ESPON

Michael Wegener

High-Speed Rail and Spatial Scenarios for Europe 2050

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EUROPEAN UNION
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Objective of this presentation

The objective of this presentation is to continue Francesca Pagliara's presentation by forecasting the impacts of ***high-speed rail projects*** on

- ***economic development***,
- ***spatial equity*** and
- ***environmental sustainability***

in the territory of the ***European Union*** based on the ESPON project ***ET2050*** (*Territorial Scenarios and Visions for Europe*) conducted 2011-2014.

The ESPON Project ET2050

The ESPON project ET2050

The objective of the ESPON project ET2050 was to develop a ***vision of the spatial structure of Europe*** based on scientific evidence.

In a ***participation process*** several groups of actors were involved in the development of the vision in order to extend ***thematic***, ***temporal*** and ***spatial*** horizons by a ***vision of the future*** going beyond sectoral, short-term and national aspects.

The ESPON project ET2050

Project partners were research institutions from

- Belgium
- France
- Germany
- Greece
- Hungary
- Italy
- Netherlands
- Poland
- Spain
- Sweden

under the leadership of MCRIT (Spain)

The ESPON project ET2050

The task of the German project partners was to ***model*** the spatial development of the European continent until the year 2050 based on assumptions about

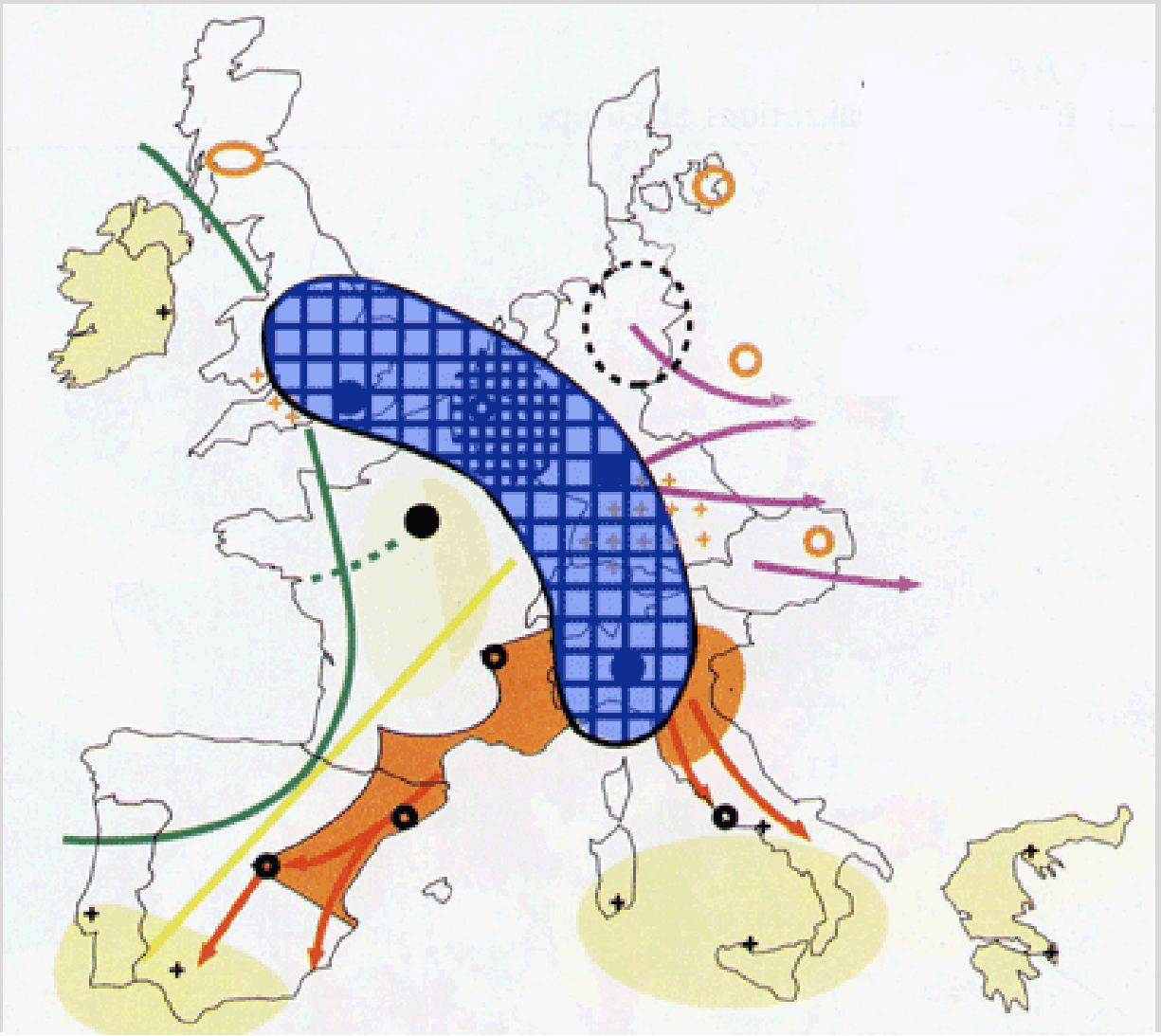
- ***structural and cohesion policy*** of the EU
- implementation of the ***Transeuropean Transport Networks***

High-speed rail was one of the main components of one of the analysed scenarios.

Spatial Concepts for Europe 1989-2020

The "Blue Banana" (1989)

The "Blue Banana" (RECLUS, 1989)



Kunzmann's "Bunch of Grapes" (1991)

The European bunch of grapes (Kunzmann and Wegener, 1991)

The ESDP (1999)

The ***European Spatial Development Perspective*** (***ESPD***) was agreed upon by the Council of Ministers responsible for planning in Leipzig in 1999.

The ***main objectives*** of the ESDP were:
- ***polycentric***, balanced development,
- promotion of ***endogenous*** development,
- partnership between ***city*** and ***countryside***,
- integration of European ***transport planning***,
- efficient/sustainable use of ***infrastructure***,
- preservation of the ***natural heritage***.

The Territorial Agenda 2020 (2011)

Based on the Europe-2020 strategy, in 2011 the ministers responsible for planning agreed on the ***Territorial Agenda 2020*** (***TA 2020***).

The ***main objectives*** of the TA 2020 are:
- ***polycentric***, balanced development,
- integrated development of ***city*** and ***countryside***,
- ***transborder*** and ***transnational*** co-operation,
- global ***competitiveness***,
- ***connectivity*** between regions,
- ***ecological*** and ***cultural*** values,
- long-term ***sustainable*** development.

The Territorial Agends 2030 (2020)

Presently an update of the Territorial Agenda 2020, the ***Territorial Agenda 2030*** is under study. The new agenda has ***six priorities***:

- ***a just Europe***
- ***a balanced Europe***
- ***integration beyond borders***
- ***a healthy environment***
- ***a circular economy***
- ***sustainable connections***

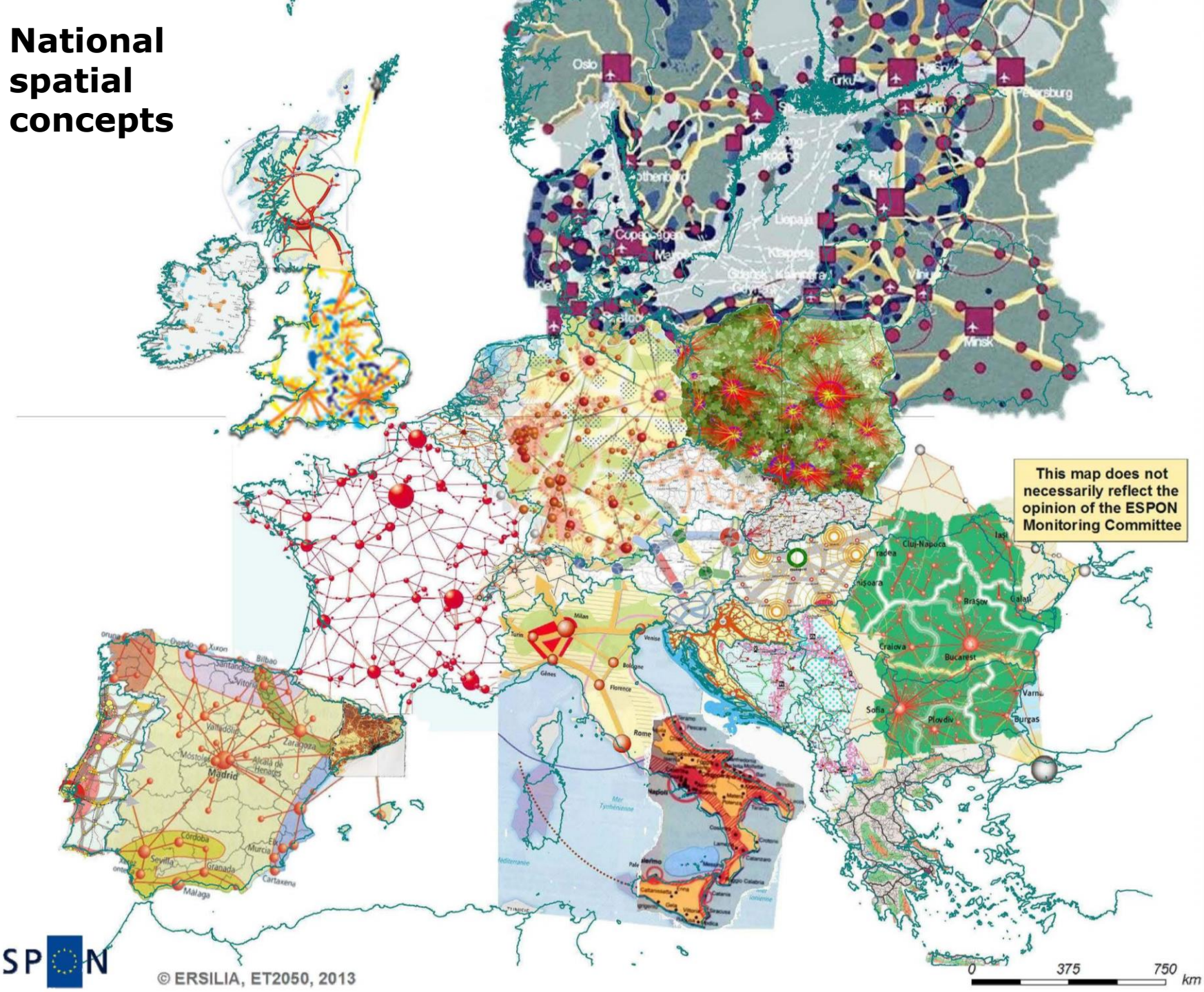
National spatial concepts

Independently from the development at the EU level, the EU member states developed their own ***national spatial concepts*** according to their historical spatial structure and planning culture.

There is to date ***no co-ordination*** between the spatial concepts of the EU member states.

The map on the following slide gives an overview about the existing ***national spatial concepts*** in Europe (Source: ERSILIA, 2013).

