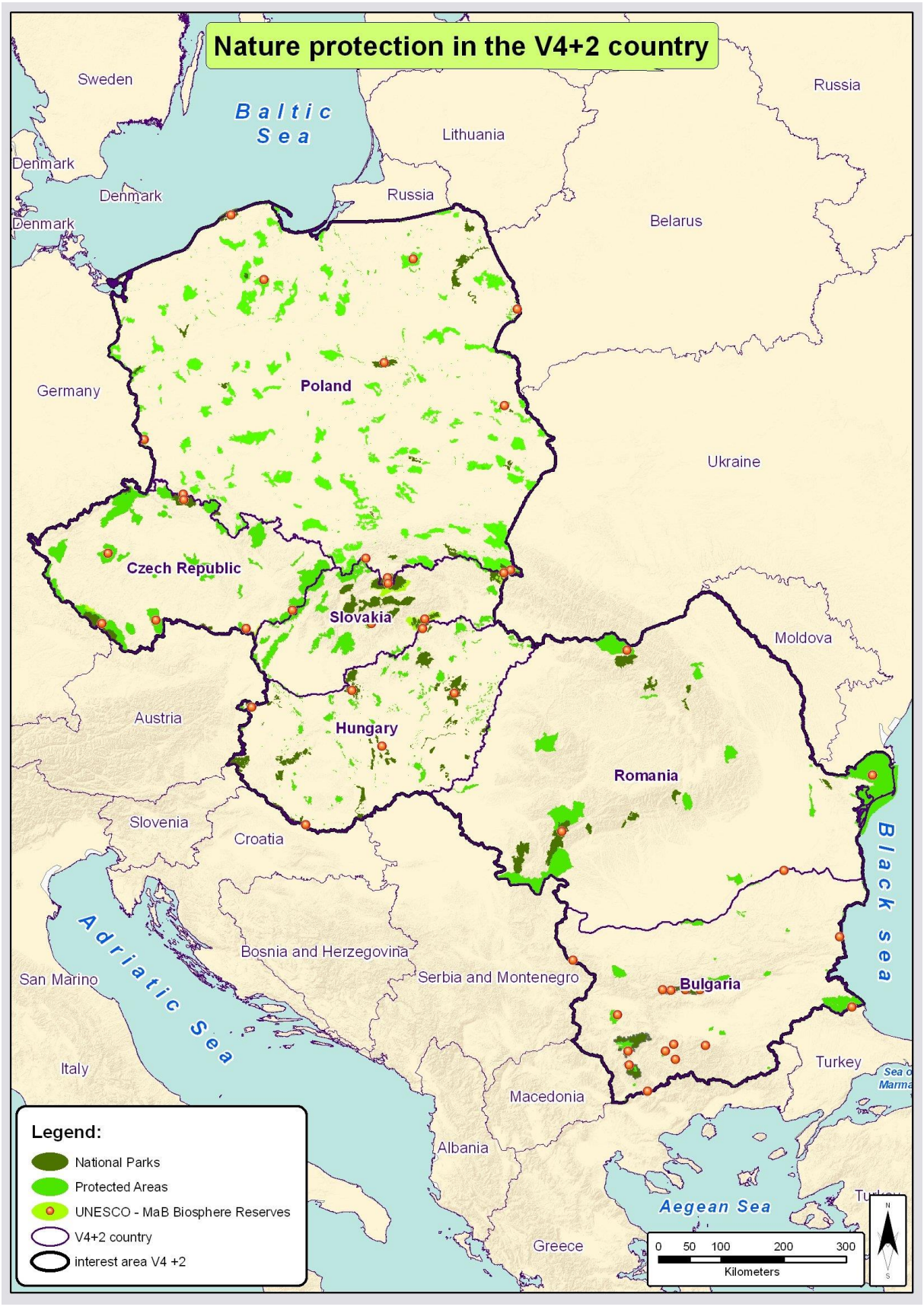


Figure 15: Scheme of NATURA 2000 Network of SPA sites

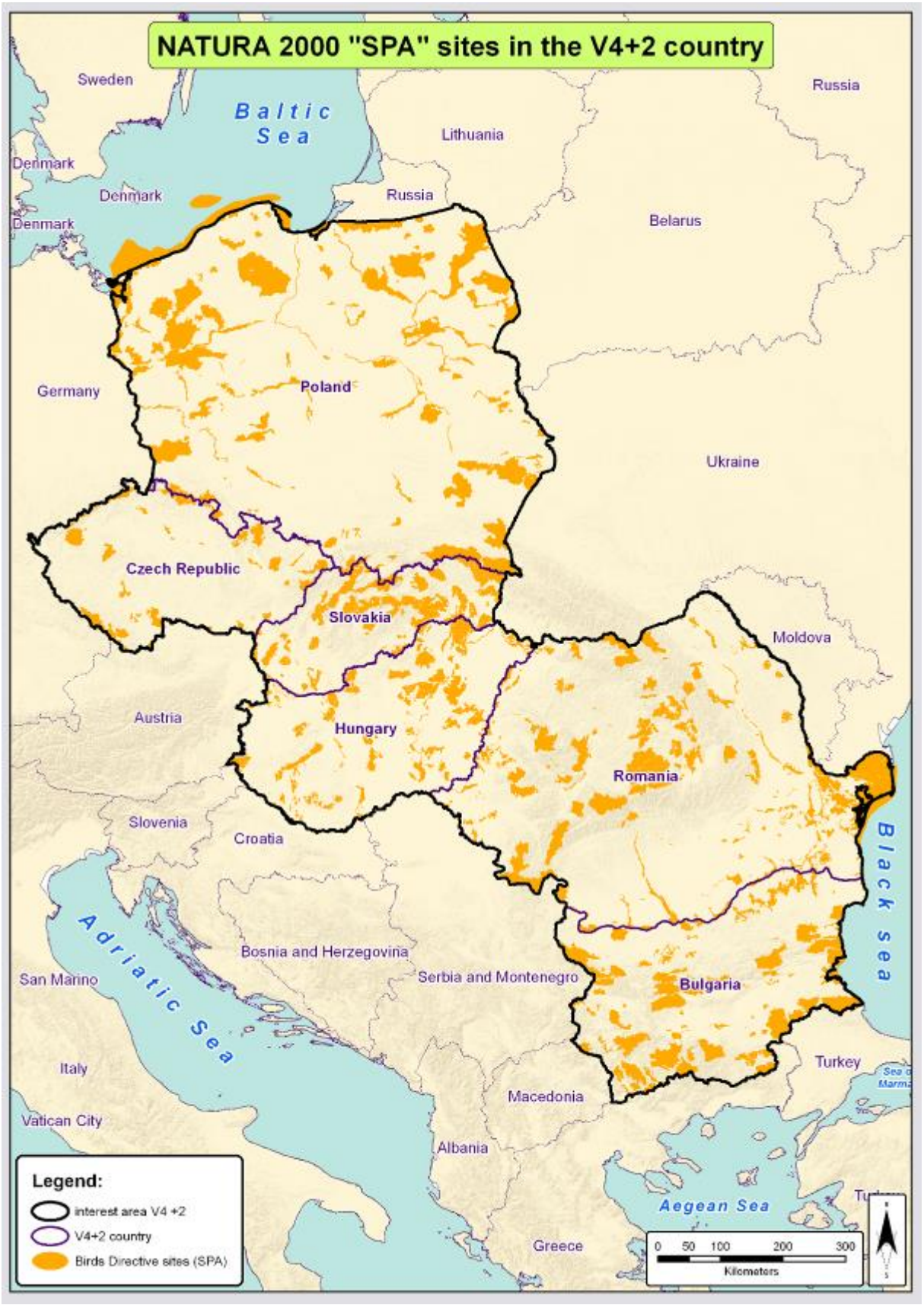


Figure 16: Scheme of NATURA 2000 Network of SCI sites

Figure 17: Scheme of NATURA 2000 Network of SCI + SPA sites

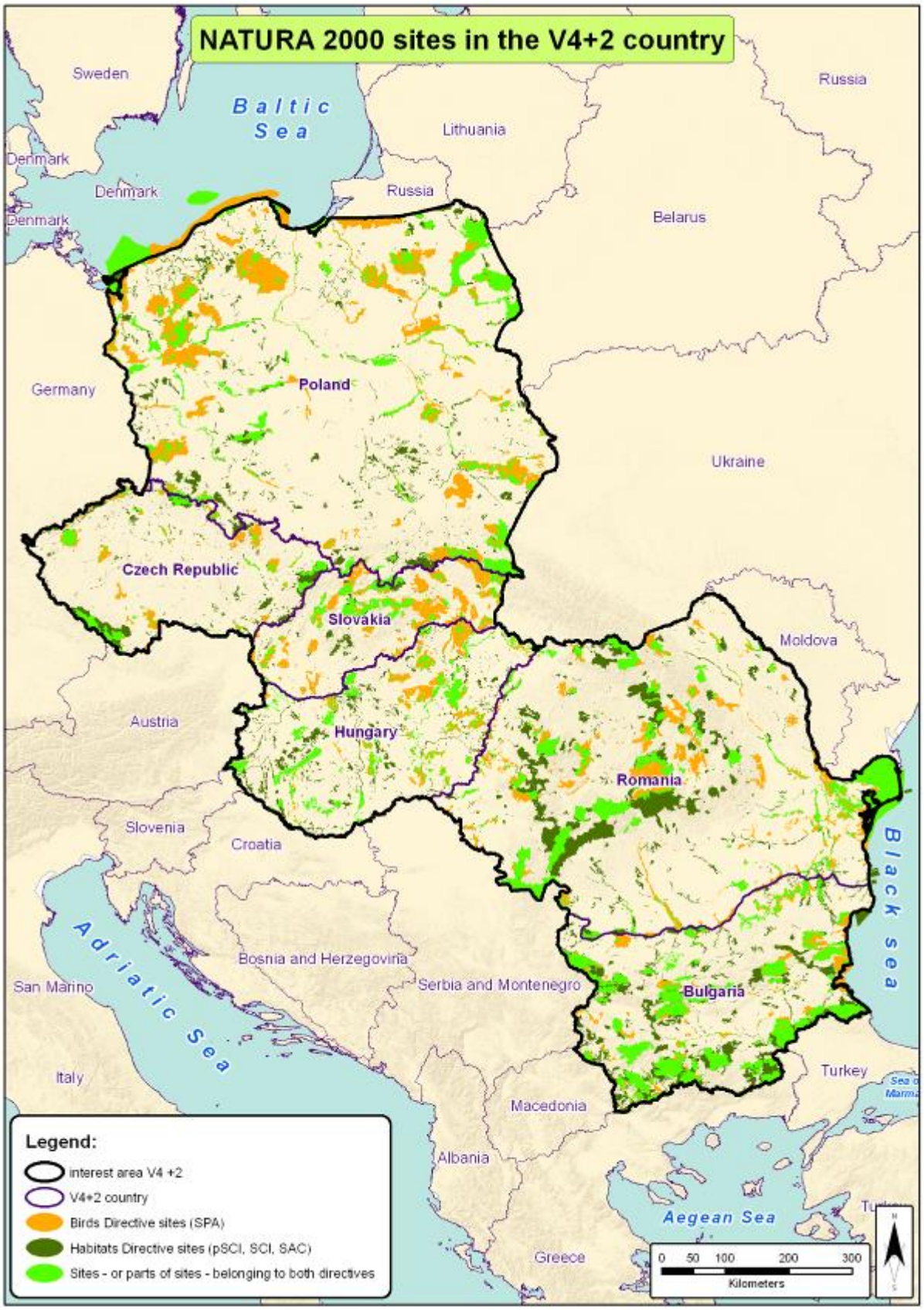


Figure 18: Scheme of landuse according Corine Land Cover 2006

6 Spatial development barriers and possibilities of their elimination

6.1 Introduction to the subject matter

The theme of spatial development barriers and their overcoming was chosen while formulating the *Common Spatial Development Strategy of V4+2 Countries*, especially in relation to development of transport and technical infrastructure. It is one from among the basic themes by which the effectiveness and functionality of translational cooperation stands or falls.

Barriers of spatial development represent various obstacles that interfere with development processes, slowing down spatial development or making it impossible. There are natural barriers; other spatial barriers (e.g. water protection zones, surface mining of non-renewable resource, including undermined areas and landslides, large built-up areas or military training spaces) economic and social, administrative, linguistic and legislative barriers and barriers, which lay rather substantial obstacles to spatial development and to cooperation. According to the agreement of the participating parties of the *Common Strategy*, the most important and most pressing issues to be solved are natural barriers (given by both physical-geographical characteristics of the area and the degree of legislative nature protection).

Natural barriers – obstacles, but also a chance for spatial development

The natural barriers belong to no less significant barriers, as they may influence and reduce the flow of all types of exchanges and communications. As natural barriers "physically" prevent common spatial development, their overcoming by technical means can lead to (too) high investments. Natural barriers are mostly formed by:

- **high mountains** – here it does not depend only on the altitude, but especially on the relative height (compared to its surroundings), disposition of the slopes, properties of their rocks and soils, width and number of ridges, width and permeability of the saddles and passes, etc.;
- **wide rivers, lakes, water reservoirs** – it depends not only on the width from shore to shore, but on the width and character of the floodplain, i.e. whether it has a character of a wetland, a floodplain forest, etc.

Many of natural barriers have also been declared as large protected nature and landscape areas – national parks, protected landscape areas (and their legislatively adequate territories), NATURA 2000 sites, which include not only mountains and river valleys and floodplains, but also valuable forest, wetland or steppe areas, in where some development activities are limited for reasons of the protection of high natural values. Especially the Carpathians – the largest mountain system of Europe, reaching to all of the V4 +2 countries, except Bulgaria (which has comparatively valuable mountains) – is a large area, so far only little fragmented by transport infrastructure and thus allowing a relatively undisturbed migration of large European mammals, particularly carnivores and ungulates. Valuable potential of many of these areas, consisting in only small disturbances in nature and landscape, allowing considerate tourism and sport, is in itself an important development factor. Therefore, it is necessary to view these localities not only as spatial development barriers, but also as areas enabling development of a specific character. Overcoming of natural barriers on common borders can be, at the same time, a challenge to use their potentials to a whole range of cross-border projects in the field of environment, agriculture, forestry and water management, transport and technical infrastructure and culture, possibly a combination thereof.

The most notable natural barriers V4 +2 are the Carpathian Mountains and the Danube River, which are not just border barriers, but also internal barriers within some countries (Slovakia, Hungary, and Romania). These two natural elements (the Carpathians and the Danube) can be seen not only as barriers, but also as important transport axes. Danube has been defined as a Pan-European corridor allowing important transport of goods and persons along and across the river (shipping and ferries).

The Carpathians had been historically also a place of common identity of the population of Central Europe and the Balkans. In history, the migration of shepherds on the ridges of the Carpathians is well documented.

In the European context, it is possible, to a certain extent, to compare the Carpathians and the Alps as regions with similar natural conditions. However, the Alps are not perceived so much as a natural barrier or a poor depopulating rural area, but basically as a prosperous region of valuable natural as well as esthetical values with famous tourism, sport and various attractive and living forms of rural agriculture, including agro tourism.

Large European rivers, such as Rhine, Elbe / Labe or Dunaj / Donau (on German and Austrian territory) constitute traditional corridors, connecting valuable cultural cities and areas with specific agriculture, like vineyards, etc.

The following chapter identifies the natural barriers and bottlenecks of each common border of V4 +2 countries. The severity of natural barriers has been classified as follows:

Very significant natural barriers (VSB)

- high mountains (usually from approx. 1 501 m above sea level and higher) – determined from contour lines observable from map backgrounds for Central Europe and the Balkans (marked up to an altitude of 1 001 m in the interval of 500 m), taking into account the relative heights and slopes of the terrain. Mountain ranges higher than 2 001 m occupy very small areas – these are the highest mountain peaks on the borders of Slovakia and Poland, in Romania and Bulgaria;
- wide rivers, lakes and dams (usually 501 m and wider – up to the total width is included also a narrow canyon or related wetlands), usually in estuaries and the large river Danube;
- national parks, NATURA 2000, strictly protected nature reserves.

Significant natural barriers (SB)

- medium sized mountains, (usually approx. 701–1 500 m above sea level);
- medium wide rivers (usually 201–500 m width) – total width includes a valley or telated wetlands);
- protected areas and landscapes and other large protected natural areas of a similar legislative character.

Barriers within states are all classified only as “significant”.

Methodological note:

Barriers are classified according to their highest degree of “barrier”. For example, even if the given barrier does not create a basic obstacle with its relief, but is however a national park (wetland, steppe, primeval forest), it is listed among very significant natural barriers, as the fragmentation of its territory through a linear construction is usually excluded.

Likewise, there is always mentioned one (main) reason of "barrierness" only. This means that when the territory is a national park, it is not simultaneously indicated that it is at the same time high mountain range or a territory of Natura 2000.

In spite of the stated criteria, not all high mountains or wide large rivers are always perceived as fundamental barriers. When there is a higher density of well functioning passes or bridges, a mountain or a river in the given area are presented as a more positive natural potential.

Only those barriers are listed which are essential for the cooperation of V4 +2 countries, i.e. barriers on their common borders or within inner countries, as long as they constitute a serious obstacle for transport or technical infrastructure. Natural barriers at the borders of other states or in their vicinity are not solved or appointed.

6.1.1 European policy and documents

The subject matter of spatial development barriers solves, among others, an important European document *Territorial Agenda EU 2020.* Its main aim is an educated / knowledgeable and sustainable Europe promoting an optimal usage and integration of all various regions with respect to their natural and cultural specifics. Particularly in point 17 the necessity of a better interlinking of regions at European and national level, limiting of the peripheral position of border regions and a better usage of their human, cultural, economic and ecological resources.

