ESPON

ET2050
Territorial Scenarios and Visions for Europe

Project 2013/1/19

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This report presents a more detailed overview of the analytical approach to be applied by the ET2050 ESPON project. This Applied Research Project is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

The approach presented in the report was presented and discussed with the ESPON Monitoring Committee, and the indications made by the ESPON Monitoring Committee were integrated, but still it may not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects

This basic report exists only in an electronic version.

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Table of contents

1. Presentation 10

1.1 Objective of ET2050 10

1.2 ET2050 Transnational Project Group (TPG) 10

1.3 Work activities 11

2. Participatory Activities 17

2.1 Type and time frame of activities 17

2.2 Stakeholders involved in the Participatory Plan 17

2.3 Methodology 18

2.4 Synthesis of comments and contributions received 19

2.5 Participatory Plan Update 34

2.6 Additional material 39

3. Present State of Europe 40

3.1 World Context 40

3.2 Analysis by sectors 43

3.3 Analysis by territories 64

3.4 Synthesis of macro-regional Visions 89

4. Baseline Scenario 92

4.1 Approach 92

4.2 Critical Bifurcations from Present State 93

4.3 Baseline Key Directions 101

4.4 Baseline Quantitative Description 107

5. Exploratory Scenarios 112

5.1 Approach 112

5.2 Analysis of most relevant Scenarios for ET2050 119

5.3 ET2050 Scenarios – Ongoing discussion 150

6. Policy Assessment of Scenarios 153

6.1 Midterm Targets and Pathways to 2030 153

6.2 Territorial Impact Assessment (TIA) 156

7. ANNEX 1 - References 161

8. ANNEX 2: Project planning 164

8.1 Schedule of activities 164

8.2 Detailed work plan and partner involvement 166
8.3 Work towards Interim Report 2 (april 2013) 171

9. ANNEX 3: Full Baseline Quantitative Description 172

10. ANNEX 4: ET2050 Meta-model SPQR (TV+ // PASH+) 189

11. FIRST ANNEX TO INTERIM REPORT (OCTOBER 2012): Structuring of Exploratory Scenarios, Territorialisation and Use of Wild Cards 193

11.1 Approach 193
11.2 Scenarios 2010 to 2030 197
11.3 Scenarios 2030 to 2050 203
11.4 Overall phased and territorially differentiated evolutions 2010-2050 207
11.5 Expectations on the Territorial Impact Assessment of Exploratory Scenarios 208

12. SECOND ANNEX TO INTERIM REPORT (OCTOBER 2012):: Quantitative Forecast Models 209

12.1 MULTIPOLES model 209
12.2 MASST model 209
12.3 Metronamica model 211
12.4 SASI Model 211

Figures

Figure 1-1 Approach to construction of scenarios and the Vision (Project Specification) 11
Figure 1-2 Tasks in the Work Programme 13
Figure 1-3 Activities carried out 16
Figure 2-1 Results to Question 4A (ParP) 27
Figure 2-2 Participatory Plan Update (schedule) 39
Figure 3-1 World Context. Evolutions for key variables 1950-2010 42
Figure 3-2 Europe in the World Context. Evolutions for selected variables 1950-2010 43
Figure 3-3 Sectors considered by ET2050 43
Figure 3-4 Macro-regions considered by ET2050 64
Figure 4-1 EU2020 Scenarios (JM Barroso, Informal European Council, Feb'10) 93
Figure 4-2 Main Characteristics of Baseline Scenario 108
Figure 4-3 Level of fulfilment of official targets by ET2050 Baseline 110
Figure 4-4 Logic framework for the Baseline Scenario 111
Figure 5-1 Classification of scenarios according to geographic scale of reference and the consideration of main drivers 116
Figure 5-2 Classification of scenarios according to Smart and Sustainable policy aims 117
Figure 5-3 Classification of scenarios according to Smart and Inclusive policy aims 118
Figure 5-4 ESPON 3.2 Scenarios in a cohesion // competitiveness 2D space 119
Figure 5-5 ESPON 3.2 - Hypotheses of the Baseline scenario 120
Figure 5-6 ESPON 3.2 - Spatial structure of Baseline in 2030 121
Figure 5-7 ESPON 3.2 - Hypotheses of the Competitiveness-Oriented scenario 122
Figure 5-8 ESPON 3.2 - Spatial structure of Competitiveness-Oriented in 2030 123
Figure 5-9 ESPON 3.2 - Hypotheses of the Cohesion-Oriented scenario 124
Figure 5-10 ESPON 3.2 - Spatial structure of Cohesion-Oriented in 2030 125
Figure 5-11 NL2040 - Framework scenarios 126
Figure 5-12 NL2040 - Scenario's Characteristics 129
Figure 5-13 FRANCE2020 – Four Scenarios 134
Figure 5-14 Territoires2040 –"*L'urbain-metropolisé français dans la mondialisation"*, scenario description 137
Figure 5-15 Territoires2040 –"*L'urbain-metropolisé français dans la mondialisation"*, scenario sketches 138
Figure 5-16 Europe2030 – Straight line development scenario sketch 140
Figure 5-17 Europe2030 – Long-term voluntarist scenario sketch 142
Figure 5-18 PLUREL Urban Development Scenarios – Framework 143

Figure 5-19 PLUREL Urban Development Scenarios – Ethnography's parameters by scenarios 145
Figure 5-20 PASHMINA – Scenarios in a speed (economy) VS concentration (social) 2D space, and possible transitions between them 146
Figure 5-21 PASHMINA – Spatial implications of different scenarios 147
Figure 6-1 Synthesis of actual EU policy targets 2020, 2030, 2050 156
Figure 6-2 Assessment of regional sensitivity to branched EU Directives in ESPON ARTS 158
Figure 6-3 Preliminary list of indicators considered in ET2050 TIA 159
Figure 7-1 ET2050 homepage (www.et2050.eu) 162
Figure 7-2 Gallery of infographic resources (www.et2050.eu) 162
Figure 7-3 Virtual library at http://www.et2050.eu/Et2050_Library/ 163
Figure 8-1 Schedule of activities and deliveries 166
Figure 8-2 Updated Tentative schedule of internal milestones and partner involvement 171
Figure 9-1 World Framework – Reference sources for exogenous variables 172
Figure 9-2 World Framework – Table of exogenous variables quantified 173
Figure 9-3 World Framework – 1990-2050 growth trends 174
Figure 9-4 World Framework – Table of growth rates of exogenous variables 175
Figure 9-5 World Framework – Table of European weight in the World 175
Figure 9-6 World Framework – 1990-2050 evolution of European weight in the World 176
Figure 9-7 World Framework – 1950-2050 evolution growth rates of exogenous variables 177
Figure 9-8 European Drivers – Table of input variables quantified 179
Figure 9-9 European Drivers –1950-2050 evolution for selected input variables 182
Figure 9-10 European Main Trends – Table of output variables quantified 184
Figure 9-11 European Main Trends – 1950-2050 evolution for selected output variables 187
Figure 11-1 1st approach for Exploratory Scenarios: full matrix of framework conditions and policies 194
Figure 11-2 1st approach for Exploratory Scenarios: integrated vs fragmented EU framework conditions 195
Figure 11-3 2nd approach for Exploratory Scenarios: set of scenarios with consistent framework conditions and policies 195
Figure 11-4 Forecast and back-cast strategies for ET2050 Explorative Scenarios 196
Figure 11-5 Spatial distribution of activities among ET2050 Scenarios 197
Figure 11-6 The large cities and MEGAs in Europe, according to population (ESPON 1.4.3, 2007) 198
Figure 11-7 List of MEGAs and FUAs in Europe (ESPON 1.4.3, 2007) 200
Figure 11-8 Draft temptative extrapolation at NUTS3 level of the European territory according to its urban functions (ET2050 2012) ..... **Error! No s'ha definit l'adreça d'interès.**
Figure 11-9 European policy framework in ET2050 Scenarios 201

Figure 11-10 ET2050 Scenarios facing Critical Bifurcations 202
Figure 11-11 Quantitative expectations for ET2050 scenarios in 2050 (preliminary) 205
Figure 11-12 Quantitative expectations for framework conditions in 2050 scenarios (preliminary) 206
Figure 11-13 Phased and territorially differentiated evolutions for FLOWS scenario 207
Figure 11-14 Phased and territorially differentiated evolutions for CITIES scenario 207
Figure 11-15 Phased and territorially differentiated evolutions for REGIONS scenario 207
Figure 11-16 Expectations on TIA scoring for ET2050 scenarios 208
Figure 11-17 Expectations on TA2020 priorities' scoring for ET2050 scenarios 208

1. Presentation

This Interim Report is submitted nine months after the beginning of works, and presents initial and/or preliminary results, open to be refined and adjusted.

There are 21 annexes to this report, corresponding to Participatory Activities, Sectorial Reports (8), Territorial Reports (9), European Policy Trends report, Review of Baseline and the Scenarios Report, Review of Exploratory Scenario Report, all of them available at the project website (www.et2050.eu)..

The information provided by this Interim Report is a summary of the results of the project planned for this period (see Table 1-3).

1.1 Objective of ET2050

ET2050 (Territorial Scenarios and Visions for Europe) aims at *supporting policy makers in formulating a long-term integrated and coherent vision for the (smart, sustainable and inclusive) development of the EU territory*.

This aim is twofold:

- content-wise: a product, namely a *Vision* for the European Territory, has to be developed
- process-wise, those who will elaborate this product, namely policy makers, have to be supported by sound scientific knowledge.

1.2 ET2050 Transnational Project Group (TPG)

The Transnational Project Group (TPG) includes, after being reorganised, 12 European applied research institutions from 9 countries: 6 universities and research institutes, 5 companies specialised in spatial planning and 1 non-profit foundation..

The TPG for the ESPON project ET2050 consists of the following thirteen Project Partners:

- MCRIT LTD, Barcelona, Spain (Lead Partner, LP)
- Free university of Brussels, IGEAT, Brussels, Belgium (PP3)
- Centre for Regional Studies of the Hungarian Academy of Sciences, Pécs, Hungary (PP4)
- Politecnico di Milano, Milano, Italy (PP5)
- Central European Forum for Migration and Population Research, Warsaw, Poland (PP6)
- Spiekermann & Wegener (S&W), Dortmund, Germany (PP7)
- Research Institute for Knowledge Systems (RIKS), Maastricht, Netherlands (PP8)
- Warsaw School of Economics, Warsaw, Poland (PP9)
- Nordregio - Nordic Centre for Spatial Development, Stockholm, Sweden (PP10)
- University of Thessaly, Volos, Greece (PP11)
- Institute of Studies for Integration of Systems (ISIS), Rome, Italy (PP12)
- Ersilia Fundation, Barcelona, Spain (PP13)

The company TERSYN (PP2) is not longer active in the project.

1.3 Work activities

Methodology

The work is organised according to the steps indicated in the Project Specifications, as follows:

- **Present State of Europe**: What is the current state of the European territorial structure?
- **Baseline Scenarios for 2030 and 2050**: What will be the future state of the European territorial structure based on the hypothesis that development trends and policies remain stable?
- **Extreme/exploratory Scenarios 2050**: What could be feasible future state of the European territorial structure in three territorially extreme/exploratory scenarios?
- **European Territorial Vision 2050**: What is the room for manoeuvre to politically steer (the development of) the future state of the European territorial structure and what is the range in which a realistic territorial vision can be formulated?
- **Midterm targets and pathways**: Is the Vision feasible?, which political pathway will be sufficient and/or more convenient to achieve end and midterm targets?

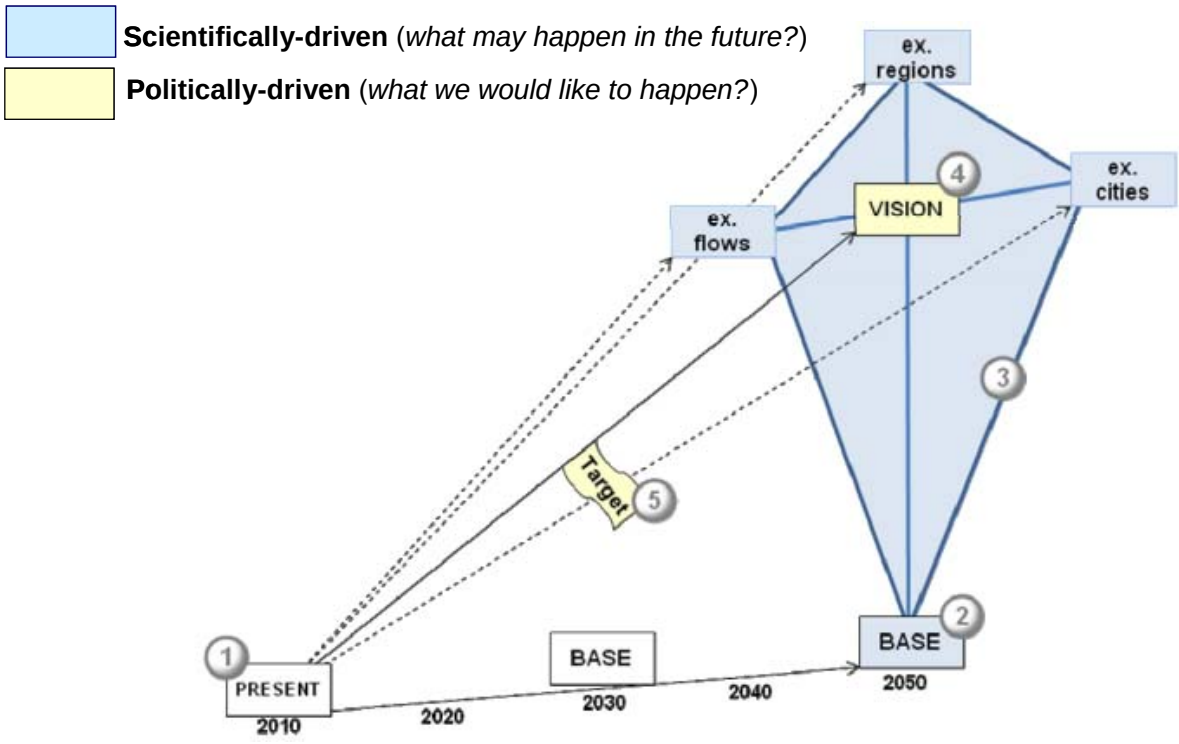

Figure 1-1 Approach to construction of scenarios and the Vision (Project Specification)

The methodology combines a quantitative and qualitative approach as follows. The qualitative work is based on partner's expertise, internal discussion structured by "Discussion Notes" (32 notes published in ET2050 website), and inputs generated in the participatory processes through specific expert surveys (2 surveys during internal and open ESPON seminars).

Mostly qualitatively approach:

- Synthesis of trends by sectors and territories, and elaboration of SWOT tables.

- Definition of critical bifurcations
- Review of existing studies on scenarios for Europe and the rest of the World (literature)
- Definition of key directions for each scenario from the bifurcation points
- Design of logic relationships between the different key directions and trends
- Elaboration of qualitative narratives for scenarios

Quantitative approach:

- Quantitative hypothesis and expectations at global level for key indicators based on foresight meta-models (PASH+)
- Quantitative hypothesis and expectations at European level for key indicators based on foresight meta-models (TV+)
- Adjustment and execution of advanced forecast models (Multipoles, MASST, MOSAIC, Metronamica, SASI)
- Meta analysis of results
- Application of TIA

Integrated qualitative and quantitative approach:

- Review of scenario assumptions
- Definition of political pathways
- Integrated qualitative and quantitative narratives

Participatory approach:

- Discussion of trends and scenarios
- Definition of TIA parameters (weights and criteria)
- Definition of the Vision throughout participatory process

Work structure

ET2050 has 3 Work Packages (WP) divided in Tasks. As illustrated below, the three main WPs are: Coordination, Management and Quality Control (WP1), Research Activities (WP2), and Communication and Dissemination of Results (WP3).

WP2 includes eight main research tasks:

- **5 content-based tasks (Tasks 2.3 to 2.7)** matching the five steps detailed in the project specifications (Present State, Baseline Scenarios 2030 & 2050, European Territorial Scenarios for 2050, Territorial Vision 2050, Midterm Targets and Pathways towards 2030).
- **3 support-oriented tasks (Tasks 2.1, 2.2 and 2.8)**: Resources for interactive participation (Task 2.1), Database management, forecast and foresight modelling resources (Task 2.2), and Innovative visualisation (Task 2.8).

The content-based tasks will be performed sequentially. The whole project will be carried out in close consultation with the ESPON MC and CU. Participatory events and workshops will be linked to ESPON CU activities.

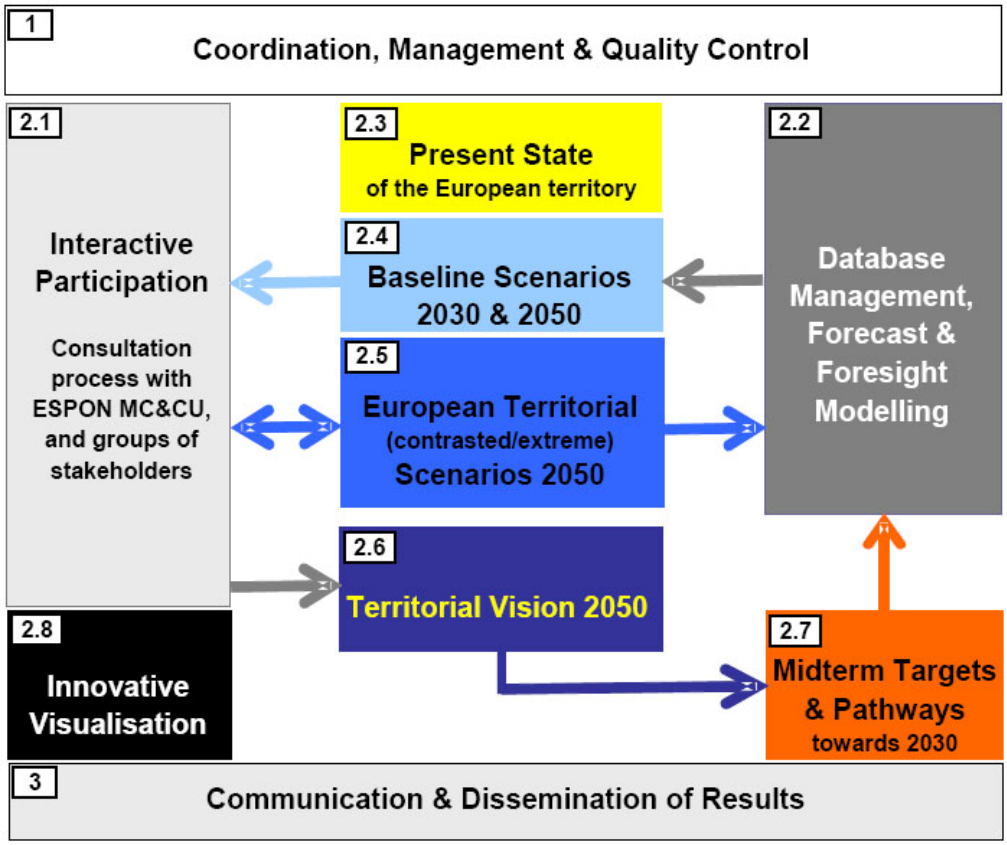

Figure 1-2 Tasks in the Work Programme

The content of the 1st Interim Report according to Project Specifications

The content of the First Interim Report will reflect the orientations given in the Inception Report as well as the results of the discussions having taken place with the Sounding Board in March 2011. The report is envisaged to include the following elements:

a) Preliminary results on the basis of available information, including:

- An overview on concepts and methodology on analysing the present state, building the baseline scenarios and the three territorial scenarios.
- A detailed presentation of a hypothesis on the scenarios and visions.
- Description of the technique/methodology/indicators/models to be used to approach the European territorial scenarios and territorial vision.
- Preliminary results of Step 1, and hypothesis for Step 2 and Step 3 in preparation for stakeholders discussions, on the basis of available information.
- Overview of involvement of stakeholders up to now and planned for the next phase up to the second Interim Report.
- First indications on the conclusions and policy relevant options that could be the outcome of the three steps.

b) Additional material to contribute to the ESPON 2013 capitalisation and communication strategy, including:

- Slideshows explaining the assumptions, the methodology and the results of the project so far.
- A selection of 3-5 maps suitable for the communication of project progress and results at the different stages on the ESPON website, but as well suitable to be used for creation of posters, postcards, exhibition materials, etc.
- Input (text, maps, images) for the creation of a specific section of the ESPON 2013 Website dedicated to the project.

c) Concrete plan for the applied research and stakeholder involvement to finalise Step 1, Step 2 and Step 3 towards the Second Interim Report.

Conclusions and Expectations for Interim Report according to Sounding Board and ESPON CU feed-back to Inception Report

The following remarks were provided by the Sounding Board and ESPON CU after the presentation of the ET2050 Inception Report in December 2011, for the further implementation of the project. These remarks have been considered by the TPG:

- Describe the plan to analyse the robustness of the results of steps 2, 3, 4 and 5 for major changes in the assumptions.
- Coverage of all 31 countries included in ESPON.
- Consideration of the results and/or methodologies of additional ESPON projects (EU-LUPA, INTERCO, ESPON 2006 project 3.2 and TANGO).
- Enhance and elaborate in more detail the qualitative analysis methods.
- Describe and clarify how TIA and wild cards will be applied in practice.
- Explain better how the results of the forecasting models will be communicated to the stakeholders. Describe of the foresight models (TV+ and PASH+) in described in templates.
- Be more ambitious, explore a broader range of scenarios, reflect in more detail on the global trends, drivers and values and use more elementary building blocks in developing the extreme scenarios further.
- Construct a coherent overview of the themes and possible indicators that will be used within the analysing and building processes of the project.
- Elaborate and present clear ideas on structuring the scenarios and visions.
- Discuss also the ‘Present State of the EU’ with stakeholders in one or more of the events.

Update of activities being carried out

Until May 2012, the project has already undertaken the following tasks::

Task	Activity
WP1 Management	Celebration of TPG workshop and meeting with Sounding Board in Brussels (March 2011). Development / maintenance of the ET2050 website (www.et2050.eu) as knowledge-sharing and communication environment Update of the schedule of activities and deliverables Reorganisation of consortium tasks, forced by event of force majeure
Task 2.1 Interactive participation	Update of Participatory Plan in coordination with ESPON CU. Elaboration of a database of contacts Between April and May 2012, small group consultation meetings (Brussels, Lille), individual interviews, and consultations by email and videoconference were held. A questionnaire was designed to address with various stakeholders the question of key values and paradigms on which the Territorial Vision should be based, as it is indeed important to bear these values/paradigms in mind during the elaboration of the scenarios, already starting from the baseline.
Task 2.2 Data gathering and modelling resources	Adaptation of models to ET2050 requirements. Documentation of ET2050 foresight models (www.et2050.eu) Refinement of data to cover ESPON space outside EU27 as far as possible. Refinement of criteria and indicators to be used within the analysing and building processes of the project (mostly through TIA)
Task 2.3 Present territorial state of Europe	Elaboration of 8 sectoral reports analysing most relevant trends in Europe: demography, economy, technology, transport, energy, land-use, environment, governance (reports available at www.et2050.eu) Elaboration of 9 macro-regional reports analysing sector specificities in different areas of Europe, threats and opportunities: South-west Mediterranean, Central Mediterranean, North-west region, Central and Alpine region, Baltic and Northern Peripheries, Danube, South-eastern region, Eastern region, and Outermost regions (reports available at www.et2050.eu). Synthesis of key trends in 125 key points
Task 2.4 Baseline Scenario 2030 and 2040	Analysis of existing official Baseline Scenarios in Europe as a basis for formulating baseline scenarios for ET2050 (annex report available at www.et2050.eu) Definition of Critical Bifurcations or challenges for Europe Definition of Key Directions assumed by Baseline in response to Critical Bifurcations. First quantitative set of indicators for Baseline 2010-2050 using foresight tools, to build a common base for modellers to implement the Baseline Scenario. Modelling activities are to validate / refine / amend these initial hypothesis, seeking to ensure consistency among models.
Task 2.5 Exploratory Scenarios	Discussion about alternative approaches to design Explorative Scenarios. Analysis of approximately 100 scenario reports (300 scenarios) as a basis for formulating ET2050 scenarios (annex report available at www.et2050.eu)

Task	Activity
Task 2.6 Vision	Participatory activities targeted at establishing hypothesis for the Vision. Identification of free-thinkers' visions of the long-term futures for Europe and the rest of the World.
Task 2.7 Midterm targets	Identification of policy targets derived from key EU policy documents and directives Analysis of European Policies
Task 2.8 Innovative visualisation	Extension of ET2050 website. Incorporation of infography, videos on future trends, videos on key trends in macro-regions, and existing territorial symbolic cartography on European Visions.

Figure 1-3 Activities carried out

2. Participatory Activities

While reporting on the various consultations recently organised to initiate the implementation of the ET2050 Participatory Plan (ParP), this chapter provides a detailed presentation of the results gathered in this framework. The type and time frame of the various activities, the participants involved, and the methodology adopted will be successively addressed in the first three sections (2.1, 2.2, 2.3). A synthesis of all the comments and contributions received will be presented in section 2.4, and section 2.5 presents the ParP update. Additional material - annexes to ParP- is listed at the end of this report and has been made available on the ET2050 website, http://www.et2050.eu/europe_2050/index.php/first-interim-report-may12

2.1 Type and time frame of activities

As planned in the approved Inception Report of the ET 2050 project, the first round of consultations took place between January and May 2012. This involved:

- the elaboration of a database of contacts (January/February 2012 + updates in March, April and May);
- the elaboration of an ET 2050 presentation leaflet (see Annex ParP1 at www.et2050.eu);
- the sending on 12th March 2012 of a "courtesy mail" to various stakeholders of Group 2 (policy makers) and Group 4 (Experts), inviting them to take part in the first round of consultations;
- in April 2012, various arrangements made with individuals and organizations who expressed their interest in participating;
- in April and May 2012, various participatory activities, including small group consultation meetings, individual interviews, and consultations by exchange of mail (several participants preferred to return a completed questionnaire without communicating verbally).

2.2 Stakeholders involved in the Participatory Plan

All those who reacted positively to the "courtesy mail" have been listed in Annex ParP2 at www.et2050.eu (54 records[1]). It is intended to enrich this list on an on-going basis during the whole duration of the ET2050 project, while keeping these participants posted and involving them in future activities. Most of those already registered participated one way or another in the first round of consultations.

In line with the project specifications and the approved Inception Report, special care was taken to involve members of Group 4 (Experts), who took an active part in the consultations. Many Group 2 policy makers also reacted positively to the "courtesy mail", including planning practitioners (i.e. "Group 2b" referred to in the CU's comments on the Inception report - especially members of the international planning associations ISOCARP and ECTP-CEU) and various European interest groups and associations (i.e. "Group 2c – European lobby organisations"), including EUROMONTANA, the Union for the Mediterranean, TECNALIA, EUROCITIES, METREX and EURADA, to name but a few.

[1] In a few records of the list, the name of the organisation registered in field "société" refers to the company or employer of the participant, which may differ from the body he/she represented during the consultations. For example,"Urban Concept" is the name of Mr L-E. Bouche-Florin's consultancy, but Mr Bouche-Florin himself took part in the consultations in his quality of member of the ECTP-CEU (European Council of Spatial Planners) and CEMAT delegate. Ms M. Jouen is member of the "Notre Europe" association, but also of the advisory board of Ms Mercedes-Bresso, President of the Committee of the Regions.

2.3 Methodology

Elaboration of the contact database

The contact database was progressively developed and updated during the activities listed above.

In a first step, a list of addressees of the "courtesy mail" was established. Various sources were consulted to this end. To comply with any legal constraints possibly applying in the area of private life protection, publicly accessible data were exclusively consulted[2].

In its current state, the contact database includes 671 records (Group 1: 48; Group 2: 345; Group 3: 67; Group 4: 211). Apart from 'planning practitioners', Group 2 also encompasses the following sub-categories: European Commission (including Sec Gen, DG CLIM, DG ECFIN and DG EMPL, as requested by the ESPON CU),Council of the EU (DG G1 Regional Policy Team), European Parliament (REGI Commission), Committee of the Regions, ECOSOC, various other EU bodies/agencies (EEA, etc.), public interest groups (e.g. AEBR, AER, CPMR, Eurocities, Metrex), territorial groupings (Council of the Baltic Sea States, Danube Strategy, Grande Région, Plan Bleu, INTERREG programmes, etc.), non EU international organisations (Council of Europe, International Maritime Organisation, UNECE, UNEP, etc.) various national planning administrations (in particular past, current and coming presidencies of the NTCCP).

Group 4 includes a broad category of "scientific experts", as well as two specific categories: ESPON project Lead Partners, and ESPON Contact Points.

Activities carried out

Stakeholders who expressed their interest in taking part in the consultations were first contacted by email. The ET 2050 presentation leaflet of the project (Annex ParP1 at www.et2050.eu) was attached to the invitation message, as well as a short questionnaire used for all the consultations. The five questions of this questionnaire are those addressed in section 2.4 below.

Depending on the availability of participants, their contribution consisted in one or more of the following three activities: answering the questionnaire verbally, answering it in writing or participating in a small group meetings (5). Comments received during the interviews/meetings by those who did not react in writing were collected and transcribed in a questionnaire by IGEAT.

According to the ET2050 Inception Report, this first round of consultations was meant to provide an input to, and clarify the hypotheses underlying, the baseline and exploratory scenarios. No reference was made to the Territorial Vision. The approach taken for the first round of consultations slightly departed from this initial one. Drawing on the principles of the systemic planning theory (elaborated in reaction to the old master planning approach[3]) the choice was

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[2] The following sources were exploited:

- list of experts selected by each ET 2050 TPG partner responsible for Task 2.3 sectoral and transnational reports, as well as proposals from the MC (cf. Krakow meeting December 1 , 2011, inception report);
- list of participants in the public consultation procedure relating to the Green Paper on Territorial Cohesion;
- officials of various EU institutions;
- officials involved in the elaboration and implementation of the Baltic Sea and Danube Strategies;
- members of NTCCP delegations (PL-DK-CY trio);
- ESPON project lead partners and ESPON ECP.

[3] For further detail, consult for example HALL Peter (2002) *Urban and Regional Planning* – Routledge, especially Chapter 9 dedicated to the planning process as theorized by B. McLoughlin, G. Chadwick and A. Wilson, in which much emphasis has been placed on the necessity to clarify key policy goals from the very outset of the planning process.

made to address with various stakeholders the question of key values and paradigms on which the Territorial Vision should be based. It is indeed important to bear these values/paradigms in mind during the elaboration of the scenarios, instead of elaborating them on a relatively arbitrary basis. The issue is addressed in question 4 of the questionnaire. Special care has also been taken in the other questions to consider various aspects of EU policy making, including EU governance.

To encourage free speech, it was decided to keep anonymous the various comments expressed by respondents, and therefore not to publish the various completed questionnaires. However, several participants have spontaneously transmitted reference documents or individual written contributions to nurture the ET 2050 Territorial Vision elaboration process. These reference documents and contributions have been included in this report as Annexes ParP 4 to 11 (www.et2050.eu)

As anticipated by the CU when commenting on the Inception Report, these small group meetings proved very fruitful, particularly conducive to creative exchange of views. As recommended by the CU, an innovative way of web-based communication was successfully experimented in this framework, namely a highly efficient professional video-conferencing system (allowing a multilateral conversation to take place with up to fifteen participants, with a possibility to record the proceedings on digital support and share various documents/presentations on line.)

2.4 Synthesis of comments and contributions received

A total of twenty completed questionnaires have been analysed. Some were directly received from respondents, others were elaborated by IGEAT on the basis of comments expressed verbally during individual interviews or small group meetings.

The purpose of this section is to summarise, for each of the five questions included in the questionnaire, the overall substance of key-messages delivered by the participants. The exercise is challenging, because a wealth of insightful and very diverse views were expressed in this framework. As is the case with any synthesis, a selective approach was adopted and relatively minor points made by respondents had to be sacrificed. Since a certain degree of arbitrariness generally remains unavoidable in such circumstances, those interested in having a closer insight into the contributions received are strongly advised to consult the attached compilation of replies to the questionnaire (Annex ParP 3) and the various extra contributions received (Annexes ParP 4 to ParP 11).

Whereas various comments collected were strikingly convergent, a few very original views were also expressed by some 'lateral thinkers'. Both types of inputs were of course worth mentioning, especially in the framework of a foresight exercise such as ET 2050: if consensus building does matter, some ideas currently put forward by a minority may also prefigure future 'leitbilds' commonly accepted in 2050. The very notion of 'sustainable development' was unknown to the layman 25 years ago... The following sub-sections have therefore been elaborated to reflect the two types of inputs, starting with those most often referred to and ending with more original viewpoints.

The areas and levels of expertise of the various respondents were very diverse. In various contributions received, the rigorousness and reliability of some elements may appear open to criticism. As the aim of the exercise was to encourage creative thinking and free expression of personal views, special care has been taken in this report to echo as faithfully as possible the content of the written and verbal contributions received, including those lending themselves to controversy. The ET 2050 project partnership will use these contributions as stimulating food for thought during the scenario and vision elaboration exercises, which will anyway involve testing the overall reliability and consistency of the various data and information collected.

Question 1 - What key EU policy issues should deserve particular attention in the ET2050 scenario building exercise?

The notion of "EU policy issues" was very widely interpreted during the consultations. Actually, various contributions were more dedicated to "policy issues in Europe". Beside formal EU policies themselves, much attention was also paid to their necessary mutual coordination and integration (or the lack of such integration), to their impact and consequences in the domestic context and the general need for vertical integration of policies.

According to various respondents, no specific thematic issue can be singled out. Instead, some overarching policy issues or principles should be addressed, including sustainable development, territorial cohesion, etc. In an interviewee's opinion, "considering all the challenges that Europe is currently facing in economic, environmental and social terms, comprehensive responses to such multi-dimensional challenges should be given priority. In particular, all the policy issues linked to the transition to a green economy should be intensively discussed". It was also stated that "key EU policy should be more oriented towards more comprehensive/holistic policy design" and that "social, economic, environmental, cultural development as well as cohesion-related results are needed". Sustainability was even deemed to be needed in fields such as finances and employment.

The emphasis was often placed on the need for policy integration, in particular at the EU level to overcome the fragmentation of the policy approach (e.g. "effective integration of EU policies such as CAP, energy, environment, etc. in a consistent EU spatial strategy"), but also through cooperation within cross-border and macroregions.

The same case for policy integration was made through references to relevant strategic documents such as the ESDP[4], the Territorial Agenda, EU 2020, and to territorial approaches in the urban [5], rural, urban-rural[6], cross-border and transnational contexts.

A respondent stressed that "cohesion must mean a reduction in disparities between the relatively prosperous European urban core (London/Paris/Rhine/Ruhr) and the periphery", and "at the very least, it must seek greater equality of competitive opportunity". For this purpose, "the key lies with the relative futures of Europe's major urban centres", but also "the development of collective strength around the periphery", for which "connectivity is key".

It was repeatedly stressed that the EU needs to be considered in its wider context. This concerns not only the territorial analysis (the integration of the 'Euromed' space, including Russia and Southern Mediterranean countries – especially since the Arab Spring, as well as the global dimension) but also the future of the EU foreign policy, neighbourhood policy in particular, with a particular focus on its territorial dimension. The relative decline of the EU relative position in the world was also referred to. A respondent involved in a previous foresight study exercise (conducted in the nineties) stressed that the approach was too "Eurocentric" at the time, even to address the question of the relationships between the EU and the external world. "External relations" were treated more as a "diplomatic issue" instead of concentrating on new challenges of international / global relevance.

[4] The view was also expressed that « the ESDP was a bold attempt which at its final stages faltered and fell short of the hopes many had for it. »

[5] One comment insists on the need not to lose sight of medium-sized towns, whose role is "very important to better balance the territorial structure and the urban system. Unfortunately, medium-sized towns have more limited financial means to get EU funding → big cities get the lion's share".

[6] Including urban-rural relationship, periurban areas, "transition zones", "urban agriculture" cf. FP6 PLUREL (Periurban Land Use Relationships) project www.plurel.net

One of the contributions pointed to major differences between Eastern and Western Europe in terms of territorial planning practices, governance and policy integration mechanisms as well as management of EU funds.

