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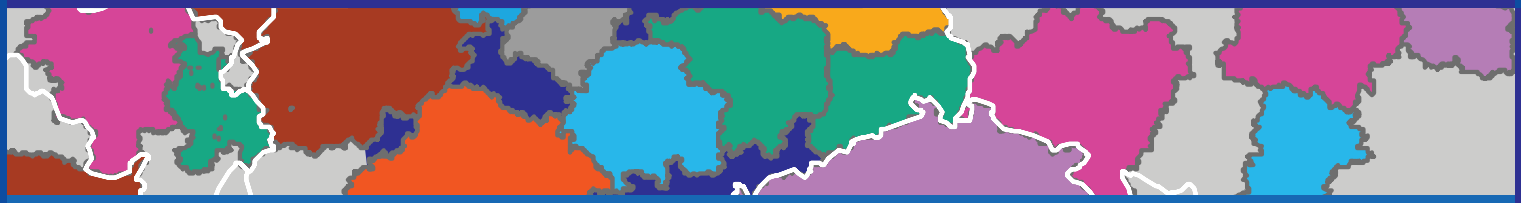

First ESPON 2013 Scientific Report
December 2010

Scientific Dialogue on
Cities, Rural Areas and Rising Energy Prices

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Part-financed by the European Regional Development Fund
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Colophon

The ESPON 2013 Programme

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The present publication was processed by the ESPON Coordination Unit, supported by Gordon Dabinett as an editor and Moritz Lennert, Andrew Copus and Daniela Velte as authors of the three scientific papers. The FOCI project, the EDORA project and the ReRisk project produced the maps.

The report is based on three scientific papers presented at the RSA Annual International Conference on 24-26 May 2010 in Pécs, Hungary. These papers were prepared by the lead partners of the three transnational project groups FOCI, EDORA and ReRisk. A list of ESPON projects is available in the back of the report.

Information on the ESPON Programme and projects, the complete reports and partners involved can be found on www.espon.eu

The ESPON website always presents the latest developments in the ESPON Programme and finding from ESPON projects. It offers the opportunity to consult in detail the ESPON publications and tools, the project reports and indicators available in the ESPON database.

ISBN: 978-99959-684-9-6

The report is the first Scientific Report published by the ESPON 2013 Programme.

The ESPON Programme is managed by the Ministry of Sustainable Development and Infrastructures Department for Spatial Planning and Development, Grand Duchy of Luxembourg.

Printed in Luxembourg, December 2010

Printed on paper produced environmentally friendly

Layout and graphic design by bee media + technology, Austria

Disclaimer
The content of this report is based on the results of applied research projects by transnational teams of researchers taking part in the ESPON 2013 Programme. As such, the maps and texts do not necessarily reflect the opinion of the ESPON Monitoring Committee.

Foreword

ESPON, the programme under Structural Funds 2007-2013 performing as a European Observation Network on Territorial Development and Cohesion, is supporting policy development with evidence and analyses on territorial dynamics within Europe. Applied Research is ESPON's main activity to deliver new European facts and understanding for policy makers. Researchers and experts from all 31 countries involved in transnational project groups contracted by ESPON are behind these findings.

One of ESPON's objectives since the beginning in 2002 has been to support the establishment of a European wide research community in the field of European territorial science. This could increase interest and competences in research on European territorial structures, trends, perspectives and impacts of EU sector policy. With the aim of Territorial Cohesion in the Lisbon Reform Treaty, the efforts in building a scientific base for future policy development becomes even more important.

This ESPON Scientific Report is part of such efforts and intends to stimulate the continuation of scientific discussions among researchers and experts around Europe.

ESPON has hitherto promoted the scientific component of the programme through scientific conferences and workshops, cooperation with European organisations in the fields of regional science, geography and spatial planning, as well as with a dedicated series of ESPON reports ("blue series") mainly targeting the scientific community. During the former ESPON 2006 Programme two reports on scientific progress were published.

This ESPON Scientific Report continues and furthers this tradition of scientific dialogue by subjecting the research findings to examination through presentations at learned society conferences and individual peer review. This report is based on three scientific papers prepared by researchers involved in ESPON Applied Research projects. Each of these were previously presented and discussed at ESPON Workshops within an international conference of the Regional Studies Association (RSA) in May 2010.

The three ESPON workshops focused on the important project themes of (1) urban agglomerations and the functionality of European cities, (2) the diversity of potentials for economic development present in rural territories, and (3) the vulnerability of the economies of European regions from higher energy prices. Based on the discussions at these ESPON Workshops and a subsequent review procedure carried out by Gordon Dabinett, Professor for Regional Studies at the University of Sheffield, United Kingdom, the papers were redrafted and finalised for publication in this report.

The ESPON 2013 Programme intends during its lifetime to issue additional Scientific Reports. The ambition for the last one during this programme is to document the scientific progress made looking across the research and analyses undertaken from 2007-2013.

Table of contents

List of Maps, Figures and Tables

1 – Introduction: Contributions to European Territorial Science

by Gordon Dabinett
Professor for Regional Studies, Town & Regional Planning, the University of Sheffield, UK

1.1 Background

The development of the European territory is facing several significant trends and events. The enlargement of the EU to 27 Member States presents unprecedented challenge for the competitiveness and internal cohesion of the Union. The integration of the EU within global economic competition is accelerating, offering regions and cities more options to decide their development path. Market forces and the evolution of society in general support a geographical concentration of activities. The occurrence of hazards due to climate change is increasing, and the emergence of a new energy paradigm is having significant territorial impacts and opportunities for the production of renewable energy sources. Previous ESPON results have revealed that territorial capital and opportunities for development are inherent in the urban and rural regional diversity that is characteristic of Europe.

This report presents three scientific papers arising from ESPON research carried out between 2008 and 2010 under the auspices of the ReRisk, FOCI and EDORA applied research projects. Each of the three chapters reflects on how each of these projects sought to undertake applied research on territorial development, competitiveness and cohesion by:

- Building a new evidence based on comparable information about European regions and cities, covering the entire territory of EU 27;
- Addressing major territorial challenges and political priorities providing comparable information covering the entire European territory;
- Providing comparable regionalised information and possible policy options for making use of opportunities inherent in territorial structures, taking into account the diversity of the ESPON territory;
- Identifying types of territories that share common development challenges and are affected most by the trends; and
- Contributing to the further identification of structures within the EU territory that represent options for exploring comparative advantages and providing concepts, methodologies, indicators, typologies, European maps and models and by defining new ones.

1.2 FOCI - Future Orientation for Cities

The FOCI project (Future Orientations for Cities) sought to develop a common understanding of European urban structures, urban development opportunities and challenges of the diverse types of cities and urban agglomerations in Europe. These are significant areas of research since cities and urban development have increasingly become the focal point of current territorial development policy. Cities are seen as the main potential motors for the achievement of the EU 2020 aim of economic growth and job creation, and dynamic cities and urban agglomerations are conceived as vital assets for regional development within debates on the future of Cohesion Policy. Knowledge on these issues is arguably vital for targeted policy development, in particular in light of the diversity of urban areas in Europe with the apparent dominance of large cities in some territories and the pattern of polycentric urban forms in others. Research in this field of enquiry has consistently had to address the challenges of understanding complex inter-relationships at different geographical scales as patterns of urbanisation, competitiveness and co-operation have played out through new and emerging spatial economic behaviours.

In addressing these policy driven agendas, the FOCI project has taken up the scientific challenges underpinning current knowledge and analyses on urban dynamics posed by the insufficient availability of comparable EU wide information on cities. This is particularly significant work since previous administrative and statistical units within which data has been collected are limited in their scope to provide rigorous and valid constructs for understanding current patterns of urban change. Urban processes are not only diverse across Europe, but often involve complex polycentric arrangements, and the transactions that define city functionalities can cross previously established borders and boundaries. To find answers on these questions, the project analysed the current knowledge about trends, perspectives and driving forces for urban development in the thematic fields of urban agglomeration, command functions, network connectivity and social cohesion. The FOCI project experimented with different novel approaches to the quantitative analyses of urban issues, in order to avoid duplication of work both with preceding ESPON projects, but also with other efforts such as the State of European Cities Reports. These novel approaches included the use of official NUTS and Urban Audit data, sometimes in new ways such as in the analysis of city-hinterland relationships. As well as this the studies collected and analysed new data sources, notably transport time tables and ORBIS firm network data to enable a range of urban network scales to be explored.

The scientific paper in this Report contains key methodological insights into how the FOCI project addressed the internal dynamics of urban areas and the highly significant relationships within and between urban networks. Of particular interest in these analyses is the attempt to understand disparities within the redefined urban areas, in respect to key indicators of city complementarities and socio-spatial patterns. The mappings that are produced from this experimental and largely innovative work re-affirm the extreme diversity of urban evolutions and dynamics within Europe, but also hint at wider generalisations between Western, Southern and Central/Eastern Europe.

The hope of the FOCI team was that these new proposed approaches can add bricks to the general construction of the understanding of the dynamics and structures of Europe's cities. Many of the results presented here are still preliminary, and some are based on data sources never used in this way before. Unfortunately many of these new data sources generally do not provide reliable time series evidence, or the clear identification of the driving forces and their future perspectives. At this stage it would appear that the results will not easily translate into policy orientations, notably at city level. However, the work does show that there is room for more and innovative use of data and approaches in studying Europe's cities, notably on questions of spatial economic development and competitiveness, but also of territorial cohesion.

1.3 EDORA - European Development Opportunities in Rural Areas

The EDORA project (European Development Opportunities for Rural Areas) sought to develop a common understanding of development opportunities and challenges of the diverse types of rural areas in Europe. With over 60% of the population in the 27 EU Member States living in rural areas, covering 90% of the EU Territory, rural development is a vitally important policy area. However, the research presented in the scientific paper in this report illustrates the wider and more fundamental questions that have to be addressed in respect to devising contemporary rural development policies. Research on rural development has to reflect changes in rural Europe that are driven by global economic and environmental processes and shifts in urban-rural relations that in turn are resulting in an increasing diversity of rural development. The EDORA project makes a significant scientific contribution by capturing these diverse patterns of rural development, and also sets them within a new schema of rural generalisations and a coherent rationale for future policy action. The Territorial Cohesion Green Paper has argued that this very diversity is the key to strengthening future economic performance and quality of life more generally in Europe. Knowledge on these issues is needed to underpin targeted policy development in the light of Cohesion Policy aiming at job creation and tackling social changes.

The scientific paper in this Report illustrates and explains how the EDORA project constructed new 'mega-narratives' of rural development from a review of recent conceptual and empirical literature. These provided the base for the project to develop a unique three-dimensional analysis framework (the "EDORA Cube") based on regional typologies of rurality and accessibility; economic restructuring; and economic performance; and subsequently a substantial database of indicators and statistical profiles of 31 countries structured according to this EDORA Cube at national and meta-region levels. The macro-scale variations identified at this level of analysis were further tested by undertaking micro-scale analyses in a number of exemplar regions, which significantly showed both elaboration and challenges to the typologies and meta-narratives previously developed.

These multiple strands of the research project provide a better understanding of rural-urban linkages, rural-global linkages, and the concept of territorial capital in a rural context. They clearly provide evidence of a need to balance an understanding of regional specificities with the need to replace outdated stereotypes of rurality with more appropriate generalisations. The analysis highlights that local potentials are often defined by regional capacities and "soft factors", which determine the ability of different rural areas to respond to increasingly global opportunities. The potential of rural-urban linkages as a "motor" for rural development together with the increasingly important role played by "rural-global" networking are both highlighted by this innovative analysis. An important feature of the recommended policy approach is an emphasis upon intangible assets, in recognition of the increasing importance to development of a capability to interact effectively in highly diverse but networked territories.

1.4 ReRisk - Regions at Risk of Energy Poverty

The ReRisk project (Regions at Risk of Energy Poverty) sought to offer new insights in a context where Europe is entering a new energy landscape. Energy prices have been rising and the dependency on fossil fuels is increasing, and in the future, energy supply and demand will have to turn more towards renewable energy sources and focus more on the efficient use of energy. The scientific results of the project presented here offer key insights into the need to prepare a common ground for a better understanding of these future energy demands in different European regions in the light of a Cohesion Policy aiming at improved regional competitiveness and sustainable economic growth.

In considering these, the project focused on gathering knowledge on the different uses of energy in the EU regions (NUTS 2 level) and on identifying opportunities to generate and strengthen sustainable energy sources. The project developed a methodology to measure the risk of energy poverty for different types of regions, and then utilised a cluster analysis in order to define groups of regions with similar levels of vulnerability to energy poverty - an energy risk profile - for which a set of policies could be designed for those regions. On the basis of these results, future-oriented territorial evidence was built on the impact of rising energy prices on the competitiveness of European regions as well as on the cohesion of Europe in a long-term perspective.

The project developed indicators offering new information on the regional impact of increasing energy prices on industry, transport and private households, revealing regions' socio-economic vulnerability, their climate characteristics and potential for the development of wind and solar power. Several case studies of regions which are especially active in this field and a survey of the priorities of 41 regional energy agencies provided the basis to develop (i) typologies of European regions reflecting the impact of increasing energy prices on the demand side as well as on the supply side; and (ii) long-term scenarios sketching the scope of actions for regions within the context of national and European energy policy. All analysis carried out in the ReRisk project shows that disparities between regions are much greater than those observed on the national level. The regional and sub-regional realities, however, are not captured well by harmonized statistics, which makes it very difficult to monitor progress (or regress) in important policy areas, for example, energy efficiency or the extent of poverty.

The project concluded that whilst some new evidence on regional energy initiatives may soon become available from a survey carried out by the Territorial Cohesion and Urban Matters (TCUM) Working Group on Energy Efficiency and Renewable Energy, there is still a need for the continued collection of harmonized indicators of energy uses in the regions. Likewise, more immediate information on the risk of poverty in regions and cities is required to implement strategies. Some aspects of energy poverty should be analyzed further by targeted studies, for example the transport modes used for commuting on lower than NUTS 2 level. Not least, the interim findings from ReRisk recommended that the pre-crisis data from 2005 is updated as soon as the impact of the present recession can be captured by more recent statistics, so that post-crisis profiles can be elaborated for the regions.

1.5 Developments in territorial knowledge

The three scientific papers presented in this report illustrate the potential of applied research to contribute to the evidence base required by policies being developed in times of significant change. Individually each paper presents new insights into processes of change that require further examination, but each also rigorously explores how data might be analysed and innovative insights developed into emergent problems and issues.

In particular the papers show the importance of meeting and responding to the challenges of the current data bases that are available to territorial researchers, and how existing, but often previously under-utilised data can be examined to show new patterns of development. This is an urgent and important task given the new boundaries of territorial development and need to seek new forms of co-operation at a variety of spatial scales within current policy responses to EU Cohesion. The papers are also all good illustrations of how to move between the specific conditions that seemingly make up the territorial diversity of the EU, and the generalisations needed to underpin rigorous research and policy evidence, with insightful typologies of regions emerging to inform policy choices.

Together, the three scientific papers reinforce the territorial diversity of the EU and the variety of potentials for economic growth that exist in different regions of Europe. They collectively reinforce the importance of metropolitan agglomeration, the significance of connectivity and the shared vulnerability to climate change. The ability of these studies to explore comparable patterns of behaviour also reveal new results about the potential that can exist in rural areas, the disparities that still exist within Europe's major metropolitan areas and the complex inter-relationships that exist between urban area and urban area, between urban area and its hinterland and rural areas, and the importance of global developments in understanding the significance of these relationships in achieving future economic growth.

2 – Future Orientation for Cities

Project description:

Cities and urban agglomerations: Their functionality and development opportunities for European competitiveness and cohesion

Cities and urban development are a focal point of current territorial development policy. Against the background of the Lisbon Agenda's aim of growth and jobs and EU Cohesion Policy, cities are seen as the main potential motors for the achievement of these goals. The "Leipzig Charter on Sustainable European Cities" also highlights the desirability of complementing the Territorial Agenda by also addressing the issue of sustainable cities.

The following two policy questions are the basis for this project:

- What are the development opportunities offered by the largest cities in the European urban system?
- What are the possibilities to realise and increase these development opportunities through territorial cooperation and the establishment of polycentric urban clusters at different scales and in different parts of the European territory, which can support a better territorial balance and cohesion?

To find answers on these questions, the project has analysed the current knowledge about trends, perspectives and driving forces for urban development in the thematic fields of urban agglomeration, command functions, network connectivity and social cohesion. Using innovative empirical research questions provides a knowledge base on urban development, necessary for integrated prospective thinking. On this basis, scenarios have been developed and a framework for policy options has been elaborated. The research has been done using three different scales – the intra-urban; the regional and the supra-regional; and the European scale with its networks of cities. A very diverse set of data sources have been used, including some of the most recent results of the Urban Audit.

The main results are:

- Indicators offering additional information on the functional specification of FUA/LUZ and new complex indicators of cities´ development opportunities, competitiveness, socio-economic and environmental situations.
- Typologies of the urban system of Europe according to the functional specialisation of the cities and their competitiveness, including the possibilities of enhancing competitiveness through cooperation and the varied impact of cities in relation to different types of territories.
- Case studies of cooperation opportunities of cities/urban agglomerations to improve competitiveness and cohesion.
- Maps of the European urban system revealing functional strengths and weaknesses, territorial classifications and variations of urban functionality, opportunities for competitiveness and cohesion and possibilities for cooperation of cities/urban agglomerations in polycentric zones/clusters.

Consortium

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New approaches to studying the city: Proposals from the ESPON FOCI project

by Moritz Lennert ed.[1]

2.1 Introduction

Cities are seen as an important component of territorial development in Europe. As loci of intensive agglomeration economies they are also often considered as motors of economic growth for the entire European Union. At the same time they concentrate a series of specific issues and problems from housing to mobility, urban sprawl and social cohesion in the very heterogeneous, but promiscuous environment of cities. After a period without specific urban policies during the 2007-2013 financing period, European policy makers are thus once again busy elaborating a specific urban approach.

One difficulty, however, is that we have very little information about European cities, especially when it comes to comparable information across the entire European continent. Generally, cities have been approximated through NUTS 2 and NUTS 3 regions, thus allowing an evaluation of some of their characteristics, notably socio-economic ones.

A new effort at European scale, developed by Eurostat in collaboration with DG Regio is the Urban Audit which uses the recomposition of Local Area Units (LAU – municipality level) to approximate both core cities and their larger urban zones. This database already contains an interesting range of variables for European cities, but coverage is still fairly limited with many variables missing in a significant number of cities.

In addition, cities cannot only be understood in a static territorial manner, but also have to be approached in their functional roles, be it locally within city-hinterland systems or globally as nodes of world economic networks. So functional approaches are needed in addition to the existing indicators.

In this paper we present some of the quantitative analyses elaborated by the FOCI project. First we show how we have used some of the official data and then we explain some of the attempts to develop new methodological approaches to study the state of European cities. We begin with classical NUTS approximation to then present the Urban Audit and some usage of it. We then go on to introduce a specific attempt at analysing city-hinterland regions, using NUTS-level data, but in an innovative way. The same goes for the following section where functional urban areas are approximated by NUTS in order to estimate their possible divergence or complementarities and thus their potential for cooperation.

In the second part, we present specific data collection efforts led during the ESPON FOCI project in order to increase the information available on cities. The first represents a form of accessibility measure, called contactability, and is based on the collection of time schedule based air and rail connection data between cities. The second uses the Bureau Van Dijck ORBIS database on firms and their ownership networks to analyse the position of European cities in such networks.

[1] The research described in this paper was not conducted by the author himself, but rather by different partners of the ESPON FOCI project, notably Céline Rozenblat (IGUL) on firm networks, Alain L'Hostis (LVTM – INRETS) on contactability, Maciej Smetkowski (EUROREG) on city-hinterland relations, Minas Angelidis (NTUA) on regional city network cooperation potentials, and Gilles Van Hamme (IGEAT-ULB) on the NUTS approximations and Urban Audit data use. Any misrepresentation of their research is, however, the lone responsibility of the author.

2.2 Approaches based on EU NUTS units and the Urban Audit

2.2.1 NUTS regions representing cities

The most classical form of analyzing cities in Europe is the use of their approximation by NUTS units. The advantage of such an approximation is the consequent availability of large, well-known and harmonized datasets which thus give an easy access to basic information about cities. There are, however, issues with using these statistical units which in most countries were not conceived as representative of cities. First of all, the question is which delineation of the city to choose as the basis of the approximation. A second issue concerns the choice of population (or other) threshold beyond which an approximation is considered acceptable. Such a threshold is always arbitrary to a large extent and no right choice exists. DG Regio uses an approximation which allows the use of a NUTS3 unit if at least 40% of the population of this NUTS3 unit live in the larger urban zone (LUZ - Urban Audit definition, see below). In the FOCI project, we decided to increase this threshold, notably because we were afraid that the analysis of urban evolutions might be misleading if more than half of the population did not live in the urban area. We thus used the following criteria for the NUTS 3 approximation:

1. Only LUZs with over 250,000 inhabitants have been included.
2. Only LUZs exceeding 70% of the population threshold of NUTS3 unit have been included. In case of LUZs consisting of more than one NUTS3, only regions with at least 50% of the population living within LUZ were considered as a part of the metropolitan area
3. Polynuclear metropolitan areas have been defined in the following circumstances:
   - The distance between LUZ's core cities have been smaller than: 60 km in case of LUZs with over 500,000 inhabitants or 30 km in case of smaller LUZs.
   - Rule 2 applies to the whole polynuclear metropolitan area.

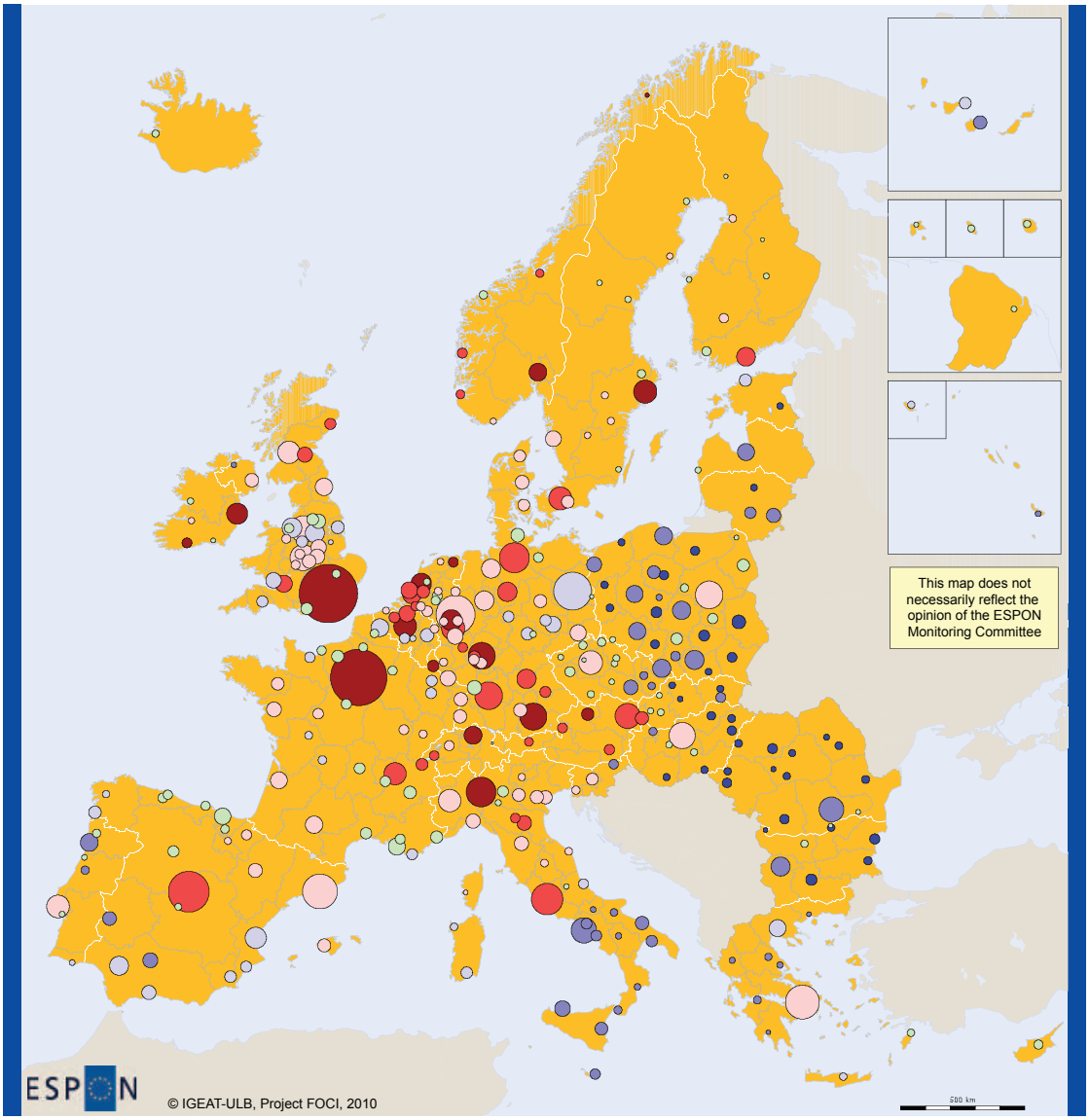
Obviously, these criteria are arbitrary, and their efficiency varies from country to country because of different national situations (and large differences in NUTS unit sizes). However, this definition allowed us to cover most of the larger European cities with over 200 cases.

Similar criteria were used at NUTS 2 level which provides a richer set of available indicators, but the number of cities that we esteemed possible to approximate at this level was only about 50.

Map 2.1 and Map 2.2 show the results of these approximations. Map 2.1 represents GDP per head in NUTS 3 approximations of Urban Audit cities and highlights firstly the gap between Eastern and Western Europe. Second, it shows lower GDP per head in Southern cities. Third, one can clearly see that big metropolitan areas have reached the average EU GDP per head in Eastern and Mediterranean countries, except for Sofia and Bucharest.

The second map is based on NUTS 2 approximations of Urban Audit cities, thus limiting the number of cities with data available. However, this level of approximation allows us to use more data, such as results from the Labour Force Survey. The indicator mapped here is the unemployment rate of lowly qualified persons minus the overall average unemployment rate in each city. What we can see is that in nearly all European cities, unemployment rates are higher for the low qualified than for the average of the entire active population. However, the gap between low qualified and the rest has a strong geographical pattern: while it is very high in most of Eastern and German cities, it shows very little differences in Southern Europe where low qualified persons often have similar unemployment rates to the average.

Map 2.1 GDP per capita in European cities, 2006



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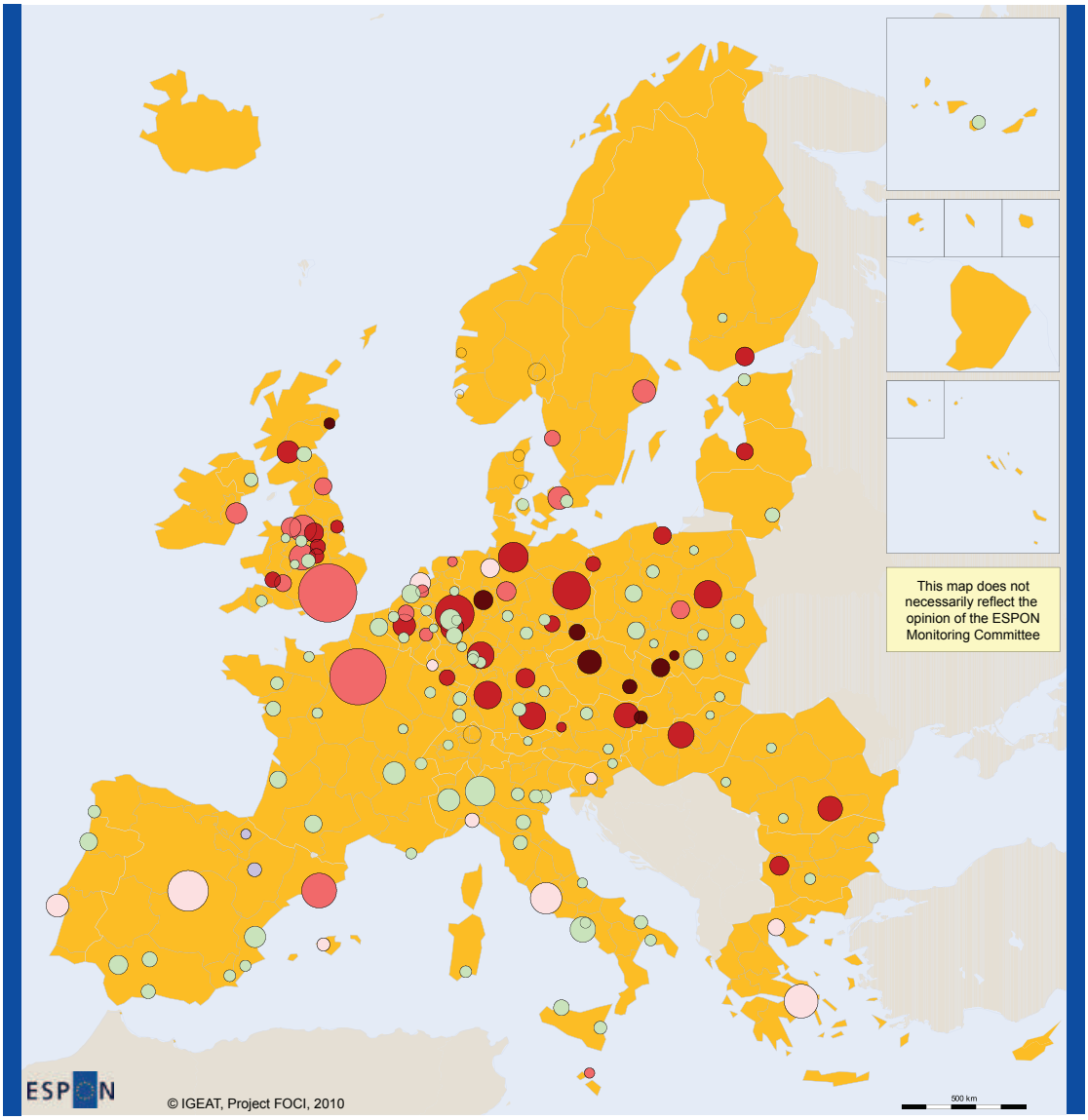
Regional level: LUZ proxy by NUTS3
Source: IGEAT-ULB, 2010
Origin of the data EU-27: Eurostat, Regional accounts, 2009
Norway and Switzerland: ESPON DB and personal calculations, 2008
© EuroGeographics Association for the administrative boundaries

GDP per capita in PPS
(EU27 = 100)

- 22 - 50
- 50 - 80
- 80 - 100
- 100 - 130
- 130 - 160
- 160 - 255
- No Data

Total population of the city

Map 2.2 Disparity in unemployment rates between low qualified persons and city averages, 2006



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Regional level: LUZ proxy by NUTS2
Source: IGEAT, 2009
Origin of the data: LFS, 2008

(Unemployment rate of low qualified persons in cities) - (Average unemployment rate in cities)
(in %)

- -0.50 - 0.00
- 0.00 - 0.75
- 0.75 - 1.25
- 1.25 - 2.00
- 2.00 - 3.80
- No Data

Total population of the city

2.2.2 The Urban Audit

The Urban Audit is a recent effort by Eurostat in collaboration with DG Regio aiming at the collection of city-level data. Cities are defined at two levels, with both levels based on LAU2 (municipal) units. The first level, the core city, is defined as an "administrative Town / City (e.g. the central municipality), which is responsible for local government." (European Commission 2004, p.10) while the second level, the larger urban zone (LUZ), is based on the notion of a Functional Urban Region (FUR), a concept which has diverging, and sometimes nonexistent, definitions across member states. "FURs are also most commonly defined by grouping together LAU level 2 (municipalities; former NUTS 5 regions), without further consideration of administrative delineations on higher levels." (European Commission 2004, p.11).