National spatial concepts

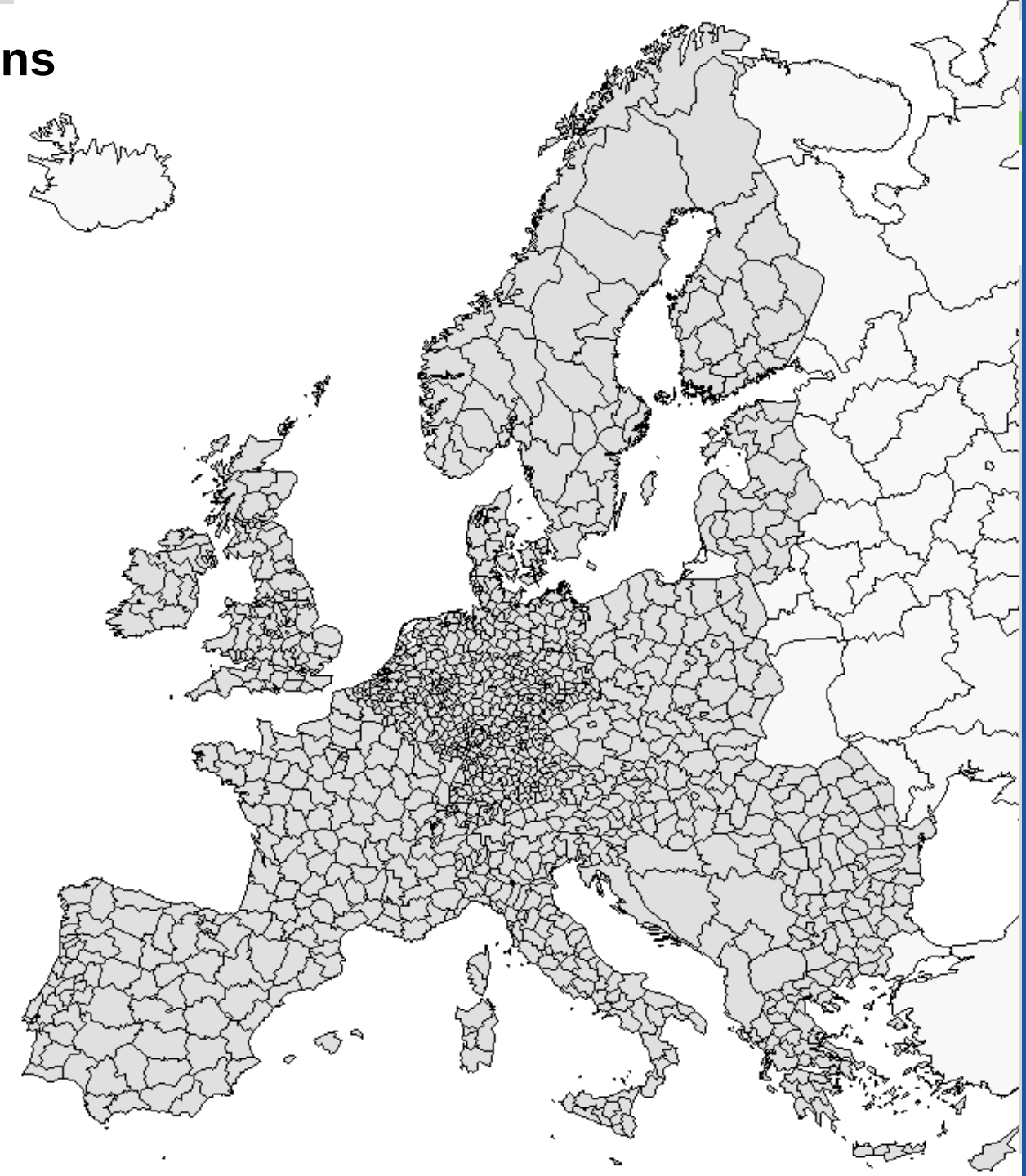


ESPON ET2050 Scenarios

ESPON ET2050 scenarios

To explore different visions of possible spatial development of Europe, a ***base scenario*** and ***three explorative scenarios*** were forecast for ***1347 NUTS3 regions*** until 2050 using the ***SASI*** model.

1347 NUTS3 regions



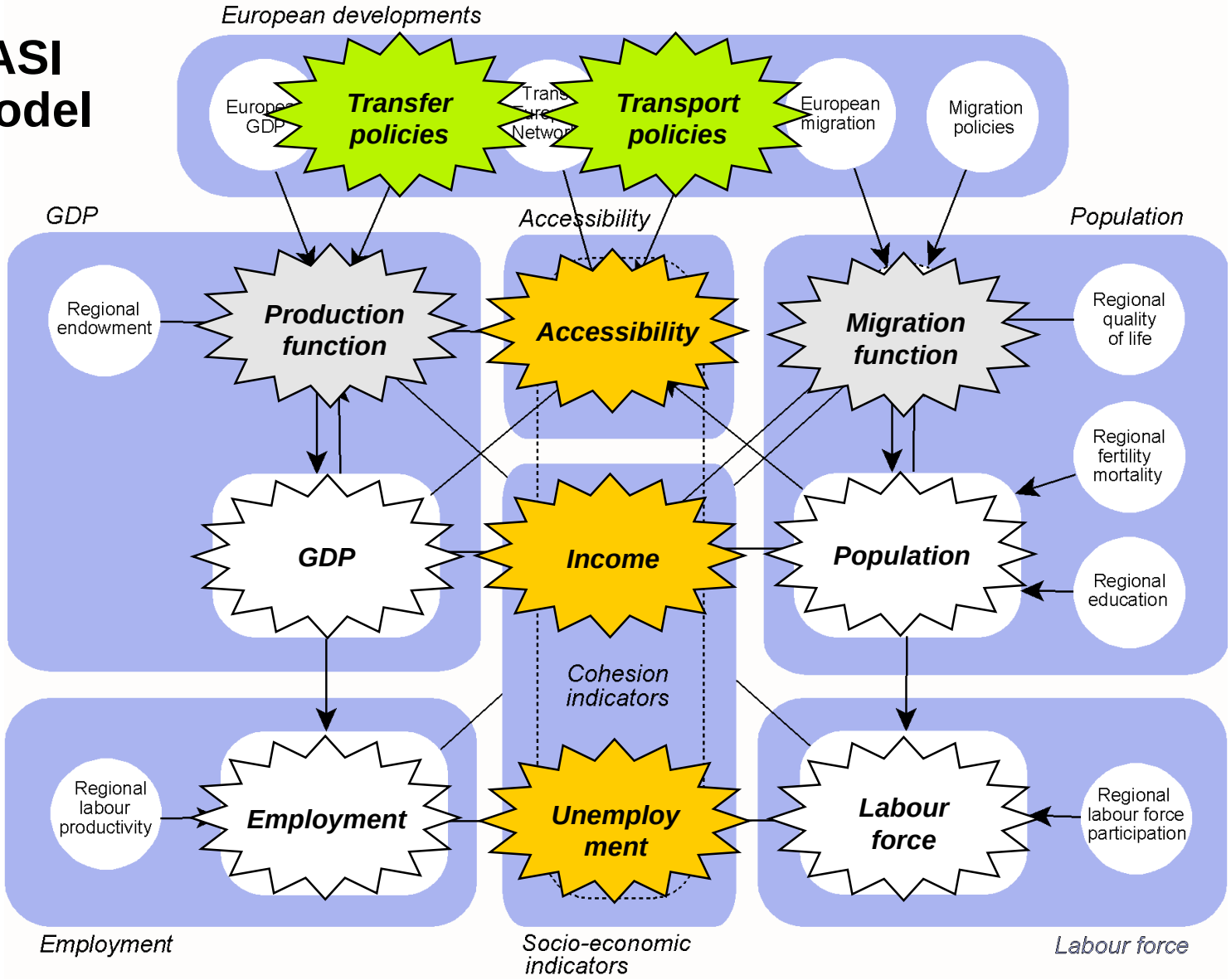
The SASI model

The ***SASI*** (*Spatial and Socioeconomic Impacts*) model is a model of socioeconomic development of regions in Europe under assumptions about

- European ***economic development***,
- European ***net migration***,
- European ***transport policy*** (TEN-T),
- European ***subsidies*** (ERDF, ESF, CF).

The SASI-Modell differs from other regional economic models by modelling not only ***production*** (the demand of regional labour markets) but also ***labour*** (the supply of regional labour markets).

SASI model


European developments
Transfer policies
Transport policies
European GDP
European migration
Migration policies
GDP
Accessibility
Population
Regional endowment
Production function
Accessibility
Migration function
Regional quality of life
Regional fertility mortality
GDP
Income
Population
Regional education
Cohesion indicators
Regional labour productivity
Employment
Unemployment
Labour force
Regional labour force participation
Employment
Socio-economic indicators
Labour force

Base Scenario 2050

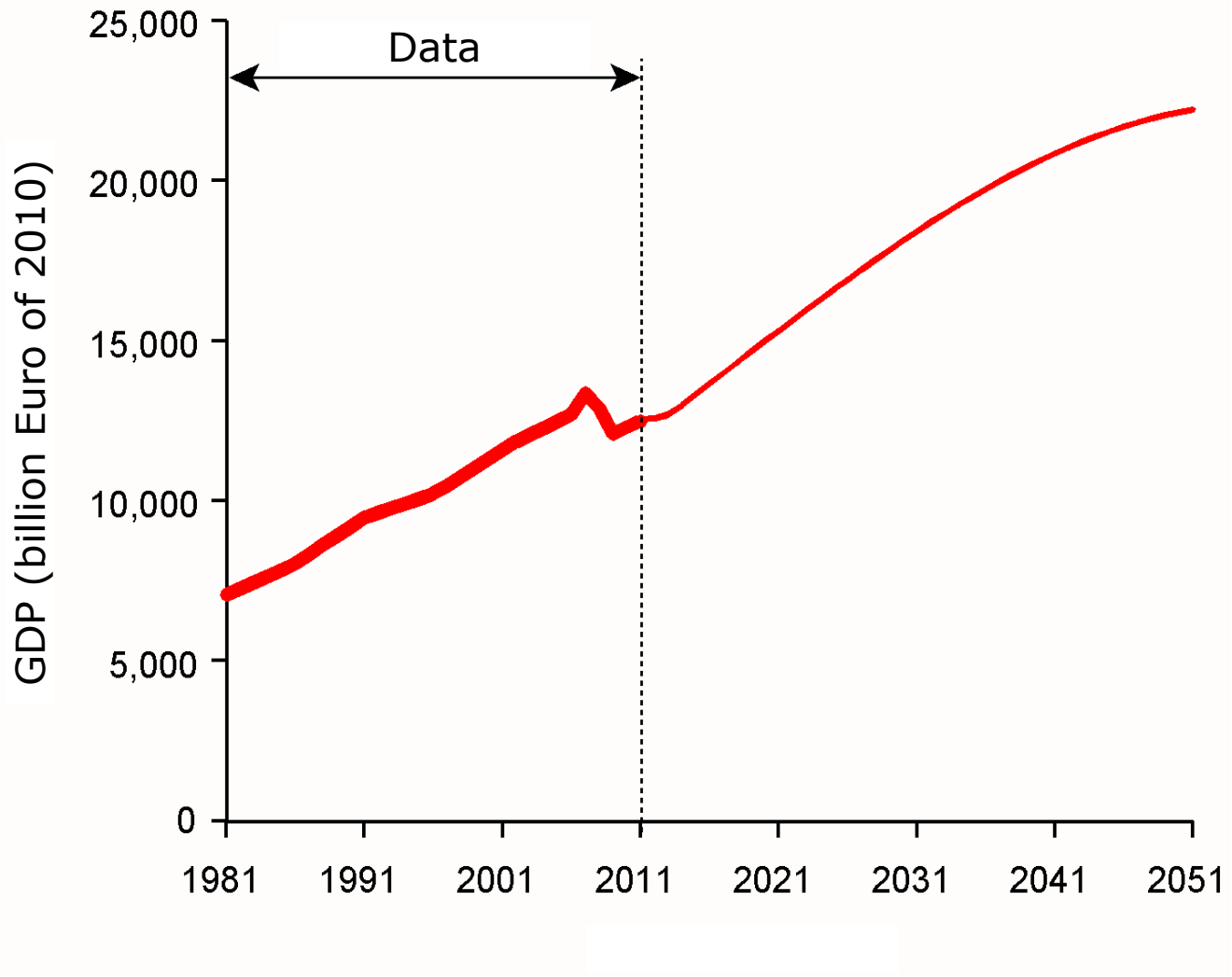
In the ***Base Scenario 2050*** it was assumed that

- the ***EU cohesion policy*** will be ***continued*** as in the past,
- that the EU countries affected by the ***economic crisis of 2008*** will continue to be supported by ***EU solidarity payments***,
- that the ***new EU member states*** will continue to ***catch up economically*** by increasing their labour productivity.