The strong bias towards policy integration did not prevent various respondents from emphasizing the critical importance of some policy areas. These are listed below, starting with those most often referred to:

- Demography: ageing, in- and out-migrations, depopulation in jobless areas and "shrinking regions"7, residential mobility, risk of brain drain. Solutions should be provided for a "Europe in movement", i.e. im-em-in-migration questions in relation to urban changes (sprawl, shrinking cities, brownfield sites). Do not only consider the issue of making people closer to jobs, but also that of making jobs closer to people8. Ageing is not taking place at the same pace in various regions. The question was asked: "Is the EU going to act politically to reverse or slow down the ageing trend in general?"
- Energy: production of renewable energy (Intelligent Energy Europe, etc.) in urban and rural areas9; energy efficiency; energy self-sufficiency of cities/towns should be the goal; security of energy supply; regional vulnerability to an increase in the energy prices; the EU energy policy should be radically revamped;
- Climate change: the issue must be considered from both the adaptation and mitigation perspectives; eco-innovation and territorial planning, smart cities, mitigation strategies; critical issues must be faced, for example the implications of the Arctic permafrost thaw (http://www.clubofrome.org/?p=3425), or specificities of Mediterranean climates and ecosystems;
- Mobility, accessibility and connectivity, especially as a critical pre-requisite to economic development in less accessible areas (hence the need for integration of the transport and development policies), affordable public transports; define clear priorities in the TENs;
- Social/economic development & cohesion: job creation, social inclusion, exploitation of the endogenous territorial development potential; "R&D and innovation is the only card to play: if we fail to play it, this will be a terrible crisis, and territorial planning is key in this respect"; public space quality as a driver of economic development of cities
- Environmental sustainability
- Access to education and training
- Scarcity of natural resources (overexploitation, necessity to promote a more efficient use), loss of biodiversity
- Coastal planning, distribution of port infrastructure, Maritime Strategic Framework Directive (MSFD); European sea- and airports compete with one another, whereas they should unite to face global competition
- Land use, land management: reuse / optimise the use of urban land, urban regeneration
- Security, including environmental security (e.g. floating buildings in flood mitigation strategies).
- Well-being, happiness (suicide figures are not good)

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[7] Cf. study "Shrinking Regions: a Paradigm Shift in Demography and Territorial Development":

http://www.ums-riate.fr/documents/Shrinking_Study_EN.pdf) and http://shrinking.ums-riate.fr/

[8] Reference was made to "Europe 2000+, Cooperation for European territorial development" published by the European Commission in 1994: chapter "Trends in the spatial distribution of population and employment", pp. 31-37

[9] A respondent wrote : « Rethink the ways (even in governance terms) of producing renewable energy at the urban and rural scales… current development/implementation mechanisms are not in favour of citizens, but of usual and well-known suppliers / distributors: Europe is missing the opportunity of linking opportunities connected to new technologies with the creation of a real new way of living based on real independency from non-renewable sources and energy multinationals"

- Cultural trends / society model: “what do people want? What makes them happy? What is a modern and mature society?”

Question 2 - Should the scenarios focus on the possible evolution of the European territorial structure and EU policy-content, or also on possible change in the area of EU governance?

Various views were expressed in the two main categories of issues raised by the question: governance aspects on the one hand, and territorial structure / EU policy content on the other. Many more comments were made on the former than the latter.

Governance aspects

The question as to whether possible change in the area of EU governance should be taken into consideration in the scenario elaboration process did not appear controversial. Many respondents warmly supported this choice, some presenting it as a major requirement. Others insisted that it would be artificial to address governance systems and policy elaboration separately, as they are two sides of the same coin. It was also said that “scenarios should take into account the conjoined evolution of territorial structure, policies and governance”.

A strong case was often made for more policy coordination and vertical/cross-sector integration. For the time being, advocating this coordination is still akin to wishful thinking. For example, the following question was raised: “Why do we need an “Aalborg declaration” and a “Leipzig Charter” as reference documents concerning sustainable urban development in Europe? Is it so difficult to adopt one single EU reference document on this topic instead of having the “DG Environment friends” and “DG Regio friends” adopting each their own, because they work in isolation?”

While acknowledging the strategic importance of EU governance, a participant expressed doubts about the possibility to reform it significantly. He also pointed to inconsistencies in the set of formal EU competences: for example, the EU has very limited power in the area of education, while ambitioning to promote the knowledge economy.

A functional definition (who does what?) of Territorial Cohesion was deemed more important than a “conceptual/theoretical” one.

The proposal was made to examine the feasibility of an “ESDP 2050”, some sort of new overall master plan for EU territorial policy making. This proposal may appear daring, but it shares some common ground with this opinion expressed by another respondent: “After a relatively long period of deregulation and neo-liberal thought, there is a trend towards more regulation. Economic regulation could make a dramatic come-back, but also spatial planning at the same time. At the EU level however, strategic planning is more on the agenda than regulatory planning.” In the same vein, it was stressed that “strategic planning is needed to break the stranglehold of parochialism and Nymbyism. Collaborative planning is important to counter departmental silos of government and the constraints of administrative boundaries. To avoid being just dominated by ‘fire fighting’ and driven short-termism, a strong and long term Vision is needed.”

The question was raised as to whether the scenarios should examine the possible effects of an evolution towards contrasted EU governance models (federal EU governance and government vs intergovernmental EU where every member states would recover its full sovereignty). While considering that this should not be the priority, a respondent suggested addressing another issue: the significant territorial impact of a possible harmonisation of taxation policy. However, reference was also made to A. Faludi & J. Peyrony’s article published in 2011 in the European Journal of Spatial Development[10]. Revisiting the scenarios of ESPON 2006 Project 3.2, the authors imagine four other types of possible scenarios (‘Anglo-Saxon, ‘Saint-Simonian’,

[10] Annex ParP 7 - http://www.nordregio.se/Global/EJSD/Refereed%20articles/refereed43.pdf

'Rhineland' and 'European') based on various combinations of governance types and cohesion policies. This article could be a very helpful inspiration for the elaboration of the ET2050 scenarios.

It was stressed that "integration of EU will only progress with a mix of EU polices and EU governance, as the present discussion about the crisis shows", and that "policies and governance have to be assessed against their impact on efficiency/equity/sustainability, with territory as cross cutting dimension." The need to propose both short term and longer term concrete policy steps was also emphasized.

In a participant's opinion, an overall (possible) radical change in the area of EU governance could consist in a significant widening of the EU policy remit and politics. This would affect territorial policy as well as other policy domains.

It was also considered necessary to make a distinction between 'EU governance' and 'governance of Europe'. Both should be addressed in the scenario building, including the possible evolution of multilevel governance, for example toward more autonomous regions with clearer responsibilities and a more effective and consistent application of the subsidiarity principle, especially in the area of territorial development. In this respect, it was also said that "several brilliant planners involved in ESPON activities promote a more European perspective in planning activities, but in reality, most of planning is very much done at the local level. And vice versa: those involved in planning practice at the local level sometime try to convey some key-messages to higher levels, but it takes a long while until this really happens."

Another point was made about multilevel governance : the problem of "institutional thickness" faced in most member states, i.e. too many authorities and other decision makers of various tiers of government responsible for dealing with the same issues. In Spain, for example, every authority claims to be entitled to deal with "territorial cohesion", including the national authorities when carrying out various sector policies. In general, reforms are needed to clarify the allocation of responsibilities and promote appropriate partnerships.

A last key governance-related issue raised was the discrepancy between the geographical remit of local or regional authorities and the size of functional areas (in the domestic, cross-border and transnational contexts). In an ideal world, this remit should be redefined, but this generally proves difficult or even virtually impossible. In many cases, decision-makers have no other choice than putting up with administrative boundaries dating back to the middle age, while exploring new governance and territorial cooperation mechanisms to guide territorial development in functional areas. This can take place in the domestic context (e.g. to run a wide metropolitan area) and at the cross-border or transnational level, for which the EGTC tool offers new opportunities. Similar tools could be used to run FUAs. It was generally acknowledged that cities need to cooperate beyond their administrative boundaries, but also that this is easier said than done.

Territorial structure / EU policy content

The following comments were made:

- A thorough analysis of various sectoral policies is a prerequisite: examine first to what extent these policies contradict or complement each other.
- Cities should be promoted as economic engines of Europe. They have a pivotal role to play, even for their surrounding rural areas (e.g. access to health care in large hospitals in the nearest big city).
- In strictly geographical terms, the EU territorial structure will keep evolving in the coming years (e.g. western-Balkans states as new EU members + still open question of Turkey…). Considering the history of Europe, this is nothing really new: the European territorial structure has often been reshaped, and this is very likely to continue in the future. As EU governance

is closely linked to the evolution of its [territorial] structure…and vice-versa, the scenarios should avoid considering these two aspects separately, and instead focus on the evolution of their mutual linkages…
- ET 2050 should elaborate scenarios for several ecological areas(Mediterranean, Continental, Southern Atlantic, Northern Atlantic, Alpine, etc.)

A more technical but important point was made about the scenario elaboration method: "scenarios, as tools for policy action, are more useful whenever a simplified narrative is used in their construction. This implies the use of as few variables as possible and thus in principle we would suggest using a one-dimensional approach to scenario development." Put otherwise, the complex discussion about policy integration and its multiple implications should not 'contaminate' the scenario building process.

Question 3 - What major trends / policy developments should be taken into account when elaborating the ET 2050 scenarios? Do you see some possible course of events that could emerge in the long run and whose importance is currently underestimated or simply ignored?

Not surprisingly, several priority policy areas already mentioned in reply to Question 1 (relating to key EU policy issues) were once more referred to here. In various field, reference was made to both positive and negative possible trends (or optimistic / pessimistic scenarios).

- Demography: ageing, population decline, segregation. In- and out-migrations between Europe and other parts of the world; this concerns not only people but also companies and job locations, depending on the relative competitiveness of European companies and those based outside Europe. A "shrinking nations / regions" scenario could be triggered by out-migration fluxes. Conversely, a sudden influx of massive immigration into Europe could also result from emancipation of oppressed populations. Risk of moral failure in relation to the questions of migrants and borders, farewell to the enlightenment principles, with huge political and economic consequences, as the Europe "brand" would be devaluated. Because of its weak demography, the EU risks to be marginalised at the global level. Climate refugees.
- Energy: evolution of the energy supply and price, growth of (non-renewable) energy consumption; energy management, new patterns of production and consumption. Energy transport networks are a key strategic issue (NABUCCO gas pipeline, etc.) Further reshaping of energy policies (e.g. role of nuclear power and scale of new renewable energy technologies.) Electric and hydrogen power will be the future. New hydrogen highways can be popular in a few years. New types of batteries such as nickel-metal hydride and lithium are non-toxic and recyclable. New private and public transport systems will appear. Further increase in decentralised energy generation (30% in Europe in 2010). Cities shall drive investments towards clean, renewable, self-sufficient energy systems. New urban forms generated by a new approach to urban design will contribute to overcome problems currently faced in the area of energy supply and consumption.
- Climate change: sea level rise, coastal erosion, water scarcity, climate refugees, greenhouse gas (GHG) emissions, major possible contribution of large urban areas to the development of an energy self-sufficiency model; this + electro-mobility make it possible to envisage the substantial decarbonisation of urban Europe well before 2030 (cf. EUCO2 80/50 project carried out by METREX: http://www.euco2.org/).
- Mobility, accessibility and connectivity: death of distances, social gap resulting from different patterns of mobility (internationally minded and wealthy people vs inhabitants of a suburb who never go downtown).
- Social/economic development & cohesion : development of the "alternative economy" (cooperative sector, local markets, etc.). Possible decline of the current austerity models. Slums in Europe. Financial crisis (+ related collapse of the housing market). At first sight, housing pol-

icy seems to be an issue of local or regional relevance, but various recent practices on the real estate and mortgage markets (sub-primes, oversupply in Spain and other countries, etc.) turned out to have major consequences at a macroeconomic scale; this evolution may also deeply impact territorial development.

- Environmental sustainability: risk of degradation of the environment due to pressures of human and economic activities such as coastal urbanisation, manufacturing industry, tourism and recreational activities
- Scarcity of natural resources: water, cultivable surfaces, food. However, there is also a good prospect of significant improvements in the area of natural resource protection.
- Coastal areas and maritime issues: growing importance of maritime spatial planning, to be coordinated with land spatial planning
- Land use, land management: growing demand for space, issue of compatibility between different land uses and possible resulting conflicts; regeneration and partial redesign of densely populated residential areas and connected public spaces
- Cultural trends / society model: preferences of people will evolve in various respects, in particular the choice of their place of residence (large agglomerations / less densely built environment / rural areas, depending on various factors such as land values, energy cost, job opportunities, access to education and health care services)

Other trends/policy areas / challenges were also mentioned:

- Political capacity: a possible drastic exhaustion of public funding would make Europe depend solely on economic factors and no more on policies ("no public policy" scenario).
- Wild cards such as collapse of the euro, nuclear catastrophe, wars in the EU neighbouring countries, and negative scenarios also need to be seriously considered. Cf. Jean-Pierre Dupuy (2002) Pour un catastrophisme éclairé.
- "Back to protectionism scenario": the EU could end up getting completely isolated from the rest of the world. Even reinforced controls at the internal borders may be feared.
- There is some hope that traditional power structures of member states will progressively become obsolete and lose ground to a new more bottom up "democratic" social alliance of a large majority of the regions.
- The traditional national-regional-local governance structure (19th century approach) is being transformed because it no longer reflects the needs of the 21st century, e.g. in the missing links between local actions and global issues. Cf. URBACT LUMASEC project: http://urbact.eu/fileadmin/Projects/LUMASEC/outputs_media/LUMASEC_Hottopic_01.pdf , diagram under heading "2. Radical change in territorial governance and finance" . Cross-border & macroregional groupings, NUTS 3 entities and neighbourhood groups are becoming new key-players.
- Evolution of the EU geography: accession of Turkey, evolution of the neighbourhood policy in reaction to new trends (e.g. the Middle East becoming an emerging market)
- Evolution of the world economic geography: shift of the world's economic centre of gravity, importance of getting closer to Asia and the Middle East
- Some revolutionary technologies may dramatic ally change the style of life while potentially reducing energy consumption and GHG emissions: example of the "3D house printing" system experimented in the Netherlands (use of a rapid-prototype or 3D printing process to fabricate large components). Cf. The Economist 21 April 2012, also http://inhabitat.com/print-a-house-in-24-hours-with-robots/ and http://phys.org/news139161727.html
- Evolution of the agricultural production in Europe (better quality food production, combined with preservation of the natural environment and cultural landscapes

- New technologies will carry on impacting important components of planning: life expectancy, transportation, energy, climate change, just to name a few. Recent advances in pharmacology and nanotechnology can for instance reduce the prevalence of Alzheimer's and other dementias, and may improve regenerative medicine. Genetic manipulation will increase the duration of human organs. Life expectancy is expected to increase, accompanied by a fundamental improvement in the quality of life in old age. Nanotechnology can also introduce new construction materials that will reduce energy consumption. The development and the application of low-carbon technologies are also very important.

Question 4 - What kind of possible EU paradigms should guide the elaboration of the scenarios and the Territorial Vision? What ideal European territory would you dream of for the 2050 time horizon?

Question 4A. - Please rank the ten paradigms proposed below by priority order (each a distinct rank):

Paradigm	Rank
Competitive Europe	
Culture first: development of the cultural heritage as the main goal	
Ecumenopolis (**): Europe integrated in a world-wide city	
European spatial justice (equal opportunities between territories)	
Inclusive growth (*)	
Minimal ecological footprint: green Europe	
Smart growth (*)	
Sustainable growth (*)	
Territorial diversity: Europe as a mosaic of identities	
Territorial integration: borderless Europe	

(*) as understood in the EU2020 strategy

(**) coined in 1961 by Constantinos Doxiadis http://www.doxiadis.org/page/default.asp?id=238

The purpose of question 4A was twofold: first, to examine whether a certain degree of convergence was perceptible among the various persons consulted with regard to key values and policy goals; second, to stimulate creative thinking by giving respondents a flavour of the type of paradigms they were invited to propose in reply to question 4B. A mix of well known paradigms (e.g. the EU 2020 smart, sustainable and inclusive growths) and more unusual ones (especially "culture first" and "Ecumenopolis") was deliberately proposed to take on board the current policy debate on the future of EU policy while leaving the door open to exogenous inputs.

Some participants expressed reservations about the exercise, motivated by its relative arbitrariness or the difficulty to propose a consistent ranking of the various paradigms listed. This explains why a few respondents did not abide by the rule "each a distinct rank". One of them specified that his ranking of "culture first" actually applied to the reworded paradigm: "culture and education first", and that "European spatial justice" should not only concern "equal opportunities between territories but also between people". The various rankings proposed are displayed in the table below .Considering the small size and the heterogeneous composition of the group of respondents, the outcome can of course not be regarded as representative of the opinions of any group of stakeholders. Nevertheless some results are worth noting:

- some consensus between participants to rank “sustainable growth” and “inclusive growth” relatively high
- “territorial diversity”, “culture first” and “Ecumenopolis” proved clearly less popular (or less familiar??), especially “Ecumenopolis” (standard deviation = 1.5)
- fairly similar position of the other five paradigms.

Paradigm	Mean	Standard deviation
Sustainable growth (*)	3.2	2.2
Inclusive growth (*)	3.4	2.1
Territorial integration: borderless Europe	4.2	2.4
Smart growth (*)	4.3	2.4
Minimal ecological footprint: green Europe	4.6	2.6
European spatial justice (equal opportunities between territories)	4.8	3.0
Competitive Europe	4.9	2.8
Territorial diversity: Europe as a mosaic of identities	6.1	3.0
Culture first: development of the cultural heritage as the main goal	7.9	2.4
Ecumenopolis (**): Europe integrated in a world-wide city	8.8	1.5

Figure 2-1 Results to Question 4A (ParP)

Question 4B. Please brainstorm. Propose your own paradigms:

A wide variety of paradigms was put forward. Some of them actually paraphrase one or more paradigms already listed in question 4A (or comments already made in reply to questions 1 to 3). Others proposed different models, sometimes presented as alternative scenarios (an even some pessimistic ones, which may appear odd in a section about “paradigms”).

In the following presentation, the material received from respondents has been grouped on a thematic basis. As is often the case with this type of clustering exercise, a certain degree of arbitrariness was unavoidable; indeed, the multidimensional nature of various responses received could have justified to include them in more than one thematic category.

Most paradigms proposed were worded in a synthetic style. It was therefore deemed preferable to reproduce them literally below. When necessary, and provided that the substance of the views expressed was unequivocal, the text of some contributions reproduced in Annex ParP 3 was slightly reworded; in case of doubt, it was left unchanged.

The themes most frequently mentioned have been placed on top of the list. By and large, the level of attention paid to various issues does not significantly differ from that observed in the replies to Questions 1 and 3. However, the section relating to “economy and technology” is rather long. This is also the case of section “political approach”, but rather understandably for a question about paradigms. Among the various other themes, “energy” and “demography”, which generally appeared as key-issues in the previous sections, are no longer on top of the list, especially “demography”, which has been hardly touched upon in the proposed paradigms. This would suggest that demographic change is perceived as some sort of “heavy trend”, on which policy decisions cannot have much influence. Such a view may arguably be regarded as questionable, but it seems to have been implicitly adopted by the respondents. Conversely,

themes such as happiness / well-being or culture / way of life are more often referred to than in the previous sections.

Economy / technology

- Economic recovery
- Secure Recovery for the Future of Europe ("Recovery" is the immediate priority, and "Security" is the longer term need).
- International competitiveness
- Go back to human scale production / local economy
- Access to essential goods and services
- In the business sector: socially responsible companies (e.g. Toshiba)
- A non-dependant Europe: Europe capable as much as possible to produce the food and energy resources it needs, raw materials in general, using fully the potential of its territory
- Europe industry of design (N.B. investment in quality is the only European specific asset)
- Education, research and innovation, qualification of human resources, "reindustrialization" of European countries
- "New Intellectual Property in Europe" : inventing things in a complete open method with the aim to improve things (in this case more sustainable lighting) instead of just making profit by protecting your Intellectual Property. Cf. Mr Frans Otten from Lemnis lighting.
- "3rd industrial revolution Europe": transition of producing from centralised mass production to local, individualised 3D printing from local resources of new materials (composites, nanotechnology etc) as the new way of production (E.g. printing a house). Tremendous impact on the use of space: reduction of travel and transport, no more big plants. The economy goes local and individual again[11].
- "Europe's financial landscape is unrecognisable": the role of money is back to where it belongs: a tool to exchange. Tax and social contribution schemes are the same all over Europe (perhaps the UK dropped out of the EU for defensive reasons) ending the tax-based competition: location of companies is based on the availability of labour and raw materials. All costs of production of goods and services are included (environment, water, public services like roads etc) in prices of products (as an example this would mean the inclusive price of an iPhone would be $ 10,000 instead of $ 1,000 you pay now).
- Socioeconomic convergence within ["between" is probably meant] European member States

Happiness, wellbeing

- Quality of life of EU citizens
- Quality of life and particularly public services: where is Europe going in this respect?
- Consider that each of us is a world, and then learn to listen and understand
- Stop running
- Ask ourselves questions such as: "Can I be happy if others are not?", "What are my fears about the future?"
- Consider activity and not only jobs
- Slow society: reject the "immediacy worship", get back to a human pace.
- Happy Europe: Europe where people can find a place to live and work that fits their aspirations, which might differ from one person to another.

[11] Cf. The Economist 21 April 2012, also http://inhabitat.com/print-a-house-in-24-hours-with-robots/ and http://phys.org/news139161727.html

- “Happiness”, place the human being at the centre of everything
- “Europe with a different concept of growth”: new indicators, looking at the growth of happiness instead of income, indicators better reflecting the wishes of the Europeans: we rather work a bit less and have more balance between work and private. Higher income is not the main driver for people’s choice of a new job. Territorial assets / quality might be an important one, certainly when raising kids.

Political approach

- A new paradigm could be Resilient Europe, capable to react positively to world changes.
- Resilient growth (against economic/political crisis and disasters)
- Shared vision, common fate/destiny
- The “European common good” (which remains to be defined)
- Strengthened rule of law and respect for fundamental rights & individual freedoms
- “The four visions of Europe as (1) a world economic power, (2) a continent with borders, (3) a normative soft power and (4) an attractive cluster of nodes in global networks seem to be complementary. But they are, in fact, contradictory, because they require different definitions of the geographical area called "Europe" and different strategic choices concerning political priorities. We assume that the contradiction can only be solved if we decide to give up the references to a mythical notion of Europe and replace it by a secular concept of the European Union. In this case, the problem is no longer a question of identity or of so-called “civilization”, but a question of strategy and political choice to be debated by citizens and their political representatives.” Cf. Annex ParP6 EuroBroadMap
- “Governance on the right level” : integrated policies will come on the second level: priorities will be dealt with by separate authorities on different territorial levels: i.e. a global authority on climate change, a catchment area authority for flooding management of rivers ...
- Under pressures of financial and related political crises: decline of power of nation states and growth of regionalism/localism.
- Actually, we can imagine many interesting paradigms. This is not the core issue, because trade-offs between various paradigms will always remain necessary. The search for a reasonable balance between various societal values will always remain necessary. Therefore we can start with many different paradigms, all of which could be considered as a given starting point, but the challenge is to go beyond this to provide the necessary synthesis and key policy options. Cupboards are full of good recommendations... But the real challenge of foresight exercises is to identify credible trade-offs between such recommendations.

Sustainability, environment

- Sustainable growth
- Everything sustainable (sustainable transport, sustainable city, sustainable energy production, etc.)
- “Europe restores its’ Environment”: creation of a complete new industry to restore the damage past and current generations have done to our own environment. (E.g. fishing all plastics from the seas and oceans and reusing it, capturing and storing CO2 through use in green houses, reclaiming the offices that are vacant, restoring nature in Pan European Ecological Network (PEEN))
- Reduce the demand and resource consumption while sustaining the current levels of quality.
- Transition from the Industrial Age to the Ecological Age (post-overconsumption era)
- Green/cultural growth
- Growth through regeneration

- A forest policy, including ecology, sylviculture, employment, territory assessment, may occupy a good place in both a sustainable development policy and in a Mediterranean [missing word : “strategy”? “policy”?] (open to no member Mediterranean countries), if it is designed as a part of a territorial approach
- Inclusive, incremental and coherent development

Energy

- Energy-rich or energy-poor paradigms? Both are possible.
- Free energy for everybody (e.g. ITER nuclear fusion, concentrated solar-thermal power of the DESERTEC project)
- Energy self-sufficient Europe
- A city with net nil energy balance (where the production of energy can be equal to its consumption)
- A decentralised renewable energy future based on the generating potential of the major urban areas.
- “European renews its Energy” : transition to an ‘internet-grid-like’ energy system, with households, buildings and other production-sites being both local producers and consumers of renewable energy and almost no central energy production anymore. Almost independent of foreign energy sources. A new way of storing energy (e.g. the Norwegian lake). Cf. Jeremy Rifkin.

Territorial development

- ‘Anglo-Saxon, ‘Saint-Simonian’, ‘Rhineland’ and ‘European’ models (A. Faludi & J. Peyrony’s article already referred to above12.
- Territorial cohesion policy at European scale
- A better balanced and territorially cohesive Europe with greater collective economic strength around the periphery based on inter and intra polycentric cooperation and complementarity.
- A better connected Europe around the periphery and to the core.
- Territorial integration: balanced inside, strong dialogue with border macro-areas
- Europolis: Europe integrated with its cities

Land use / city planning

- Europe of social cities (German “soziale Stadt” www.quartiersmanagement.de)
- A Europe of (social) Cities
- “Europe’s cities have changed”: like the Portland 20 minutes land use concept: every citizen can satisfy his needs within a radius of 20 minutes, which allows dense building with less energy consumption (heating and transport) and can facilitate the migration towards urban areas. http://www.portlandonline.com/portlandplan/index.cfm?a=288098&c=52256
- Harmonisation of territorial and urban policies
- Inclusive cities

Culture, way of life

- A beautiful Europe: a territory with a varied landscape, with a lot of open spaces, of cultivated land, producing diversified local products.

[12] Annex ParP7) and http://www.nordregio.se/Global/EJSD/Refereed%20articles/refereed43.pdf

- Culture as the fourth pillar of sustainable development
- "Europe eats differently": consumption of local food, different food (like insects), slow food, less meat more vegetables, no more big flows of nutrients from South America and Africa to Europe to feed cattle.
- "Europe without religion": religion has always been a source for conflicts and mono-theistic religions are the cornerstone of man's belief he is beyond his environment and not part of the environment. This artificial hierarchy (god ➔man ➔ animals ➔ plants ➔ elements) is man created to support the concept of mono-theism. It justifies mankind's power over nature/environment: we can do what-ever we want with what is under our command and God is far away, so he will not punish us now.... Concept for man's feeling of superiority.

Demography

- A younger Europe

"Miscellaneous"

The following text has been provided by a respondent. Many aforementioned issues are also raised here. As it would have been a pity to dismantle this contribution, it has been reproduced exhaustively below.

"My dream in 2050

European territory is a mosaic of different regions and landscapes. The whole territory is covered with access to a high level of broadband. Technology has been improved to minimize impact of magnetic fields. Rural areas are lively, apart from a few highly protected natural parks. Big urban centres are less congested as many people have left. People there are happier. European land is farmed in a sustainable manner and produces enough food for European people, according to European standards, without harming the environment. Food is varied in form, taste, names. Names are consonant with places. People know where their food comes from. They even know how it is produced. Settlements of reasonable sizes are present everywhere. All people have access to a minimum number of square meters/person to live (not too big but not to small) at reasonable prices compared to average income. Shared community habitat has developed. Low-carbon habitat has been developed in most areas. Wind and solar energy are produced everywhere on the territory. Artists have decorated the windmill fields so that we find them beautiful (or invisible). Technology has improved, windmill fields are less noisy and so better accepted. Electric lines are in the ground. The economic structure differs from one region to another but services are well provided and developed, thanks to wide development of e-services as well. Industrial production is dynamic and clean. More products are made in Europe than in 2010. Long distance efficient transport systems are available within maximum 1h for everyone and clean local transport systems are available for the shorter distances. Car sharing is a common practice for most citizens, thanks to wide development of car sharing websites and shared cars systems. There are shared bicycles in all cities. Everyone can access an efficient hospital within 20 minutes. It is possible to easily access a theatre and a cinema. Thanks to ICT, you can follow on screens shows performed elsewhere if you live far from a big cultural centre.

Well, just a dream…"

Question 5 - What recommendations would you like to express concerning the ET2050 scenario and Territorial Vision elaboration process?

Quite a great deal of helpful pieces of advice were provided in reply to Question 5. Issues addressed can be grouped into four broad categories: policy-related aspects, technical aspects, participatory process, and communication

Policy-related aspects

ET 2050 should take on board various policy initiatives and projects already initiated by the EU and other actors, for example:

- EU 2020 and its flagship initiatives e.g. Innovation Union13, Resource Efficient Europe14, and Smart Specialisation Platform15.
- various activities spearheaded by METREX such as PolyMETREXplus, which produced a "European Territorial Vision and Framework (ETVF)" (outcomes summarised in the METREX booklet "This is not a Plan" – Annex ParP 9). Also the EUCO2 80/50 project, whose final report was published in 201116
- the ECTP Young Planners' Workshop on "planning and territorial cohesion"17.

As already specified in reply to Question 1, the approach cannot be limited to the EU space: it is essential to consider, in the scenario and Territorial Vision development process, the wider geographical context; this includes

- territorial development issues in foreign countries (Russia, etc.)
- possible changes in European geography: possible accession of Turkey and relations with the Middle East, Asia and North Africa.

Recommendations were made about other key-components that should appear in the ET2050 scenarios and Territorial Vision:

- European territorial cooperation (ETC), in particular ETC governance (e.g. widening the EGTC scope to the transnational context)
- EU funding-related issues: problems faced by some cities/regions as a consequence of their insufficient financial management capacities, in particular the resulting inefficiency of the EU-funded operations;
- Possible redirection of public investments to sectors and bodies which really need them (e.g. urban and community development)
- Actions to be taken to harness the territorial capital and promote a less fragmented EU space
- European and national hubs and networks (transport & energy networks but also the ecosystem framework and the green infrastructure, including forests and other woodland areas)
- European and national flagship projects

Other recommendations include:

- Avoid a "TA2007/TA2020" remake: these documents are less good (less "territorial") than the ESDP.
- Be creative, think out-of-the-box. The lack of creativity for the preparation of the new EU regulatory timeframe has been a disaster. Even structures are meticulously kept unchanged.
- Systematically underestimate the influence of politics.
- Do not avoid philosophical issues

Technical aspects

[13] Cf. http://ec.europa.eu/research/innovation-union

[14] Cf. http://ec.europa.eu/resource-efficient-europe

[15] Cf. http://s3platform.jrc.ec.europa.eu

[16] downloadable from the METREX web site at www.eurometrex.org)

[17] Cf. http://ypwectp.wordpress.com/

The following recommendations were made:

- Take into account, update as appropriate and propose a critical assessment/synthesis of other prospective studies, e.g. the recent “Euro-Med 2030” (2011)
- Provide as many graphic representations (graphs, curves, maps) as possible to show the main trends and the outputs of the scenario making.
- Scale: the territorial structure must be assessed at the local level, infraregional disparities must be taken into account.
- Provide decision makers with appropriate tools, e.g. TIA, SEA, and STeMA (Sustainable Territorial environmental/economic Management Approach)
- Try to propose evaluations criteria of scenario “free of GDP”.
- Especially for long-term forecasting exercises, propose smoothed/fuzzy maps of results (not in current regional limits).
- To forecast X years in the future, make sure that you also have data relating to the X past years at hand.
- Propose a reference methodology to measure the capability of local and regional authorities to be competitive in sustainability.

Participatory process:

Among the countless stakeholders and other (categories of) actors to be involved, the following ones were mentioned:

- networks of cities
- CEMAT experts
- (non EU) external observers sufficiently “distant” in various respects (geographically, politically, linguistically)
- key-players which are not yet familiar with ESPON
- ordinary non-expert people, at all the social levels
- young people
- non-planners, as much as possible.

Other recommendations and suggestions relating to the participatory process itself were made. These include:

- Consider both the EU vision (top-down) and the people views, fears and wishes (bottom-up)
- Formation of a "user group" for any Territorial Vision for Europe; this group would include the key urban, transport and energy interests from various EU institutions and networks with recognised urban interests, such as the Committee of the Regions, EESC, METREX, CEMR, Eurocities etc. The contribution of such a group could be to give a response to Scenarios and Visions on the basis of subsidiarity.
- Adopt a multi level process; ESPON often gives the impression that the truth comes from a European vision, whereas national, regional, local stakeholders are wrong, with too narrow a vision. We certainly need to build a European vision, but it should be built on the diversity of national/…/local visions, and not on “pensée unique” see what Krugman says: http://www.nytimes.com/2012/05/07/opinion/krugman-those-revolting-europeans.html. This is also why cross border cooperation is so important; it can be the place where national visions have to adapt to / combine with each other.

Communication

Last but not least, various helpful comments also addressed communication-related issues.

- Avoid sticking too much to EU jargon (e.g. “smart, sustainable, inclusive”).
- Get rid of spatial planning jargon. Planners must be able to communicate in plain language, understandable to the layman, which is not always the case for the time being.
- To help bridge the gap between scientists and decision makers , develop/adopt a common language for a common understanding of common issues.
- Keep key regions/cities informed of progress on ET 2050
- Do not forget to keep those involved in different stages of the project regularly informed about progress made by ET 2050.
- The ESPON community should be much closer to policy-makers. For the time being, they do not understand the ESPON production, because it is not very user-friendly. Scientific results should be made much more readable.

2.5 **Participatory Plan Update**

It was announced in the Inception Report that the ParP would be updated on a six-monthly basis. Two relevant comments expressed by the CU in their response to the Inception Report have already been addressed above, namely:

- a better definition of the various groups of stakeholders (cf. Heading “3. Methodology”, sub-section “elaboration of the contact database”): significant refinements were introduced (especially in the composition of Group 2); the database content was further expanded (671 records, including all the relevant services of the European Commission);
- small group consultations, including an innovative way of web-based communication (cf. same heading, sub-section “contacts with participants”)

Other points made in the CU response include considerations about the interaction between stakeholder groups: exploration of the “scope for positive sum games” and elaboration of a mutual understanding of the scenarios (including the “integration of diverse opinions”, as recommended by P. Salez, member of the sounding board). These points seem to be connected with the more general comment made on page 5 (third bulleted point) of the CU response about “communication and integration of stakeholders” [18], in particular to clarify “how the participatory process will ensure that the policy driven assumptions and logic behind the forecasting models will consider and reflect the discussion with the stakeholders on the scenarios and vision”. This question is highly complex and difficult. Somehow, first clues were provided during this first round of consultations by participants themselves, especially those raising governance-related issues in their responses to Question 2 of the questionnaire. Furthermore, some of them, despite their belonging to a specific interest group, showed clear awareness of the need for policy integration transcending specific interests. However, this leaves unanswered the question of how the various viewpoints should be integrated, in practical terms, in the ET2050 scenario and vision building. It seems clear that a very important step of this process will consist in giving full consideration to the outcome of this first round of consultations in the coming scenario elaboration phase. As far as possible, the scenarios should therefore integrate assumptions and key parameters of EU- and European policy relevance, on both policy-content and governance-related issues. In-depth discussions about this topic should take place during the coming workshops in Aalborg and Brussels. Later on, a similar approach should be adopted for all the subsequent steps of the ET 2050 project. At this stage however, it seems premature to include detailed amendments in the ParP to provide a comprehensive picture of all the steps to be taken to secure the right level of policy integration in the scenarios and the vision. Instead, it is proposed to do so after the Aalborg and Brussels workshops, to exploit their conclusions.

[18] “stakeholders’ contributions” was probably meant.

Commenting on the calendar of project activities, the CU response to the Inception Report pointed out that "the 'Present State of the EU' was missing in the objectives and also a discussion on the robustness of the results." In reply to this observation, it is worth stressing that the Present State robustness was tested by the various partners responsible for the macro-regional and sectoral reports. These reports integrate the contributions of several experts consulted on the various specific issues addressed. Furthermore, this robustness, as a key-element to be considered in the scenario-building, will also be discussed during the coming Aalborg and Brussels workshops.

As far as the calendar of participatory activities itself is concerned, a revised version has been elaborated, amending the version included as Figure 3.5 in the ET 2050 Inception Report.

The main amendments essentially concern activities planned in 2012:

- Adaptation and clarification of various activities carried out between January and May 2012
- Clarification of the nature of activities planned later in 2012 (Aalborg MC meeting and Open Seminar, further ParP contacts, Brussels Policy Workshop with the ESPON MC on 28 September and Cyprus Policy and Scientific Workshops in December).