Data collection has been ongoing for several years now, in 3 year cycles, but with varied success in terms of actual geographic and thematic coverage. The available data have been extensively analysed in the State of European Cities Report (Ecotec et al 2007) and in the forthcoming second version of this report.

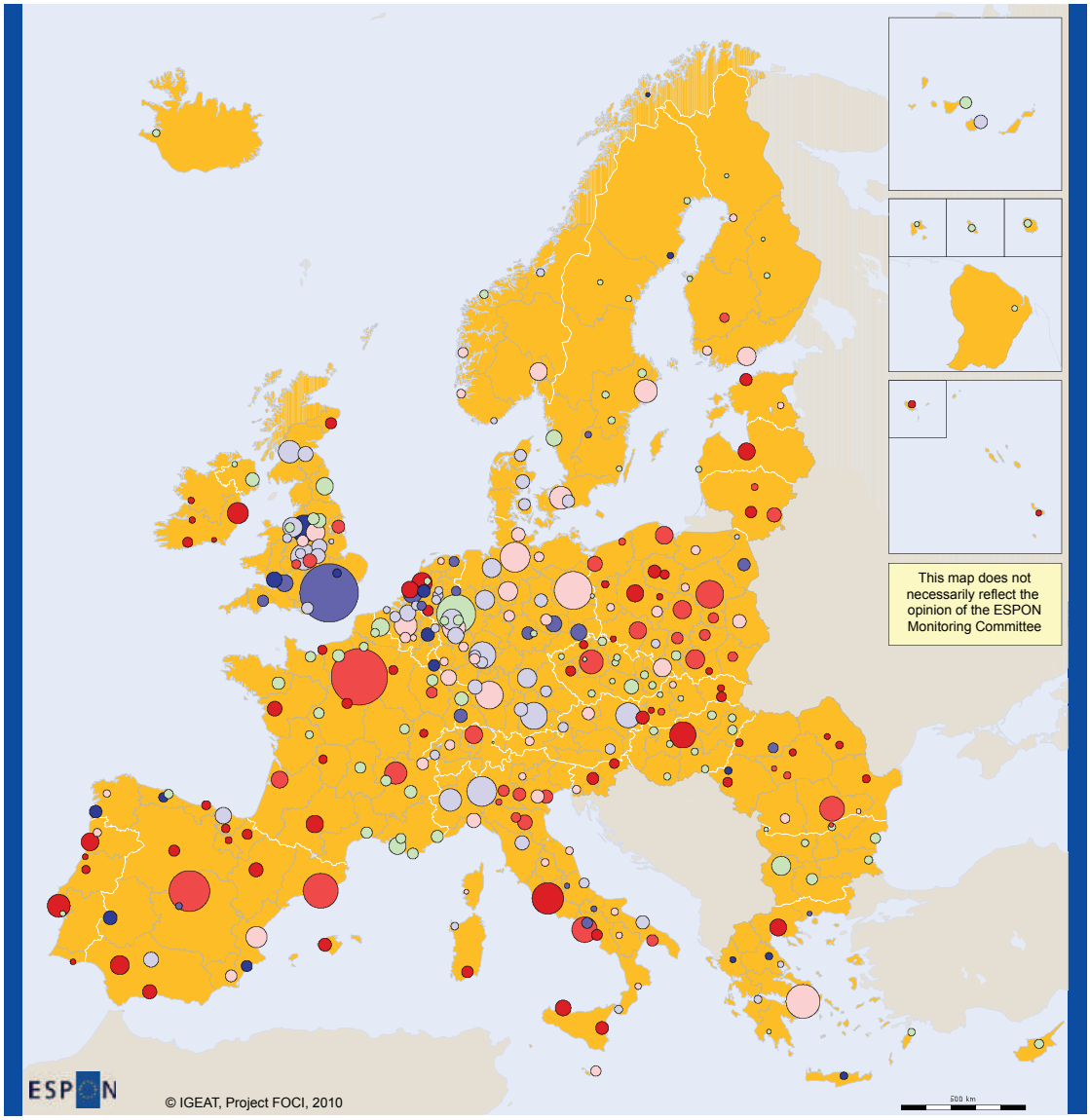
In the FOCI project we used the data as much as possible, that is, whenever an indicator was available for a sufficient amount of cities. Map 2.3 presents a typology in which we distinguish firstly between growing and declining Larger Urban Zones (LUZ), and then secondly, we take into account the dynamics in the core cities as opposed to the rest of the LUZ. On this map, we can identify several major types of urban evolution:

- In the dense urban and central parts of Europe, many cities are characterized by their population growth in both core and peripheries, with often higher growth rates in the core cities;
- In Eastern Europe, most of the cities are characterized by the decline of their population with an intense process of suburbanization, except mainly Warsaw and Praha;
- In Mediterranean LUZ, we observe population growth with an intense process of suburbanization.

Another interesting aspect of the Urban Audit is its attempt to go even deeper than the city level and collect data for sub-city districts (SCD). These districts should have a population between 5000 and 40000 inhabitants and should be fairly homogeneous internally in terms of social composition and built structure. These constraints have been met "by the different countries with varying degrees of success" with one important factor being "the availability of statistical data for the SCD defined" (European Commission 2004, p.12).

Map 2.4 shows the usage of this sub-city level data, depicting the weighted variance of unemployment rates by district. It shows large differences in the socio-spatial inequalities in the cities: the highest levels are reached in UK, France, Belgium and some cities of southern Europe. We find low levels in most of the Eastern countries (except Poland), in Nordic countries, in Western Germany and Northern Italy. Low socio-spatial inequalities in Eastern cities are probably the result of real estate mechanisms and are still to a certain extent a heritage of the communist period. One important element to note, however, is the apparent absence of correlation between socio-spatial inequalities and the level of GDP per head in European cities.

Map 2.3 Disparity in population growth between suburbs and core areas of cities, 2000-2006



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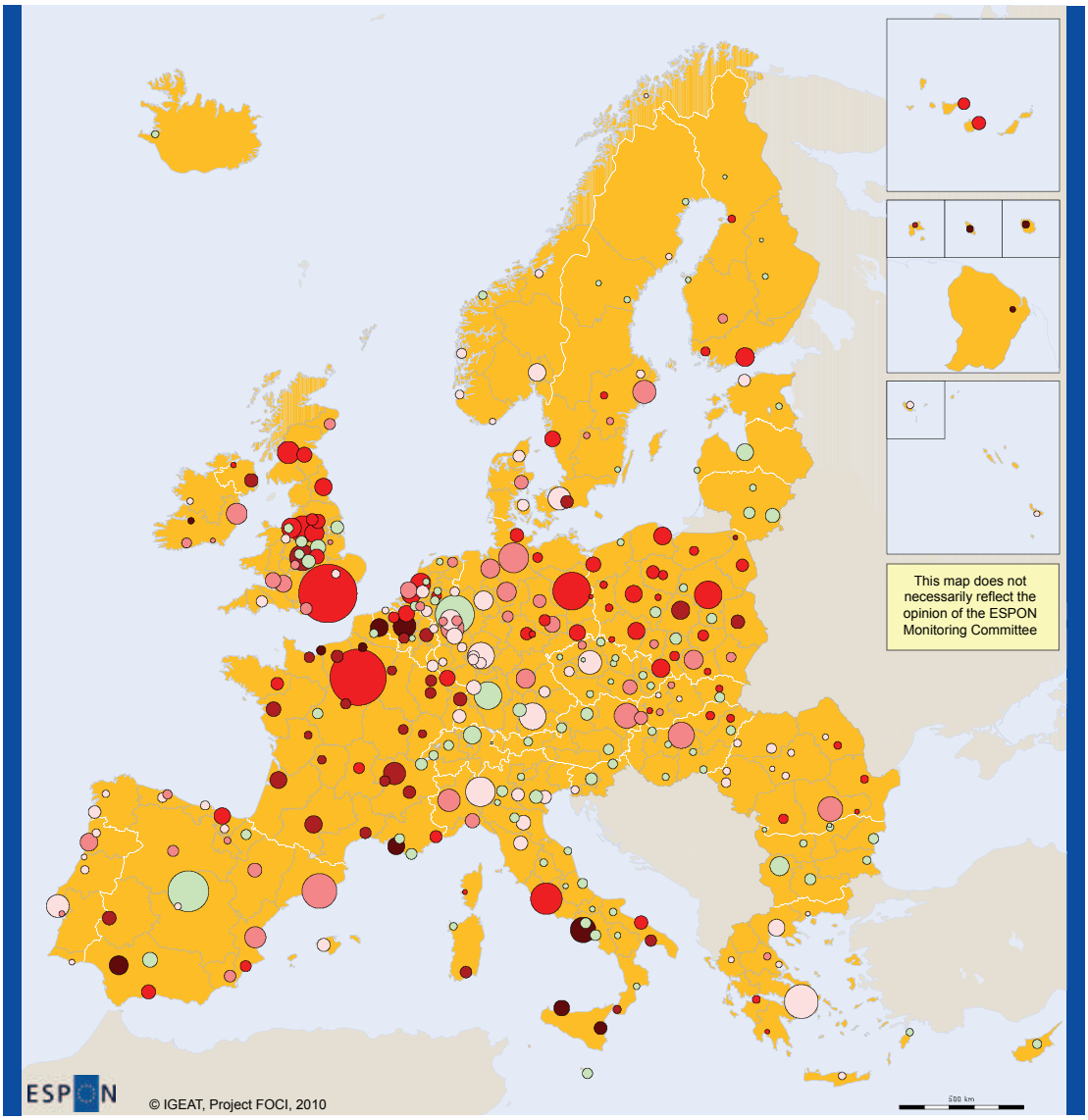
Regional level: LUZ
Source: IGEAT-ULB, 2010
Origin of the data: Urban Audit, 2010

Difference in the population growth between suburban and core areas of the LUZ

- -6.0 - -1.0
- -1.0 - -0.5
- -0.5 - 0.0
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 5.0
- No Data

Total population of the city

Map 2.4 Weighted variance in unemployment rates by city districts, 2000



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Regional level: core city
Source: IGETA-ULB, 2010
Origin of data: Urban Audit
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Weighted variance of unemployment by district

- 0 - 2
- 2 - 5
- 5 - 20
- 20 - 50
- 50 - 130
- No Data

Total population of the city

2.2.3 Approaching city-hinterland relations

An important issue in the current policy debates is the question to what extent cities play a role of motor of economic development, but also as service provider, for their wider hinterland. The German notion of "metropolitaner Verflechtungsraum" is a perfect example of such an approach (BMVBS 2006, p. 12ff). At the same time many authors have put forward the hypothesis that the regional hinterland is no longer needed by the metropolises as it does not offer the resources that are necessary for metropolitan development (cf. e.g. Castells 1998, Sassen 1991, Jałowiecki 2000, Kunzmann 1998), and the hinterland is therefore undergoing a relative marginalisation, while the differences in the development level between the metropolis and its regional surroundings are increasing. However, very little empirical information exists about these phenomena.

Obviously it is very difficult to define a city's hinterland. Some would consider the Urban Audit LUZ as this hinterland, but in the FOCI project we have considered that the LUZ represents the metropolis and that the hinterland is rather the even larger surrounding area. Starting from the NUTS3 approximations of the LUZ explained in the previous section, we have applied a very simple operational definition of the hinterland:

1. The FOCI 'regional hinterland' consists of all NUTS3 regions contiguously neighbouring the NUTS 3 representation of the LUZ in a respective country.
2. Additional NUTS3 regions are added if at least 75% of their total area is within the range constituted by the maximum distance between the LUZ's core city and the farthest point of the neighbouring regions.
3. LUZ regions situated in the regional hinterland of another LUZ constitute a part of the regional hinterland of that LUZ if the ratio of the population size between the latter and the former LUZ is more than 3.
4. A NUTS3 units that is part of two different 'regional hinterlands' constitutes a part of the regional hinterland a) of the larger LUZ if the ratio of the population size between the larger and the smaller LUZ is more than 3, b) of the metropolitan area of the LUZ it is contiguous with, or c) of the LUZ situated in the same NUTS2 region.

Such approximations based on NUTS3 units are obviously a blatant simplification. Among the weaknesses of this approach, the following might be indicated:

- significant differences between the approximations of metropolises and their hinterland because of significant differences in the size and nature of statistical divisions in individual countries,
- the neglect of functional ties between territories, and
- the necessity of raw estimations in case of densely populated areas with a polycentric settlement pattern.

However, other possible solutions based on smaller units are affected by insufficient availability of socio-economic data. In the project report we present a detailed analysis of the national specificities related to this approximation.

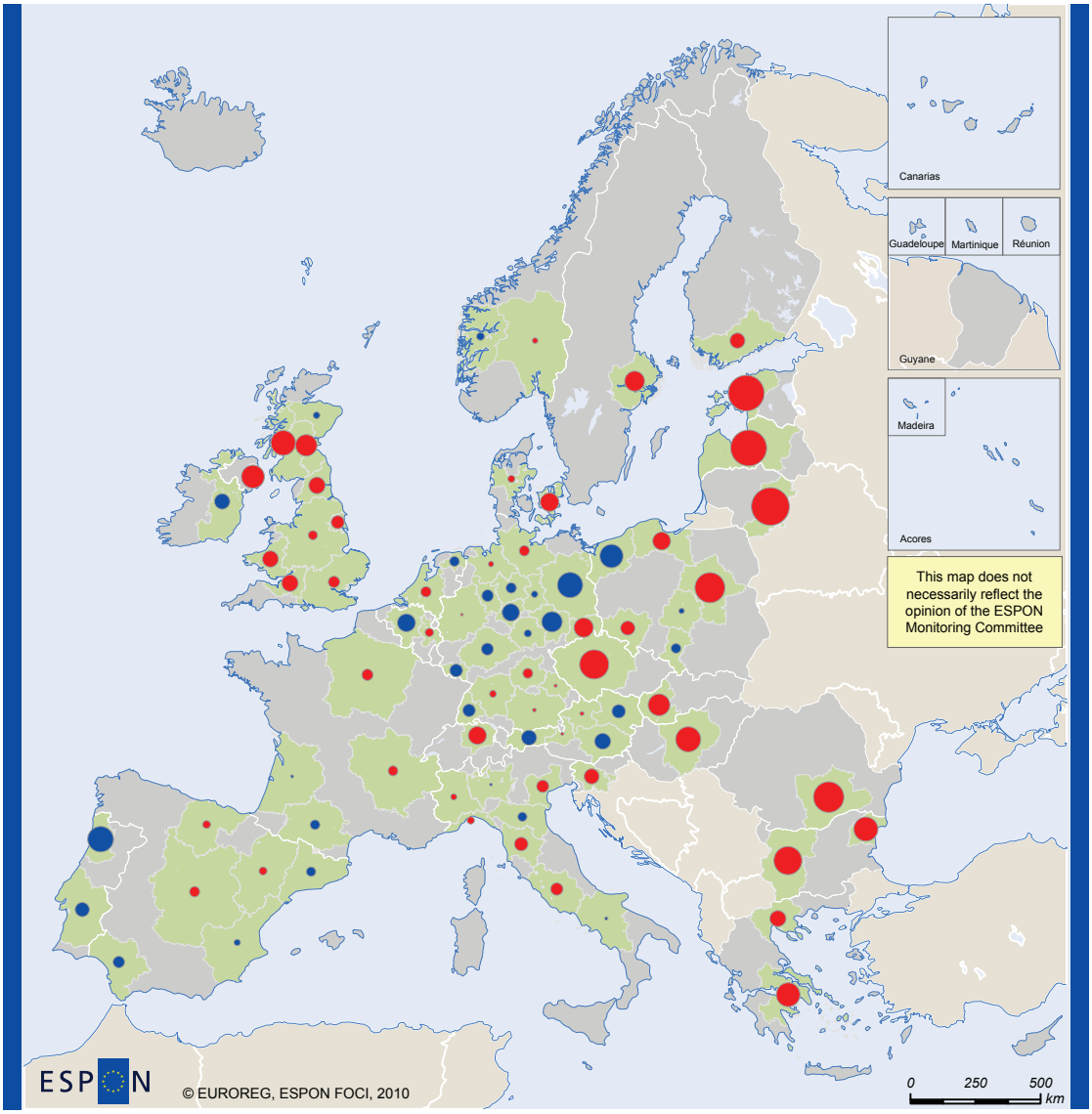
Map 2.5 shows an analysis based on this approximation of metropolises and their hinterland. The indicator presented is the evolution of the disparities (measured as the ratio between the GDP per capita of the metropolis and of the hinterland) in the period 1995 to 2004. The general trend seems to be an increase of development disparities between the metropolis and the surrounding region. This can be viewed as a consequence of metropolisation processes, which lead to a faster development of the large urban centres which can pool the resources indispensable for the development of the information economy more than their regional hinterlands, which in many cases function in the previous industrial or agricultural development paradigm. This does not necessarily mean, however, that the hinterland does not profit from this faster development of the metropolis.

Opposite processes were also taking place in some of the macroregions, but this was usually either as a consequence of enormous intraregional disparities or of lower rates of economic growth in the countries in which they were located. The national context plays an important role in analysing the development dynamics of metropolises as the nationwide rate of growth is as a rule strongly correlated with the rate of development of metropolitan areas.

In order to understand the diverging evolutions between cities and their hinterland, we analysed the disparities within metropolitan macroregions in terms of the correspondence of demographic processes, structural changes and labour market fluctuations. Results of our analyses point to a significant role of the national and regional contexts, which shows the importance of the individual particularities of each of the surveyed macroregions. Nevertheless, taking into account the above dimensions of disparities, we identified several main types of conditions determining the economic relationships between the metropolis and the region observable in Europe (Map 2.6).

The capital city macroregions of Central and Eastern European countries were the most conspicuous of metropolitan macroregions. In this group, it could be clearly observed how metropolises break the ties with their regional hinterlands. This was probably caused by the rapid pace at which the capital city metropolises joined the mainstream of an open networked economy, with a dominance of traditional functions such as low-productivity agriculture and declining traditional industries in the economies of their regional hinterlands. To some extent, this type was imitated by other, usually smaller cities with peripheral locations, where similar processes took place but with a lower degree of macroregional divergence as the insertion of these smaller cities into the European and global economy went at a slower pace. At the same time, highly industrialised regions ("industrial" or "problem" regions) were relatively the most internally coherent. However, during the process of adapting their economic structures to the conditions of global information economy, their intraregional convergence would as a rule decrease. The remaining types of regions were quite varied despite a similar scale of intraregional disparities in the level of economic development.

Map 2.5 Disparity in GDP levels between metropolises and hinterlands, 1995-2004



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Regional level: NUTS3
Source: ESPON 2013 Database
Origin of the data: ESPON project FOCI, 2010
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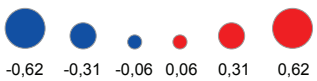
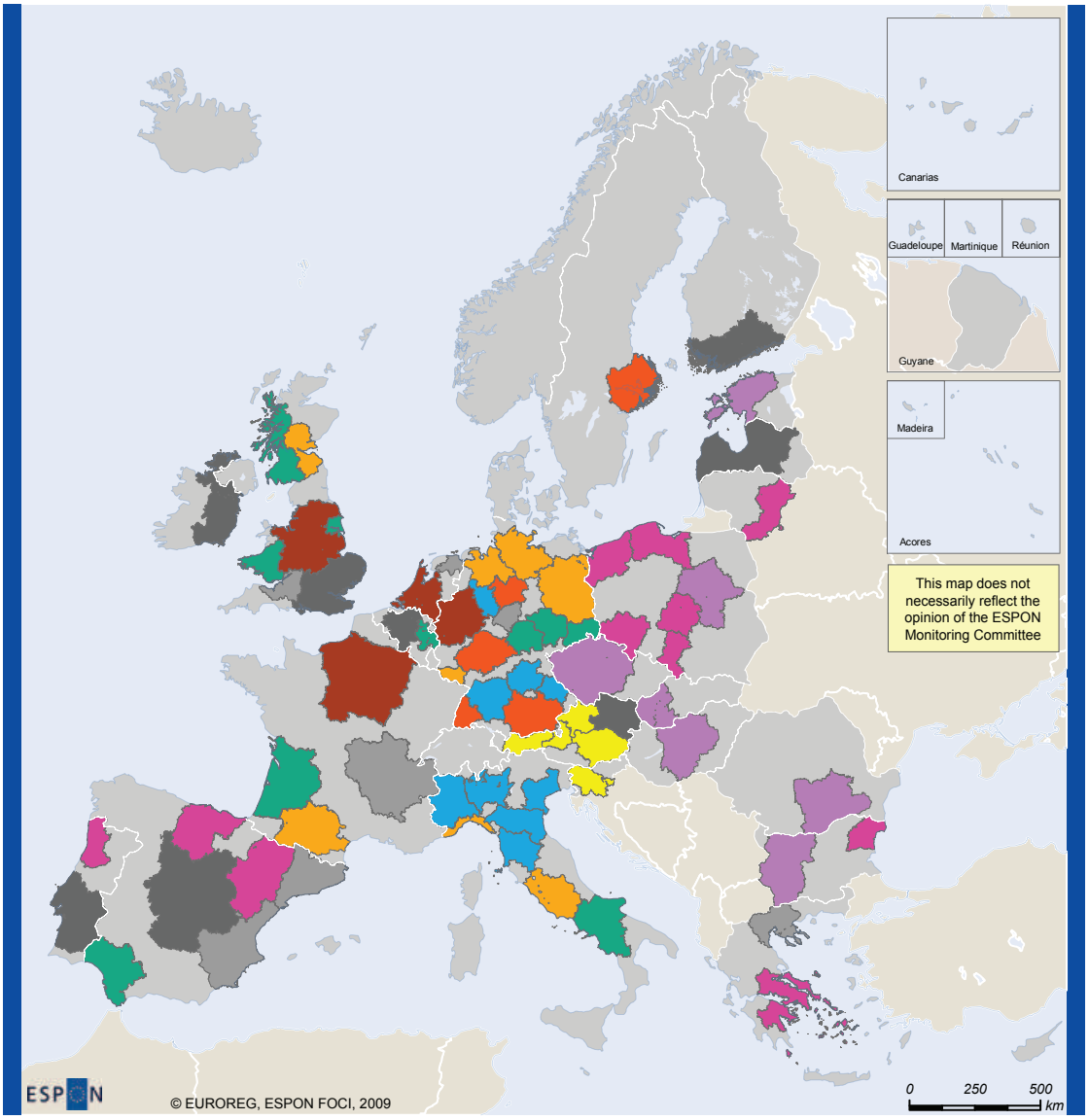
Change in GDP per capita ratio 1995-2004



Map 2.6 Typology of metropolitan macroregions



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Regional level: NUTS 3
Source: ESPON 2013 Database
Origin of data: ESPON project FOCI
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The most common types of metropolitan macroregions

1. Monocentric service centers surrounded by regional hinterland with labour market problem (8)
2. Central service centers surrounded by industrialized regional hinterland (5)
3. Small service centre surrounded by mountain areas (5)
4. Polycentric metropolis in polycentric regions (4)
5. National growth poles surrounded by industrialised areas (9)
6. Restructuring cities in problem areas (10)
7. National growth poles surrounded by traditional rural areas (CEECs capitals) (7)
8. Smaller cities in peripheral areas (11)
9. Other macroregions – capital cities (8)
10. Other macroregion – non capital cities (7)

2.2.4 Using NUTS data to evaluate cooperation potential between cities

> "Public policy can help territories to make the best use of their assets. In addition, it can help them to jointly respond to common challenges, reach critical mass and realise increasing returns by combining their activities, exploit the complementarities and synergies between them, and overcome divisions stemming from administrative borders."

This statement from the "Green paper on territorial cohesion" (European Commission 2008) is representative of the general policy-driven approach to city cooperation and city networks in Europe. Polycentricity is a major theme of European territorial development documents (as was already the case in the European Spatial Development Perspective and the Territorial Agenda), with the general idea that cities can enhance both their sustainability and their competitiveness through polycentric cooperation networks, for example by reducing commuting and by increasing critical mass. ESPON has already provided several attempts at grappling with this concept, but it remains difficult to circumscribe and to define precise content.

From a spatial planning point of view, a particularly useful step is to go beyond the "concentration" and hierarchy components of polycentricity by further exploiting the concepts of existing and potential activities (firms) networks and urban networks in relation to territorial complementarities. Complementarity can be about the whole range of urban functions, not just business and economic development (Hague and Kirk 2003). According to Meijers (2006a), in order for cities in polycentric urban regions to be complementary, there must be differentiation between the cities in terms of urban functions or activities as well as the geographical markets of demand for their urban functions/activities or environments must at least partly overlap. Activities in one city should provide their services also to businesses or citizens located in the other city. Businesses and households should consider the working and residential environments in several parts of the polycentric urban region with respect to their location decisions.

In order to provide a very first step in the direction of identifying potentials of complementarities and thus of cooperation between cities, we attempted first to define areas that could be identified as potential urban networks and then we tried to measure their actual potential. This is highly experimental work, and at this stage still far from directly usable for policy conclusions, but the methodology is worth presenting for furthering the scientific discussions on this issue. In order to identify the networks (or potential polycentric areas) within which complementarities were to be analysed, we tried several different methods. The one we decided to use for further analysis is based on work in previous ESPON 2006 projects (1.1.1 on Polycentricity and 1.4.3 on Urban functions): using 90-minute isochrones from city centres, and including in each "area of interest" those LAU2 units of which more than 50% of the area is included in the isochrone. Further on, we developed a method of identification of "regional" urban networks using isochrones from the "regional" or "provincial" centres as not overlapping "service" territories. Whenever possible, each of the urban areas included in a given network was then approximated by a NUTS3 unit in order to provide access to the relevant dataset.

We attempted evaluating levels of divergence within these potential polycentric areas based on economic sectoral structure (6-sector resolution). The data is processed through a correspondance analysis, a technique which allows to visualise (dis)similarities between data points, and offers a single, summary statistic describing the differentiation within a given group of points, the inertia. When inertia is low when economic structure of the cities in a given area is similar, it is high when the structures are very different from each other.

Several problems have to be acknowledged with this methodology:

- There are no values of total inertia for the cases of urban networks of which all members are located in the same NUTS3 unit.
- The results for the cases where two or more cities are located in the same NUTS3 unit are not very useful.
- The same is valid for urban networks with only two cities.

In summary, we have useful results only for about 120 urban networks. Other attempts were made to define networks on more functional criteria, notably the road traffic between cities. However, such data is not available for all of Europe.

Map 2.7 shows that the highest total inertia values, reflecting a high degree of functional differentiation (complementarity) are observed in urban networks of the Eastern and Southern Europe countries, mainly in those networks dominated by capital cities. This can be seen as a confirmation of the results of the city-hinterland analysis which also showed that the differentiation between the large cities and their surroundings is particularly high in Eastern Europe. However, differences are also notable in those networks of Western Europe where the one or more dominant cities are highly specialized in financial services.

Two elements limit the immediate usefulness of these results, however:

- Representing cities through NUTS 3 units within such regional networks represents a very gross approximation. Ideally work should be done with smaller units, such as LAU2 but hardly any sectoral information exists at this level.
- Even at NUTS 3 level the only harmonised sectoral data currently available is in a very coarse six-sector resolution which only gives very rough ideas of economic structure. It seems quite clear (amongst others from the city-hinterland analysis) that cooperation is probably going to happen more in areas where the complementarities play out at much finer sectoral resolution within fairly similar sectoral structures, than in areas where a specialisation in high-level finance is opposed to one in agriculture.

2.3 Approaches based on New Data Sources

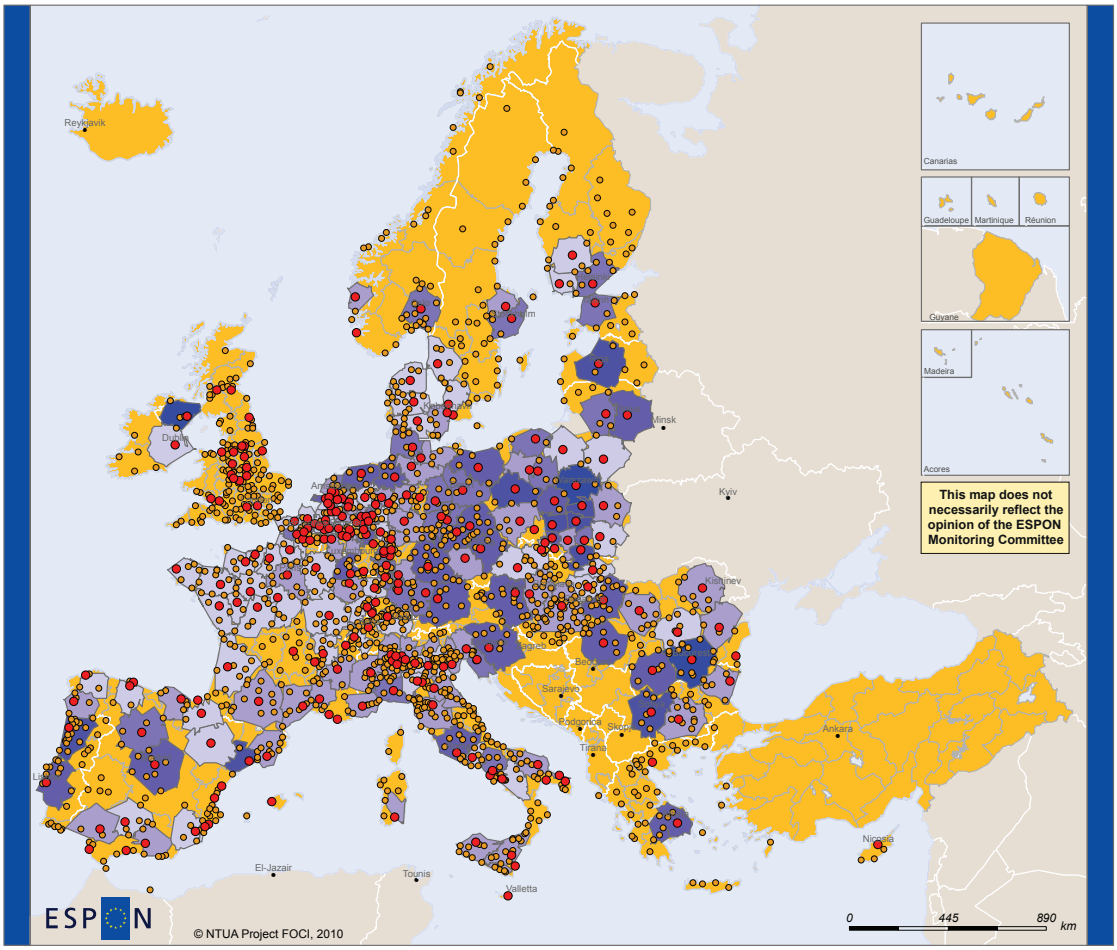
2.3.1 From accessibility to contactability: using actual transport timetables

Accessibility is a fundamental ingredient to the development of a city, both in terms of attractiveness and in terms of insertion into networks of economic and political decision-making. The existing accessibility indicators used in ESPON, notably in the ESPON 2006 projects 1.2.1 “Transport Trends” and 2.1.1 “Transport Policy Impact” used a measure of potential accessibility, based on what the existing physical infrastructure could provide in terms of transport flows. However, the former also introduced into ESPON the notion of contactability.