Point 30 says that rural areas, river valleys, lake basins and other types of territory have specific features or suffer serious and lasting natural or demographical disadvantages, such as a low density of population, which affects their development potential. It is possible to use this specific potential and solve problems in an integrated manner, in cooperation with subjects from different states or regions.

Paragraph 35 urges to ensure the necessary access to road, railway, water and air transport and to broadband trans-European energetic networks.

Point 36 draws attention to the development of trans-European TEN-T networks and the development of second class roads at a regional level and the accessibility of peripheral areas, where due to social and economic disadvantages; an exclusion of vulnerable groups may occur. Where appropriate, it is necessary to develop links across spatial barriers.

And finally, point 42 notes that taking into account the territorial impacts while creating strategies can aid to limit the formation of barriers and unintended territorial impacts on territorial units. The strategies should make provision for territorial differences; the measures are to be adapted to territorial specificities. This will improve the usage of spatial capital.

6.2 State of the subject matter and ascertained problems

6.2.1 Natural barriers on common national borders

The Czech Republic – Poland

Natural barriers – state

Natural barrier of Bohemia, Moravia and Czech Silesia to Polish Silesia, is formed largely by the Hercynian Mountains of the Krkonošsko-jesenická (Sudetian) sub-province and a part of the Western Carpathians. These are mountainous areas with an altitude usually between 801–1 500 m. Only the Krkonoše Mountains exceed this height with several highest peaks. Many of the Hercynian Mountains or their parts have been announced as part of large protected area or included in the Natura 2000 network. Listed mountains do often form a barrier to transport transmittance, but they are also places of cross-border cooperation and tourism boost. While some valuable areas (e.g. the Czech and Polish part of the Krkonoše Mountains) are already overloaded by tourism, other have not fully used this potential (e.g. Rychlebské hory, Králický Sněžník, Zlatohorská vrchovina). The most accessible territory of this border is formed by the Silesian coal basin (Slezská uhelná pánev), where mining and industrial cooperation and the related exchange of labour have always been very intense. This area is the most densely populated territory of both countries, without any major natural barriers, through which passes a Trans-European multimodal transport corridor (European rail corridor and, so far, the only common motorway).

Severity rating of the CZ – PL barriers

Very significant natural barriers

- Krkonošský národní park / Karkonoski Park Narodowy:

a unique mountain landscape and a tourist area of crucial importance in both countries.
- CHKO[8] Broumovsko (part) / Park Narodowy Gór Stołowych:
  unique sandstone rock towns and precious complexes, particularly of baroque monuments – a strong tourist potential.

Significant natural barriers
- CHKO Jizerské hory / Góry Izerskie, Wysoki Grzbiet:
  valuable natural area, currently affected by emissions destroying mountain forests. But despite this, it is important in terms of tourism and water management;
- Vraní hory / Góry Krucze;
- CHKO Orlické hory / Góry Bystrzyckie;
- Bird protection areas Králický Sněžník / Śnieżnicki Park Krajobrazowy, Park Krajobrazowy Gór Sowich:
  valuable areas, so far with an underused potential of nature friendly tourism;
- CHKO Jeseníky / Park Krajobrazowy Góry Opawskie;
- Rychlebské hory / Góry Złote:
  valuable area, so far with an undeused potential of nature friendly tourism;
- Slezské Beskydy / Park Krajobrazowy Beskidu Śląskiego:
  valuable area with a preserved pastoral mountain settlement and with a developing tourism.

The Czech Republic – Slovakia

Natural barriers – state

Virtually all natural borders are defined by the Morava river, Bílé Karpaty Mountains and Beskydy Mountains, which are all large protected areas, suitable especially for cooperation in the field of nature conservation, management of mountain areas and soft tourism. Most of the border crossings are formed by saddles and passes.

Severity rating of the CZ – SK barriers

Significant natural barriers
- Bílé Karpaty PLA / Biele Karpaty PLA,
- Beskydy PLA, Slezské Beskydy / Kysuce PLA:
  In both cases these are mountanious areas of a character with preserved natural biotopes and partly also pastoral mountain settlements.
- Biosphere reserve Dolní Morava – river Morava / Záhorie PLA:
  internationally important area of floodplain primeval forests and wetlands.

Slovakia – Poland

Natural barriers – state

The border is formed along the entire length by the Carpathian Mountains, having a character of uplands and high mountains, of which there are three national parks and further three large protected areas (PLA). The entire territory, especially its Eastern part is rather sparsely populated and the density of major roads is relatively low (two major road and two rail links). There are long sections without any transport connection. In some parts of the common border, thanks to exceptional natural conditions, there is lively tourism (Tatry, Pieniny).

[8] PLA – protected landscape areas

Severity rating of the SK – PL barriers

Very significant natural barriers

- CHKO Horná Orava / Babiogórski Park Narodowy;
- Tatranský Národný park / Tatrzański Park Narodowy;
- Pieninský národní park / Pieniński Park Narodowy;
- Popradzki Park Krajobrazowy, Magurski Park Narodowy / Busov;
- Národný park Poloniny / Bieszczadzki Park Narodowy.

Significant natural barriers

- CHKO Kysuce / Beskid Śląski;
- Kysúcké Beskydy / Żywiecki Park Krajobrazowy;
- Skorušinské vrchy / Brazda;
- Spišská Magura / Magura Spiskia;
- Ľubovnianské vrchovina / Beskid Sądecki;
- CHKO Východné Karpaty / Beskid Niski, Jaśliński Park Krajobrazowy a Ciśniańsko-Wetliński Park Krajobrazowy:
  In all cases, it concerns very well preserved and highly valuable natural areas. With the exception of the Tatry and Pieniny mountains, these areas have not been touched by tourism yet.

Slovakia – Hungary

Natural barriers – state

The border is formed in the western part by the Dunaj / Duna, which, along with valuable floodplain forests, declared as Dunajské luhy PLA (in Hungary Szigetközi Tájvédelmi Körzet) creates an important natural barrier. Another important part of the border consists of the Dunaj / Duna affluent – the river Ipeľ / Ipoly, which is however a significantly smaller barrier. Next there is the volcanic highland Cerová vrchovina PLA / Karancs-Medves Tájvedelmi Körzet and almost neighbouring Slovenský kras National Park (on the Hungarian side the Aggteleki Nemzeti Park). Relatively free of barriers is the area between the rivers Bodva / Bódva and Hornád / Hernád, which forms another barrier on the short section of the border. The last Slovak – Hungarian border barrier is formed by the southern part of Slánské vrchy – Massif of Veľký Milíč / Nagy-Milic (895 m), which is the highest point of the entire border. The rest of the territory consists of permeable lowland (Východoslovenská nížina) with the exception of a five kilometre border section of the river Tisza on the Slovak – Hungarian – Ukrainian border. Main common rail and road corridor, as well as the common highway is located in the south-western part of the territory in the Danube basin. Another important development and transport area is the territory Košice – Miskolc.

Severity rating of the SK – HU barriers

Very significant natural barriers

- river Dunaj / Duna:
  European transport corridor Danube is a valuable area in this territory with a tangle of original river branches and floodplain primaeval forests suitable for a guided sightseeing tourism;
- Slovenský kras National Park / Aggteleki Nemzeti Park,
- Duna-Ipoly Nemzeti Park:
  both national parks present very precious areas in terms of landscape as well as biology.

Significant natural barriers

- river Tisa / Tisza;
- CHKO Cerová vrchovina / Karancs-Medves Tájvédelmi Körzet,
- Velký Milíč / Zempléni-hegység:
  both border uplands still conceal a relatively undiscovered landscape potential.

Hungary – Romania

Natural barriers – state

On the European scale, it is a completely unique border, which with the exception of a relatively small section of the Maros / Mureş river, is not formed by any natural elements, as it runs through the Great Pannonian Plain and is thus entirely artificial.

There are several smaller protected natural areas, but they do not cross any major transport routes and so do not form any barriers. On the Romanian side of the border a short stretch of the river Maros / Mureş is located and a nature reserve of the floodplain forest Pădurea Cenad without any continuity on the Hungarian side, which is partially populated and built up. The others include Denésmajori Csigás-erdő near Gyula without continuity in Romania, a little to the north Parcul natural Cefa, without continuity in Hungary and finally Fényi-erdő closer to Carei, without continuity in Romania.

The Hungarian-Romanian border is intersected by three major railways, and the closest motorway connection is in the area Makó – Arad, where currently only a relatively short motorway segment lacks across the common border.

Severity rating of the HU – RO barriers

Significant natural barriers

- river Maros / Mureş:
  unregulated river with floodplain forests creates in the border section a valuable natural potential.

Romania – Bulgaria

Natural barriers – state

About 77 % of the border is located on the lower Danube / Dunărea / Dunav, creating a significant barrier, but also one of the main European waterways. There are two bridges on the whole border, one is between Giurgiu and Ruse, the other between Calafat and Vidin, which was completed in 2013 and is fully operational. Between them, there is a section about 280 km long, where the Danube can be crossed only by two local low-capacity ferries. For the rest of aprox 115 km between Giurgiu and Călăraşi – Silistra (where another low-capacity ferry operates) there is no other bridge. The rest of the border between the Danube deflection towards North at Silistra from whence the river flows further only through Romania as far as the Black sea, lies in the Dobrudža (Dobrogea) plain, or a mild upland and is thus artificial and without barriers.

Severity rating of the RO-BG barriers

Very significant natural barriers

- *river Dunărea / Dunav.*

6.2.2 Natural inner barriers

Natural barriers of mutual cooperation and of common development often do not lie on common borders, but, in some countries far more markedly, within their own territory. This is especially the case of high and steep mountains and wide rivers, including the inaccessible parts of their marshy floodplains, eventually deeply cut canyons. Provision is made also for important large protected areas – national parks and protected landscape areas. Listed are those inner barriers that complicate mutual cooperation of the V4+2 countries and prevent important railway tracks and roads. However, the mentioned barriers usually are of considerable importance for biodiversity, for the quality of environment and thus also for an active recreation in these countries.

Bulgaria

Natural inner barriers – state

A crucial inner barrier, which passes from the West to the East and so dividing the country practically in two halves are the Stara planina mountains. To the south from it, there is a lower mountain ridge Sredna Gora. The highest mountain of Bulgaria on the south-west of Bulgaria (Rila, Pirin) and other large mountains forming the southern border (Rodopy) are not crucial barriers in terms of the cooperation of the V4+2 countries. Bottlenecks at the crossing of Stará Planina are therefore essential.

Significant inner barriers

- Rila, Pirin, Stara planina, Rodopi, Sredna Gora – mountains:
  all the mountains stated above, represent a very valuable and for far almost untouched natural potential, protected in two national parks and in several other large protected areas.

The Czech Republic

Natural inner barriers – state

The surface of the Czech Republic is filled predominantly by uplands and highlands. Most mountains of the mountainous type lie at the state borders. The Czech Republic, also with regard to its geographical position on the main European watershed, has not got such wide large streams as other states of the V4+2 group of countries. The widest Czech and Moravian rivers (Labe, Vltava, Morava, Dyje, Ohře, Odra) form in some places certain barriers by creating deep valleys or vice versa broad wetland plain.Thus, the inner natural barriers do not create such serious obstacles for spatial development, transport and economic links as is the case in some other states of the V4+2.

In the international as well as in the interstate transport, the direction West-East (more precisely the northwest – southeast) definitely prevails.

In the North-South direction are the most significant barriers the České Středohoří mountains, Ještědsko-kozákovský hřbet, Jizerské hory, Broumovské stěny, and Hrubý Jeseník, which create adifficult access to some border areas. A narrow valley of the Svitava river between Brno and Blansko represents a specific feature, which acts as a barrier for modernization of railway corridor track and significant turning point. Hřebeč ridge in the Svitavská pahorkatina is a barrier to the prepared motorway. In central Moravia smaller barrier creates Moravská brána and in south Moravia Chřiby mountains with the Morava river and Vizovické hills, creating so-called Napajedelská gate. They all are relatively narrow places through which important transport and ifrastructure corridors must pass.

Significant inner barriers

- Vltava, Elbe, Morava – moderately broad rivers including floodplains and valleys (in some places),
- Ještědsko-kozákovský hřbet, protected landscape areas Jizerské hory, Broumovsko, Jeseníky, and České středohoří.
- Bird protection areas Bzenecká Doubrava and Strážnické Pomoravi, site of European importance Hodonínská Doubrava – Natura 2000.

Hungary

Natural inner barriers – state

On most of its territory Hungary is a flat country, thus without any more significant barriers formed by the terrain relief. The more serious barrier presents the river Duna, flowing through

the country from North towards South and dividing the country practically in two halves. With the exception of Budapest, until recently, there were only two bridges over Duna. The bottleneck effect is also to be found at the so-called Dunakanyar north of Budapest, where the railway corridor is gripped by the river Danube and steep slopes of the Börzsöny mountains and which is also a national park. A similar bottleneck forms the southern root of the mountain and protected areas and the Gerecse Mountain with the city of Tatabánya, through which runs an important railway corridor and a motorway. Another relatively significant barrier is the river Tisza. Some other barriers on important roads are formed by national parks of the character of wetlands and floodplain forests. Also Buda highland (Budai-hegység), which is also a nature protected area (Budai Tájvédelmi Körzet) forms an important natural barrier between Budapest and northern part of agglomeration. According to the selected criteria, Lake Balaton should also be considered a significant barrier due to its narrow shape, however, because of its substantial recreational importance, it is not perceived as a territorial barrier and the laying of important supra-local corridors of transport and technical infrastructure is not desirable either.

Significant inner barriers

- Duna, Tisza – wide rivers:
  important transport corridors (especially Danube) and valuable natural biotopes (a larger part of both rivers);
- Duna-Ipoly Nemzeti Park – national parks;
- Gerecsei Tájvédelmi Körzet – protected areas:
  Wooded uplands, precious in terms of scenery and biology, creating valuable recreational facilities for metropolitan areas of a capital city.

Poland

Natural inner barriers – state

Due to glacier, Poland is predominantly a flat country with significant mountains only on the southern borders. Certain barriers thus represent only Polish rivers and their related navigation channels. Thanks to a fairly dense settlement and a relatively dense transport network, including bridges, Polish rivers (although, in the case of the river Wisla and Odra, rather wide rivers) are not perceived by the inhabitants as barriers. Several less significant barriers are formed by forest or wetland national parks of a lowland character.

Significant inner barriers

- Odra, Wisła, Warta, Bug, Narew – medium to wide rivers:
  these are important rivers, both in terms of transport (particularly Odra and Wisła) as well as with its natural potential;
- Wielkopolski Park Narodowy, Narwiański Park Narodowy, Biebrzański Park Narodowy – national parks:
  in Poland, there are 23 national parks in total. However, the three above mentioned, form relatively the greatest barriers for transport and technical infrastructure.

Romania

Natural inner barriers – state

The territory of Romania has a large share of mountainous landscape with a long section of Carpathian Mountains, which has a very specific arc shape. Thus, the Transylvanian Plateau is almost completely surrounded by Carpathian Mountains – however there are numerous mountains passes that link Transylvania to the other Romanian regions. In particular, the Southern Carpathians (Carpaţii Meridionali) are very high. There are only few mountain passes that allow a crossing. However, there are now two modernised roads that cross the Carpathians

at very high altitudes (over 2 000 m), slightly reducing the effect of bottlenecks in road transport (in summer months). The Western Carpathians (Munţii Apuseni) are also quite difficult to pass; the most important routes have to avoid them in the southern or northern direction. Only two bottlenecks were identified in large protected natural areas.

There are also important river barriers; the river Duna separates the area of Dobrogea (counties Constanţa and Tulcea) from the rest of the counties, with only two bridges connecting the two river banks. Other large rivers (Mureş, Olt, Siret) are important natural barriers in some areas.

Significant inner barriers

- most of the territory of the Carpatii Meridionali, Carpatii Orientali, Muntii Apuseni, Muntele Mare, Muntii Banatului, Muntii Poiana Ruscă, Munţii Mehedinti, a part of the Carpaţii Orientali territory – mountains:
  in the European context, most Romanian mountains still hide much undisturbed ecosystems, original pastoral farming and a living folklore. Some of the most valuable parts of the Carpathians were declared national parks;
- Dunărea, Mureş, Olt, Siret – medium to wide rivers:
  the Delta Dunării is a national park of a global importance. So far, only slightly regulated Romanian rivers create specific river landscapes. Their energy potential is not fully utilised yet, but it is necessary to coordinate it with the interests of nature protection.

Slovakia

Natural inner barriers – state

The territory of Slovakia is formed by a mountainous landscape with a rich subdivision into various mountain parts of the Carpathian massif. In terms of transport-communication and socio-economic links, both between regions and international transit relations, it is necessary to overcome the barriers of mountain massifs.

Among the most significant natural barriers in the North-South direction there are especially Veľká Fatra, Nízke Tatry and Slovenské Rudohorie, especially its Eastern part – Volovské vrchy.

Among the most significant natural barriers in the West–East direction, next to the above mentioned massifs in the North–South direction, belong especially Malé Karpaty PLA, Považský Inovec, Strážovské vrchy PLA, Oravská Magura PLA and the national park Malá Fatra in the western part of the territory of Slovakia and Branisko Čergov, Slánske Vrchy and Vihorlat in the eastern part of the territory of Slovakia. Due to its potential navigability, the lower flow of the river Váh as far as Žilina can also be considered as a certain kind of barrier.

Significant inner barriers

- Národný park Nízké Tatry, Národný park Malá Fatra, Národný park Veľká Fatra – medium to high mountains, national parks;
- Národný park Slovenský kras – national park;
- Malé Karpaty PLA, Volovské vrchy, Považský Inovec, Strážovské vrchy PLA, Branisko, Čergov, Slánské vrchy, Vihorlat PLA – mountains:
  all Slovakian mountains belong to important areas in terms of protection, water management and forestry. With the exception of parts of Nízké Tatry and Malá Fatra, these areas have not been fully utilised yet.