Date	Place	Objectives / Contribution to the project	Actors involved	Activity
2012	**Month 5**	**- month 16**		
01/01 / 30/04		Input to thematic and macroregional reports	Relevant ET 2050 PPs Scientific, policy analyst and policy makers	**Personal interviews**
19/03	Brussels			**TPG meeting**
20/03	Brussels			**TPG meeting – Cu + sounding board**
03	Web mail	Awareness raising	Group 2 (policy makers) and Group 4 (experts)	**"Courtesy mail", information on ET 2050**
05	Brussels	Input to / hypotheses for baseline scenarios, exploratory scenarios and Territorial Vision	PP3 Group 2 (policy makers) and Group 4 (experts)	**Small group & individual consultations** Interactive participation: questionnaire, interviews, small group meetings, video conference
12/06	Aalborg	*Baseline scenario 2030 and 2050:* *discussion of hypotheses and storyline in relation to their consistency, likelihood and, more importantly, their preferability.*	ET 2050 LP, PP3 + MC, DG Regio, CU	**Policy workshop 2** (dedicated session of MC meeting) presentation and discussion

Date	Place	Objectives / Contribution to the project	Actors involved	Activity
		Input to prepare the MC WORKSHOP 28 SEPTEMBER, dedicated to the policy-aims and criteria to elaborate the Territorial Vision		
13/06	Aalborg			**Steering committee ET 2050**
14/06	Aalborg	Key findings of the 1st Interim Report Critical questions to identify 2013-2020 trends, building blocks for the exploratory scenarios	ET 2050: LP and relevant PPs Participants in ESPON open seminar	**Scientific workshop 2** ESPON Open seminar (dedicated session**)** Interactive sessions (quantitative survey and qualitative questionnaire
18/09	Brussels	Involvement	Et 2050 LP+ PP ? CU director Eu Parliament representative (REGI commission)	**Policy face-to-face interview / individual consultation**
19/09	Brussels			**Steering committee** **+ Cu + Sounding board**
28/09	Brussels	Input on the policy-aims and criteria to elaborate the Territorial Vision, and influence elaboration of exploratory scenarios	ET 2050 LP PP3 MC, DG regio, CU	**Policy workshop 3** interactive session (90 minutes) based on answers to questionnaire delivered in July to MC members (synthesis provided by PP3)
10	Web mail	Awareness raising	PP3 Gr 3	**Courtesy mail**
10	Brussels	*Input to the fine tuning of the baseline scenario 2050 storyline* Input to exploratory scenarios and territorial vision	PP3 key EU actors: DG (MOVE, AGRI, REGIO, ENVI, …) CoR, ECOSOC EU PArliament	**Small group and individual consultations** Interactive participation: questionnaire, interviews, small group meetings**,** video conference
11	Brussels	Input to exploratory scenarios and territorial vision	PP3 key EU and non EU actors, from	**Small group and individual consultations** Interactive participation: questionnaire, interviews, small group meetings**,** video

Date	Place	Objectives / Contribution to the project	Actors involved	Activity
			GR 3 (non public)	conference
04/12	Cyprus (Paphos)	***Validation** of the baseline scenarios 2030 -2050* Input to the exploratory scenarios in terms of consistency, likelihood and desirability, criteria for TIA. **Discussion** on methods and input to elaborate the Vision, and first proposal on hypothesis	ET 2050 LP (MCRIT), PP3 (IGEAT) + PP POLIM + PP S&W + MC, DG Regio, CU	**Policy workshop 4** dedicated session of the MC meeting half day session is needed interactive presentation (communication and media tools: PP 13)
5-6/12	Cyprus (Paphos)	Input to extreme scenarios, Input to Territorial Vision	ET 2050 LP and relevant PPs Participants in the ESPON seminar	**Scientific workshop 3** ESPON internal seminar, dedicated session interactive presentation (media tools: PP 13) + interactive/informal sessions during the seminar (poster, survey…PP 13)
2013	**Month 17**	**- Month 28**		
01 ?	Barcelona	Towards second interim report	All ET 2050 PPS	**TPG meeting**
02	**?**	Input to basic assumptions and development of the extreme scenarios assessing the baseline and exploratory scenarios	ET 2050 All the relevant PPs Participants (scientific experts, group 4, potential group 2 and 3)	**Expert group consultations** Thematic and/or geographic panel *ESPON scientific Conference?*
03	Brussels	Input to hypotheses for/development of the extreme scenarios Input to the development of the Territorial Vision	ET 2050 relevant PPs and experts Actors from all groups	**CU Joint Thematic workshop 1** **Full day dedicated to ET 2050 ?**
04			**All PPs**	**Second interim report**
05	Brussels	Input to the Territorial Vision	ET 2050: LP, PP3 + relevant PPs Key actors from groups 2 and 3 (Eu Parliament REGI committee hearings)	**Policy group consultations** interactive events brainstorming

Date	Place	Objectives / Contribution to the project	Actors involved	Activity
06	Ireland	Testing the consistency and likelihood of exploratory scenarios (draft final) Input to Territorial Vision, based on first outline	ET 2050 relevant PPs Participants in ESPON Open seminar	**Scientific workshop 4** ESPON seminar: a dedicated workshop is needed
06	Ireland	Presentation and discussion of the draft final exploratory scenarios. Testing a first outline of territorial Vision, Developing by consensus building on policy-goals	ET 2050 steering committee + ESPON CU +MC and DG Regio	**Policy workshop 5:** MC meeting **A half day session is needed**
09	Brussels	Discussion on mid term target and pathways	All relevant PPS LP and PP 3 MC, CU , DG REGIO	**Policy workshop 6** **MC session (90 minutes ?)**
10	website	Consultation on (Exploratory scenarios ?) territorial Vision and midterm target and path ways	GR 2,3 and 4	**Mail consultation, use of database from PP3**
11	Brussels	(exploratory scenarios?) territorial vision, mid term target and path ways	GR 2 and 3	**Small group consultations**
12	Lithuania	Discussion on exploratory scenarios, Territorial vision, midterm target and pathways	ET 2050 relevant PPs Participants to ESPON seminar	ESPON Internal seminar **Scientific workshop 5**
12	Lithuania	**Validation of exploratory scenarios ?** **Validation** of the draft Territorial Vision Validation of draft midterm target an pathways	ET 2050 steering committee +MC , DG Regio, CU	MC meeting **Policy workshop 7**

Date	Place	Objectives / Contribution to the project	Actors involved	Activity
2014	**Month 29**	**-Month 34: final report**		
02:				DFR
03	Brussels	Communication and Consensus building on the Territorial Vision Fine tuning mid-term targets and pathways	All groups	**Joint/ Thematic workshop 2 ???**
06	Greece	Discussion and Consensus building on the Territorial Vision mid-term target and pathways	ET 2050 relevant PPs and expert Participants in ESPON Open seminar	ESPON Open seminar **Scientific workshop 6**
06	Greece	**Validation** of the Territorial Vision **Validation** of midterm targets and pathways	ET 2050 steering committee MC, DG Regio, CU	MC meeting **Policy workshop 8**

Figure 2-2 Participatory Plan Update (schedule)

2.6 Additional material

Further relevant material[19] relating to the participatory process can be downloaded from the project website: *Cf. http://www.et2050.eu/europe_2050/index.php/first-interim-report-may12*

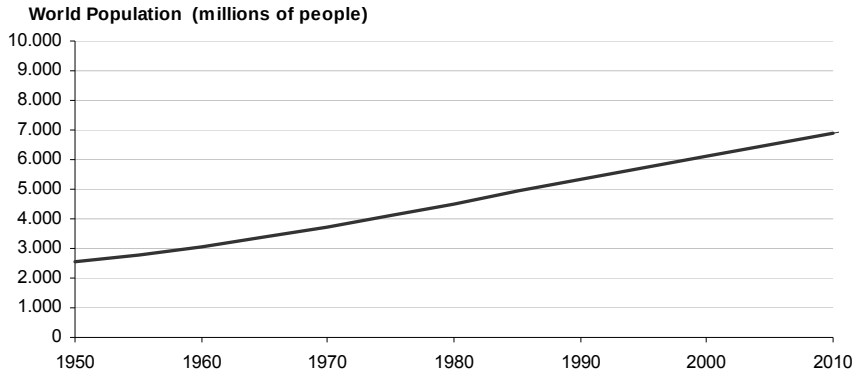
- [19]Annex ParP1. ET2050 presentation leaflet
- Annex ParP2. Participants in the ET 2050 first round of consultations
- Annex Parp3. ET2050 First Round of Consultations_Compilation of replies to the questionnaire
- Annex ParP4. GOODSTADT Vincent (ECTP-CEU)_Europe 2050 - Some Reflections on Way Forward
- Annex ParP5. VAN DER KAMP Hendrik (ECTP-CEU)_The City State as an Urban Model
- Annex ParP6a. EuroBroadMap Presentation
- Annex ParP6b. EuroBroadMap VISION1 “Europe” as a world economic power
- Annex ParP6c. EuroBroadMap VISION2 “Europe” as a continent with borders
- Annex ParP6d. EuroBroadMap VISION3 “Europe” as a normative soft power
- Annex ParP6e. EuroBroadMap VISION4 “Europe” as an attractive cluster of nodes in global networks
- Annex ParP6f. EuroBroadMap VISION5 “Europe” as an obstacle to the European Union
- Annex ParP7. FALUDI, Andreas and PEYRONY, Jean, 2011, Cohesion Policy Contributing to Territorial Cohesion – Future Scenarios, Refereed article No. 43, September, 2011, European Journal of Spatial Development
- Annex ParP8. TEIXEIRA João Pereira (ECTP-CEU)_New paradigms or the same problems with other contexts?
- Annex ParP9. METREX_European Territorial Vision & Framework (ETVF)
- Annex ParP10. VOGELIJ Jan (ECTP-CEU)_Contribution to the building of a Vision ET2050
- Annex ParP11. VOGELIJ Jan (ECTP-CEU)_Some ideas for a new vision

3. Present State of Europe

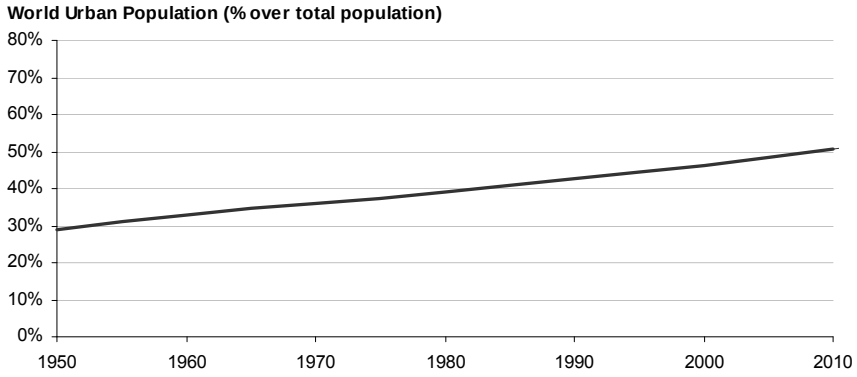
3.1 World Context

Evolutions for selected key variables from 1950 until 2010 (sources indicated in each case) are presented just as a reference for the most detailed analysis at European level.

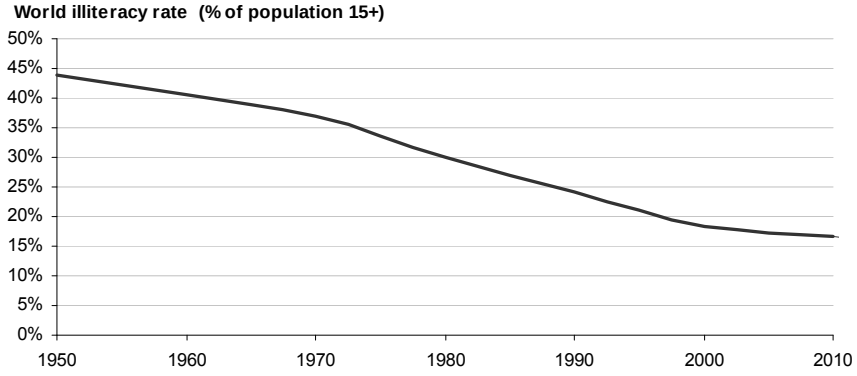
The below figures show a constantly growth of the World population, with an increasing urban population share, improving social conditions (decreased illiteracy rate, increased world equity since the 1990s), with exponential growth patterns in sectors like economy, trade, tourism, transport, and linear energy consumption increases. As a result of all previous trends, global GHG emissions, CO2 included, have also increased steadily. The weight of Europe in the World for most of these trends tends to decrease all over the period considered, mostly due to an increasing number of world relevant actors (emerging and emerged economies).



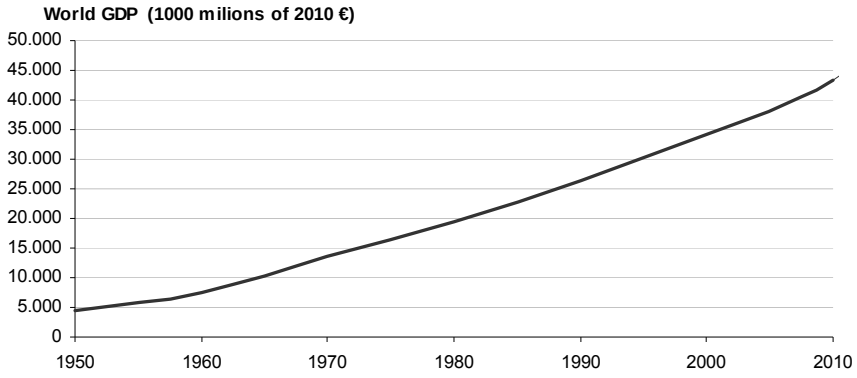
Source: United Nations – UNDESA (2010)



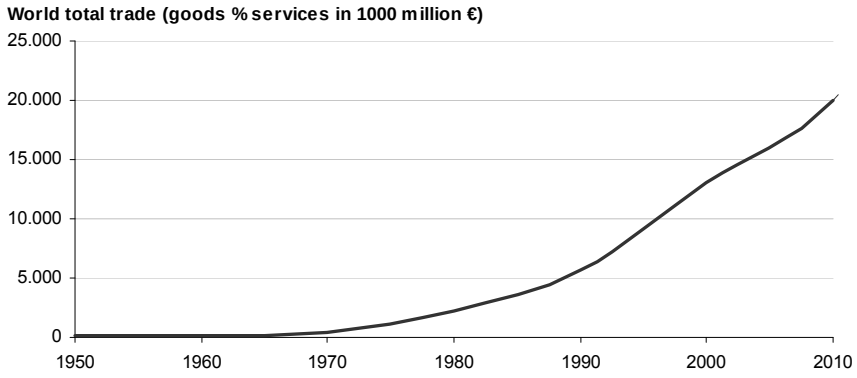
Source: United Nations – UNDESA (2011)



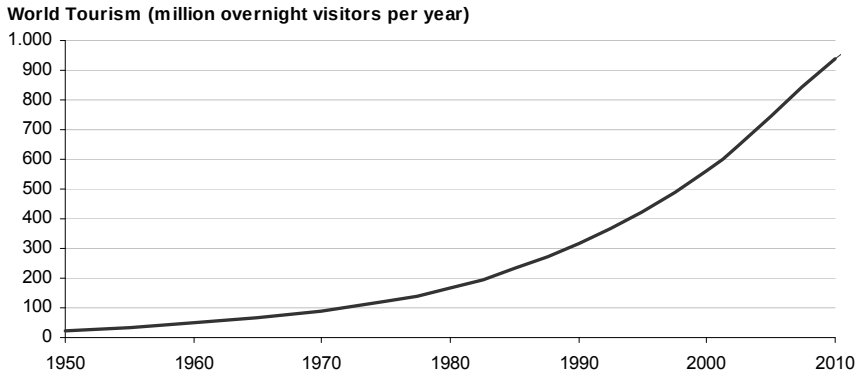
Source: United Nations – UNICEF (2010)



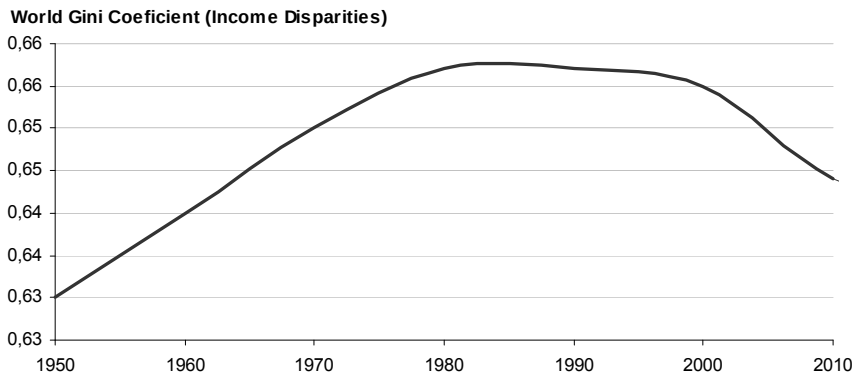
Source: World Bank – (A.Maddison 2007) // WB 2012)



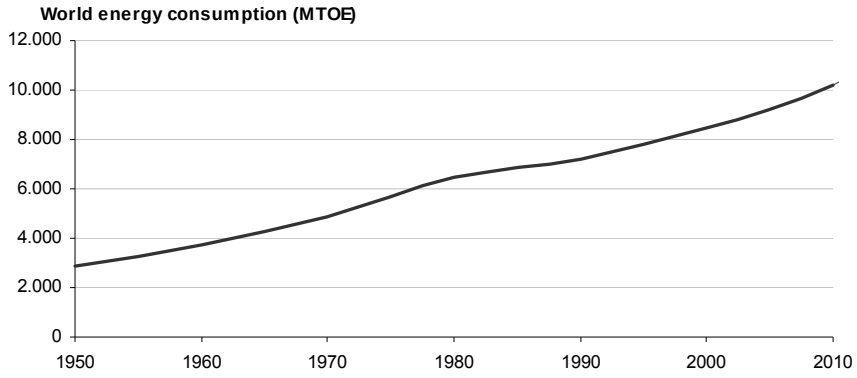
Source: United Nations – UNCTAD (2011)



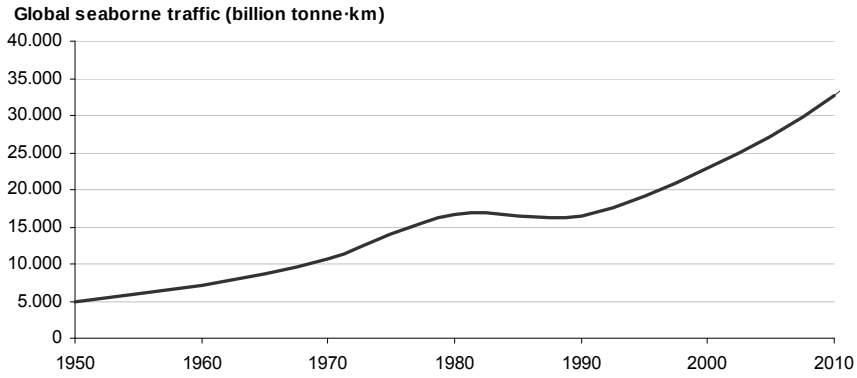
Source: United Nations, UNWTO (2012)



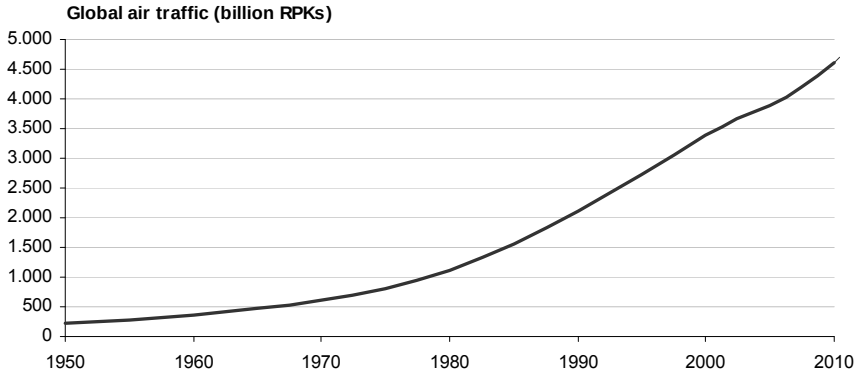
Source: Bourguignon/Morrison (2002)



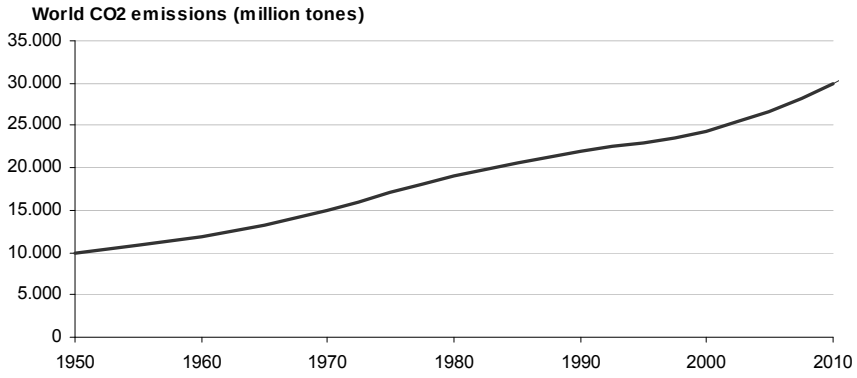
Source: British Petroleum – BP (2011)



Source: British Petroleum – BP (2011)



Source: British Petroleum – BP (2011)



Source: British Petroleum – BP (2011)

Figure 3-1 World Context. Evolutions for key variables 1950-2010

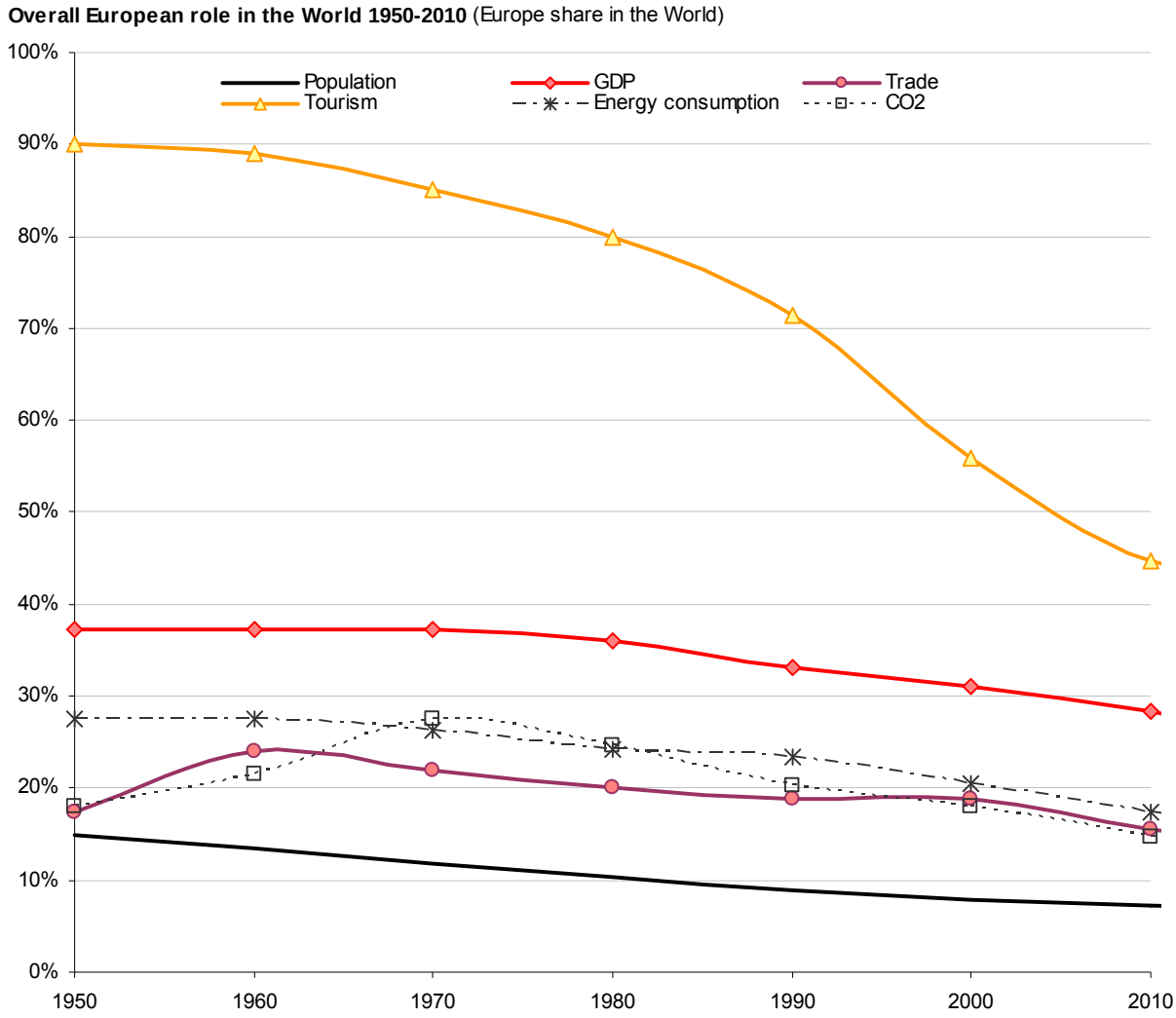


Figure 3-2 Europe in the World Context. Evolutions for selected variables 1950-2010

3.2 Analysis by sectors

The sectors considered are listed in the following table:

Sector
Demographic trends and potential territorial impacts in Europe
Economic trends and potential territorial impacts in Europe
Societal trends and potential territorial impacts in Europe
Technologic trends and potential territorial impacts in Europe
Energy trends and potential territorial impacts in Europe
Transport trends and potential territorial impacts in Europe
Land-use trends and potential territorial impacts in Europe
Environmental trends and potential territorial impacts in Europe
Governance trends and potential territorial impacts in Europe

Figure 3-3 Sectors considered by ET2050

The sectorial analysis (included as Annexes of this Interim Report) have been summarised in the next 125 key points. All points refer to 2012 unless stated otherwise.

Demography[20]

1. **Global growth**. Since the 1970's, the World population has been growing at a rate of one billion approximately every 12 years. A vast majority of population increase is confined to developing countries; the developed countries as a whole noted very small increases. The share of European countries' population in relation to the World's has decreased from 15% in 1950 to 7,5% in 2010.
2. **Low fertility**. In 2010 the total fertility rate (TFR) stood at 2,5 for the world but continental values varied substantially from 4,7 in Africa to 1,6 in Europe, and within Europe from 2,2 in Iceland, 2,1 in Ireland (the only two countries with above replacement fertility) to 1,3 in several states in Western Balkans and Eastern Europe.
3. **Longer life expectancy**. Life expectancy at birth of males in the ESPON countries is currently 76,2 years and females' is 82,2 years, with a trend towards a narrowing of the gap in life expectancy between both genders. In the countries in which the reduction in mortality was the most successful, life expectancy has been growing since it started to be measured in 1840s at the pace of around 2,5 year per decade. In Europe the regional distribution of life expectancy shows a clear East-West divide, with countries belonging in the past to the Soviet block lagging behind. South European and Scandinavian regions have higher life expectancy than other countries of the "old" EU.
4. **Aging population.** The old-age dependency ratio (ODR) calculated as the ratio of people aged 65 or above relative to the working-age population aged 15-64, is 22,4% on average in 2005. The implications of an ageing EU population will be substantial in the coming decades.
5. **Neighbouring countries and demographic pressures**. Eastern EU neighbours experience population decline (Russia, Belarus, Moldova, Ukraine) due to dramatic levels of mortality, especially in males, comparable to those observed in developing countries. Neighbouring countries in the south of the EU (the South and East coast of the Mediterranean Sea) experience population increases driven by fertility, young age structures and moderate mortality. The differences in population dynamics between the EU and neighbouring regions generate and will generate in future a pressure to emigrate from North Africa and the demand for migrants in Europe. However, for this category of migrants, a mismatch between supply and demand of skills is very likely and should be consider as a migration limiting factor.

[20] Demography building blocks have been put together based on ET2050 *Demography Sectoral Report* (CEFRM-IOM, 2012), and the following forecasts and reports:

- Rees P., P. Boden, A. Dennett, J. Stillwell, M. Jasińska, A. de Jong, M. ter Veer, M. Kupiszewski, D. Kupiszewska (2010) Regional population dynamics: a report assessing the effects of demographic developments on regional competitiveness and cohesion. Report on Deliverable 7. DEMIFER. Demographic and Migratory Flows affecting European Regions and Cities. Applied Research Project 2013/1/3. ESPON.
- Rees P., P. Boden, A. Dennett, J. Stillwell, M. Jasinska, A. de Jong, M. ter Veer (2010) Report on scenarios and a database of scenario drivers Deliverable 6. DEMIFER. Demographic and Migratory Flows affecting European Regions and Cities. Applied Research Project 2013/1/3. ESPON.
- EUROPOP2010 by Eurostat
- NIDI et al. (2010), *ESPON Demifer*, Espon Programme
- UMS RIATE et al. (2007), *ESPON Project 3.4.1,* Espon Programme
- Lanzieri,G (2011) *The greying of the baby boomers: a century-long view of ageing in European populations*, Eurostat Statistics in Focus 23/2011
- EC (2009) *2009 Ageing Report: Economic and budgetary projections for the EU27 Member States (2008-2060)*, Joint report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG);
- EC (2012) *2012 Ageing Report: Underlying assumptions and projection methodologies*, DG ECFIN and the Economic Policy Committee (AWG).
- UN (2010) *World Population Prospects: 2010 update*, United Nations Department of Economic and Social Affairs (UNDESA)
- UN (2011) *World Urbanisation Prospects: 2011 update*, United Nations Department of Economic and Social Affairs (UNDESA)

6. **International extra-European migration.** Two factors are dominant in the process of recruitment of extra-European migration: geographical distance and historical colonial links. The current economic crisis has reduced the inflow and in some cases even reversed the direction of flows, as for example in Spain which switched from a net gainer to a net loser.
7. **International intra-European Migration.** In the last decade the intra-European migration was dominated by East to West flows. Retirement related migration to sun-sea-sand areas played important role in the Mediterranean, but these flows are strongly affected by economic conditions and are currently subsiding. A substantial share of migrants moved to the largest cities, but it was quite characteristic that rural and peripheral areas also attracted some, a phenomenon not widespread previously.
8. **Internal Migration** Internal migration in ESPON member states is dominated by inflows to urban agglomerations, which have greater than proportional to its population gross internal migration.

Economy[21]

9. **European growth**. The European Union was growing around 2,5% right before the crisis, below the 3,2% of the US but above the 1,2% of Japan. Within Europe, the new 12 member countries have significantly outperformed the old 15 members, by almost 2%, a very significant difference but still insufficient to fill the gap between the two groups in terms of income per capita. The economic crisis has hit Europe even harder than the United States, and has also hit all countries of Europe but in much differentiated ways. The old 15 member countries of the EU have been hit significantly more than the new 12 member countries.
10. **Regional disparities**. Wide differences still exist among European countries in GDP using purchasing power parity, with the highest level in the Luxembourg at more than 270% and the lowest level in Bulgaria at less than 50%. There is still a dualism between the old 15 member states of the European Union and the New 12 member countries which have joined the EU in 2004 or 2007. None of the New 12 countries reaches the EU average.
11. **Employment rates**. They are around 65% of the relevant population on average in the European Union, a level very similar to the one of the United States. Differences between countries, however, are significant. Female employment rates are lower in Europe, about 5% less than the male counterpart, with a difference more marked than in the United States. The long term pattern of employment rates was stably increasing until the start of the economic crisis while with the economic crisis it bounced back. The employment rate of females is still 6% lower than the total one but there has been partial convergence.
12. **Unemployment.** The problem of unemployment has been made much more important by the economic crisis but the different European countries have labour markets with different capacity to produce jobs. At the EU 27 level the unemployment rate is now close to 10%, significantly higher with respect to a structural/frictional level. The total unemployment rate had been declining in the late 90s, then increasing slightly in the early 2000s and then significantly declining to about to around 7%, before growing steeply with the current

[21] Economy building blocks have been put together based on ET2050 *Economy Sectoral Report* (Politecnico di Milano, 2012), and the following forecasts and reports:

- EC (2009) *2009 Ageing Report: Economic and budgetary projections for the EU27 Member States (2008-2060)*, Joint report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG);
- EC (2012) *2012 Ageing Report: Underlying assumptions and projection methodologies*, DG ECFIN and the Economic Policy Committee (AWG).
- A. Maddison (2003) *The World Economy: Historical Statistics*, OECD.

economic crisis to values close to 10%. The economic crisis has hence been able to cancel the progresses of the previous 15 years. Female unemployment has slowly converged to the one of males, while the economic crisis affected young people significantly more than the others so that the difference with respect to the total rate is now the largest recorded in the time series. There is chronic employment in Southern Europe, e.g. around 10% in Spain (out from the total 23% unemployment) and 7,5% in France. The situation is critical in many other countries. Unemployment reaches almost up to 40% of youths in Southern Europe, even among well educated people, inducing new outwards migration.

13. **Productivity**. In average, between 1998 and 2011 productivity per capita grew 0,5% in the euro zone, against 2,5% in USA and 3,0% in Sweden. The total amount of worked hours by the European labour market is not significantly smaller than in the USA or Japan. Despite the fact that the number of hours worked per week and employee has dropped in Europe some 15% since 1980, the total labour input has remained stable. However, the level of investment on research and development and the training and professional qualification of the population is low, and the economic structure of many European countries is dominated by sectors providing low productivity, such as agriculture, construction, distribution or tourism. In countries like Spain, a large part of the GDP growth in the last 2 decades was mostly due to the increase on the number of workers, mostly emigrants, working on sectors with low productivity. In Poland, but also in some other countries in Europe, productivity in agriculture remains 20% below average.

14. **Research and Development**. Expenses on Research and Development are about 1,9% in the euro zone, against 2,6% in USA and 3,7% in Sweden. The relevance of sectors related new technologies is smaller in Europe than in USA (7% of GDP against 10%). The fragmented investments in Defense and Military-related fields by European countries, compared to the Chinese and USA integrated military programs, explain to a large extend the difference in publically financed research.

15. **North-South Structural Gap**. Still the Northern and Southern European regions have large differences on terms of their economic structures. After decades of transfers from northern to southern countries linked to Structural and Cohesion Funds, the North remains industrialised and technologically-oriented, while the South is even in a faster process of deindustrialisation. Employment in the industrial sector in Germany was reduced 10% in the latest ten years (mostly transferred to industrial-related business activities) while it was reduced by 25% in Spain (mostly due to the industrial delocalisation process; industries coming in the late eighties and nineties leaving to Eastern European countries such as Poland and Hungary, or to China, and to a some extend also to Morocco). Salaries in the industry use to be higher than in the low service sectors (e.g. tourism) and therefore also the consumption level in Southern countries tends to be reduced, or compensated by a higher level of private debt that recently achieved unsustainable levels. Economic gaps among more developed and less developed regions may remain, because of the likely reduction of financial transfers and solidarity between regions and countries at EU level, as well as Cohesion Policies, due to the financial shortage of National administrations.

16. **Public Debt.** The level of public debts in European economies has rapidly grown after the 2008 crisis, largely due to the need to guarantee the stability of the financial systems and cover unemployment expenses. Optimising the size of Public Administrations and improving their efficiency delivering added-value services remains as a key challenge for many countries.

17. **Private Debt.** Because salaries loose purchase power, consumption tend to be reduced for the majority of the population, except for the highest income group. The private debt accumulated during the latest years will tend to be reduced very slowly. After the introduction of the euro, largely because the monetary situation of Germany and the lack of proper

common fiscal regulation in Europe, private debt grew from 120% of GDP to 225% in Spain, from 170% to 250% in Portugal, from 150% to 330% in Ireland, and from 55% to 120% in Greece.

18. **Real Estate Speculative Bubble** has increased private debt two/three times faster that GDP. The ratio of loans that fail increased by 12 in Ireland from 2007 to 2010, creating an in-depth crisis in the financial system. The number of Real Estate properties in hands of banks has increased exponentially in the previous three years, and in many cases still their market values have not been reduced according to the crisis. The speculative Real Estate Bubble (e.g. Japan in 1993; USA and Europe in 2008) result from periods of fast growth, and very low interest rates, in contexts with relaxed land regulations. In Spain, 2012, there are approximately 1,3 million new houses and apartments, many in the hands of banks, along the coast, to be sold.

19. **Stable Inflation.** In the last decade, inflation has not been a problem for the European Economy, after the creation of the euro and the European Central Bank. In the near future a small inflation may be even beneficial to finance debts and stimulate exports sensitive to the rate change. A strong value for the euro together with austerity measures reinforces the recession.