Contactability is defined by Haggett (Haggett 2001) as the possibility to contact people in a distant city. Contactability analysis in a regional space was studied with specific indicators allowing for daily journey-to-work between majors cities (L'Hostis et al 2004). In the ESPON project 1.2.1 contactability indexes were developed under the aspect of daily accessibility. The main idea behind these indicators is to measure the “the interrelationships between activities in space and time, and the role of transportation and communication technologies in facilitating and constraining these relationships” (Miller 2004)

In the concept of contactability, the quality of the link between two poles can be assessed through the possibility to go from the pole A to the pole B, to have enough time for an activity related to work, education or other purposes, and to come back to pole A in a single day. Reciprocally, one can assess the possibility for a city to foster an event gathering people from remote metropolises.

Map 2.7 Functional differentiation in urban networks, 2006



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Regional level: NUTS 3 and FUAs
Source: FOCI project, 2010
Origin of data: Employment in 2001 per six groups of NACE brunches: Eurostat, 2009
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Total Inertia of the "regional urban systems"
(for the measurement see explanation in the text)

- 0,0032 - 0,0238
- 0,0239 - 0,0490
- 0,0491 - 0,0845
- 0,0846 - 0,1392
- 0,1393 - 0,2449
- 0,2450 - 0,5238

The “regional urban systems” are included in respective “regional territories” which are defined as following:
We have created “service areas” of the FUAs with more than 250.000 inhabitants at 90 minutes time-distance from the centroid of each FUA (the boundary of the service area corresponds to the 90 minutes isochrone from the FUA).
We have taken the option that the “service areas” to be not overlapping in cases two FUAs are distant less than 180 minutes (the common edge of the two respective service areas is equidistant from the two FUAs)

- FUAs with more than 250.000 inh. in 2000
- All FUAs

The same criteria are used but inversely, to allow for people from city A to get to city B, and to hold a meeting there. The indicator expresses the attractiveness of city B to organize a conference, an event with several persons. A high level on this indicator will be necessary to develop a congress activity of a city. This direction of the relation is also useful for universities, research centres, firms headquarters that need to gather persons from several remote cities, for seminars, colloquium and board of administration.

In order to be able to evaluate actual contactability between cities in Europe the use of timetables appears indispensable since short travel times and high frequencies are necessary but not sufficient to guarantee high daily accessibility levels, and thus the adequacy between timetables and mobility rhythms must be tested. We collected such timetables for both air and rail. For air transport we used the OAG database[2] of flights operated in winter 2009. This database is readily available at a fairly reasonable price and has been used in previous ESPON studies. Concerning the rail system, however, such a database does not exist and so we developed a system of automatic query of the major cities and major rail nodes on the Deutsche Bahn website. It covers all direct trains between a selection of about 400 cities in Europe for a typical weekday of the winter 2009. The base of the urban grid is constituted by the Urban Audit list of cities. The territorial base includes all countries of the ESPON space up to Moscow.

Additional data was used to connect transport nodes –station and airports– to cities, in order to obtain a door-to-door approach. In addition several nodes where air to rail transfer is possible were introduced. The criteria to introduce such possibility rely on the presence of long distance trains inside airports. Therefore, we have not introduced dedicated airport-city rail link in the analysis.

Besides the tremendous effort necessary for downloading the train time tables in a structured and useful form, this approach also implies a series of methodological difficulties. A major issue is the question of which cities are to be considered to be part of the influence zone of which airports. For example, Belgian cities such as Antwerp and Ghent can reasonably be considered as being served by Brussels airport. Linked to that is the question of how to include the possible use of road transport in order to reach an airport within a certain distance, thus making this airport into the dedicated airport for a given city, even though it is apparently at a sufficient distance in order to consider it as separate from this city. The choice of airport-city attribution is thus somewhat arbitrary and will influence the results, at least at the margins.

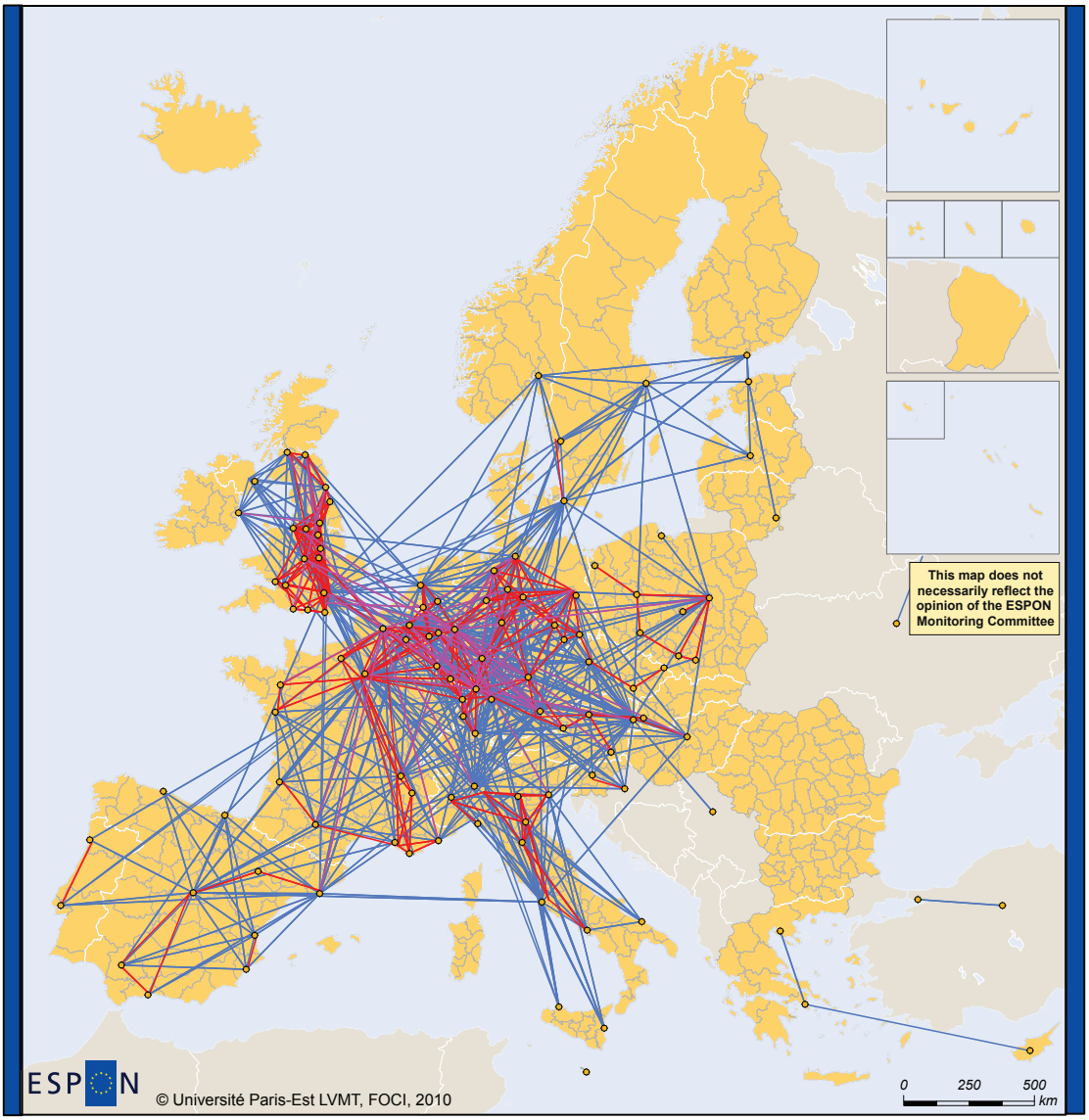
Following the approach adopted in earlier ESPON projects (1.2.1), we propose to evaluate the possibility of single day business trip with 6 hours available at destination and within the time window 5h-23h, in a door to door approach.

Map 2.8 shows the results of this analysis. Several key elements are worth highlighting. First, the very high importance given to rail is striking, especially when we consider that links appearing on the map express the best spatio-temporal performance; this means that rail is able to compete with air for a large set of proximity relations. One must notice though, that the national logic is very present as can be seen in the Italian case; the high-speed rail line opened recently between Naples and Milan allows for strong integration of the national city network with rail. Nevertheless Italian cross border links rely mostly on the air mode. The second element is the high level of integration of most of the European space. The Iberic Peninsula is strongly linked to the Pentagon, and the relations towards eastern countries like Poland or Hungary are clearly shown, even if their intensity is much lower than what can be seen inside the Pentagon. The integration of the Eastern Balkans proves more difficult; in this part of the territory the peripheral character and a lower density of large cities lead to a much less intense level of potential relations. Thirdly the combination of rail and air plays a decisive role in the integration of the network.

Map 2.9 shows an extract of Map 2.8, focusing on the mode of rail. It is important to remember that the links shown are those for which rail is better than air. The main message coming out of this map is that several present missing links can be identified. Many state borders remain visible on the map hinting at the fact that the main missing links are mostly international. Rail is present in intra-national inter-metropolises daily relations, but is much less present in international relations.

[2] http://www.oagaviation.com/Solutions/Aviation-Data/OAG-Schedules-Data

Map 2.8 City network contactability by rail and/or air, 2009



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Regional level: MEGa
Source: FOCI project, 2010
Origin of data: air: OAG database, rail: Deutsche Bahn website, 2009

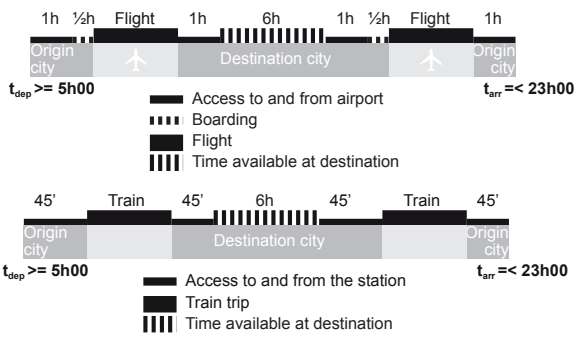
MEGA

Reciprocal return trip by rail

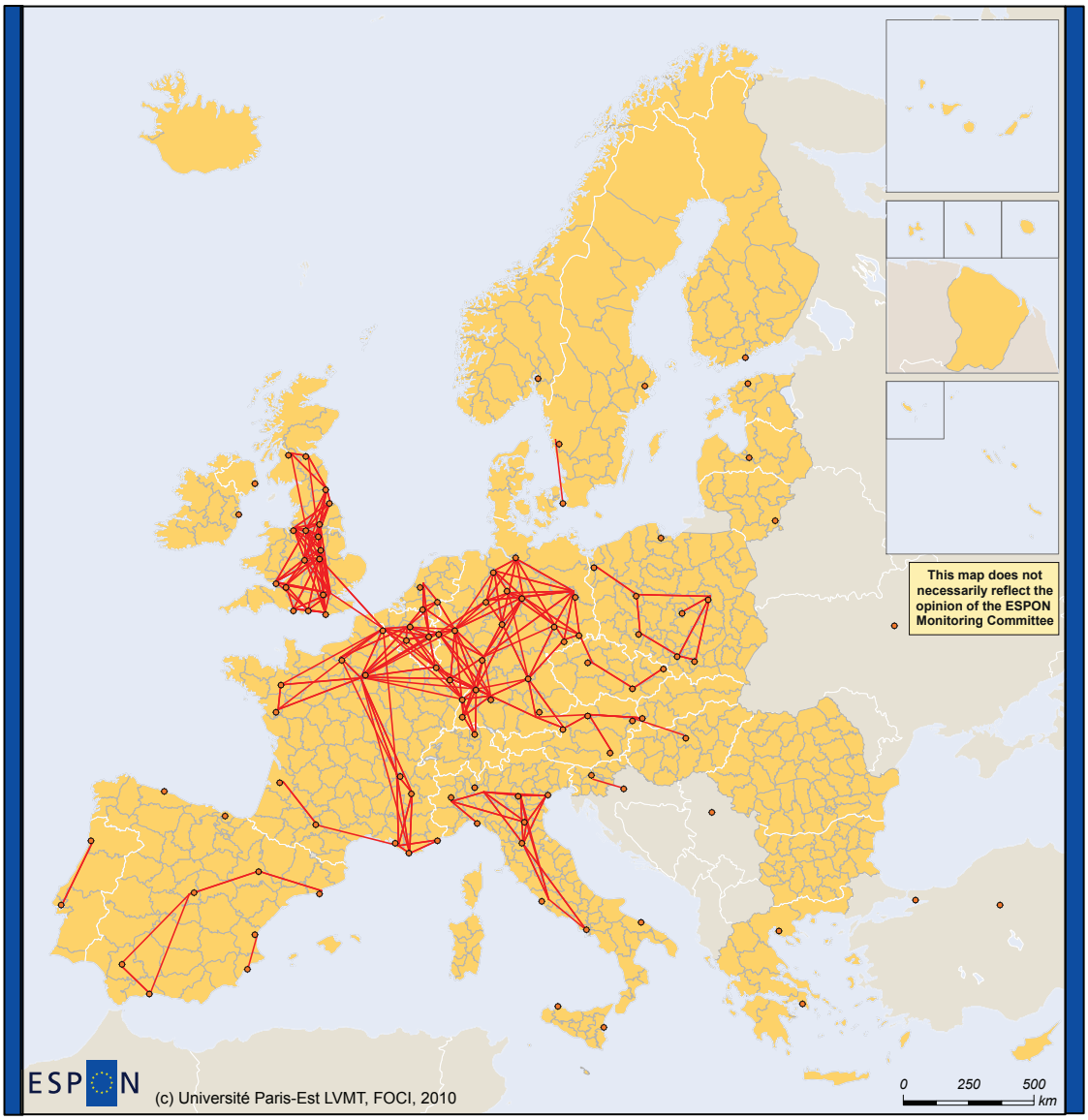
Reciprocal return trip by air

Reciprocal return trip by combination of air and rail

Structure of the return trips:



Map 2.9 City network contactability by rail, 2009



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Regional level: MEGa
Source: FOCI project, 2010
Origin of data: rail: Deutsche Bahn website, 2009
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MEGA

Reciprocal return trip by rail

Structure of the return trips:

2.3.2 Cities in firm networks: using the ORBIS database

The centrality of cities in the global economy constitutes an important component of urban competitiveness (Begg 1999). Most studies have measured the various centralities of cities according to their accumulated stock of population, wealth and portfolio of activities. For instance, global cities are defined as leaders in advanced producer services (Sassen 1991, Taylor 2001). But other measurements of urban centrality have been based on their position in various networks, mainly multinational firms' subsidiary networks, which are recognized as powerful actors in the globalization process. Multinational firms are supposed to confer power to cities not only through their locations but also through their connectiveness (Allen 1999 and 2008, Taylor 2001, Rozenblat & Pumain 1993 and 2007, Alderson & Beckfield 2004, Wall & van der Knaap 2009). This power is enhanced by several urban accumulation processes improved by the location of multinational firms, such as activity support, employment growth, investment, and technological and social innovation spillovers. These processes are an essential component of urban adaptation to socio-economic changes through firms' external relations. Global centrality clearly denotes a positive local urban resource (for a comprehensive review, see Bathelt et al 2004). Thus, these worldwide networks provide crucial resources for urban development.

Conversely, systems of cities form a set of resources for multinational firms (Neal 2008). Cities allow multinational firms to connect and to take advantage of inter-firm and social networks, thanks to spatial proximity to other agents and to some organized sets of agents, while reducing transaction costs, fostering access to the networks, and increasing transactional mutual values (Williamson 1975 and 1985, Zajac & Olsen 1993). These social and economic networks span a variety of geographical scales.

In order to measure positions of cities through such corporation networks, we built a database including all the direct and indirect subsidiaries of the first 3.000 worldwide companies groups by their turnover (based on the ORBIS database, Bureau Van Dijck, 2007 version[3]). Each group is seen as a (quasi) tree, owning subsidiaries which themselves own other subsidiaries and so on. It results in a sample of 400.000 subsidiaries located all over the world, linked by 600.000 financial links, which are directly or indirectly owned (at least at 10%) by the main first 3.000 groups. These subsidiaries are allocated to metropolitan areas, and defined by their activity sector (NACE), their turn-over and number of employees when it is available, and by their owners and subsidiaries. The network constructed out of these firms and their ownership relations was then analysed using standard network centrality and linkage analyses.

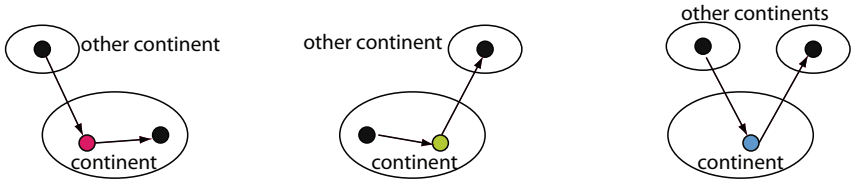
Major difficulties linked to the use of this data source was the issue of geocoding the firms, often on the basis of incomplete address data, but also the non-exhaustive coverage of information concerning employment and added value forcing the use of the simple indicator of numbers of enterprises without a measure of their size. Some headquarter locations are also mere letter boxes for fiscal reasons, thus sometimes giving biased results. In the specific network approach, the decoding of ownership relations also had to be handled with care in order to avoid traps linked to the complexities of such relations. However, all in all the analyses seem quite stable.

One analysis elaborated on the basis of the ORBIS data concerns the role cities play in the global economic networks. Multinational firms networks use gateways for internationalization. In particular for overseas investments arriving in Europe, "continental gatekeeper places" are privileged to receive the investment, spreading it in a second step to the continent they represent. In the other direction, "continental representative places" offer to multinational firms the means to reach places outside Europe. Finally, "international platforms" play the role of intermediaries between other continents, in general for financial or organizational function. Table 2.1 and Maps 2.10a, 2.10b and 2.10c present these three cases and the top 30 world cities in each of the roles, based on the sample of 3000 networks of multinational firms.

[3] http://www.bvdinfo.com/Products/Company-Information/International/Orbis.aspx

In Europe, London largely dominates the "gatekeepers" especially as the host of North American and Asian headquarters in Europe. Amsterdam, Edinburgh, Munich and Zurich appear much better than one might expect according to their size. Paris and London are at the same level in the opposite role of "representative city" for ownership of companies outside the continent. London offers an ideal stepping stone for European banks to overseas, while Paris, also a gateway for banks, seems to be more diversified. In terms of "platforms", London and Paris again dominate, with Amsterdam, Zurich and Munich and Rotterdam following.

Map 2.11 is based on the same data, but analysed at a different scale, and thus informing on different issues, notably on regional city networks. It is thus complementary to the polycentricity analyses presented above. The map shows the local centralities of cities in networks of multinational firms within a distance of 100km. Some interesting links or lack of links do appear. For example, Toulouse is linked to Barcelona, while there is not such dense urban network there. The same phenomenon can also be underlined at the Eastern border of Germany, for Madrid with the Castille region, for the Bretagne region in France, and for Denmark. At the opposite, some "potential" regional urban frameworks do not support enough networks, for example Poland, Hungary, Romania and Bulgaria.



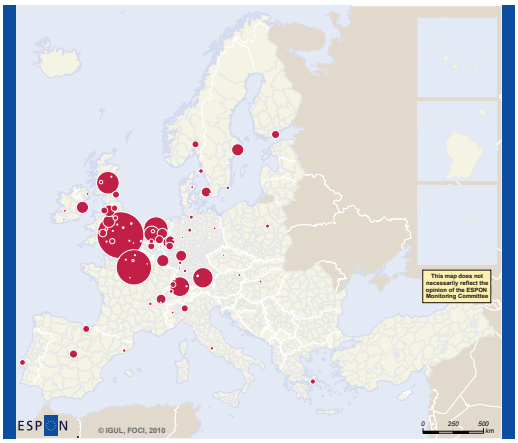
A. Gatekeeper B. Representative C. Platform

RANK	CITY	CONTINENTAL GATEKEEPER	CITY	CONTINENTAL REPRESENTATIVE	CITY	INTER-CONTINENTAL PLATFORM
1	LONDON	17589	NEW YORK	14581	PARIS	5104
2	PARIS	9858	PARIS	6000	LONDON	4048
3	AMSTERDAM	4774	LONDON	5512	BERMUDA KINDLEY	3967
4	EDINBURGH	4050	TOKYO	3873	MEXICO CITY	3482
5	MUNICH	3278	FRANKFURT	3719	AMSTERDAM	2401
6	ZURICH	3069	ZURICH	3113	ZURICH	1935
7	NEW YORK	2884	MUNICH	2523	MUNICH	1560
8	ROTTERDAM	1940	CHICAGO	1829	ROTTERDAM	1096
9	HONG KONG	1658	MADRID	1826	NEW YORK	838
10	BIRMINGHAM GB	1195	SAN FRANCISCO	1767	TOKYO	685
11	TAIPEI	1178	BRUSSELS	1623	GENEVA	606
12	STOCKHOLM	1175	DALLAS	1582	GRAND CAYMAN	529
13	LUXEMBOURG	1164	CHARLOTTE	1304	HONG KONG	453
14	DUBLIN	1138	STOCKHOLM	1105	ENSHEDE	433
15	MANCHESTER	1059	STUTTGART	997	DETROIT	416
16	SYDNEY	1027	AMSTERDAM	990	SINGAPORE	353
17	DALLAS	1024	CINCINNATI	987	JOHANNESBURG	347
18	FRANKFURT	918	BOSTON	928	EINDHOVEN	339
19	DUSSELDORF	917	MINNEAPOLIS	886	SAN ANTONIO	325
20	TOKYO	887	BALTIMORE	874	STOCKHOLM	322
21	GENEVA	837	SYDNEY	806	DUBLIN	320
22	ENSHEDE	792	TORONTO	772	MANCHESTER	315
23	SEOUL	778	ST LOUIS	750	BOSTON	304
24	COPENHAGEN	726	HARTFORD/SPRINGFIELD	744	LUXEMBOURG	280
25	CHICAGO	725	DENVER	738	EDINBURGH	276
26	ESSEN	684	ROTTERDAM	721	TAIPEI	263
27	SINGAPORE	650	TORINO	710	CHICAGO	255
28	JOHANNESBURG	638	LUXEMBOURG	708	LAGOS	236
29	DETROIT	606	LOS ANGELES	706	FRANKFURT	212
30	BERMUDA KINDLEY	582	MILANO	694	SEOUL	202

Table 2.1 Mining firm data: Global ranking of the top 30 gatekeepers, representatives and platforms in the networks of the 3000 largest multinational firms

Map 2.10 Roles of European cities as continental functional areas

(a) Continental FUA Gatekeepers for Worldwide networks of multinational firms



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Level: FUA
Source: IGUL-LAUSANNE, Rozenblat, 2010
Origin of data: ORBIS, BVD, 2007
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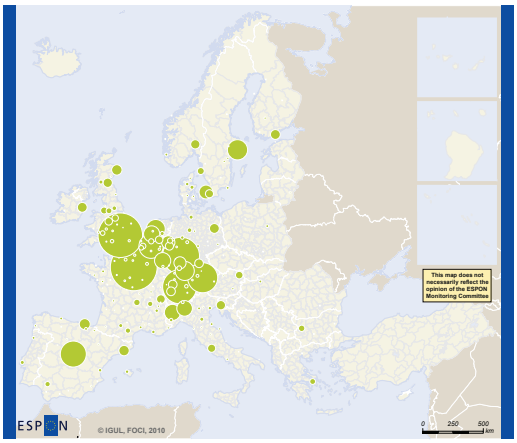
Total number of Intercontinental subsidiary links passing by the FUA to another European city:

18.000
5.000
1

* in the sample of the 600.000 direct or indirect subsidiaries in the world of the first 3.000 first worldwide multinational firms

(b) Continental FUA Representatives for Worldwide networks of multinational firms



EUROPEAN UNION
Co-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Level: FUA
Source: IGUL-LAUSANNE, Rozenblat, 2010
Origin of data: ORBIS, BVD, 2007
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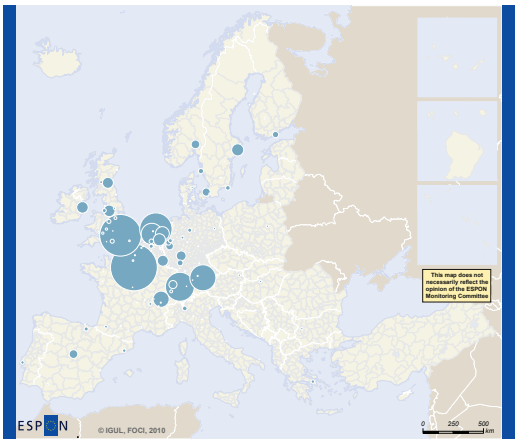
Total number of continental subsidiary links passing by the FUA to another city outside Europe:

6.000
1.500
1

* in the sample of the 600.000 direct or indirect subsidiaries in the world of the first 3.000 first worldwide multinational firms

(c) Inter-continental FUA Platform for Worldwide networks of multinational firms



EUROPEAN UNION
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Level: FUA
Source: IGUL-LAUSANNE, Rozenblat, 2010
Origin of data: ORBIS, BVD, 2007
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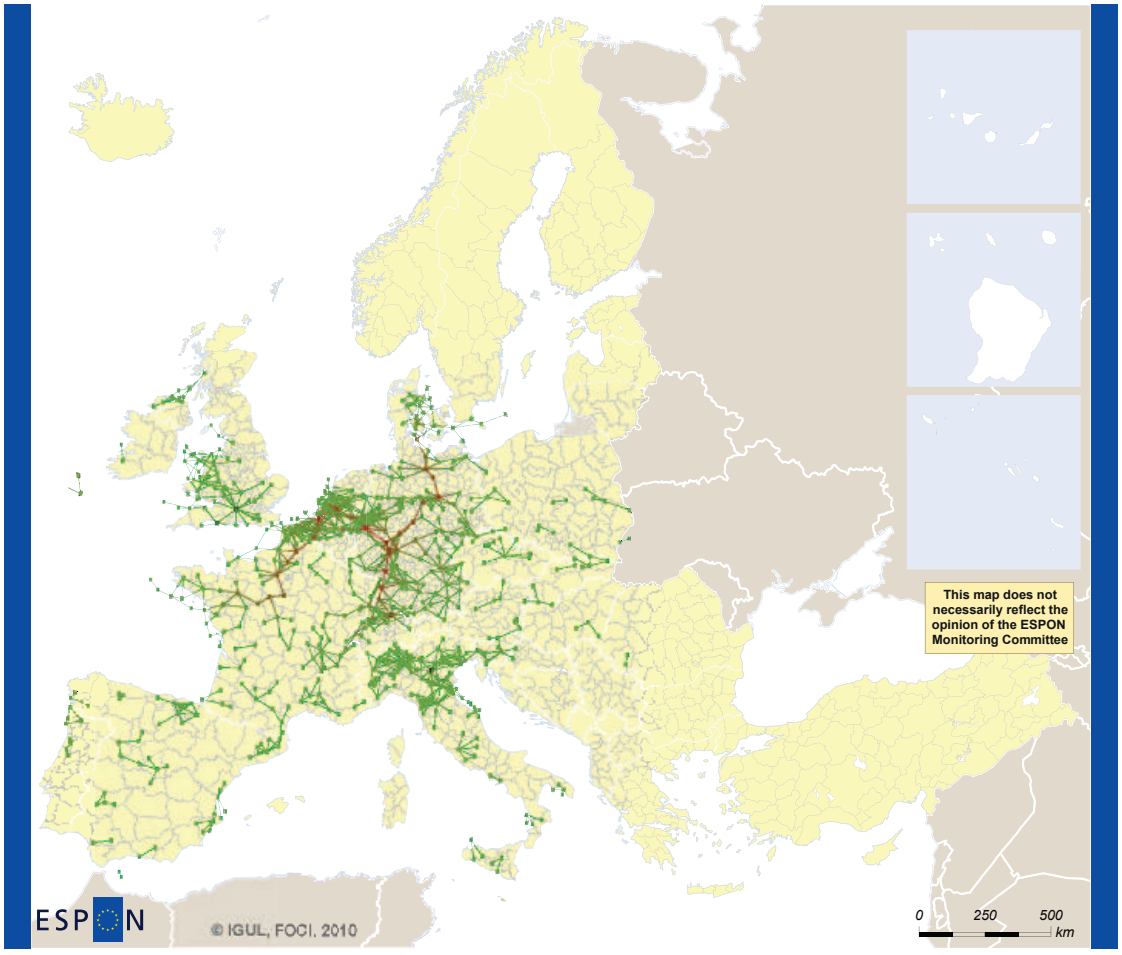
Total number of extracontinental subsidiary links passing by the FUA to another city outside Europe:

5.000
1.300
1

* in the sample of the 600.000 direct or indirect subsidiaries in the world of the first 3.000 first worldwide multinational firms

Map 2.11 City links in multinational firm networks



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Level: FUA
Source: IGUL-LAUSANNE, Rozenblat, 2010
Origin of data: ORBIS, BVD, 2007
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Number of shortest paths passing through the FUA (Betweeness centrality)
weighted by the number of subsidiary links

- +10
- 1-10
- 0-1

Links with less than 100 km

* in the sample of the 600.000 direct or indirect subsidiaries in the world of the first 3.000 first worldwide multinational firms

2.4 Conclusions

The ESPON FOCI project has experimented with different novel approaches to quantitative analyses of urban issues, in order to avoid duplication of work both with preceding ESPON projects, but also with other efforts such as the State of European Cities Reports. These novel approaches include the use of the classic official data (NUTS and Urban Audit), but sometimes in new ways (for example for the city-hinterland analysis), as well as the collection and analysis of new data sources, notably transport time tables and firm network data. Besides the methodological challenges raised for their respective analyses, the preparation of these latter data was a very time-intensive effort.

The hope of the FOCI team is that the proposed approaches can add bricks to the general construction of understanding on Europe's cities. Many of the results are still preliminary and as part of them are based on data sources never used in this way before, time is still needed for digestion and detailed understanding. These new data sources generally do not provide time series analysis, nor do they provide the easy identification of driving forces and future perspectives. Results are thus not easily translated into policy orientations, notably at city level. However, the work does show that there is room for more and innovative use of data and approaches in studying Europe's cities, notably on questions of competitiveness, but also of territorial cohesion. On their own, none of these data sets give any clear answers, but they do provide new insights which further research will hopefully be able to deepen and extend.

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FOCI: Discussion

During the RSA Annual Conference held in Pécs on May 24-26, the ESPON FOCI project was presented at an ESPON Session. The discussion after the presentation was very brief and included mostly comments which are summarized below.