Would the ***Base Scenario*** be different ***after*** the ***Corona crisis***?

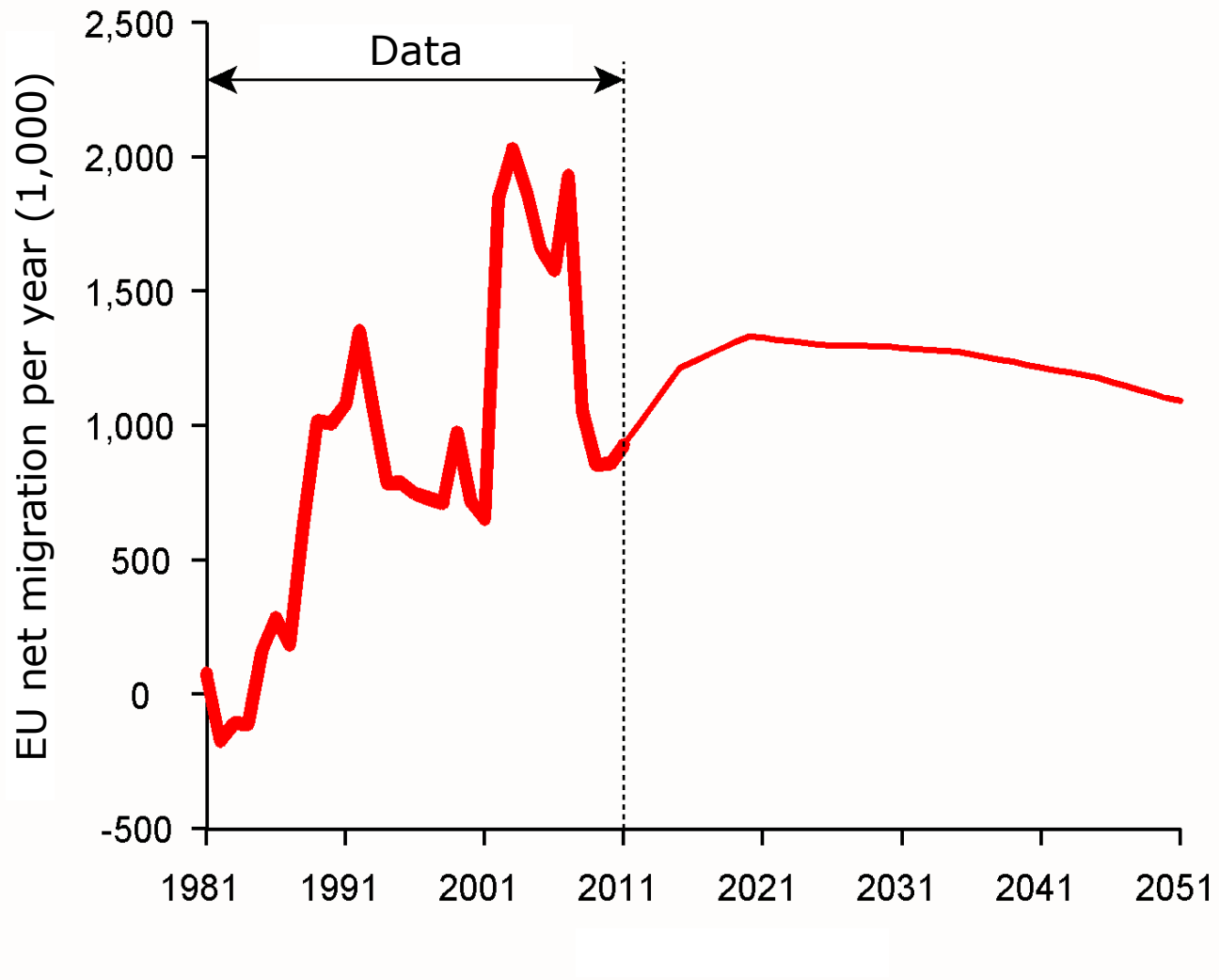
Base Scenario 2050

Assumption about EU27 economic development: Total GDP (2010 Euro) 1981-2051 ("Sluggish recovery")



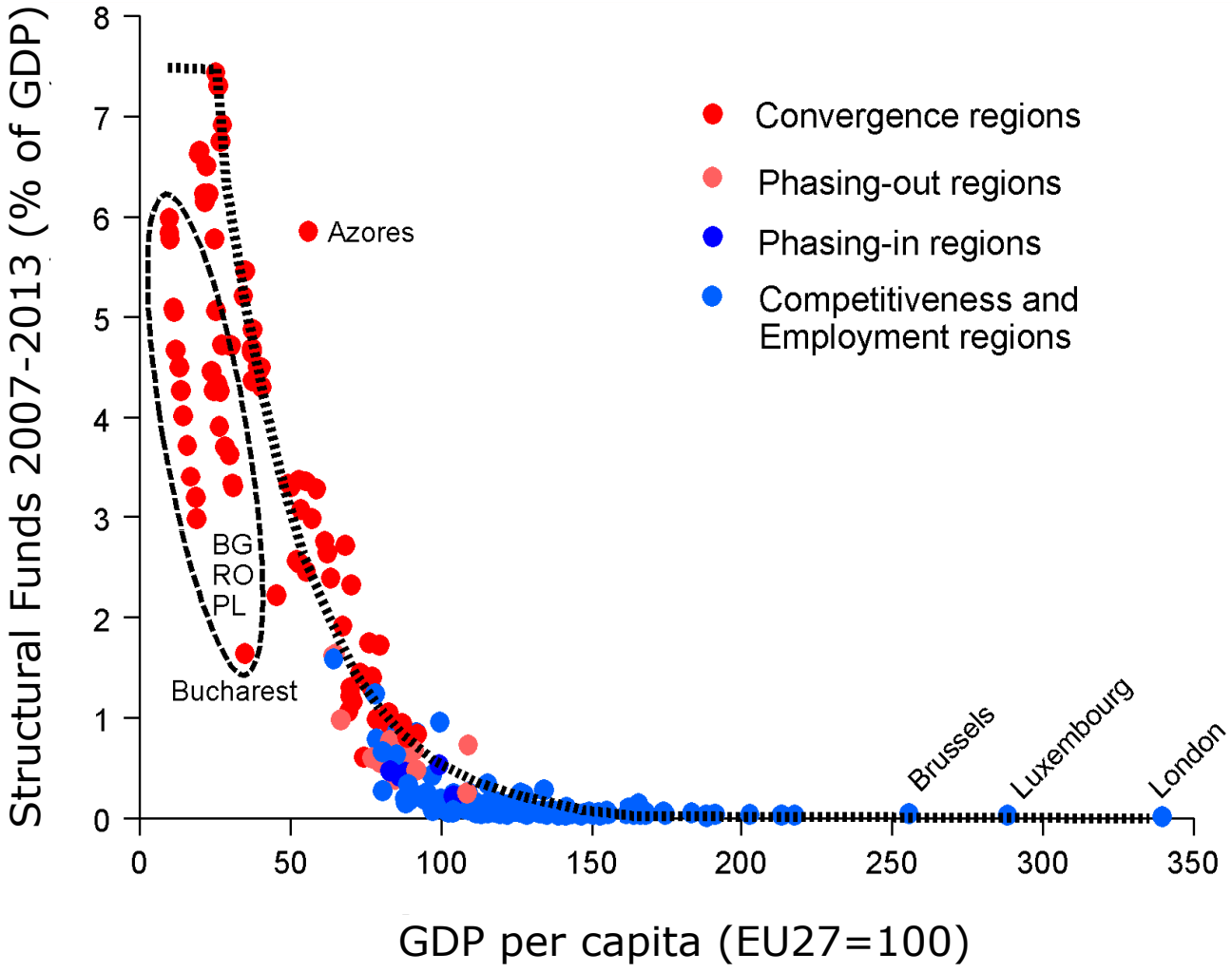
Base Scenario 2050

Assumption about EU27 external net migration 1981-2015: net migration per year (1,000)