6.2.3 Natural barriers in terms of the laying of transport and technical infrastructure

As it was already stated, high mountains and wide rivers represent not only an obstacle to spatial development, but they are also a territory's values of considerable importance. Problem, which these natural barriers create are expressed particularly in the laying of transport and technical infrastructure. During the overcoming of barriers through these networks, it is not the absolute altitude of the mountain or the width of the given river that matters, but the relative height, which is to be overcome, the geological and land conditions, the state of a floodplain (poor access due to non-regulation, extensive wetlands etc.), the depth, width and layout division of a canyon, through which a road passes etc. Each type of transport or technical infrastructure has different requirements and demands on the relief of a territory and its overcoming. For example falling gradients and elevations, which a first class road manages without any major problems, while for an motorway this becomes more difficult, and it is ever harder for a railway or a motorway. The construction of a high-speed line (VRT) causes the most extensive landscaping in such a terrain. It is necessary to note that e.g. a tunnel over 500 m of length requires already a more sophisticated and so a more expensive safety measure (escape drifts etc.).

Gateways of the planned transport and technical infrastructure through the natural barriers need to be addressed not only technically, but especially strategically. Solutions should be economical and at the same time it should take into account the need for the least unfavourable impacts on its environment. Therefore, even historically, mountain saddles and mountain valleys oriented to them were chosen for crossings, the capacity of which conformed for centuries to a standard roadway. A problem arises during the increase of capacity and the extension of roads and railways, as well as during the adding of different types of technical infrastructure. Bridges across large rivers were logically built in big cities, or in narrowest places. Nowadays the possibilities of the construction of new bridges are limited also by the navigability of rivers according to the EHK OSN AGN agreement on inland waterways, or the TEN-T, because here not only the span of bridges is manifested, but also their required height above the water surface, which causes especially by railways, frequent driving on the bridge constructions, which are visible in lowlands from afar and they themselves create an artificial barrier within the territory.

The following text delineates gateways of the planned routes of transport and technical infrastructure through the most significant natural barriers of the V4+2 countries. These are spaces, where lines of the planned routes of roads, railways, gas pipelines, product pipelines of very high electric voltage often concentrate and lead across (or through) mountain ranges or wide rivers, possibly lowland national parks (wetlands and primeval forests). It can be completely new areas – not used so far, as well as existing spaces (bridges, defiles and mountain saddles) through which the current transport and technical infrastructure gains more capacity.

Currently used gateways through barriers are delineated by names of municipalities on both sides of a particular barrier, or by names of more remote towns on the given transport axis or technical infrastructure route for the emphasis of this strategic bottleneck. The slash sign (/) divides two or more directions leading to a gateway. Where it is useful, mountain barriers state also the name of a respective pass (defile).

In the case of planning completely new routes of transport and technical infrastructure, the approximate spaces of their crossings over natural barriers are defined in a wider description, without binding delineating gateway points.

6.2.3.1 Problems in the laying of the planned transport and technical infrastructure in terms of barriers on common national borders

The Czech Republic – Poland

Gateways through barriers for the planned transport and technical infrastructure on the borders of the CZ – PL

	Type of transport/media	Direction	Barrier	Barrier significance	Approximate delineation of the barrier gateway
A	High-speed railway	Praha – Wrocław	Krkonošsko – Jesenická soustava / Sudetian	SB	Náchodsko (Aa), Trutnovsko (Ab)
B	Motorway D11/R11/ Expressway S3	Praha – Hradec Králové – Lubawka – Legnica –Sulechów	Východní Krkonoše	SB	Žacléřský průsmyk/pass
C	Expressway	Brno – Wrocław	Orlické hory / Góry Bystrzyckie, Králický Sněžník / Śnieżnik	SB	Mladkovské sedlo

Natural barriers in terms of the planned transport and technical infrastructure – problems

All stated natural barriers on the Czech-Polish border or in its surroundings represent a bigger or smaller obstacle in transport and area development. At present, it is possible to identify only one barrier, which poses an actual problem that needs to be solved.

Barrier No. 1: Mladkovské sedlo (Orlické hory, Králický Sněžník)

Border crossing: Lichkov – Międzylesie (railway No. 024), Dolní Lipka – Boboszów (I/43 road)

***Planned long-distance connection*:** Wrocław – Brno

Description of the problem: The problem does not involve the Polish side, where the road runs through a wide floodplain of the Kladská Nisa (Nysa Kłodzka) without any serious spatial limits.

The problem is the potential interference arising from an extension of a road on the Czech side, with more localities that are in the interest of nature protection. This concerns particularly:

- Natura 2000 – bird area Králický Sněžník – direct interference – the area is considered to be declared as PLA;
- Natura 2000 – site of European importance Tichá Orlice– direct interference.

The Czech Republic – Slovakia

Gateways through barriers for the planned transport and technical infrastructure on the borders of the CZ – SK

	Type of transport/media	Direction	Barrier	Barrier significance	Approximate delineation of the barrier gateway
D	Track No. 280 – modernisation	Hranice – Vsetín – Púchov	Javorníky / Bílé Karpaty	SB	Lyský průsmyk / pass
E	Track No. 320 modernisation	Český Těšín – Čadca	Slezské (Těšínské) Beskydy / Kysuce	SB	Jablunkovský průsmyk / pass
F	R49/R6 – motorway	Zlín – Púchov	Vizovické vrchy, Javorníky	SB	Pozděchovský tunel, Lyský průsmyk / pass
G	Track No. 280 – modernisation	Hodonín – Otrokovice – Púchov (SK)	Vizovické vrchy, Javorníky	SB	Lužná – Lidečko – Lyský průsmyk / pass

Natural barriers in terms of the planned transport and technical infrastructure – problems

The basic problem is the potential interference of the planned canal connection Dunaj – Odra – Labe, with valuable wetland and floodplain biotopes of the rivers Morava and Dyje, which are protected in the following modes:

- Natura 2000 site of European importance, Soutok – Podluží;
- Natura 2000 bird area, Soutok – Tvrdonicko;
- Biospheric reserve MAB UNESCO Dolní Morava;
- Wetlands of international importance (the Ramsar Convention) – Dolní Dyje wetlands.

Slovakia – Poland

Gateways through barriers for the planned transport and technical infrastructure on the borders of the SK – PL

	Type of transport	Direction	Barrier	Barrier significance	Approximate delineation of the barrier gateway
H	D3/S69 – motorway/ expressway	Žilina – Bielsko-Biała	Kysuce / Beskid Żywiecki)	SB	Skalité – Zwardoń
I	Track modernisation	Žilina – Bielsko-Biała	Kysuce /Beskid Żywiecki)	VB	Skalité – Zwardoń
J	R3/S7 motorway/ expressway	Martin – Kraków	Chočské vrchy, údolí Oravy	SB	Ružomberok – Dolný Kubín – Tvrdošín
K	R4/S19 expressway	Prešov – Rzeszów	Východné Karpaty / Beskid Niski	SB	Dukliansky priesmyk / pass

Natural barriers in terms of the planned transport and technical infrastructure – problems

Natural barriers in the Slovak-Polish border area consist of relatively high mountain massifs, the crossing of which requires a more challenging technical solution. The possibility to pass the border is limited only to a few crossings, given by natural options.

Slovakia – Hungary

Gateways through barriers for the planned transport and technical infrastructure on the borders of the SK – HU

	Type of transport/media	Direction	Barrier	Barrier significance	Approximate delineation of the barrier gateway
L	M11 – highway	Štúrovo – Budapest	Dunaj / Duna	VSB	Štúrovo – Esztergom (see no-cotinuations)
M	Very high voltage 400 kV	Bratislava – Győr	Dunaj / Duna	VSB	Medveďov (west of the village)

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Problems with crossing the Slovak-Hungarian border area occur especially in sections, where the border is formed by rivers – Dunaj / Duna, Ipeľ / Ipoly and Tisa / Tisza. In terms of nature protection, on the Slovak side the Cerová vrchovina PLA and the Slovenský kras national park are perceived as barriers. These are areas, which continue also on the Hungarian side of the border. On the Hungarian side, there is the Duna-Ipoly Nemzeti Park without any linkup to an adequately protected area on the Slovakian side. The mentioned protected areas are also part of the NATURA 2000 network.

Hungary – Romania

Gateways through barriers for the planned transport and technical infrastructure on the borders of the SK – HU

Do not exist.

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

As most of the border area is not affected by natural barriers, there are no significant problems of this kind at the borders of Hungary and Romania. The only possible problem relates to the Natura 2000 sites, which could influence the construction of the new cross-border road (as the proposed express road between Satu Mare and Nyiregyháza).

Romania – Bulgaria

Gateway through barriers on the borders of RO – BG

Dunav / Dunărea

	Type of transport/media	Direction	Barrier	Barrier significance	Approximate delineation of the barrier gateway
N	Railway modernisation	Giurgiu – Ruse	Dunav / Dunărea	VSB	Giurgiu – Ruse – new bridge or a reconstruction of the existing one
O	Road modernisation	Giurgiu – Ruse	Dunav / Dunărea	VSB	Giurgiu – Ruse – new bridge or a reconstruction of the existing one
P	Road – bridge	Bucureşti – Calaraşi – Silistra – Varna	Dunav / Dunărea	VSB	Calaraşi – Silistra
Q	Road – bridge	Bucureşti – Turnu Măgurele – Nikopol Sofia	Dunav / Dunărea	VSB	Turnu Măgurele – Nikopol
R	Road – bridge, Nabucco – Gas pipeline*	Craiova – Bechet – Orjahovo – Vraca, Turkey – North-West Europe	Dunav / Dunărea	VSB	Bechet – Orjahovo

* has been currently suspended

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

The river Danube forms an important barrier along the borders of Romania and Bulgaria with a length of 470 km, and there are just two above mentioned bridges (apart from small ferries) Giurgiu – Ruse and Calafat – Vidin. The current bridge between Giurgiu and Ruse also is not considered appropriate for cross-border traffic in this area and requires a substantial increase in its capacity and a reconstruction.

Both bridges are part of the existing Pan-European corridors No. 4: …Craiova – Calafat – Vidin – Montana – Sofia – Blagoevgrad – Kulata – (Greece) and No. 9: … Bucuresti – Giurgiu – Ruse – Veliko Tarnovo – Stara Zagora – Haskovo / Kurdzsali – (Greece / Turkey). The Giurgiu – Ruse bridge represents also the main connection between Bucharest and Varna (port and airport). Currently, discussions are being held over the new bridge across Danube, which was discussed by the interinstitutional committee that got established in connection with the Joint Memorandum on complicity of the two governments, approved in the year 2012.

Another problem is also the historically underdeveloped road and railway infrastructure in a relatively sparsely populated border area of both countries.

Moreover, along the Bulgarian-Romanian border, there are many protected areas, including the Natura 2000 sites, the Ramsar sites etc. Fortunately, all the planned cross-border connections are proposed outside these areas.

6.2.3.2 Gateways through barriers in the inlands of the individual countries

Bulgaria

Gateway through barriers in the direction North-South

	Type of transport/media	Direction	Barrier	Approximate delineation of the barrier gateway
1	Railway modernisation	Sofia – Plovdiv – Edirne (TR)	Ihtimanska Sredna Gora	Novi Khan – Momin prohod – Ihtiman

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Potential problems can occur also due to the existing inner natural barriers on the territory of Bulgaria. The Stara Planina Mountains (part of the Balkan mountain range) is a significant barrier to the development of a fast and high-quality transport infrastructure in the direction North-South and the interconnection of the whole V4+2 territory with Greece, Turkey, the Aegean and the Mediterranean Sea (and the area). Part of the Rila-Rodopy mountain massif can be considered as another inner barrier in the part No. 4 of the corridor – Sofia – Blagoevgrad – Petrich (Kulata) – – (Greece), where the only option is the crossing through the Struma valley.

The Czech Republic

Gateways through barriers for the planned transport and technical infrastructure

	Type of transport / media	Direction	Barrier	Approximate delineation of the barrier gateway
2	Railway	Praha – Liberec	Ještědsko-kozákovský hřbet	Turnov – Liberec
3	High-speed railway Moravia – gas pipeline	Brno – Ostrava, Dolní Dunajovice / Náměšť nad Oslavou – Kojetín – Bohumín	Moravská brána	Hranice – Bělotín
4	High-speed railway	Praha – Dresden	České středohoří	Lovosice – Ústí nad Labem
5	Track No. 260, modernisation	Brno – Česká Třebová	Svitava river valley	Brno – Blansko
6	R35 – motorway	Hradec Králové – Mohelnice	Svitavská pahorkatina	Hřebečský hřbet, Nízký Jeseník
7	R55 – motorway	Olomouc – Přerov – Hulín – Břeclav	Napajedelská brána	Napajedla
8	R55 – motorway	Olomouc – Přerov – Hulín – Břeclav	SPA Bzenecká Doubrava – Strážnické Pomoraví	Bzenec – Hodonín
9	Crude oil pipeline Družba – doubling	Russia – Middle Europe	SCI Hodonínská Doubrava	Mutěnice – Hodonín

SPA – Special Protection Areas – Natura 2000
SCI – Sites of Community Importance – Natura 2000

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Barrier No. 1: Červenohorské sedlo

***Direction of the border* crossing:** Mikulovice – Głuchołazy (road, railway).

***Long-distance connection*:** Opole – Nisa – Brno / Olomouc – I/44.

***Description of the problem*:** The Jeseníky mountain range in the Červenohorské sedlo and its interface with the Rychlebské Mountains in the Ramzovské sedlo represents a crucial inner natural barrier. Particularly during snow calamities, windbreaks etc. this easily leads to blockages of both these bottlenecks and thus the Jeseník district is used to be cut off from the rest of the country. Moreover, the II/369 road passes through the Kralický Sněžník bird area and the road I/44 through the Jeseníky bird area and also through the PLA of the same name.

Hungary

Gateways through barriers for the planned transport and technical infrastructure

	Type of transport / media	Direction	Barrier	Approximate delineation of the barrier gateway
10	M4 – motorway	Budapest – Szolnok – Gyula	Tisza	Northern edge of Szolnok
11	High-speed railway, Nabucco – Gas pipeline*	Szeged – Arad (RO), Turkey – North-West Europe	Tisza	Szeged – northern edge
12	M8 – motorway	Sárvár – Veszprém	Badacsony	Ajka – Bánd
13	M10 – motorway	Budapest – Dorog	Budai hegység	Pilisszentiván – Piliscsaba
14	M0 – motorway	Budapest Ring – highway circle	Budai hegység	North-west edge of Budapest
15	Nabucco – Gas pipeline*	Turkey – North-West Europe	Duna, Duna-Dráva Nemzeti park	Northing of Mohács
16	South Stream – Gas pipeline	Turkey – North-West Europe	Duna	Harta – Bölcske
17	VVN 400 kV	Alsógöd – Tatabánya	Duna	Alsógöd – Szentendre
18	VVN 400 kV	Cegléd – Paks	Duna	Kalocsa – Paks

* has been currently suspended

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Barrier No. 1: Budai-hegység

The main problem is that only a few highly frequented roads pass through the valleys of the Budai-hegység, which connect the capital city with the north-western part of the agglomeration. The Budai-hegység are also a barrier for the motorway circuit around Budapest, because its completion would have a substantial impact on the nature there and this represents not only a financial problem, but also a conflict with nature protection authorities.

Poland

Gateways through barriers for the planned transport and technical infrastructure

	Type of transport / media	Direction	Barrier	Approximate delineation of the barrier gateway
19	High-speed railway	Wrocław – Kalisz – Łódź – Warszawa	Wisła	New bridge or adjustment of the existing bridge in Warszawa
20	High-speed railway	Kalisz – Poznań	Warta	New bridge southeast of Poznań
21	High-speed railway	Praha – Wrocław	Odra in Wrocław	New bridge or adjustment of the existing bridge in Wrocław
22	High-speed railway, Very high voltage 400 kV	Warszawa – Bydgoszcz – Jasiniec – Grudziądz – Pelplin – Gdańsk Przyjaźń	Wisła	Possible crossing in the space of Bydgoszcz
23	S11 – expressway	Poznań – Koszalin	Warta	Oborniki Wlkp.
24	S11 – expressway	Upper Silesia basin – Poznań	Warta	Nowe Miasto
25	S3 – expressway	Szczecin – Świnoujście	Dziwna – Zalew Szczeciński	Wolin
26	S3 – expressway	Szczecin – Świnoujście	Swina	Wolin
27	S7 – expressway	Gdańsk – Elbląg	Wisła	southeast of Gdańsk
28	S5 – expressway, Very high voltage 400 kV	Bydgoszcz – Grudziądz – Olsztyn, Jasiniec – Grudziądz – Pelplin – Gdańsk Przyjaźń	Wisła	Grudziądz, Grudziądz – Nowe Miasto
29	S74 – expressway	Kielce – Nisko	Wisła	Sandomierz
30	S19 – expressway	Belarusian Border – Białystok – Lublin	Bug	Jarniki
31	Very high voltage 400 kW	Plewiska – PL Border	Odra	Górzykowo – Brody

Barrier No. 1:
Among the main areas, due to a high proportion of protected nature areas, belong notheastern Poland (the Warmińsko-Mazurskie province) and mountain areas. This applies to the provinces Małopolskie and Podkarpackie, and to a certain extent also the provinces Warmińsko-Mazurskie and Lubelskie.

Barrier No. 2:
River valleys – particularly, where the streams are not regulated and which function as bio-corridors and are to a great extent protected (primarily as Europe's significant localities or the Natura 2000 bird areas) This applies among others to valleys of the largest rivers: Wisła and Odra.

Barrier No. 3:
Wetlands, such as swamps and bogs, are not suitable for investments. The largest of these are the Biebrzańskie and Narwiańskie wetlands, located in eastern Poland (particularly the województwo Podlaskie).