A first comment concerned a positive reaction to the comparative analysis of population evolution of core cities and of larger urban zones. The question addressed whether **differential natural population development** might be a factor in addition to migration in explaining change. This is obviously true to a certain extent as some types of foreign immigrants have higher birth rates than the local population. As these immigrants tend to concentrate in the city centres of many large European cities, this might explain part of the positive population dynamics in these centres. However, this immigration effect on birth rates decreases very quickly with the second and third generations of immigrants, and so should not be overestimated.

A second comment supported the **role of housing** as a factor determining the socio-spatial polarisation within cities as highlighted in the presentation.

A question was raised concerning a possible comparison of the ORBIS **firm network data** with similar data and results from the Global and World Cities (GaWC) research. The ORBIS data actually includes most of the information contained in the GaWC data, but goes beyond this in the sense that it covers all economic sectors, not only advanced producer services, and also ownership relations, thus allowing the FOCI analysis to go even further in respect to the definitions of hierarchical relationships than what would be provided by the GaWC data.

Finally, in reaction to the insistence by the project of the importance of the national context for explaining the economic development of cities, a question was raised concerning the possible existence of **macro-regional block effects** (e.g. East-West), in addition to national effects. The research clearly supports such a notion by showing the often very comparable situations and trajectories of Eastern European cities, but also of Western peripheral cities. This clearly highlights the common historical paths of these countries. It does not, however, reflect issues of economic regulation at block level, but, at the most, common regulatory processes in each of these countries.

Project description:

Development opportunities in different types of rural areas

It is widely accepted that contemporary changes in rural Europe, driven by economic, social and environmental processes and shifts in urban-rural relations, are resulting in an increasing diversity of rural development. The Territorial Cohesion Green Paper has argued that this very diversity is the key to strengthening future economic performance and quality of life. This project sought to develop a better understanding of the development opportunities and challenges facing rural areas in Europe and to inform any future targeted policy development relating to job creation and social change in these regions.

The key policy questions addressed by the project were:

- What are the broad patterns of differentiation between different rural areas?
- What are the main constraints and opportunities for future development?
- In which ways do these opportunities depend upon, and may be strengthened by, interaction between rural and urban areas, interaction between rural and rural areas, and interaction between the rural areas and the wider global economy?

In responding to these policy questions, the EDORA project has sought to balance an understanding of regional specificities with the need to replace outdated stereotypes of rurality with more appropriate generalisations. It has highlighted the fact that local potential is often defined by regional capacities and "soft factors", which determine the ability of different rural areas to respond to increasingly ubiquitous opportunities. The potential of rural-urban linkages as a "motor" for rural development has been carefully considered, together with the increasingly important role played by "rural-global" networking. Looking ahead, an Expert Foresight exercise considered that the two most important future exogenous drivers are likely to be climate change and trends in economic governance, which are anticipated to superimpose radical shifts upon ongoing incremental changes.

The main results are:

- The development of a three-dimensional analysis framework, (the "EDORA Cube"), based upon regional typologies of rurality and accessibility; economic restructuring; and economic performance.
- A substantial database of indicators and statistical profiles of 31 countries structured according to the EDORA Cube at national and meta-region levels.
- A better understanding of rural-urban linkages, rural-global linkages, and the concept of territorial capital in a rural context.

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Dispelling stylised fallacies and turning diversity into strength: Appropriate generalisations to underpin 21st century rural cohesion policy

by Andrew Copus[4]

3.1 Introduction

3.1.1 Increasing rural diversity

One of the less desirable consequences of globalisation is the increasing uniformity of urban and regional environments. For example, city-scapes retaining vernacular architectural styles all too often become "living museums" resisting a tide of increasingly standardised shop fronts, anonymous commercial office developments, kit-built houses and mass produced street furniture. Less tangible aspects of regional culture, such as minority languages and dialects, or place-specific traditional communal activities, are also under threat.

This oft-lamented increasing uniformity is in marked contrast with the view advanced by number of rural development theorists; that current trends are leading to increasing diversity in rural areas. The following quotations illustrate this:

> *"…Apparently similar areas demonstrate quite different characteristics in terms of key indicators, like net migration, commuting, deprivation, new enterprise formation, the degree of social cohesion or fragmentation, and so on… the character and complexity of rural uneven development has shifted profoundly." (Marsden 1999)*

> *"…while all rural localities are touched by global networks and global flows in some way, the intensity of the connections forged, the extent of change effected to the locality, and the degree of manifestation of characteristics of the global countryside, all vary considerably. Globalization, it appears, is more significant in remaking some rural places than others. This differential geography in part reflects structural factors that moderate the exposure of rural communities to global networks and processes,…" (Woods 2007)*

There is thus a "post-modern" thread through the recent literature on rural and regional development which stresses the need to acknowledge diversity, and to accommodate it in policy design. This has often been associated with a preference for interpretation, based on qualitative methods and idiographic approaches, rather than the pursuit of positivist explanation and generalisation derived from quantitative analysis. This of course reflects a broader paradigm shift in the social sciences generally.

The assumption of increasing rural diversity has become commonplace in the policy literature too, - it is for example fundamental to the rationale of the EDORA project's Technical Specification (ESPON 2008). In parallel, there has been a move away from "equalisation" (of regional incomes, quality of life, etc) towards an ethos of endogenous development enabling each region to fulfil its potential. This line of thinking has supported the argument that it is in the very diversity of rural areas that much of their potential for development lies. The sub-title of DG Regio's 2008 Green Paper on Territorial Cohesion (EC 2008b): "Turning Diversity into Strength" is totemic of this view.

[4] The author would like to acknowledge the fact that this paper is based upon the collective efforts of the EDORA project TPG, and especially upon contributions by Mark Shucksmith and Hilary Talbot (University of Newcastle), Joan Noguera (University of Valencia), Paul Courtney (University of Gloucestershire) and Thomas Dax (Federal Institute for Less-Favoured and Mountainous Areas, Vienna). He would also like to thank the reviewer, Gordon Dabinett, University of Sheffield, and the ESPON CU for their helpful comments and guidance.

Two questions seem to follow from this sequence of ideas:

1. If rural areas are moving towards increasing diversity (this assumption has not been tested, and of course it would be very difficult to establish objectively), what was/were the previous, more uniform state(s), from which they are now moving away?
2. Is there a continuing role for generalisation in rural development research, and rural policy design? If so what is it, and how can researchers ensure that their generalisations are "useful" in a policy context?

It is not the role of the EDORA project to establish the facts regarding the degree of "rural uniformity" in the past, or to challenge the assumption of increasing diversity, and it is perhaps sufficient to point out that in the historiography of European economic and social change there are many examples of lively academic debates generated by similar assertions (which sometimes turn out to be weakly supported by evidence). The focus of the project, and this paper, is very much upon the second of these two questions.

3.1.2 Valid generalisations and unjustified stereotypes

The rural development policy literature is populated by many generalisations, some being more or less representative and accurate, and others being anachronistic stereotypes with an inadequate evidence-base, which Hodge (2004) has dubbed "stylised fallacies". The latter are sometimes perpetuated by powerful interest groups.

Such rural stereotypes have often been quite negative, and have included, for example:

- The agrarian countryside, in which the role of land-based industries is overestimated at the expense of other forms of economic activity which are of greater and increasing importance to socio-economic development.
- The "rural exodus": characterised by out-migration and demographic ageing. This ignores the fact that many rural areas show in-migration, population increase and relatively young age structures.
- Rural "dependency culture" – an attachment to policy supports and compensation for disadvantage as the main policy option. In reality many rural areas, even remote ones, show evidence of dynamism, innovation and growth, even without policy support.
- Rural labour markets are commonly associated with segmentation, in which a dominant "secondary" component, characterised by low levels of human capital, insecurity, low activity rates (especially for females), disguised unemployment, and high levels of self-employment. All of these characteristics are certainly present in some (but by no means all) rural areas.
- Similarly, sparsity of population is often perceived as a barrier to entrepreneurship, due to an absence of agglomerative economies. As a result, the impacts of globalisation processes are believed to be predominantly negative in rural areas. Nevertheless it is important to recognise that information and communication technology (if associated with appropriate human capital conditions) are facilitating new forms of economic activity which enable some rural areas to sidestep these handicaps.

3.1.3 Phenomenology and generalisation as tools for policy formulation

Clearly rural change is an extremely complex and nuanced phenomenon; the more that policy makers can understand of the details of the local experience, and the more intervention can accommodate the full range of regional differences, the more effective it will be. Recent trends in policy design and implementation have introduced a greater degree of flexibility to meet local circumstances, through menu-based approaches, neo-endogenous paradigms and so on (Copus and Dax 2009).

Nevertheless, whilst it is not desirable that one set of "stylised fallacies" be replaced by generalisations which, although they are closer to contemporary realities, introduce a new set of inflexibilities, it is also apparent that the debate concerning policy options for "non-urban" Europe cannot be sustained by phenomenological approaches alone. Broad generalisations have an important role to play. It is crucial that the debate begins to move away from anachronistic stereotypes, and is

informed by generalisations which are soundly based upon up-to-date evidence. The EDORA project has a role to play in the long–overdue task of refreshing the images of different kinds of rurality which underlie policy design and implementation. It is hoped that the conceptual phase of the project may make a contribution to development of more appropriate "stylised facts" and "meta-narratives" of change. In addition, although subject to a range of limitations in terms of available data, and weaknesses associated with the regional framework, such generalisations may (at least in part) be given a tangible geographical manifestation in the typologies and "analysis framework" presented in this paper.

3.2 The EDORA project

The over-arching aim of the EDORA project (as set out in the technical specification) is a better understanding of the development opportunities and challenges facing rural areas in Europe, to support targeted policy development, relating (inter alia) to job creation and social change. In particular, insights should support the practical implementation of spatial development principles which have evolved out of the Fifth Cohesion Report (EC 2008a), and the Territorial Cohesion Green Paper (EC 2008b), within the context of the EU2020 goal of "smart, sustainable and inclusive growth". Three key issues are:

- the need to better understand patterns of differentiation, between different kinds of rural area,
- the nature of the different opportunities for development which each of them faces, and,
- the way in which such opportunities depend upon, and may be strengthened by, interaction between rural and urban areas.

Addressing these issues requires a research approach which fully reflects recent conceptual advances, and constructs hypotheses derived from contemporary interpretations of the process of rural change in the full range of European rural environments. At the same time it requires a comprehensive utilisation of available data sources, so that robust and empirically valid findings can form a firm foundation for policy recommendations.

The broad structure of the project is presented in Figure 3.1. In order to avoid picking up the conventional rural development bias towards land-based industries, - which is difficult to avoid both because of the balance of scientific literature, and associated data availability, - a deliberate strategy of deduction, rather than induction, has been strictly adhered to.

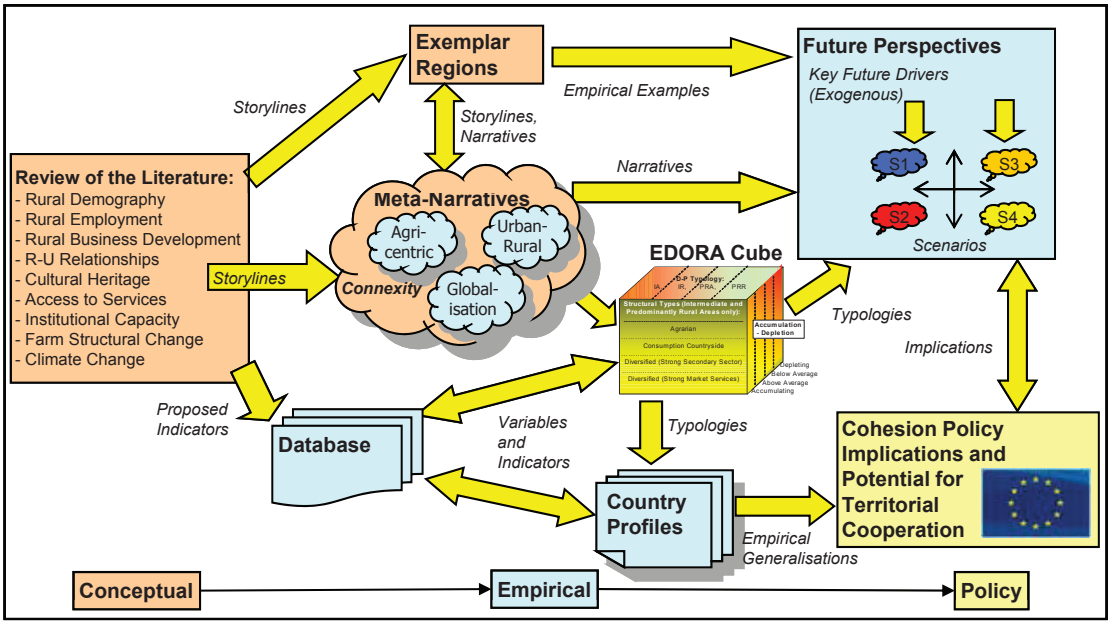


Figure 3.1 The structure of the EDORA project

The first phase of the project was therefore a review of the conceptual literature, advised by the project specification's guidance towards activities outside agriculture and forestry. This took the form of nine thematic reviews, each of which generated a separate working paper. These thematic reviews revealed a large number of "story lines" of rural change, including both well-known ones, such as urbanisation and counter-urbanisation, demographic ageing, structural shifts in the economy away from primary activities towards secondary and tertiary ones, the increasing difficulties associated with provision of services to rural consumers, and a number of less well-known ones. The findings of the nine thematic reviews were subsequently synthesised into three principal "meta-narratives" of rural change. These were defined as (i) an Agri-centric narrative, (ii) an Urban-Rural narrative, and (iii) a narrative of Global Competition. At a more generalised level an overarching theme of increasing "Connexity" was shown to be very much in evidence, across all nine themes. In order to explore these findings within specific regional contexts the conceptual phase of the project was completed by exploring recent changes in twelve carefully selected "Exemplar Regions".

Having established a balanced conceptual framework, the second phase of the project concentrated upon furnishing an empirical evidence base. Fundamental to this phase was the creation of a regional database, containing both raw data from secondary sources, and derived indicators. Another core activity was the development of an "analysis framework" composed of three discrete regional typologies, distinguishing groups of regions in terms of their rurality/accessibility, their economic structure, and their socio-economic performance. These three dimensions form a helpful standard basis for cross-tabulation, and are collectively referred to as the "EDORA cube". This analysis framework was subsequently used to structure statistical profiles for 31 countries within the ESPON space. The empirical phase of the project was completed by a qualitative Expert Foresight exercise. This built upon both the conceptual phase and the preceding empirical analysis, but considering the likely impacts of key exogenous drivers (climate change and trends in economic governance) which, over the next two decades, are anticipated to superimpose radical shifts upon the ongoing incremental change established in the meta-narratives.

The final phase of the project explored the implications of the findings (both conceptual and empirical) in terms of a rationale for policy to enhance territorial cohesion in rural areas. It is in this context that the importance of finding the right balance between the establishing appropriate generalisations to replace outdated stereotypes on the one hand, and due regard for regional specificities, on the other, becomes very evident. It also becomes clear that local potential is often defined by regional assets or capacities (including "soft factors") which determine the ability to respond to increasingly ubiquitous opportunities.

3.3 Towards evidence-based generalisations about rural change

One of the first tasks of the EDORA project was to review the recent conceptual and empirical literature relating to nine separate aspects of rural change:

1. Rural demography.
2. Rural employment.
3. Rural business development.
4. Rural-Urban relationships.
5. Cultural heritage.
6. Access to services of general interest.
7. Institutional capacity.
8. Climate change.
9. Farm structural change.

Each of these reviews is reported in a Working Paper. They are synthesised in a comparative report, (Lee et al 2010). The full text of each of these papers is available for download from the EDORA website[5].

[5] http://www.nordregio.se/EDORA

The individual thematic reports generated a large volume of information about elements of rural change which are interlinked in complex ways across both rural space and time. A "narrative" approach was adopted as a means of organising and presenting the findings. Where so much of the information is intrinsically qualitative, narratives are more practicable than quantitative analysis/ modelling of indicator data.

The thematic accounts of recent socio-economic trends provided in the nine working papers may be termed "story lines" in that they are focused on specific aspects (demography, business development, employment etc). At a more synthetic level these "story lines" may be woven into various "meta-narratives" which are not constrained by disciplinary or research topic boundaries, but integrate processes across the spectrum.

It is tempting to view these "meta-narratives" as the "drivers" of rural change. Nevertheless, it is important to keep in mind the extreme complexity of regional/rural development processes, and the partial nature of our understanding of it, which means that it is risky (perhaps simplistic) to speak in terms of linear cause and effect relationships. It is safer to consider the "meta-narratives" primarily as "heuristic devices" – a helpful way of organising an otherwise bewildering array of information. It's also worth emphasising that they are not mutually exclusive, the same "story lines" may be tied into more than one meta-narrative. Neither are the meta-narratives synonymous with the development paths of individual rural areas. Most localities show evidence of several meta-narratives concurrently.

The key findings may be summarised as follows:

(i) Economic processes:
An important "story line" in this context is structural change, the process of diversification away from the traditional focus upon primary or land-based industries, towards a New Rural Economy (NRE) in which secondary and tertiary activities are increasingly dominant. The NRE has developed more fully in accessible rural areas, and is closely associated with the demographic process of "counter-urbanisation", and with centrifugal dispersion of economic activity, from cities and towns, into the countryside.

A second "story line", which has affected both accessible and more remote rural areas, concerns the commodification of countryside and environmental public goods, and the rise of "multifunctionality" both within traditional activities such as farming and forestry, and newer activities, especially recreation and tourism. This complex and incremental structural shift is captured by the term "Consumption Countryside".

A third characteristic vector of rural change relates specifically to farming, where there is an increasing polarisation between large-scale, highly mechanised, commercial, "Para Productivist" development paths on the one hand, and small-scale, often part-time, multifunctional "Peri-Productivist" strategies on the other (Crowley et al 2008). In some regions of the NMS12 semi-subsistence agriculture presents a rather specific and "narrower" variant of the second option.

These three components of rural economic change interact with each other and with different regional contexts, to produce an almost infinite variety of outcomes. Regional context varies not only in terms of "hard" aspects, such as physical environment, resources, settlement pattern, accessibility and infrastructure, but also "soft" factors, such as human and social capital, business networks, "institutional thickness", and governance. This "development milieu" is both extremely influential and much more difficult to quantify, assess, or to reinforce by means of policy intervention.

(ii) Social processes
The key social process in contemporary rural change is migration. However it represents not a single "story line", but three: (a) the "rural exodus" which (selectively) drains human capital out of remote rural areas, in favour of urban and accessible rural locations; (b) the flow of economic migrants from the poorer regions of the NMS12 towards both rural and urban regions of the EU15; and (c) "counter-urbanisation" movements from cities and towns into accessible rural areas. The social and economic impacts of the first of these upon the origin regions are predominantly negative. The other two kinds of flow result in a complex balance of positive and negative effects upon rural regions.

These three migration story lines are intimately connected to the issue of demographic ageing which in turn interacts strongly with aspects of economic development, exacerbating "depletion" effects in some regions and strengthening capacity for diversification and innovation in others.

A third very important issue which should be mentioned under the heading of "Social Processes" relates to the provision of Services of General Interest (SGI). The shift away from a "welfare state" ethos towards neo-liberal and "New Public Management" approaches has interacted with the effects of migration, demographic ageing, and "regional enlargement" to highlight a number of critical policy questions in recent years. The circularity of causal links between the provision of SGI and other social and economic processes of rural change renders the former a prominent driver in processes of "cumulative causation", whether "vicious" or "virtuous".

Structural change in the rural economy is associated with changes in the character and configuration of rural social capital which are linked in complex ways to rural governance. This renewal of social capital has many and varied impacts upon the capacity of rural areas to respond to new opportunities for development.

(iii) Governance and policy processes
In the policy arena the focus of the review is understandably less upon "story lines" of change than upon different kinds of regional contexts. However, some of the key processes of change are; "regional enlargement", the "hollowing out" of the welfare state, the increasing importance of the Third Sector, "multi-level governance" models, partnership approaches, and the use of fixed-term projects as a vehicle for implementation. This nexus of changes in governance, loosely linked to what the OECD has described as the "New Rural Paradigm" (OECD 2006, 2009), are leading to the emergence of what may be termed the "Project State" (Andersson 2006, High and Nemes (forthcoming), High and Powles (2007)). The balance between benefits and perverse impacts varies, but two things are clear: that comparative analysis is extremely difficult due to differences in institutional heritage; and that institutional capacity is very difficult to construct through exogenous policy interventions.

(iv) Environmental processes
The EDORA thematic reviews have not specifically focused upon the wide-ranging and important topic of environmental change, but have included a number of socio-economic implications.

More specifically, one of the thematic reviews (Langlais and Tepecik Dis 2009) considered the narrower issue of climate change and its rural development impacts. This points to a broad N-S divide in Europe in terms of the likely impact of climate change on rural economic activities, and on agriculture in particular. In the northern Member States the main negative impact of increased variability, is anticipated to be offset by higher average temperatures which will effectively broaden the farming system options for most rural areas. In the South and East rising temperatures and reductions in precipitation will effectively narrow the options for agriculture, and increase the risk of environmental degradation, with knock-on effects in terms of tourism and leisure activities. In the latter the institutional capacity to deliver mitigation or adaptation strategies is also generally less developed.

At present climate change research tells us more about likely direct environmental impacts, rather than the complex indirect socio-economic consequences. It also tends to have a rather large-scale focus - the likely regional or local impacts are not well understood as yet.
In very broad terms, it is probably safe to assume that climate change impacts will be more substantial in regions where agriculture and other primary activities are still relatively important, and in those regions where "Consumption Countryside" activities are strongly developed. Regions where the structural shift towards a diversified "New Rural Economy" (NRE) has proceeded further are likely to be less seriously affected. Indeed judicious diversification would be one means to reduce the anticipated impact of climate change.

(v) Urban-Rural relations
This theme is touched upon in a wide variety of contexts; not least in the ESPON 2006 projects on Urban-Rural Relations (Bengs et al 2006) and Small and Medium-sized Towns (Schneidewind et al 2006). The former argues (p21) that the relationship has changed and intensified so much in recent years the distinction between urban and rural areas has become blurred. Accessible rural areas have been the most affected, whilst remote areas have been "left behind" and have fewer diversification options (ibid p22). Schneidewind et al stress the importance of recognising that the roles and functions of small and medium sized towns (SMESTOs) have changed considerably in recent decades. This is partly a consequence of the shift from Fordist to "postmodern" forms of production, and the impacts of new transport and communication technologies. It is also a result of changing daily mobility and travel-to-work patterns, with the concomitant changes in the way in which both public and market services are provided, accessed or delivered. Some SMESTOs have declined, others have restructured and benefitted from "flexible specialisation" approaches, whilst still others have been absorbed by neighbouring conurbations. All these profound changes to the settlement landscape obviously have implications for the rural "end" of urban-rural relations which have yet to be fully explored and reflected in theory or policy.

It is obvious that urban areas and rural hinterlands overlap and interlink in a complex system of economic and social interactions, (commuting, service and goods provision patterns, leisure and recreation linkages etc). These interactions undoubtedly provide the basis for a range of service industries. However, as Schneidewind et al op cit show, there are many and varied kinds of small/medium sized town, each with equally varied relationships with the surrounding rural areas. A simple "Christallerian" concept of rural-urban processes is today no more appropriate than a Thunenesque explanation of rural land use patterns.

It is also misleading to assume that localised urban-rural interactions are the sole, or even principal drivers of post-modern rural economies. Many rural businesses have as many links to distant regions across Europe or the rest of the world as they do to adjacent urban areas (Bengs et al 2006 op cit p21). Indeed one of the key conclusions from the business networks literature is that such remote linkages or "weak ties" are crucial as a channel for information to support the development of NRE activities (Courtney et al 2010, Cernic Istenic and Copus 2009). The concept of small rural towns as service centres for the surrounding countryside is being challenged by the rise of internet retailing.

There is a sense in which the current interest in local food networks and short supply chains is an attempt to resist or reverse the weakening of ties between towns and adjacent rural areas. This form of territorial cooperation seems to offer a range of rural development advantages, such as retention of a greater proportion of value added, enhancement of regional social capital, and a reduction of "food miles" - with associated environmental benefits. Courtney et al (op cit p23) argue that this form of "relocalisation" process could be applied, with benefits to rural economies, to a number of specific rural activities, such as agri-tourism, and energy production. Some have argued (Slee, 2008) that relocalisation should also be worked through in relation to working patterns and leisure activities in general.

(vi) Meta-narratives and regional contexts
Woven through the nine thematic reviews is the "leitmotif" of Connexity; the increasing interconnectedness of all aspects of rural economic and social activity, which means that "relational reach" and "organisational space" are increasingly important as determinants of regional performance and cohesion, at the expense of the traditional role of Euclidean distance.

Within this overarching theme three "meta-narratives" of contemporary rural change serve as heuristic devices, assisting understanding of the complexity and variety of individual development paths. These are:

The Agri-Centric meta-narrative, which draws together various "post-modernisation" or "post-productivist" concepts and strategies, such as "multifunctionality", "commodification", or "ecological modernisation", which all stress the fact that agriculture and farming communities are increasingly concerned with a broader range of objectives than maximising output of food and fibre. Again, the notions of para- and peri-productivism are fundamental to this meta-narrative.

The Urban-Rural meta-narrative draws together various story lines relating to migration, rural-urban relationships, access to SGI, agglomeration (or its absence), and highlights the cumulative causation process which drives the differentiation of, and disparities between, accessible and remote/sparsely populated rural regions.

The meta-narrative of Global Competition emphasises implications of increasing connexity and global trade liberalisation, in terms of the spatial segmentation of labour markets and the associated structural change of European rural areas. This points to strategies which depend upon the "knowledge economy" (supported by ICT infrastructure and good education provision), the role of the creative class, an emphasis upon quality, place marketing, niche markets and so on.

3.3.1 Some broad implications of the meta-narratives

Each of the meta-narratives is associated with both opportunities and challenges for rural areas. Table 3.1 provides some examples of these. Helping us to understand the broad spatial patterns associated with these opportunities and challenges is the key role of the regional typologies presented in the next section of this paper.

The overarching theme of increasing connexity, and the three meta-narratives, are largely "exogenous"; common vectors of change, which act upon all rural regions within the ESPON space. As such they are often part of an interactive web of socio-economic changes and trends which are global in scope and impact, and are not easy to change by policy intervention. The observed increase in regional diversity across rural Europe can therefore best be explained by differences in the local social and business environment upon which these forces of change operate. These differences in "local capacity" are also the key to appropriate forms of intervention for cohesion policy.

Table 3.1 Some examples of rural opportunities and constraints associated with the three meta-narratives

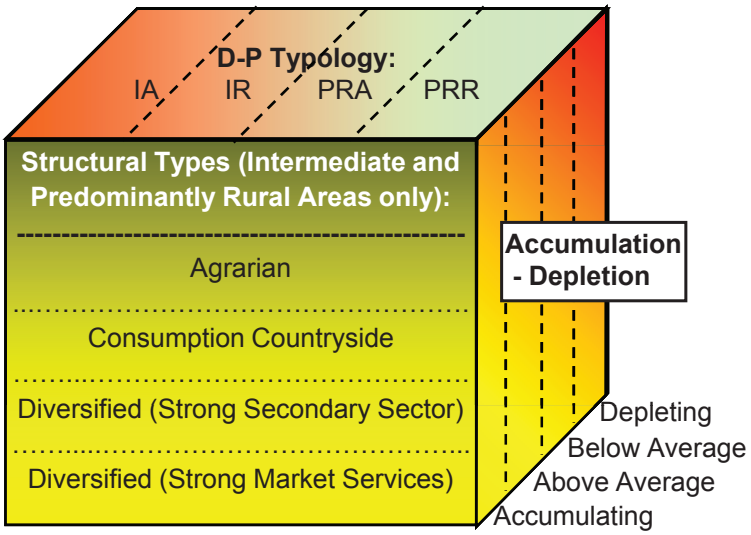
Meta Narrative	Opportunities	Challenges
Agri-Centric	- Increased agricultural competitiveness in some areas. - Diversification. - Remuneration for rural amenities (consumption countryside). - Quality products, short supply chains, regional appellation.	- Loss of agricultural competitiveness in some areas ⇾ low income or abandonment. - Decline in farm employment, even in competitive areas. - Environmental effects of intensification in competitive areas. - Difficulty in valuation of public goods.
Rural-Urban	- Counter-urbanisation (increased population and economic activity) in intermediate and accessible rural areas). - Information technology facilitating new activities. - Establishment of the New Rural Economy.	- Sparsity (especially in remote rural areas) - Peripherality. - Selective out-migration from remoter and sparsely populated regions. - Accelerated demographic ageing. - Difficulties in provision of SGI. - Pump effects of infrastructure improvements.
Globalisation	- Wider markets for rural products. - Rapid diffusion of innovation. - Increase in “primary segment” jobs. - Expanded opportunities for international tourism.	- Restructuring – loss of competitiveness for "traditional” activities. - “Rationalisation” of globally controlled activities ⇾ concentration in accessible rural, intermediate, or urban regions. - Loss of local control over economic activities, employment, provision of market services etc. - Loss of regional distinctiveness, cultural assets, ⇾ reduced residential attractiveness and potential for tourism.

3.4 Macro-scale patterns of rural differentiation

The meta-narratives are thus a form of generalisation about common “ensembles” of processes of change. They are neither exhaustive or inclusive of all the ways in which individual regions experience change. Neither is it possible to associate one meta-narrative with one particular type of region. All three, (and others which we have not described) may be at work, to some extent, in any individual region. What then can helpfully be said about macro-scale geographical patterns across rural Europe? Again, as with the preceding discussion of processes of change, the following attempt to outline broad socio-economic patterns is not viewed as an end in itself; but as a means by which policy may be better informed by, and attuned to, contemporary rural realities.

3.4.1 The EDORA Cube

A single typology cannot easily encompass the salient aspects of differentiation of rural regions. The EDORA analytical framework (the "EDORA cube") comprises three typologies, the choice of which was constrained, both by the Technical Specification of the project[6], and by (NUTS 3) data availability issues. Whilst it is not claimed that the three aspects represented by the typologies are technically orthogonal to each other, they are certainly distinct dimensions of variation, broadly aligned to the meta-narratives, which are best considered separately.



Note: IA = Intermediate Accessible IR = Intermediate Remote,
PRA = Predominantly Rural Accessible PRR = Predominantly Rural Remote

Figure 3.2 The EDORA Cube – a 3 dimensional framework for analysis

The three EDORA typologies are as follows:

(i) Rurality/accessibility. This typology relates to the Urban-Rural meta-narrative, and was developed from the OECD typology by Lewis Dijkstra and Hugo Poelman at DG Regio (Dijkstra and Poelman 2008). Four types of (non-urban) regions were distinguished, Intermediate Accessible, Intermediate Remote, Predominantly Rural Accessible, and Predominantly Rural Remote.

(ii) Economic Restructuring. This typology relates to both the Agri-Centric and Global Competitionmeta-narratives, and was developed from 13 indicators, using a multi-criteria, disaggregative approach[7]. Again four types of non-urban regions were distinguished: Agrarian, Consumption Countryside, Diversified (with strong secondary sector) and Diversified (with strong market services sector).

(iii) Performance. This typology places regions on a continuum between "accumulation" and "depletion", and derives its rationale mainly from the urban-rural meta-narrative. It is based upon a synthetic index of performance, incorporating 5 indicators. The four types of region (accumulating, above average, below average, depleting) are defined by the mean and standard deviation of the index.