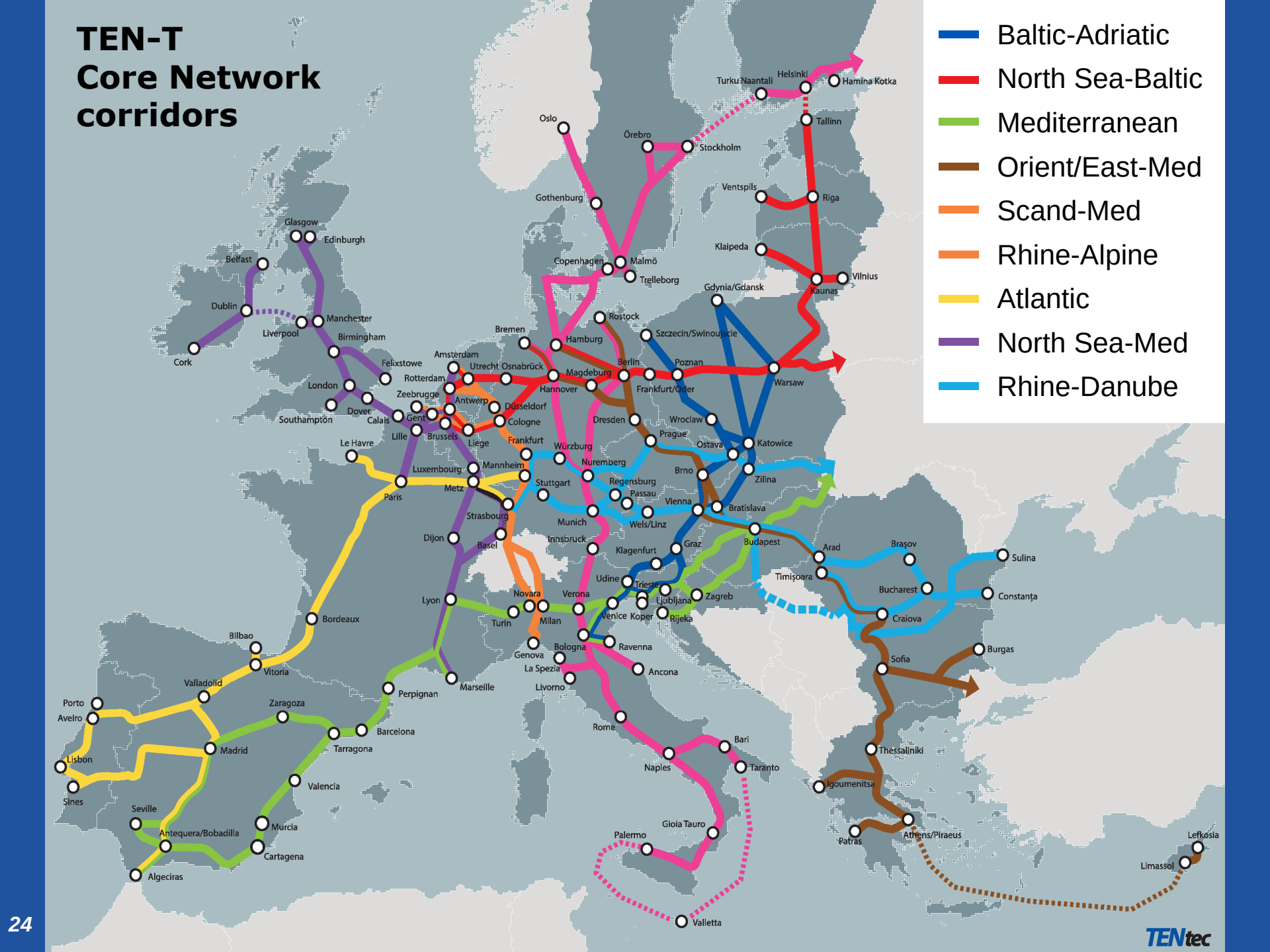


Base Scenario 2050

Assumption about distribution of Structural Funds in % of GDP 1981-2051

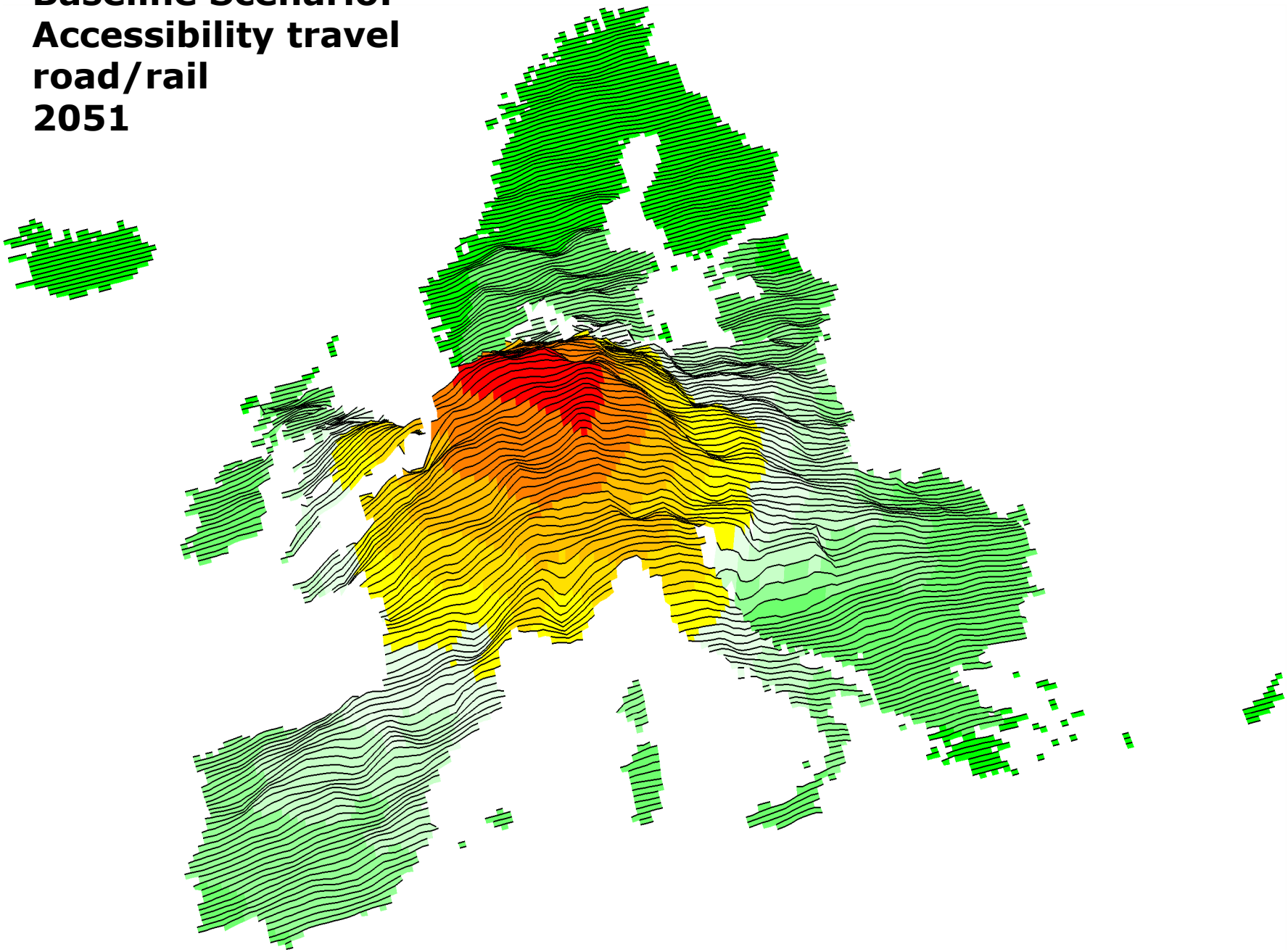


TEN-T Core Network corridors



TENtec

Baseline Scenario: Accessibility travel road/rail 2051

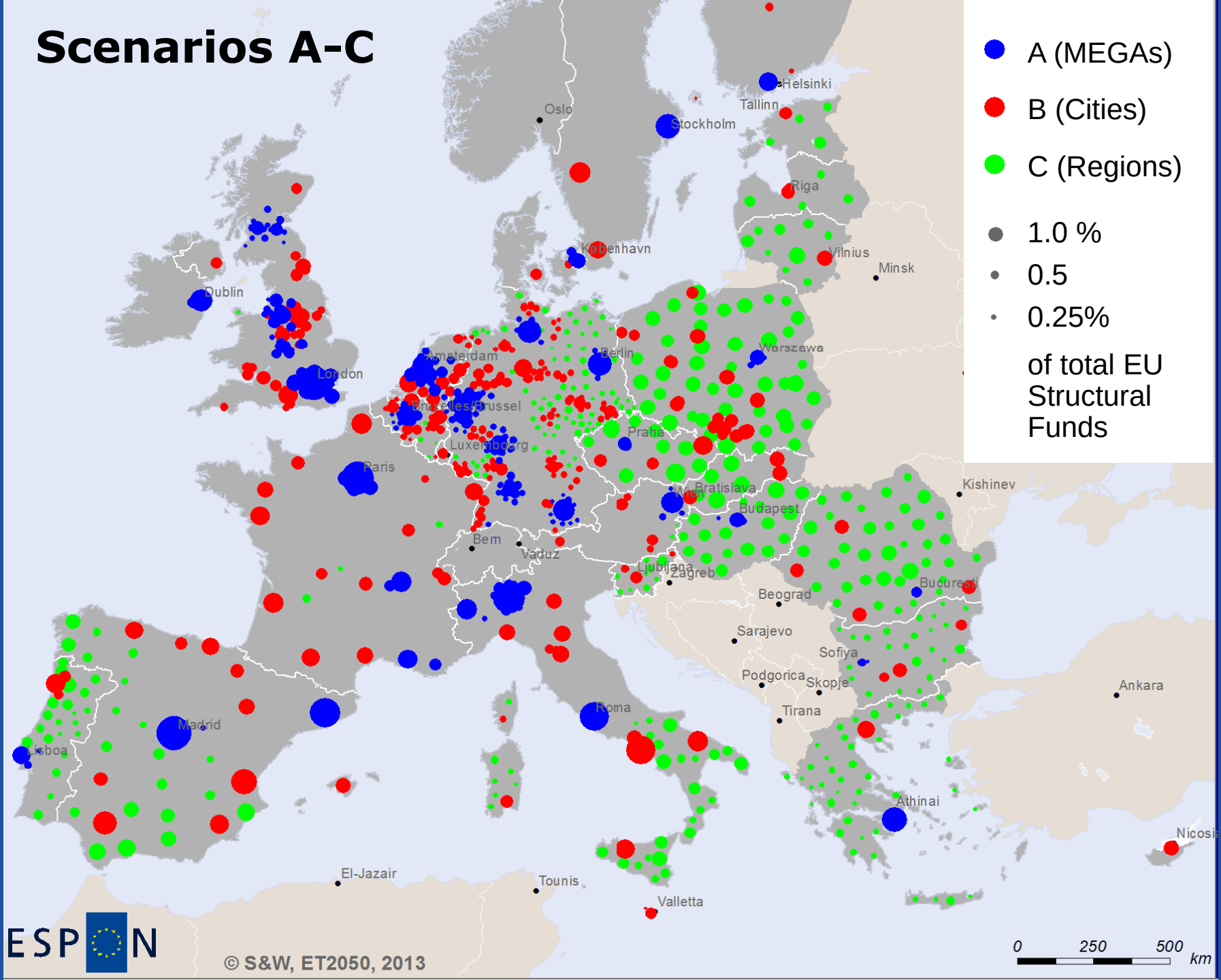


Explorative scenarios 2050

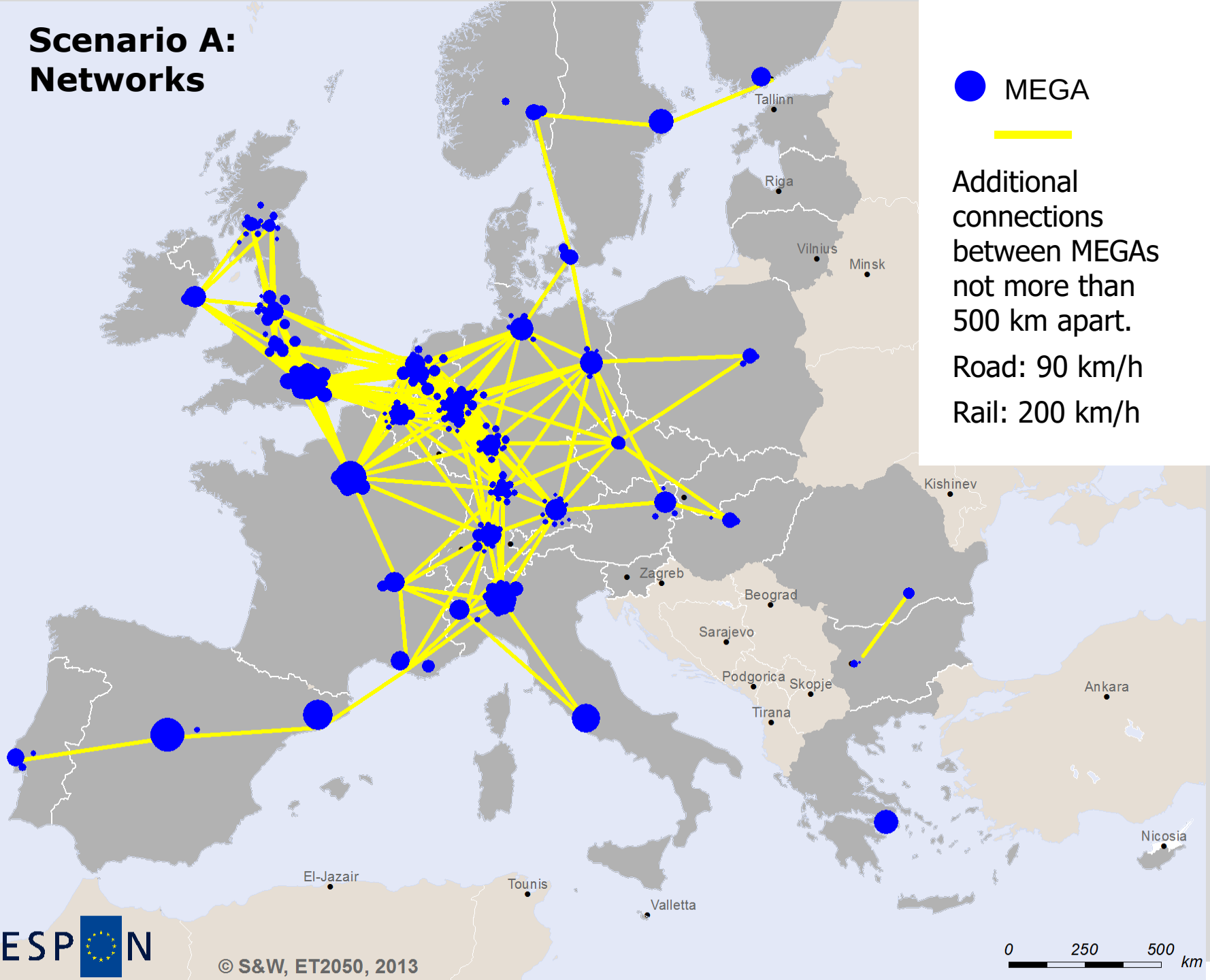
In addition to the Base Scenario three ***explorative scenarios*** were modelled:

- In the ***MEGAs Scenario A*** large European metropolitan areas were promoted in the interest of competitiveness and economic growth.