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Barrier No. 1:
The main problem can be attributed to interferences with the placement of the new linear transport infrastructure as the Via Baltica.

Barrier No. 2:
Especially the modernisation of the waterway via the river Odra – the most important waterway in Poland – will be very difficult.

Barrier No. 3:
Wetlands of a linear character complicate the passing of the capacity transport and technical infrastructure to the greater part of the województwo Podlaskie and its metropolis Białystok.

Romania

Gateways through barriers for the planned transport and technical infrastructure

	Type of transport / media	Direction	Barrier	Approximate delineation of the barrier gateway
32	High-speed railway	Bucureşti – Constanţa	Dunarea	Feteşti – Cernavoda
33	High-speed railway, Railway modernisation	Timişoara – Braşov – Ploieşti – Bucureşti	Carpaţii Meridionali	Predeal pass
34	High-speed railway	Timişoara – Sibiu	Mureş river valley	Margina – Deva – Oraştie
35	Railway modernisation, Nabucco – Gas pipeline*	Timişoara – Craiova, Turkey – North-West Europe	Mureş river valley, Carpatii Meridionali, Timis and Cerna river valleys	Caransebeş – Orşova
36	Railway modernisation, motorway, Very high voltage 400 kV	Timişoara – Craiova, Orşova – Calafat, Drobeta–Turnu Severin – Timişoara – Arad	Dunarea at Porţile de Fier (Iron Gates gorges)	Orşova – Drobeta –Turnu Severin
37	Railway modernisation	Timişoara – Craiova	River Jiu	Jugastru – Filiaşi
38	Motorway	Ploieşti –Moldova Border	Siret	Cosmeşti
39	A1 – highway	Sibiu – Piteşti	Carpaţii Meridionali, Olt river valley	Turnu Roşu pass
40	A3 – highway	Turda – Iaşi – Ungheni (Moldova)	Carpaţii Orientali	Praid – Tulgheş – Tărgu Neamt
41	Crude oil pipeline	Panchevo (Srbia) – Constanţa	Munţii Banatului	Orşova – Oraviţa – Drobeta-Turnu Severin
42	Very high voltage	Braşov – Buzău	Munţii Buzăului	Nehoiu – Prejmer
43	Very high voltage 400 kV	Cernavoda –Buzău	Munţii Întorşurii, Buzău river valley	Hârşova – Însurăţei
44	Very high voltage 400 kV	Cluj – Suceava	Carpaţii Orientali	Ilva Mare – Gura Humorului
45	Very high voltage 400 kV, Nabucco – Gas pipeline*	Severin – Timişoara – Arad, Turkey – North-West Europe	Munţii Banatului, Semenicului, Almajului	Orşova – Anina

* has been currently suspended

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Barrier No. 1:
Carpathian Mountains, due to small number of passes and high proportion of natural protected areas, are barriers for the trans-regional transport and technical infrastructure.

Barrier No. 2:
River valleys – particularly where the streams are not regulated; occasionally they also have the function of green corridor and SPA Natura 2000 status. The Danube (between Călăraşi and Galaţi), but also several inner rivers (Siret, Olt, Jiu, Mureş, Someş, Buzău) are barriers to transport infrastructure and to the technical infrastructure.

Slovakia

Gateways through barriers for the planned transport and technical infrastructure

	Type of transport / media	Direction	Barrier	Approximate delineation of the barrier gateway
46	R2 – expressway	Trenčín – Nováky	Protected landscape area Strážovské vrchy	Mnichova Lehota – Trenčianske Jastrabie
47	R2 – expressway	Nováky – Žiar nad Hronom	Kremnícke vrchy	Handlová – Lovčica-Trubín
48	R2 – expressway	Zvolen – Lučenec	Veporské vrchy	Kriváň –Mýtna
49	R2 – expressway	Rožňava – Košice	National park Slovenský kras	Krásnohorské Podhradie – Jablonov nad Turňou (Soroška)
50	R1 – expressway	Banská Bystrica – Ružomberok	National park Nízke Tatry	Slovenská Ľupča – Hiadelské sedlo – Korytnica kúpele
51	R3 – expressway	Žiar nad Hronom – Martin	Kremnícke vrchy	Kremnica, Ráztočno
52	D1 – highway	Košice – Michalovce	Slánske vrchy	Bidovce – Sečovce

Natural inner barriers in terms of the planned transport and technical infrastructure – problems

Barrier No. 1:
Among the main problems of leading of the expressway R2 belong especially the hilly terrain, and on certain sections, the need to build tunnels.

Barrier No. 2:
Leading of the route R1 in the section Banská Bystrica – Ružomberok passes through Hiadeľske sedlo (protected natural area) across the Nízke Tatry PLA (NATURA 2000 – sites of European importance, protected bird areas), where it is necessary to deal with sensitive environmental issues, as well as to lead the way, in two sections, through tunnels.

Barrier No. 3:
Leading of the route R3 is alternative in the direction from Martin to Žiar nad Hronom through Ráztočno (then in parallel with the R2), or from Martin through Kremnica. Both alternatives are led through a demanding geomorphologic terrain with the need to overcome differences in height and the construction of tunnels.

Barrier No. 4:
Leading of the route D1 in the section Košice – Michalovce assumes the construction of the tunnel Dargov.

6.3 Limits and possibilities for solutions

High and steep mountains, wide rivers with marshy floodplains, deep canyons, or large protected areas appear to be barriers, which were formed independently of man and their character and territory permeability can be changed only in a limited way. It is possible to realise the whole scale of the problem, especially in situations, when a strategically important bridge or a pass is closed, even for a short term, and long diversionary routes and traffic jams fundamentally change people's lives within the affected area. These barriers can be removed by a challenging technical solution, however, it is necessary to decide whether such a step is needed and under what conditions. Every such investment requires reliable assessment of the impacts on the environment and more options / variations of proposed alternative solutions, so that an optimal solution can be selected, both in relation to the environment and also with respect to the local community.

One possibility and a challenge at the same time, is also to view the natural barriers as a potential, which often consists in the preservation of unique nature and landscape, typical rural settlements, and the like. Together with suitable terrain conditions possibilities arise, to engage in sustainable hiking and tourism. As an example, the economically prosperous alpine region can be mentioned, in comparison with the Carpathian region, where the utilisation is well below its potential. Similarly, also the large rivers Danube, Tisza, Odra or Wisła are understandably not just barriers, but apart from their crucial transport functions they bind to themselves several natural attractions, they become unmistakable symbols of many cities or regions and thus logically attract attention and visitors´ attendance.

Searching for acceptable, sensitive technical, standby and compensatory solutions while overcoming of barriers, and simultaneously finding optimal utilisation of their natural potential, which can bring the desired development to peripheral regions is one of the tasks of this document.

6.3.1 Possibilities of solutions to barriers on the borders of the individual countries

The Czech Republic – Poland

It is necessary to examine the historical connection of two important cities – Wroclaw and Brno – linked via Kladská basin, through Mladkovské valley, Lanškroun and Svitavy with continuing to Vienna. New tracing of a road of an appropriate capacity and possibly also of a railway, will not get along without an interference with the bird area and the Natura 2000 sites of European importance, directly in the area of national borders as well as further beyond on the territory of the Czech Republic. Routing and dimensioning of a route optimal for both sides is apparently possible only through a technically demanding construction. It will be a matter of compromises and its final solution will be complicated.

The Czech Republic – Slovakia

The planned canal connection Dunaj-Odra-Labe will have to find an optimal route, as well as a sensitive technical solution, which will help to maintain the existing state and also the conditions in the given natural area of an international importance, for the development of valuable species and their habitats.

Slovakia – Poland

For overcoming of natural barriers it is necessary to make use of the existing road and railway crossings, within which also the building of superior transport infrastructures is planned.

Slovakia – Hungary

In part of the border formed by rivers, only technical solutions are necessary (construction of bridges on the river Dunaj / Duna and Ipeľ / Ipoly). When passing through the rest of the territory it is necessary to evaluate connections with protected areas.

Hungary – Romania

A close cooperation with environmental authorities of the two countries is recommended in order to ensure that the projects avoid any possible impact on Natura 2000 areas from the first planning phase.

Romania – Bulgaria

Both countries adopted measures for the solving of the problems mentioned and suggested relevant solutions in an Action plan, stipulated by the Inter-Ministerial Committee on Sustainable Development (IMCSD), established within the Danube Region Strategy in October 2012, in a common memorandum on the understanding of both governments in the framework of the EU Strategy for the Danube Region.

According to a common proposal of the relevant Bulgarian and Romanian authorities, measures will be taken for execution of works for the rehabilitation of the railway line Craiova – Calafat – Border RO / BG – Vidin – Montana, part of Corridor no. 4, and elaboration of studies for the rehabilitation of the railway line Bucharest – Giurgiu – Border RO / BG – Ruse – Gorna Orjachovica, part of the TEN-T Core Network. Currently several discussions are ongoing on how the process will be organized in terms of planning and defining the technical parameters of the railway lines.

The common Action plan includes other activities for improving the interconnectedness between both countries and within the framework of this activity a study will be conducted that will analyse the most appropriate location of the new bridges across Dunarea / Dunav. There are several alternatives: Călăraşi – Silistra, Bechet – Orjachovo, Turnu Măgurele – Nikopole and the modernised bridge between Giurgiu – Ruse.

Improvement of border crossings along the river Dunarea / Dunav between Romania and Bulgaria has now significantly progressed. The bridge between Calafat and Vidin is in operation since June 2013. The construction of a subsequent third bridge will then notably improve relations not only at local, but also at regional and international level. New bridge connections will strengthen alternative routes in the North-South direction, across the V4+2 territory, Romania and Bulgaria – Istanbul – (Turkey), respectively – the East Mediterranean Sea and its area.

6.3.2 Possibilities of solving the inner barriers of the individual countries

Bulgaria

The ongoing construction of highway “Struma”: Sofia – Blagoevgrad – Kulata – to the border with Greece will improve the conditions for the traffic of corridor No 4 and in particular will overcome some of the relatively existed natural and transport barriers to Mediterranean space.

The Czech Republic

Possibility of solving the barrier No. 1 Červenohorské sedlo

A realistic option of a solution is the tunnel under the Červenohorské sedlo on the road I/44, stated in the Development principles of the Olomoucký Region. It is spatial and investment preparation however, will not be easy, considering the necessary length as well as the nature conservation.

Hungary

Possibility of solving the barrier No. 1 Budai-hegység

Current plans envisage building a few tunnels in the most crucial and naturally protected parts of the Budai-hegység thus the problems of environmental pollution and natural protection would be solved, however it would be significantly increase the budget of the construction.

Poland

Every investment requires a creditable evaluation of the impacts on the environment and more options for the selection of solutions, which will be most considerate to the environment and also to local inhabitants.

Romania

There are several ongoing plans for construction of motorways which will solve or diminish the problems caused by some of the natural barriers: the motorways Ploieşti – Braşov, Sibiu – Piteşti, Târgu Mureş – Iaşi (section Ditrău – Târgu Neamţ).

Concerning the Danube inner barrier, a bridge over the Danube river in the area of Brăila and Galaţi would overcome the barrier and allow better transport links with the isolated part of Dobrogea (counties Tulcea and Constanţa).

Slovakia

Existing inner barriers to routes of superior roads consist mainly of natural barriers of a mountainous terrain. Overcoming of these barriers is also usually associated with the overcoming of protected natural areas, and this has to be taken into account during their implementation. Therefore, current plans for the running of motorways and expressways in all routes, consider a construction of tunnels in several places.

Figure 19: Outer and inner natural barriers of spatial development – V4+2 countries

Figure 20: External and internal natural barriers of spatial development – V4 +2 countries (including protected nature areas)

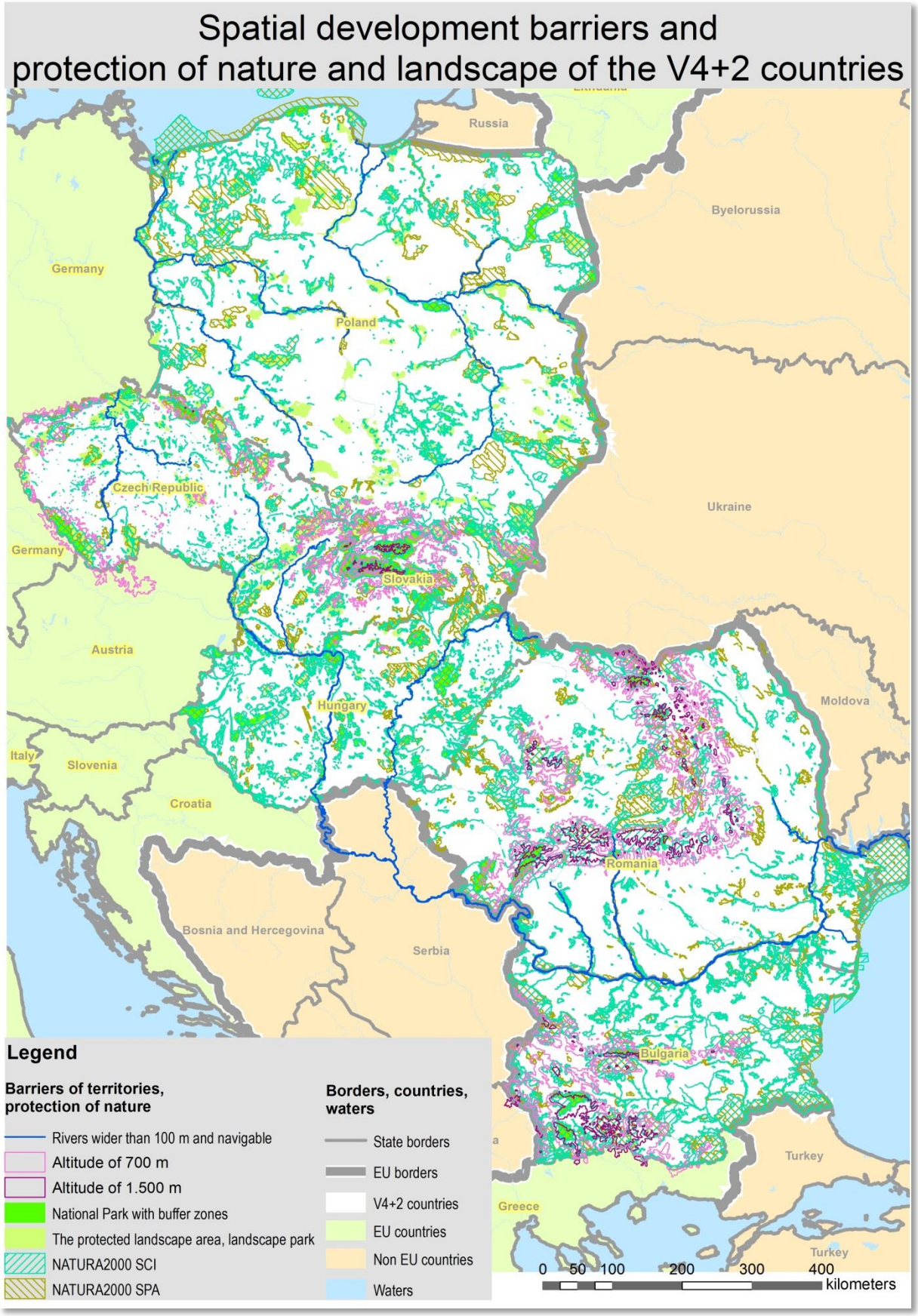


Figure 21: Barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the transport infrastructure

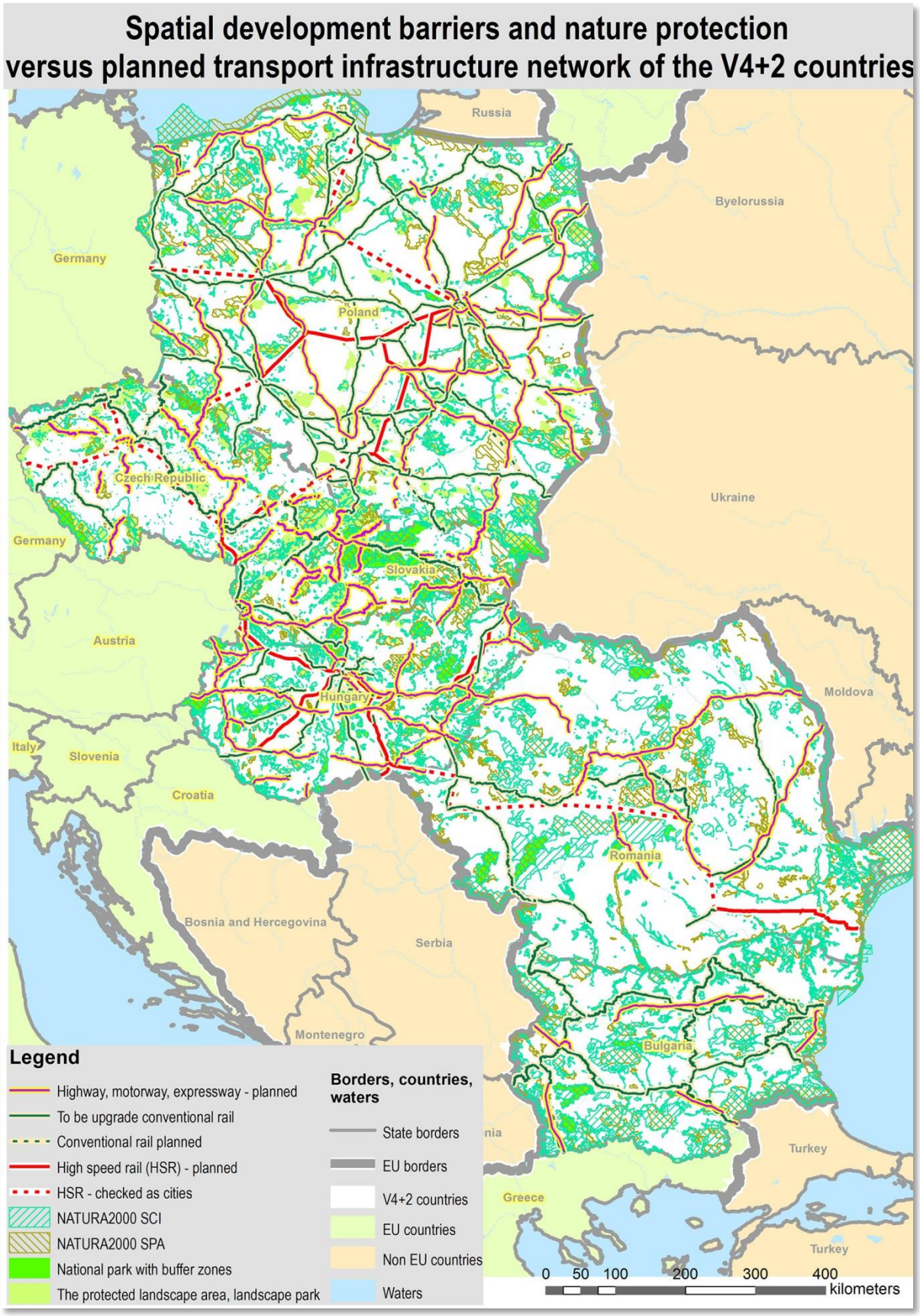


Figure 22: External and internal natural barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the transport infrastructure