20. **Trade**. Global trade has increased by 2.000% since 1950. EU trade in 2010 is six times greater than in 1980. EU trade in 1980 was already six times greater than in 1970. Exports and imports account for around 40% of EU GDP in average. Most important trade partners are USA (18% of exports), China (8,4%) and Switzerland (7,8%). There has been a replacement of the USA with China as the main exporter towards Europe, while European exports are still mainly towards the USA. The comparison of Chinese figures against USA and, specially, Switzerland clearly indicates the growth potential for trade growth.

21. **Trade by sector.** With the increasing demand from emerging economies, the demand and price of raw materials and fuels have been high and growing. Because raw materials and mineral fuels have considerably increased their share on European imports and represent 5% of GDP approximately, if the pattern of increasing prices continues, this may result in a lost of growth in EU GDP. On the other hand, energy efficiency could limit the impact of these increases.

22. **Global Finances**. Global finances have grown much faster than trade, in an unregulated process, often creating unstable dynamics (e.g. crisis in Asia in early nineties, crisis related to subprime in 2008). Paradoxically, developing countries such as China, that have strict regulations for the use of international private funds to finance their growth, used to transfer public savings to finance Western public debts; at the same time, private savings and private direct investments in Western countries have been increasingly transferred to developing countries where more business opportunities exist in the coming years.

Society[22]

23. **Hours worked.** Total number of hours worked per employee and year has declined over time. In 2010, Europeans worked on average 1.746 hours per year, while in 1980 they

[22] Society building blocks have been put together based on ET2050 *Economy Sectoral Report* (Politecnico di Milano, 2012), and the following forecasts and reports:

- EC (2009) *2009 Ageing Report: Economic and budgetary projections for the EU27 Member States (2008-2060)*, Joint report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG);
- EC (2012) *2012 Ageing Report: Underlying assumptions and projection methodologies*, DG ECFIN and the Economic Policy Committee (AWG).
- EC (2012) *Active ageing and solidarity between generations: a statistical portrait of the European Union 2012*, Statistical Books, Eurostat

worked 2.000 hours. In most advanced economies, like Germany or France, people work today around 1.500 hours per year.

24. **Women Labour.** The participation rate in the European countries (of people aged 15 to 64) is at 70.6% (2007), and for the euro area at 70.8%. Man and woman participation rates converge, but still there is a 6% difference on average with important geographical differences (e.g. Northern Europe and Southern). Since the 70s, the social ideal of women working at home has been replaced by a more flexible balance between work and family. Today, half of western women go to work. This development calls for new employment models and will have a significant influence on values in the years to come.

25. **Retirement Age.** The legal retirement age is currently established at 65 in most European countries, but the average retirement age of European population is 61,2. More flexible work places and schedules in a more service-oriented and knowledge-based economy allow for longer careers in some cases, while pre-retirements on the other hand are applicable already in the mid 50s.

26. **Service-oriented jobs**. European countries' economy is more and more dependent on services and advanced tourism. Advanced personal services in health and education represent an increasingly important economic activity. In 2010, the weight of services in the European economy is 79,5%, while in 2000 it was of 75,3%. The weight of services may still increase in the future.

27. **Entrepreneurship** remains lower that in emerging economies, but the number of people working free-lance grows. Most new companies are started by individuals 25-44 years of age, and the shrinking share of this cohort will also mean less entrepreneurship and reduced innovation.

28. **Youngster Employment**. Too many young people today leave school early, increasing their risk of becoming unemployed or inactive, living in poverty and causing high economic and social costs. Unemployment is currently high among young graduates from different levels of education and training. Indicators for youth labour market performance do not fully capture that an astonishing 15% of European 20-24 year olds are disengaged from both work and education (NEET youth: neither in employment, education or training) and risk being permanently excluded from the labour market and dependent on benefits.

29. **Consumption Patterns**. 55% of GDP is produced by household expenditures (gross fixed capital formation is 22%). Consumption is recently tending to be reduced and focused on low-cost products, for most people, but also to more luxurious products and services for the wealthier elite. Also, more environmentally sensitive consumption is being perceived. Changes in consumption patterns often happen linked to new generations.

30. **Income Disparities**. In the latest 20 years disparities have increased in most European countries, as well as in other developed and emerging countries, even if disparities at country level have been reduced globally. Slums and conflicting neighbourhoods still exist in large advanced European metropolis, such as Paris or London.

31. **Global Middle Class** is emerging worldwide, approximately 100 million per year (according to Goldman Sachs), and their consumption level is also rising. The gap in GDP and welfare between European countries and emerging developing countries worldwide is getting reduced.

32. **Single Households.** Due to population ageing, the number of single and two-person households has already increased considerably, and was potential to continue to do so towards 2030 and 2050. About one third of people are currently living in single-parent families. In 2010, average household size in the EU is of 2,3 persons, while in 1990 was of 2,7.

33. **Internet Users**. There are more than 250 million daily Internet users in Europe and virtually all Europeans own mobile phones. This has changed lifestyle. It will be challenging for business and other organizations to find new ways of work-life integration. The increasingly free production and access to information content will challenge the traditional business model in many sectors, particularly in the creation of added value.

34. **eLearning**. The education system remains to be adapted in many European countries to the requirements of the emerging economy, favouring more pro-active and collaborative, creative and entrepreneurial competences in students. Links between universities and corporations remain weak. Knowledge-based economies require lifelong education that hardly formal system can deliver. Education systems are currently adapting only slowly to the learning society. European systems have been slow to respond to the requirements of the knowledge society, failing to adapt curricula and programs to the changing needs of the labour market.

35. **Multiple Identities**. Identities attached to the territory gain importance, leading to selected closure from foreign activities and cultural influence, excepts in cosmopolitan centres, that attract educated globally-minded youth. Informal relations still dominant in peripheral and less developed zones and conflictive neighbourhoods. Face-to-face relations remain important, even though Virtual Communities are further expanded. New Communities emerge related to projects and interests, not just religious or family.

36. **Cultural Diversity**. Migration in the EU largely comes from North Africa, the Near East and South America. An increased protectionism and self-sufficiency in wealthier communities can be already perceived. The number of languages spoken in Europe tends to get reduced. Only 2% of Europeans live and work in other European countries. Cross-border short-distance traffic remains marginal. International relations between European countries grow less than could be expected, given the geographic proximity and the common market, in relation to the growth of traffic between European countries and countries outside the EU27.

37. **Rigid Social Institutions.** Rigidity in social institutions, resistant to change. Political parties, Trade Unions, and other social institutions are challenged by emerging more active minorities.

38. **Security Society.** Protection against crime is a fundamental governmental task, as well as reducing social anxieties and hysteria in relation to external risks. New ICT will provide more safety at the extent of invading personal privacy, moving towards a radical transparency.

39. **Productive Agriculture**. Within the food sector, the most influential trend is that the global food prices are growing in real terms, as a result of growing world population, rising affluence, and the shift to Western dietary preference. This can place more pressure on water for agriculture. The strongest effect of high food prices is that the poorest countries may not be able to afford decent food or the minimum to maintain its basic needs for survival. One important trend is the increase of local markets for agricultural products sensitive to ecological higher quality. This brings higher level of self-sufficiency at local and regional level. This trend is closely related to trend 46 (food and water security).

Technology[23]

40. **R&D expenditure.** The EU2020 strategy has set up the target of attaining a 3% GDP yearly investment in R&D by 2020. Today, the EU is spending 1,9% of its GDP for research and

[23] Technology building blocks have been put together based on ET2050 *Technology Sectoral Report* (MCRIT, 2012), and the following forecasts and reports:

- Wintjes,R., Hollanders,H. (2010) Regional impact of technological change in 2020, European Commission (DG Research & Innovation)

development compared with America's 2,6%, and the US has twice as many scientists and engineers per million people as the EU, and scientific brain drain from Europe to the US continues. China's will become the 2nd largest R&D power in the World in the mid 2010s well ahead of major EU Member States, and with efforts focussed in most promising cutting-edge areas. Overcoming the missing link between research and development-deployment in Europe is key to future development.

41. **Regional Innovation.** Progressive convergence for public R&D expenditures in EU Member States (catching up in patent inscription by lagging regions), but industry based R&D increasingly concentrated in few selected locations (densely populated metropolitan areas in Western Europe). Some regions perform well at accessing, absorbing and diffusing knowledge even when they have limited knowledge creation capacities, while traditional regions are set to improve education to increase their absorption capacity.

42. **Healthcare Technologies**. Progress in biotechnology, genetics, stem cell research, tissue engineering and nanotechnology, as well as personalised medicine, advanced prosthetics and anti-ageing medicine is believed will have a huge impact in human life span. Nanomachines allowing precision interactions with nanoscale objects will be used to identify and destroy cancer cells not long after 2020. Stem cell therapies will go beyond already existing therapies to treat a wider variety of cancers, Parkinson's disease, spinal cord injuries, sclerosis and muscle damage. Developments in prosthetics and implants are to increase the quality of life of disabled and elderly.

43. **Social Networking**. The vision of "ubiquitous computing" defined by Weiser in 1993 is already in force through smart phones. Social networking and virtual communities based on hobbies, work and cultural affinity will create bonds as important as those attached to the territory, and geographic proximity. People in networked societies live and work in multiple sets of overlapping relationships, cycling among different networks. Social capital will thrust due to complementarities of relational networks, despite the fact that people may be physically dispersed and do not know one another.

44. **Virtual Reality.** Augmented reality results from the combination of virtual and real objects in real environment fully integrating virtual content with the real world. Telepresence combines software, video, audio, screen and networking technologies to create a collaborative experience that is as close to a face-to-face physical meeting as it gets, allowing to reduce travel needs.

45. **Smart Cities and Housing**. The new intelligence of cities resides in the increasingly effective combination of digital telecommunication networks, ubiquitously embedded intelligence, sensors and tags, and software. Residential users may control their environment through the service interface of the gateway that is able to get connected with any type of home terminal, like e.g. wireless PDA, embedded devices. Electric intelligent transport vehicles, of individual use and collective property of management will change the way we move in the city. The most dramatic general effect of digital telecommunications is to create new kinds of interdependencies among scattered regions and settlements. The proliferation of nested smart cities and smart places connected to global networks will eventually produce new types of urban tissue which in the long term will radically reshape our cities. This trend is related to trend 79 (intelligent vehicles)

46. **Food and Water Security.** Urban agriculture in the future can be developed in vertical structures thanks to techniques such as hydroponics or aeroponics, methods of growing plants using mineral nutrient solutions, in water or aerosols, without soil, allowing for lower water costs, lower nutrition costs, no nutrition pollution, lower risk of pests and stable and higher yields easier to harvest. Desalination is one of the most obvious technological advances in relation to access to 'new' water resources, used mainly in arid and semi-arid areas (today 50% in the Gulf, 16% North America, 13% Europe, 11% Asia, 5% Africa and 3%

the Caribbean). This trend is closely related to trends 39 (productive agriculture), 104 (water stress), and 106.(organic farming).

47. **New Materials.** Demand is increasing fast for a series of critical raw materials driven by the growth of developing economies and new emerging technologies. Materials can enable industrial and commercial success for both existing and not-yet existing products and processes: they may introduce new functionalities and improved properties adding value to existing products and process representing an invisible revolution. The engineered production of materials by design might allow the development of products and processes under a really sustainable systemic approach. This trend is closely related to trend 108 (resources scarcity).

48. **Environmentally Friendly Vehicles**. Before people drive advanced electric cars, hybrid vehicles using a combination of fossil fuels and other sources are helping to bridge the gap between conventional gasoline engines and the cleaner hydrogen vehicles of the future. Hybrids may account in 2015 for 2% of total cars in Europe, 6% in the US and 8% in Japan. Hydrogen vehicles built on fuel cells are potentially highly energy efficient, but technical obstacles still exist regarding their development mainly due to fuel cell costs and hydrogen production costs (and emissions), freezing conditions, service life. In urban environments, smaller and cleaner vehicles are to spread guaranteeing very high levels of personal mobility at low costs and impacts.

49. **Renewable Energy Sources**. The use of RES has been growing fast in the last decade: wind energy and solar photovoltaic are the most developed. Biochar, created when biomass is heated to high temperatures under low oxygen concentrations offers a CO2 emissions zero balanced combustion source based on recycling urban waste. This trend is closely related to trend 61 (decarbonisation).

50. **Biofuels**. The EU has a significant potential for the production of biofuels but it is estimated that between 4% and 18% of the total agricultural land in the EU would be needed to produce the amount of biofuels to reach the level of liquid fossil fuel replacement required for the transport sector in the Directive 2003/30/EC. This trend is related to trend 79 (intelligent vehicles)

51. **Nuclear Energy**. Nuclear fusion is an attractive long-term energy solution, although it is unlikely that the technology will be ready for commercial power generation in the near future. Nevertheless, fusion energy has made significant progress over the last few decades and is now considered as a credible option for clean, large-scale electricity generation. This trend is closely related to trend 64 (phase-out nuclear energy).

52. **Grid Energy Storage** refers to the methods used to store electricity on a large scale within an electrical power grid. Electrical energy is stored during times when production exceeds consumption and the stores are used at times when consumption exceeds production. In particular, the use of grid-connected intermittent energy sources such as photovoltaics and wind turbines can benefit from grid energy storage.

53. **Carbon Capture**. Carbon Capture Storage (CCS) is a group of technologies for capturing the CO2 emitted from power plants and industrial sites, compressing CO2 and transporting it to suitable permanent storage sites such as deep underground. First commercial plants are beginning to operate. CCS can provide the main means of curbing emissions from heavy industrial sectors such as steel, cement and refineries, which together account for around 10% or 15% of Europe's CO2 emissions. Plankton blooms in the seas achieved by seeding oceanic waters with iron have been proposed as a Carbon Capture solution considering that when the planktons blossom they consume carbon dioxide but at the end of the growing phase, dead plankton sinks to the bottom of the Ocean requisitioning consumed CO2 for several centuries.

54. **eGovernance**. The rush by government agencies worldwide to embrace the associated technologies collectively known as Web 2.0 has opened up a number of dazzling new ways citizens can participate in the public sector. Prodded by this private-sector groundswell and by the successful use of these technologies in election campaigns, local, regional and national governments are now focusing on Web 2.0 as they develop more accessible services and an array of participatory public platforms.

Energy[24]

55. **Energy Intensity** (energy consumption in relation to GDP), tends to decrease overtime in Europe due to changes in the economic structure (relative de-industrialisation, more service-oriented activities) and efficiency improvements. It varies between European countries, being higher in Eastern European countries. Since GDP will tend to grow in a long-run, it is expected that European energy consumption will rise at a relatively lower level. In 2008, Ireland and Denmark are the Member States with the lowest energy intensity (respectively 107 and 103 kgoe/€1000 GDP), followed by United Kingdom, Austria and Italy. Bulgaria, with more than 5 times the EU average, has the highest energy intensity, followed by Romania. Ireland and United Kingdom have decreased energy intensity by more than 20% between 2000 and 2008, which is the most important decrease in EU-15 countries.

56. **Energy Demand.** Over the last twenty years, global energy demand has increased by around 40% around the world, so an average of 1,5% a year, but only a 5% in Europe. The vast majority of the energy consumption growth is coming from non-OECD countries such as China, India, etc. From 4.900Mtoe in 1971 energy demand grow to 10.200 Mtoe in 2010 in the World, from 1.300 Mtoe in 1971 to 1.764 Mtoe in 2010 in Europe.

57. **Energy External Dependency.** EU energy dependency tends to increase: from 47% in 1980 to 57% in 2010. 83.5% of oil and 64.2% of gas was imported in 2009. Oil and gas from the Atlantic North will be increasingly used to reduce dependency from Russia and Arab countries major providers.

58. **Energy Prices** (oil, gas) may experiment erratic patterns year to year, even if they tend to rise overall, because markets segments will become more speculative and unreliable, more diversified demand and supply. Peaks on energy prices will be an incentive to adapt consumer behaviours to reduce energy demand and induce more effective uses, as well as to progressively implement new technologies, such as the Electric Grids (trends 52 and 63), allowing a more decentralised production and more efficient management of resources. This trend is closely related to trend 80 (transport prices).

59. **Oil Production Peaking** due to the progressive depletion of numerous large oil fields. Forecast vary from more optimistic 101,5 Mb/day in 2030 (by the International Energy Association) to 75,8 Mb/day as maximum level. Oil prices, in speculative markets, will continue to be unstable. This trend is closely related to trend 108 (resources scarcity).

60. **Coal Reserves.** European coal reserves are just 5% of the total estimated World level, in Poland, Germany, Czech Republic, Greece and Hungary. Deposits are expensive to exploit due to their depth. This trend is closely related to trend 108 (resources scarcity).

[24] Energy building blocks have been put together based on ET2050 *Energy Sectoral Report* (TERSYN, 2011), and the following forecasts and reports:

- EC (2009) EU Energy Trends to 2030. Update 2009, European Commission DG Energy in collaboration with DG for Climate Action and DG for Mobility and Transport; EC (2010) Priorities for 2020 and beyond – a blueprint for an integrated energy network European Commission DG Energy
- BP (2011) *Statistical Review of World Energy 1965-2010*, British Petroleum BP.

61. **Decarbonisation.** According to 2008 data, 10,3% of EU energy consumption comes from renewable energy sources. There are big differences among Member States: Sweden and Finland have a share of more than 30%, while 7 member States (Belgium, Cyprus, Ireland, Luxembourg, Malta, the Netherlands and United Kingdom) have a share of less than 5%. Onshore and offshore wind energy potential is high in the Baltic, and North Atlantic. Solar-thermal energy has potential especially in the South of Europe, as well as solar-photovoltaic energy. In 2008 four Member States had a share of wind power on total electricity of 8% or more: Denmark (18.3%), Portugal (10.4%), Spain (9.9%) and Ireland (8%). This trend is closely related to trend 49 (renewable energy sources).

62. **Hydrogen Energy Carrier**. Hydrogen will be developed as new energy carrier allowing for better energy management.

63. **Electric Grid**. The interconnection of all electricity networks is a strategy of the EU. The interconnection of networks is to allow redistribution of renewable energy production all around. Intelligent and decentralised electricity networks will be developed on the long-run. Houses, facilities, vehicles, will be able both to consume and produce energy to be distributed. This will induce more self-sufficiency at different levels, resulting in a better management of demand peaks and probably moderating or reducing the tendency of energy prices to rise. Transport represents 33% of energy consumption in Europe. Increasing energy prices will result in higher transport costs that will mostly affect peripheral regions depending on long-distance transport. This trend is closely related to trend 52 (energy grid storage).

64. **Phase-out nuclear energy**. Germany, Belgium and Switzerland recently decided to phase-out nuclear energy, with France still having a different policy. Nuclear energy accounts for about one third of EU electricity production and 12% of EU total energy consumption. Nuclear power is a low-carbon energy source with no direct CO2 emissions, but it has obvious environmental and health risks. This trend is closely related to trend 51 (nuclear energy).

65. **Carbon taxes**. May affect the profitability of energy-intensitive industries.

Transport[25]

66. **Flows at World Level**. Transport and communication technologies have facilitated the development of efficient and relatively inexpensive logistic chains at World level over the last decades, inducing the delocalisation of European industries towards developing economies, especially in Asia. The flows of passengers and containers have continued to grow in the World exponentially in the last 20 years. The civil aviation traffic (in RPM) grew in the world by six times between 1970 and 1990, and air trips between Europe and the rest of the World grew by 3,5% yearly during the decade of 2000. The world merchandise maritime trade multiplied by 2 between 1995 and 2005, well above global GDP growth which was around 30%. The strongest growth has been with the Asia region and between the large emerging economies (BRIC) and Europe and North America. The transatlantic maritime freight has already become less important, and larger European ports situated in the North may face increasing competition from Mediterranean ports in the routes Asia-Europe-North and South

[25] Transport building blocks have been put together based on ET2050 *Transport Sectoral Report* (S&W, 2012), and the following forecasts and reports:

- EC (2011) *Impact assessment of the 2011 transport White Paper* (SEC(2011) 358 Final)
- EC (2009) *EU Energy Trends to 2030. Update 2009*, European Commission DG Energy in collaboration with DG for Climate Action and DG for Mobility and Transport; EC (2010) Priorities for 2020 and beyond – a blueprint for an integrated energy network European Commission DG Energy
- Mcrit et Al. (2009) *Mobility scenarios towards a postcarbon society*, Task 2 Quantitative Scenarios deliverable of TRANSvisions study co-ordinated by Tetraplan for EC DGTREN.

America. This evolution is likely to continue at a more moderate speed in relation to Asia, and more accelerated with Africa and South America.

67. **EU passenger transport growth.** While daily commuting trips have a trend towards progressive stabilisation in Europe (decoupling from economic growth) long-distance passenger transport (business, personal visits and leisure trips abroad) grow very faster. Passenger·kilometres (pax-km) of trips with neighbouring countries grow at 6% annually, increasing their share in total EU27 pax-km from 3% to 9%. Even for long-distance transport, the elasticity to GDP will be smaller for intra-EU27 trips (less than 1.3% per year for EU residents, and 1.45% for non EU residents) than for international travel (2.1% per year). Passenger traffic grows following the travel time and budget constraints (approx. 15% of personal available income allocated in transport, in average, no more than 1 hour/day per person, in average, all trips together). Depending on GDP per capita, and the evolution of transport costs and average transport speed, passengers will travel more or less in the future (in pax-km), reflecting the fact that personal mobility is not purely driven by economic aspects. Shrinking EU population in several countries (e.g. BG, DE, EE, LV, LT, HU, RO) and rapid ageing in most countries can also have an effect on moderating passenger transport growth in certain regions.

68. **Short and Long-Distance Trips**. Urban, and Domestic transport growth is lower than long distance. While urban transport is already decoupled from economic growth, the number of long-distance trips inside Europe, and outside, keep growing and the average passenger trip becomes longer. Pax·km are therefore expected to grow faster than trips (+60% elasticity) with increasing average trip lengths.

69. **Trip purposes.** The shorter, regional, distances are divided in equal parts between commuter, private and holiday. Private and business gain importance at national level while long-distance transport is dominated by holiday trips. More diversity of trip purposes as well as dispersed origin and destinations are expected for long-distance transport.

70. **EU freight transport growth**. Freight transport has grown above economy during the last decades. In 2005, the traffic between the EU27 and the rest of the World represented 86% of the total freight traffic generated or attracted by the EU27 (tonnes-km, including freight to overseas), and only 14% was traffic intra EU27. In 2005, 35% of inland EU27 freight traffic was imports or exports from overseas, with an increasing trend. European ports and freight corridors near large ports and urban centres are increasingly busy. While many European ports are widening their infrastructure, the connections to their hinterlands need be upgraded by dedicated freight services to improve their efficiency, mostly by rail in the short term.

71. **Road traffic** is the dominant transport mode. In 2005, road traffic represented 87% of passenger traffic, pax-km not including trips to overseas. It is expected that the road freight market, being extremely competitive, will be able to take advantage of technological innovation faster than other modes, if properly regulated.

72. **Rail traffic.** High-speed rail has introduced a new formerly not existing level of surface transport. Since 1990, the volume of high-speed pax·km has increased by a factor of more than six and represents in 2010 more than 25% of total rail travel (although air travel is still six times larger). Rail passenger has a share of 10% for long-distance inter-NUTS3 trips in 2005, and rail freight growth between NUTS3 a share of 24%.

73. **Short sea shipping.** It is expected that SSS will continue to grow in Europe as much as overseas traffic. Transhipment hubs and secondary ports in Europe may become more important in their regional hinterlands.

74. **Intercontinental Air Travel**. With an increasing number of mega-cities in the world, intercontinental travel has a global trend towards increase of RPKs, especially for hub to hub relations and for feeder services. The number volume of RPKs inbout or outbound from

Europe increased from 450 billion in 2000 to 662 billion in 2010. The number of available seat kilometres (ASK) hub to hub, and for feeder flights in the world has multiplied by 9 between 1972 and 2006, from approximately 20 billion ASK to 180, while the number of ASK between secondary airports over the same period has only doubled, from 5 to 10 billion ASK. However, the growth of LCC in regional markets has been very important in the last 15 years.

75. **Integrated Networks**. More productive long-distance transport and communications services connecting some selected nodes in Europe to premium Global nodes. Given the relatively high urbanisation of Europe, transport infrastructures in Europe can not be expanded easily in the next decade, especially in the central regions, or around major cities and metropolitan areas, at a reasonable economic and environmental cost, even if they are very congested. Because of this, achieving productivity gains in the transport sector and avoiding the increase of congestion costs above the present 1% of GDP, or reducing it, will be increasingly important. New materials and more efficient construction processes may allow for specialised transport infrastructures adapted to new type of vehicles, even in city centres, such as car parks and special urban tunnels for electric vehicles that are driven automatically when travelled across.

76. **Specialised Modes**. Air and roads will still be the dominant transport modes, Rail is mostly focused on inter-city fast services for passengers, commuting and dedicated lines for freight transport connecting larger European ports. As recognised by the European Commission, there needs to be a focus on strategic, multi-modal “core networks” that can be funded and will be able to handle the major share of the future growth and transport tasks.

77. **Infrastructure Construction**. The rapid economic growth in developing economies create a huge demand for all kind of infrastructure, that also generates more development. At global level, investment needs across key sectors telecommunications, airports, ports, road, rail, electricity, oil and gas (transmission and distribution) and water infrastructure – are likely to total around 2.5% of world GDP over 2010-2030. National frameworks need to highlight the importance of strategic infrastructure.

78. **Transport Planning**. Achieving integrated and sustainable urban transport is an increasingly complex task which touches many stakeholders and interests. A greater coordination of all authorities having an influence on the transport system is highly desirable but is not likely to be accomplished. National infrastructure planning remains to a large extent disconnected from planning at EU level. National and European infrastructure projects have largely focused on developing individual priority projects rather than on creating a network.

79. **Intelligent Vehicles**. Electric intelligent transport vehicles, of individual use and collective property of management will change the way we move in the city. The difference between private and public transport modes will tend to disappear. Online pricing and traffic management will make the current divide between scheduled, collective transport and individual vehicles much smaller. It therefore makes sense that the categories we use today as “transport modes” may not even be relevant in forty years. Fossil fuel-based vehicles may likely improve their efficiency 12%, and non-fossil fuel-based vehicles share will rise to 4.5% in 2020. Thirty years later, these figures may be 39% and 22%, respectively. This trend is closely related to trends 45 (smart cities), 50 (biofuels) and 102 (urban pollution).

80. **Transport Prices** With energy prices including sensitive year to year fluctuations due to speculative and unreliable markets, peaks on energy prices will be an incentive to adapt consumer behaviours. However, overall transport prices will tend to increase only marginally, internalising environmental costs, and following deterritorialised patterns. Flows increasingly permeate political borders. Transport policies do not achieve the goals of liberalisation of markets, and transport infrastructure follow a mix of nation-building strategies and social and economic profitability. This trend is closely related to trend 58 (energy prices).

81. Taxes on oil in 2005 represent roughly 2% of the GDP. In the long term, as oil become less used in transport, other alternative fiscal revenue generation systems will be needed. A couple examples of these are online pricing based on the actual use of infrastructure and transport services, which is more likely to induce demand self-organisation than oil taxes. In a number of scenarios studied the reduction in public revenue from oil taxation happens very rapidly. This is as an area of opportunity in political terms, since more effective taxation systems can be implemented. Regional traffic inside NUTS3 generates 41% of road emissions in 2005, so a reduction of 50% of urban emissions would yield a 19% reduction in total direct transport emissions.

82. CO2 emissions. In 2010, transport uses 32% of all final energy consumption in the EU27, and energy consumption in transport has grown by 33% between 1990 and 2008. The share of unconventional vehicles (hybrids, electrics…) in the road sector was in 2000 only of 0,5%, and in 2010 of 4,2%. Transport today accounts for about one fourth of total CO2 emissions (1050 million tonnes emitted in 2010, 29% above 1990 levels). The higher cost of abating emissions in the transport sector makes that potential for decarbonisation of transport in the short term is relatively low. However, the average level of emissions per new vehicle in the road sector has dropped from 172gr/km in 2000 to 140gr/km in 2010 (19% decrease). This trend is related to trend 100 (green house gas emissions).

83. Externalities. The number of road fatalities has had a decreasing trend in the last 40 years. In 1970, the number of deaths in European roads is estimated on around 110.000 deaths per year. Between 1970 and 2000, the number of fatalities decreased around a 20% per decade (down to 56.500 deaths in 2000) but between 2000 and 2010 there has been almost a 40% drop, attaining 35.000 deaths per year level. It is an objective of the EU that the number of fatalities in the road sector gets reduced by 50% by 2020, and to almost eliminate road fatalities by 2050.

Land-Uses[26]

84. Types of Land-uses. The three largest land types in Europe are forests (35%), arable land and permanent crops (25 %), and pastures and mixed mosaics (17%). About 4% of Europe is covered by artificial surfaces.

85. Population density. Europe has the highest overall population density (60 inhabitants/km2) of any continent, but huge disparities in population density exist. Of the total European population, 73% lives in urban areas, with 67% in southern Europe and 83% in northern Europe. In 2010, urban population represents 73% of total EU27 population against 69% in 1990 and 55% in 1950.

86. Land occupation. Structure and distribution of transport and urban infrastructure lead to the fact that 30% percent of EU27 land is highly or very highly fragmented. As a result of increased fragmentation, 70% of species are threatened by loss of their habitat, an extraordinarily high proportion. The consumption of ecosystem services, which is unsustainable in many cases, will continue to grow as a consequence of a likely three- to six-

[26] Land uses building blocks have been put together based on ET2050 *Land uses Sectoral Report* (RIKKS, 2012), and the following forecasts and reports:

- IGEAT et al. (2006) *Spatial Scenarios and Orientations in Relation to the ESDP and Cohesion Policy* final report of the ESPON 3.2 Project.
- J.Robert (2010) *Synthesis of the 15th CEMAT National Reports*, document prepared for the 15th Council of Europe Conference of Ministers Responsible for Spatial/Regional Planning, CEMAT/CoE
- EEA (2011), *The European Environment – State and Outlook 2010 (SOER 2010)*

fold increase in global GDP by 2050 even while global population growth is expected to slow down. This trend is closely related to trend 105 (land consumption).

87. **Urban Sprawl**. After the industrial revolution, the perceptions of cities as "spaces of risk" prevailed in British and some other European cultures, and the escape to the countryside was sought by those who could afford it. By contrast, Southern European -Mediterranean- societies have portrayed cities as spaces of virtue, attraction, culture and creativity, and the affluent social classes chose to live closer to the historic core. Therefore (according to URBS PANDENS[27]). Cultures of urbanism in Southern Europe have created compact cities in combination with infrastructure-related urban sprawl after long periods of informal suburbanisation as a means to survival. Cultures of anti-urbanism in North-West Europe created lifestyle-related urban sprawl. More affluent residents are recently moving to their second homes in rural areas due to increase of tourist and entertainment industry, traffic congestion in inner-city areas. State controlled /induced sprawl in Central and Eastern Europe has deconstructed the compact city/pastoral landscape dualism through the development of new suburban landscapes, which are usually not only residential after 1990s. The role of central and new local governments (municipalities, regions) with regards to the sprawling process varies between and within Central-East and South-East European societies (e.g. illegal sprawl). This trend is closely related to trend 105 (land consumption).

88. **Forest Expansion**. An expansion of forest is expected due to a declining agricultural area and policy incentives at various levels. Decrease of agricultural area is assumed in relation to to global competition and tighter environmental constraints, and partially also due to improvements in agriculture productivity. European cropland is expected to decrease by 2080 between 28% to 47% and grasslands between of 6% to 58%.

89. **Agricultural Uses**. 36% of European land is dedicated to agriculture. Europe is one of the World's largest and most productive suppliers of food and fibre (in 2004: 21% of global meat production and 20% of global cereal production). About 80% of this production occurred in the EU25. The productivity of European agriculture is generally high, in particular in Western Europe: average cereal yields in the EU are more than 60% higher than the global average. Current land-use practices, dominated by concentration and specialisation, and abandonment of land, both result in landscape polarisation that often leads to a reduction in landscape diversity and its multi-functionality — its capacity to support multiple uses (Selman, 2009). Over-specialised lands that optimise one function, such as crop production, at the expense of others are stable only in a narrow span of conditions and can become more vulnerable to diseases, climatic extremes, invasive species and other factors (Foley et al., 2005)

90. **Environmentally Protected Areas**. At the end of 2009, 17,6% of the terrestrial area in EU27 was part of Natura 2000, i.e. around 755.000 km2; further increasing compared to 17% in 2008. Slovenia and Bulgaria are the countries which rank first, with a share of more than 30% which is around twice the EU average. Spain and Slovakia follow with a share of around 29%. Spain accounts for more than 19% of the EU's Natura 2000 terrestrial area, with a surface of almost 145 000 km2. Compared to 2008, in 2009 Spain, Poland and Germany have the most significant increase of the Natura 2000 terrestrial area (by adding 10 000 km2, 9 000 km2 and 6 000 km2 respectively), while Romania and Sweden have decreased their own surface of Natura 2000 protected areas.

91. **Hybrid Geographies.** Europe has a diverse mix of land-use patterns, from compact cities and specialised zones around transport nodes, to more disperse urbanisation, for instance along the Mediterranean coasts, fragmented and specialised developments in a general

[27] URBS PANDENS, *Urban sprawl: european patterns, environmental degradation and sustainable development*, was an EU funded project developed between 2002 and 2005 by a consortium of 8 institutions leaded by the Potsdam Institute for Climate Research (PIK). The project was concerned with cross-European patterns of urban sprawl.

tendency towards more relaxed land regulations and increasing land occupation, excepts in countries with strict anti-sprawl regulation. Large parts of Europe become periurban, a "Middle Landscape" largely composed by fuzzy urban-rural zones, with urban developments extensions customised to specific residential and/or corporative needs and limited reurbanisation projects. The trend towards protection of natural habitats will be reinforced through EU specific regulations, but legal framework regarding land-use mostly remains at municipal and regional level.

92. **Spatial Polarisation.** Transport and Communication networks reinforce centrality of global metropolis. We observe rising number of megalopolis at global level. The number of cities larger than 1 million inhabitants in Europe has grown from 21 in 1950 to 37 in 2010 (+76%), but the overall number in the World has increased from 75 in 1950 to 449 in 2010 (+500%). Patterns of polarisation are extremely diverse at different geographic scales: polycentric macro-regional systems (Rhine, Randstad…), monocentric national (Paris, London, Vienna, Madrid), fragmented inner rural zones. By the 2030s, five of the world's eight billion people will live in cities.

93. **Subverted Proximities,** Neighbourhoods become more distant while some remote places become much closer. Differences on accessibility remains between inner rural areas and remote regions, especially in the East of Europe, as well as in relation to large cities well connected to networks. Paradoxically, this tendency increases the value of the territory as place, not just relative position, and cultural landscape and, in some cases, cross-border historical zones. The electronic unravelling of traditional imperatives of contiguity may produce urban rearrangements and may result in random scattering and galloping decentralisation, of residence, tourism, low added-value industrial or logistic functions, as well as concentrate highest added value functions in large cities.

94. **Settlement Structures.** Various settlement systems in Europe are at differing stage of urbanization – suburbanization – counterurbanization - reurbanisation cycle. Gentrification of city cores contributed substantially to the reurbanisation phase. Centrifugal migration does not usually imply an increase in the agricultural activities. Emigrants from cities and towns often utilise rural space as a place of living, but not work, sometimes they engage in entrepreneurial activities which are associated with rural areas, such as tourism or localised traditional production and services. The concentrating and deconcentrating effect of migration is highly dependent on migrants' age and therefore life cycle.

95. **Metropolitanisation** seems to have slowed down in Western, but not in Eastern. Europe in the 2000s. Bigger cities have performed better than average since 1995. This highlights in general a process of concentration of wealth in the biggest cities, mainly the first national cities and especially in Eastern Europe. However this metropolitanisation is mainly to be observed during the nineties and is slowing down in the years 2000, at least in Western Europe. The economic growth of cities is embedded in contexts of national regulation and growth and although some room of manoeuvre exists for cities, national / regional policies play an important role in determining their economic paths (according to ESPON FOCI). Increased urbanisation is the growing of agglomerations and metropoles but also the recomposition of rural settlements resulting from the spread of cities.

96. **Gateway Nodes**. Large (capitals) cities play an important role as gateways between the economies of Europe and the rest of the world. Specialised developments emerge clustered to global transport nodes such as airports (e.g. *Aeropolis*) and ports (e.g. *Logistic Villages*…).

97. **Rural Depopulation.** The development of international migration, globalization of migration processes and decrease in the costs of travel has resulted in migration flows going from rural and peripheral areas towards world cities. Emigration from rural and remote areas leads to adverse effects: depopulation, ageing and deformation of sex structures of affected populations. Emigration is selective: emigrants are young, better educated and more

entrepreneurial than stayers. Demographic deterioration of rural and peripheral areas is one of the important issues which should shape research agenda on the future organization of growth, mostly in the areas of high tourist and recreational value. Movements of "rurbanisation" and "counter-urbanisation" can be important in certain areas (some EU regions are already showing a constant repopulation of their rural areas).