- In the ***Cities Scenario B*** major European cities were promoted to strengthen the balanced polycentric structure of the European territory.
- In the ***Regions Scenario C*** rural and peripheral regions were promoted to advance spatial equity (cohesion) between affluent and lagging regions.

Scenarios A-C



Scenario A: Networks



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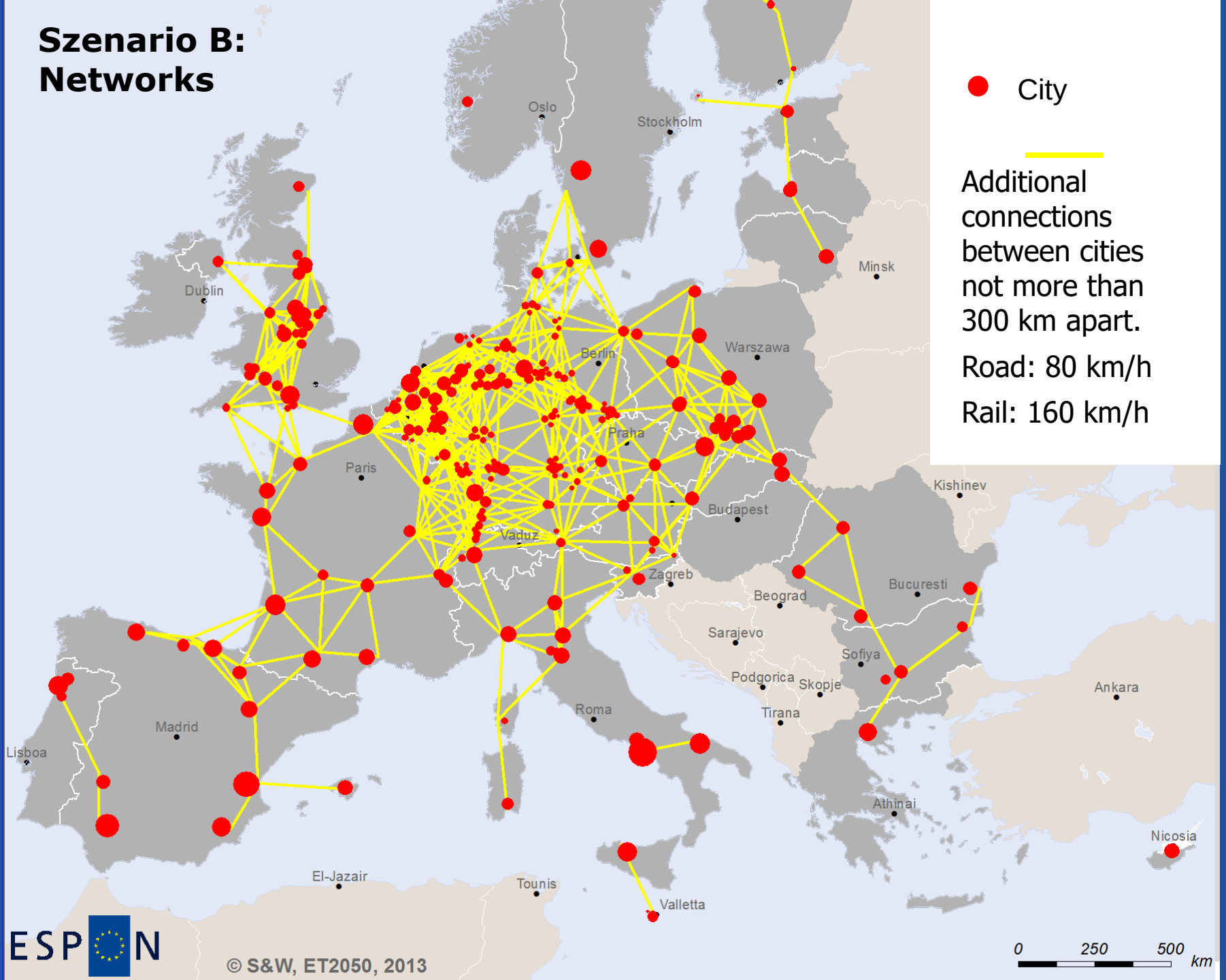
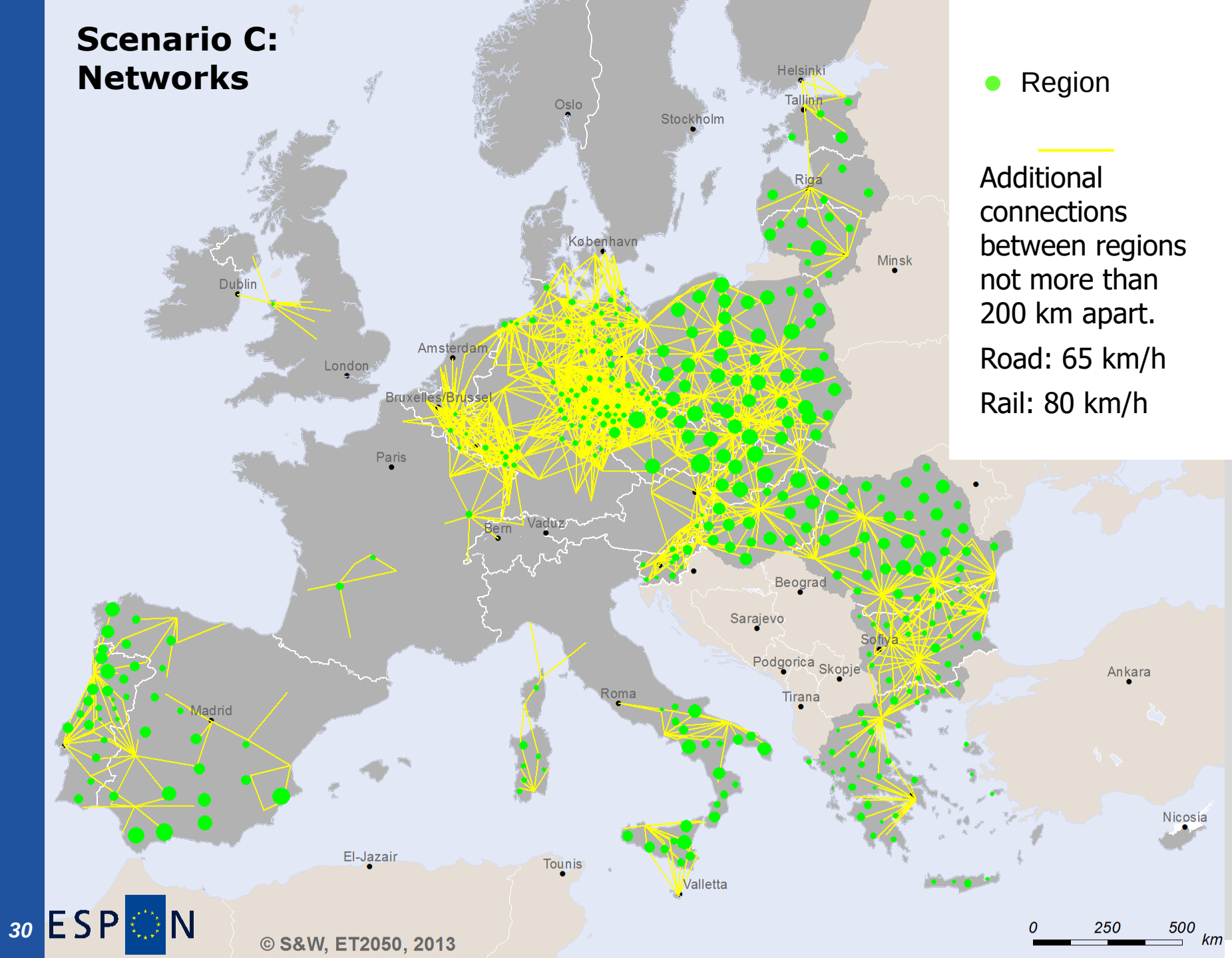
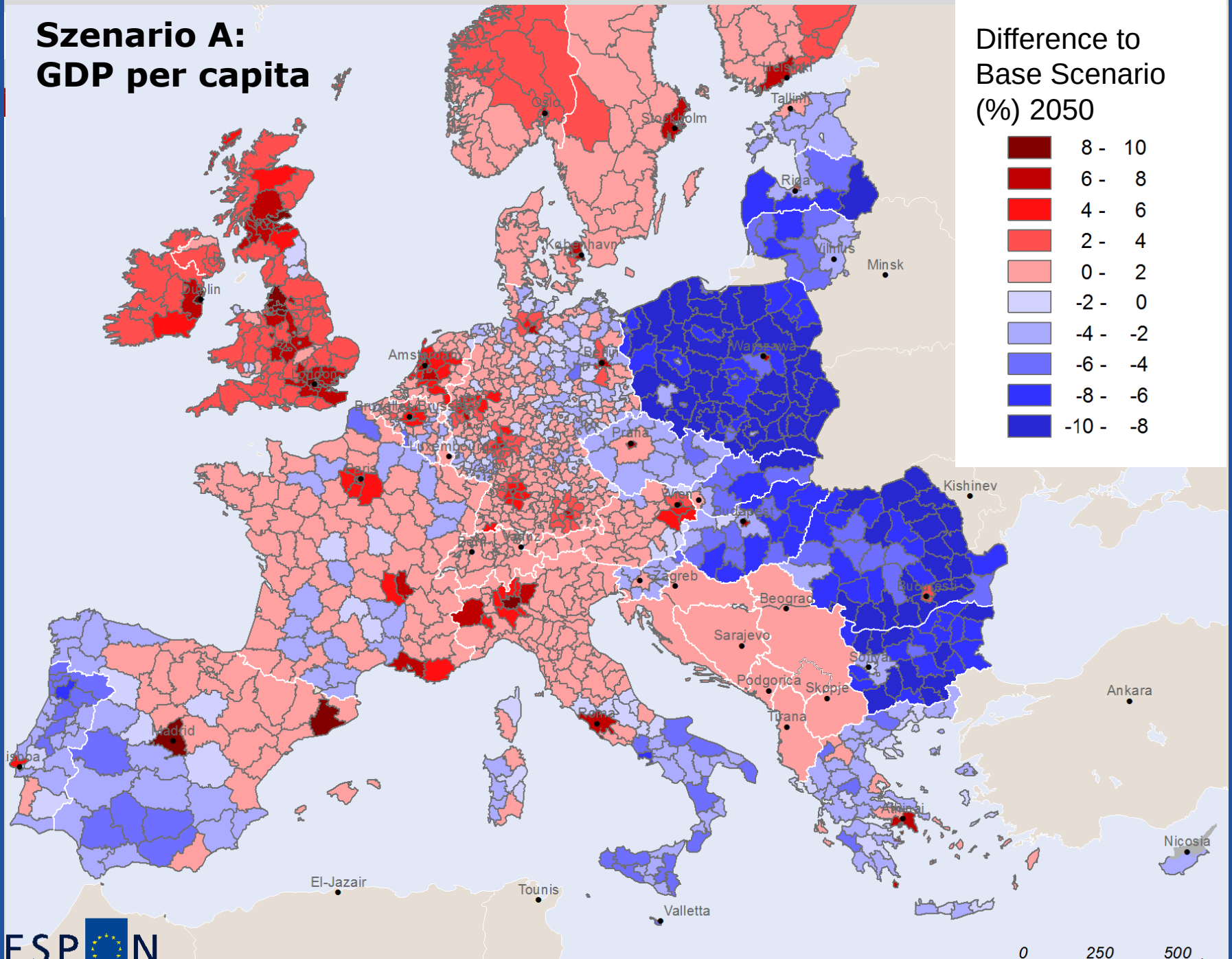
Szenario B: Networks