Figure 23: External and internal natural barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the railway infractructure

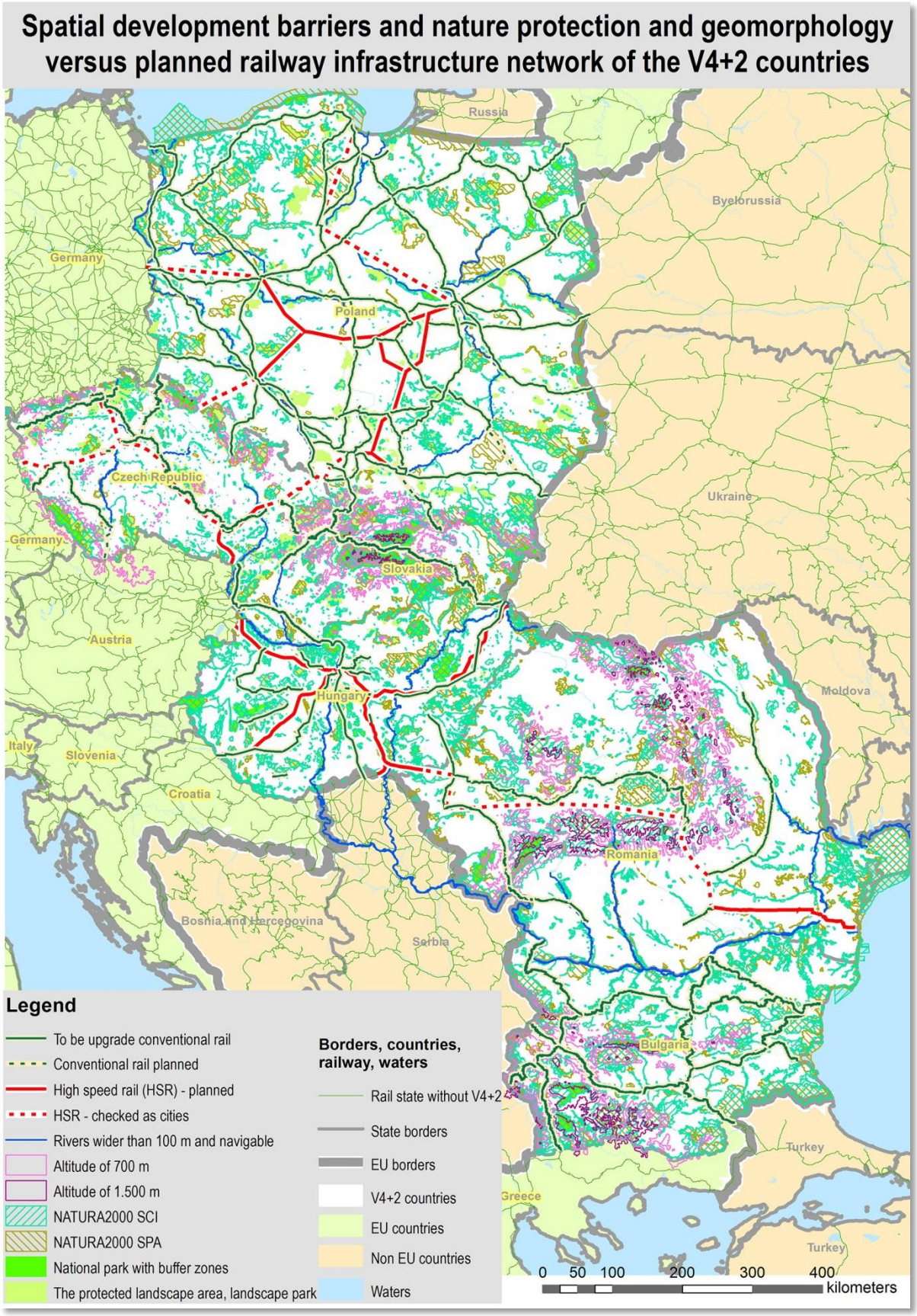


Figure 24: External and internal natural barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the road infrastructure

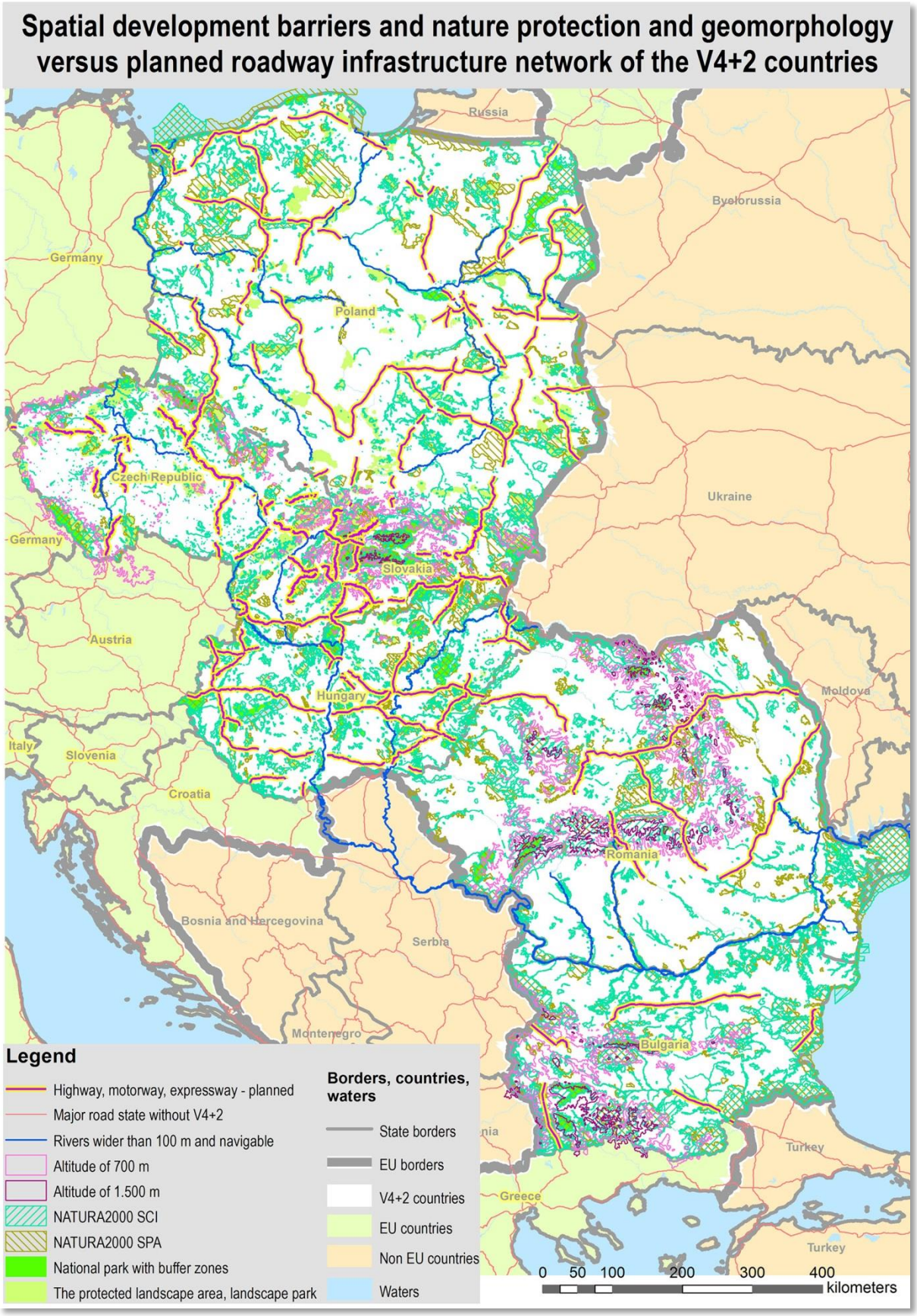


Figure 25: Barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the technical infrastructure

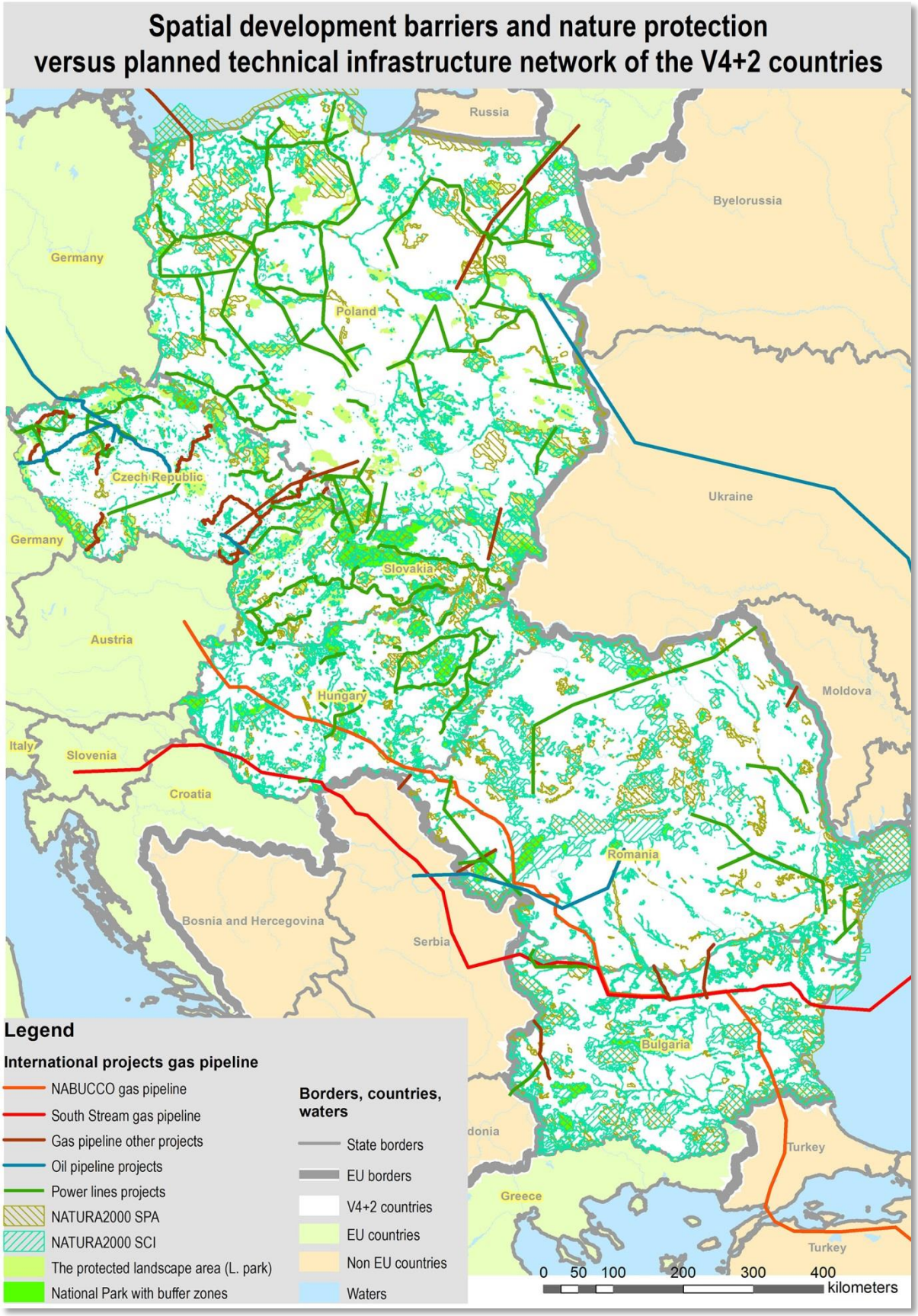


Figure 26: External and internal natural barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the transport and technical infrastructure

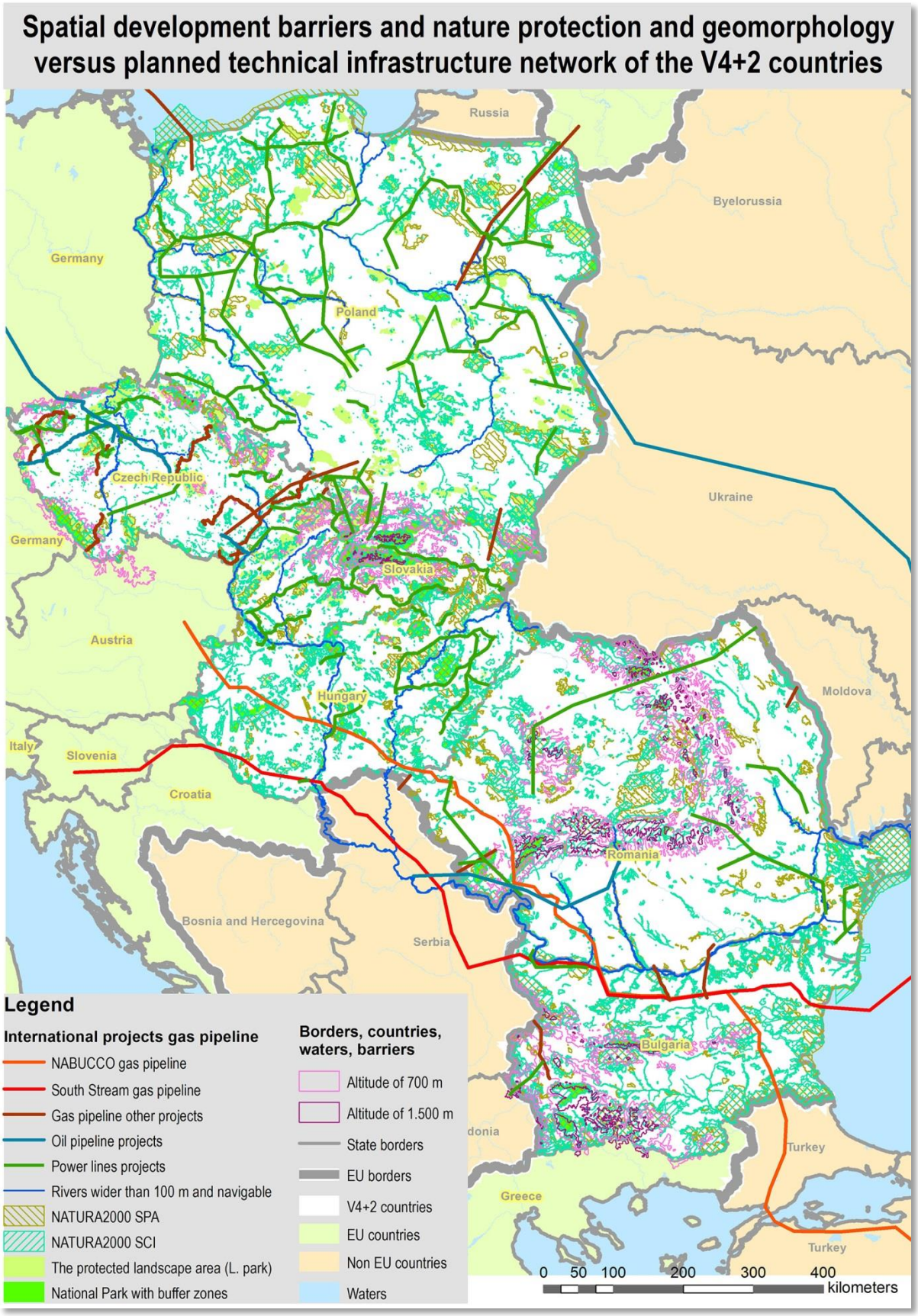
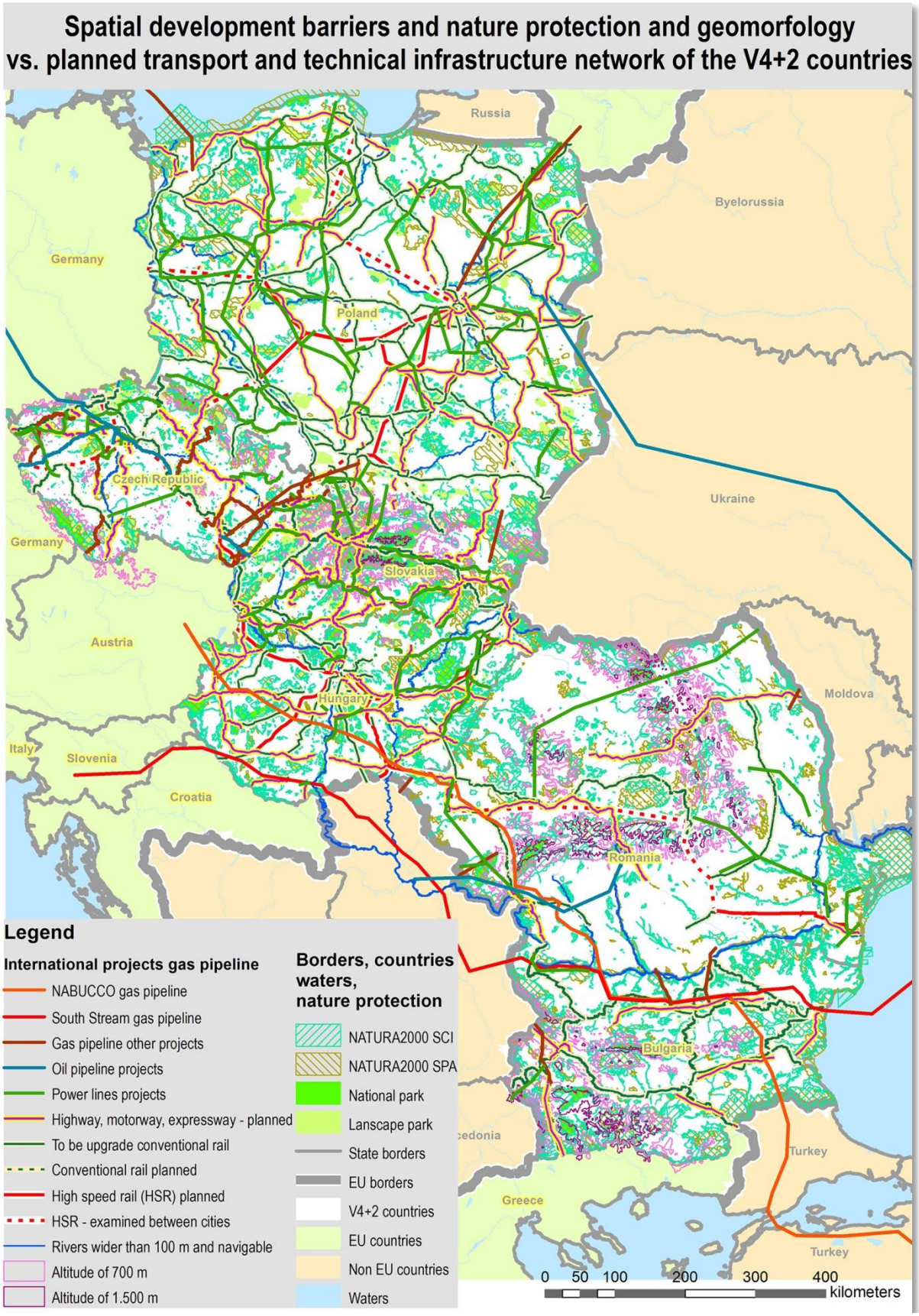