[6] The specification required that the applicability of the Dijkstra-Poelman typology be explored.

[7] For a full methodological account please refer to Copus and Noguera (2010)

The ability of the Structural typology to differentiate between groups of non-urban regions, in terms of their socio-economic performance, was assessed through two statistical analyses. In the first analysis the synthetic performance index scores associated with each of the Dijkstra-Poelman types, and each of the Structural types were compared, using a t-test[8]; the null hypothesis being that there was no significant difference in performance between the D-P and Structural types. The detailed results are presented in Copus and Noguera (2009). In general terms this analysis showed that the Structural typology has a superior ability to distinguish between non-urban regions in terms of their performance. A second t-test analysis was employed to explore the possibility of combining the first two typologies into a single classification. The results suggested that (in terms of the synthetic performance index at least) a higher level of discrimination may be achieved by retaining two separate typologies. This provides some support for the view that a single typology, able to capture all dimensions of variation which are significant for rural policy formulation, is not a realistic goal. It also seems unlikely that the three typologies developed by EDORA will prove sufficient. It is easy to think of other aspects which should be represented, not least (for example) the vulnerability to climate change, or access to Services of General Interest. However it is argued that the three typologies presented here are a valuable first step in the process of developing appropriate generalisations to supersede outdated stereotypes of rural Europe.

3.4.2 Key dimensions of macro-scale variation across non-rural Europe

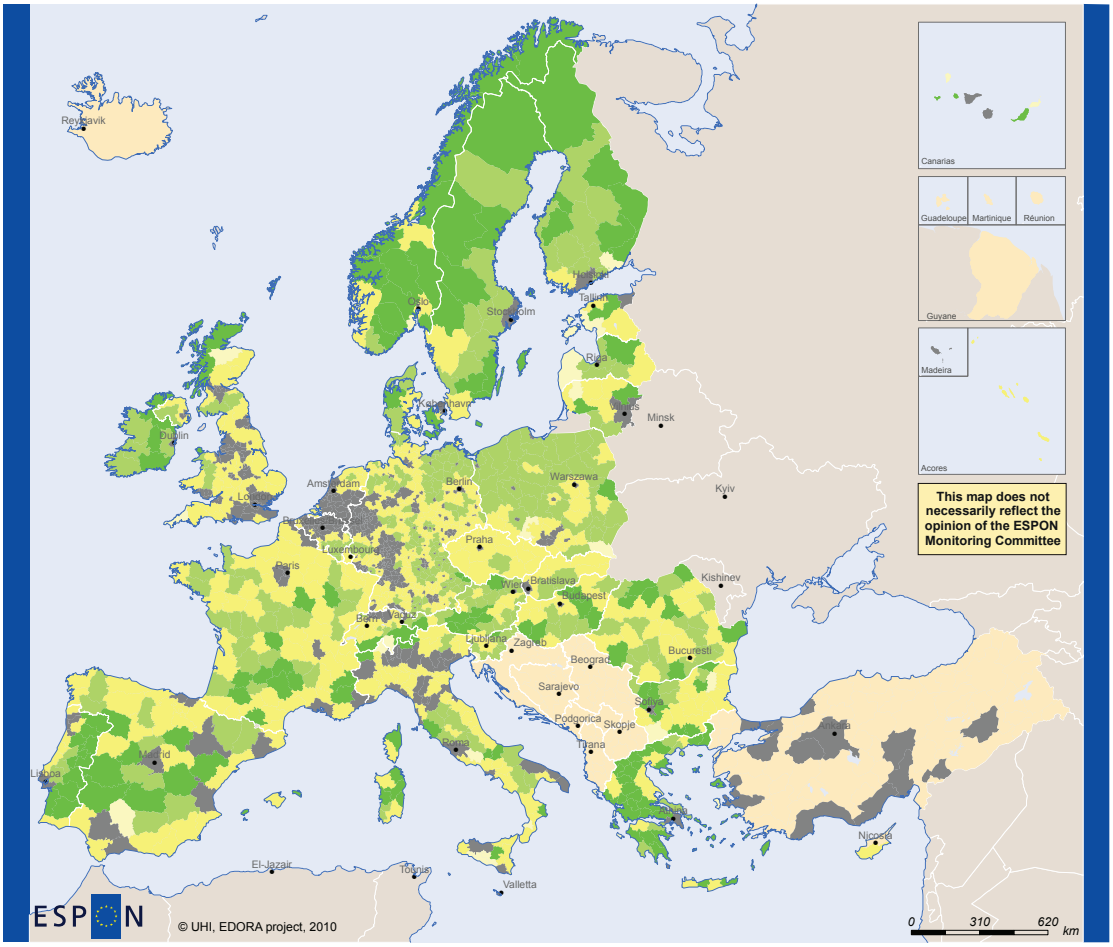
An analysis of the typology maps, together with cross-tabulation analysis, provided a useful "triangulation" of European rural regions, which is fully reported in Copus and Noguera (2009). The principal findings were:

- Regions in which the primary sector plays a major role in the local economy are mainly concentrated in an arc stretching around the eastern and southern edges of the EU27.
- The rest of the European space is characterised by a patchwork of three types of rural area, Consumption Countryside, Diversified (Secondary) and Diversified (Private Services). Of these the last seems to be to some extent associated with the most accessible areas.
- Broadly speaking there is a tendency for the Agrarian regions to be relatively low performers, showing many of the characteristics of the process of socio-economic "Depletion". The Diversified (Secondary) regions also tend to be relatively poor performers, no doubt in part because of the role played in their economy of declining manufacturing industries.
- The Consumption Countryside regions and the Diversified (Private Services) group are both high performers, and likely to continue to "accumulate" in the immediate future.

These are very simple, broad-brush generalisations, which, of course, cannot "do justice" to the wealth of local variation in rural areas across the ESPON space, or to the infinite number of possible combinations of drivers, opportunities and constraints. Nevertheless within the context of the debate about the future of European (cohesion) policy for rural areas, it would seem that the four Structural Types may be more useful as stereotypes than the prevalent, but outdated, association of rural exclusively with Agrarian rural economies, or even with the Consumption Countryside. The rather different needs and potentials associated with Diversified rural economies (whether strong in secondary activities or private services) would seem to deserve far more attention in the context of the policy debate than they have heretofore received.

[8] See EDORA Working Paper 24, p22-26, for further details (http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/edora.html)

Map 3.1 The Dijkstra-Poelman urban-rural typology



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Regional level: NUTS 3
Source: EDORA Database, 2010
Origin of the data: Eurostat REGIO Database, and other sources, various years (centred on 2006)
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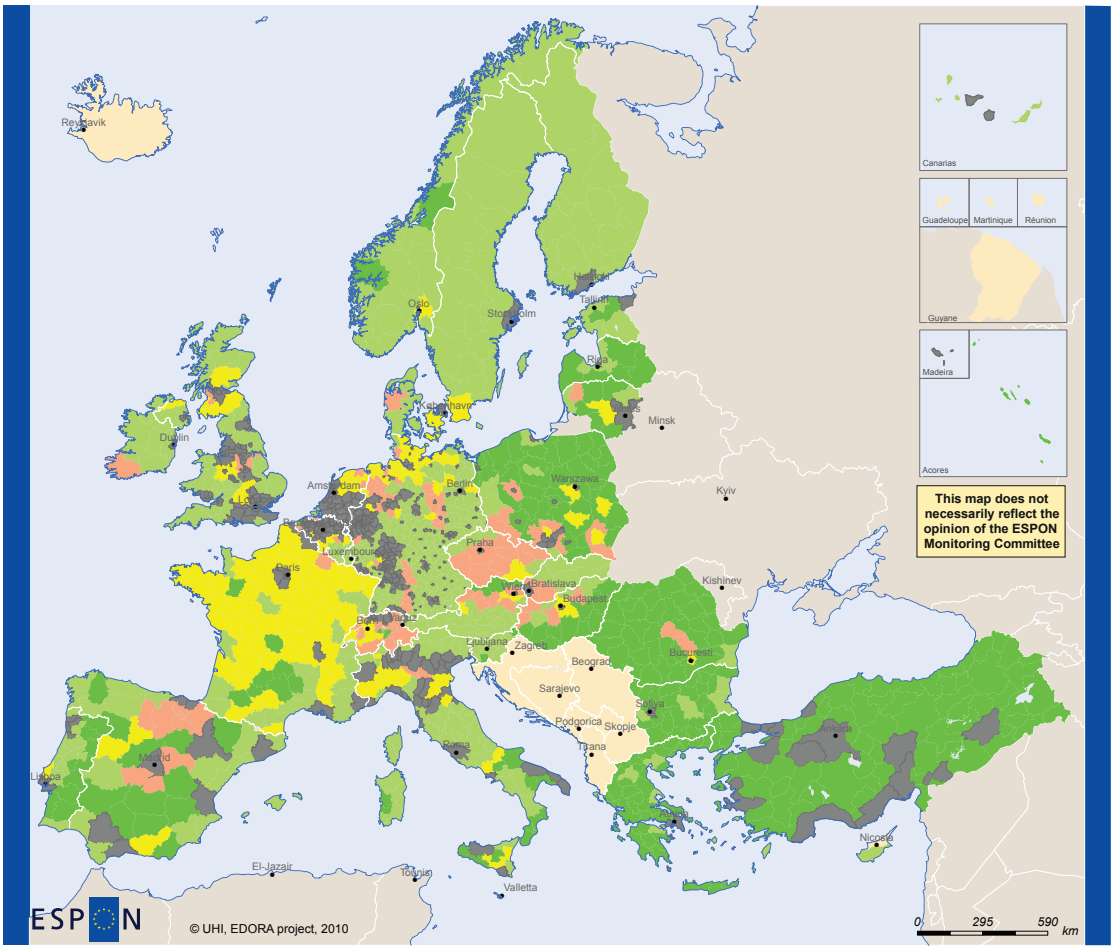
Urban-Rural Types
(NUTS 3 Regions)

- No Data
- Predominantly Urban
- Intermediate Close to a City
- Intermediate Remote
- Predominantly Rural Close to a City
- Predominantly Remote

Map 3.2 The structural typology of rural regions



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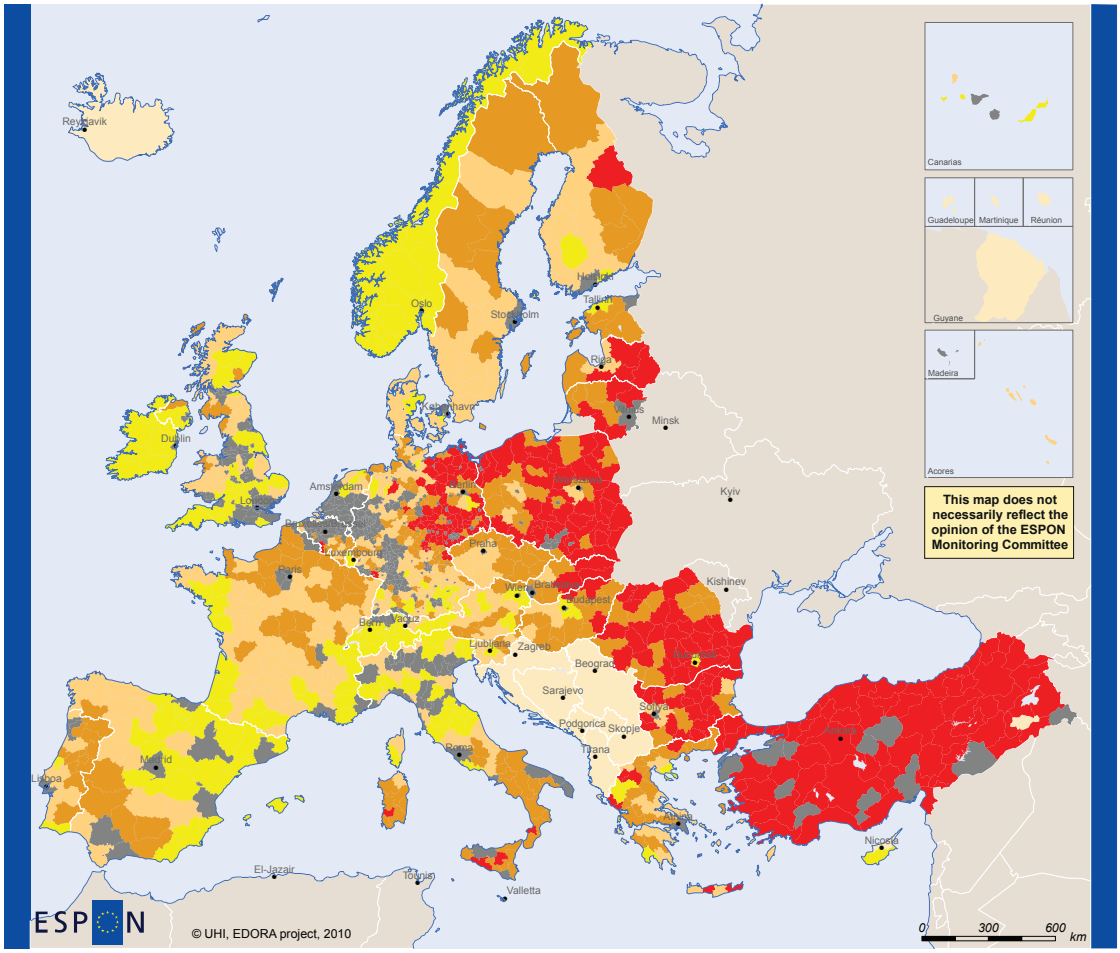
Note: A simplified classification procedure was necessary in CH and TR, due to missing data. However it is anticipated that acquisition of a wider range of indicators would not materially change the outcome.

Structural Types
(Intermediate and Predominantly Rural NUTS 3 Regions)

- No Data
- Predominantly Urban
- Agrarian
- Consumption Countryside
- Diversified (Strong Secondary Sector)
- Diversified (Strong Private Services Sector)

Map 3.3 The performance typology of rural regions



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Regional level: NUTS 3
Source: EDORA Database, 2010
Origin of the data: Eurostat REGIO Database, and other sources, various years (centred on 2006)
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Note: The type allocation to TR and CH is based upon a reduced set of indicators, and should not be considered fully comparable with the typology for the EU27.

Performance (A-D) Types
(Intermediate and Predominantly Rural NUTS 3 Regions)

- No Data
- Predominantly Urban
- Depleting
- Below Average
- Above Average
- Accumulating

3.4.3 Profiles for countries and groups of countries

National and regional boundaries are important "filters", or structuring elements, through which the policy community may more easily relate to the new picture of rural Europe presented by the EDORA cube. Building upon this, the goal of the Country Profiles was to produce "pen-pictures" of rural areas, at national and "meta region" (groups of countries) levels, based on the three typologies, together with other socio-economic indicators, and enriched with the "local knowledge" of the authors.

This work is reported in a comparative working paper (Noguera and Morcillo 2010), and also in a set of 31 individual country reports[9]. These illustrate both the individuality of MS and the existence of macro-scale (meta-regional) patterns.

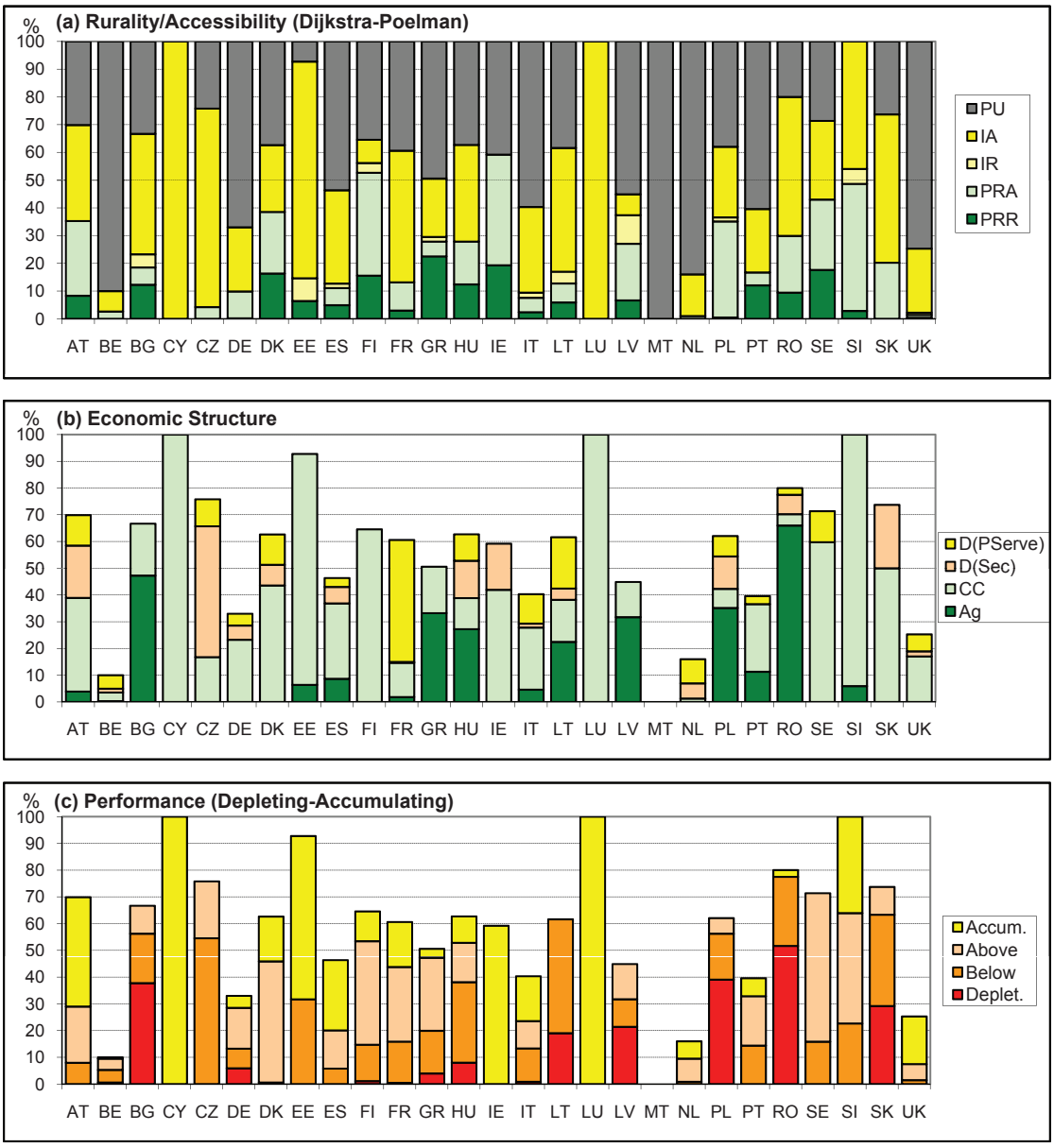


Figure 3.3 Distribution of regional GDP (PPS) by typology class and MS (EU27 only[10])

[9] http://www.nordregio.se/EDORA

[10] Norway, Switzerland and Turkey are excluded, due to GDP data constraints.

The graphs above (Figure 3.3) provide a clear picture of differentiation between MS in terms of their non-urban regions profile, as reflected by the distribution of GDP[11] between the classes of the three typologies of the EDORA cube. It is very easy to see the differences between MS in terms of the degree of rurality (graph a). Contrast, for example, the role of non-urban regions in Czech Republic or Romania, with that of Belgium or Netherlands[12].

In the second and third graphs of Figure 3.3 the Predominantly Urban (PU) regions are excluded (represented by the gaps above the top of the columns). Here again the differences between individual MS are very easy to see. For example, the importance of Agrarian regions is evident in Romania, Bulgaria, Greece, Poland, Hungary, Lithuania and Latvia. The importance of Consumption Countryside regions in the MS of northern Europe is clear. Manufacturing is important in the non-urban regions of Czech Republic, Slovakia and Austria, whilst France is the prime example of an MS in which Market Services play an important role in rural areas. Their importance in Lithuania is more difficult to explain.

In order to highlight the importance of macro-scale geographic patterns the report of Work Package 25 (Noguera and Morcillo 2010) also presents average results for several commonly accepted groupings of countries, (EU15, NMS12, Mediterranean MS, Central-West Europe (CWE), and the Nordic countries).

3.4.4 Implications for a rationale for rural cohesion policy

It has already been argued in Section 3.3 that the meta-regions each have both positive and negative impacts upon rural areas. The typologies presented above offer a broad spatial framework which can help us to identify areas in which the challenges are dominant, others in which the opportunities are more evident, and intermediate zones where the balance between positive and negative impacts is not very clear. This is represented schematically in Figure 3.4. More detail on how this conclusion was reached is provided in the EDORA Final Report.

Rural Types	Meta-Narrative: Agri-Centric	Rural-Urban	Global-isation
Intermediate Accessible	+/-	+	+
Intermediate Remote	+/-	+	+
Predom. Rural Accessible	+/-	+	+
Predom. Rural Remote	-	-	-
Agrarian	-	+/-	-
Consumption Countryside	+/-	+/-	+/-
Diversified (Secondary)	+	+	-
Diversified (Market Serv.)	+	+	+

Figure 3.4 Schematic representation of meta-narrative impacts on the urban-rural and structural types

The fact that every non-urban NUTS 3 region occupies a row in the top half of the figure (according to its D-P type) and in the bottom half (according to its Structural type), and that the balance of challenges and opportunities of the two types may be different reflects (and underlines) the great complexity of the macro-scale patterns.

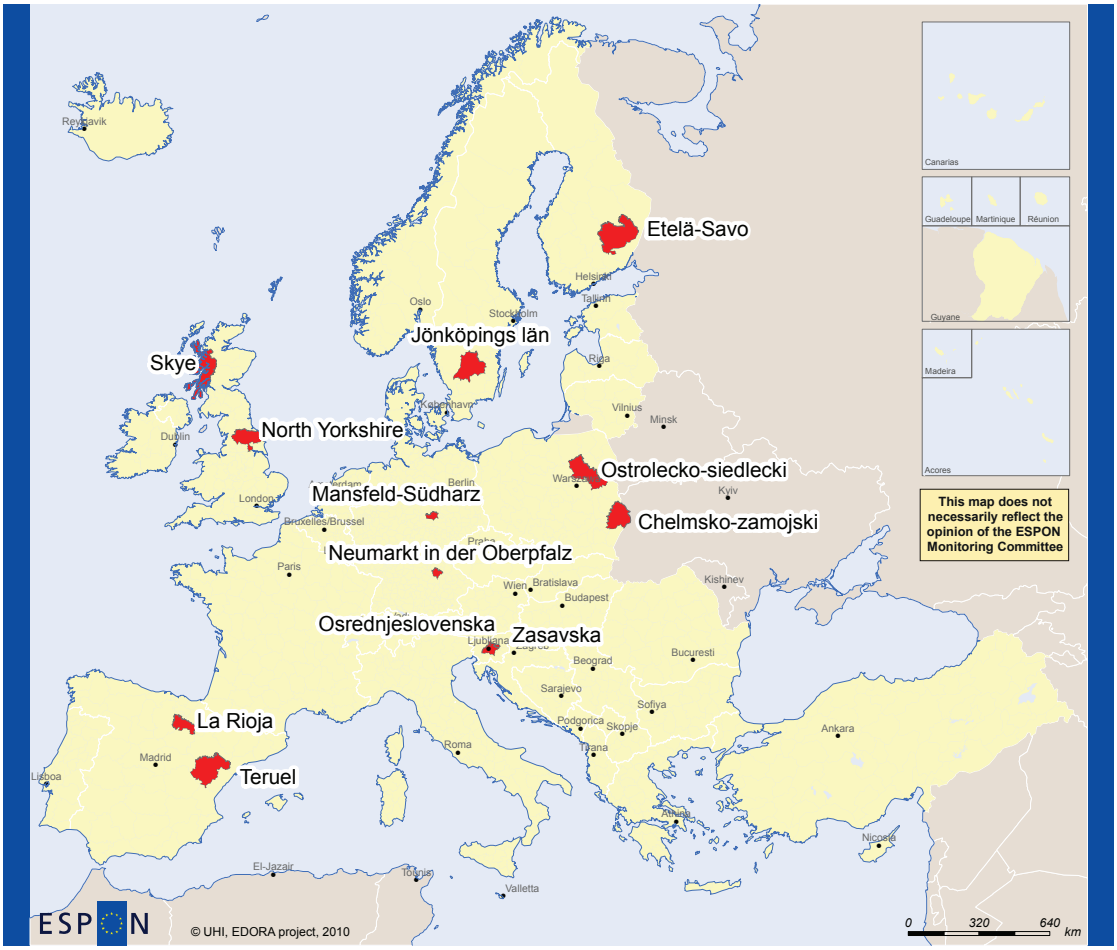
[11] See Appendix 3 of the EDORA Draft Final Report for parallel graphs showing distribution of regions, area and population.

[12] Malta, Cyprus and Luxembourg are not good examples, since they are comprised of a single NUTS 3 region.

3.5 Micro-scale patterns of rural differentiation

The Country Profile graphs (Figure 3.3) are attractive in terms of their clarity, but it is important to keep in mind the fact that the use of NUTS 3 region data means that they incorporate multiple sources of distortion, derived from the internal heterogeneity of many NUTS 3 regions, differences in the way in which regional boundaries are drawn in different MS, and many aspects of the Modifiable Areal Unit Problem (MAUP). This weakness is in part addressed by individual Country Profile reports, which incorporate more nuanced and expert interpretation. Another opportunity to observe micro-level variations is provided by the analysis of 'exemplar regions'. Descriptive reports were prepared on twelve NUTS 3 regions from seven Member States (Map 3.4), in order to deepen our understanding of the processes of rural change in different contexts, and thus to enrich narratives of differential change. The regions were carefully chosen to represent a variety of rural contexts, provided good coverage of the Structural and Performance types.

Map 3.4 The EDORA exemplar regions



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Source: EDORA Database, 2010
Origin of the data: Eurostat REGIO Database, and other sources, various years (centred on 2006)

Space will not permit a detailed account of the findings here,[13] but the key principles to be derived are:

- The micro-scale analyses elaborate upon, and sometimes challenge, the typologies and the meta-narratives developed in the conceptual stage of the project. Where more than one region shared the same type, the differences between them were as prominent as the similarities, reminding us that although generalisations are helpful, indeed indispensable, we should never loose sight of the fact that each region is unique. The exercise thus highlighted the limitations of broad generalisations, and the need for flexible, adaptable rural policy.
- Several of the NUTS 3 regions studied were in fact heterogeneous combinations of sub-areas representing different types. This underlines the shortcomings of NUTS 3 regions as a spatial frame, both in research and policy contexts.
- The analyses highlighted the crucial importance, in all types of regions and in relation to all of the meta-narratives, of social capital, institutional capacity and styles/structures of governance.
- Although there are numerous examples of the role of increasing 'connexity', it was clear that conventional transport infrastructure and accessibility within Euclidean space are still widely considered extremely important. At the same time (perversely) accessibility to a major city did not always bring benefits. This perhaps points to a complex relationship between conventional accessibility, or good ICT infrastructure, on the one hand, and the less tangible human and social capital required to realise their potential for development on the other.
- The region reports highlight the variability in the rate and trajectory of change within the meta-narratives, from very gradual continuing depletion or accumulation, to "recent turnaround". It is common that specific events can trigger relatively sudden reversals. For example, in the NMS12 regions the impact of globalisation has been heightened and compressed in time by accession.

3.5.1 Assets-based approaches as a framework for policy implications

Important aspects of local environments include "hard" factors, such as raw material resources, landscape, physical infrastructure and buildings, and "soft" aspects, such as the skills and capacities of the local workforce, its entrepreneurial culture and innovativeness, characteristics of business networks, the quality of local institutions and governance, and so on. The role of these different "assets" has been recognised within a practical development policy context, especially in the developing world, but also, increasingly, in association with neo-endogenous initiatives in Europe, as "Asset Based Community Development" (ABCD). ABCD is founded on a conceptual framework which defines 7 forms of capital, as described in Figure 3.5 (Braithwaite 2009).

Braithwaite notes that community (or territorial) assets are difficult to assess, proposes a number of "parameters", and coins the term "assetness" to capture the perceived (subjective) value of local capitals. O'Leary (2007) also provides a useful review of ABCD, which reinforces the strong connection to community based approaches and capacity building. However there seems to be no reason why the assets-based rationale should not successfully transfer into a cohesion policy context.

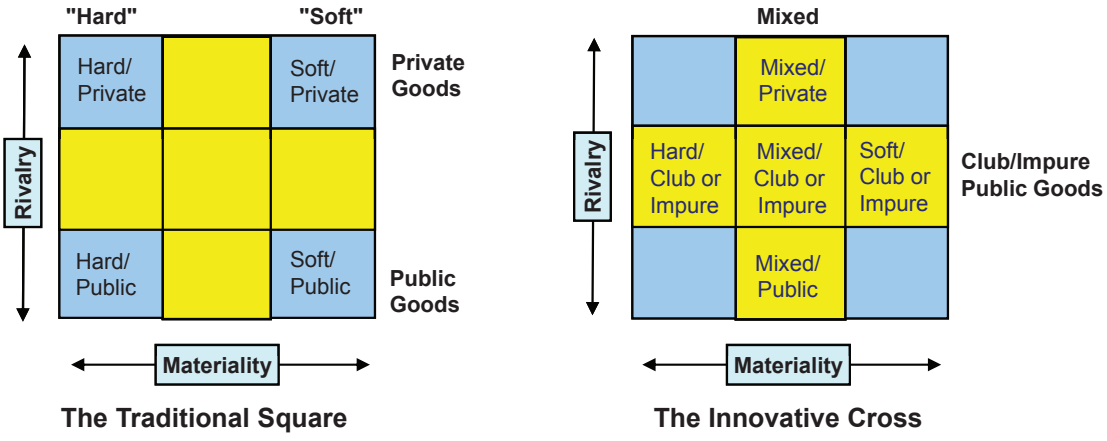
[13] All the individual reports are available for download from http://www.nordregio.se/EDORA

Capital	Definition	Examples and comments.
Financial	Financial capital plays an important role in the economy, enabling other types of capital to be owned and traded.	The liquid capital accessible to the rural population and business community, and that held by community organisations.
Built	Fixed assets which facilitate the livelihood or well-being of the community.	Buildings, infrastructure and other fixed assets, whether publically, community or privately owned.
Natural	Landscape and any stock or flow of energy and (renewable or non-renewable) resources that produces goods and services, (including tourism and recreation).	Water catchments, forests, minerals, fish, wind, wildlife and farm stock.
Social	Features of social organisation such as networks, norms of trust that facilitate cooperation for mutual benefit. May have "bonding" or "bridging" functions.	Sectoral organisations, business representative associations, social and sports clubs, religious groups. 'Strength' relates to intensity of interaction, not just numbers.
Human	People's health, knowledge, skills and motivation. Enhancing human capital can be achieved through health services, education and training.	Health levels less variable in an EU context. Education levels very much generational. 'Tacit knowledge' is as important as formal education and training.
Cultural	Shared attitudes and mores, which shape the way we view the world and what we value.	Perhaps indicated by festivals, or vitality of minority languages. Some aspects - e.g. 'entrepreneurial culture' - closely relate to human and social capital.
Political	The ability of the community to influence the distribution and use of resources.	Presence of, and engagement in, 'bottom up' initiatives, the most local part of 'multi-level governance'. Relates to local empowerment v. top-down policy, globalisation.