98. **Social Polarisation in cities** seems to be a general phenomenon across Europe. Main factors explaining this evolution are, amongst others, the professionalisation process of the demand for labour, the reorganisation from a fordist to a flexible regime of regulation inducing higher fragilisation of at least parts of the work force, socio-demographic trends such as decomposition of households, the concentration of immigration in cities, general state-level reforms of welfare regimes and labour markets and increasing real estate prices.

99. **Intraregional Disparities**. A general trend to increase of disparities between cities and their hinterland, but individual situations are varied and complex and dependent on regional and national context.

Environment[28]

100. **Green House Gas emissions**. The EU25 had, in 2002, the average greenhouse gas emissions of 11 tons CO2 per capita. In EU27 greenhouse gases emissions decreased by 14.3% between base year and 2008 (and by 11.3% during 1990-2008). Energy-related GHG emissions represent 80% of total GHG emissions in the EU27. In the EU27, most GHG emissions come from the production of electricity and heat, road transportation, fossil fuel combustion in households and in manufacturing industries, agriculture and the iron and steel industry. In 2008 the EU-15 countries showing the most significant decrease compared to the base years are Germany (-22.3%) and United Kingdom (-19.1%), followed by Sweden (-11.3%) and Belgium (-8.6%). This decline in emissions in 2008 was due largely to lower CO2 emissions from fossil fuel combustion in the energy, industry and transport sectors. This trend is closely related to trend 82 (transport CO2 emissions).

101. **Global Warming.** Global warming is well established at a European scale (+0.41°C/decade for the period 1979 to 2005). However, there is a difference between Northern Europe and the Mediterranean countries: the trends in temperature and precipitations are higher in the Northern Europe than in the Mediterranean area. Despite general reductions in the extent of air pollution in Europe over the last decades, significant problems still remain with acidification, terrestrial nitrogen deposition, ozone, particulate matter and heavy metals. Restrictive measures to mitigate these impacts by reducing greenhouse gas emissions are implemented, like higher fuel, taxes, emission trading schemes. Targets concerning CO2 emissions will be achieved only in 2050, because of the combination of low economic growth and more energy efficiency.

102. **Urban pollution**. The evolution of transport technologies will lead to a less noisy and pollutant vehicles, with more intelligent traffic management in cities. This will increase the quality of life in large cities, making them more attractive places to work and live. In 2007 more than 47 million people (i.e. 52% of the population living in agglomerations with more

[28] Environment uses building blocks have been put together based on ET2050 *Environment Sectoral Report* (IGEAT, 2012), and the following forecasts and reports:

- EC (2009) EU Energy Trends to 2030. Update 2009, European Commission DG Energy in collaboration with DG for Climate Action and DG for Mobility and Transport; EC (2010) Priorities for 2020 and beyond – a blueprint for an integrated energy network European Commission DG Energy
- BP (2011) *Statistical Review of World Energy 1965-2010*, British Petroleum BP

than 250,000 inhabitants) were exposed to daily road noise levels exceeding 55 dB Lden (the lower benchmark for the combined noise indicator). People exposed to daily railway and airport noise were fewer, but still significant, with respectively nearly 6.5 and 3.7 million exposed to each. The number of people exposed to levels exceeding 50 dB Lnight (the lower benchmark for night time noise) to road noise was 33.7 million. This trend is related to trend 79 (intelligent vehicles).

103. Vulnerability. The impact of climate change is projected to include a significant rise in the level of the world's oceans together with the melting of glaciers and changes in ocean currents. Low lying coastal areas could become completely submerged increasing human vulnerability in other areas. Floods and droughts could affect millions of people leading to significant movements of migrants, refugees and internally displaced people. With the highest population density of any continent, the pressure on Environment in Europe is quite high. 73% of the European population lives in urban areas, this affect directly agriculture, which is one of the world's largest and most productive in food and fibre. However, Europe should not expect any significant immigration generated by climate change.

104. Water Stress: There are many pressures on water quality and availability including those arising from agriculture, industry, urban areas, households and tourism. As GDP per capita rises, so does water demand and by 2025 two-thirds of the world's population are expected to be living in water-stressed regions. A significant part of the problem is the huge and often deeply inefficient use of water. In addition, throughout many parts of the world, rainfall and river flows are strongly seasonal, with too much water arriving during monsoon periods followed by maybe seven or eight months of water scarcity. Of the total withdrawals in European countries, 32% are for agriculture, 31% for cooling water in power stations, 24% for the domestic sector and 13% for manufacturing. Freshwater is stable or declining in northern Europe and growing slowly in southern Europe. Recent floods and droughts have placed additional stresses on water supplies and infrastructure. This trend is related to trend 46 (food and water security).

105. Land Consumption. According to recent data, about 3.7% of Europe's land is covered by artificial surfaces such as housing and industrial sites; which equals 0.12% of land outside urban and industrial areas is taken up by transport infrastructures. It has to be outlined that artificial surfaces such as urban areas and transport infrastructure have expanded by nearly 8% between 1990 and 2006. This trend is closely related to trends 86 (land occupation) and 87 (urban sprawl).

106. Organic Farming. The total organic farming area in EU27 continues to show an upward trend, and has increased by 7.4% in 2008. In 2008 EU27 had around 7.6 million ha under organic farming, i.e. around 22% of the total area cultivated organically in the world. EU27 share of organic farming in utilized agricultural area in 2008 was 4.5%, further increasing compared to 2007 (4.1%). With 15.8% of organic farming, Austria had the highest share in 2008, followed by Sweden (10.8%), Latvia and Czech Republic (around 9%). In 2008 Spain passed Italy out and has the largest organic area (almost 1.3 million ha, i.e. more than 17% of total organic farming area in EU27), followed by Italy (almost 1.0 million ha, i.e. 13%) and Germany (0.9 million, i.e. 12%). Many countries have a minor share of organic farming, of less than 4% of their utilized agricultural area (Belgium, Bulgaria, Cyprus, France, Hungary, Poland, Ireland, Luxembourg, the Netherlands, Romania and Malta). This trend is related to trend 46 (food and water security).

107. Ecologically sensitive zones. Grasslands, wetlands and coastal habitats face the greatest threats, mainly due to the decline of traditional patterns of agriculture, tourism development and climate change. The abandonment of traditional management practices has resulted in a loss of biodiversity in some locations whereas in others the shift towards more intensive agricultural practices is the root of the problem. Bogs, mires and fens require

specific hydrological regimes. Dune habitats are under severe pressure throughout the EU with almost no favourable assessments.

108. Resources Scarcity. Alongside energy, the growth in consumption of many of the world's main metals is also on the rise. Between now and 2030 we will consume more copper, more aluminium and more steel than we have in history. A number of rare metals increasingly matter in the global economy, not only because they are vital to the production of advanced electronics equipment – cell phones, batteries, plasma screens – but also because they are part of the "green technology revolution", being essentials in the construction of hybrid cars and wind turbines. Growing territorial conflicts linked to resource and risk management, for energy, resources and also water, together with emerging cooperative initiatives (e.g. Baltic, Danube). This trend is closely related to trends 47 (new materials), 59 (peak oil) and 60 (coal reserves).

109. Fish Resources. Despite policies to protect fish, over-fishing has put many fish stocks in European waters outside sustainable limits (62- 92% of commercial fish stocks in north-eastern Atlantic, 100% in the western Irish Sea, 75% in the Baltic Sea, and 65-70% in the Mediterranean). Aquaculture is increasing its share of the European fish market leading to possible adverse environmental impacts in coastal waters.

110. Biodiversity. Today there are 100.000 nature reserves around the World, covering approximately 15% of earth's surface. But the number of known species is shrinking. Forty percent of all organisms known are threatened with extinction.

111. Natural Disasters. About 90% of all natural disasters in Europe that have occurred since 1980 are directly or indirectly attributable to weather and climate, and about 95% of economic losses caused by catastrophic events have resulted from these weather and climate-related disasters. The average number of annual disastrous weather and climate-related events in Europe and the damage caused by them has increased substantially in recent decades. In the period 2000-2009 369 natural disasters linked to weather and climate-related events have been reported. These events have caused more than 1.5 million victims (more than 77.000 deaths and 1.472.601 affected) and economic damage of around US$ 93,8 billion. The most frequent event are floods (167, i.e. around 50% of total), followed by wind storms (111), extreme temperatures (84) and droughts (7).

112. Environmental Taxes. The share of environmental taxes in total tax revenue decreased for the EU27 as a whole during the period considered reaching 6.1% in 2008 (from 6.8% in 2000) while at the same time, the share of taxes on labour also decreased slightly (from 50.1% in 2000 to 50.0% in 2008). However, one can observe that this does not hold in all Member States and some of them (Bulgaria, Denmark, Estonia, Poland) have increased the share of environmental taxes while decreasing taxes on labour. The share of environmental taxes in total taxation varies among the Member States: e.g. in 2008 the share was more than 10% in Denmark, Bulgaria and Malta, while it was less than 6% in Belgium, Germany, Spain, France, Austria, Italy, Lithuania and Sweden. During the period 2000- 2008 trends were also different among countries: Romania had the greatest decrease in the share of environmental taxes (from 11.4% to 6.3%), followed by Malta and Lithuania, while Bulgaria registered the highest increase (from 7.5% to 10.6%), followed by Estonia and Denmark.

Governance[29]

113. European Enlargement. After successive enlargements, the EU territory has nearly reached continental size, but there is a growing adverse perception of new Enlargements. None of the 12 countries joining the EU in 2004 and 2007 reaches the average EU GDP.

114. European Crisis Management. Weak and slow decision-making processes at EU level has been especially notorious in the several crisis events over the last decades (e.g. *Balkans war* in the 90s, *Subprime* crisis in 2008). The heterogeneity in relation to the size of countries in Europe (6 countries account for 70% of the total GDP on EU27) is not considered into the structure of the decision-making processes.

115. Multi-speed Governance Europe evolutes towards a "Multi-speed" governance, based on the Open Coordination Method, with countries retaining much of their power. The more adaptative countries and regions are able to move on quickly than others which stay as laggards. Rising populism at National level.

116. Fragmented Government. The 2008 crisis has demonstrated the lack of reliability of official European statistics. The public debt in Greece raised from 3,7% to 12,7% (once official figures were corrected), then 15,4% in October 2010. European institutions failed to act together in a short enough period of time, making the debt crisis in the euro zone affecting also Portugal. Even though the public debt in Japan and USA is higher than in Europe, the interest rates paid by European countries are much higher due to the fragmentation of the debt nationally, and the lack of credibility of some countries. The austerity policies imposed to Southern European countries, largely due to the poor management of their governments, reducing public investments, cutting social programmes, while keeping strong the euro and low levels of inflation, reinforced their dramatic situation. Investors just leave the euro zone, at the end.

117. Corporative Government. Increasing importance of large corporations and Public Private Partnership in public policies. Public sector still represents 40% of the economies. The public debt of most countries remains above 50% of GDP. Limited capacity to streamline public institutions. Social expenditure represents 50% of public budgets (3,5% GDP). Investments on infrastructure represents 1% GDP and R&D 2% GDP. Increasing financial problems in European countries on public services related to social expenditures.

118. Territorial Governance. International cooperation between institutions of different scales and sectors remain difficult. Little integration and coherence leading to inefficiencies. Multi-level Cooperation remains relatively low at BSR and Danube. Regional tensions (e.g. Scotland, Flanders, Basque Country, Catalonia, Corse, North of Italy…) remain unsolved. Countries remain the dominant players at European levels, with cities and regions playing more important roles at global level. Internally, the European Union promotes not only economic and social cohesion but also territorial cohesion.

119. European Political reforms. European institution budget remains at 1% GDP coming from National transfers. The EU aims to ensure a more balanced development of economic activity across all of its regions including urban and rural areas, islands and peripheral regions. In particular, the Commission intends to pay more attention to urban areas, and to increase the involvement of local and regional authorities in operational programmes. A major

[29] Governance building blocks have been put together based on ET2050 *Governance Sectoral Report* (Nordregio, 2012), and the following reports

- EC (2011) *EU Budget 2010. Financial Report*, Publications Office of the European Union
- EC (2009) *Community Expenditure 1958-2008 by heading,* annex II of *EU Budget 2008. Financial Report*, Publications Office of the European Union, pp77-83
- P. Butzen, E. De Prest and H. Geeroms (2006); *Notable trends in the EU budget,* Economic Review, 2006 issue II, pp 49-67

challenge ahead will therefore be the capacity of European governments at all levels to carry out the necessary structural changes, such as the opening of transport markets, pricing, education and training, in order to achieve potential productivity gains from technological innovation. No ambitious reforms carried out at European level yet, just some quick fixes to prevent the whole building to collapse. Some policies in the agenda, fiscal harmonisation and investment criteria to be adopted at European level.

120. Neighbouring Countries. European economy will remain open. FDI will remain at the present level. Direct investments of European companies in Neighbouring countries will tend to increase in the future, both in Arab countries (specially in Morocco), as well as in former USSR republics, from industrial plants, logistic centres or energy-related facilities to tourism. The level of economic integration with Neighbouring countries will tend to be reinforced to assure these increasing investments.

121. World Governance. In 1900, Europe (excluding Russia) accounted for roughly 40% of global economic product; 100 years later it produced less than 25% of global output. Although in all probability the European Union will remain intact as an organization and will continue to play a role in the global governance, its position is increasingly weak, challenged as it will be by the need to find a compromise between the different member states on foreign and global policy issues.

122. EU Budget Size. The European Union budget has a number of specific characteristics which make it different from the budgets of the Member States: in principle, it must never be in deficit, and there is a special decision-making procedure to determine it. The structure and maximum expenditure of the budget are specified for 7-year periods in the Financial Perspective. Current period is 2007-2013 has an overall budget of €864,3 billion. With a yearly budget of around €120 billion (1% of the aggregated Member States GDP), if the EU were a country it would be placed between Finland and Greece in terms of the size of its expenditure. As a reference, Germany's budget (expenditures) for 2010 was of €1.186 billion and France's €1.068 billion, and the US budget for 2011 was to €2.692,0 billion ($3.599,0 billion).

123. Main EU Expenditures. The main items of the budget are the CAP and the regional policy. In the 2007-2013 period the agricultural, rural development and fisheries expenditure account for 42% of EU budget (*Preservation and* management *of natural resources* fund[30]), while the competitiveness and cohesion funds account for 45% of the budget (*Sustainable growth* fund[31]). The foreign policy represents some 6% of the budget, while the administrative body costs an additional 6%. The importance of the Common Agricultural Policy, historically the largest EU expenditure item, is steadily diminishing in favour of expenditure on cohesion policy. However, opinions differ on the contribution made by the cohesion policy towards income convergence between regions in the EU.

124. Budget Trends 1957-2020. Under the Treaty of Rome the budget was to be made up of contributions from Member States. In the 1970s, as new competences were acquired by the EU, a new budget model was created with the EU having its own resources based on Member States' sales, agricultural and customs taxes. This change made budget much more important. In the 1980s, the EU budget continued to grow rapidly, with the CAP and payments to poorer member countries like Ireland, Spain, Portugal and Greece being particularly expensive. The late 1980s brought period budget agreements for increased budgetary stability. After Delors reform it was 1989-1993 (five years), 1994-1999 (six years), 2000-2006

[30] Includes among others the Agricultural markets fund (43.500M€ yearly), the rural development fund (11.500M€ yearly).

[31] Includes among others the structural funds (21.700M€ yearly) and Cohesion Fund (7.960M€ yearly), Regional Competitiveness fund (6.750M€ yearly), 7FP (6.500M€ yearly), Lifelong learning program (1.100M€ yearly), TEN program (850M€ yearly), Energy projects to aid economic recovery program (700M€ yearly), Galileo program (450M€ yearly)

(seven), 2007-2013 (seven) and 2014-2020(seven) Negotiations for the 2014-2020 are underway, with the Commission proposing an overall increase of 5% on the previous budget, despite the requests of some member states including the UK, Germany and France, for the budget to be frozen.

125. **The Balance of Payments** has been a traditional source of controversy (e.g. since 1984 the UK has a rebate on payments on the basis of scale of contribution to the EU budget and level of returns). Currently, the largest net donator to the EU budget is Germany with €8,9 billion yearly, while Poland is the largest receiver with €8,5 billion. Overall, 9 countries would be net donators (Germany, UK, France, Italy, Netherlands, Sweden, Austria, Denmark and Finland) in 2010. The largest net donator per capita is Sweden, with almost 125 euros per inhabitant and year, while the largest net receiver per capita is Luxembourg, with more than 2.500 euros per inhabitant and year.

3.3 Analysis by territories

Next table presents the list of macro-regions considered just for the purpose of covering the whole area of study:

Trans-national macro-region
North West Region (Ireland, UK, France, Belgium, Netherlands, Luxembourg)
Baltic and Northern Peripheries Region (Denmark, Norway, Sweden, Finland, Iceland, Lithuania, Latvia, Estonia) with extensions to the Arctic and Barents area (Baltic Russia)
Central and Alpine Region (Germany. Austria, Switzerland)
Danube Region (Slovakia, Czech Republic, Hungary, Croatia, Bulgaria, Romania) with extensions to Moldova, southern Ukraine
Eastern Europe (Poland) with extensions to Belarus and northern Ukraine
West Mediterranean Region (Spain, Portugal) with extensions to Maghreb countries (Morocco, Algeria, Tunisia)
Central Mediterranean Region (Italy, Slovenia, Malta) with extensions to some Mashrek countries (Libya, Egypt)
East Mediterranean Region (Greece, Cyprus, Albania, Kosovo, Macedonia, Serbia, Montenegro, Bosnia and Herzegovina) with extensions to (Turkey, Armenia, Georgia, Syria, Lebanon, Jordan, Israel, Palestinian territories);
Outermost regions (Canarias, Madeira, Açores…)

Figure 3-4 Macro-regions considered by ET2050

North West Region[32]

- **Demography.** The changes in population in Europe can be summarised under the notion of the 'Ageing of Europe'. The process of ageing is the result of three parallel trends: a fall in fertility rates, a fall in mortality rate and an increase in longevity. Freedom of movement within the EU has meant large-scale intra-European migration, largely for economic

[32] This chapter is based on ET2050 *North-West Region Report* (IGEAT, 2012). The North-west region is integrated by the following countries: Ireland, UK, France, Belgium, Netherlands, Luxembourg

reasons. The main migratory flows are from periphery to core, and from East to West. It is clear that population is increasing in most areas of NWE. In Ireland, the Netherlands, Luxembourg, most of Belgium, Central England, West and South Germany, and parts of Southern England, West and Central France, population is increasing because of both positive natural population growth and a positive migratory balance. Although population decline is mainly concentrated in Southern and Eastern Europe and the Nordic countries, there are pockets of population decline in NWE, too, such as most of Scotland, Wales and North East England, together with parts of Central and Eastern France. The areas least affected by the demographic challenges in NWE are large metropolitan areas such as Paris and London, a region stretching from South East England via the Netherlands to northern Germany, all of the island of Ireland, some parts of Southern Germany, Northern Switzerland and Alsace.

- **Economy.** Looking at the Lisbon criteria of a tertiary, knowledge-based economy relying on urban economic centres, it appears that the highest competitiveness levels are located in the main metropolitan and industrial centres. In NWE, a group of core regions (South West Germany, South East England, Paris, Luxemburg, Brussels, Southern Netherlands) achieved the highest Lisbon performance levels. There are also relatively high levels in much of the rest of the UK, Ireland, the Netherlands and Belgium

- **Territorial patterns.** High population densities concentrated in highly urbanized areas**.** NWE hosts a large number of "functional urban areas", especially two Global Cities (Paris and London), several "Metropolitan European Growth Areas" (MEGAs – i.e. Dublin, Geneva, Manchester or Lyon) both of a strategic importance in the wider European and global context. It is also the host of the "European Engines" (Brussels, Amsterdam) and of potential MEGAs (Glasgow, Edinburgh, Birmingham, Lille, Antwerpen, Rotterdam, Luxembourg). Such an urban concentration draws a core-periphery pattern of relationship between low population densities in rural areas at the fringe and high densities in the urban core. Such high urban densities involve also a pressure on rural land with the intensification of agriculture in the surrounding zones of the urban cores, with substantial impact on the environment, but also an extension of housing pressure due to the metropolitan growth.

- **Transport.** Due to the existence of a dense motorway network, a well developed network of inland waterways, the concentration of major European seaports, a highly developed high speed train network and the largest airport hubs in Europe, the overall level of accessibility of NWE is high, but not universal across zone. Many of the most accessible regions of NWE constitute a relatively compact zone crossing Belgium, Luxembourg, the regions of Western Germany, of the Mid-South of the Netherlands, of North-Western France, including Paris and of the South-East of England, including London. The more peripheral parts of the NWE area (i.e. Ireland, Scotland and especially the Highlands & Islands, West of England & Wales) are characterized by a comparatively lower endowment with transport infrastructures by road & by rail. However, this slightly improves once accessibility by air is considered, especially with the low cost airlines companies privileging cheapest peripheral airports.

- **Land-Uses.** One of the key transnational issues with regard to settlement patterns in NWE is the tension between the opposing trends of polycentrism and monocentrism of population and economic activities. At the macro level, NWE is home to a significant part of the 'pentagon' (an area delineated by metropolises of London, Paris, Frankfurt, Milan and Hamburg). At the meso level, the strong economic growth of NWE has not been experienced universally, and great disparities exist both within the core and between the core and periphery. At the micro-scale, urban-rural interdependencies are increasing, partly as a result of the spatial deconcentration of economic activities and the expansion

of city hinterlands. Achieving balanced regional development requires a strong regional integration of functional urban areas and their surroundings.

- **Environment.** There is a clear north-south split in terms of the impact of climate change, with NWE faring better than southern Europe. Nevertheless, there is a small increase in drought potential in the western and eastern borders of France, Belgium, Luxembourg, South of the Netherlands and parts of the southern Rhine Valley in Germany. There is also an increased potential for flood hazards in much of West and South Germany and in some parts of central England. In terms of natural hazards, NWE shows vulnerability to winter storms. Western and Southern Germany and Northern Switzerland have the highest indicator values for flood events. In relation to the risk of radioactive contamination, cities and regions in the vicinity of nuclear power plants, such as North West of France show a higher degree of exposure. The greatest number of flood events has occurred in South West Germany, while there have also been frequent flooding in other parts of West and South Germany, South Belgium, East France, and Central and South England and Wales. River flooding occurrence is generally very low in the periphery of NWE. The major pollution causes in NWE are power generation, industry, waste disposal, transport, agriculture, and households. Hence, levels of pollution are highest in the core areas where the greatest concentrations of industrial and urban development exist. Most of the areas with the highest rates of fragmented semi-natural areas in Europe are to be found in NWE. The most extreme fragmentation in NWE is in coastal or river zones, particularly in the coastal regions bordering English Channel and south of North Sea (i.e. South and Central England, North France, North and Central Belgium and the Netherlands), as well as in Ireland. The least fragmentation is generally found in mountainous areas, which in NWE is mostly limited to North and West Scotland
- **Governance.** National policies (National Strategic Plans for the coming decades) share common values and planning principles: it is broadly assumed that a socio-economic balanced territorial development should be implemented on sustainable economic, social and environmental basis. Transport efficiency as well as access to housing, an accurate management of environmental issues such as resource depletion and CO_2 emissions appear as crucial targets for all NWE countries.

Strengths	**Weaknesses *(Structural unbalances)***
Population increase in most areas Highest competitiveness levels regarding the Lisbon criteria Excellent overall transport accessibility Shared Governance Values	Ageing population Economic concentration and specialization Core-periphery territorial structure Low regional accessibility in inner peripheries Most fragmented semi-natural area in Europe
Opportunities	**Threats**
Achieving a balanced regional development with a strong regional integration of functional urban areas Development of low carbon and sustainable urban economies Diminishing the pressure on rural hinterland Reinforcing the coordination of national development strategies with stronger and better integrated territorial policies	Increasing pressure on rural hinterland: risks for environment and agriculture productivity Environmental and industrial hazards (flood, drought, winter storm, radioactive contamination) Lack of cross-country integration and territorial policies Lack of urban-rural integration Lack of balanced regional development

Baltic and Northern Peripheries Region[33]

- **Demography.** Many areas in the Region, especially in rural surroundings are suffering on population decline and demographic thinning out. Decline in population is not affecting only to total number of people but also to age structure; i.e. in the rural areas primarily young and well educated inhabitants are out-migrating. Thus many regions will increasingly suffer from a shrinking potential labour force (i.e. less people in working age) as well as from a greying population (i.e. more people of pension age) whereas in the largest cities the migration processes contribute to a comparatively good labour market situation. Although aging has become an issue of common concern in the Region, it is also possible to identify a relatively high birth rate trend in the north-western part of the Region. In terms of migration, three main types of flows can be identified: from rural to local/regional urban centres, from smaller towns to metropolitan cities and across national boundaries. The intraregional transnational migration flows are mainly from the East to the West. I.e. 25% of all international migration on average in Norden occurs within the Nordic countries and in addition 10% of the Nordic migratory flow is to/from Balticum and Poland.
- **Economy.** There are large disparities in the status of socio-economic development between western and eastern countries, as well as lagging behind development of rural areas in some parts of the region. Disparities in GDP per capita, for instance, are amongst the highest in the EU. The Western part has a GDP/capita equal to 122% of the EU27 average, whereas the GDP/capita in the Eastern part is only 52.6% of the EU average (European Commission 2010b). Anyhow, prior to the onset of the economic and financial crisis, real GDP growth was above the EU. Thus the east-west division has been partly eroded.
- **Territorial patterns.** Three main territorial divides can be found. The north-south divide results from diversified climate conditions and settlement pattern of densely populated southern parts and sparse north in the Region. In the Southern part of the Region there are plenty of densely populated small municipalities. Many of these small municipalities have good commuting possibilities as a part of dense urban network like in Denmark and Southern Sweden or otherwise good connections to regular but looser system of cities. In the sparsely populated north the population is nonetheless extensively centralized to a number of isolated towns where majority of the population live heavily concentrated. And because of the long distances it can be challenging to reach a sufficient number of people within daily commuting range to run public and private services cost-efficiently and to establish a well-functioning labour market. The east-west divide reflects differences in several socio-economic development aspects. In economic term this regional divide is one of the sharpest in continental Europe. The urban-rural divide is on the one hand related to partly striking differences between the metropolitan areas and hinterlands where the rural areas are struggling with population ageing and outward migration. Additionally, some remote territories with low accessibility suffer from a deficit of affordable and modern ICT connections.
- **Knowledge-base.** Many of the countries are relatively small in economic terms and are thus often simply unable to compete on a par with the major European economies although well-educated population and considerable R&D capacity is a high potential for knowledge-based development. Some Nordic regions are among the regions in the EU with the highest share of GDP spent on R&D (European Commission 2010b). That fact in

[33] This chapter is based on ET2050 *Baltic and Northern Peripheries Report* (Nordregio, 2012). The Baltic and Northern Peripheries region is integrated by the following countries: Denmark, Norway, Sweden, Finland, Iceland, Lithuania, Latvia, Estonia with extensions to the Arctic and Barents area (Baltic Russia)

combination to high qualified labour force sites that the competitiveness of the Region is today strong and the Region has good preconditions for coping with the challenges of globalization.

- **Energy:** Large oil and gas reserves (Norway, Russia) as well as significant use of renewable energy sources, mostly hydropower, are of importance for regions energy balance and for ensure energy security. The region is anyhow increasing reliance on nuclear energy. Half of the region is dependent on energy imports and thus the importance of developing integrated energy networks and markets are crucial.
- **Transport.** The location at the periphery of Europe and thus remote from the main markets set challenges related to accessibility and logistics costs due to distances, topographic and climatic reasons. For the region the good transport connections of both persons and goods is particularly important as the regional economies are dependent on exports. The region has high potential to absorb future transport growth through maritime services and thus increase the overall accessibility. The main challenge with regard to the future transport development in the Region is to reduce its remoteness by improving links within the region and to the rest of the EU i.e. by extending the TEN-T network. A number of initiatives have been proposed to develop transport connection both to/from and within the region in order to support the industries better. This includes north-south connections as well as east-west and transversal transportation networks, both within the Region and from the region. Opportunity is related to gateway function of the Region in serving especially flows to and from Russia and the Far East market. The Baltic Sea is one of the maritime areas with the densest traffic in the world. Seaports act as key transit point for the export and import of natural resources, manufactured goods and high added-value goods.
- **Land Uses.** The Region is rich in natural resources that work as a basis for the prosperity in the Region. Southern part of the region has good agricultural possibilities whereas forestry is an important industry in the northern part. Minerals and metals found mostly in the Fennoscandian Shield are unique regional resources in a European context.
- **Environment.** In the Arctic and Atlantic parts of the region global climate change and possible increase both in transport flows and offshore energy production can be potential risks. Increasing temperatures will potentially have fundamental impacts to fragile and vulnerable marine and terrestrial ecosystems as to traditional livelihoods in the regions with limited adaptation capacity. Increasing use of resources is mostly an environmental challenge or hazard as management of possible oil spills or other accidents would be very challenging due to distances and harsh weather conditions, both ice and storms.
- **Governance.** Regarding the border regions, the countries in the region share both internal and external EU boundaries with and without EFTA agreement. Even there are multiple cross-border cooperation programmes and initiatives; the existence of the boundaries sets some limitations both for territorial cooperation, competitiveness and cohesion of the region but also to i.e. provision of services. Also the lack of some boundaries in the maritime areas set some extra challenges.

Strengths	Weaknesses *(Structural unbalances)*
Well-educated population and considerable R&D capacity High IC T usage in some parts of the Region (top leading countries) Relatively high quality of environment (including vast forest areas) High potential and know-how for production of renewable energy Well-established forum for regional co-operation	Large disparities in the status of socio-economic development between W-Region and E-Region Insufficient use of innovation potential Peripheral geographical location to important economic centres Poor accessibility (of some parts of the region) Environmental state of the Baltic Sea Monocentric settlement pattern
Opportunities	**Threats**
Making use of the vast innovation potential Future transport growth through maritime services More and more widely used e-government practices	Increasing regional disparities inside the countries in the Region High potential for cross-border customs fraud and smuggling of excisable products Environmental problems associated with the growth in both road and sea transport Natural hazards such as rising sea level, flooding, etc. High vulnerability to technological hazards (e.g. oil spills) due to fragile ecosystem Disadvantageous demographic processes

Central and Alpine Region

- **Demography**. Looking at natural population development, most regions in Austria, except the regions of the Vienna agglomeration, have had rather positive figures. However, most regions in Germany have a negative natural population development. Since the unification, the new German Länder are characterised by continuously negative net migration rates, the only exception are the regions around Berlin benefitting from suburbanisation processes. Net outmigration at lower rates is also the dominant trend in several rural areas in other parts of the macro region. Accordingly, total regional population change is very different in different parts of the region. On the one hand, there are clusters of regions in most of Switzerland, Austria and Southern Germany plus a few metropolitan hot spots (Berlin, Hamburg, Bremen, Cologne) that had clear population increase during the last decade. On the contrary, there is a massive population loss in most parts of the new German Länder that is also expected to be the dominant trend in future. Population loss is also the dominant trend in several, but not all, rural areas of the macro and in some old industrialised areas in Germany. The aging of population is a concern in all three countries, however, due to the different natural and population developments regions are affected differently.
- **Economy**. The economic performance within the macro region is highly disparate. Whereas on the one hand, some regions in Germany and Switzerland have the highest GDP per capita in Western Europe, the regions of the new German Länder perform clearly below EU average: However, this low performance is still much higher than those of most regions in Eastern Europe. On the other hand, growth rates during the last decade were higher in the new German Länder than in most other parts of the macro region. Surprisingly, the educational level of the macro region is not as high as expected. Germany and Austria are only about European average in terms of population with tertiary education, however, disparities within the countries are comparable low. Many indicators for advanced economies such as R&D expenditure, patent application, high-tech employment, labour productivity show great disparities in the macro region with some parts belonging to the leading regions in Europe and other clearly behind. Similar pattern apply to unemployment rates. Switzerland, Austria and the southern parts of Germany have lowest rates in Europe, whereas the new German Länder are belonging to the worst performing regions in Europe. Notable, German's regions are almost the only

regions in Europe that have a decrease in the unemployment rates during the past years of the economic crises.

- **Territorial patterns**. The territorial pattern in the macro region is very heterogeneous in any respect. The macro region accommodates many types of European landscapes ranging from coastal zones, flat lands via low mountain ranges to the Alpine mountains. There are several high-density large metropolitan areas functioning as the economic cores of the macro region. The other end is marked by low density rural areas in the Alps or particularly in the north-east of Germany, the latter being affected by a low economic base, high unemployment rates and outmigration. The overall spatial pattern is the increase of importance of the metropolitan areas in terms of population development, which is only partly accompanied by increase of jobs. In Germany, population increase in the core cities of the agglomerations was often higher than in the suburban areas.
- **Energy**. Traditional energy resources are limited in the macro region. The extraction of the sole relevant energy resource in Germany, coal, is almost abandoned due to non-competitive extraction costs. In consequence, coal fired power plants are importing coal from worldwide sources. Energy production is based on a mix of coal and gas (about 60 percent in Germany), nuclear power (about 20 percent in Germany) and renewable energies. Wind energy potential is high in the middle and northern parts of Germany, but low in the southern parts of the macro region. However, this is compensated by a reverse spatial pattern of solar energy potential. However, the share of renewable energy in energy consumption is partly high in the macro region with Austria leading with almost 30 percent of energy consumption from renewable energies with an importance of hydro power; whereas Germany's share is about fifteen percent.
- **Transport**. There have been huge investments in the road network of the macro region during the past decades that led to the densest network in Europe and contributed to the high share of road transport in modal split of passenger travel. In particular in Germany, many parts of the road network are highly congested due to an overlap of daily commuter traffic and long distance freight transport. The rail network has been particularly improved by investments in high-speed rail, new Alpine crossings and logistic centres. Accessibility by road and rail belongs in some regions, particularly in the western parts of the macro region to the highest in Europe. Due to the distribution of international airports across Germany and the two capital airports in Switzerland and Austria, the share of regions with good accessibility by air is much higher than in other parts of Europe.
- **Environment**. Greenhouse gas emissions have been clearly reduced during the last decades so that the modest Europe 2020 targets will be or are already reached but currently no targets that are more demanding. Share of protected Natura 2000 areas is high in several Alpine regions as well as in some parts of the low mountain range and coastal and low density flatland areas in the new German Länder.
- **Governance**. The countries of the macro region have developed a highly complex political decision system following the principles of subsidiarity. Decision and implementation power for spatial development is to a large degree in the hand of the middle political level (Länder or Kantone) or even below. On the other hand, decisions at European policy level have become more and more important for the development of the regions. For regional development, ERDF and Cohesion Fund spending are of particular importance in the new German Länder resulting in up to twenty percent of public investment there..

Strengths	**Weaknesses *(Structural unbalances)***
Dominant role of metropolitan areas Polycentric urban system	High unemployment in parts of the macro region Huge spatial disparities

Strong economic performance Many features of advanced economies Diversity of regions and landscapes High quality and density of transport infrastructure Balanced governance systems	Dominance of road transport Rather unbalanced accessibility pattern
Opportunities	**Threats**
Attractivity for foreign labour force Transformation to green economic structures Potentials for sustainable transport Potential for renewable energy production	Depopulation of some rural areas Aging of population Maintenance of services of general interest Continuation of land consumption for settlements Import dependency for traditional energy resources

Danube Region[34]

- **Demography.** The Danubian macro-region has 59 million inhabitants. The Danube region is the only macro-region in the EU where the population is not increasing but decreasing. Between 2001 and 2011 the population of the macro-region decreased by 2 million people from 61 million to 59 million. The decrease has both natural and migratory reasons. Natural reasons because the number of children born is low and the death rate of adult men is high (alcoholism and smoking is also high.) Intensive international migration is a relatively new phenomenon in the Danubian region. In the "socialist" priod the countries of the region were – with the exception of the former Yugoslavia - strictly isolated from each other and from western countries. Migration to other EU countries started immediately after EU accession when the official obstacles were removed. The target countries of migration were determined by linguistic and historic affinities: Romanians went to Italy, Spain and France. Slavic migrants went to England, to Germany and to Northern Europe, Hungarians went to Austria and – in absence of language knowledge - remained at home. Apart from the most densely populated urban areas (Bucharest is an extremely densely populated city with 8,000 inhabitants per square kilometre) the region's average population density is 100 per square kilometre. The most sparsely populated areas are the Western region of Romania and the central parts of Romania and the majority of Serbian regions. Burgenland is also a sparsely populated region. In ageing population, regional level data are showing great differences. Several economically advanced regions have ageing population (Austria, Central-Hungary, West-Transdanubia and some of the neighbourhood of Bucharest). In the majority of regions in Danube macro-region the ratio of young generation overweighs the old-aged one. This is extremely true in all the Polish regions, and in the central and northern regions of Romania.
- **Economy.** All the countries of the Danubian Macro-region are less developed than the EU average. But a catching-up process can be observed in all countries. • Especially the catch-up of Slovakia is remarkable. The Danubian macro-region is remarkable also for the disparities within the region. The poorest region of the EU where the GDP per capita is less than 30 percent of the EU average are here (Sevarozapaden and Severen tsentralen in Bulgaria, Nord-Est in Romania). On the other hand, all capital city regions (Praha, Közép-Magyarország, Zahodna Slovenija, Bratislavsky kraj, Bucuresti-Ilfov) have higher per capita GDP than the EU average, in the case of Prague and Bratislava the double of the average).