Figure 27: Barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the transport and technical infrastructure

Figure 28: External and internal natural barriers of spatial development – V4 +2 countries (including protected nature areas) in relation to intentions of the transport and technical infrastructure



III. Common Territorial Development Perspectives and Priorities of the V4+2 Countries

1 Introduction

The task to formulate the Common Spatial Development Strategy of the V4+2 Countries in the European context was assigned in the conclusions from the meeting of the ministers responsible for regional development of the Visegrád Four, Bulgaria and Romania in Budapest on 29th March 2010[9].

This requirement resulted from the cooperation of partner countries during the preparation of the "Common Spatial Development Document of the V4+2 Countries". In part 2 of this document *"Proposal for further works on the Common Spatial Development Document of the V4+2 Countries, focused on the elimination of spatial development barriers and on strengthening of spatial cohesion"*, the following recommendations are:

1. *„Raising awareness for the national approaches and processes in the field of spatial development (whose results are the national spatial development documents), with a view to facilitate further cooperation. To this the following should help:*
   - *elaboration of an overview about the spatial development systems in individual states and glossaries of special terms according to a an example made by the Hungarian side (see Annex 5 of the Common document);*
   - *constant exchange of information about works on development documents of the individual countries;*
   - *shared Internet websites for internal needs of concerned parties and public Internet websites on the Common document.*
2. *Formulation of a common spatial development strategy in European context for the territory of the V4+2 countries.*
3. *Assignment of themes, which would be a subject of further cooperation (e.g. energetic infrastructure, climate change, demography, polycentric settlement, cultural heritage, forests and other environmental values of the territory and others). That could eventually lead to a new form of cooperation, for example to a new project.*
4. *Common discussion on European planning processes in the field of spatial development (within the framework of the discussion about the updating and revision of the TEN-T network, Territorial Agenda of the European Union, Territorial State and Perspectives of the European Union, ESDP etc.).“*

In the *Common Spatial Development Strategy of the V4+2 Countries*, spatial development is perceived as a development of values and possibilities of an area, which brings prosperity to all participating partners. Spatial development of countries and regions, if to be successful and sustainable, must not occur in isolation in one region, one country, without reference to their neighbours.

2 Common starting points and experience

Spatial development is addressed by the V4+2 countries in national documents aimed at spatial planning issues and national regional policy. These national documents are being elaborated for various periods. There is an evident link of the spatial development of the individual partners to the topics of European policy, economic, social and spatial cohesion.

For the partners, the present cooperation in the questions of common spatial development has unambiguously proven to be of markedly larger contribution than just formally required procedures

[9] Ministerial conclusions from the meeting of the ministers responsible for regional development of the Visegrád Four, Bulgaria and Romania, BUDAPEST, 29. 3. 2012

of joint consultations, stipulated e.g. in European Directives for the assessment of the impacts of concepts on the environment.

From the European spatial development context[10], it is obvious that common problems are caused especially by the separation of Europe into the so-called Eastern and Western block, for more than 40 years. Although, this political as well as economic barrier ceased to exist for more than 20 years, and even though the participating countries have been part of the EU already since 2004, or 2007, the consequences of this isolation are still significant. They manifest themselves not only in regions along the former "Iron Curtain", but also in regions within the territory of the participating countries and in other countries of the former Eastern block. In comparison with the EU average, the V4+2 countries have clearly a worse accessibility of their territory on roads as well as railways. This is also associated with lower labour productivity and lower GDP, with the exception of metropolitan regions. The territory of the cooperating countries defined by significant differences in GDP towards its surroundings – a markedly lower GDP compared to the EU15, while at the same time, higher in comparison with most neighbouring states outside the EU. A depopulation trend is also evident, particularly in remote rural areas.

These characteristics of the V4+2 countries show a considerable perseverance and they cannot be successfully influenced merely by an isolated effort of the individual partners involved in the cooperation on the *Common document* and on the *Common strategy*. Important is also the cooperation of the neighbouring EU member states and the support of EU institutions. Specific as well as more demanding are the requirements on the coordination of spatial development at a tri-country border area. It would be appropriate to pay attention to such regions together with countries that do not yet participate on the *Common strategy*. For these reasons, the *Common strategy* is open to participation from other countries and orientates on the support of spatial cohesion within the EU, as well as along its outer borders.

3 Common perspectives and priorities in the European context

For the stipulation of common spatial development perspectives and priorities of the V4+2 countries is in the *Common strategy*, the European context – especially in the *Territorial Agenda of the EU 2020* - is vital. Important for the solving of spatial development problems is the support of spatial cohesion in Europe, as a new goal of the European Union[11], endeavouring to create equal opportunities for citizens and businesses, wherever they are situated[12]. To achieve spatial cohesion, it is most appropriate to adjust development opportunities to the specific features of certain areas[13]. With regard to the stated characteristics and problems of spatial development in the V4+2 countries, implementing of the *TA EU 2020* requires a specific approach.

With respect to the spatial development topics of the individual V4+2 countries in part II of the *Common strategy*, and with respect to the findings in subchapters "Limits and possibilities of solutions", specifics of their territories and regions and shared problems, the *Common strategy* cultivates those challenges and priorities, which can be effectively solved by means of a joint endeavour of several countries. Challenges and spatial priorities of the *TA EU 2020*[14], which are better solved by a self-contained approach of the individual countries, are not contained in the *Common strategy*.

[10] E.g. ESPON
[11] See the *TA EU 2020, e.g.* point 3)
[12] See the *TA EU 2020*, point 8)
[13] See the *TA EU 2020*, point 9)
[14] See the *TA EU 2020*, part II, „Challenges and potential for spatial development, Driving forces and their territorial aspects" and part III, „Spatial development priorities of the European Union"

Territorial Agenda of the European Union 2020 – II. „Challenges and potentials for territorial development; Driving forces and their territorial aspects"

For spatial development of the V4+2 countries, the following challenges from the *TA EU 2020* are seen as important:

- ***„Increased exposure to globalisation: structural changes after the global economic crisis***
  Metropolitan and other urban regions, international and global gateways are assets for the development of the whole European territory, provided that other regions benefit from their dynamism and are connected through networks. Local endowments and territorial characteristics have growing importance for regions in order to cope with and recover from external shocks.[15]
- ***Challenges of EU integration and the growing interdependences of regions***
  Cohesion at the external borders is crucial, as disparities and differences in legal, social and political systems have important consequences especially in terms of migration and trade. The growing interdependence of regions generates demand for better connectivity at global, European and national level. Integration barriers at local and regional level can result in the underutilization of human, cultural, economic and ecological resources of the border regions and increase their peripheral position and social exclusion.[16]
- ***Territorially diverse demographic and social challenges, segregation of vulnerable groups***
  Ageing and depopulation will bring about changes in many regions, including rural and peripheral regions and lead to severe impacts for social and territorial cohesion, public service provision, labour market and housing.[17]
  Exclusion from the socio-economic circuit definitely has a strong territorial character. The risk of exclusion is higher in areas with low accessibility, weak economic performance, lack of social opportunities or other particular territorial circumstances.[18]
- ***Energy challenges come to the fore and threaten regional competitiveness***
  Certain European regions face challenges of security in energy supply, as they are heavily dependent on fossil fuel imports or specialized in energy intensive activities. Significant imports from third countries vulnerable to economic or political instability increase problems for energy security. Rising energy prices and emissions draw attention to the need for sustainable energy solutions such as realising the potential of renewable energy resources and shifting towards greener, low carbon economic activities. Insufficient energy infrastructure and dependencies created by existing networks call for diversification of energy production and supply, as well as development of energy market and integration."[19]

Important is the development of energy systems and networks and the development of a competitive integrated energy market at a macro-regional level. A serious topic is to increase the resistance of the transmission systems against the risk of the so-called „black out", to increase their ability to handle big emergency energy capacities from renewable resources of energy; it is necessary to focus also on the solution of those no-continuations of energy transmission systems in the individual partner countries, which can make the overall benefit for all partners.

- ***„Loss of biodiversity, vulnerable natural, landscape and cultural heritage***
  Natural and cultural heritage are parts of territorial capital and identity. Ecological values, environmental quality and cultural assets are crucial to well-being and to economic prospects and offer unique development opportunities."[20]

The Carpathian Mountains and the Danube river valley act as a barrier, and at the same time, present significant possibilities for common spatial development (e.g. borders of the Roman empire – limes romanus etc.), orientated on tourism and recreation.

[15] See *TA EU 2020*, bod 16
[16] See *TA EU 2020*, bod 17
[17] See *TA EU 2020*, bod 18
[18] See *TA EU 2020*, bod 19
[19] See *TA EU 2020*, bod 22
[20] See *TA EU 2020*, bod 23

Territorial Agenda of the European Union 2020 – III. „Territorial Priorities for the Development of the European Union"

The following spatial priorities of the Territorial Agenda of the EU 2020 have a specific projection into the *Common strategy*:

„1. Promote polycentric and balanced territorial development

- *Polycentric territorial development policy should foster the territorial competitiveness of the EU territory also outside the core 'Pentagon area'.*[21]
- *Policy efforts should contribute to reducing the strong territorial polarisation of economic performance, avoiding large regional disparities in the European territory by addressing bottlenecks to growth in line with Europe 2020 Strategy."*[22]

Common long-term spatial development perspective of the V4+2 countries

It aims to help such a dynamic development, that will be less vulnerable and more resilient against possible economic turmoil. The polycentric development should be taken into account at the national, regional and also macro-regional level. The main incentive of the economic development, spatial cohesion and cooperation at a European level should be the strengthening of mutually beneficial relations between metropolitan and urban regions and between medium and large cities.

Cooperation between metropolitan areas of the V4+2 countries

In Central and Eastern Europe (Warszawa, Budapest, Praha, Bratislava, Sofia and Bucureşti), we can watch the emergence of new metropolitan areas, which has a slightly balancing effect at the level of the European cities network. It is necessary to strengthen the cooperation between the metropolitan areas of the V4+2 countries, which should be forming networks as to be able to act as centres contributing to the development of broader regions.

For a safer and less vulnerable development of the EU, it is important to divide activities into several dynamic areas. The long-term aim is to diversify economic activities of the EU, currently predominantly found only in the EU Pentagon. This requires a continuous and purposeful endeavour to create conditions for utilisation of possibilities of the development of further dynamic areas of an all-European importance and their interconnection with the original areas.

„2. Encouraging integrated development in cities, rural and specific regions

- *Rural, peripheral and sparsely populated territories may need to enhance their accessibility, foster entrepreneurship …….*
- *Special attention may need to be paid to underdeveloped peripheral rural and sparsely populated areas where disadvantaged social groups ……*
- *In rural areas where agriculture and forestry are still important forms of land use, modernisation of the primary sector ……"*[23]

Release of the potential of special rural V4+2 regions

Many rural areas of the V4+2 countries have significant cultural and natural richness. In accordance with partners, it is necessary to delineate specific rural areas stretching beyond states´ borders, which require joint attention. In rural areas of the V4+2 countries, possibilities of their development (e.g. rural tourism, cross-border cooperation, economic diversification – local products and alternative agriculture, recreational functions) have to be identified.

A problem lies in the strengthening of the accessibility of rural areas, which belong to important factors of business development and which contribute to an increase in using these areas for recreational purposes.

[21] See *TA EU 2020*, bod 25
[22] See *TA EU 2020*, bod 26
[23] See *TA EU 2020*, bod 28

Special attention has to be paid to run-down peripheral rural areas in which the number of inhabitants from disadvantaged social groups is rising. These people often suffer in consequence of segregation, a lack of work places and poverty.

Other types of rural areas, which face a serious depopulation, need long-term solutions in order to maintain their economic activity. This can be done through the creating of work places, attractive living conditions and by providing public services to inhabitants and businesses.

The Carpathian Mountains and the river Danube

The main natural potentials and current barriers of spatial development of the V4+2 countries are formed by the Carpathian Mountains and the river Danube.

The Carpathian Mountains are a common area of interest to the V4+2 countries. In this territory, many demographical, ecological and economic problems are situated, which can be effectively solved through common tools (e.g. strategies, plans, programmes). At the same time, it is a unique mountain area in Europe, where a significant part of the natural and cultural heritage of the V4+2 countries, can be found. However, the Carpathians stretch to Hungary only with a less extensive lower part and they do not reach into Bulgaria. Nevertheless, the mountain range on its territory is of the same geological origin and its problems, as well as potentials, are practically identical, as in the case of the Carpathians. Leading of the corridors of transport and technical infrastructure across the Carpathian ridges is dependent on relatively sparse defiles and passes, which is especially the case of the Slovak-Polish borders and the inland areas of Slovakia and Romania.

The river Danube has, apart from its incredibly valuable wetlands, also an important function in terms of the European river boat transport. Danube acts also as a barrier, particularly on the Hungarian-Slovak borders and Romanian-Bulgarian borders, as well as within Hungary and Romania.

„3. Territorial integration in cross-border and transnational functional regions

- *……. the integration of territories through territorial cooperation can be an important factor in fostering global competitiveness. Attention shall be paid to areas along external borders of the EU in this regard."*[24]

Integration of an area through a jointly coordinated spatial planning, can be an important factor in strengthening the competitiveness of the V4+2 region. Recently, comprehensive strategies for macro-regions are being introduced, with the aim to coordinate the measures and policies of member states, regions, international organisations, financial institutions and non-governmental organisations. These is also an urgent need to coordinate planning and development activities in the V4+2 countries. Specific territorial features of the V4+2 region have to be more highlighted in spatial development policies at the EU level and in all relevant programmes (e.g. ESPON).

A common procedure is recommended namely in these areas:

- transnational cooperation: placing the V4+2 region into the spatial structure of Europe, with a special regard to the fact that its territory is connected by the Danube and the Baltic Sea macro-regions;
- cross-border agglomerations and functional regions: preparation of cross-border spatial visions and strategies, which will be taken into account in macro-regional and national spatial development documents, as well as in sectorial plans and in the assessment of the impacts; regular cross-border refinement of all plans and measures regarding spatial development; elaboration of common cross-border regional plans, and possibly spatial studies, as the closest form of cross-border cooperation in the field of spatial development;

[24] See *TA EU 2020*, bod 31

- cross-border peripheral areas, whose development lags behind, and which are characterised especially by an ageing population and depopulation, high rate of unemployment and by a concentration of vulnerable groups and ethnic minorities;
- planning of the protection and touristic use of protected areas along the common border, including the metropolitan areas of growth and areas affected by industrial restructuring.

Coordination of approaches that ascertain spatial development problems

It is necessary to better synchronise the ascertaining and the accessible databases on spatial development and the using of existing databases (e.g. ESPON). The aim is to provide comparable information, analyses and scenarios of options and dynamics of spatial development.