Source: Based upon Braithwaite 2009

Figure 3.5 The seven capitals approach

More recently Camagni (2008) has provided a more economic theoretical perspective by seeking to define the concept of "territorial capital". One of the most useful aspects of Camagni's paper, in the EDORA project context, is the concept of mapping out different forms of territorial capital in a two dimensional matrix, the axes distinguishing in terms of rivalry/excludability, and "materiality" (Figure 3.6).



Source: Based upon Camagi, 2008

Figure 3.6 Camagni's Traditional Square and Innovative Cross

Camagni argues that regional policy has, until now, tended to focus upon the four corners of his typology diagram, and that further consideration should be given to the intermediate categories of both axes, i.e. to club/impure public goods, and "mixed materiality". In terms of rural policy it could be argued that the tendency (until very recently) has been to operate almost exclusively on the left side of the diagram (concerned with "hard" assets, such as farm investments, or public infrastructure). In this context one suggestion might be to reinforce policy efforts with respect to the right hand side of the diagram, by supporting "softer" forms of capital, such as Human Capital, or the protection/exploitation of environmental amenities (Figure 3.7), as well as seeking to develop intermediate assets within the "innovative cross".

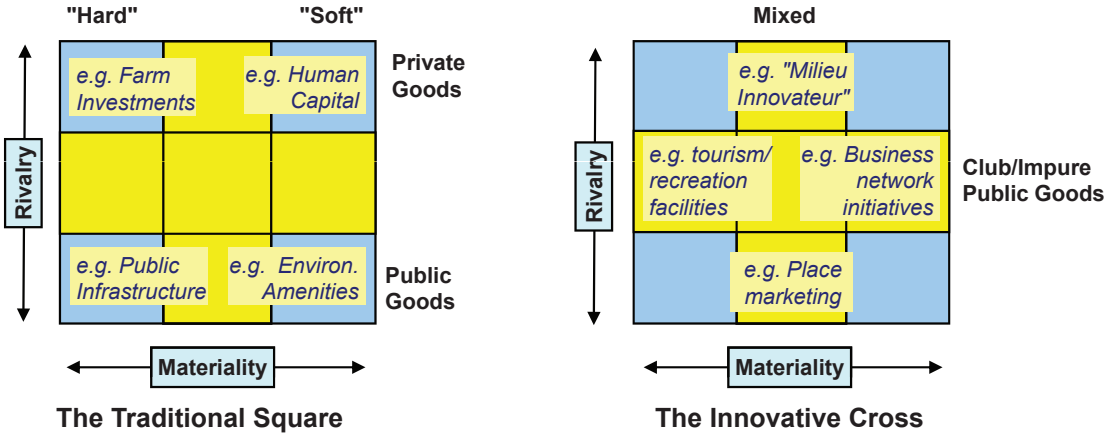


Figure 3.7 Application of the Camagni Territorial Capital Framework in a rural policy context

The literature on the knowledge economy has borrowed the term "Intangible Asset" from that on intellectual property rights to describe the contents of the right-hand side of the Carmagni diagram. Thus a recent Framework 7 project (IAREG) stated:

> *"Globalization and increased competition are putting new types of pressure on companies and, by extension, on the regions that depend on their success… The relative importance of (physical) resource endowment as drivers of regional growth is decreasing as these factors are now almost ubiquitously available. However, "soft" production factors, that is, those related to personal bounded knowledge, are becoming more important." (Suriñach and Moreno 2010 p4).*

This project has made a valuable contribution in providing a more systematic overview, and in identifying new quantitative indicators. Nevertheless, since variation in such 'soft factors' is generally aspatial (Copus 2001), a local qualitative auditing process would still appear to be the most appropriate way to build an evidence base on "intangible assets" in a Cohesion Policy context.

3.6 Towards a rationale for rural cohesion policy

The research reported above supports three broad propositions about rural differentiation and change which have the potential to form the foundation for a coherent policy rationale:

A. That in a globalised world, in which various kinds of "non-Euclidian" space are becoming increasingly important as arenas for economic and social activity, intangible assets will increasingly become the key to enabling each rural region to fulfil its potential.
B. Also as a consequence of globalisation, processes of change which affect rural areas (i.e. the meta-narratives) may be considered endogenous, and common throughout much of the ESPON space. The observed increase in rural differentiation is thus primarily a consequence of local or regional differences in the capacity of regions, (or rather of their people and businesses) to respond to the challenges or opportunities which are presented to them.

C. That the capacity to respond may be divided into two components, according to the geographical scale at which they vary:
   - Some exhibit broad macro-scale patterns of differentiation. These reflect the fact that the meta-narratives have different impacts in different types of rural area. These patterns may be to some extent captured by regional indicators, and typologies.
   - Others, particularly the intangible assets, seem to vary in an 'aspatial' way, which can only be captured on a region-by-region (or locality) basis, by some form of qualitative auditing.

Clearly these propositions point towards neo-endogenous approaches, in which a "bottom up" process of regional programme design is fully supported and guided by available (hard/standardised/comparable) information, expert advice, and the kind of strategic perspective which is best assembled at a central level (Figure 3.8). The EDORA findings are thus supportive of the "place based" approaches advocated by the Barca Report (Barca 2009).

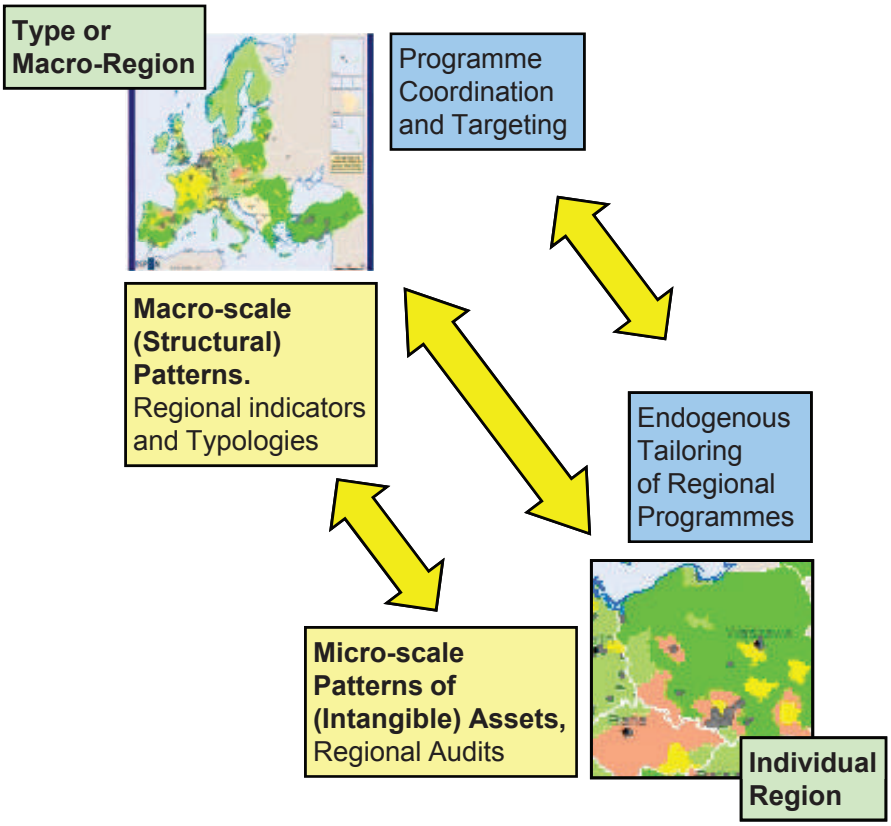


Figure 3.8 Neo-endogenous rural cohesion policy

It is beyond the scope of this project to discuss how such a Neo-Endogenous policy approach may be implemented in detail. However some guiding principles emerge from the findings presented above:

- The need for close coordination between interventions to support territorial cohesion in rural areas, and other policies active in similar contexts and themes. These include, for example CAP Pillar 2, which, - as the EDORA Final Report explains - is viewed as a complementary policy, essentially sectoral, but with significant cohesion impacts, particularly in Agrarian and Consumption Countryside regions. Also important are a range of EU, national and regional Social and Employment policies which already address the issue of intangible assets.
- Whilst a menu-based approach may imply unhelpful rigidities, the "top-down" guidance should be sufficiently clear and specific to ensure its value as a resource to support regional implementation, and yet be flexible enough to be relevant across the full range of contexts.

- This policy concept is only feasible within the context of effective multi-level governance. Where appropriate, support should be provided to facilitate regional capacity building. In addition to the need for rural audits and indicators of intangible assets, in the context of programme design, these should be developed in the tandem with systematic monitoring and evaluation of impacts.

3.7 Conclusions

This paper has sought to present the key findings of the EDORA project as an evidence-based rationale for territorial cohesion policy for rural areas. The meta-narratives, the typologies, and the exemplar region analyses are key components, forming a sequence of logical steps which all point towards a two-stage neo-endogenous approach in which both macro-scale and micro/aspatial socio-economic differentiation are addressed. An important feature of the recommended approach is an emphasis upon intangible assets, as a recognition of the increasing importance to development of a capability to interact effectively in non-Euclidean network space.

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EDORA: Discussion

During the RSA Annual Conference held in Pécs on May 24-26, the ESPON project EDORA was presented at an ESPON Session within two presentations: one presentation introducing the project and a second on perspectives and policy implications. The questions and remarks made are summarized below.

A request was raised to explain why the **Agri-Centric narrative** (which stresses the concern of agricultural and farming communities to broaden their objectives beyond maximisation of food and fibre output), **can lead to stagnation**, whilst the other two narratives of urban-rural relations and global competitiveness do not? Especially because this query is particularly related to the descriptive reports prepared for the twelve 'examplar regions'. The Agri-Centric Narrative assumes that most Agrarian regions are moving in the direction of either large scale commercial 'Para Productivism' or small scale multi-functional 'Peri Productivism'. However a couple of the NMS12 Exemplar regions showed that a third possible "destination" is stagnation. This very clearly illustrates the fact that the Meta Narratives are generalisations about common "ensembles" of rural change, and that the exemplar regions illustrate real world deviations (as they were intended to).

Then the following two questions were raised. How did you **capture 'relational networks' and measure 'connexity'** by not using constructs and indicators of Euclidean space rather than other types of space? And how did you explore how things were related to each other in the increasing interconnectedness of rural economic and social activity? The answer to both these questions is that the Connexity Meta Narrative, and the concept of Relational or Organisational Space derive from the conceptual phase of the project, i.e. the thematic literature reviews. Unfortunately no attempt was made to measure these concepts with quantitative indicators. However this provides an opportunity to stress the fact that it's not a question of phenomena existing either in Euclidean or Relational Space, all phenomena are located in both "dimensions". It is the relationship between them that is interesting – possibly a very interesting topic for future research.

After that the question was posed if the project made **different policy recommendations for the regions** differentiated by the three regional typologies. A differentiation of policy recommendations might be very difficult and never was the objective of the EDORA study. The different typologies should contribute to a better understanding of rural changes and differentiation; moreover, what the three dimensions of the typology work reveal is how different aspects of the analytical dimensions overlap within one area. In discussing the project (and also at the Pecs session) reference was mainly made to the need to take account of this complexity of territorial development. It was also concluded that this is not a 'rural' feature per se, but can be experienced in regions of all kind; hence targeting on these areas is better covered by referring to non-urban regions.

This then also has implications for **the level of policy recommendations**. Due to the increased inter-linkages of many aspects of rural differentiation, a strict focus on one territorial level would be restrictive and not appropriate to the many inter-relationships and the policy needs. The project aims to incorporate the relevance of all levels, and the individual project work packages (like thematic reports, exemplar regions and synthesis report; as well as the country profiles) are full of exemplary evidence for various aspects at different territorial levels. As EDORA has the task to explore the opportunities for development in rural areas, the local dimension is emphasized, to stress that empowering actions and participatory policy elements are important contributions needed to address regional potentials more fully, rather than through a primarily top-down perspective. Policy recommendations might also need to be specific in terms of the level for which they are formulated, as very different policies have an influence on the region's development. This is a typical multi-governance issue that is particularly evident at the regional level (including both the aspects of horizontal and vertical coordination tasks).

Finally the question was raised to indicate the really new results of the project. What are the **new lessons learned**? The key issue of the project is that it presents a coherent policy rationale for "rural cohesion policy" – as an alternative to the "stylised fallacies" which seem to underlie the current rural development policy framework.

4 – Regions at Risk of Energy Poverty

Project description:

Effects of rising energy prices on regional competitiveness

Europe is entering a new energy landscape where energy prices have been rising and the dependency on fossil fuels is increasing. In the future, energy supply and demand will have to turn more towards renewable energy sources and focus more on the efficient use of energy. EU Ministers responsible for territorial development have given priority to this issue by expressing their intention in the Territorial Agenda (2007) to explore and develop opportunities of new forms of renewable energy supply.

Against this backdrop, the following key policy questions form the basis for this project:

- How and to which degree will an increase in energy prices have impact on the competitiveness and cohesion of European regions?
- How can affordable and clean energy be secured within the regions of Europe?
- What is the role of regions in national energy policy and which policy initiatives for promoting additional sources of renewable energy can be carried out at regional level?

Considering this, the project focused on gathering knowledge on the different uses of energy in the EU regions (NUTS 2 level) and on identifying opportunities to generate and strengthen sustainable energy sources. The project developed a methodology to measure the risk of energy poverty for different types of regions, and then utilised a cluster analysis in order to define groups of regions with similar levels of vulnerability to energy poverty - an energy risk profile - for which a set of policies could be designed for those regions. On the basis of these results, future-oriented territorial evidence was built on the impact of rising energy prices on the competitiveness of European regions as well as on the cohesion of Europe in a long-term perspective.

The main results are:

- Indicators offering new information on the regional impact of increasing energy prices on industry, transport and private households, revealing the regions' socio-economic vulnerability, their climate characteristics and potential for the development of wind and solar power.
- Typologies of European regions reflecting the impact of increasing energy prices on the demand side as well as on the supply side.
- Long-term scenarios sketching the scope of actions for regions within the context of national and European energy policy.
- Several case studies of regions which are especially active in this field.
- A survey of the priorities of 41 regional energy agencies.

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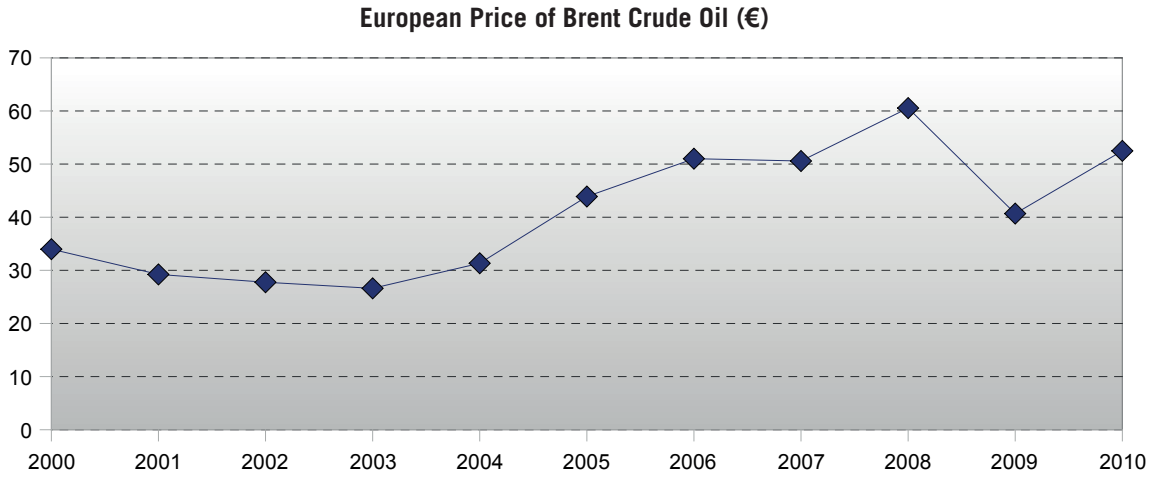
Methodological aspects of the ESPON ReRisk project

by Daniela Velte[14]

4.1 Introduction

As is well known and has been well-documented, energy prices have increased sharply in recent years. The trend only came to a halt in 2008 as a consequence of the economic recession, but prices of crude oil have already started to rise again, as shown in Figure 4.1.



Source: Own elaboration based on data available at Europe's Energy Portal (http://www.energy.eu/#prices)

Figure 4.1 Development of crude oil prices in Europe 2000 - 2010

The increase in crude oil prices spreads into the economy, affecting electricity markets and fuel prices for transport, which have seen an increment of 23.4% in the case of gasoline and 20.5% for diesel fuel between 2005 and 2010. This sharp an increase in a basic resource such as energy can have severe impacts on the competitiveness of regional economies and social cohesion.

Concern over the consequences of rising energy prices is growing in Europe, both in political circles and among NGOs (INFORSE 2010). The European Commission (EC 2008b) stated in 2008 that:

> "International oil prices have recently reached an all-time high. Estimates indicate that the current high oil prices will have long-term impacts, reducing growth and increasing inflation in the EU economy. Through higher input and transport costs, high fuel prices increase food prices. These high price levels are squeezing the purchasing power of all EU citizens, with the most severe impact on the lowest income families, and putting a strain on business. Energy intensive sectors, as well as transport and agriculture, and in particular fisheries, are most affected and face a difficult adjustment process… The response of the EU to recent increases in oil prices should be based on the assumption that prices are likely to remain high in the medium to long term."

[14] With contributions from: Jennifer Stack, Rasmus Ole Rasmussen, Oihana Blanco

When a family is not able to afford the costs of keeping its house warm and the lights on, it is hit by "energy poverty". In the UK this is said to occur when in order to heat a home to an adequate standard of warmth a household needs to spend more than 10% of income on total fuel costs (heating fuel plus electricity). However, in many EU countries, not the least in Central Europe, it is common that poor people pay well above 10% of their income for household energy costs. It is also common that low-income households disconnect from heat and gas supply to save money. In Central Europe the traditional solution was to subsidize energy supply for the entire population, with the well-known results of low energy efficiency and no incentives to develop renewable energy. But even with subsidies in place, the poorer part of the population is too often not able to afford the upfront investment necessary to improve the energy efficiency of their homes. And this situation is presently getting worse, not only due to increases in energy prices, but because of diminishing incomes in households.

Over recent years, all EU countries experienced similar price hikes, independently of the fuel mix they use for generating electricity. This can be explained by the fact that gas prices are indexed to oil prices. Furthermore, the wholesale markets for electricity are organized in such a way that the final daily sales prices are generally determined by gas-fired plants (EC 2007), so that on the production side, regional exposure to rising energy prices is similar in most countries.

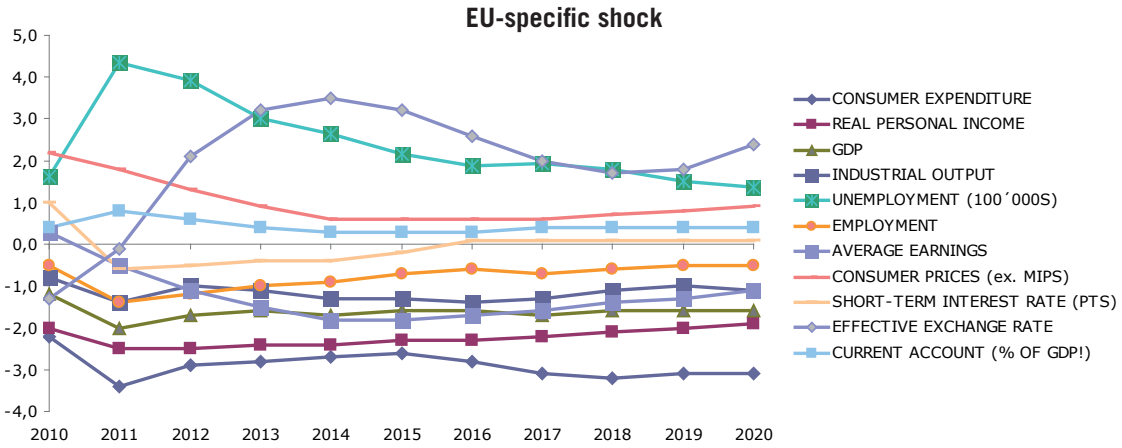
It was for this reason that the ESPON project ReRisk (Regions at Risk of Energy Poverty) concentrated on analysing the different uses of energy in the regions, rather than looking into infrastructure or production issues, which are often at the heart of energy studies. However, by putting the focus on energy consumption, the project immediately ran into the problem that there is no comparable data available for the EU regions, so that other indicators had to be used (and sometimes built) in order to measure the regions' vulnerability to rising energy prices.

The ESPON project ReRisk has measured the EU regions' vulnerability to rising energy prices, based on a series of socio-economic indicators available from Eurostat and DG Regio, which were further processed for the purpose of this project. By adding GIS-derived data on the climate characteristics of the EU regions, as well as data on wind and PV potential obtained from other sources (European Environmental Agency and the Joint Research Centre), it has been possible to point out not only potential threats to the competitiveness of regional economies and to social cohesion, but also possible opportunities, which may arise as a consequence of increasing prices for fossil fuels. These threats and opportunities were sketched in four qualitative scenarios and analysed with regard to the implications for different groups of regions with similar characteristics, which were defined by means of a clustering exercise. Case studies on regional energy initiatives, as well as a survey of 41 regional energy agencies added valuable information on the scope of action and the priorities of regional policy makers in the field of energy. This paper describes the main methodological challenges that the project partners were confronted with, the solutions that could be found to overcome data gaps, as well as the research questions that still need to be addressed.

This paper follows the research strategy applied in the project, discussing first the scientific background as well as methodological questions related to individual indicators, with special attention to the socioeconomic data used for analysing the regions. The next sections shortly describe the regional typologies derived from the clustering exercise and the qualitative information obtained from expert input (scenarios), the survey of regional energy agencies and several case studies. The final section of this article indicates needs for further research and political action.

4.2 Scientific and methodological context

The impact of rising energy prices on economies and societies has so far mainly be addressed on national or European levels through modelling exercises. According to economic theory, "shocks that change real variables in the short run will trigger a round of nominal adjustments (to prices, wages, exchange and interest rates), which will ensure real variables converge on their equilibrium values in the long run" (Oxford Economic Forecast 2006). The possible quantitative impact of a 30% price increase in all final energy uses has been calculated for the EU countries (see Figure 4.2), indicating that the time the economy needs to reach that new equilibrium of lower energy demand lasts from 10 to 20 years and that the negative impacts are still visible at the end of the first decade.



Source: Own elaboration based on data from Oxford Economic Forecasting
Figure 4.2 Estimated economic impact of a 30% price increase in all end-uses of energy (European Union)

A lively debate is presently going on among economists and energy experts on the relationship between rising energy prices and the present economic recession (Hamilton 2009). The question has been framed nicely by a former vice-president of the Saudi-Arabian company ARAMCO, Sadad al Husseini:

> " … as you go up to say $90 a barrel, you're consuming 4.5% of the global economy (for oil). That in itself is a ceiling - you cannot go indefinitely into more expensive alternatives without destroying (the) economy and therefore destroying demand. So we do have a ceiling on prices and how much expensive alternative fuel we can put into the market." (Lardelli 2009)

Among energy analysts, it is largely accepted that energy prices will remain on high levels for the time coming, due to the fact that the world production of fossil fuels will not be able to meet increasing demand (Dargey & Gately 2010). The decline of oil supplies will put stress on other resources, such as natural gas and coal. Actors react to high prices looking for cheaper or more abundant substitutes, thus provoking "dynamics of depletion" (Velte 2011).

Despite the fact that abundant energy is a prerequisite for economic growth, the possible impacts on regional economies have hardly been explored so far and much less from a comparative perspective. An earlier ESPON project discussed the regional dimension of energy on the production side concluding that "when dealing with energy policy indicators we have to take into account that most of them only have sense at national or EU level" (CEEETA – ESPON 2005).

The EU's Directorate General for Regional Policy (DG Regio) made a first attempt to calculate an "energy vulnerability index", estimating regional exposure to the energy challenge over the medium term. This index uses information from different data sources and combines regional and national data: "The energy index is based on four variables, notably regional energy consumption of households (including private transport) in 2004, regional energy consumption of industry, agriculture, services and freight transport in 2004, national energy import dependency in 2006, national carbon

content of gross inland energy consumption in 2006" (EC 2008a). DG Regio passed part of the data on to the ReRisk project for further research, as the exercise carried out by the Commission staff was "by its very nature, limited; it simplifies a complex reality and focuses on a single regional level. It cannot substitute for a detailed analysis of specific national and regional contexts, nor take into consideration the capacity of Member States and regions to respond." (EC 2008a).

The ReRisk project followed these recommendations and supplied the information that the policy side was asking for, even though some data gaps still persist. More in-depth information on many of the chosen indicators is available from regional sources (see for example EVE 2009), but these reports generally lack the comparative perspective that characterizes the ReRisk findings.

The research realized in the ReRisk project was organized in four consecutive steps, once a satisfactory data base had been compiled (see Figure 4.3).

Firstly, the regions' vulnerability was analyzed with regard to industrial competitiveness and employment, their dependence on motorized transport and the main causes for poverty, using a set of indicators for each of these three categories, all based on harmonized Eurostat data. Industry, transport and households together account for 84% of energy consumption in the European Union. Data on wind and PV potential, as well as temperature data for the last 15 years could be obtained from GIS data provided by the Joint Research Centre and the European Environmental Agency, although some of this data had to be converted to NUTS II level.

Then a clustering process was applied to identify groups of regions with similar levels of vulnerability and development potential. The resulting five groups of regions were then compared to earlier ESPON typologies, such as lagging regions, the motors of growth ("Pentagon regions") or urban regions with potential for polycentric development, the so-called PUSH areas.

Thirdly, possible long-term developments in the energy sector were considered in the form of scenarios, in order to take into account how the different types of regions might be affected by national and European policy objectives and energy strategies. This scenario exercise was enriched by information obtained from case studies in regions that are exceptionally active in terms of energy policy and by data collected from a survey of 41 regional energy agencies, which gave insights on the influence that regional administrations have in the energy field, as well as their priorities in this area.

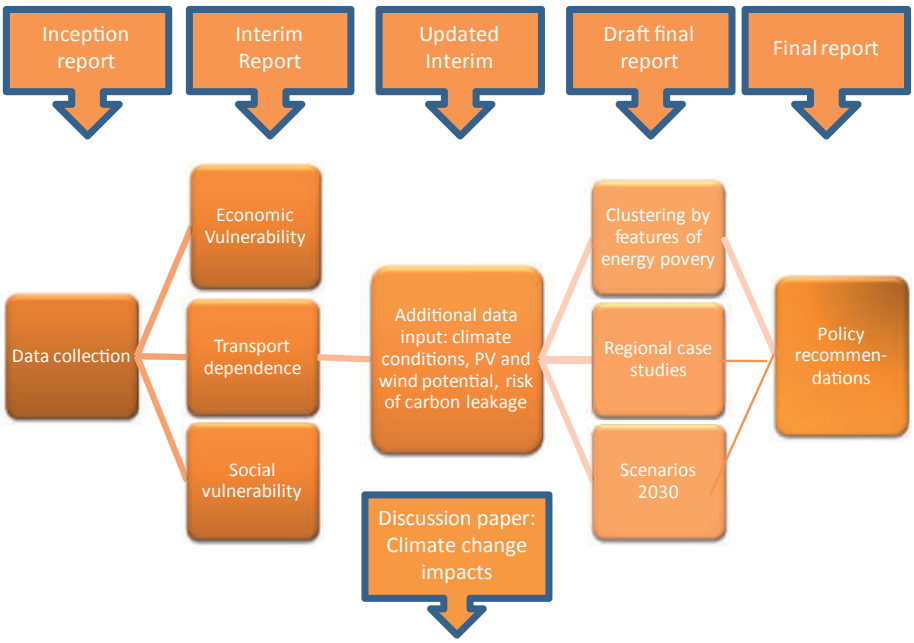


Figure 4.3 Overall research approach of the ReRisk project

Finally, conclusions were then drawn in the form of policy recommendations for actions to be taken on local, regional, national and European level to reduce the vulnerability of regions and grasp the opportunities that are likely to arise from increasing prices for energy from fossil fuel sources.

The following five factors are especially relevant when identifying regions that are potentially at risk of energy poverty:

1. Regional economies, in which wealth creation depends heavily on industries that spend a considerable part of their total production cost on energy purchases. Further, if these industries are an important source of employment for the region, the effect is multiplied. The basic assumption is that if energy is an important cost item, an increase in prices will leave companies with lower net margins, and hence their competitiveness is at risk. And this could affect negatively the economic development and stability of the region itself.
2. Regions with population bases that have low levels of income at their disposal to affront and absorb increases in their energy costs. This problem is quite like that in the first factor, but at the microeconomic level, where the unit is an individual family, instead of a company. However, the underlying issue is the same: there are economies (in this case family economies), which have less ability to respond to and absorb increases in energy costs.
3. The role of transport in a region's economy is also a critical factor. On the one hand, if the transport industry represents an important part of a region's gross domestic product (GDP), a threat to the transport sector's profitability and survival due to increasing fuel costs will have a clear effect on the economic development of a region. And on the other hand, regions where residents have to travel large distances to work, and as a result, transport represents an important cost in the family budget, will also be more affected. Furthermore, increases in the cost of freight transport get passed on to consumers and businesses – the transport company does not accept lower net margins and is not willing to absorb all of these increased costs. Therefore, an increase in fuel prices affects the family not only as they fill up their own car, but also as they purchase any good that had to be transported.
4. An example of a key good that is affected by increased transport costs is coal. When transport costs to ship the coal from the mine to the power plant increase, these costs end up getting passed along to the consumer through higher electricity prices – be it an industrial or household consumer.
5. Regions that have important temperature extremes, i.e., hot climates that need cooling systems and cold climates that have high heating needs.
6. One last factor that should be included in the analysis for determining the vulnerability of regions with regard to rising energy prices is the potential for generating energy from renewable resources, without being fed into the general electricity grid. Examples of this can include solar-thermal, small wind, biomass, geothermal or photovoltaic (PV) plants, which deliver energy for direct consumption. The reason for this is that grid access has costs associated, such as transport and distribution costs as well as taxes. If the production stays off the grid and is consumed directly, these additional costs are avoided by the consumer. As a result, the higher the total price of electricity sourced from the grid, the more competitive installations of renewables for end-use become.

The initial set of socio-economic indicators used in the project is summarized in Table 4.1.

Table 4.1 Initial set of socio-economic indicators used in the ReRisk project

Dimension of energy poverty	Indicator
Economic competitiveness	- Regional employment in industries with high energy spending - Regional GVA in industries with high energy spending
Transport dependency	- Regional employment in the transport sector - Regional spending on transport fuel Commuting between regions - Age of regional car parks - Regional air travel (passengers)
Social vulnerability	- Long-term unemployment - Rates of economic activity - Age dependency ratio - Disposable income

4.3 Measuring impacts on competitiveness and cohesion

4.3.1 Impacts on the competitiveness of companies and employment

The greatest methodological challenge in the first phase of the project was that of measuring and comparing the economic vulnerability of regions in the absence of harmonized data on energy consumption. This problem was solved by using data on industrial energy purchases. For companies, energy is one of the main cost factors in the production process and therefore the amount companies spend on purchasing energy is more relevant in terms of competitiveness than their actual energy consumption.