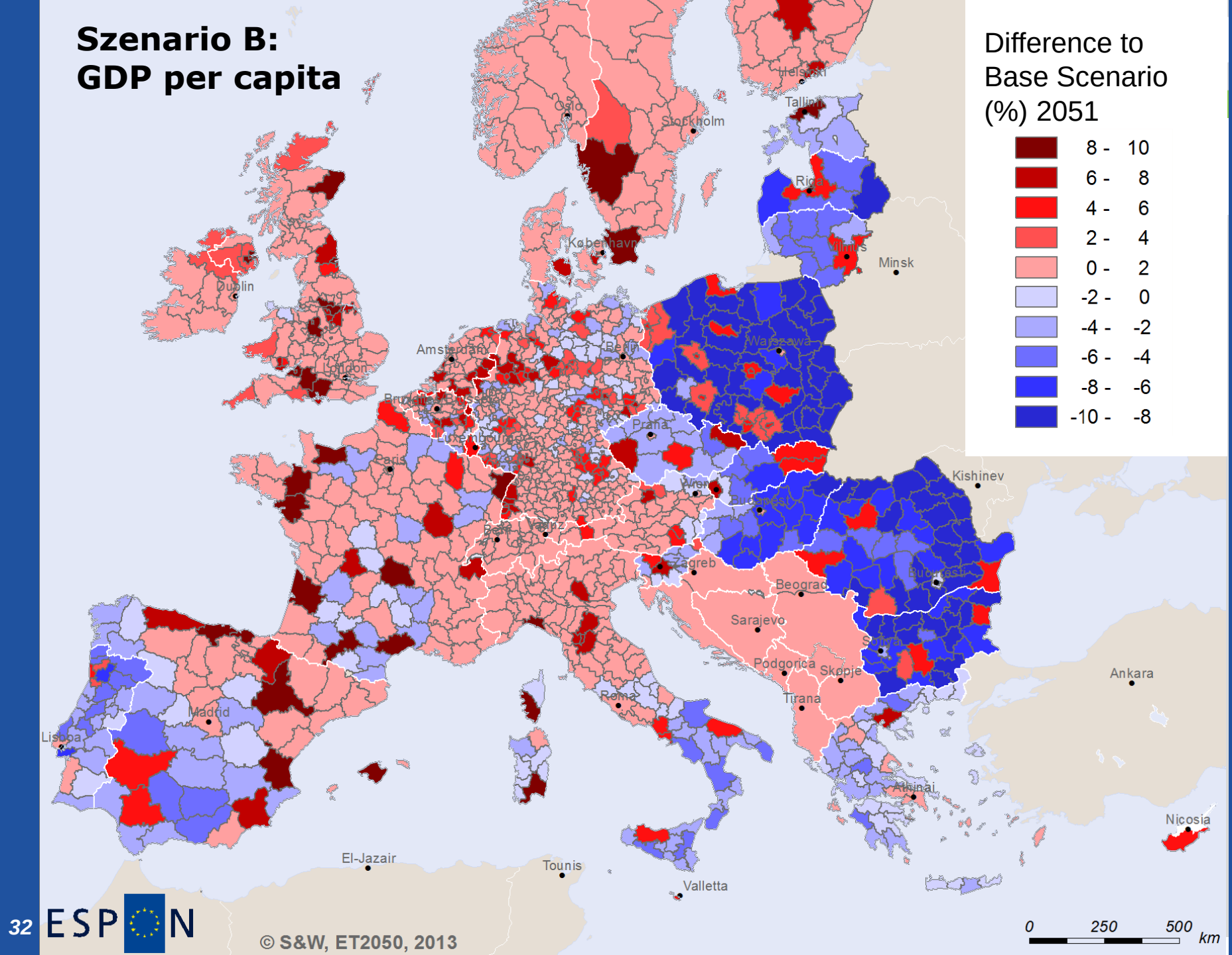
Scenario C: Networks



Szenario A: GDP per capita



Szenario B: GDP per capita



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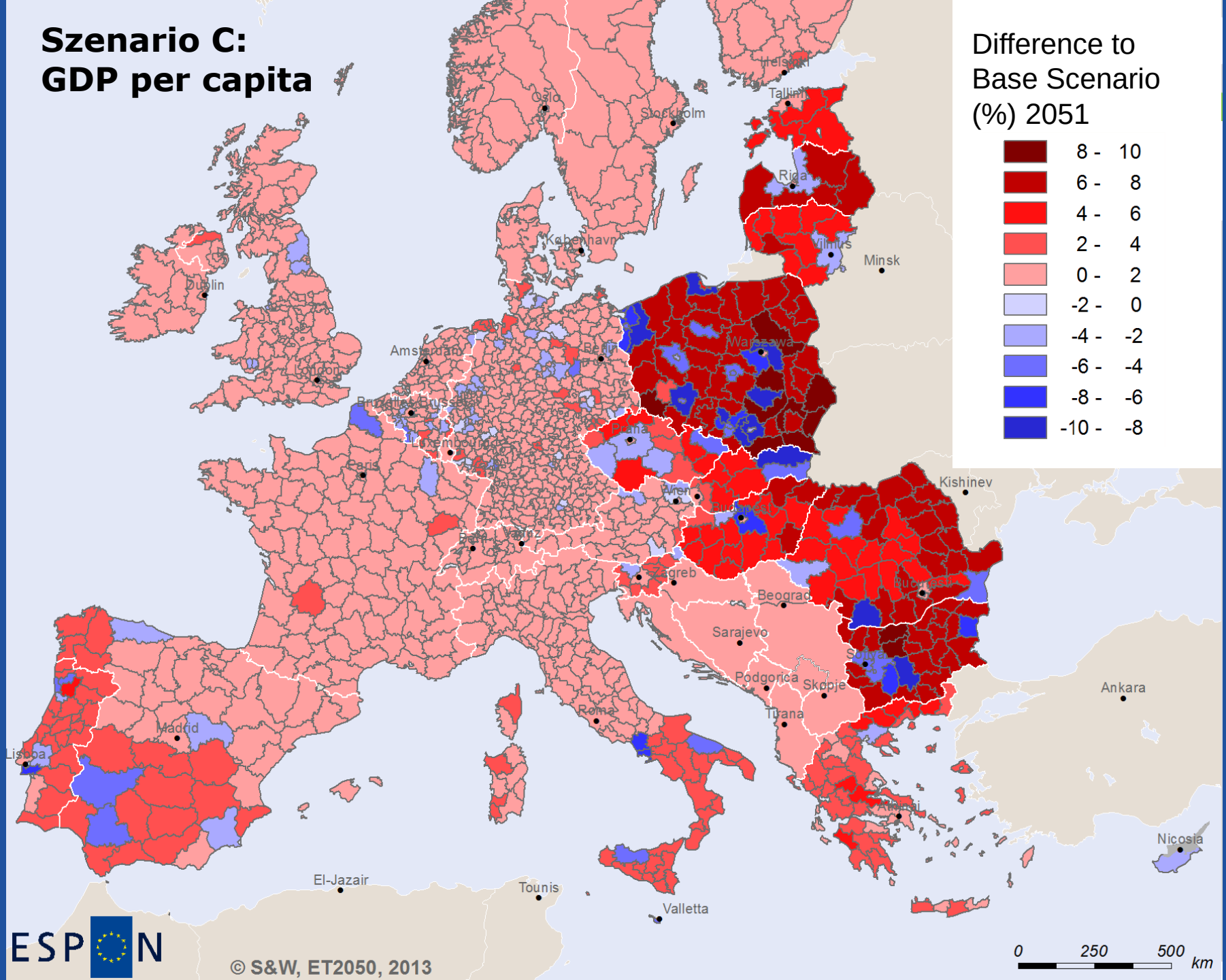
Szenario C: GDP per capita



Szenario Variants

Scenario variants

The ***explorative scenarios*** A, B und C were combined with alternative ***framework conditions***:

1 ***Economic recession***. Globalisation and growth of emerging economies lead to slower growth of the European economy.

2 ***Technology advance***. New innovations in production and transport techniques lead to higher labour and transport productivity.

3 ***Energy/climate***. Rising energy costs and/or greenhouse gas emission taxes lead to higher production and transport costs.