„5. Improving territorial connectivity for individuals, communities and enterprises

- *…….. fair and affordable accessibility to services of general interest, information, knowledge and mobility are essential for territorial cohesion. Providing services and minimising infrastructure barriers can improve competitiveness, and the sustainable and harmonious territorial development of the European Union. Among others it is important to secure access to road, rail, water-based and air transport, and to other infrastructure facilities such as broadband and trans-European energy networks. We support decentralized, efficient, secure and environmentally-friendly production and use of renewable and low carbon energy.*[25]
- *The increasing importance of global linkages creates the need for balanced intercontinental traffic including greater use of overland connections with Asia. Further development of Trans-European networks (TEN-T) linking the main European centres, such as capitals, metropolitan regions and TEN-nodes and improving linkages between primary and secondary systems should be an essential component of the integrated network."*[26]

It is, among others, necessary for improvement of transport networks and guaranteed energy security of V4+2 countries to respect the fundamental tasks of given documents of the TEN-T revision and of Regulation (EU) No 347/2013 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure.

In comparison with other EU countries, the territory of the V4+2 countries notably suffers from a lack of capacity transport infrastructure and as a result of this, there is a poor accessibility. Capacity interconnections of metropolitan and other urban regions, which are a source as well as a goal of the international cooperation are necessary for the development not only on the V4+2 territory, but also for the development of the neighbouring regions. Common spatial development, strengthening the economic, social and spatial cohesion, is conditioned by a common approach, focused especially on the development of transport infrastructure links between development poles as the main networks of cities and regions; there is a strong need of a capacity transport interconnection, which will overcome the existing barriers between the individual cooperating countries, as well as improve links of their regions, metropolitan areas, strengthen territorial cooperation of developing areas, networks of urban and rural areas with regions of the surrounding countries[27]. This will not do without targeted investments in transport and technical infrastructure.

It is necessary not only to improve the connection of transport infrastructure in the direction North-South within the framework of the V4+2 countries, but of the same importance is also a capacity connection in the direction East-West enabling the development of links between the EU and its surroundings. For the purpose of reaching this aim, it is necessary to focus also on solving those no-continuations of transport networks that can determine the overall contribution to all partners.

[25] See *TA EU 2020*, bod 35

[26] See *TA EU 2020*, bod 36

[27] The starting point is the White Paper – Roadmap to a single European Transport Area, which aims not only at eliminating the key barriers in areas, but also at creating a competitive transport system, effectively using resources.

Improving relations between primary and secondary systems are important for the V4+2 countries´ integration into European transport networks and for ensuring of an energy security of the V4+2 countries.

4 Further cooperation of the V4+2 countries in the field of spatial development

Further cooperation, apart from the above mentioned perspectives and priorities, should be focused on:

- mutual awareness about new/updated spatial development documents, particularly with regard to the impacts of development intentions on neighbouring states;
- cooperation in border areas, in a special view of the territory, where the borders of three countries meet, e.g. through the elaboration of common studies of development;
- stipulation of themes, which should be the subject of further cooperation and the solution of which would require an elaboration of a common project;
- possible update of the *Common Spatial Development Strategy of the V4+2 Countries*, if the participating countries will regard it as purposeful.

Attachment 1

Current state of solving development axes no-continuations

The Common Spatial Development Document of the V4 +2 Countries (hereinafter also *Common Document*) defines in a unified manner development poles and development axes on a territory of the V4+2 countries and identifies their no-continuations.

In the period between 2010 and 2013 some identified no-continuations were resolved or further specified.

During 2012 bilateral meetings between neighbouring states were held and following conclusions were reached.

Comparing the status of 2010 and 2013 (division and markings are taken from the *Common document*):

Absence of a development axis on one side of national border

A. Between **Bulgaria and Romania, direction Vidin – Craiova – Timişoara** (no Romanian axis is connected to the main Bulgarian axis), see Fig. 1 – **X1**.

The parties agreed to resolve this no-continuation by the recommendation that the **new axis on the Romanian side in the direction of Calafat – Craiova** should be incorporated into Romanian Spatial Development Strategy during its processing. Furthermore, transport network TEN-T and the new bridge over the Danube, linking Calafat and Vidin, should be taken into account.

B. Between **Slovakia and Poland, direction Žilina – Katowice** (no Polish axis is connected to the Slovakian secondary axis).

A secondary development axis in the direction to Žilina is incorporated in approved *KPZK 2030*; this axis remained in the updated *KÚRS 2011*. It can be said that **this no-continuation is resolved.**

C. Between **Slovakia and Poland, direction Ružomberok – Kraków** (no Polish axis is connected to the Slovakian secondary axis).

A development axis in the direction to Ružomberok is incorporated in the approved *KPZK 2030*; this axis remained in the updated *KÚRS 2011*. It can be said that **this no-continuation is resolved.**

D. Between **Slovakia and Hungary, direction Lučenec – Salgótarján** (no Hungarian axis is connected to the Slovakian secondary axis).

In the Hungarian *National Spatial Development Concept* this development axis is included and the fact that on the Slovakian side, this route is a secondary axis, has been considered. **The no-continuation has been resolved.**

E. Between **Bulgaria and Romania, direction Varna – Constanţa** (no Romanian axis is connected to the Bulgarian secondary axis), see Fig. 1 – **X3**.

The parties agreed to resolve this no-continuation by a recommendation that during processing of the Romanian Territorial Development Strategy a new axis on the Romanian border in the direction of Constanţa – Mangalia – Varna should be included in it.

No-continuations caused by the interference of various categories of development axes on national borders

1. Between **Poland and Slovakia, direction Rzeszów – Prešov** (Slovakian secondary axis is connected to the Polish main axis).

   This axis has been promoted to the main axis in the updated *KÚRS 2011*, but conversely, in the *KPZK 2030* this axis was intended as a secondary one, particularly for nature and landscape protection reasons. However, the development axis as a whole has been preserved, **it is not a no-continuation**, but there is a different perception of its importance in the individual countries.

2. Between **the Czech Republic and Slovakia, direction Zlín – Žilina** (the Czech main axis is connected to Slovakian secondary axis).

   This axis has been changed to a main axis in the *KÚRS 2011*, **the no-continuation has been resolved**. The Slovak party recommended changing the direction to Zlín – Púchov, because on the Slovak territory this axis divides only beyond Púchov in the direction to Žilina and Bratislava. The Czech party agrees, in the *PÚR ČR 2008* this axis is marked as Zlín – the CR border / Slovakia (– Púchov).

3. Between **Slovakia and Hungary, direction Bratislava – Győr** (Hungarian secondary axis is connected to the Slovakian main axis).

   The Hungarian *National Spatial Development Concept* has upgraded this axis to a main axis; **the no-continuation has been eliminated**.

4. Between **Slovakia and Hungary Košice – Miskolc** (Hungarian secondary axis is connected to the Slovakian main axis).
   The Hungarian *National Spatial Development Concept* has upgraded this axis to a main axis; **thus the no-continuation has been eliminated**.

5. Between **Romania and Hungary, direction Oradea – Debrecen** (Hungarian secondary axis is connected to the Romanian main axis).

   The Hungarian *National Spatial Development Concept* has upgraded the Debrecen – Oradea axis to a main axis; **the no-continuation has been eliminated.**

6. Between **Romania and Hungary, direction Arad – Szeged** (Hungarian secondary axis is connected to the Romanian main axis).

   The Hungarian National Spatial Development Concept has included the **Szeged – Arad – Timişoara** axis and has considered the fact, that on the Romanian side it is a main axis; **the no-continuation has been eliminated.**

New ideas that weren´t sufficiently discussed with a neighbouring state at the time of the completion of the work on the Common Document

I. Between **the Czech Republic and Poland, direction Wroclaw – Brno**, see Fig. 1 – **X1**
This is taken as a secondary axis in the KPZK 2030, due to the expected North-South linkage Poznań – Wien.

On the Czech side, only a railway link is expected and the railway has not a development effect of such importance to propose a development axis here. A linking of roads is not possible due to nature and landscape protection reasons. The Czech side will examine it within the framework of the *A-PÚR ČR*.

II. Between **Hungary and Romania, direction Nyíregyháza – Satu Mare**, see Fig. 1 – **X2**

The parties agreed to propose this development axis during the processing of the new Hungary *National Development and Territorial Development Concept* and the new Romanian *Strategy for Territorial Development of Romania.*

III. Between **Hungary and Romania,** direction **Szeged – Timisoara**

See point 6.

Identification of new no-continuations arising from new / updated documents

In the period between Common Spatial Development Document issuance and the processing of this document Polish *National Spatial Development Concept 2030* (*KPZK 2030*) was accepted in Poland, while *Spatial Development Concept of Slovakia 2001* (*KÚRS 2011*) was updated in Slovakia.

a) In the *KPZK 2030* the **Kraków – Prešov** development axis was defined as a main axis, in the *KÚRS 2011* as a tertiary axis. Neither of these countries **considers this situation as a non-continuation** but as a different perception of importance in the individual countries.

b) In *KPZK 2030* is incorporated secondary axis due to the expected east-west linking **Kraków – Praha**, see Fig. 1 – **X4.**

Czech side will examine an incorporation of this axis within the *A-PÚR ČR*.

Other no-continuations have not been determined.

Attachment 2

Current state of transport networks no-continuations

1 Primary no-continuations resulting from the *Common document*

Comparison of the state in 2010 and 2012 (classification and marking is taken over from the *Common document*)

1.1 No-continuation due to an absence of a transport network

Railway network

A. Between **the Czech Republic and Poland** in the direction **Ostrava – Katowice** (no Polish high speed line is connected to the Czech planned high speed line; so far, the Polish line ends in Katowice).

In the document KPZK 2030, it was removed on the Polish side, where it is still in a phase of an entry analysis. The solving is planned for the third stage of the concept. However, the input of the KPZK 2030 of December 2011 has not yet projected itself in the proposal of the TEN-T revision, unlike the new interconnection Praha – Wrocław.

The no-continuation has been partly resolved.

B. Between **Hungary and Slovakia** in the direction **Győr – Bratislava** (no Slovakian high speed line is connected to the Hungarian planned high speed line, see Fig. 2, no-continuation A) – the situation persists, no change is expected, though this could change with the results of the TEN-T revision negotiations. The solution was found on the Internet, directly within the railway junction Bratislava (TEN-T: high speed line until 2015: Petržalka – Filiálka – Rača and Hlavná stanica – Nové Město – Letisko), which acts more as a link of important stations in Bratislava, but without a solution to the no-continuations with the neighbouring states.

The identified no-continuation persists.

C. Between **Hungary and Romania** in the direction **Szeged – Arad – Timişoara** (no Romanian high speed line is connected to the Hungarian planned high speed line). The issue of the necessity of a connection has already been dealt with even before the V4+2 project, but currently, because of the unclear situation regarding the corridor on the Romanian side, only junction nodes Arad – Timişoara – Bucureşti – Constanţa are known, without a precise determination of a transfer point at the borders. Despite some problems, both parties agreed that this no-continuation has been resolved. However, the corridor is part of the TEN-T revision proposal, though only in a schematic depiction.

The no-continuation is resolved.

1.2 Interference of different categories of transport networks on state borders

Road network

A. Between **The Czech Republic and Poland** in the direction **Mohelnice – Opole** (a Polish road of lesser importance is connected to a Czech planned transnational main road). The Polish party does not consider a change of the category of a linking road. V rámci *A-PÚR ČR* bude prověřeno řešení bez přeshraničního propojení do Polska. Of crucial importance for an inclusion in the *PÚR ČR 2008* was, above all, the overcoming of the Jeseníky massif as an inner natural barrier and the improving of the link with the remote Jesenicko area with the Czech national road network. An improvement of links to Poland was merely an addition to the solution.

The no-continuation is being solved by the Czech party.

B. Between **Hungary and Slovakia** in the direction **Esztergom – Štúrovo** (a Slovakian road of lesser importance is connected to a Hungarian planned motorway, see Fig. 3, no-continuation A). During the period 2020-2030 a construction of a bridge between the two above mentioned cities, in this border area, is to take place. Ont the Hungarian side it would be a motorway, on the Slovakian side a primary road, whereby this no-continuation would not be resolved. However, if the Hungarian party would – contrary to expectations – build only a primary road, same as Slovakia, then the problem of this no-continuation would be resolved.

The identified no-continuation persists.

C. Between **Hungary and Romania** in the direction **Nyíregyháza – Satu Mare** (a Romanian road of lesser importance is connected to a Hungarian planned motorway). Romania has been considering the Baia Mare – Satu Mare – Petea express road (on the Romanian-Hungarian borders) since 2007. Later, the Hungarian party discovered a problem with the trespass of the Natura 2000 site, near the border, and so the connection point was moved 10km to the South. Currently, a discussion of the new corridor on the Hungarian side is awaited and subsequently a new meeting to determine the point of crossing. Further, the completion of the planned change of the corridor on the Romanian side is expected. Both parties are in agreement about the category, only the suitable transfer point of the motorway is being discussed. This motorway was not included in the TEN-T, not even in its revision. But given the number of crossings and the significance of the settlements, this link is of an international importance.

The no-continuation is resolved.

D. Between Hungary and Romania in the direction **Békéscsaba – Chişineu Criş** (a Romanian road of lesser importance is connected to a Hungarian planned motorway, see Fig. 3, no-continuation B). On the Romanian side, there is a possibility of a link with the Hungarian side, as the planned motorway Arad – Oradea in the TEN-T network passes just 25 km from the border. However, the intention of the Hungarian party regarding the motorway, reportedly after the issuing of the Government Resolution No. 1222/2011 (VI. 29), does not mention the corridor Békéscsaba – Chişineu Criş as an express transport corridor, which is contrary to the background material that we have received from the Hungarian party within the framework of the V4+2. What emerges from this is that there is no no-continuation and possibly there never was one, because neither party plans an motorway in this corridor, though the Hungarian party admits the possibility of an extension (which according to www.mapy.cz took place at least in the section Békéscsaba – Gyula, however, there is no similar section in the surrounding area; the above mentioned section has four-lanes, but it is not certain if it has the character of an motorway). Nevertheless, following a mutual negotiation, the parties agreed to look for a common solution.

The no-continuation is being solved; both parties exchanged their first points of view, negotiations continue.

E. Between **Bulgaria and Romania** in the direction **Shumen – Călăraşi** through **Silistra** (a Romanian road of lesser importance is connected to a Bulgarian road of transnational importance, see Fig. 3, no-continuation C). It has not been decided whether the no-continuation is merely an issue of a terminology discord, or whether the Bulgarian "new road of transnational importance" is defined in the strategic documents as transnational. This is currently being the subject of further negotiations between the Bulgarian and Romanian parties at the level of the ministries of transport, which will subsequently submit reports to the resorts participating on the V4+2. Even so, both parties agreed that there will still be the natural barrier, as there is no bridge across the river Danube in this corridor (see chapter 6. Barriers).

The identified no-continuation persists.

2 New incentives, which were not sufficiently discussed with the neighbouring state at the time of the completion of the works on the *Common document*

2.1 No-continuation due to an absence of a transport network

Road network

- The first no-continuation ascertained from the new Polish document has already been discussed at the end of July 2012 within the V4+2, namely the expressway **Wrocław – Kłodzko – Polish / Czech border**, see Fig. 3, no-continuation D, where the Czech party reminded the Polish party that they have a barrier (see chapter 6 Barriers) in an area with a favourable terrain (pass), which is formed mainly by the Natura 2000 sites, or possibly in the future the prepared PLA. A further reason can also be a low intensity of use of the existing transport routes as well as a low intensity of land use. Despite these arguments, the Czech party decided that this development intention will be examined within the *A-PÚR ČR*.

  The no-continuation will be examined by the Czech party.

3 Identification of possible new no-continuations resulting from new / updated documents

3.1 No-continuation due to an absence of a transport network

Railway network

High-speed railway Wrocław – Praha

No-continuation is caused by the fact that in 2011 the document *KPZK 2030* was formulated in Poland, in *SDP CR* this intention is not mentioned (see Fig. 2, no-continuation B). Transport connection is subject of solution of *A-PÚR ČR*. Dopravní spojení je prověřováno v *A-PÚR ČR.*

The problem of no-continuation and also the whole intention will have to be discussed.

Inland waterways

- **Odra – Váh** canal link (see Fig. 4, no-continuation A)

  The common meeting (July 2012) did not bring an agreement, it was only stated that the Czech-Slovakian as well as Polish-Slovakian interconnection is possible.The government of the CR imposed in the *Report on implementation of the SDP CR 2008* to exclude this intention from the *A-PÚR ČR*. Poland considers this intention to be surpassed and it cannot be found in the *KPZK 2030*. Slovakia, on the contrary, insists upon its preserving and has it in its development documents.

  The problem of no-continuation and also the whole intention will have to be discussed.

3.2 Interference of different categories of transport networks on state borders

Inland waterways network

- **Dunaj–Odra–Labe** canal link

  The Polish document *KPZK 2030* still indicates a part of the Odra river as regional waterways. Therefore, this regional part of the Odra river is not included even in the TEN-T revision. Since the canal link is prepared as an international connection, at least in Poland this objective would not be achieved.