Choosing this economic approach, however, has a series of implications: the ReRisk indicators highlights sectors that use expensive energy and do not necessarily benefit from special industrial rates, a fact that is sometimes overlooked in studies on energy-intensive industries, such as steel, aluminium and cement (ICF 2007). The methodology elaborated in the ReRisk project permits to compare the energy costs of a large number of industrial subsectors between countries and with regard to the EU average. This makes it possible to have very detailed information on the performance of industry branches, for which rising energy costs may pose a problem and these are not necessarily identical with those generally considered to be “energy-intensive”. The negative side of using this economic indicator, instead of actual energy consumption, is that processes with energy-saving potential cannot be neatly identified. For that, more specialized information sources had to be consulted (UBA 2009).

The following approach was chosen in order to determine the sectors and regions that are most vulnerable to energy price increases (see Figure 4.4).

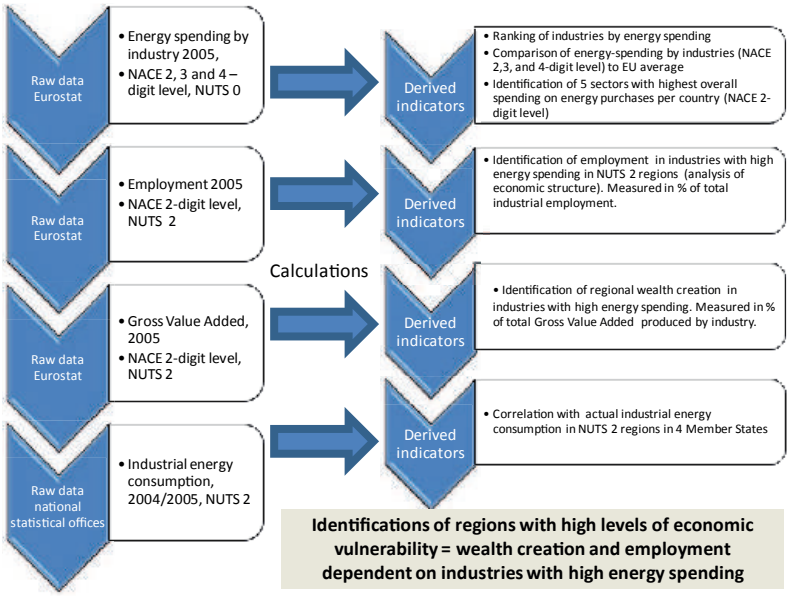


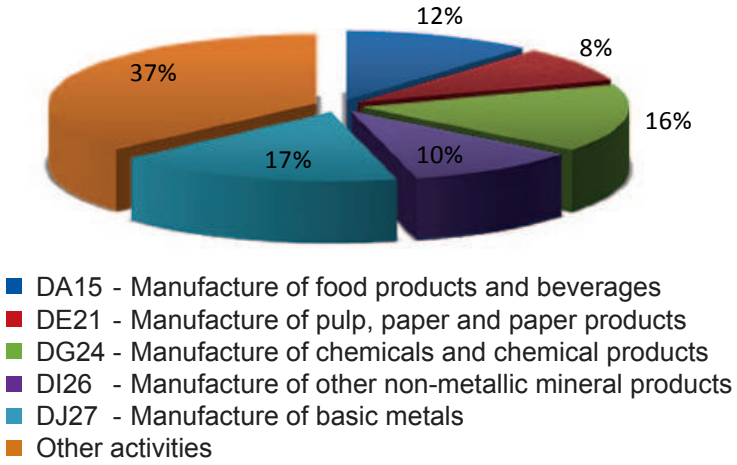
Figure 4.4 Methodological approach for analyzing the regions' economic vulnerability

First, we estimated, for the EU 27, the sectors with the highest spending on energy products on NACE 2 digit level, and which, combined, represent 63% of industrial energy spending (see Figure 4.5).

Furthermore, it was checked if the national data diverges significantly from the EU average and if some adjustments had to be made for countries with a different profile of industrial energy spending. In a second step, we calculated the ratio between "total purchases of goods and services" and the energy purchase in each sector (down to NACE 4 digit) for those EU countries, for which complete data sets were available for both categories. This made it possible to identify the subsectors and processes with the highest energy purchases, and also to determine the relative position of these sectors in each EU country in terms of energy spending.

Then, we identified the EU regions, in which large part of the industrial employment and gross value added (GVA) depends on these sectors with high energy spending and which may therefore be more vulnerable to energy price increases.
Finally, we confirmed that there is a significant correlation between the industrial energy spending in the regions and their energy consumption, using actual consumption data from 4 Member States.

The calculation described permits understanding of the industrial structure in the regions and identification of the need for action in this part of the economy. Industry is, however, not the only source of employment and wealth creation in the regions - services, transport and agriculture also provide work opportunities and income. This fact can be accounted for by relating employment and GVA in industries with high energy spending to the overall employment and total regional GVA, which were the indicators the ReRisk project finally settled for. Map 4.1 highlights the regions in which a considerable part of gross value added is produced by industries with high energy costs.



Source: Own elaboration based on Structural Business Statistics
Figure 4.5 NACE sectors with highest overall energy spending (EU 27), 2005

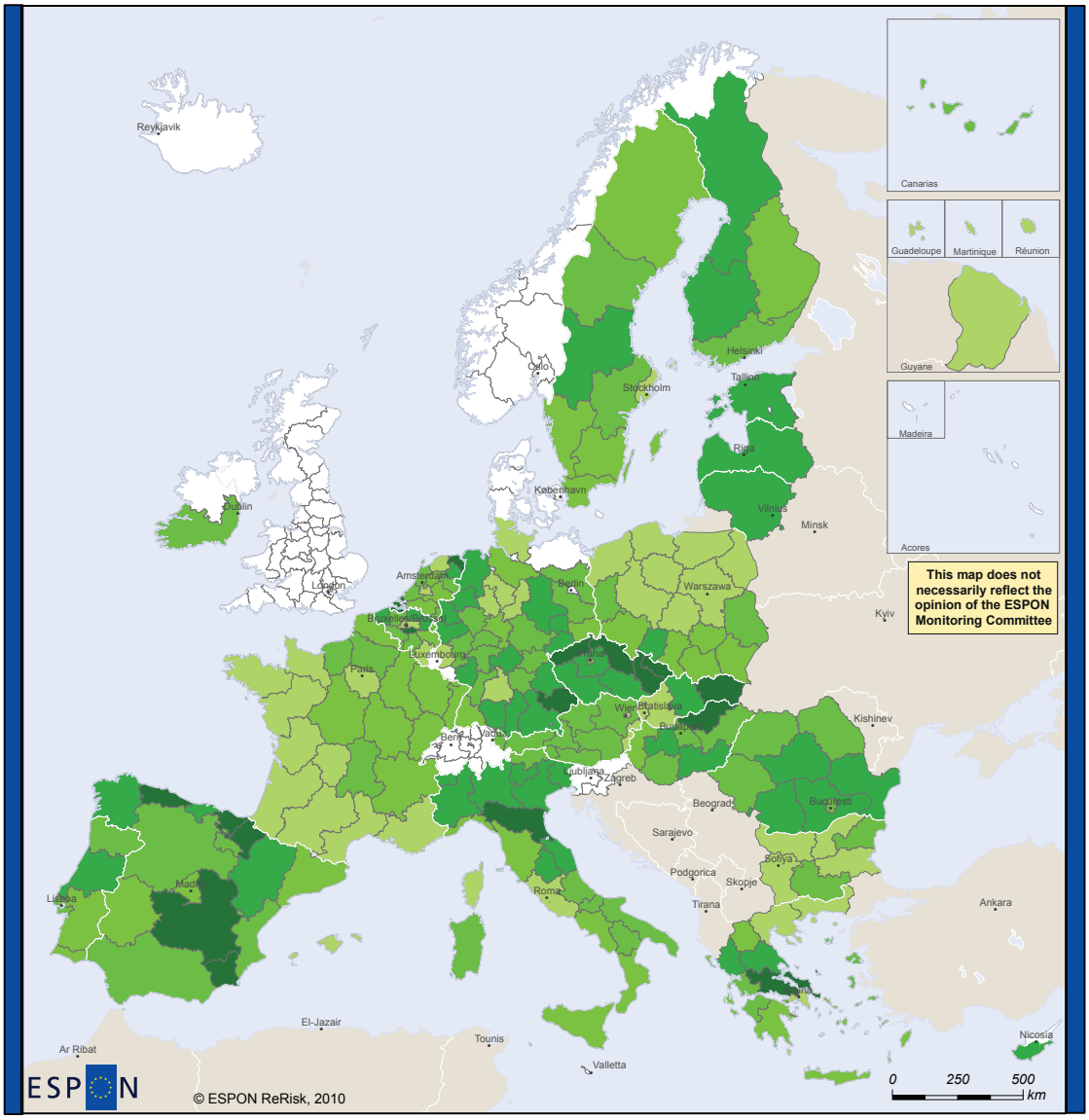
It is unfortunate that Poland, Lithuania, Bulgaria and Slovenia have not yet published data on energy purchases by companies, so that the estimates for these countries had to be based on the EU average values and not on the specific country profiles. Findings for the Czech Republic and Hungary, which have collected data on energy expenses, indicate that industries in the Eastern part of Europe are likely to be especially vulnerable to increasing energy costs. It can, however, be expected that these data gaps will be closed soon, since the survey, from which the data was taken, is obligatory for the Member States.

4.3.2 Measuring dependence on (motorised) transport

Anywhere in Europe, a large part of transport is fuelled by oil and increases in oil prices are almost immediately passed on to the final customer. Scenario and modelling exercises suggest that the transport sector in general will soon run into supply problems so that "powerful demand-side measures" need to be applied (Lindfeldt et al 2010). The situation could become especially critical for the aviation industry, even if the present level of air traffic is maintained and efficiency improvements of 5% per year to 2026 are achieved (Nygren 2008). Military advisors have recognized this problem (Zentrum für Transformation der Bundeswehr 2010) and foresee the need to switch to other fuel types (coal-to-liquid, gas-to-liquid or biofuels) before the end of this decade (Milici 2008). However, these substitution strategies could have negative effects on seemingly abundant reserves of the alternative fuels (Milici 2008), especially if large-scale solutions for commercial transport are needed. For these reasons, it has to be assumed that carrying goods and people around will become increasingly expensive, even posing a threat to globalization.

Several suitable indicators were available from Eurostat and from DG Regio to measure regional vulnerability to rising prices for passenger and freight transport. By relating the number of air passengers to the total population, the main transport hubs for air transport can be identified, as well as remote and island regions, which rely heavily on air travel. Transport is also an important source of employment in some regions and this could be measured by applying a similar procedure as that described Section 4.4.1, calculating the percentage of the regional work force that is occupied in this sector. Freight costs measured as percentage of GDP, as done by DG Regio, permit to estimate the impact that rising prices for transporting goods may have in the regional economy.

Map 4.1 Regional GVA in industries with high energy costs, 2005



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Regional level: NUTS 2
Source: ESPON ReRisk, 2010
Origin of data: Own elaboration based on data from Structural Business Statistics and Eurostat Regional Statistics
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GVA in Industries
(% of GVA)

- 1.15 - 4.49
- 4.50 - 7.19
- 7.20 - 10.18
- 10.19 - 14.43
- 14.44 - 25.13
- No Data

Finally, daily movements of workers must also be considered, but in this case, the only statistical evidence available refers to interregional movements (people working in another region / people working in the same region). Needs for commuting within a region can presently not be identified on the base of Eurostat data. Obviously, the percentage of people working in another region tends to be greater in smaller regions, but the ReRisk results show that the area size of the region is not the determining factor for high levels of commuting, but rather the access to job and growth centres in nearby regions. Some of the regions with high levels of commuting have a close to average size and some of the smallest regions have low levels of commuting. Furthermore, the main argument with regard to policy recommendations is independent from the area size, since improving public transport networks to offer cheaper alternatives to commuting workers, requires interregional cooperation, which, in the past, has often been a serious obstacle to unifying transport services.

Table 4.2 shows the regions with the highest levels of vulnerability with regard to employment in the transport sector, increases in fuel costs for freight transport, level of commuting between regions and the dependence on air travel.

Table 4.2 Ranking of regions by transport dependence

Transport employment / total employment		Fuel costs for freight as % of GDP		Commuting (persons working outside the region / inside the region)		Nº of passengers in air travel / total population (%)	
Region	**%**	**Region**	**%**	**Region**	**%**	**Region**	**%**
FI20 Åland	60.26	BG32 Severen tsentralen	14.22	BE31 Prov. Brabant Wallon	98.22	ES53 Illes Balears	28.60
DEA2 Köln	45.78	BG34 Yugoiztochen	8.18	UKI2 Outer London	77.29	GR42 Notio Aigaio	19.44
SK01 Bratislavský kraj	38.22	PL33 Swietokrzyskie	7.99	BE24 Prov. Vlaams Brabant	72.92	CH03 Nord-westschweiz	17.54
FR10 Île de France	27.69	BG33 Severoiztochen	7.16	NL23 Flevoland	60.62	NL32 Noord-Holland	16.93
BE10 Région de Bruxelles-Capitale	26.07	BG42 Yuzhen tsentralen	6.72	AT11 Burgenland	50.66	ES70 Canarias	15.78
ES30 Comunidad de Madrid	25.45	PL43 Lubuskie	6.67	DE93 Lüneburg	48.34	BE24 Prov. Vlaams Brabant	15.32
DE50 Bremen	25.25	PL34 Podlaskie	6.59	BE35 Prov. Namur	45.16	UKI Outer London	15.00
DE71 Darmstadt	24.20	BG31 Severozapaden	6.39	BE34 Prov. Luxembourg	45.14	GR2 Ionia Nisia	14.85
PL12 Mazowieckie	24.09	CZ02 Střední Čechy	6.27	UKH2 Bedfordshire Hertfordshire	37.17	DE7 Darmstadt	13.71

Source: Own elaboration based on data from Eurostat and DG Regio

The combination of indicators used in the ReRisk project shows that differences in transport dependence are considerable between the EU regions in each of the above categories. The most vulnerable regions are the large logistic centres, peripheral and island regions, but also some rural regions dependent on working opportunities in nearby urban poles or agricultural regions with high export levels.

4.3.3 Measuring poverty or the threat thereof

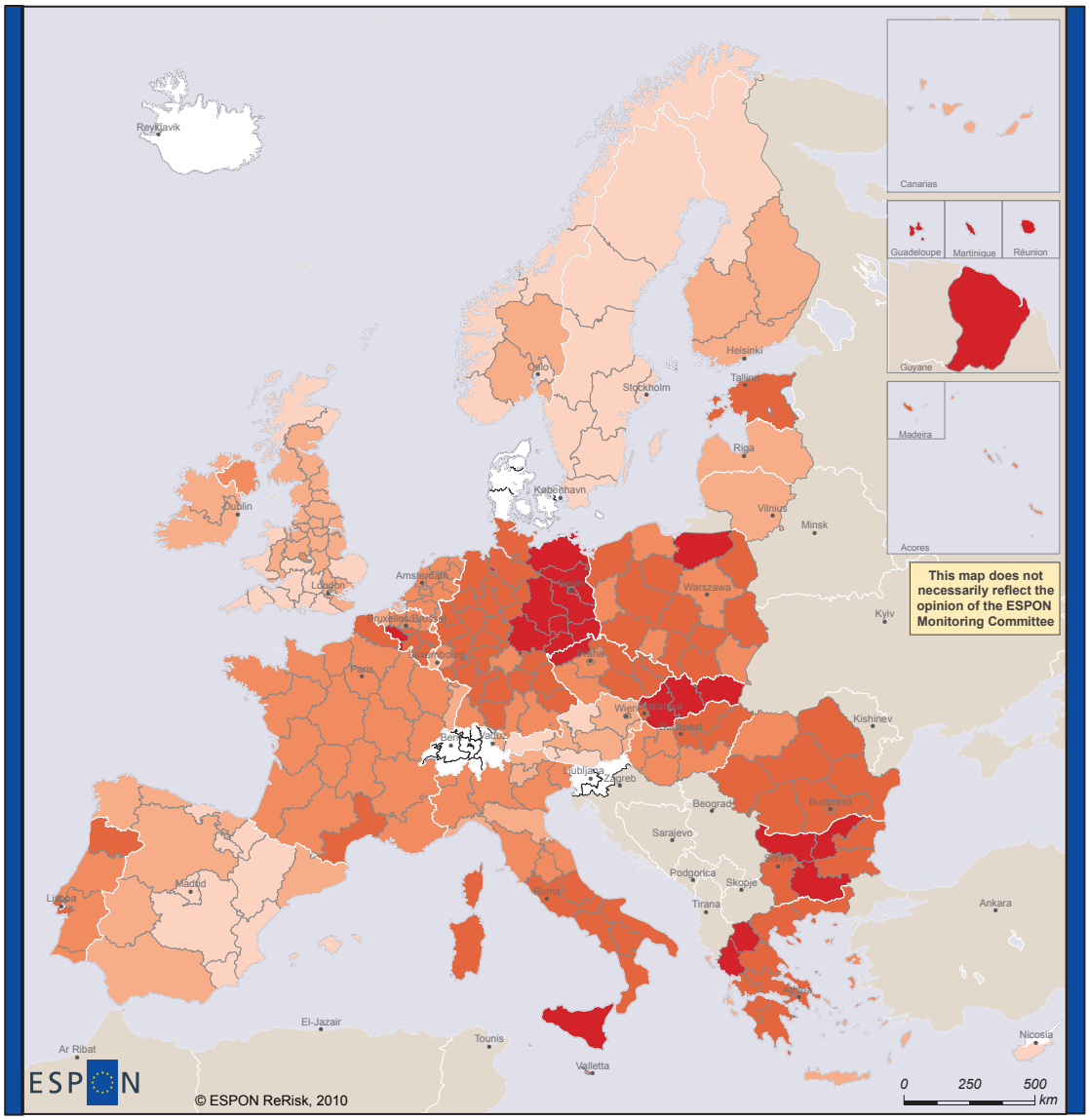
The statistical evidence on the social situation in the regions is almost as scarce as that on energy consumption. The core indicator used by the European Commission to measure progress in this area - the at-risk-of-poverty rate[15] – is not compiled regularly on regional level, although the Directorate for Employment and Social Affairs (Lemmi 2003) issued a study on this problem in 2003. The latest reports on the social situation in Europe indicate that "the crisis has aggravated poverty in its multiple aspects" (Council 2010), but that the statistical evidence available to monitor the situation on lower than national level is insufficient, especially when it comes to cases of extreme poverty, associated to homelessness (EC 2010). Statistical data on the regions is published with considerable delay and this can lead to misleading impressions. In this sense, Eurostat just announced that there is "increasing convergence in regional gross domestic product", according to data from 2007 (Eurostat 2010), while the Council admits that with regard to social protection "not all Member States have the financial means to meet rising demand and some have large gaps in their safety nets" (Council 2010 op cit). Working with pre-crisis data (2005), as had to be done in the ReRisk project, is therefore not the ideal way of portraying poverty in the regions. For this reason, the project partners have suggested to update this analysis when newer data becomes available and to elaborate pre- and post-crisis profiles for the regions.

It has been documented exhaustively on the basis of national data (EC / EUROSTAT 2006) that the causes, which drive people into poverty, are to a large extent related to the inability to access the labour market, i.e. the different forms of "inactivity". Three indicators were available from Eurostat to measure the percentage of "inactive" population in the regions activity rate; long-term unemployment (see Map 4.2); and the old-age dependency ratio Whether the inactive part of the population actually slides into poverty or not, depends to a large extent on the effectiveness of social policies, but also on the families' capacity to support members with economic difficulties. The financial resources of families are measured by the fourth indicator used in the project-disposable income in power purchase parities (PPS). It should be noted here that income should always be measured in PPS to take into account the important differences in price levels in the Member States. All four indicators brought forward a very similar message: in social terms, the East-West and North-South divides persisted in the European Union in 2005, despite considerable overall economic growth.

Despite the data limitations, the findings make quite clear that the actual dimension of the risk of energy poverty – at least on household level – can only be fully understood when taking into account regional and local realities. For example, Figure 4.6 shows that a comparison of national household energy prices (in power purchase standards) that energy costs are slightly more relevant for people living in Hungary and Poland than for the British.

[15] The at-risk-of-poverty rate refers to the part of the population, who has to make ends meet with less than 60% of the medium income

Map 4.2 Long-term unemployment in the regions, 2007



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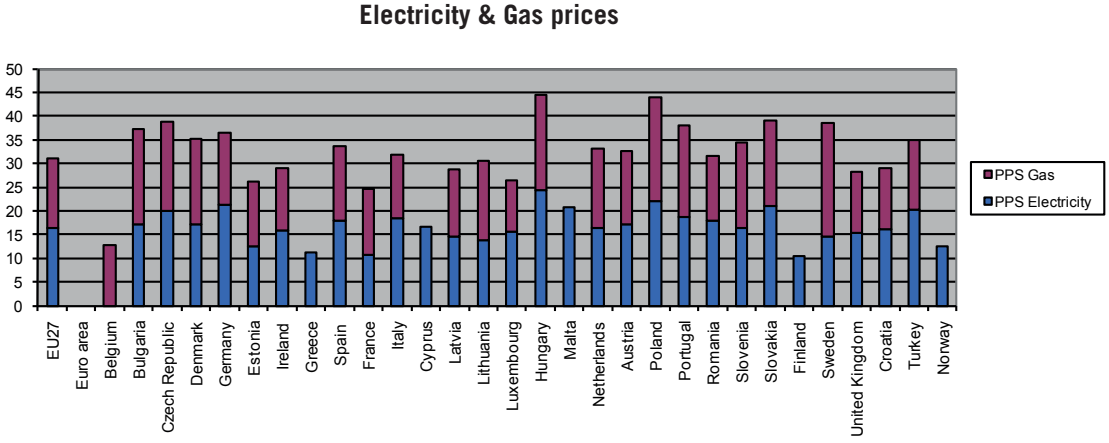
Long term unemployment rate
(%)

- 9.07 - 20.15
- 20.16 - 32.08
- 32.09 - 45.38
- 45.39 - 58.80
- 58.81 - 85.41
- No Data

Figure 4.6 Comparison of household energy prices (in PPS), country level, 2nd semester 2009



Source: Own elaboration based on Eurostat News Release 75/2010, 28 May 2010

However, when breaking this analysis down to regional level, we find that disparities are even greater: people living in the poorest region in Bulgaria – Severozapaden – earn less than 12% of the average income in Inner London (measured in PPS), but Bulgarians pay on average 17.07 PPS for 100 kWh, while the British pay 15.37 PPS.

4.4 Determining heating and cooling demand, and wind and PV potential

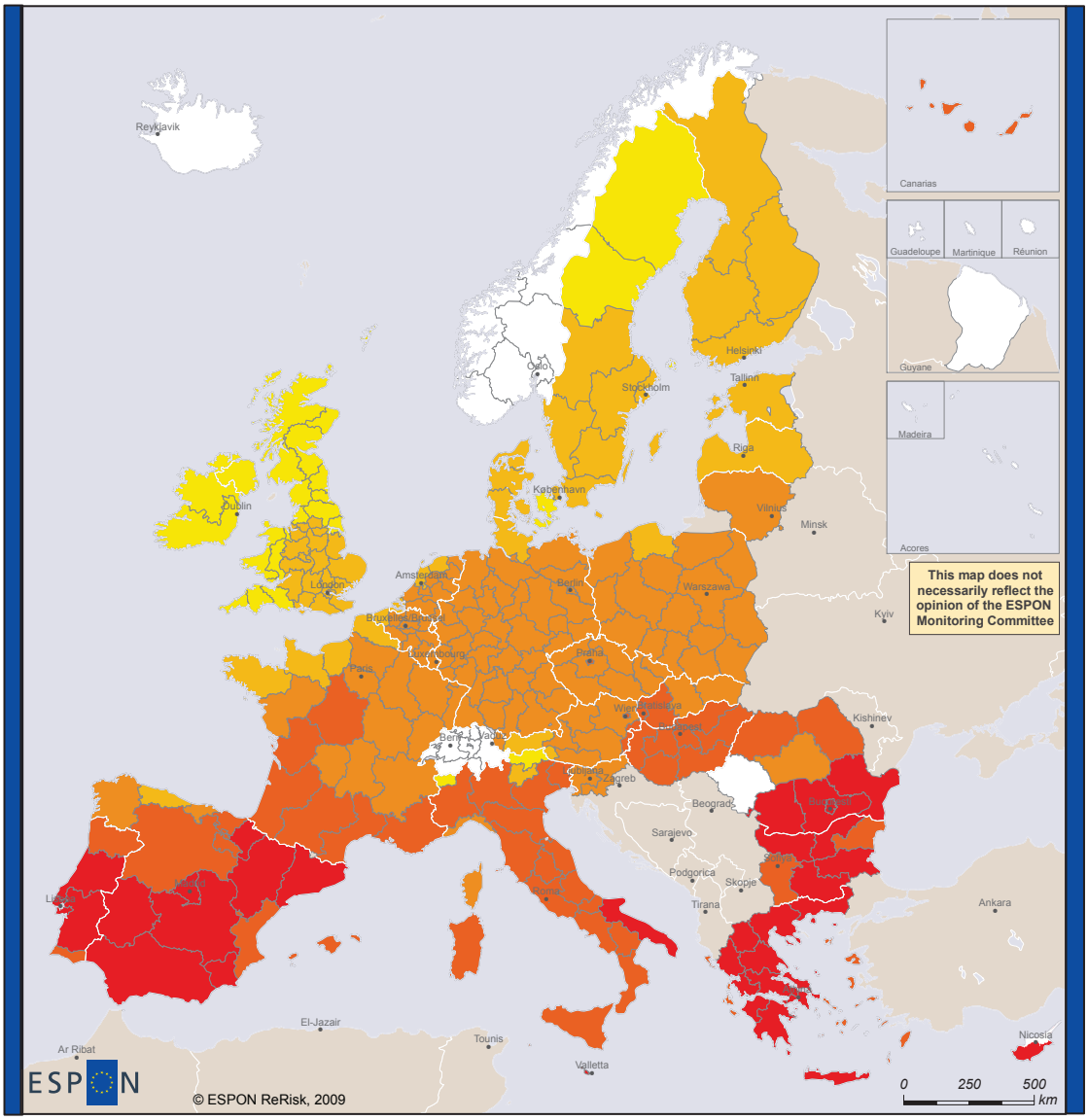
4.4.1 Determining heating and cooling demand

In order to further define the "vulnerability profile" of regions, some context data on climate conditions had to be elaborated. Maximum and minimum temperatures determine cooling and heating demand in the regions, and it was necessary to obtain longer-term data for that purpose. The Joint Research Centre's Ispra - IPSC - MARS Unit prepared the data for the last 15 years and made it available to the ReRisk project. The temperature data is only a rough indicator of energy demand, because the larger NUTS 2 regions can include different climate zones, as well as housing and heating markets with different characteristics and equipment.

The data situation is even worse when trying to calculate the growing demand for air-conditioning, which is putting serious strains on the electricity grids in Southern countries, as indicated in the discussion paper on climate change published by the ReRisk project partners (ESPON project ReRisk 2009). The mean maximum temperature for July and the mean minimum January temperature, which was calculated by the project partners from the 15-years series supplied by the JRC, is therefore a first proxy to stimulate a debate on this problem, but cannot entirely fill the existing data gaps.

It is expected that climate change will have a considerable effect on the energy used for space heating and cooling, as well as some industrial processes, for example cooling processes related to food production and storage (Hekkenberg et al 2009). With regard to space cooling, temperatures up to 29° C can be coped with by natural night ventilation, but only for a short-term period with an outdoor air temperature maximum of 36.7° C (Frank 2005). The need for mechanical cooling sets in during prolonged periods of heat, as experienced in large parts of Europe in 2003 and, in a more general form, in the Southern European regions. In Map 4.3 the borderline between the most vulnerable regions in the South and the rest of continent becomes perfectly visible. Depending on the speed and intensity of climate change, this borderline is expected to move upward. The greatest increase in additional electricity demand for cooling is not likely to occur in the hottest regions, where air-conditioning is already quite common, but in regions with – up to now - moderately

Map 4.3 Mean maximum temperature for July



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Mean maximum temperature for July
(over the years 1994 - 2009 in ° Celcius)

- 22.5 - 26.5
- 26.6 - 29.9
- 30.0 - 33.0
- 33.1 - 35.9
- 36.0 - 40.6
- No Data

hot summers. In the case of Greece, the increase of annual electricity demand attributable solely to climate change is expected to be in the range of 3.6 – 5.5% (Mirasdegis et al 2007). Even in Switzerland, the cooling demand for office buildings is forecasted to increase by 223 - 1050% for the period 2050-2100, while benefits in terms of reduced demand for heating are expected to be minor: between 33-44% (Frank 2005). Both in Switzerland (Christenson et al 2006) and in Greece (Cartalis et al 2001), spatial impacts are expected to vary extremely, with the most affected regions being in Greek Attika and Central regions of Former Yugoslav Republic of Macedonia (FYROM), the Aegean Islands, Crete and the Thessalia prefecture.

4.4.2 Determining wind and PV potential

The analysis of the regional profiles would not be complete without considering possible opportunities for economic development derived from rising prices for fossil fuels. These opportunities are to a large extent related to the increasing competitiveness of renewable energy resources. Two complete data sets have been made available to the project from Commission sources, thanks to advanced geographic information systems (GIS): the wind power and the solar potential. The data on wind intensity in the regions was prepared in GIS format by the European Topic Centre on Air and Climate change (ETC/ACC), led by PBL the Netherlands, on request of the European Environmental Agency (EEA 2009). The data was converted to NUTS 2 level by the NTUA researchers, with help from the ESPON database project. It identifies those regions in Europe, which have the highest potential for producing electricity from on-shore wind power. However, the EEA has introduced some restrictions when calculating the maximum potential, mainly due to environmental reasons. ReRisk has followed these recommendations, using the “restrained” wind potential for the regional analysis. The EEA explains that the report provides an “analysis of local wind resources across Europe, primarily based on wind speed data. Those findings are then used along with projections of wind turbine technology development to calculate the maximum amount of wind energy that could be generated (the technical potential) in 2020 and 2030.

Evidently, raw potential is only part of the story. Policymakers need to know how much wind energy is feasible in practical terms and that calls for the integration of other factors into the analysis. For that reason, the subsequent analysis uses various proxies to convey both the (socially and environmentally) 'constrained potential' for wind energy development and the 'economically competitive potential'. To calculate 'constrained potential', Natura 2000 and other protected areas are excluded from the calculations of wind energy potential. Although it is not illegal to site wind farms on Natura 2000 sites, they provide a useful proxy for the restrictions implied by biodiversity protection”.

Data on PV potential in the regions was provided Joint Research Centre’s Sunbird data base[16], which forms part of the SOLAREC[17] action at the JRC Renewable Energies Unit[18]. The data refers to the yearly total of estimated solar electricity generation (for horizontal, vertical, optimally-inclined planes) [kWh] within the built environment (see Map 4.4). These types of installations will be the first to become competitive at end-use level with electricity obtained from the central grid, with estimates from the International Energy Agency (IEA 2010) pointing to 2020 as break-even point in the regions with the highest potential.