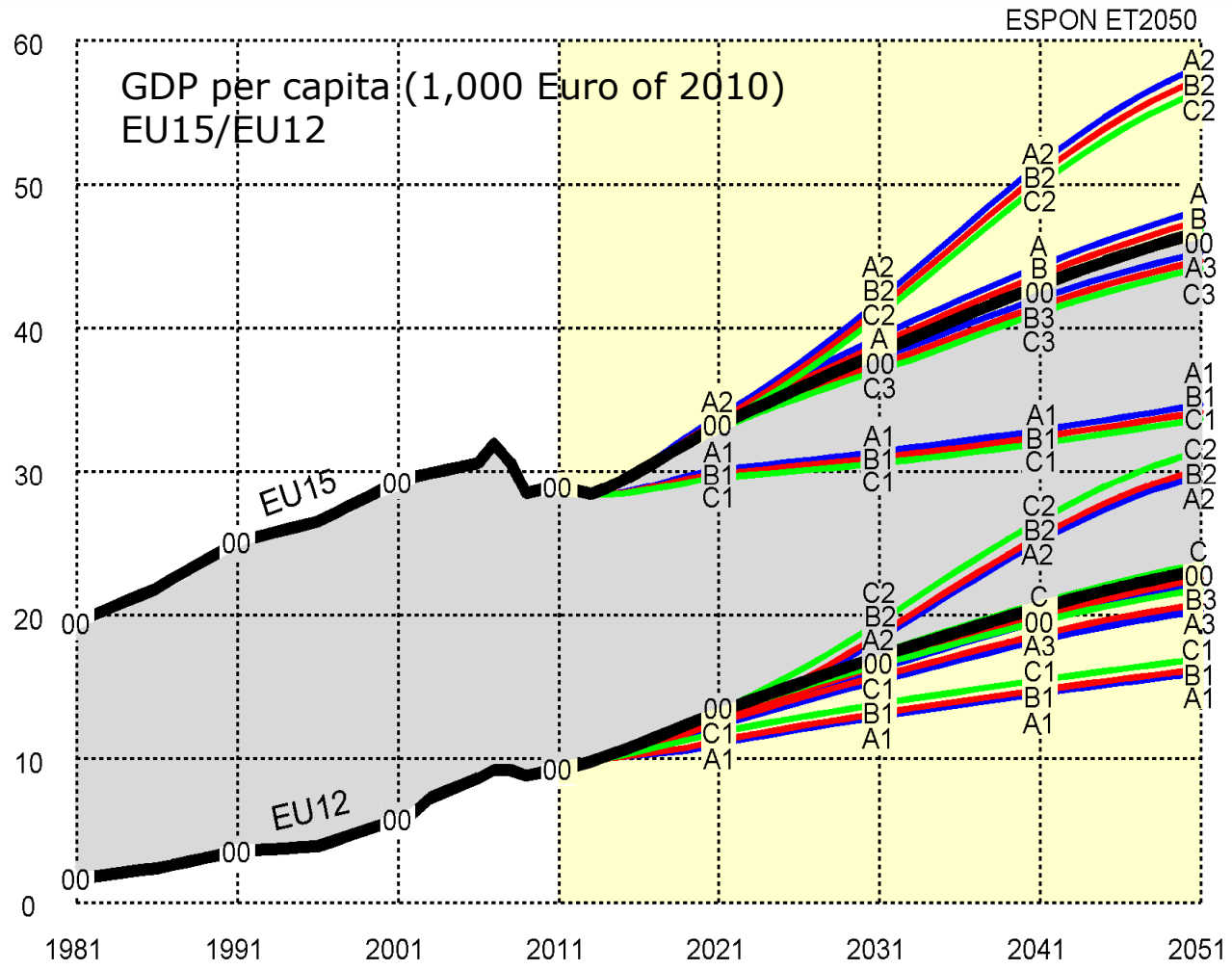
Scenario variants

Combination of the three ***explorative scenarios*** with the three ***scenario variants*** results in ***nine additional scenarios***:

Spatial orientation	Framework conditions			
	As in the Baseline Scenario	*Economic growth reduced*	*Labour productivity increased*	*Energy costs increased*
A MEGAs	A	A1	A2	A3
B Cities	B	B1	B2	B3
C Regions	C	C1	C2	C3

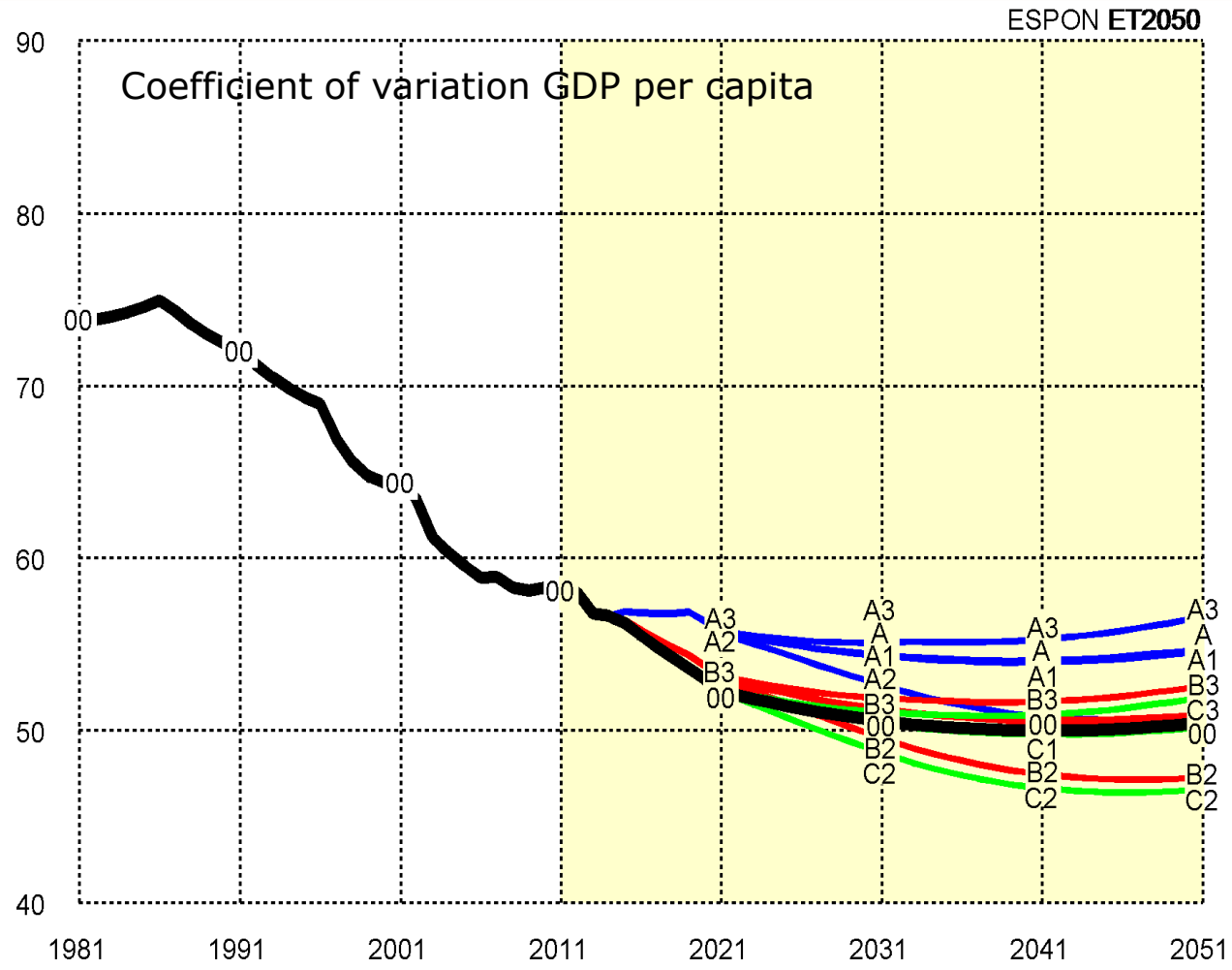
Scenario comparison: Economy

GDP per capita EU15/EU12 (1,000 Euro of 2010) 1981-2051



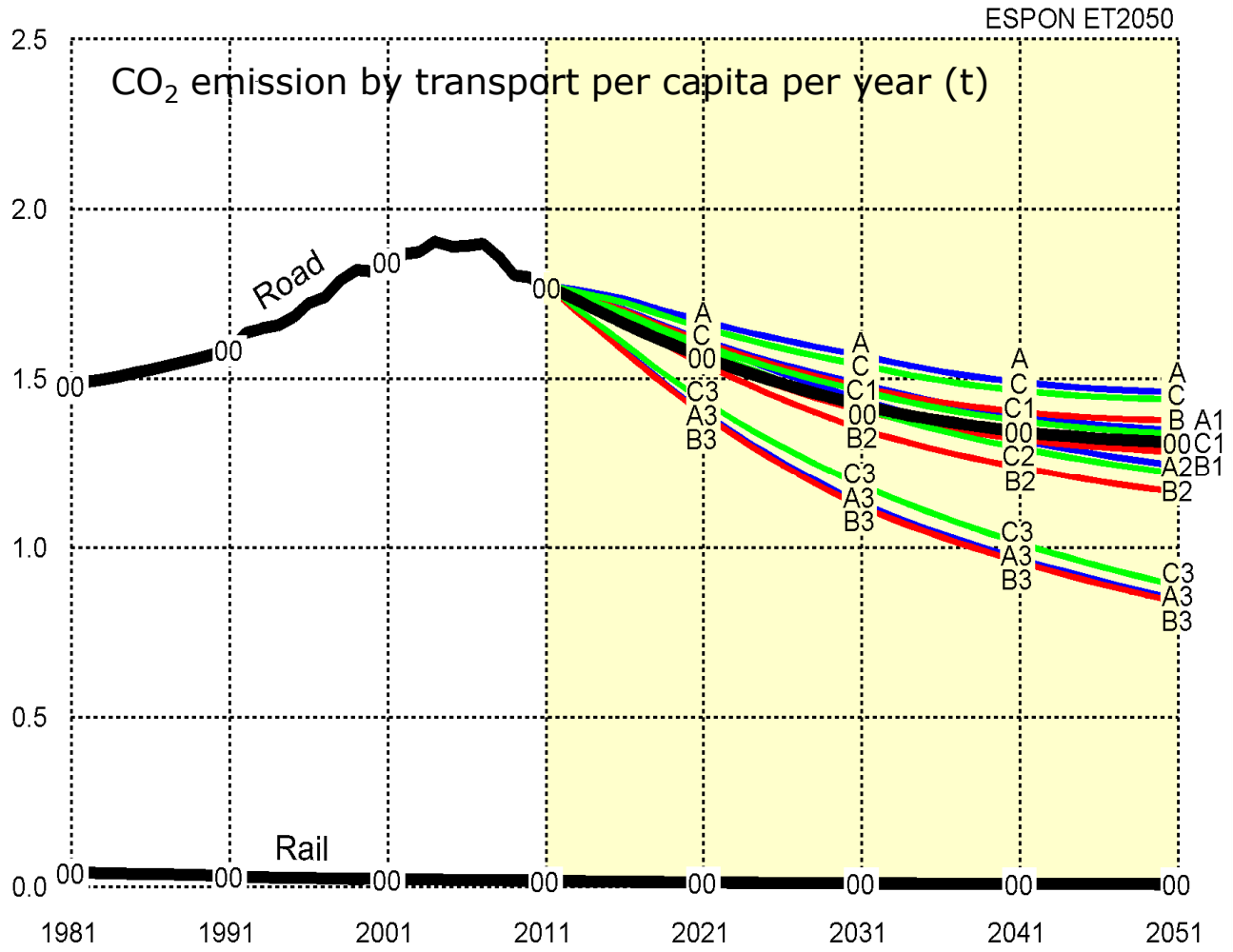
Scenario comparison: Equity

Coefficient of variation GDP per capita 1981-2051



Scenario comparison: Sustainability

CO_2-emission by transport per capita per year (t) 1981-2051



Scenario comparison

Scenario		Economiy		Equity		Sustainability	
		A scenario good for economy		*C scenario good for equity*		*B scenarios good for sustainability*	
Baseline		42,897	+1.43	50.3	65.1	32.2	1.31
MEGAs	A	**43,988**	**+1.50**	54.4	62.1	36.0	1.46
Cities	B	43,463	+1.47	50.7	65.2	**33.9**	**1.38**
Regions	C	43,078	+1.45	**50.1**	**65.7**	35.3	1.44
Economic recession	A1	**31,636**	**+0.63**	54.6	62.1	33.2	1.35
	B1	31,254	+0.59	50.8	65.2	**31,6**	**1.28**
	C1	30,978	+0.57	**50.2**	**65.7**	32.8	1.34
Technology advance	A2	**53,548**	**+2.03**	50.7	62.1	30.6	1.24
	B2	52,922	+2.00	47.2	65.3	**28.7**	**1.16**
	C2	52,436	+1.97	**46.5**	**65.8**	29.9	1.22
Energy/ climate	A3	**41,190**	**+1.33**	56.5	63.2	22.1	0.86
	B3	40,810	+1.30	52.5	65.6	**22.1**	**0.85**
	C3	40,571	+1.29	**51.8**	**65.8**	23.1	0.89