Per capita GDP as percentage of the EU average

[34] This chapter is based on ET2050 *Danube Region Report* (HAS RCERS, 2012). The Danube region is integrated by the following countries: Slovakia, Czech Republic, Hungary, Croatia, Bulgaria, Romania with extensions to Moldova, southern Ukraine

	1995	2000	2005	2011
EU	100	100	100	100
Bulgaria	32	27	37	45
Czech Rep.	77	71	79	80
Croatia	46	50	57	61
Hungary	51	54	63	66
Romania	33	26	35	49
Slovakia	47	50	60	73

Rising unemployment is a serious problem especially for young people: in some countries youth unemployment rate may go as high as 40%. It is low-educated or professionally unskilled people who are the most badly hit by unemployment. East Central Europe has a growing tendency of youth unemployment but there are significant differences in this aspect among the member regions of the macro-region. However, the Czech Republic and Austria have low rate of youth unemployment. In these post-socialist countries the shutdown of big industrial plants and the collapse of agricultural cooperatives have resulted in a massive dismissal of employment surplus. On the demand side the following factors were increasing the ratio of unemployment: tensions in industrial structure, the shrinking size of internal markets, the transformation of firms, the new proprietary structure and privatization of firms. A specific challenge for the Danube region is the fate of the Roma population. 5 million Roma live in the Danubian Region, more than half of the World's Roma population. They were always poorer than the other groups of the population but their problems became acute after the change of the economic and political system in the Danubian Region in 1990. Before this change Roma people have found employment in the agricultural co-operatives, in the nationalized industry and in the building sector. After the change, there was no agricultural co-operatives, nationalized industry and even building industry employed less people than earlier. Roma people are in very critical situation. The EU and the member states prepared in 2009 a Roma strategy for the EU and for the member states but the time was not enough to achieve decisive results.

- **Territorial patterns.** Convergence processes have been favourable for the whole Danube region, but they have been most beneficial for capital cities. It means that the overwhelming part of GDP is produced in the capital-city-regions (in Bulgaria 48%, in Hungary 48%, in Slovakia 60%, in Croatia 47%). The sharp dividing line between German and Austrian, as well as post-socialist space persists, while a rearrangement of development rankings is taking place within the study area itself. Even accounting for differences in the level of data aggregation, the unambiguous winners of the process are capital regions, exploiting their role as metropolitan growth areas (in ESPON terminology, MEGAs). All of these regions have improved their relative positions, while a decline in relative development level has taken place in a number of non-central regions with a strong industrial character. No region outside capital regions has experienced a significant improvement in development ranking. This process highlights the heavily metropolitan character of high-technology manufacturing and knowledge-intensive high-technology services, as well as the functions of economic, financial and political control, where the higher tiers of the globally organised urban network predominate, and the competitive positions of functional urban areas (FUAs) lacking a critical mass are much less advantageous. The location of industry shows the strengthening position of a manufacturing integration zone stretching from the Vienna–Budapest corridor to south-western Poland, with strengthening linkages to Western European industrial networks, predominantly automotive industry. The development of supply networks and clusterisation processes follow the spatial structures of individual economic branches. The clusters of high-technology manufacturing and knowledge-intensive high-technology services follow the hierarchy of the urban network, with strong metropolitan concentration and the relevance of technology- and natural sciences-oriented universities. The favoured

spaces of clusterisation lie in western border regions, with gradual expansion along main transport corridors. The Danube has become the axis of urbanisation; commercial-industrial activities related to the river have contributed to a strong concentration of population on the upper and middle sections of the Danube. From the standpoint of the urban network, the middle section of the Danube has become a true axis of urbanisation (Linz–Vienna–Bratislava–Budapest), which has now extended to the South-East – towards Novi Sad and Belgrade. The lower section of the river is more sparsely populated and rural in nature. Urban system of Central Europe will be characterised by a number of specific features during the coming decades: a polycentric macroregional urban system constituted by monocentric national urban systems and a fragmented rural network, a high level of industrial employment in cities compared with European core regions, a high concentration of companies of international and national importance in capital cities, the weakness of the urban bourgeoisie and civil society outside Germany and Austria, an increase in poverty and in degenerating social strata, the poor condition of the built heritage and the slow disappearance of infrastructural weaknesses.

- **Energy.** The European Union is determined to increase energy security, diversification of the purchase, to avoid one-sided dependency. Important energy transport infrastructures cross the macro region: South Stream, large capacity gas pipeline that bypasses Ukraine and the EU so that the region is freed of the threat of Russian-Ukrainian gas disputes; The Nabucco gas pipeline system diversifies the sources of supply (Azerbaijan, Iraq, Turkmenistan and possibly Egypt), thereby it reduces the dependence of the EU on Russian gas. However, the number of participants of the project and the direction of the pipeline became uncertain by May 2012. From 2020, the region's nuclear power plants will deliver electricity supply to Germany as well having closed down its similar facilities.
- **Transport.** Mono centrism, centred in capital cities, became natural in structuring the long-distance highway/ motorway network and rail network in the 20th century – degrading decentralization and regional development efforts drafted in the documents of the various political systems following each other. Nevertheless, in the last 15 years a considerable network of motorways had been constructed in the region, especially in Croatia, Hungary, and Slovakia and in the Czech Republic. Unfortunately, transport on the Danube is significantly less than 20 years ago. During the war in the former Yugoslavia important bridges on the Danube were destroyed and traffic was stopped. After the war the bridges were rebuilt but traffic remained very small.
- **Land-use** is expected to move towards stronger urbanisation in selected urban areas (capital cities and cities with good growth prospects), especially in the Western Balkans, where urban sprawl has already been observable, and metropolitanisation is proceeding at a brisk pace. Suburban growth is comparatively limited at the moment. The continuing relevance of home ownership in these states (partially in the absence of a strong rental market) will be an important factor in the process. Urban planning is currently unprepared to manage these processes, and fundamental changes are unlikely, or expected to be slow.

  Rural areas undergo the loss of population and sometimes a reduction in land-use intensity, especially in distant (mountainous) areas, with potentially accelerating instances of the complete abandonment of settlements due to depopulation, but gain relevance as second homes in attractive locales and suburban growth areas in the proximity of developing agglomerations. Unlike Western Europe, selected rural areas undergo a form of ghettoisation due to the increasing concentration of disadvantaged groups.

  Roadway networks will be one of the influential forces in land-use development. While transport networks are essentially "finished" in Western Europe, and well-developed in specific countries on the southern periphery, even the main transport axes can be missing

in CEE. Balkans countries, especially, are affected by a low motorway density, and will encourage the development of these networks even if they fall out of favour in Western European policy.

Another factor shaping rural land-use patterns is EU policies encouraging specific forms of usage (energy, forestation, recreational and reserve areas). National policies also play a part, e.g. Hungary, where forest management and reserve areas have traditionally enjoyed strong attention. Forestation and reforestation are both trends which can be expected to continue, coupled with the reclamation of agricultural land. Market conditions and public policies will both shape the emerging configuration of land-use.

A specific issue of the Danube region concerns river management and flood control, as along the length of the Danube, Drava (the Hungarian–Croatian border river), and especially the Tisza in Hungary, flooding is commonplace and the area of land where flood prevention is required is larger than the equivalent in the Netherlands. An added issue is the cross-border nature of flood control, as some relevant rivers are border rivers, or cross several countries – the Danube first and foremost. This area has been, and is expected to remain a key area of cooperation, including non-EU countries, i.e. Ukraine–Romania–Hungary. It is possible that with changing land-use patterns and the increasing importance of conservation, initiatives towards the partial re-flooding of selected areas and the expansion of wetland reserves will take shape in the following decades, in Hungary, Western Transylvanian regions in Romania, Vojvodina in Serbia, as well as around the Danube Delta.

- **Environment**. Those dependent on the Danube will need to prepare for direct climate change impacts including more frequent flooding and longer periods of drought. Indirect effects can include worsening water quality, loss in diversity of flora and fauna, including fish species as well as other environmental benefits and services that we have come to take for granted.
- **Governance.** In the whole Danube region the EU has become the dominant factor, the operator and financing agent of external and partially of the internal integration. The Euro-regional initiatives and the different EU funding programmes directly convey the expectations and reactions for the outsiders. There is no region in the area which is not linked somehow to the EU programmes, not receiving some kind of institutional, technical and financial support.

Strengths	**Weaknesses *(Structural unbalances)***
Skilled workforce, valuable economic traditions Lower production costs Improving infrastructural connectedness, FDI inflows into manufacturing, Favourable environmental conditions, low pollution in comparison with the EU-15, Abundant natural resources in Balkans countries, especially Bosnia–Herzegovina and Albania, Danube as a connecting source of identity and communication & innovation axis	Low economic activity rate, high relevance of informal economies Underdeveloped urban centres (FUAs) without a critical mass, the dominance of capital cities, Undercapitalised economies, over-reliance on FDI, Dual economies: competitive exogenous MNCs and underdeveloped indigenous enterprises, Predominant foreign ownership in strategic sectors Low internal demand and fragmented internal markets, Large but inefficient public sector, Weak civil society,
Opportunities	**Threats**
Integration into European and global value chains, continuous industrial upgrading, Growing service economies, Favourable capital attraction conditions, Knowledge-based development on the basis of university poles, State reform initiatives, Market expansion towards the EU core and third countries, as well as the exploitation of internal markets with rising	Capital-centred development without broader catching-up, increasing core–periphery dichotomy Ageing population, Continuing marginalisation of specific social groups, especially Roma, Dependent power relations and increasing profit repatriation, Losses in human capital due to immigration, Energy security challenges coupled with growing demand,

living standards, Unexploited, diverse tourist and natural reserves potential	"Frozen conflicts" in the Balkans, postponed EU-integration, Delocalisation of production towards the Far East Political marginalisation in a "core vs. periphery" EU development scenario; preserved "second-tier" membership, Inadequate preparedness for climate change scenarios,

Eastern Europe[35]

- **Demograhpy.** The countries concerned vary considerably in terms the trajectory of demographic processes. In 2009 and 2010 Poland had a population growth rate of 0.9/0.9 per mille whereas the respective figures for Ukraine were -4.2/-4.4 with Belarus recording 2.7/ 3.1. The age structure of population in those countries has been systematically deteriorating given the very fast growth of population past the productive age and the shrinking number of newly born children. The balance of foreign migration in 2008 and 2009 per one thousand inhabitants was -0.7 and 0.0 in Poland, +0.8 and +0.5 in Belarus, with no data available for Ukraine. The average life expectancy for women and men in 2009 was respectively: 80.1/71.5 years in Poland, 73.9/62.3 years in Ukraine and 75.9/64.3 years in Belarus. Over the last two decades the average life expectancy in Poland has increased by approx. 5 years whereas the indicators for Ukraine and Belarus have stabilised at their current low levels. Population density per square kilometre amounts to 122 people in Poland, 76 people in Ukraine and 46 in Belarus.
- **Economy.** The Gross Domestic Product (GDP) per capita at purchasing power parity (PPP) in Poland exceeded 61% of the UE-27 average in 2009. In 2010 the GDP per capita at PPP was USD 19,752 in Poland, USD 6,874 in Ukraine and USD 13,951 in Belarus. Such strong variation results from Poland's successful transformation and EU accession in 2004 while Ukraine and Belarus remained at the margin of modernisation processes, with no openness in their national economies. The economic crisis which began in 2008 largely bypassed Poland, significantly hitting other European economies, including Ukraine: its GDP in 2009 fell by approx. 15% whereas Belarus recorded no changes in that year. This led to significant problems in external debt servicing for Ukraine and Belarus.

  In 2010, the volume of exports per capita totalled USD 4,184 in Poland whereas the respective figures were USD 1,123 for Ukraine and USD 2,667 for Belarus. The isolation of Belarus is clearly evidenced in two indicators: the number of foreign tourists per 1,000 residents and tourism revenues in 2008. For Poland, those indicators reached, respectively, USD 12,960 and 11,771 million. Ukraine recorded USD 25,449 and 5,768 million (with Russians accounting for most tourist traffic) whereas Belarus achieved merely USD 91 and 363 million. This stems from the perception of Belarus in the European Union as a country which remains outside Europe and its essential changes in economy and civilisation have slowed down. Thanks to a sound business environment, Poland is among top ten destinations of foreign direct investments (FDI). Ukraine leverages FDI opportunities only partially whereas Belarus is bypassed by foreign investors.
- **Territorial patterns.** The systemic transformations towards market economy in the three countries led to the aggravation of inter- and intraregional disparities. The main

[35] This chapter is based on ET2050 *Eastern Region Report* (SGH, 2012). The Eastern Region region is integrated by the following countries: Poland with extensions to Belarus and northern Ukraine

beneficiaries of those transformations were the capital cities of the three countries, i.e. Warsaw, Kiev and Minsk, with benefits derived also by other large cities which were centres of various services. Those opportunities were leveraged to the lowest extent by rural areas with an important role of agriculture, many of them with a peripheral location. As regards Poland, Western regions are in a much more favourable situation in comparison with the Eastern parts of the country, located along the external EU frontier. The structure of production capacities in Ukraine and Belarus is essentially different and resembles a jigsaw puzzle, with a good position of Eastern regions. Of crucial importance are the disproportionate levels of development between the three countries, whereas differentiations within each country are much less marked. It is observed that the spatial structure of Poland is polycentric, with a few almost equally important business hubs: a situation which generally facilitates socio-economic growth. This pattern is found in Ukraine to a lesser extent with Belarus decidedly falling behind.

Poland can boast high-quality strategic documents concerning territorial issues, both at the national level (National Spatial Development Strategy 2030; National Regional Development Strategy 2020), as well as the regional level (spatial development strategies and plans). Ukraine has launched wide-ranging studies, primarily of diagnostic nature, some of them supported by Europe Aid. They should lead to the territorial dimension being incorporated into public policies. The new generation strategic thinking about territorial development is absent in Belarus.

- **Knowledge base.** The R&D expenditures as a proportion of GDP in 2009 accounted for merely 0.68% in Poland, which is a disastrously low percentage. There is no information about the scale of such expenditures in Ukraine and Belarus but they are presumably even lower. Poland has declared that the ratio will increase to 1.9% by 2020. The problem lies in the very low R&D expenditures in the private sector (industry) and very strong territorial differentiation in the scale of such expenditures: two Polish regions are among the bottom ten NUTS 2 areas. Poland's contribution within framework programmes is higher than the funds transferred to this sector as a result of competitions. There is a very strong territorial concentration of the R&D potential in a handful of major centres (Warsaw, Cracow, Poznań, Wrocław). Opportunities arising from R&D networking in a variety of frameworks are not utilised. All the countries have high ratios of students per 10,000 residents in the 2008/2009 academic year: 564 in Poland, 619 in Ukraine and 615 in Belarus. The number of Internet users per 1,000 residents in 2010 reached to 623 in Poland, 317 in Ukraine and 230 in Belarus.
- **Transport.** In Poland we are dealing with generally low yet geographically diverse territorial accessibility, both for goods and for people. This results mostly from the country's peripheral location within the European Union. As a consequence of spatial isolation, many cities and subregions are excluded as potential destinations of foreign direct investments. Accessibility deficits are recorded both in terms of the insufficient quality and density of TEN-T networks, as well as inter- and intraregional frameworks. Generally, the external accessibility of Western Poland is much better than that of Eastern Poland. An important problem is that the connections between metropolitan centres have been improving too slowly. The systemic transformation and EU membership brought serious lateral shifts in streams of transit traffic (from South West to North East, and from South East to the West). The largest deficits are recorded in the case of quality and speed of rail transport. Poland has virtually abandoned the idea to develop high-speed rail by 2030. Recent years have seen a considerable quantitative and qualitative expansion in the scale and network of air transport, which often compensates for the weaknesses of land transport. Since 2004, many essential transport connections, mostly roads, have been financed under the European cohesion policy. Despite investments in ring roads, traffic segregation, photo radars etc. Poland still has one of the highest road traffic

mortality rates in the EU. Public transport investments in major cities play an important role, including city rail transport and integration of transport systems within metropolitan areas, which has become one of the priorities of the European cohesion policy in Poland.

The external frontier of the European Union represents a barrier to the development of connectivity and to socio-economic growth of Ukraine and Belarus due to the customs frontier for goods, constraints in the movement of persons resulting from the Schengen Agreement and rigorous phytosanitary and veterinary requirements. Despite the priorities identified under the European Neighbourhood and Partnership Instrument, the number of border crossing points is insufficient, with their equipment and capacities being too low to handle the existing traffic streams. Additionally, numerous pathologies on the frontier constrain cross-border relations. Of importance for Poland and Ukraine is maritime transport (respectively: Baltic Sea and Black Sea) with ports acting as gateways. The quality of transport infrastructure in Ukraine and Belarus is in even more critical condition than in Poland.

- **Land use.** The countries concerned are generally characterised by a very low degree of spatial order, which results from: investors' pressure to gain access to the most valuable areas, privatisation and appropriation of many unique resources, degradation and insufficient quality of public space. The systemic transformation largely accelerated the process of uncontrolled suburbanisation, which is evidenced in the chaotic outflows of built-up areas around large and medium-sized cities. This is caused, among others, by weaknesses in legal regulations concerning land use planning. On the other hand, weaknesses of spatial planning generally do not affect the protection of forests and natural resources whereas the improving environmental awareness among the public facilitates preservation and protection of crucial resources such as fertile soil, ores etc. In Poland, the new generation of local physical plans only partially cover the most important areas which play a crucial role for the county's development. This kind of analysis is also sometimes found in Ukraine.

- **Environment.** After 1990 the three countries saw an improvement in the quality and condition of their natural environment. This stemmed indirectly from the restructuring and changes in the sectoral structure of their respective economies and the national product (deindustrialisation), entailing a radical reduction of dust and gas emissions, improved quality of water management, reduced contamination of surface waters, lower quantities of solid waste and improved management of such waste. Societies of those countries demonstrated increasing sensitivity to the condition of the natural environment, with environmental organisations gaining the status of an important partner for public administration. Traditionally, the three countries had relatively effective solutions in place to protect their most valuable natural resources and landscapes, such as national parks, nature reserves etc. In Poland, additionally, the European integration process played an important part: introduction of environmental impact assessments, 'polluter pays' principle etc., considerable support for environmental investments under the European cohesion policy, efforts to achieve compliance with the acquis in terms of EU environmental standards, introduction of integrated environmental monitoring, as well as work related to the integrated system of nature protection areas NATURE 2000.

  In Ukraine and Belarus, liquidation of the aftermath of the Chernobyl nuclear disaster was an important factor in the past decades. Poland has no nuclear power plants, and the debate about building such plants is in progress. Given the structure of energy supplies from domestic resources, where coal plays a significant role, Poland and Ukraine find it very hard to fulfil the expectations concerning a significant reduction of carbon emissions. In Poland, the share of energy from renewable resources has significantly increased in the past few years, partly as a result of investments conducted within the European

cohesion policy. According to estimates, climate change has a generally neutral impact on the situation in Eastern Europe. Of particular importance, however, are extreme weather phenomena, notably floods, which have become more frequent than in the past.

- **Governance.** The situation of the three countries is quite different in this respect, due to their respective integration trajectories. For Poland, the European Union has become a catalyst of many important socio-economic changes. Starting from early 1990s, Poland was a beneficiary of the PHARE programme. The association agreement guaranteeing access to the EU market came into force in February 1994, and preparations for EU membership meant that Poland's legislation had to be brought in line with that of the EU (acquis communautaire). The accession, which took place on 1 May 2004, enabled Poland to leverage the European cohesion policy facilities. After 1990, Poland profoundly reformed its territorial public administration structure, establishing local governments at the level of cities and municipalities. At the second stage of the reform, which started in 1999, self-governing regions (voivodships) were established. Territorial government units are based on elected representative bodies, their own budgets and competencies in local and regional matters. The new voivodships, 16 in total, became NUTS 2 areas. After Poland's accession those voivodships managed approx. one third of structural funds and the Cohesion Fund facilities. Radical modernisation of public administration is one of the effectively implemented cohesion policy priorities. Multi-level public governance is a new phenomenon, enabled by the ever improving culture of collaboration between various stakeholders. Much as in Ukraine and Belarus, Poland has traditionally been weak in terms of civil society, which is evidenced in its deficits with regard to various institutions enabling citizens' activity. The low social trust makes it harder to establish public-private partnerships and other forms of collaboration between various stakeholders.

  Despite economic transformations across Europe, various benefits of European integration were, regretfully, unavailable to Ukraine and Belarus after 1990s. Those countries have centralised decision-making systems, which is manifested, among others, in the absence of independent local governments that would be equipped with core competencies. In the case of Ukraine, the existing forms of political discourse led to the freezing of ratification of the already-negotiated association agreement in 2012. Moreover, Belarus has been subjected to various restrictions by the European Union as a consequence of human rights violations and various insufficiencies of democracy. This essentially slows down the process of building economic and social connections with the European Union and the achievement of the required standards in law and civilisation. It is also believed that corruption is a widespread phenomenon in those countries.

Strengths	**Weaknesses *(Structural unbalances)***
Poland is among the poorest EU member states but with a strong developmental potential Poland stands out in terms of its entrepreneurial spirit Labour costs are lower in Poland than in Western Europe Natural environment resources represent a developmental opportunity Polycentric spatial development in Poland Numerous factors accelerating economic growth Rich cultural heritage resources High adaptive capacities of Polish businesses	High unemployment rate as a key problem Weaknesses of R&D Improvements in infrastructure as a precondition for development Increasingly diverse degrees of development across Poland's regions The need for improvements in administration
Opportunities	**Threats**
Intensifying integration and globalisation processes Prospects of further EU integration Poland's EU membership Favourable international environment Ensuring the inflow of foreign direct investments	Intensifying emigration processes Issues in supply of energy and basic materials Growing threats to natural environment International conflicts which affect the economy

West Mediterranean Region[36]

- **Demography**. Significant slowdown in what is still a high annual rate of population growth in the south of the region (e.g., Morocco, Algeria, Tunisia), mostly due to a faster than predicted fertility decline. Despite migrations in the 2000 decade, the ageing of population is a concern in the northern countries of the region (e.g., Spain may have population losses after 2030). Labour shortages in the north of the region in the mid term will need to be met from new immigration (considering economic recovery), and a persistent heavily labour supply surplus in the southern-rim countries, but with net entries into the labour force starting to decrease sharply from 2015. In the northern rim, urbanization rate will moderate, adding only around 250.000 urban dwellers a year, compared to very high average annual growth in the south, around 4 million per year. Migratory flows were very high between 1997 and 2007 in Spain and Portugal during the period of economic growth, and stopped thereafter, even slightly inversed. In 2006, Mediterranean Europe (ES, FR, IT, GR) welcomed as a whole over 11 million foreign residents, and in Spain 20% of foreign residents hail from other Mediterranean countries (especially Morocco).
- **Economy.** Most important trade partner for Tunisia and Morocco is the EU (70% and 57% of their trade). However, while EU countries remain essential export markets (80% and 70% of exports respectively) suppliers have diversified to the advantage of the rest of the world. In any case, the strong Euro-Mediterranean interdependencies are likely to continue to increase. Tourism is an important circulatory flow of people for the region. International tourist arrivals more than quadrupled between 1970 and 2005: in Spain there were 57 million visitors in 2011 (against 42 million in 1998), in Portugal 13 million in 2006, in Morocco 9,2 million in 2011 (against 1 million in 1990 and 5 million in 2004), in Tunisia 7 million in 2008, but in Algeria only 0,2 million in 2006. In 2003, more than 87% of tourists in the Mediterranean countries came from Europe. Increasing of residential economy in coastal areas of Southern Europe: demographic ageing and the increased spending power of some older age groups has prompted a growing trend to utilise their role as popular retirement destinations to boost economic growth. Development of a region's residential economy usually focuses on consumer services, health, leisure, culture and education, tourism, financial services and home related services. The jobs created are often relatively poorly paid, and low skilled. There is a perceived risk that the dominance of these activities could discourage development of higher value-added activities for which more skills are required. This could increase the fragility of local economies. Foreign direct investment (FDI) flows have been noticeably increasing since the turn of the century, although they are still far from reaching the levels which would be needed for any notable effect to be felt in terms of capital accumulation and increased productivity. Mediterranean Partner Countries continue to comprise the region in the world with the lowest levels of trade integration between its countries, with little more than 5.7% of their total trade.
- **Territorial patterns.** Urbanisation has been particularly growing along the coastal strip of West Mediterranean countries to accommodate both permanent and temporal population. This phenomenon is much more acute in Europe than in Africa, and especially important in Spain. The result of a substantial urbanisation of the coast has adverse effects on the quality of the environment. The predominant pattern of residential urbanisation is diffuse settlements adjacent to or disconnected from concentrated urban centres. Residential sprawl is on average responsible for more than 45% of coastal zone land transformation into artificial surfaces. There is an increasing demand for investment in coastal

[36] This chapter is based on ET2050 *South-West Med Report* (MCRIT, 2012). The Western Mediterranean region is integrated by the following countries: Spain, Portugal with extensions to Maghreb countries (Morocco, Algeria, Tunisia)

residences due to tourism and leisure from northern Europe. In addition, there is also domestic demand from the inland population, e.g. the retired.

- **Knowledge-base.** The Western Mediterranean Region ranks low on knowledge base. The region experiences a gap between its southern and northern shores, not only with regard to development, but also in relation to research, technological development and the production of knowledge in general. However, even if the situation is much better in Spain and Portugal than in the Maghreb, there is a substantial gap between the situation in these countries (e.g. R&D investment as a share of GDP) and other central and northern regions in Europe. The Western Mediterranean region remains relatively poor in terms of attraction of innovative companies, both with regard to volume and sectors. The Human Potential is the keystone of a policy for knowledge production and competitive R&D. Even in the southern rim the human potential becoming involved in research is on the rise despite reservations with regard to quality.
- **Energy**. The Mediterranean basin holds a significant potential for renewable energy sources (RES), particularly in terms of solar and wind energy. RES represented 12% in 2010 of Portugal's primary energy consumption (and 52% of electricity consumption), and 9,5% of Spain's primary energy demand in 2010 (and 35% of electricity demand). The situation in the southern rim is more modest. As of now, their contribution to meeting the demand is still relatively low. Increased hydraulic stress coupled with the increased frequency of extreme climatic events can be a drop in hydro-electric potential and the cooling potential of thermal plants (reduced yield). The Maghreb–Europe Natural Gas Pipeline Project (Gazoduc Maghreb Europe; GME) involved the construction and operation of a 1,620km pipeline system to bring gas from the Hassi R'Mel field in Algeria, across Morocco and the Strait of Gibraltar, to interconnect with the gas grids of Spain and Portugal and into the rest of the western European gas transport system.
- **Transport.** The Mediterranean offers a route for exchanges of manufactured products between Europe and Asia, as well as for the supply of Europe with energy products from the Gulf countries. Around 24% of the goods tonnage consists of energy products, with non-bulk goods accounting for 36% of the total. Container traffic originating in Asia and bound for European countries is preferentially unloaded in the ports of the northern range. The performance of Mediterranean ports remains insufficient to actively compete with northern European ports. However, some Mediterranean ports accommodate relatively large container traffics, e..g. Port Saïd (Algeria), Tanger Med (Morocco), Algesiras, Valencia and Barcelona (Spain), Marseille (France), Marsarxlokk (Malta) and Gioia Tauro, Genoa, la Spezia, Taranto (Italy), in most cases dedicated to transhipment activities. Most of the main container ports in the Mediterranean have development or expansion plans in place to keep pace with containership growth and operator requirements. Relatively good transport road infrastructure in the northern Mediterranean rim, important deficits in the southern rim though being addressed, especially Morocco.
- **Environment.** The impacts of climate change with major direct physical consequences for human activity are: the water issue, already central to sustainable development concerns in the West Mediterranean (particularly to the Southern countries) because it is so scarce, will be a key factor through which the effects of climate change on human activity are expected to spread; tourism: the climate is an essential component in the choice of tourist destination. If heat-waves and summer temperatures increase, creating problems with water resources, the Mediterranean regions could end up becoming less attractive than more northern climes. Some estimates suggest that 1°C of warming by 2050 could drive tourist numbers on the southern shores down by 10%; The coastal zones: Greater exposure of infrastructure to wave action and coastal storms could be

cited as one of the most serious effects. The same problems will be faced by port installations, lagoon areas, and delta.

- **Land-Uses.** Within the 10 km coastal zone, urban surfaces are dominant on the first kilometre from the shoreline. In several coastal regions of Spain (like in Italy and France) the coverage of built-up areas in the first kilometre coastal strip exceeds 45 %. Land use changes in the West Mediterranean are mostly conversion from other land covers to agriculture (especially in the southern rim) and urban uses (especially in Spain and Portugal).
- **Governance.** International cooperation policies and economic reforms in the northern rim (and also in the southern rim, to a lower extent) of the region have been focused essentially on reducing state involvement, trade liberalization, withdrawing subsidies and privatization. There are a number of political and institutional initiatives if cooperation in the region: Union for the Mediterranean (UfM), Euro Mediterranean Free Trade Area (EMFTA), Mediterranean Sea Basin Programme as a part of the new European Neighbourhood Policy (ENP), EU-Morocco Action Plan, EU-Tunisia Action Plan, Trans-Mediterranean transport network and Regional Transport Action Plan, Coastal Zone Policy: ICZM Protocol to the Barcelona Convention, Inter-Mediterranean Commission (IMC).

Strengths *(*Mediterranean *way of life)*	**Weaknesses *(*Structural *unbalances)***
Large cities with advanced activities Cultural heritage Weather conditions in the coast Relatively good infrastructure, even in Northern Africa (ports and roads) Space availability in the interior rural zones Tourist infrastructure Agricultural potential competitiveness Younger populations Cultural diversity because of very diversified migration	Unbalanced economy Lack of research and development Limited number of corporations in more advanced sectors Social Inequity Regional unbalance Public institutions capacity Democratic deficits (especially in Northern Africa) Excess of density in the coast Lack natural resources in the North Low-scale agricultural production
Opportunities (*Emerging economies*)	**Threats (*A turbulent* neighbourhood)**
Increase of foreign investments on logistics (in relation to the Asian markets) Increase of foreign investments on industry in the South Increase on tourism at global level Energy resources in the South Fisheries Young active population in the South	An uncontrolled rise in illegal migration Water scarcity Continued paralysis of Euromed cooperation as a consequence of the Arab-Israeli conflict A lack of convergence to EU levels of income Cultural and political conflicts Social conflicts linked to unemployment, specially in the South Environmental deterioration in the Mediterranean Climate Change

Central Mediterranean Region[37]

- **Demography.** Italy and Egypt stand out with a total number of inhabitants of, respectively, sixty and eighty million people. Slovenia and Libya are instead relatively smaller inhabited respectively by two and six million people. Italy currently faces two major demographic trends: ageing population (Italy is the second oldest of the world) and growing immigration. Slovenia faces demographic challenges similar to Italy. Libya has a yearly growth rates reaching 6 per cent per year, partly, because the process of increasing immigration from bordering countries; at the same time, Libyan citizens are

[37] This chapter is based on ET2050 *Central Mediterranean Report* (Politecnico di Milano, 2012). The Central Mediterranean region is integrated by the following countries: Italy, Slovenia, Malta with extensions to some Mashrek countries (Libya, Egypt)

keener to flee from their Country the higher their education level. Egypt experienced a steady positive rate of population growth in the last century. Over 40% of Egypt's population is aged 20 and under, the median age is only 24, with a meagre 5% of the population being 65 and over. This massive labour force represents a major strength for Egypt's economy, although a relative lack of jobs pushes Egyptians to emigrate. This trend is likely to remain quite stable in the next years and should be taken into account when drawing inference on the possible migration flows from this Country to Countries belonging to the EU

- **Economy.** Italy and Slovenia belong to the OECD, have GDP levels similar to the advanced part of the EU27, and reached a relevant stage of development. As such, they currently face two major problems: maintaining a good balance between increasingly conservative approaches to public spending and regaining momentum in growth performance; fine-tuning of the national pension system, stressed by reduced spending capability and ageing population. These two countries, therefore, may be more sensible to scenarios where the current public spending patterns are subject to an even stronger pressure, for instance because of lower future growth of countries belonging to the EU. Libya and Egypt, instead, belong to the middle income group as defined by the World Bank. They experienced relevant growth rates in the last decades, pushed mainly by the large availability of natural resources (in the case of Libya) and the vast number of young people in their working age (as for Egypt). They are, however, currently experiencing a period of political turmoil, with the recent fall of long-lasting regime and uncertainly about the identity and nature of future ruling parties.

- **Territorial patterns.** In terms of urbanisation rates, Italy and Libya host two thirds to three quarters of their population in urban areas; however, this datum for Libya clearly reflects the barren nature of this Country (in 2010, less than one per cent of the Country's surface was arable, according to World Bank data) and 84% of total population lives in costal areas. At the same time, Egypt (also with a vast share of national soil made up of desert land: arable land covers just 3 per cent of the Country's total soil) and Slovenia host less than half of their population in cities. In Italy, the distribution of the Country's population shows a massive concentration of the center of gravity in the largest urban areas. Therefore, a sprawl process involved large urban agglomerations in Italy in the last decades, with growth taking place mainly outside large municipalities, but connected to the creation of jobs in the core areas. Italy's Southern and Northern regions have been traditionally characterized by a major GDP gap. While far from reducing, internal regional divisions have at least remained unchanged in recent decades. Slovenia presents some relevant internal spatial imbalances, mainly due to the rural/urban dichotomy. The benefits of the fast convergence against the EU are not equally distributed across space, with a strong core-periphery pattern. Central Slovenia's GDP is currently above the EU27 average, whilst the Pomurska region, bordering Hungary, is below half of the mean EU value and predominantly characterized by agricultural activities. In Egypt, 98 per cent of total Egypt population lives in just 3 per cent of the total Country territory, concentrated over the land made arable by the river Nile.

- **Knowledge-base.** The South Mediterranean Region is highly diversified within its boundaries. On the one hand, Italy and Slovenia belong to the OECD, have a well-trained and sectorally diversified labour force, with good levels of education. On the other hand, Egypt and Libya are relatively behind, with relevant portions of the population without formal education. Relevant, in particular for Egypt, is the gender divide, with the female portion of the population receiving less education than the male one. While therefore Libya and Egypt may still walk a long way in traditional human capital investment (viz. formal education, available for as many citizens as possible), Italy and Slovenia will be likely to pay attention to their ageing knowledge base. In these countries, a major risk is

the depreciation of their human capital stock, which can be arrested (or inverted) only with major improvements in their education systems.

- **Energy.** Libya stands out in this field with respect to other countries in this region. In fact, Libya's economy heavily draws on its natural reserves. In particular, the Country hosts about 3 per cent of total world oil reserves (the 8th largest figure in the world) and the 22nd largest natural gas reserve. On the contrary, Italy, Egypt and Slovenia are mostly dependent on energy imports. All these countries access gas reserves located in Northern Africa (Algeria and Tunisia) and trade oil with oil-producing countries; all these countries need therefore also to think strategically about their location within international oil trade networks. Among all four countries, only Slovenia produces energy from nuclear sources.

- **Transport.** Italy stands out in this respect. A rich and dense transport infrastructure network has been recently updated with fast trains connecting the major cities in the North and in the Center of the Country. Its key geographic position between the core economic regions of the EU, North Africa, and the Balkans grants accessibility to crucial trade routes. Slovenia enjoys a favourable position as the key of trade routes between Central Europe and the Balkans. Currently, it represents the South-East border of the EU27 (a position which will be overrun if Croatia will access the Union). Its transport infrastructure may still benefit from further investment. Libya and Egypt face the Mediterranean sea from its southern shore. These Countries are the final gate to Southern Europe, because of their strategic position for the trade routes between Sub-Saharan countries and the EU. Besides, Egypt enjoys the crucial role of the Suez canal for the East-West trade routes – in fact, In fact, as much as 8 per cent of total seaborne trade is deemed to pass through this canal.