  The government of the CR by its resolutions imposed to defend the territory in form of territorial reserve in planning documentation and to discuss the corridor with representatives of affected countries and signatories of the relevant agreements. In particular, additional land protection within confirmation of the long-term character of an intention (e.g. after 2050) is

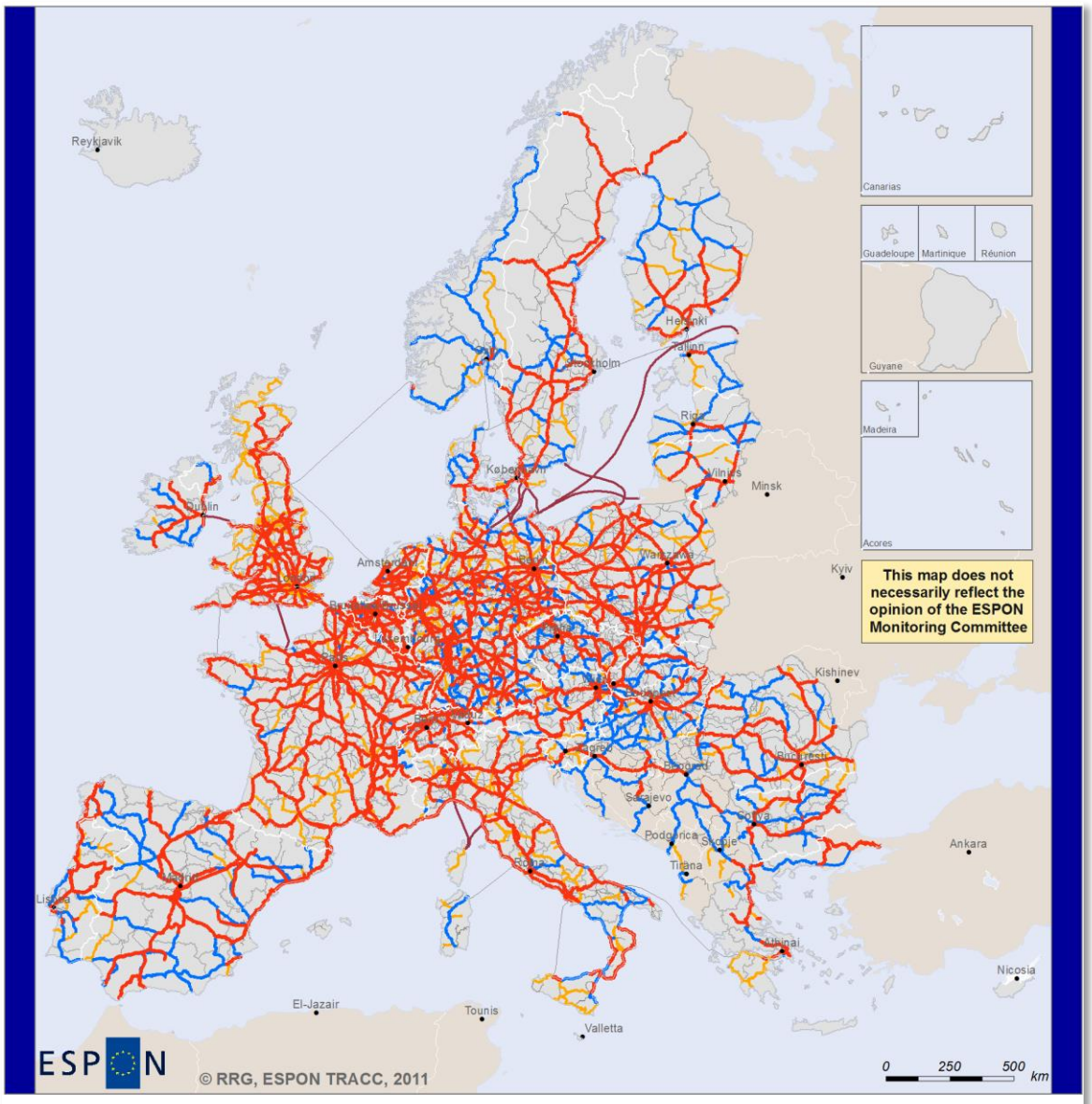
problematic in the Czech Republic because of a territorial protection of the canal connection has lasted for more than 40 years and much of the area is thus unusable. The government of the CR imposed in the Report on implementation of the SDP CR 2008 to examine a usefulness of a definition of this canal connection.

The problem of this no-continuation as well as the whole intention and its time horizons will have to be discussed.

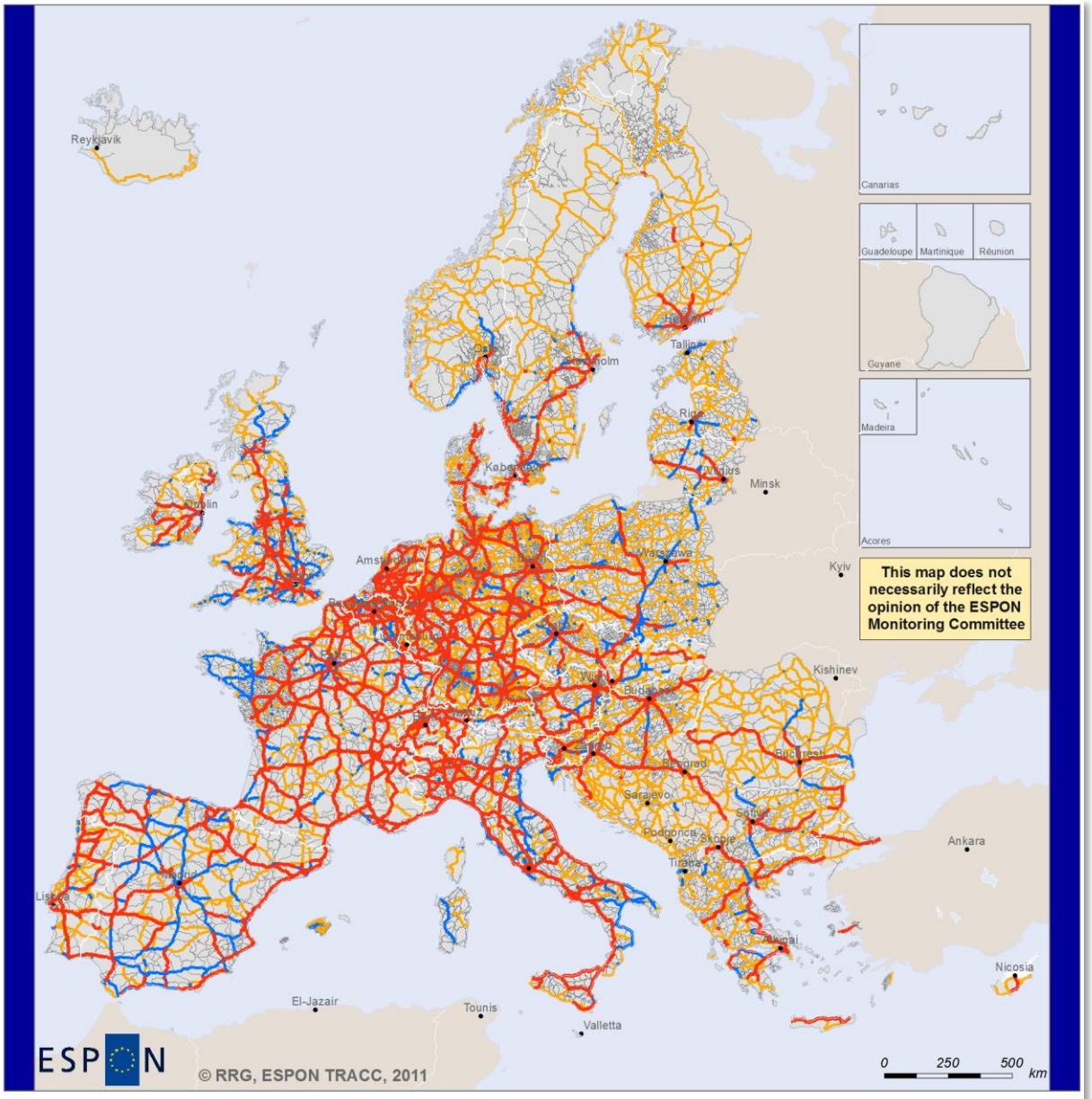
Attachment 3

State of the European transport network according to the ESPON programme

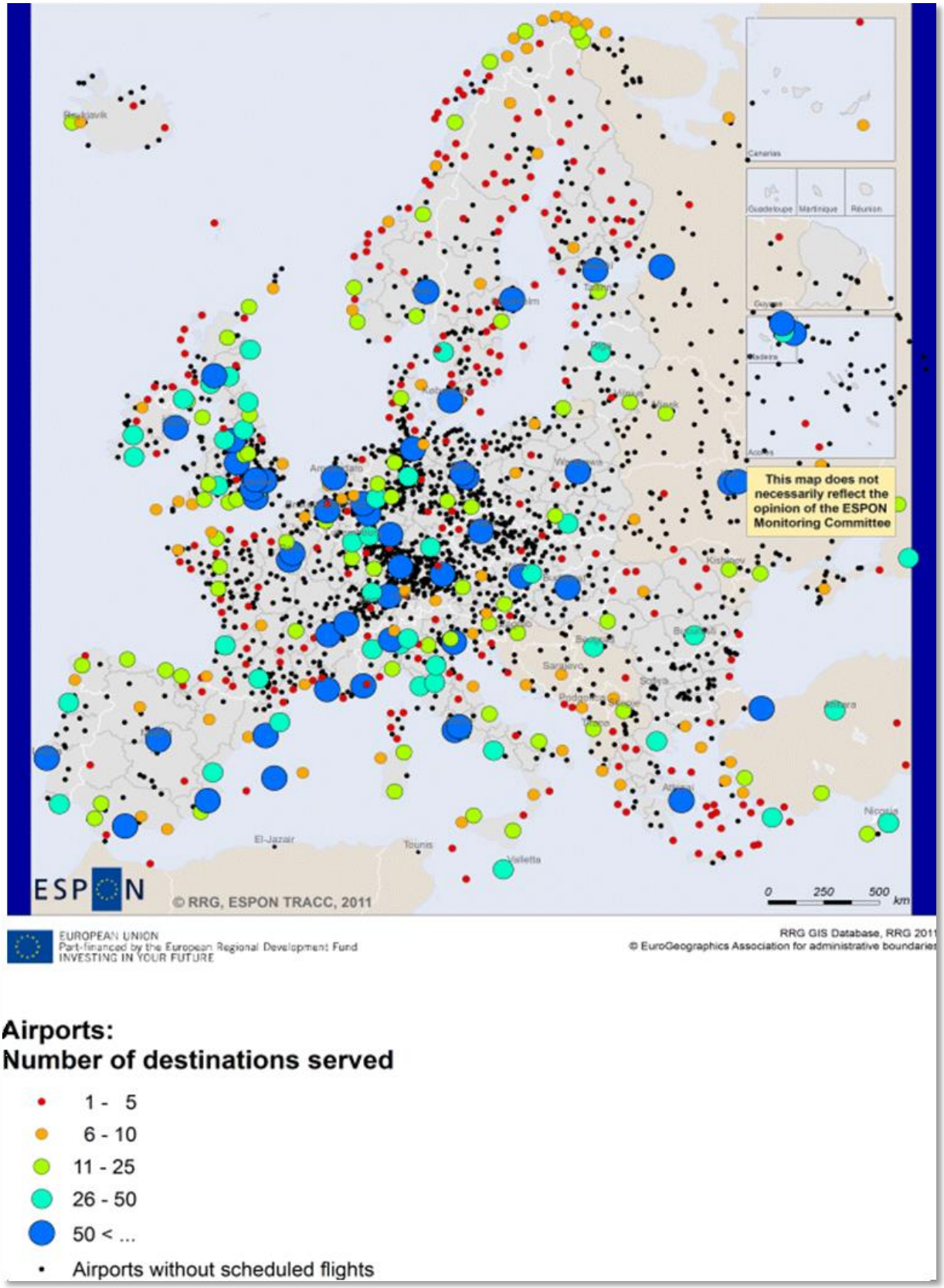
1 Rail network



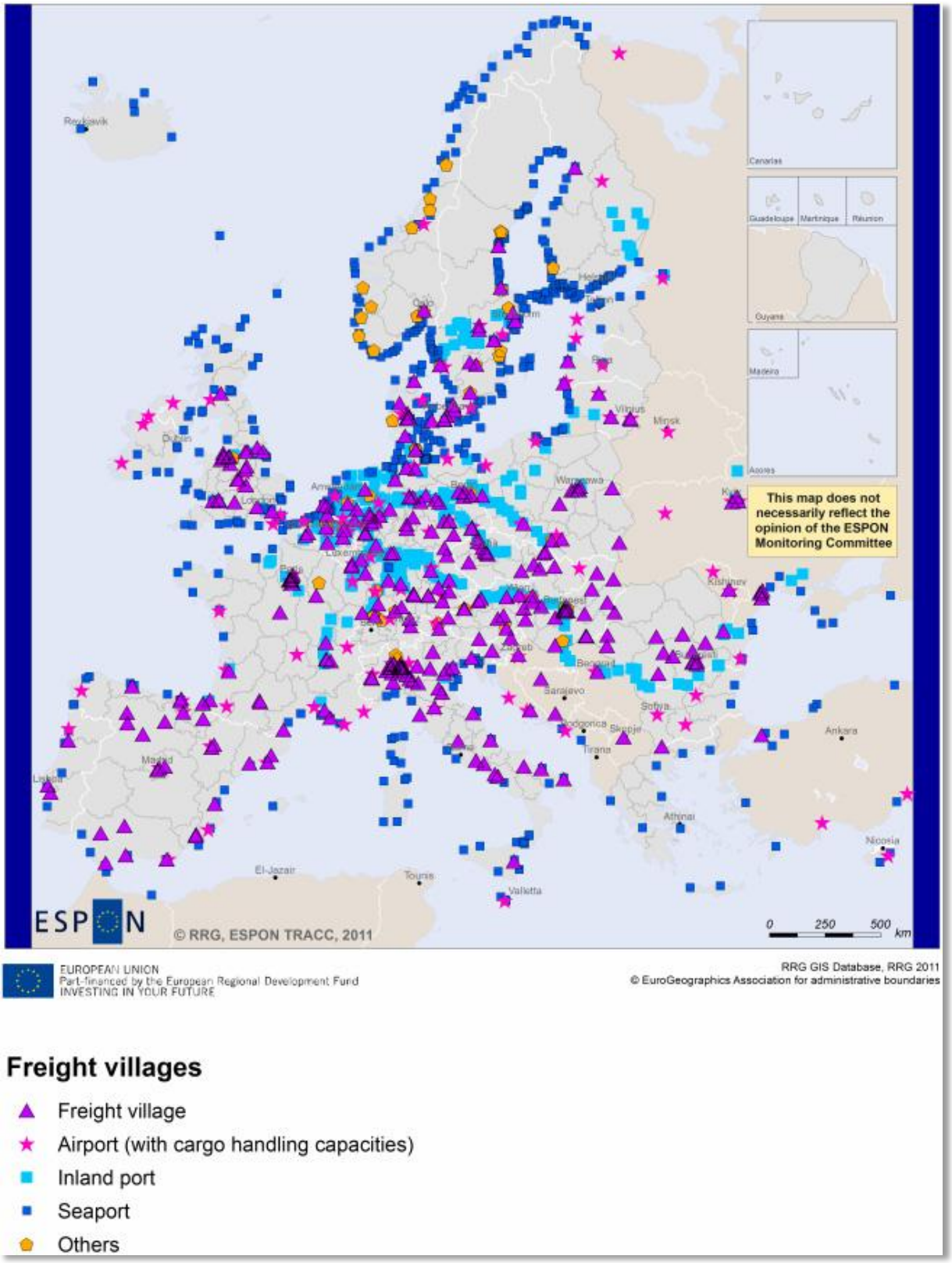
2 Road network



3 Airports


This map does not necessarily reflect the opinion of the ESPON Monitoring Committee
ESPON
© RRG, ESPON TRACC, 2011
0 250 500 km
EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE
RRG GIS Database, RRG 2011
© EuroGeographics Association for administrative boundaries
Airports:
Number of destinations served
1 - 5
6 - 10
11 - 25
26 - 50
50 < ...
Airports without scheduled flights

4 Freight villages



Attachment 4

List of relevant documents

The document title	Country / published	Date of approval/ /discussion (update)
Common Spatial Development Document of the V4+2 Countries	the Czech Republic, Hungary, Poland, Slovakia, Bulgaria, Romania	29. 3. 2010
www.v4plus2.eu	the Czech Republic, Hungary, Poland, Slovakia, Bulgaria, Romania	
Territorial Agenda of the European Union 2020 (TA EU 2020)	/ EU	19. 5. 2011
Territorial State and Perspectives of the EU	/ EU	2011
„WHITE PAPER“, the Roadmap to a Single European Transport Area – establishing a competitive transport system that would use resources effectively	/ EU	March 2011
Europe 2020 Strategy	/ EU	2010
Directive 79/409/EEC of 2nd April 1979 on the conservation of wild birds (the Birds Directive)	/ EU	2. 4. 1979
Directive 92/43/EEC of 22nd May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)	/ EU	21. 5. 1992
Regulation of the European Parliament and of the Council (EU) No 1315/2013 of 11th December 2013, on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU (TEN-T revision)	/ EU	11. 12. 2013
TEN-E Trans-European energy networks	/ EU	6. 9. 2006
Outputs from the ESPON programme	/ EU	
National Concept for Spatial Development for the period 2013–2025 (NCSD)	Bulgaria	5. 11. 2012
Spatial development policy of the Czech Republic 2008 (PÚR ČR 2008)	the Czech Republic	20. 7. 2009
Updating of the Spatial Development policy of the Czech Republic 2008 (A-PÚR ČR)	the Czech Republic	preparation
Transportation Policy of the Czech Republic for 2014–2020	the Czech Republic	12. 6. 2013
National Energy Policy of the Czech Republic	the Czech Republic	10. 3. 2004 updating in preparation
Transport sector strategies, 2nd phase	the Czech Republic	13. 11. 2013
National Development 2030 – National Development and Territorial Development Concept (NDTDC)	Hungary	December 2013
National Transport Strategy of Hungary	Hungary	
National Spatial Development Concept 2030 (KPZK 2030)	Poland	13. 12. 2011
Strategy of Transport Development to 2020 (with perspective to 2030)	Poland	30. 3. 2011

Strategy for Territorial Development of Romania (in preparation)	Romania	preparation
Spatial Development Concept of Slovakia 2001, as amended by the KÚRS 2011	Slovakia	14. 8. 2002 updating 16. 11.2011
Ramsar Convention on Wetlands	160 countries / Iran	2. 2. 1971 editing 1982
Directive on effective management and categorisation of protected areas	/ IUCN	2000