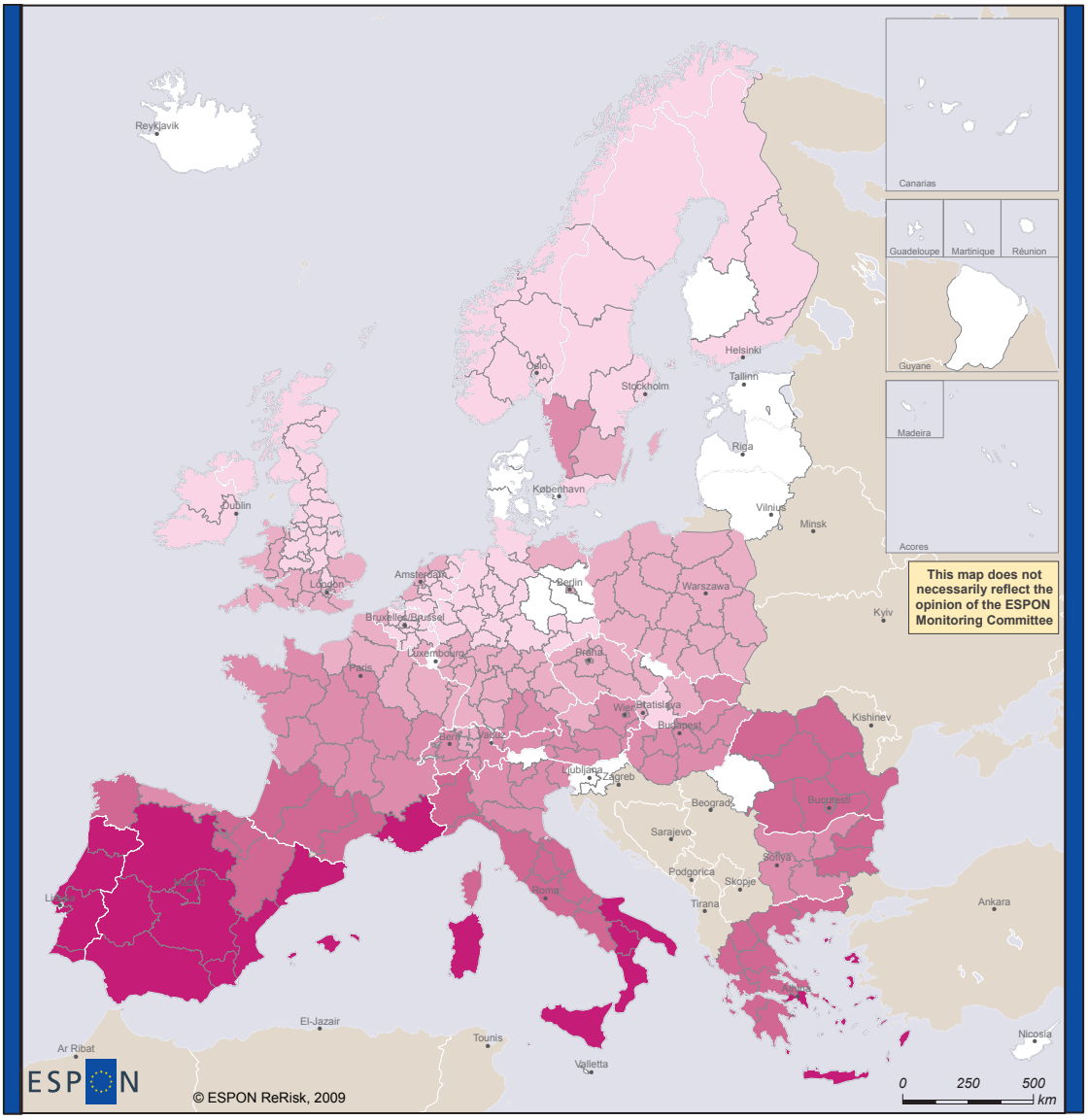
Obviously, there are many other renewable energy sources that could be exploited on regional level, such as small hydro, biomass, geothermal, energy from waste, etc. However, comparable information on these resources for EU 27 is presently not available, although the project has been informed by the data providers on wind energy that the European biomass potential could be published during 2010. Again, it is necessary to complete the project results with data compiled at regional or national level.

[16] See: http://sunbird.jrc.it/pvgis/apps/pvest.php

[17] See: http://re.jrc.ec.europa.eu/

[18] See: http://ies.jrc.ec.europa.eu/Units/re/

Map 4.4 Photovoltaic (PV) potential in the EU regions



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PV Potential
(PV output for a 1 kWp system mounted at optimum angle)

- 676.1 - 845.0
- 845.1 - 951.0
- 951.1 - 1113.1
- 1113.2 - 1291.3
- 1291.4 - 1506.2
- No Data

4.5 Regional typologies and scope for action

4.5.1 Regional typologies of energy poverty

After analysing the "features of energy poverty" separately, a clustering process was applied in order to define groups of regions with similar levels of vulnerability, for which sets of appropriate policies can be designed. Using the nine indicators with the most complete data sets for the 287 EU regions, five relatively homogeneous groups of regions were identified by means of the cluster algorithm called k-means procedure (Kalogirou 2003). The indicators were weighted by experts for energy policy and spatial planning, as well as the project partners themselves, in order to assure that the clustering exercise responded to the project specifications and requirements, for example the special attention that had to be paid to the expected impacts on economic competitiveness.

237 of the 287 NUTS 2 regions could be assigned to a total of initially four typologies, while 50 regions could not be covered due missing data (see Table 4.3). Typology 1, which depicts the most typical situation in Europe, turned out to group a large number of regions, so that further analysis had to be carried out to better understand the position of these regions. The category was then split up in two, being the main differentiation the potential for development of renewable energy resources (wind and PV), which is higher in regions belonging to cluster 1a, and the industrial structure, which is more vulnerable to rising energy prices in regions grouped in cluster 1b. The regional typologies so identified show the following characteristics:

Table 4.3 Characteristics of regional typologies

Mean Values	Typology 1a "With problems and potential"	Typology 1b "Well-off, with trouble ahead"	Typology 2 "Struggling, looking for jobs and a brighter future"	Typology 3 "Wealthy and commuting"	Typology 4 "Cool and windy, but working"
Maximum temperature July	32.36	30.66	33.70	30.46	26.17
Minimum temperature January	-6.21	-7.55	-11.80	-6.81	-17.59
% employment in industries with high energy purchases	3.41	5.22	5.28	3.60	6.14
Fuel costs of freight transport	1.93	1.89	5.23	1.73	2.37
% workers commuting	4.28	13.71	3.54	48.70	3.67
Long-term unemployment rate	39.15	37.00	48.44	36.51	18.75
Disposable income in households	14,176.55	15,968.78	7,144.57	16,917.15	12,631.45
Wind power potential	108,004.23	69,263.38	153,859.09	65,568.82	843,163.27
PV potential	1065.27	896.13	1041.70	857.19	833.83

Taking into account the information elaborated in the ReRisk project on the regions' vulnerability to rising energy prices, as well as data from previous ESPON typologies, the ReRisk categories can be described as follows (see Map 4.5):

Typology 1a "With problems and potential" contains two groups of regions with low exposure to rising energy prices for industry: the service - oriented urban centres – the hearts of the "Pentagon" - and semi-rural, often tourist-oriented coastal and island regions in the South of Europe. The high photovoltaic (PV) potential of many of the regions in this latter group is an important asset for the future and could help to ease the strain of high demand for cooling in the summer time. However, the capital areas must be prepared for possible changes in transport patterns as a result of rising energy prices, both in terms of commuting (incoming labour) and loss of traffic volumes in the transport hubs. Also, the higher than average unemployment rates in 2007 are an indicator for possible social problems both in the semi-rural and capital areas.

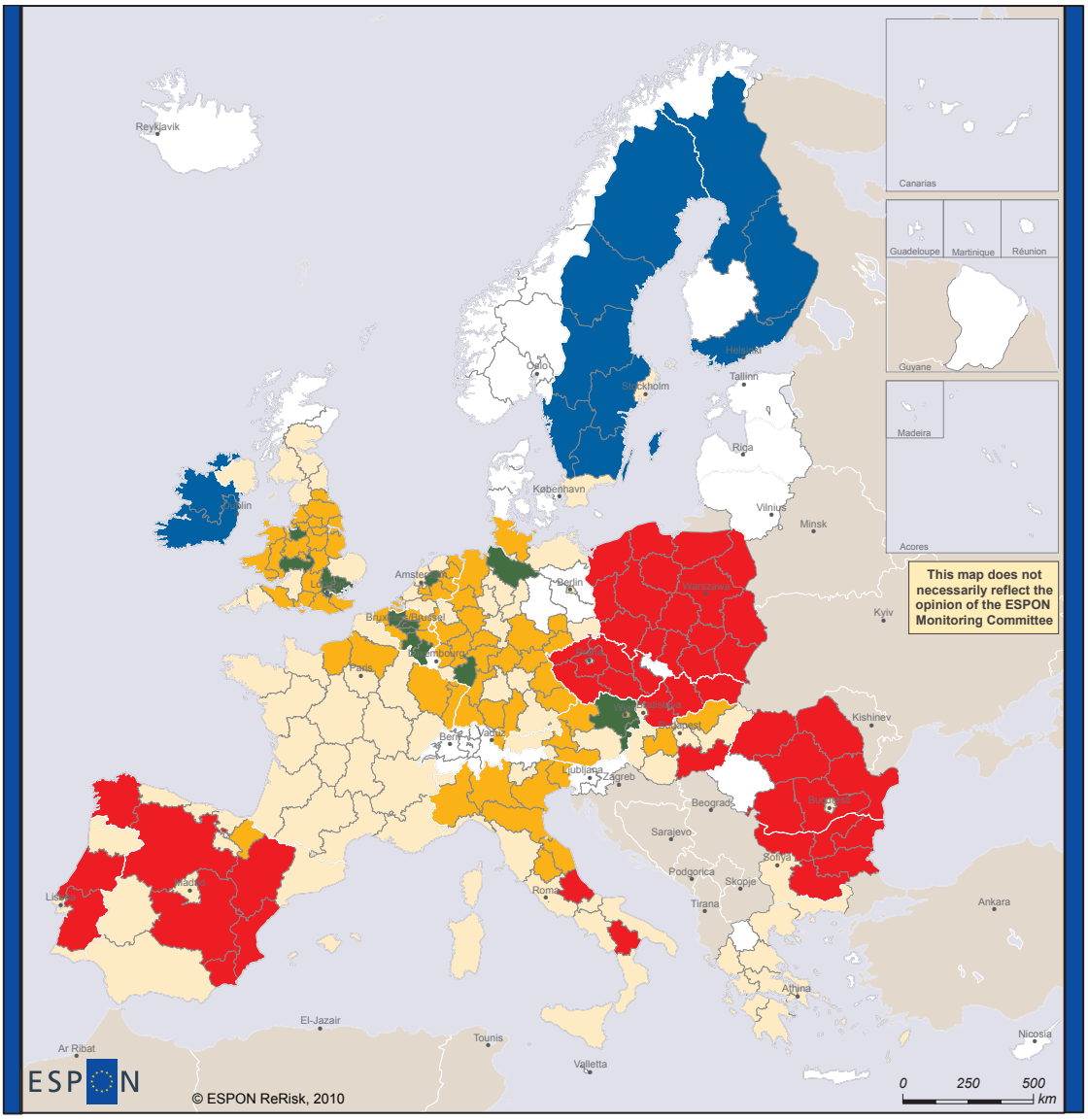
Typology 1b "Well-off, with trouble ahead" is made up of central, industrialized regions, including the more industrial coastal (harbour) and Pentagon areas, with low potential for developing wind and solar energy. The competitiveness of these regions could be severely affected by rising energy prices if efforts to improve energy efficiency in industry and transport fail, but their starting position is much more favourable than that of regions grouped in typology 2.

Typology 2 "Struggling, looking for jobs and a brighter future" is composed of the most vulnerable regions in terms of social cohesion, located mainly in the East of Europe, with high energy demand both for heating and cooling. These mostly peripheral regions do have potential to develop renewable energy systems, but lack the resources to do so. The number of regions grouped in this typology is smaller than those considered "lagging", according to data from 2005 – 2007, but may have increased considerably in the wake of the economic recession.

Typology 3 "Wealthy and commuting" is mostly made up of regions belonging to the Pentagon "hinterland", in which wealth creation is dependent on accessing near-by centres of economic growth. The main challenge related to rising energy prices in these regions is that of guaranteeing affordable mobility. There is a high potential for polycentric development in these regions, but fewer possibilities for using wind and solar power.

Typology 4 "Cool and windy, but working" is very special in terms of features of energy poverty. The greatest concern is the heavy industrial base, combined with extreme peripheral location on the coastline and the high energy demand for heating in these, mostly Nordic, regions. However, opportunities for the further development of wind energy are considerable and the risk of energy poverty in households is low as long as the job situation remains as it was in 2007.

Map 4.5 Regional typologies of energy poverty



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EU regions
(Typologies)

- Typology 1a “With problems and potential”
- Typology 1b “Well-off, with trouble ahead”
- Typology 2 “Struggling, looking for jobs and a brighter future”
- Typology 3 “Wealthy and commuting”
- Typology 4 “Cool and windy but working”
- No Data

4.5.2 The scope for action in regions

The cluster analysis shows that different sets of policies are needed to cope with the challenge of rising energy prices on regional level. But energy policies are to a large extent determined by national policies and are embedded in a long-term planning framework. Energy - like spatial - planning requires the development of infrastructure and therefore operates with a time horizon of 30 to 60 years. The energy sector is presently undergoing a far-reaching transition process, and the political and investment decisions that are now being made will shape the framework for regional competitiveness for time to come. It is for this reason that the policy recommendations presented as main outcome of the project use information obtained from scenario building. Energy policies are still highly diverse in Europe, and the policy recommendations must be "robust", meaning that they must help the regions to reduce their vulnerability in the short term and improve their adaptive capacity in the longer term under different framework conditions.

The four scenarios, which were elaborated in two workshops with outside experts from the fields of energy policy and spatial planning, describe how different development paths in the energy sector may affect the European regions and cities in the medium and long term, both in terms of competitiveness and cohesion. The scenarios are based on the common hypothesis that energy prices will remain at a high level, but political response to this challenge is different. Scenario 1 "Green High-tech" assumes a quick development of renewable energy sources, both large and small-scale, in which the regions gain greater influence on energy policy. In this scenario, regions can specialize on certain types of renewable energy production and will win from cooperation and shared networks.

The second scenario "Energy-efficient Europe" assumes a greater use of natural gas by 2030, while trying to keep Europe's energy dependence within limits through important efficiency gains in all sectors and a move towards more regionalized economies. In this situation, regions that depend on gas supplies from one producer region only will have to deal with a higher risk of supply interruptions, but economic development will probably follow a fairly balanced and more sustainable path.

In the case that the present plans for expanding the use of nuclear energy are actually implemented in a large number of Member States, as assumed in "Nuclear Energy for Big Regions", it has to be expected that the power sector will remain highly centralized, since few players are able to carry out the needed investment. The logical consequence would be to "go electric", both in industry and transport, but these decisions are likely to be little influenced by local and regional policy makers.

Choosing (clean) coal to fill the gap of dwindling oil reserves, as described in "Business as Usual?", would obviously benefit the mining and some harbour regions and fits well into certain protectionist ideas in Europe. However, in most parts of Europe, (imported) coal is a preferred option not because of price, but because of availability of reserves. Production from coal power plants will become even more expensive when technologies for carbon capture and storage are widely deployed. This could lead to a situation, in which high energy prices provoke continued backlashes in a world economy that is not able to function "as usual". In this case, numerous regions, and especially the urban areas, will face severe social problems in the coming years, due to the increase of consumer prices.

Table 4.4 summarises the scenario assumptions and Table 4.5 shows how the ReRisk typologies of energy poverty are expected to perform under the different scenario assumptions. These tables form the basis for the recommendations to policy makers on the local, regional, national and EU level.

Table 4.4 Summary of scenario assumptions

General overview of scenarios	Scenario 1 "Green High Tech"	Scenario 2 "Energy-efficient Europe"	Scenario 3 "Nuclear Energy for Big Regions"	Scenario 4 "Business as Usual?"
Energy-related policies	- Large-scale renewables connected by the European grid and small-scale renewables for local consumption - Energy from waste and material recovery from recycling	- Energy efficiency all along the chain - Nuclear phase-out - Large-scale renewables - Increased gas imports	- Grid extension - High level of investment in nuclear energy and security - Renewables take off, but stagnate	- Increased use of coal and gas for electricity generation - Phase-out of nuclear Lack of investment in the retrofitting of buildings and local networks
Other policy domains	- High investment in R&D and education - ICT and infrastructure policies - International climate change agreements on GHG - Participatory planning processes	- Technological development in efficient technologies (R&D) - Regionalisation of economies, polycentric development - Hybrid / electric cars and car-sharing - Binding environmental policies in planning	- Moderate investment in R&D and education - No international agreements on GHG but European climate change policies - Electrification of the transport system	- Low R&D - Low investment in education - No agreements on GHG, removal of European ETS - Inadequate urban planning
Governance	- Increased autonomy for regions with regard to energy policy priorities	- National energy efficiency strategies implemented on local level	- Centralized (national and EU level)	- Protectionist (national and EU)
Region with opportunities	- Regions with high PV and wind potential - Rural regions with natural resources and access to large cities	- Regions with energy-intensive industries but with clean technologies and access to secure gas supplies; agricultural regions	- Regions with industries with high electricity consumption and central urban regions	- Medium-sized cities surrounded by resource rich areas - Coal and harbour regions
Regions experiencing threats	- Regions with high fuel costs - Regions with industries with high energy purchases (need for adaption)	- Regions dependent on long-distance freight transport (islands, remote..) and commuting	- Regions with high l/t unemployment rates and/ or low disposable income - Peripheral regions	- Urban regions with l/t unemployment rate and lowest income - Regions with energy-intensive industries - Tourism-dependent regions

Table 4.5. Summary of expected performance of regional typologies

General overview of scenarios and typologies	Scenario 1 "Green High Tech"	Scenario 2 "Energy-efficient Europe"	Scenario 3 "Nuclear Energy for Big Regions"	Scenario 4 "Business as Usual?"
Typology 1a "With problems and potential"	- Highly favourable for rural and coastal regions with high solar and wind potential	- Negative for the most peripheral coastal areas	- Favourable for Metropolitan and Pentagon regions with high levels of employment in the knowledge economy	- Increasing poverty and overcrowding in metropolitan areas
Typology 1 b "Well-off, with trouble ahead	- Need for developing renewable resources others than solar and wind	- Strong positive impact on the competitiveness of the more industrialized Pentagon areas	- Need for accelerating transition to more service-oriented activities	- Weaker impact on harbour regions, danger for industrial areas to slide into the category of struggling regions
Typology 2 "Struggling, looking for jobs and a brighter future"	- Possible positive impact if resources for the development of renewables can be found	- Highly positive if affordable clean energy technologies can be accessed by industries in these regions	- Increased burden on households, due to rising costs for heating and fuel purchases	- Job opportunities for Eastern coal regions, but "no way out" for the rest
Typology 3 "Wealthy and commuting"	- Strong opportunities for polycentric development	- Living standards could be negatively affected in these areas due to increased costs of car ownership	- Favourable, due to increased electrification of transport systems	- Deteriorating infrastructures in cities and urban sprawl
Typology 4 "Cool and windy, but working"	- Strong positive impact on Nordic and Irish regions with high wind potential	- Strong positive impact on the competitiveness of industrial strongholds in the North, but possible negative impacts of increased transport costs	- Favourable only for industries with high electricity consumption	- Strong risk of loosing industrial base and employment

So, what can regional policy makers do to reduce vulnerability to rising energy prices? To answer this question, it is first necessary to define what scope of actions regions have with regard to energy policy and how their influence is limited or enlarged by the governance model, i.e. the degree of regional autonomy.

Within the context of national energy policy, regions do have scope to act, especially with regard to policies promoting energy efficiency and the setting of environmental standards, which can go beyond European or national norms. According to the ReRisk survey of energy agencies, regional involvement is comparatively higher in the field of renewable energy and natural gas projects, while their influence regarding coal use and nuclear plants is more limited.

Evidence from the survey of 41 regional energy agencies and from the case studies carried out in the project suggests that there is a strong relation between the governance model and the performance of regions in terms of economic specialization, as well as the development of renewable energy sources. Nationally-guided energy strategies tend to give higher priority to security of supply, while regions are generally in charge of policies related to awareness-raising, especially in the residential sector. Regions with a greater scope of action and lower dependence on energy-intensive industries tend to be more active in promoting renewable energy sources and these characteristics determine to some extent their exposure to the risk of energy poverty.

Regional competences also vary with regard to energy research, since in only six Member States, plus Norway, regions are carrying out their own R&D programmes in the energy field. Experts in the field argue that there is a greater need for regional participation in energy research to promote the use of renewable energy sources:

> "Sustainable energy supply structures based completely on the importation of knowledge and technology do not seem to be favourable for countries and regions. Local or regional R&D constitutes a good basis to optimise energy systems and to reduce vulnerability. Besides, the yield of renewable energy sources and the types of optimal technologies depend, in part, on local (climatic) conditions. Thus, specific technologies have to be developed – mostly by means of local or regional R&D" (Luther 2004).

4.6 Conclusions

The main messages sent out by the project to policy makers can be summarized as follows:

- Urgent measures are needed to help the most vulnerable regional economies, mainly located in the Eastern part of Europe, to cope with the challenges of rising energy prices. Competitiveness is not only at stake in Eastern regions with industrial background or strong dependence on food processing, but also in the highly industrialized Northern periphery.
- Remote regions in general have to prepare for higher prices for long-distance travel and air transport, with negative impact on overall price levels and tourism, which is often an important source of employment in these regions.
- The main challenge from the policy point of view is that of mobilizing the considerable potential for renewable energy sources in regions that lack the financial resources to do so and to coordinate a large set of policy instruments on local, regional, national and EU level to enhance access to energy efficiency measures, both for industries and households.

All analysis carried out in the ReRisk project shows that disparities between regions are much greater than those observed on national level. The regional and subregional realities, however, are not captured well by harmonized statistics, which makes it very difficult to monitor progress (or regress) in important policy areas, for example, energy efficiency or the extent of poverty. Some new evidence on regional energy initiatives may soon become available from a survey carried out by the Territorial Cohesion and Urban Matters (TCUM) Working Group on Energy Efficiency and Renewable Energy, but there is still a need for the continued collection of harmonized indicators of energy uses in the regions. Likewise, more immediate information on the risk of poverty in regions and cities is required to implement strategies such as the British "Warm Homes, Greener Homes" (HM Government 2010). The European Commission has just announced that vulnerable energy customers need to be defined and foresees to bring forward "proposals on producing harmonised statistics at EU level to help develop better ways to quantify the extent of energy poverty in the Union"[19]. In this context, the need for improved information on regional and local level could be taken into consideration.

[19] Euractiv, 8/09/2010, "EU to define 'vulnerable' energy customers" http://www.euractiv.com/en/energy/eu-define-vulnerable-energy-customers-news-497583

Some aspects of energy poverty should be analyzed further by targeted studies, for example the transport modes used for commuting on lower than NUTS 2 level. For some regions, appropriate and comparative statistics are already being elaborated, using data collected for the Labour Force Survey, an EU-wide inquiry. Last not least, it is recommended that the pre-crisis data from 2005 is updated as soon as the impact of the present recession can be captured by more recent statistics, so that a pre- and post-crisis profile can be elaborated for the regions. Parts of the data sets elaborated in the ReRisk project can be used for analyzing changes in the industrial structure and employment in the regions or the loss of purchase power among the population.

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ReRisk: Discussion

During the RSA Annual Conference held in Pécs on May 24-26, the ESPON project ReRisk was presented at an ESPON Session. After the presentation, during the session discussion, many questions/remarks were made by the audience, which are summarized below.

The increase in prices for fossil fuels has opened many opportunities for European regions, in particular for the **development of renewable energy sources**, and to address the dependence on imported energy sources. If different opinions in this field are being considered, the conclusion can be drawn that there is a big impulse towards regional participation in energy research to promote the use and supply of renewable energy sources at this territorial level. Energy supply structures which are mainly based on importation are not considered as the most favourable way of acting on a long term basis.

The differences between European regions cannot be forgotten, as shown in the scenario analysis of the ReRisk project. European wide policies at the different scales of regional, national and EU level, intend to improve the access to **energy efficiency measures**, both for industries and households. Businesses must now consider the situation as an opportunity to develop new technologies and markets, which will definitely influence the competitiveness of regions.

There are **specific types of regions**, such as islands or remote regions, which in general are more vulnerable to increasing energy prices than others. Islands may face a specific risk of energy poverty due to their lack of connection to the energy infrastructure at the mainland, caused by the need for importing fuels for energy production and their great dependence on air or maritime transport.

Spatial planning can contribute to making a difference, since spatial planning instruments could help regions advance towards a more sustainable territorial management. It is necessary that spatial planning is integrated with energy planning, in order to meet high efficiency standards. **CO2 emissions** are also an important issue that has been analyzed within the ReRisk project. It is part of the scenario exercise, as the reduction of CO2 emissions is an environmental goal of itself, and therefore can determine different future scenarios.

The risk of "**carbon leakage**" has also been taken into consideration, since this analysis is also relevant for the competitiveness of the EU regions.

List of ESPON 2013 projects

Applied research projects:

- DEMIFER – Demographic and Migratory Flows Affecting European Regions and Cities
- EDORA – European Development Opportunities in Rural Areas
- CLIMATE – Climate Change and Territorial Effects on Regions and Local Economies in Europe
- FOCI – Future Orientation for Cities
- ReRISK – Regions at Risk of Energy Poverty
- TIPTAP – Territorial Impact Package for Transport and Agricultural Policies
- ATTREG – Attractiveness of European regions and cities for residents and visitors
- EU-LUPA – European patterns of land use
- TERCO – Territorial cooperation in transnational areas and across internal/external borders
- TRACC – Transport accessibility at regional/local scale and patterns in Europe
- SGPTDE – Secondary growth poles in territorial development
- GEOSPECS – European perspective on specific types of territories
- KIT – Territorial dimension of innovation and knowledge economy
- TIGER – Continental territorial structures and flows (globalisation)
- ARTS – Territorial and Regional Sensitivity of EU Directives

Applied research projects (started autumn 2010):

- European seas in territorial development
- Indicators and perspectives for services of general interest in territorial cohesion and development

Applied research projects (start summer 2011):

- European Regions: Potential Contribution to the EU 2020 Strategy
- Territorial Scenarios and Visions for Europe
- Territorial Governance - Best Practices for New Perspectives
- Territorial Potentials for a Greener Economy

Targeted analysis projects:

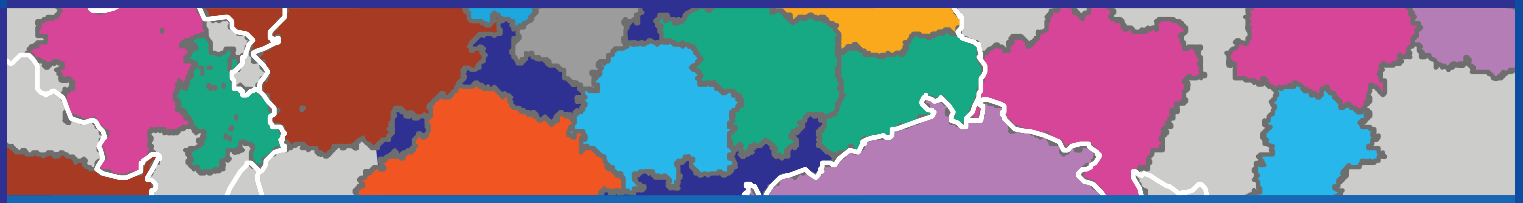
- CAEE – The Case for Agglomeration Economies in Europe
- TEDI – Territorial Diversity in Europe
- EUROISLANDS – The Development of the Islands - European Islands and Cohesion Policy
- METROBORDER – Cross-Border Polycentric Metropolitan Region0s
- SS-LR – Spatial Scenarios: New Tools for Local-Regional Territories
- SURE – Success for Convergence Regions' Economies
- PURR – Potential of Rural Regions
- TranSMEC – Transnational Support Method for European Cooperation
- EATIA – ESPON and TIA
- ULYSSES – Using Applied Results from ESPON as a Yardstick for Cross-Border Spatial Planning and Development
- RISE – Identifying and Exchanging Best Practice in Developing Regional Integrated Strategies in Europe
- POLYCE – Metropolisation and Polycentric Development in Central Europe: Evidence Based Strategic Options
- TPM – Territorial Performance Monitoring
- BEST-METROPOLIS – Best Development Conditions in European Metropolis: Paris, Berlin, Warsaw
- SEMIGRA – Selective Migration and Unbalanced Sex Ratio in Rural Regions
- SMART-IST – Smart Institutions for Territorial Developments

Targeted analysis projects (start early 2011):

- ADES – Airports and Drivers of Economic Success in Peripheral Regions
- AMCER – Advanced Monitoring and Coordination of EU R&D Policies at Regional Level

List of Acronyms

ABCD	Asset Based Community Development
CAP	Common Agricultural Policy
CWE	Central-West Europe
EC	European Commission
EEA	European Environmental Agency
EU	European Union
EU15	15 EU Member States prior to the last two rounds of accession
FUR	Functional Urban Region
GDP	Gross Domestic Product
GIS	Geographic Information System
GVA	Gross Value Added
ICT	Information and communication technologies
LAU	Local Area Units
LUZ	Larger Urban Zones
MAUP	Modifiable Areal Unit Problem
MS	Member State
NACE	Nomenclature statistique des Activités économiques dans la Communauté Européenne (Statistical classification of economic activities in the European Community)
NGO	Non-Governmental Organization
NMS	New Member States
NUTS	Nomenclature des unités territoriales statistiques (Nomenclature of Territorial Units for Statistics)
OAG	Official Airline Guide
OECD	Organisation for Economic Co-operation and Development
ORBIS	A database with company information around the globe
PPS	Purchasing Power Standard
PU	Predominantly Urban
PV	Photovoltaic
R&D	Research and development
SCD	Sub-City Districts
SGI	Services of General Interest
SMESTO	Small and medium sized town
TCUM	Territorial Cohesion and Urban Matters
TIA	Territorial Impact Assessment



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The ESPON 2013 Programme supports policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory. It provides comparable information, evidence, analysis, and scenarios on territorial dynamics, which reveal territorial capitals and development potentials of regions and larger territories contributing.

This Scientific Report presents three scientific papers on the work done in the ESPON applied research projects FOCI, EDORA and ReRisk. Each of the three papers reflects on how the applied research on territorial development, competitiveness and cohesion has been carried out. The papers have been presented at the RSA Annual International Conference on 24-26 May 2010 in Pécs, Hungary and a section reflecting the discussions following these presentations is included.

The purpose of this report is to communicate important findings of the ESPON 2013 Programme and to exchange methodologies for exploring comparative advantages and developing concepts, indicators, typologies and European maps on territorial development, competitiveness and cohesion through a dialogue among researchers, practitioners and policy makers. As part of this dialogue you are welcome to engage with ESPON via www.espon.eu.

ISBN 978-99959-684-9-6