Scenario comparison

The results of the scenario simulations can be ***summarised*** as follows:

- ***Scenario A***: Promotion of ***mega cities*** will maximise ***economic growth*** but will increase ***inequity*** and ***environmental damage***.
- ***Scenario C***: Promotion of ***peripheral regions*** will increase ***equity*** but will reduce ***economic growth*** and ***sustainability***.
- ***Scenario B***: Promotion of ***medium cities*** is a rational ***trade-off*** between ***economic growth*** and ***equity*** and best for the ***environment***.

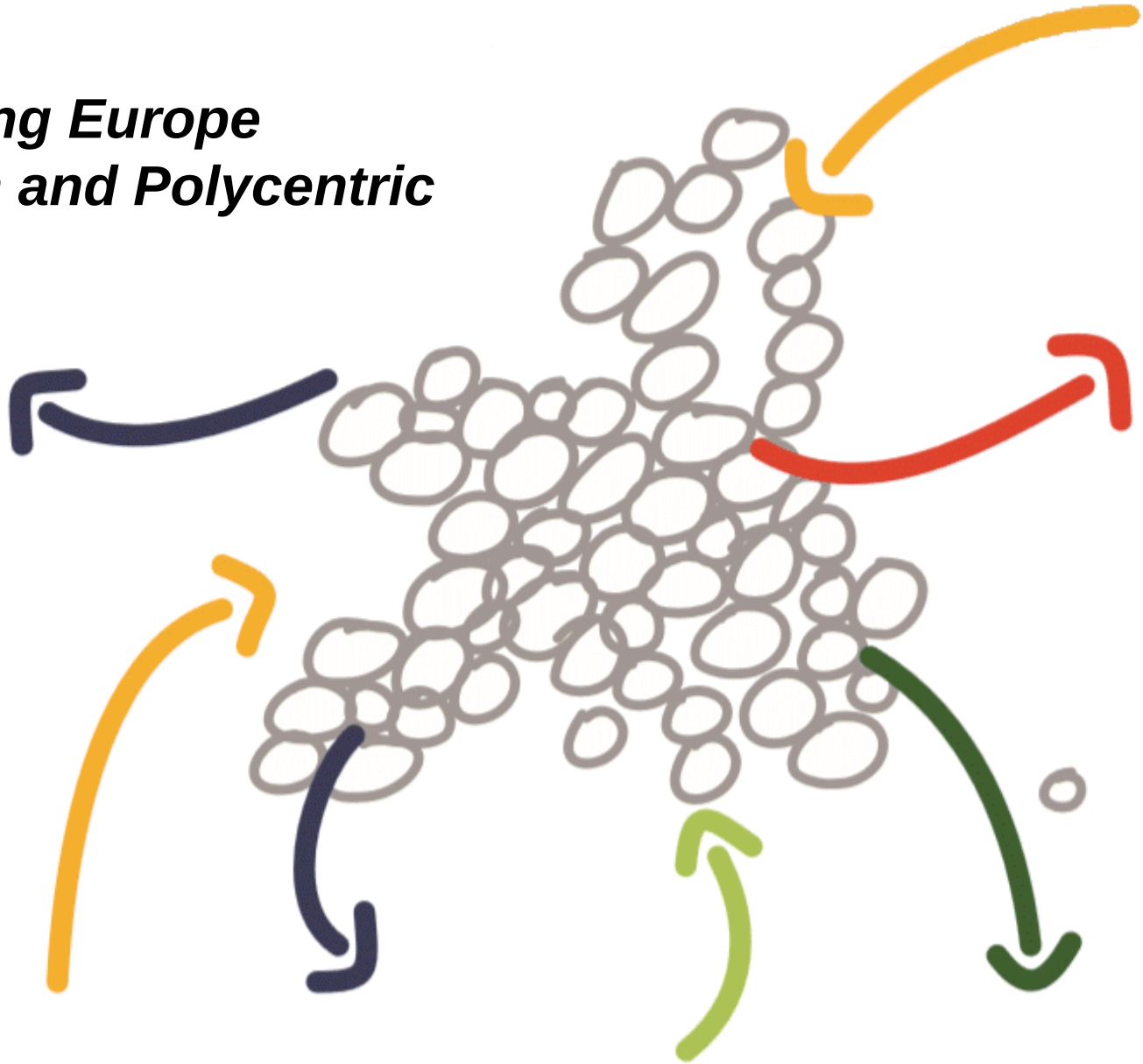
Scenario comparison

These results confirm the balanced polycentric spatial organisation of Europe as suggested by the ***ESDP*** and the ***TA 2020*** and ***TA 2030***.

The ***B scenarios*** (***Cities***) should therefore be the point of departure for the ***spatial vision***.

Spatial Vision of Europe 2050

Making Europe Open and Polycentric



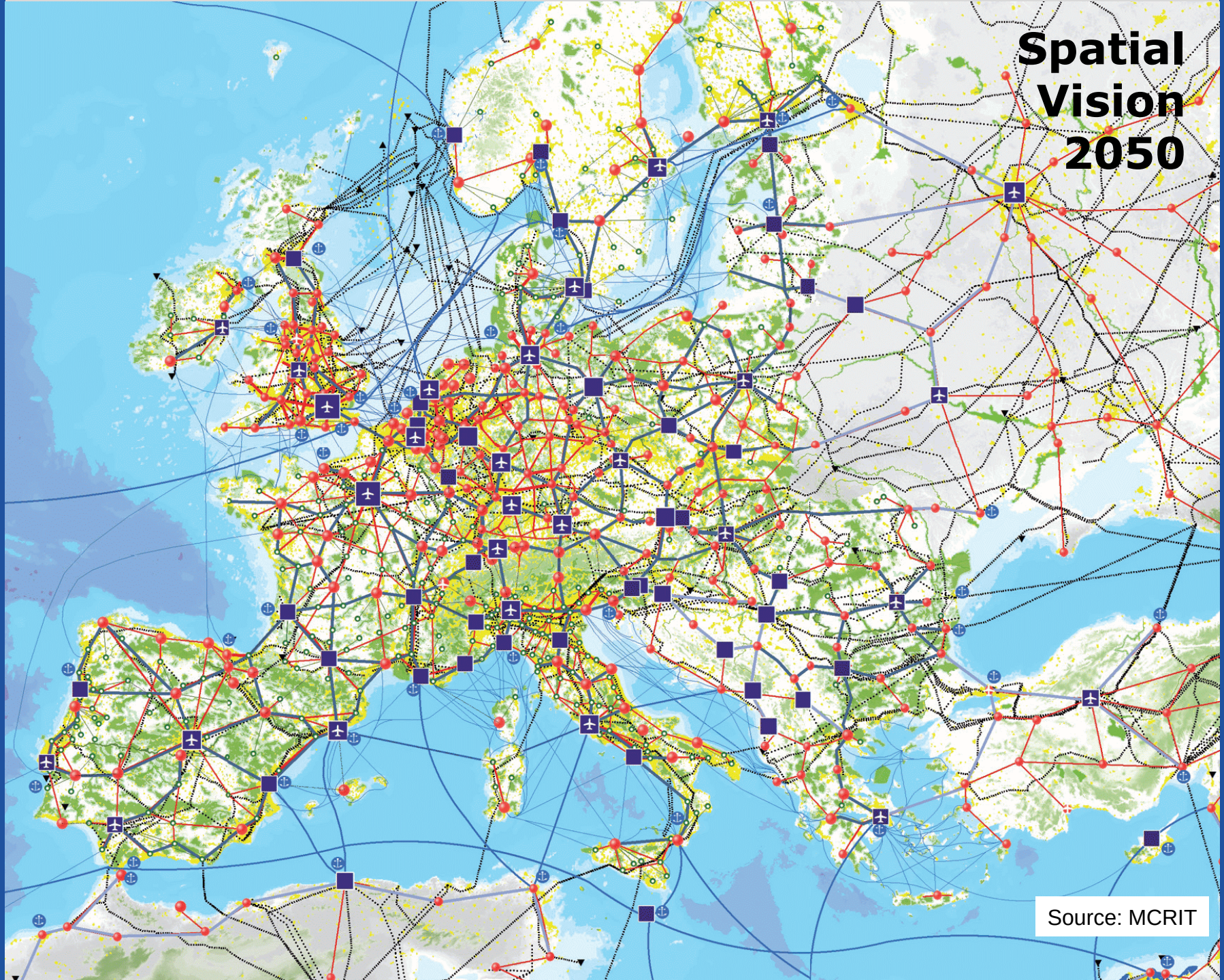
Making Europe Open and Polycentric

First goal: openness

- networking Europe globally,
- collaboration with neighbouring countries.

Second goal: polycentricity

- regional diversity and endogenous development,
- reinforcing the balanced urban system,
- sustainable use of natural resources.


Spatial
Vision
2050
Source: MCRIT

What does this mean for high-speed rail?

High-speed rail connecting the highest level of cities is successful in promoting overall ***economic growth*** but fails to increase ***spatial equity*** and ***sustainability***.

This means that ***medium-speed rail*** connecting the medium-sized cities is more successful in promoting ***spatial equity*** and ***sustainability***.

This was found for the ***European territory***, but it is probably also valid for ***developing countries*** and also for ***post-Corona*** Europe?

More information

Internet:

http://www.espon.eu

Publications:

ESPON & MCRIT LTD. (2014): *Making Europe Open and Poly-centric*. Visions and Scenarios for the European Territory towards 2050. *https://www.espon.eu/topics-policy/publications/making-europe-open-and-polycentric*

Spiekermann, K., Wegener, M. (2014): *Integrated Spatial Scenarios until 2050*. ET2050 Scientific Report Volume 6. *https://www.espon.eu/sites/default/files/attachments/ET2050_FR-03_Volume_6_-_Integrated_Spatial_Scenarios.pdf*