- **Land-Uses.** Libya and Egypt are clearly disadvantaged by their soil structure. In both countries, almost available surface is barren, which limits the availability and scope for transport infrastructure but also – and especially – for agricultural use. On the other hand, this creates the rationale for a compact urban system, with the coastal areas being most attractive for urban location. Slovenia is mostly mountainous, with around 90 per cent of the surface of the country at least 200 meters above sea level. The Country is affected by a relevant rural/urban dichotomy, which is correlated with non-negligible spatial imbalances. Its surface is mostly covered in forests, which causes risky trends of deforestation and diminishing availability of agricultural land. This fosters the risk of non-sustainability of the development process in terms of the environment and future urbanisation processes. Italy, finally, suffered from relevant soil consumption in the era around its first economic boom (following WWII). Large portions of the Country, previously used for agricultural purposes, have been urbanised. This process is a relevant deviation from the Country's long-term urban planning tradition, and needs major amendment if Italy wants to maintain equilibrium on its territory.

- **Environment.** For all examined countries, a major theme of analysis, with relevant scenario implications, may be their long-run capability to invest in territorial quality. Environmental sustainability is in fact not only an issue of collective wealth, but also for territorial competitiveness. In fact, relatively fertile countries like Slovenia and Italy risk the rapid depletion of their natural capital, because of its over-exploitation. At the same time, countries like Egypt and Libya, where the surface available to economic exploitation is much smaller, must invest in maximizing the sustainability of their environment use, in order to prevent from stealing from future generation's wealth.

- **Governance.** These four countries belong to a relatively geographically homogeneous Area. Clearly, their potential for economic and cultural cooperation is relevant. All four countries share the fact of being a potential gate of access to other regions (Libya and

Egypt as a gate to Sub-Saharan countries, Italy to the core European area, Slovenia bordering the Balkans and Central-Eastern Europe). However, major political differences, coupled – in the last few months by political unrest in North Africa and the economic crisis in Europe – caused major concerns in this respect.

Strengths	**Weaknesses *(Structural unbalances)***
Excellent regional positioning on major trade routes) Diversified economy (Italy, Slovenia) Natural resources (Libya) Cultural heritage Natural capital Competitiveness on some high-tech, high-value added sectors (Italy)	Population ageing (Slovenia, Italy) Excess labour force (Egypt) Dependency on natural resources, viz. non-diversified economy (Libya) Relevant public debt (Italy) Low education of the labour force (Egypt, Libya) Water scarcity (Egypt, Libya)
Opportunities	**Threats**
Attractiveness for tourism Young labour force (Egypt) Likelihood of fast technological catch-up	Political instability (Libya, Egypt, and to a lesser extent Italy) Dependency on imported energy sources Diplomatic challenges (EU countries in the world arena, north-African countries bordering politically-unstable countries) Reducing pool of available Mediterranean fish Climate change, with risks of further desertification (Egypt, Libya)

East Mediterranean Region[38]

- **Demography.** Demographic trends are heterogeneous between and within the countries depending on economic, social, cultural and spatial factors. Challenges that need to be met are: the spatial concentration of positive or negative demographic development, the depopulation, the ageing population and migration. Regarding population growth at national level the EU members have experienced a modest increase in population through the last years mostly caused by immigration. On the contrary, the non-EU countries have lost a significant part of their population due to emigration. The demographic development in the EU member states follows the European trend of an ageing population. The main problem in those countries is the ageing of the population with all the connected strong impacts on the social and health services and the labour market. On the other hand, the candidate countries follow two different routes. Countries like Serbia, Montenegro and Albania seem to have a strong positive balance between birth and death rates offsetting emigration and keeping population on a growth path. The weak economic performance and lacking perspectives are the main motivating factors stimulating external migration. Notable are the emigrant outflows coming from Greece, Serbia, Montenegro, Bosnia and Herzegovina and Former Yugoslav Republic of Macedonia. Within EU, there is generally a shift of population from east to west with the exception of some parts in the examined macro-region such as Cyprus. Cyprus clearly succeeded in gaining population during the second half of the 90s with being in the group of regions which heavily improved their positions. Regarding the islands, the main handicaps are found in islands where a minimum population threshold, 3,000/4,000 habitants is not reached. These islands, experiencing a declining population, see their access to physical and social infrastructures and other general services becoming worse. On the other hand the Middle East has experienced an increased rate of population

[38] This chapter is based on ET2050 *South East Mediterranean Region* (University of Thessaly, 2012). The South-eastern Mediterranean region is integrated by the following countries: Greece, Cyprus, Albania, Kosovo, Macedonia, Serbia, Montenegro, Bosnia and Herzegovina with extensions to (Turkey, Armenia, Georgia, Syria, Lebanon, Jordan, Israel, Palestinian territories);

growth over the past century. Improvements in human survival, particularly during the second half of the 20th century, led to rapid population growth in the Middle East and other less developed regions. The introduction of modern medical services and public health interventions, such as antibiotics, immunization, and sanitation, caused death rates to drop rapidly in the developing world after 1950, while the decline in birth rates lagged behind, resulting in high rates of natural increase (the surplus of births over deaths).

- **Economy.** The analysis of the GDP per capita performance revealed that the area is far from being cohesive since it includes the Balkans and Greece facing severe problems of economic instability due to the economic crisis and Cyprus being an exception. With reference to the economic activity level and growth performance two patterns are visible in the area since economic strength is obviously influenced by the status of EU integration: old EU member countries are usually performing better economically than new EU member states, which in turn perform better than EU candidate, potential candidate and other countries.
- **Territorial patterns.** The eastern countries of the Mediterranean report accelerated urbanization (3.6% over the period 1970-2000). By 2025, urban population would reach 220 million in the Eastern and Southern countries (151 million in 2005) and 156 million in the countries of the European rim (140 million in 2005). A third of this growth would take place in the Mediterranean coastal regions. The political or economic capital cities and the several-million metropolises are thirty in the Mediterranean, though they accommodate only a third of total urban population. The medium and small-sized cities – numbering 1450 – are experiencing a steady growth, whereas they lack resources and technical capacities. The extent of decentralization in these countries is still quite weak, particularly on the financial level. The expansion of cities is mainly induced by the dynamism of unregulated housing. According to countries and cities, between 30 and 70% of city-dwellers cannot have access to housing unless they resort to informal channels for the purchase of building land plots. This results in the development of derelict areas on the outskirts, with difficult access to water, sanitation and other basic facilities.
- **Knowledge-base.** The research and development (R&D) system includes universities, other public and private R&D facilities, science and technology parks, innovation and transfer centres while universities and science centres are concentrated in urban areas or in regional economic centres. According to national strategies for innovation and technology the countries in the area are more or less provided with technology parks, innovation and transfer centres. In the EU member states such facilities are essential partners of implementing the national and regional innovation strategy. In the new member states such institutions were established during the transformation process while in the candidate, potential candidate and third countries such facilities and institutions as well as adequate strategic concepts are missing.
- **Energy.** There is a certain typology that can be found in the Eastern macro-region and especially in Greece and its islands. This includes 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 group is an important asset for the future and could help to ease the strain of high demand for cooling in the summer time. The most pressing problems are related to possible climate change impacts on the regional energy infrastructure, both in terms of energy production and demand, due to diminishing water reserves, higher average temperatures and heat waves, and consequently, forest fires. The supply problems will coincide in time with higher peaks of electricity demand, derived from a more extended use of air-conditioning. By 2025, primary energy demand in the Mediterranean, will have increased by 50% compared to 2006 Energy demand growth

rates in the southern and eastern Mediterranean countries will exceed, in percentage terms, four times those of the northern ones and will by then account for 42% of the Mediterranean basin's total demand for energy, compared with 29% in 2006. Turkey could well become the basin's second biggest consumer. Fossil fuels (oil, gas and coal) account for 80% of the countries' energy supply (94% for the Souteastern Mediterrnaean countries and 75% for the Northern Mediterranean countries according to the Blue Plan). Four countries- Algeria, Libya, Egypt and Syria- are oil exporters, providing 22% of the Mediterranean basin's oil imports and 35% of its gas imports. All the other countries are net energy importers.

- **Transport.** The railway network of the countries is not sufficiently developed mostly because of the mountainous morphology of the area. Discontinuities across the borders are very often the season of the limited efficiency of railway at the transnational level. The area also comprises major strategic transit routes and important seaports within three European Transport Areas. The most important ports within the Mediterranean Transport Area belong to Greece, Cyprus and Turkey. Flows of air transport are oriented southeast serving the holiday destinations and the Eastern Mediterranean and linking the Middle-East and Africa to en route traffic arriving departing the European Region. There is a major transnational axis in the macro-region, the South Eastern axis that link the EU with the Balkans and Turkey and further with the Southern Caucasus and the Caspian Sea as well as with the Middle East up to Egypt and the Red Sea.
- **Land-Uses.** East Mediterranean region has undergone major land use changes through the last decades mainly due to the rapid urbanization of the coast, the abandonment of farms and grazing land, forest fires and the expansion and intensification of tourism-related activities and agriculture. Especially the eastern part of the Mediterranean is subject to sudden and drastic environmental and socio-economic changes. These changes lead to the partial and/or complete abandonment of large areas of agricultural land resulting in noticeable but non-quantified land degradation. Studies have revealed a significant land use change from agricultural and natural vegetation to urbanized areas due to the high population increase during the last 80 years (51-times the magnitude of the total built-up area). Overgrazing was practised by 70 per cent of the farmers and was found to be one of the most important environmental consequences of land use change (1600 ha have been transformed from natural grazing to built-up (urban) in the study area).In addition, this part of the Mediterranean has witnessed problematic political and military conditions that have drastic influences on the environmental and socioeconomic situation, contributing further to the deterioration of the environment and land use changes as well as the peasants' socio-economic conditions.
- **Environment.** The densely populated unregulated-housing areas are particularly vulnerable to natural hazards. Between 1975 and 2001, out of 480 extreme events recorded in the Mediterranean, the most affected countries of the examined macro-region as for the number of fatalities have been Turkey and Greece. Earthquakes, floods and other fatal disasters regularly unveil a poor implementation of town planning and building rules. With the expected impacts of climate change, the vulnerability of urban areas to extreme hydrometeorological events, to warming and to sea level rise for the very low coastal cities, will be accentuated. With accelerated urbanization on the East, management of household waste has also become a major concern for local authorities.
- **Governance.** There are a number of political and institutional initiatives of cross border cooperation such as the Mediterranean Action Plan, the Union of the Mediterranean, Strategic action plan for the environmental protection and rehabilitation of the Black Sea, the Black Sea Synergy, the Mediterranean sea basin programme 2007-2013, cross-

border cooperation within the European Neighbourhood and Partnership Instrument (ENPI) etc.

Strengths	**Weaknesses *(Structural unbalances)***
Strong polycentric system and a leading role of the small and medium-sized cities High educated labour force potential Important high-capacity ports Broad biodiversity and abundance of natural resources of high environmental value A great variety of valuable world cultural heritage	Existence of imbalances in the study area reflecting broader regional economic relationships Depopulation and migration Weak accessibility and poor quality of basic services Low level of exploitation of renewable energy and of energy efficiency
Opportunities	**Threats**
Mobility of labour force through EU Membership and approximation Dynamic FDI activities in Balkan countries Qualified human resources as basis for promoting the entrepreneurial skills Sustainable development of tourism Construction and upgrading of Pan-European Corridors and TEN projects	Brain drain-migration of skilled labour force Social segregation due to economic problems, migration Delayed integration in common market Lack of co-operation in decision making

Outermost Regions[39]

- **Demography.** The ORs' demographic features are characterized by a mildly positive population dynamics, lower than EU27 average growth (+0.4% per year in the period 2000-2007), except in the case of Guiana (+4%) and, to a lesser extent, the Canary Islands (+2.3% in 1998-2008). The dependency ratio is below the EU average (38.1%) especially where the combination of natural growth and mortality is "favourable" (e.g. the Canary Islands, Réunion, Madeira and the Azores).
- **Economy.** A high proportion of the workforce of most ORs is employed in agriculture, this fact means that they also design their unique environmental and cultural landscape and to a varying degree assure an export good and a supply for the local food market. Tourism has a relevant potential in most ORs and in some of them is a key sector for employment and external trade; in the ORs tourism is based on an exceptional natural and cultural environment. All outermost regions are characterized by a small local market size, both in terms of population and purchasing power. This small size, when combined with high trade costs, implies that many products are not sold in that market. A large flow of transfers from the mainland and the EU have sustained private consumption and disposable income (These transfers vary and in some ORs may well be around 30 to 40% of the GDP). ORs are very distant from the European continent in geographical terms. They are isolated, either because they are oceanic islands, or because they are bordered by poorly populated, basically forested areas with relatively low levels of development, in addition to the lack of direct communication with their geographical surroundings and the difficulty of trading relationships due to the fact that they belong to different economic areas. They are areas with a small surface area, with scarce natural resources.
- **Territorial patterns.** Most ORs are of volcanic origin and are characterised by very diverse relief from steep to flat, sometimes within the same region. Most of the social and economic life is concentrated in the coastal areas which are particularly exposed to

[39] This chapter is based on ET2050 *Outermost Regions* (MCRIT, 2012). Outermost regions include the following: Canary Islands, Madeira, Açores, French Guiana, Martinique, Réunion

extreme climatic events. The archipelagos are highly fragmented, a factor which provokes a double insularity in the smaller islands. The natural surface area comprises values of between 40% and 50%, those with a larger natural surface area (Martinique, Reunion, Guadalupe, and Guiana) have values of above 80% and even 90% (the Canary Islands). The Useful Agricultural Surface Area (UAS) is below 30%.

- **Knowledge-base.** Potential growth in the ORs can come from restructuring the traditional sectors of tourism, agriculture and fishery and new specializations which stem from the application of RTDI to old and new sectors. New and high profile skills, well focused and market oriented applied research as well as improved marketing need to sustain the process.
- **Energy.** The Outermost Regions have had severe problems to assure the regular supply of fossil fuels and are penalized by higher cost of provision, due to accessibility and distribution handicaps. During the past years, the development of renewable energies has been pursued and favourable natural and environmental conditions exist in different regions to develop different renewable sources from biofuels to wind, solar and photovoltaic. In addition, in some ORs there is a growing experience in RTDI on renewable energies which to draw upon for their development. The insularity and small size encourage a wider development of small plants of renewable energies, which could aim to satisfy a much more significant share of total energy demand, given the higher cost of traditional sources and their unreliability.
- **Transport.** Remoteness has a negative impact on most sectors because of the transport costs, which affect mobility of factors (labour and capital), trade and in general all forms of integration with the EU. To deal with remoteness however in the past transport infrastructures have been built and a mildly positive trend in the maritime transport of freight can be observed in the last decade in all ORs except the Portuguese Islands. At the same time air transport of people increased substantially almost everywhere thanks also to the opening of low cost routes. Accessibility issues affect ORs not only in their trade and exchanges with the EU but also within their geographic areas and within the same archipelago.
- **Land-uses.** The natural surface area comprises values of between 40% and 50%, those with a larger natural surface area (Martinique, Reunion, Guadalupe, and Guiana) have values of above 80% and even 90% (the Canary Islands). The Useful Agricultural Surface Area (UAS) is below 30%.
- **Environment.** The Outermost Regions share specific characteristics which make them particularly vulnerable to climate change impacts, namely: Concentration of population, socio-economic activities and infrastructure along the coastal zone; High sensitivity to extreme weather conditions (e.g. hurricanes, cyclones, drought, floods, volcanic eruptions); Dependence on water resources (coastal aquifers) highly sensitive to sea level changes. Although flooding, erosion and freshwater shortage pose a certain threat to the coastal zones of the outermost regions, recent climate change discussions for the OR primarily focus on the loss of biodiversity, a main factor influencing the important tourism industry of the islands.
- **Governance.** In the Treaty on the Functioning of the European Union, the outermost regions are covered in Article 349, which requires that EU policies must be adjusted to their special circumstances. Since 2004, the EU has had an integrated strategy, based on active partnership between EU institutions, national governments and the outermost regions. The three priorities are to make the regions more accessible, more competitive and more integrated with the countries around them. Several programmes has been started to accomplish the goals of accessibility, competitiveness and integration: POSEI

Programme, Transnational Cooperation Programme Madeira-Açores-Canarias, Operational Programme Indian Ocean

Strengths	**Weaknesses**
High-quality agricultural produce Tourism, key sector Quality of life / Way of life/ Style of life Tropical climate Good inter-island links Positive demographic balance	Small size of the market affects the competitiveness Remoteness (from EU) and insularity Higher cost of transport High prices of import goods Fragmented territory and difficult access due the topography Dependency on tourism
Opportunities	**Threats**
Ideal location for experimentation to combat the effects of climate change Remarkable biodiversity and wealth of marine ecosystems Scientific portals for their geographical areas Renewable energies (wind, tidal and wave). Research and hi-tech industries Project of port infrastructures for developing services (logistics, naval repair) Creating more technology-based and/or innovation-based jobs (aquaculture, renewable energies, biotech)	Transportation costs: internal interisland and with third countries Economic dependence on a few products (bananas) Water scarcity Climate Change effects (flooding, coastal erosion) Lost of biodiversity Change in EU and national regulations concerning the Outermost Regions

3.4 Synthesis of macro-regional Visions[40]

Cooperation between European regions as well as between cities but also between cities and their hinterland appear as a crosscutting issue for the development of a Vision for Europe. This has to do both with the improvement of relations between territorial entities and with the improvement of the decision-making process, which should be improved by the means of transparency and collaborative processes.

These are old values of territorial development in Europe. These values are key drivers in the development of visions for Europe as the situations of the macro-regions are rather contrasted. Moreover, radical disparities between sub-entities of those macroregions appear especially in Southern and Eastern Europe.

Related to polycentricity and equilibrium are connection and accessibility. The improvement of transport networks and of connections between various regions in Europe still appears to many of crucial importance, but the overinvestment on infrastructure with limited economic sustainability also emerges as important. Related to this issue is also the scarcity of energy resources as well as the environmental impact of nuclear energy and of GHG emissions. Improving accessibility, reinforcing equilibrium and developing cooperation are key policy-aims, heavily dependent upon energy and environmental perspectives. The integration of this set of issues (environment, energy, and political and economical development) should be at the core of the development of a vision for Europe.

Economic growth remains a central value of economic development, the production of wealth being largely seen as a central issue in the development of political communities and of their wellbeing. Despite this, a Vision for Europe should also take into account the fact that growth should be related to sustainable development. On this, the whole issue of Green Growth appears of central importance, notably in the Europe 2020 Strategy. Green Growth is envisioned as a turn of economic activities to sustainable development in accordance to OECD's standards.

In this perspective, the majority of the macro-regions envision a sustainable development based on renewable energies, ecosystem conservation, biodiversity enhancement and water and

[40] This section has been elaborated as a first step towards the European Vision, by Vincent Callay (IGEAT 2012).

energy friendly production at the core of future development. However, regarding geographical as well as economic disparities in Europe, the situation of the macro-regions and their sub-entities is contrasting. The development of visions for the future of Europe should tackle this latter point.

The reinforcement of democracy appears also as a shared target for the visions examined. Developing collaborative decision-making processes as well as transparency remains of crucial importance. This couples to the ambition of enhancing participatory processes and the involvement of population in policy development.

To address the potential limiting factor derived from sub-regional heterogeneities when building the Territorial Vision, this preliminary synthesis of macro-regional trends and visions has initially attempted to focus on key territorial typologies beyond the defined macro-regional frameworks: Coastal Europe, Urbanised Europe and Rural Peripheries. The further development of European spatial patterns and the Vision will require more contrasted typologies in order to picture the huge internal diversity of Spaces in Europe.

Coastal Europe

Out of the territorial Visions examined comes an emerging issue: the new trans-regional dynamics developed within coastal and maritime regions in Europe, namely the North Sea, the Atlantic Coast, the Baltic Sea and the Mediterranean Sea. Each coastal region appears to share common social, economic and environmental problems and opportunities. This dimension is of crucial importance in the development of a common European Vision as these coastal areas could be seen as specific territorial entities where new definitions of transnational regions emerge. Those regions share common environmental issues, but also economic issues, such as the transformation of industrial economies, their nodal position in the transport of goods and a peripheral position in the national economies; and social issues such as new waves of in-migrations and tourism potential.

Urbanised Europe

The importance of connections between cities could be summed up in the “Urban Clusters” idea of the Plan Bleu concerning the Mediterranean area. This is shared by many visions, especially those concerned with the development of coastal regions. This points out both issues of connections between cities and of joined strategies and collaborative visions about economic, social and environmental development. The concept of Urban Cluster introduces sharing perspectives and projects between close cities in order to foster their competitiveness.

Envisioning the future of rural hinterland is a crucial issue. The rapid development of urban areas in Europe is a matter of high pressure on their rural hinterland at economic, social and environmental level. Having visions about how those hinterlands will transform and change as well as about how their relationships with their main urban core will be managed is a key for the future equilibrium of Europe.

It is largely admitted that the future of Europe’s economic development will be based on cities. The rising of the knowledge-based economy as well as of the service economy and their domination in Europe’s economic development is broadly envisioned as the future of Europe. However as it is emphasised in the Plan Bleu and the Norvision, it remains crucial to manage how cities as motors of economic development will affect their hinterland and how the wealth generated by urban activities will be redistributed. Another issue is the economic transition of rural and peripheral areas: the recent transformations in their population structures influenced by the new technologies of information and communication, the development of private means of transport as well as the rise in commuting and of its scale should be tackled as a crucial issue in the relationship between cities and their hinterland but also in the definition of the urban character itself of the economy.

The sustainable character of cities is broadly envisaged as a crucial point at many levels: housing, commuting, public and private transports, economy, etc. This emphasises the importance of conceiving visions that entail sustainability and green economy at the core of both urban development and the transformation of urban-rural relations.

“Being attractive” has been the motto of many cities in Europe and the world since the 1990’s. This has engendered an overall turn to urban marketing, missing the point of social equilibrium as well as the whole issue of sustainable development. The development of visions for Europe should critically address the effects of being attractive, positive as well as negative and situate that very issue within a broader framework where this mingles with social and environmental issues.

Territorial equilibrium is often seen as a crucial support to social integration. The social fragmentation of Europe’s territory is a threat that overlaps with the current disequilibrium between the urban core of Europe concentrating mainly in the North Western area and the rest of the territory either urban but economically peripheral or rural. The social integration of the broad territory but also at a smaller scale, especially at the scale of cities, is a key issue that should be a part of visions about the future development of Europe, especially its more pessimistic ones.

Rural European Peripheries

The importance for rural periphery to be better connected to urban economic cores appear of crucial importance to satisfy both targets of a better territorial equilibrium in Europe as well as of a social integration of the whole territory.

To assume a highest connection of the rural periphery into the core dynamics of Europe means both to support its better integration but also to take into account its specificities and the contrasting situations. This means also to support the diversification of activities in the rural hinterland and periphery to reinforce both the autonomy of those territories and their capacity to collaborate with urban regions.

The diversification of those territories has not only to do with economy. It is also a matter of environment and biodiversity. The constant pressure of extending urban areas and conurbations affects the rural periphery by pushing to a homogenization of its environment. Envisioning how rural areas could maintain diversity at the environmental level comes out as a key issue.

Such an environmental diversification has to do with the keeping or the re-development of a small and medium scale agriculture respecting natural cycles and respecting environmental equilibrium and ecosystems. Gains in productivity by the intensification of agriculture should also been critically addressed. Moreover the whole issue of urban small-sized agriculture should be envisioned as a possible turn in food supplying.

The transformation of agricultural practices should also be seen as a trend to an improvement in food production in a context where the health of an ageing Europe will be highly valuated.

The transformation of the rural economy, its diversification and change in size as well as transformations in the productivity of agricultural production could help to find rooms for the development of activities related to the production of renewable energies in various countries: solar and wind energies productions in Mediterranean countries are already a rising activity and this could be seen as an important turn in the whole rural European area.

4. Baseline Scenario

4.1 Approach

A Baseline Scenario is a projection of current trends in absence of neither new policies nor unexpected events. It should strive to generate consensus, with other baseline scenarios previously developed to be a useful reference. A Baseline Scenario will not likely comply with most official political targets, and therefore it can be understood as a realistic future ahead, especially in the short and mid term. A baseline scenario is neither the "worst-case" scenario, nor the "most likely future".

The Baseline Scenario could be understood as a future evolution with no dominant drivers:

no "technologic panacea": Neither technology nor free markets are the solution

no "Invisible hand": spontaneous behaviour does not result in social self-organisation

no "political reforms", but small adjustments

Exploratory Scenarios, on the other hand, can be understood as ways to explore more or less extreme possibilities for each of the three drivers behaviour, technology and government. The ET2050 Vision could be, in this context, the "middle path" – an ideal balance of the alternative exploratory scenarios.

The ET2050 Baseline Scenario sticks to the principles of smart, sustainable and Inclusive growth as the leitmotifs of European policies, and is built on the baseline scenarios developed in EU policy documents and recent studies. The European territory must be explicitly included in the scenario narratives in two complementary senses: as territorial impacts (passive factor that generates externalities) as well as territorial conditions (active factor that induces development).

The ET2050 Baseline Scenario is a structural description of the European territory in the 2030 and 2050 time horizons. It concentrates in particular on changes in the following thematic areas: demography, economy, technology, energy, transport, land-use, environment and governance, and their independency with territorial dynamics. From a territorial point of view, the baseline describes implications of identified mega-trends in the different European macro-regions.

The methodology of development of the Baseline Scenario for 2030 and 2050 included the following research activities:

- internal expert consultations and debates by ET2050 partners carried out in the Second TPG meeting in Brussels, to discuss a first draft Baseline Scenario (19/20-03-2012)
- analysis by sectors and macro-regions, carried out in the ET2050 project (see all reports at www.et2050.eu, 20-04-2012 version
- elaboration of the Present State and Trends analysis
- analysis of ongoing debates on policy reforms in Europe
- identification of Critical points of Bifurcation or alternative evolutions in response to major challenges anticipated for key sectors based on the present state of Europe and historical evolutions (see Section 4.2 of this report).
- comparative analysis of existing baseline scenarios developed in European studies as well as at World scale (ET2050_Baseline_References, document, 24-04-2012 version)
- definition of baseline assumptions or Key Directions of the Baseline Scenario based on possible responses to critical bifurcations. Validation through participatory process
- quantitative analysis made with TV+ and PASH+ refined meta-models, that provide for a number of relevant indicators aggregated at EU level (27-04-2012)

The next steps will be:

quantitative modelling (at NUTS3 or NUTS 2 level) using forecast models

analysis of territorial differences

providing explanation to territorial dynamics: drivers, seeds, trends, limits and patterns.

definition of relevant wild cards

TIA policy-evaluation of the Baseline Scenario

definition of scenario variants, based on the TIA policy evaluation

full revision of the Baseline Scenario in comparison with Exploratory Scenarios

assessment of the consistency of the scenarios with territorial policy aims applying TIA. This assessment will help in the discussion process with the ESPON MC.

For 2012-2020, the Baseline Scenario and also the explorative scenarios up to 2020 are inspired by EU policy documents, mostly by the Regions 2020 Report (2008, 2011)[41].

The ET2050 Baseline Scenario assumes as starting hypothesis a Sluggish recovery pathway for the 2010-2020 period.

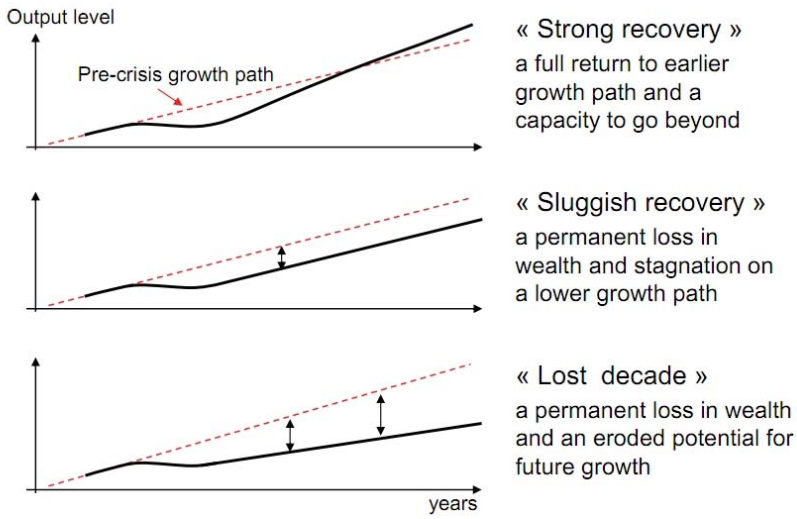


Figure 4-1 EU2020 Scenarios (JM Barroso, Informal European Council, Feb'10)

The resulting assumptions for the ET2050 Baseline Scenario will be explained in Section 4.4 of this report.

4.2 Critical Bifurcations from Present State

The following 25 questions are aimed at assisting the process of definition of scenarios. Depending on the answers given to the following questions, alternative future scenarios can be defined, such as the Baseline. There is a difficulty of the exercise that needs to be considered: there is a huge uncertainty as regards the world economic development and the impact of

[41] ÖIR et al (2011), *Regional Challenges in the Perspective of 2020 – Phase 2: Deepening and Broadening the Analysis*, EC DG Regio.

growing resource scarcity (water, energy, etc..) on the production and consumption patterns. This makes the process of answering to most of the following questions particularly challenging.

Particularly relevant bifurcations are:

1) Will European national economies[42] be able to adjust to structural transformations?

Dealing with the economic crisis and increasing economic growth rates. The economic crisis has significantly decreased the income of most European countries and increased unemployment (up to 10% in many countries, and more than 20% in Spain). To recover, it will be necessary at least some years of sustained growth, which will require structural transformations.

The Baseline assumes that structural transformations, requiring policy reforms beyond business-as-usual are not carried out as required. Therefore, economic growth is low and unemployment remains high, especially in Southern countries.

2) Will migrations continue to be necessary in Europe to shirking labour market?

Dealing with a shrinking labour market. Population changes are the main driver of employment rates in most regions. Average participation rates tend to be reduced in Europe, among others due to the increasing number of retired people in the higher age cohorts. The ageing of European population will reduce both the active population as well as the average rate of participation. External migration will be necessary to maintain economic growth. But other regions such as North America, Australia, and most developed Asian countries will also compete for the global migration as their populations get older.

The Baseline assumes that net international extra-European migration will be growing slowly, especially coming from Ukraine or Belarus, Arab Countries, former colonies, as well as from southern and south eastern Asia. Migration will be attracted mainly by cosmopolitan centres and urban agglomerations.

3) Will European countries be able to sustain their welfare system?

Dealing with World-wide competition without abjuring the European labour market model and welfare state. The European society is characterized by higher levels of public welfare with respect to almost all the rest of the world, which means higher services but also higher expenditure for health care and pensions. These costs translate into higher taxes on labour and capital. At the same time, the European labour market model is in many cases little flexible, with workers which either do the same job until the retirement age or fall into unemployment. Young people, in particular, find it difficult to find a regular job to enter this protected labour market. In order to be able to sustain its welfare system and labour protection, European countries will need to foster labour productivity, otherwise production and services will be off-shored.

The Baseline assumes that the public welfare system will be reduced, and its management more privatised, forced by public financial constrains. There will be a process of harmonisation across European countries along these lines.

4) Will Europe (and its single countries) be able to find ways to finance its public debt?

Dealing with stretched public finances. The expensive welfare state, as well as the poor efficiency of many public administrations together with an emerging political populism, already made Europe a relatively indebted continent, but this situation has worsened with the economic crisis, so that now almost all countries have a significantly larger burden of public debt on GDP. Some

[42] European countries refers to ESPON space.

countries are already experiencing difficulties in re-financing maturing debt. For this reason tight public finances, better public management, and coordination between countries will be needed in order to maintain the debt sustainable.

The Baseline scenario assumes that financial debts will remain as a permanent burden for most European countries; even if future public expenses are reduced and debts are better managed, debts will not be significantly reduced. Each country will still stand alone for its own debt, increasing the costs for all.

5) Will Europe be able to compete with emerging countries in high-value sectors?

Dealing with a different competition from rising powers. The European economy used to compete with their products against the firms of other OECD countries such as the US or Japan. The earlier competition from China and the Asian tigers but also from Brazil and India, was on the contrary based on cost competitiveness on lower value added products. This pattern has already changed. Emerging economies are increasingly active in high-tech sectors and products, and this will increase in the future so that European economies will need to compete against younger countries also in these sectors, by trying to maintain and renew the technological advantage they still have.

The Baseline scenario assumes that European technological advantages will be progressively reduced overtime, since emerging markets will be able to adapt and integrate new technologies easier than European countries; therefore, hardly European companies will not be able to compete in new sectors.

6) Will Europe be decarbonised and decentralized energetically, reducing GHG emissions?

Dealing with energetic transition. Primary biomass in European Countries may grow from 180 Mtoe in 2010 to 300 Mtoe in 2030 (EU25), especially in Poland, Spain, Italy or UK. The transition towards a society free from fuel energies will last for some decades, or two generations. In this transition, a large number of alternative sources of energy will emerge. The share of renewable energy sources is already increasing but still remains far from EU targets. As Northern European countries are more involved that Southern ones in the development of renewable energy sources, they contribute better to the GHG emissions decrease. Even if a large increase in renewable energy is expected in Europe, especially in wind, solar and biomass (RES could account in 2030 18,4% and 26% in 2050), the rising of these sources will only compensate the decrease in hydropower. Grid energy storage will be commercially introduced to store electricity on a large scale within an electrical power grid. Transport emissions, accounting today for more than 20% of GHG emissions, will mostly remain stable due to the fact that increasing transport demand largely counter balances the impact of improvements in fuel efficiency and fuel shift.

The Baseline scenario assumes that fossil fuels will still be the most important energy sources, despite the important increase in RES, and a decrease in GHG emissions even though targets will not be met, and a gap will develop between Northern and Southern Europe contribution to improvement.

7) Will Europe will be able to tap the untapped potential of its regional diversity richness?

Dealing with internal income disparities. Income disparities between countries and even more between regions will grow. The resources devoted to the compensation of these differentials will be scarce in the foreseeable future, and not effective enough. For this reason Europe will need to find a way to enhance the endogenous potential of its regions if it has to achieve overall growth. Cooperation between European cities is weak and competition is strong.

The Baseline scenario assumes that disparities will grow in Europe, as they are growing in the rest of the World. Inequalities at local or regional level will become more dramatic than at national

level. Public support to less developed regions will become more scarce and will produce limited, sometimes even contradictory, effects.

8) Will spatial development and settlement structures be more polarised?

Dealing with Territorial Cohesion. Europe has the highest population density (60 persons/km2) of any continent. Of the total European population 73% lives in urban areas against 69% in 1990 and 55% in 1950, but southern Europe is far less urban (67%) than northern Europe (83%). The urbanisation process is expected to continue, up to 80% urban population in European countries in 2030 and even 89% in 2050, resulting in even denser urban environments than today. In the meanwhile, many rural and sparsely populated areas lose out along this process, in human capital and activities. In Eastern Europe this process will result in much larger urban centres than today, than in Western Europe where the distribution is to remain largely constant since area is already much urbanised. The current debate on territorial cohesion is concerned with integrating relevant policies and actions, requiring well-established democratic institutions and adequate responses to the demands of technical systems and markets. In the context of Europe 2020, the question is weather this EU strategy will remain mainly a matter for Directorate Generals and their various clients pursuing their policies, or will Cohesion policy, with its more integrated and decentralised approach involving many levels of government and stakeholders, form platforms for integrating them.

The baseline assumes no relevant policy reforms taken over the next decades, with a continuation of the urbanization process and the development towards larger urban centres, and increased territorial unbalances.

9) Will be Europe politically more integrated?

Dealing with different national interests. Since its foundation, 27 States have become part of the European Union, integrating today a population of more the twice its original. The European model has changed forever with the expansion towards the East in the years 2000s, doubling the number of countries and embracing nations that are substantially poorer in comparison to former partners. Governance will become more complex and so will be the culture mix. Europe evolutes towards a “Multi-speed” governance, based on the Open Coordination Method, with countries retaining much of their power. The more adaptative countries and regions are able to move on quickly than others which stay as laggards.

The baseline assumes no significant advancement of European political integration, in a more complicated and variable institutional geometry.

10) Will decision and management processes of EU key policies be more decentralised?

Dealing with improved governance. The EC White Paper on Governance urged the Union to renew the Community method by following a less top-down approach and complementing its policy tools with non-legislative instruments. The White Paper aims at increasing the involvement of citizens in the European policy, empowering local actors to a higher extent and considering spatial, environmental and socioeconomic issues altogether in an integrated approach. At the same time, an increasing mismatch between social and economic flows and administrative and current political boundaries is taking place, territorial jurisdictions introducing rigidities in service provision, fund allocation and policy building. New planning and territorial cooperation initiatives are needed, open to networks of public and private institutions, and attached to add-hoc geographies (e.g. cross-border regions, mountain zones, coastal zones or islands, river basins, remote or sparsely populated regions …). Policies should increasingly emerge in the future by the initiative of local communities putting accent on good governance and strategic thinking.

The baseline assumes that EU governance will still be mostly top-down, and that the territorial decentralisation of decision and management processes and the empowerment of local communities will remain limited.

The next points (11 to 25) complement the 9 basic bifurcations and are aimed to provide greater precision in the definition of ET2050 Scenarios, also of the Baseline.

11) Will be European countries able to re-qualify its aging labour force?

Dealing with an aging population and workforce The European population is aging very fast, second only to Japan. This implies that the workforce is increasingly old, and that workers in their 50s or even 60s will need to be re-trained and qualified for new economic jobs. Moreover, due to the demographic trends (life expectancy growing from current 79 to 85 in 2050, and fertility rates well below 2,1), the old-edge dependency ratio will more than double in the European countries (from current 22,4% to 58,1% in 2050), so that it will become important to maintain workers into the labour market until older ages.

The Baseline scenario assumes that the level of qualification of the labour force will increase at a very modest level, and labour productivity will be lower than in USA and emerging economies.

12) Will be Europe able to put in place a "smart growth" as suggested by the Agenda 2020?

Building a more innovative economy. The only way to foster productivity for advanced economies passes through innovation, but despite the efforts by the individual countries and the EU, the innovation effort is still not high enough. Moreover, the competition for the most qualified human capital has become global too, which makes it important for Europe to be able to retain and attract the highest skilled workers and researchers, by offering them not only good quality of life but also job satisfaction opportunities.

The Baseline scenario assumes that "smart growth" as such will mostly happen in Northern and Central European countries, while Eastern European countries will tend to be more focused on manufacture and Southern countries have a mixed economy, with an increasing importance on low-added value services, such as mass-residential tourism, and some more added-value services such as tourism linked to health, education and business.

13) Will be Europe able to create and take advantage of a demand from emerging countries?

Dealing with lower demand. The US, which is still the largest buyer of European goods and services, will probably remain in a situation of weak demand for the years to come, so that the European economy, which cannot rely on the public sector to create demand, will need to find other demand sources. This should be found in the same emerging economies which have increased their exports towards Europe in the last two decades. These emerging economies, in fact, have already started increasing the disposable income of their citizens, and European firms have to try and find a way into these rapidly expanding markets.

The Baseline scenario assumes that European firms will struggle to be able to maintain the actual level of exports to emerging markets, excepts in sectors where competitive advantages exist and can be maintained; emerging markets will tend to keep foreign imports low, or increase the relative trade among themselves.

14) Will trade continue to grow World wide at a higher ratio than GDP?

Maintaining a relevant position in global trade. World trade has grown between 1991 and 2011 at twice the rate of economy, almost 6% yearly on average (WTO, 2012). The volume of exports in the World between 1950 and 2008 multiplied by 32 times according to UNCTAD (in volume, tonnes), for a growth of global GDP of just 8 times. Container traffic emerged since the 90s, and

represents today one sixth of total trade (went from TEU25 million in 1990 to TEU160 million in 2008, and is forecasted to rise to TEU375 million by 2020). However, since the trade collapse of 2008-09, the world economy and trade remain fragile and a further slowing of trade is expected in 2012 showing that the downside risks remain high. Developed economies exceeded expectations with export growth of 4,7% in 2011 while developing economies (including CIS) did worse than expected, recording an increase of just 5,4%.

The Baseline scenario assumes that European trade will continue to grow in the coming decades driven by intra-European trade, and because of the growth of emerging economies, even if Europe is likely to lose some shares in this global framework.

15) Will tourism continue to grow World wide at a higher ratio than GDP?

Managing international tourist flows. Since the 1950s, tourism has experienced continued expansion and diversification becoming one of the largest and fastest growing economic sectors in the World. Tourism is responsible for 5% of the world's GDP, 6% of total exports and employs 1 out of every 12 people in advanced and emerging economies alike. In spite of occasional shocks, international tourist arrivals have shown uninterrupted growth: from 25 million in 1950, to 277 million in 1980, to 435 million in 1990, to 675 million in 2000, and the current 940 million. Even in 2011, international tourist arrivals grew by over 4%, according to UNWTO, in a year characterised by a stalled global economic recovery, major political changes in the Middle East and North Africa and natural disasters in Japan. Tourist arrivals to Europe reached 420 million in 2011 (more than 500 million including Russia) accounting for almost half of World tourism, but the fastest growth is in the emerging regions where the share in international tourist arrivals has steadily risen from 31% in 1990 to 47% in 2010.

The Baseline scenario assumes that European tourism will continue to grow in the coming decades even if Europe is likely to lose share in the global framework.

16) Will intra-European migrations grow?

Experiencing fewer migratory tensions. In the last decade the intra-European international migration (i.e. between EU Member States) was dominated by East to West flows, related to work. Retirement related migration to sun-sea-sand areas played important role in the Mediterranean, but these flows are strongly affected by current economic conditions and could also move to Northern African countries and more remote areas. Internal migration (i.e. within EU Member States) was dominated by inflows to urban agglomerations.

The Baseline assumes that intra-European international migration will slightly decrease and internal migration will remain on the current level. The differences in the attractiveness of various regions and in regional migration gains and losses will be much lower than those in the past.

17) Will long-distance freight transport be decoupled from transport growth?

Growing global freight traffic. If global GDP doubles between 2005 and 2030 (from $47 billion to $92 billion), world maritime container traffic could increase by more than 6,0% per annum, air freight could increase by around 5,9% per annum and rail freight traffic worldwide could increase at around 2,5% per annum. On this basis air freight could triple in 20 years, and port handling of maritime containers worldwide could quadruple by 2030. Transport prices will continue to go down relative to the value of goods because of more efficient technologies (larger vehicles, more efficient management…), even if higher environmental taxes are somehow introduced. Increasing concentration of transport operators at global scale.

The Baseline scenario assumes that freight transport in Europe will only increase at the projected economic growth rate, resulting only in an 80% increase between 2010 and 2050, that is a 1,5% annum.

18) Will long-distance passenger growth be decoupled from economic growth?

Growing long-distance passenger traffic. Worldwide passenger traffic would grow on average 5,1% yearly. To meet this increased demand for air transportation, the number of airplanes in the worldwide fleet will grow at an annual rate of 3,6%. The traffic would grow at an average rate of 4,8% yearly between 2010 and 2030. Globally, the single biggest traffic flow will be the US domestic market with 11.1% of all RPKs flown, while intra-Western European traffic, with its well established global and low cost carriers, will be the third largest flow with nearly 8% of World RPKs. The Chinese domestic market is forecast to grow at more than 7% per annum, moving it from the fourth largest flow in 2010 to the second by 2030.

The Baseline scenario assumes that long-distance will not be decoupled from economic growth, and both will grow in parallel.

19) Will urban transport be decoupled from economic growth?

Dealing with congested urban environments. Commuting transport is growing the least in Europe, and long distance the most. The number of trips by person made in European cities will tend to become more stable, even if GDP continues to grow, and their purposes more divers. Individual transport modes (e.g. walking, riding a bike, or a motorbike, an small private car) will not be significantly reduced, replaced by collective transport modes.

The Baseline scenario assumes that in congested urban environments, urban transport will tend to be stable, independent of economic growth.

20) Will be Europe able to put in place energy efficiency?

Establishing an energy efficient economy. While energy efficiency improvements are widespread over the coming decades in the World, total energy use is still projected to grow strongly at global level. Over the next twenty years, global energy demand will increase by around 40%, and double by 2050, with the vast majority of the growth coming from non-OECD countries such as China and India. Most of the growth in energy production is located in developing regions, which are projected to substantially increase their share in global production for the coming decades. Energy dependency in European countries is to increase, 59% in 2030 and 65% in 2050, compared to 54% in 2005. The price of energy will not decrease due to the rising of demand from emerging economies which will compete for the same resources and commodities; hence energy efficiency will be needed also for pure economic reasons.

The Baseline scenario assumes a tendency towards more energy efficiency and a moderate transition to renewable energy sources, below the levels assumed by European targets in force.

21) Will be Europe able to take the lead in the green economy sector?

Dealing with the challenges of global warming. Reducing emissions will probably entail higher costs for European firms, which will make them less competitive in the short-term, *ceteris paribus*, with respect to countries where regulations are less ecologic. At the same time, this challenge could bring long-term opportunities if Europe could establish itself as a forerunner in green technology.

The Baseline scenario assumes that long-term potential competitive advantages will not compensate certain short-term costs. Environmental regulations, applied to current markets and existing technologies, will not be cost-effective, all considered.

22) Will be European agriculture more competitive?

Dealing with local and global agriculture. Europe is one of the World's largest and most productive suppliers of food and fibre (21% of global meat production and 20% of global cereal production in 2004). 36% of European land is dedicated to agriculture. The productivity of

European agriculture is generally high, in particular in Western Europe: average cereal yields in the EU are 60% higher than the global average. In 2008 European countries had around 22% of the total area cultivated organically in the world. Global food prices are growing in real terms, as a result of growing world population, rising affluence, and the shift to Western dietary preference. Competition for agricultural land with biofuel production may raise food prices as well (between 4% and 18% of EU's agricultural land will be needed to produce the amount of biofuels to reach the level of liquid fossil fuel replacement required for the transport sector in the Directive 2003/30/EC).

The Baseline scenario assumes an increase of local markets sensitive to ecological higher quality. The "buy local" movement takes hold both based on environmentalist but also protectionist motivation.

23) Will land-use patterns become more hybrid due to ineffective planning?

Dealing with increasingly mixed land-uses. Urban planning is stagnated and unable in many areas of the World to give adequate response to growing population. In some areas, new construction in urban areas has not kept up to demand, so crowding and sprawl to the surrounding suburbs is apparent. Many regions have developed residential tourism economies supported by extensive real estate operations in a general tendency towards more relaxed land regulations and increasing land occupation, except in Northern countries with strict spatial development regulation. New residential developments will mostly be located on agricultural areas.

The baseline scenario assumes continuity in the trend towards increasing "Middle Landscapes" largely composed by fuzzy urban-rural zones. Inland water bodies will remain attractive for new residential development in South-eastern Europe and Western Europe, and so will be marine water bodies in Mediterranean and Western Europe. Agricultural areas close to cities are likely to be taken over by suburbanization. The area of forests is likely to expand while the area for grassland is likely to decrease.

24) Will governments become more corporative?

Dealing with higher governance tensions. Future governance in European Countries will be driven first by the type of societal value system we will be living in (more inclusive or more exclusive), and second the kind of response by political and societal institutions (partial or complete, proactive or reactive). Public sector still represents today 40% of the European economies. There is a limited capacity to streamline public institutions. The public debt of most countries remains above 50% of GDP. More public private partnership initiatives are expected. Increasing financial problems in European countries on public services related to social expenditures.

The baseline assumes a weaker institutional framework will result in higher influence of corporate interests in public governance.

25) Will Europe become more spatially integrated?

Dealing with the integration of different European territories beyond political borders. Since the adoption of the ESDP, there has been a necessity to develop a more functional approach to European integration, based on enhanced policy integration and coordination between different types of territories (e.g. metropolitan areas, cross-border areas, transnational regions, urban-rural relationships). This emphasis on spatial integration is based on two main arguments. First, it has become evident that regions and territories are increasingly interdependent in terms of socio-economic growth and welfare development: in order to sustain these interdependencies, EU policymakers have developed policy initiatives and mechanisms supporting further spatial integration. Second, a better policy coordination and integration both between sectors and

between territories may lead to substantial savings in public funding (i.e. avoiding unnecessary redundancies in public investments) and create stronger socio-economic leverages due to larger and more targeted investments. However, the difficulties encountered to find the right balance in territorial governance adjustments may seem daunting in an era requiring swift and transparent decision-making structures. Social integration is still weak in Europe. Only 2% of Europeans live and work in other European countries. Cross-border short-distance flows of people remain marginal, despite cooperation initiatives. International relations between European countries grow less than could be expected, given the geographic proximity and the common market.

The baseline assumes no significant advancement will be made when it comes to spatial and cross-sectoral integration, with the mere continuation of existing structures and initiatives.

4.3 Baseline Key Directions

Based on the answers provided to previous questions, key directions of the Baseline Scenario are presented at aggregated European level for most relevant sectors. These Key Directions will be further developed at a territorial more desegregated scale (NUTS2 or NUTS3), based on typologies developed by past ESPON projects, and evolutions overtime refined, based on the results of the modelling exercise to be developed.

1) Ageing Population

Increasing ageing and labour scarcity in Europe due to persistent low fertility rates and increasing life expectancy. Population growth in developing Asian and African countries and the demand for labour in Europe lead to the increasing immigration targeted to areas where lower skill jobs are available, as well as to cosmopolitan centres where talented people are attracted. The consequences of ageing may be different for different regions and may affect migration flows across regions in different ways. A major consequence of the ageing of the population is that the working age population will decline with downward effects on economic growth and competitiveness of many European regions.

2) Relative Economic Decline

Continuation of present trends of globalisation, free trade, extension of resources through technological innovation, but less intensive than years before. The gap in GDP and welfare between the EU and developing countries worldwide is reduced. A growing middle class emerge worldwide. European economy is more dependent on services and advanced tourism. Reindustrialisation limited to traditionally industrial zones. Increase of local markets for agricultural products. Transport industry, food processing and design niches may remain competitive, but in other sectors European industries will not be World leaders (microelectronics and computers, software, genetics, nanotechnology…).

3) Growing inequities:

Increasing polarisation among more developed and less developed regions, as well as between cities in regions and neighbourhoods within cities, beyond traditional core-peripheral paradigms. The electronic unravelling of traditional imperatives of adjacency may produce urban rearrangements but it is unlikely to result in random scattering and galloping decentralisation. Reduction of financial transfers and solidarity between regions and countries at EU level, as well as Cohesion Policies, due to the financial shortage of National administrations.

4) Risk Adverse Society:

Salaries continue to loose purchase power and reduces consumerism. Private debts remain high, but do not increase from actual levels. More environmentally sensitive and reactive society.

Identities attached to the territory gain importance, leading to selected closure from foreign activities and cultural influence, excepts in cosmopolitan centres, increased protectionism and self-sustainability. Overprotected place-based strategies in wealthier communities. Informal relations still dominant in peripheral and less developed zones and conflictive neighbourhoods.

5) Insufficient Technologic Innovation

The new technologic wave of innovations linked to nanotechnologies and biomedicine, energy and artificial intelligence will take longer than expected. Technology is not the panacea to solve actual problems. Slow implementation of actual technologies (e.g. Smart Cities, Electric Grid…) in Europe. Insufficient research efforts, with significant but limited exceptions. Ineffective planning.

6) More diversified energy sources

Even though a large increase in renewable energy is expected, and energy supply is more diversified, fossil fuels will still be the most important energy sources in the short-term and prices will keep rising at a moderate rate. EU energy dependency will also increase to some extend. Growing territorial conflicts linked to resource and risk management, for energy and other resources (e.g. water).

7) Subverted proximities

More productive long-distance transport and communications services connecting some selected nodes in Europe to premium Global nodes Political borders are surpassed by flows but cross-border relations remain weak in Europe. Neighboring places become more distant while some remote places become much closer. Geographic proximities are subverted by networks connecting from the body to the globe, as well as by Virtual Communities.

8) Differentiated territorial patterns

Extraordinary diverse evolution of territorial patterns, from compact cities and nodes around transport nodes, to more disperse urbanisation, fragmented and specialised developments in a general tendency towards more relaxed land regulations and increasing land occupation. Paradoxically, this tendency reduces the value of the territory as position and increases its value as place, and landscape.

9) Increasing Urbanisation

The urbanization process and the development towards larger urban centres is expected to continue all over Europe, although the rate with which this process takes place is expected to be slower in Western Europe than in the rest of Europe. Urban sprawl remains an important issue and new urban development can mainly be found in areas formerly occupied by agriculture, causing agricultural areas close to cities to be taken over by suburbanization. Europe becomes a landscape largely composed by fuzzy urban-rural zones, with urban developments customised to specific people's and corporative needs. More focus on reurbanisation projects in the center of large cities and neighbourhoods.

10) Land Scarcity

Competition of land is expected to increase, due to a further urbanization, an increasing demand for meat and dairy products and the need to maintain a sufficient agricultural production, together with an increasing demand for bio-energy crops, all while meeting ambitious environmental goals, such as the GAEC standards for permanent pastures, the nitrate and water framework directive and the biodiversity action plan BAP). This increasing demand for land is likely to further slow-down the expansion of the forests that Europe experienced over the past decades.

11) Climate Changes

Stronger impacts of Climate Change than projected by climate researchers, and more strong restrictive measures to reduce greenhouse gas emissions (fuel, taxes, emission trading schemes) are applied; since these measures are not fully cost-effective they contribute to further reduce economic growth.

12) Corporative Government

Increasing financial problems on public services related to social expenditures. Limited investments on infrastructure, and R&D focused on selected fields. Either populists and technocrats in charge of Public Administrations. Rising of corporative government. Political power partially transferred to international larger corporations

13) Multiple-speed and multi-level European governance.

Increasing coordination on fiscal and labour policies among central EU countries while others have specific cooperation agreements with them, as well as with other neighboring countries, and other countries worldwide, in a more complicated and variable institutional geometry. Reduction of solidarity with Third Countries and increasing international conflicts. Territorial authorities become less efficient, at all administrative scales.

14) EU facing its permanent dilemmas

The European Union will carry on oscillating between further policy- and territorial integration and disintegration. Capitalising on historical landmark breakthroughs such as the Single Act, the Maastricht and Lisbon Treaties, and the single currency policy, federalists and functionalists will continue making their strong case for a more extensive use of the “Community Method”, the only efficient way to secure further policy integration, which the EU desperately needs to avoid being turned into a club of dwarf states in the global context. In contrast, intergovernmentalists will persist in resisting any move towards further EU integration. Supported by emerging populist parties, they will argue that any further infringement on national sovereignties cannot be tolerated, all the more so as alternatives such as the Open Method of Coordination do exist. A similar scenario will take place in the framework the EU cohesion policy. Activists of the Territorial Cohesion ideal will keep on promoting vertical and horizontal integration of various sector policies with a territorial impact as well as territorial integration, while advocating the adoption of a formal EU territorial strategy. Territorial planning sceptics will take the opposite line: arguing that integrated planning is an old fashioned concept doomed to failure (as demonstrated in Eastern Europe during the cold war), they will support a flexible approach based on a case-by-case evaluation of the territorial impact of various policies and projects.

15) Towards a Multiple-Speed Europe

Member States will remain the key political actors in the European Union, since they were in the Rome Treaty. The political integration process, after the failure of the European Constitution and the current economic crisis, will follow during the next decades a multiple-speed evolution, with continuous small adjustments overtime, slowly moving Southern and Eastern Member States, as well as Neighbouring Countries, to have particular ad-hoc cooperation agreements with more integrated Central and Northern countries. More fiscal integration will be necessary to reduce monetary instability, if the euro-zone has to be maintained. Populist tensions will emerge and become stronger in the next decade. The enlargement process will be delayed, limited to few countries in the Balkans. Territorial Cooperation between cities and regions in different countries will be limited to specific cross-border areas, or restrained in time, on the basis of specific issue-based cooperation initiatives. European policies will remain the result of increasingly complicated multi-party negotiations among Member States, and nationalistic short term positions will still prevail in front of long-term common interests. European visions, such as the current *Europe*

2020 Strategy, will have limited political influence, in an intergovernmental frame where European institutions may complement Member States in some areas, but can't substitute them in the critical ones. Territorial governance becomes less prioritized in subsequent European strategies, and essentially returns to a classic spatial dichotomy between urban and innovative regions as growth engines of Europe and lagging regions that needs to converge. The mode of EU governance returns essentially towards an inter-governalist approach.

16) A Frozen EU Budget

The 7-year period *Financial Perspective* 2014-2020 will probably be frozen, despite EU request for a 5% increase. EU Budget will remain not much higher than 1% of European GDP, with a progressive reduction of the budget allocated to agriculture (40% in 2012), and cohesion (Structural and Cohesion Funds (approximately 35% in 2012), and relative increases in all other sectors, particularly research and competitiveness-related policies. More balanced transfers between Member States and European institutions. The European Union will not be able to raise its own taxes or generate debts to finance its programmes. Common policies will be effective in regulatory aspects, such as market competition and environmental protection, complementary to Member States own regulations, but will hardly be able to apply common European strategies in the redistribution of funds among countries and regions, each country pursuing its own interest.

17) Low ambition in making value of the territorial framework of the Cohesion policy

The Cohesion policy is expected to represent 48% of EU budget up to 2020. Structural Funds in 2012 represent 58%, of Cohesion Policies budget, the European Social Fund 22% and the Cohesion Fund 20%. Even when the EU offers a more territorialized framework for the post-2013 programming period than in the past, with the Common Strategic Framework integrating territorial policies and funds, with the reinforcement of the multilevel governance scheme, with "integrated territorial investments" and the generalisation of local development to all territorial funds, the potential of this territorial framework will remain substantially unexploited, with new strategic territorial planning documents in line with *ESDP* (1999) or the *Territorial Agenda 2020* (2011) remaining of very low political influence. The Cohesion budget will progressively be reduced in the mid term, and will increasingly tend to be more focused on promoting a competitive environment adapted to the cycles of the economy (e.g. avoiding excess of investment on fast growth situation). Structural Funds will be progressively reduced and allocated to promote more economic activities than basic infrastructure. Since policies will be more sensitive to disparities at local and intraregional level, social funds will tend to be better linked to urban redevelopment plans and targeted to deprived areas and neighbourhoods with social tensions. More integration between Cohesion policy and other sectoral policies, particularly Pillar II of the CAP, environmental and transport policies, is expected in order to create more leverages for regional development in spite of reduced financial resources available.

18) Agricultural Policies more focused on rural development and natural preservation

The CAP is in the process of being reformed in 2013. It will continue being ruled by the more demanding regulation geared towards a viable food production, sustainable management of natural resources and climate action, and also rural development. While Pillar I covers direct payments and market measures providing a basic annual income support to EU farmers and support (75% funds 2012), Pillar II covers rural development (25% funds 2012). Pillars will be maintained, funds will be progressively increased in Pillar II, and mechanisms to transfer funds from the second to the first pillar will tend to become more limited. Subsidies to production will tend to be reduced in favour of objectives such as landscape management, ecologic production, more self-sufficiency and access to local markets. Integrated rural development plans outside the agricultural sector will become much more relevant than today, particularly focussed on

promoting tourism, improving commercial chains between producers and consumers, and promoting bottom-up public-private initiatives, at National and European level.

19) Transport policies aim to better regulate markets and promote new technologies

The *European Transport White Paper* 2010-2020, and the *Transeuropean Networks Guidelines for Transport* continues the previous evolution of the Common Transport Policy. It remains focused on liberalising and further integrating the European transport system, particularly the rail sector, introducing right market incentives (e.g. the *user-pays* principle) and promoting the implementation of more effective technologies from economic and environmental point of view. Reducing mobility demand will not be an option, nor forcing economically non sustainable modal shifts, since transport demand is expected to grow for long-distance relations above GDP growth, both for freight and for passengers, and all trip purposes, especially between European main nodes and the rest of the World. the TEN-T Core Networks represent a major investment on long-distance infrastructure from 2012 to 2030 (€ 1,5 trillion), with a relatively dense rail networks for freight and passenger connecting all major airports and ports in the long-term. It is unlikely that this ambitious investment programme will be realised. Transport investments on infrastructures with low socioeconomic profitability will hardly be supported by European funds, even if they may have social or territorial cohesion interest. At urban level, decoupling mobility and economic growth is expected and urban policies will be focused on applying intelligent systems to manage mobility, increasingly carried out by public modes and more environmentally friendly individual modes; since noise, pollution and stress, may tend to be reduced, the centre of European cities will become more liveable, attractive and productive environments. Safety will be an increasingly important goal.

20) More integrated Environmental Policies

Environmental directives have been effective in imposing higher environmental standards across European countries and promoting the European environmental sector. The *Road Map towards the 7th Environmental Action Programme* fixes an ambitious programme having as a paramount target the reduction of 20% GHG emissions by 2020 (in relation to 1990 levels), and 80% by 2050, to mitigate the impacts of Climate Change. In addition to the more traditional elements of environmental policy (biodiversity, water, waste, etc) the 7th EAP will build on the actions set out in the *Resource Efficiency Roadmap* and will also have to deal among others with changing the behaviour of consumers, especially the new roles of urban communities, while it will renew the emphasis on the international aspect of environmental policy, setting the basis for a global green growth while continuing to strive for better global environmental governance. Financing environmental policy objectives will require a mix of public and private means given the pressures on public budgets. In April 2009 the European Commission presented a policy paper known as a *White Paper on Adaptation to Climate Change* which presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change. In the long-run, it is expected that European environmental regulations will not be much relaxed and will tend to be more important for all economic sectors, particularly Real Estate, Energy or Transport. Environmental taxation may tend to be slowly integrated into other taxations, and the *polluter-pays* principle generally applied at National level, based on common European criteria, generating additional revenues to be applied to environmental management. Plans for Natural Protection and Management will be one of few cases of permanent cross-border cooperation in Europe.

21) Energy policies begin

The Lisbon Treaty (2007) laid out for the first time the EU's competencies in the Energy area and the key objectives of energy policy (*Energy Plan for Europe*), and declared it to be an area of 'shared competence'. Given the high dependency of most European countries from oil and gas

produced by neighbouring countries the need to straightening this policy is clear, however the National strategies are different (e.g. while France maintains a high Nuclear capacity, other countries have a lower capacity and even reduce it). Also the need to develop an integrated but decentralised *Electric Grid* at continental level, largely powered by renewal sources, will push in favour of more cooperation in this political field. The *Energy Roadmap 2050* focus on EU's decarbonisation (reduce by 95% in carbon emissions from primary energy sources by 2050, compared to 1990 levels.) According to the EU 2020 Strategy, the EU is committed to reducing its own emissions by at least 20%, reducing its energy consumption by 20% and increasing the proportion of renewable energies in its energy mix by 20% by 2020, and different countries have their own targets. A 10% biofuel component in vehicle fuel is also envisaged by 2020, but it is estimated that between 4% and 18% of the total agricultural land in the EU would be needed to allow this threshold, making it both likely and desirable that these needs will in fact be met through a combination of domestic EU production and imports from third countries. The EC has outlined a master plan for an integrated energy network taking into account key interconnections with third countries, in its Communication on '*Energy infrastructure priorities for 2020 and beyond'*. Since it is not likely that a strong Common Energy Policy emerge in the coming decades, it is expected that the energy corporations existing in different countries, often public companies, may follow more or less compatible but different, often competitive, strategies.

22) European Research programs will grow

One of the flagship initiatives of the *Europe 2020 strategy* is innovation. This new approach aims to support innovation in fields that represent challenges for European society, such as climate change, energy efficiency, food safety, health and the ageing population. In this regard, one of the objectives to be reached in 2020 – namely 3% of the gross EU domestic product to be invested in research and development – is difficult to achieve giving the current economic situation. The fragmentation of research into National programmes diminishes its effectiveness, in relation to American or Chinese programmes. *Horizon 2020* will be a key tool in implementing the Innovation Union flagship initiative and it will focus on excellent science (35% of total budget), industrial leadership with dedicated support for ICT, nanotechnologies, advanced materials, biotechnology, advanced manufacturing and processing, and space; facilitate access to venture capital; and provide support for innovation in SMEs. (25% of total budget); and society changes such as food security, health and wellbeing, efficient energy, smart green transport, climate action and resource efficiency, and inclusive innovative societies (40% of total budget). The budget of *Horizon 2020* is of EUR 80 billion. It is expected that in following programmes the budget and the ambition of European integrated research programmes may grow.

23) Migration policies maintained

EU members were historically allowed to set their own policy on migration. However, the Treaty of Amsterdam (1997) and the Tampere European Council (1999) gave the EU responsibility for setting a Common Immigration and Asylum Policy, with the principal aim of making migration safe and legally controlled. Since 1997, EU member states have not made a sufficient progress in developing a common position on these issues, and it is not expected that the progress will be intensified in the future, however the Lisbon Treaty (2007) strengthened the ability of EU authorities to determine member states' immigration and asylum policies. Advances towards developing a common migration policy are being made, in particular by developing various directives (eg single permit directive, directive on the right to family reunification, directives concerning students and researchers …), but countries will keep the right to decide about their admission policies.

4.4 Baseline Quantitative Description

Baseline at a glance

In this section first reference values for key indicators are provided as starting point for the modelling exercise. Values are obtained from a large number of sources at global and European level and made consistent, at aggregated European level, by using TV+ and PASH+ Meta-models.

Based on the results to be obtained from forecast models in the next months, integrated through the meta-analysis process**,** the values presented next will be refined and adjusted whenever needed. Main sources used for reference are always indicated (MM means ET2050 Meta-model, in the cases no other source has been used as reference).

Next table presents working hypothesis to be validated or modified by the actual results produced by forecast models. An extended version of this table, including the quantitative World framework and the European main drivers and trends is available as an Annex in the end of this report.

	Trend 2010-2050	Headline	Baseline snapshot	Rate of change
Population	⇘	Population in EU27 peaks by 2040 with 526 millions, and starts declining.	Around 525 millions between 2025 and 2030, and declining thereafter. 17% of population older than 65 in 2010, 24% in 2030 and 29% in 2050.	Population growth rates from +0,3% yearly in 2010 to +0,2% yearly in 2030 and to -0,15% yearly in 2050
Society	⇘	25% increase in age-related and social welfare expenditure between 2010 and 2050.	Share of people older than 80 from 4,2% in 2010 to 10,6% in 2050. Dependency ratio from 46% in 2010 to 72% in 2050 (3 dependants for every 4 workers, approx)	Dependency ratio increasing at 1,2% yearly between 2010 and 2030, and 1,0% thereafter towards 2050
Economy	⇗	Sluggish recovery	GDP per capita in 2050 43.000 euros (1.8 times 2010's). Labour productivity in 2050 100.000 euros per worker (2.1 times 2010's)	GDP growth rate from 6% in 1970 to 2,0% in 2000, 1,6% in 2030 and 1,4% in 2050. Labour productivity growth stabilised around 1,8%
Technology	⇔	Inability to increase R&D investment to 3% (EU2020 goal).	Convergence for government R&D expenditure in the EU, but intense polarisation of private. Old technologies and evading technologies (emotion controllers, immersive virtual-reality)	R&D investment stabilised in 1,9% of EU27 GDP.
Energy	⇘	Decreasing energy consumption only after 2030, but increasing energy dependence.	Energy imports from 54% in 2005 to 59% in 2030 and 65% in 2050. RES in gross final energy demand, from 11% in 2010 to 25% in 2050.	Between 2010 and 2050, 45% energy intensity[43] drop.

[43] Energy required to produce a GDP unit (TOE per euro)

	Trend 2010-2050	Headline	Baseline snapshot	Rate of change
Transport	⇧	Sustained growth of traffics, and increasing share of road transport	Rail modal share below 5% in 2050 (6,6% in 1995, 6,2% in 2009) for passengers, and below 7% for freight (12,6% in 1995, 10% in 2009).	Total passenger transport activity (including international aviation) to increase 51% between 2005 and 2050.
Land-Uses	⇧	Increasing urbanisation	Accelerating growth of metropolitan areas driven by globalisation and knowledge society, especially capital cities; but population increase in a number of medium sized highly rural towns linked to attractive landscape and quality of life.	From 55% urban population in 1950 to 73% in 2010, 80% in 2030 and 89% in 2050.
Environment	⇘	Decreasing CO2 emissions but established targets are not met	GHG emissions in 2010 represent 87% of 1990's, in 2030 76% and 2050 65%. Still, 2050 EU27 target is to reduce to 80%, by 2020 (EU2020), and 20% by 2050 (July'09 agreement in G8 summit)	Between 2010 and 2050, 25% carbon intensity[44] drop.
Governance	⇔	Multiple-speed and Multi-level more complex governance	Nation-States remain the key players in Europe, and follow different integration and cooperation patterns. EU budget ramins at 1% GDP	No further enlargement in the Union after Romania's and Bulgaria's in 2007

Figure 4-2 Main Characteristics of Baseline Scenario

Baseline level of fulfilment of EU targets

Sector	Horizon	Official European Target	Baseline	assumption
Public expenditure	permanently	Annual government deficit under 3%	below 1%	Complies
	permanently	Government debt under 60% of GDP	63% in 2030 // 50% in 2050	Complies
Employment	2050	75% of the 20-64 year-olds to be employed	71% in 2030 // 72% in 2050	Does not comply
R&D / innovation	2020	From 1.8% to 3% of the EU's GDP (public and private combined) to be invested in R&D	1,9%	Does not comply
GHG emissions	2020	Total greenhouse gas emissions 20% in 2020 lower than 1990	14% reduction 2020	Does not comply
	2050	Total greenhouse gas emissions 80% in 2050 lower than 1990	35% reduction 2050	Does not comply
Energy sources	2020	20% of total energy from renewables in 2020	14,8% in 2020	Does not comply
Energy consumption	2020	20% increase in energy efficiency by 2020	15% in 2020	Does not comply
	2030	50% increase in energy efficiency by 2030	22% in 2030	Does not comply

[44] Emissions relieved per energy unit (CO2 tonnes per TOE)

Sector	Horizon	Official European Target	Baseline	assumption
Transport	2030	Transport emissions (including CO2 aviation, excl. maritime), 20% lower in 2030 in relation 2008	2% lower	Does not comply
	2050	Transport emissions (including CO2 aviation, excl. maritime), 60% lower in 2050 in relation 1990's	2% lower	Does not comply
TEN-T	2030	Multi-modal TEN-T core network by 2030	Only partially achieved	Does not comply
	2050	All core network airports connected to rail network by 2050, preferably by high-speed rail	Only partially achieved	Does not comply
	2050	All core seaports sufficiently connected to the rail freight and, where possible, inland waterway system.	Only partially achieved	Does not comply
Urban transport	2030	Lower to 50% the use of "conventionally-fueled" cars in urban transport	70%	Does not comply
	2050	0% use of "conventionally-fueled" cars in urban transport	30%	Does not comply
	2030	CO2 free logistics in cities by 2030	Only partially achieved	Does not comply
Road transport	2030// 2050	By 2020, 50% fatalities in road transport. Close to zero fatalities in road transport by 2050.	Accomplished	Complies
	2020	Car emissions: 95 g CO2/km target for 2020	110 g CO2/km	Does not comply
	2030 // 2050	30% of road freight over 300km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050 (facilitated by efficient and green freight corridors)..	Share of road freight transport over 300km is maintained	Does not comply
Rail transport	2030	To triple the length of high-speed rail network by 2030.	Increases by 50%	Does not comply
	2050	To complete a European high-speed rail network by 2050.	Doubles its current length	Does not comply
	2050	By 2050, the majority of medium-distance passenger transport should go by rail. .	Share of rail mid distance passenger transport increased but air transport still dominant	Does not comply
Aviation	2050	Low-carbon sustainable fuels in aviation to reach 40% by 2050	20%	Does not comply
	2020 // 2050	Stabilisation of air emissions by 2020 (carbon neutral growth) and 50% reduction in 2050 compared to 2005	Only partially achieved	Does not comply
Maritime	2050	CO2 emissions from maritime transport should be cut by 40% (if feasible 50%) by 2050, compared to 2005 levels	Only partially achieved	Does not comply
Transport management	2020	SESAR, Modernised air traffic management infrastructure.	Only partially achieved	Does not comply
	2020	To establish the framework for a European multimodal transport information, management and payment system	Only partially achieved	Does not comply

Sector	Horizon	Official European Target	Baseline	assumption
	2050	Move towards full application of “user pays” and “polluter pays” principles	Only partially achieved	Does not comply
Education	2020	Reducing school drop-out rates below 10% by 2020	13% in 2020	Does not comply
Social exclusion	2020	at least 20 million fewer people in or at risk of poverty and social exclusion by 2020	1,6 million only	Does not comply

Figure 4-3 Level of fulfilment of official targets by ET2050 Baseline

Logic relationships between trends and key directions for the Baseline

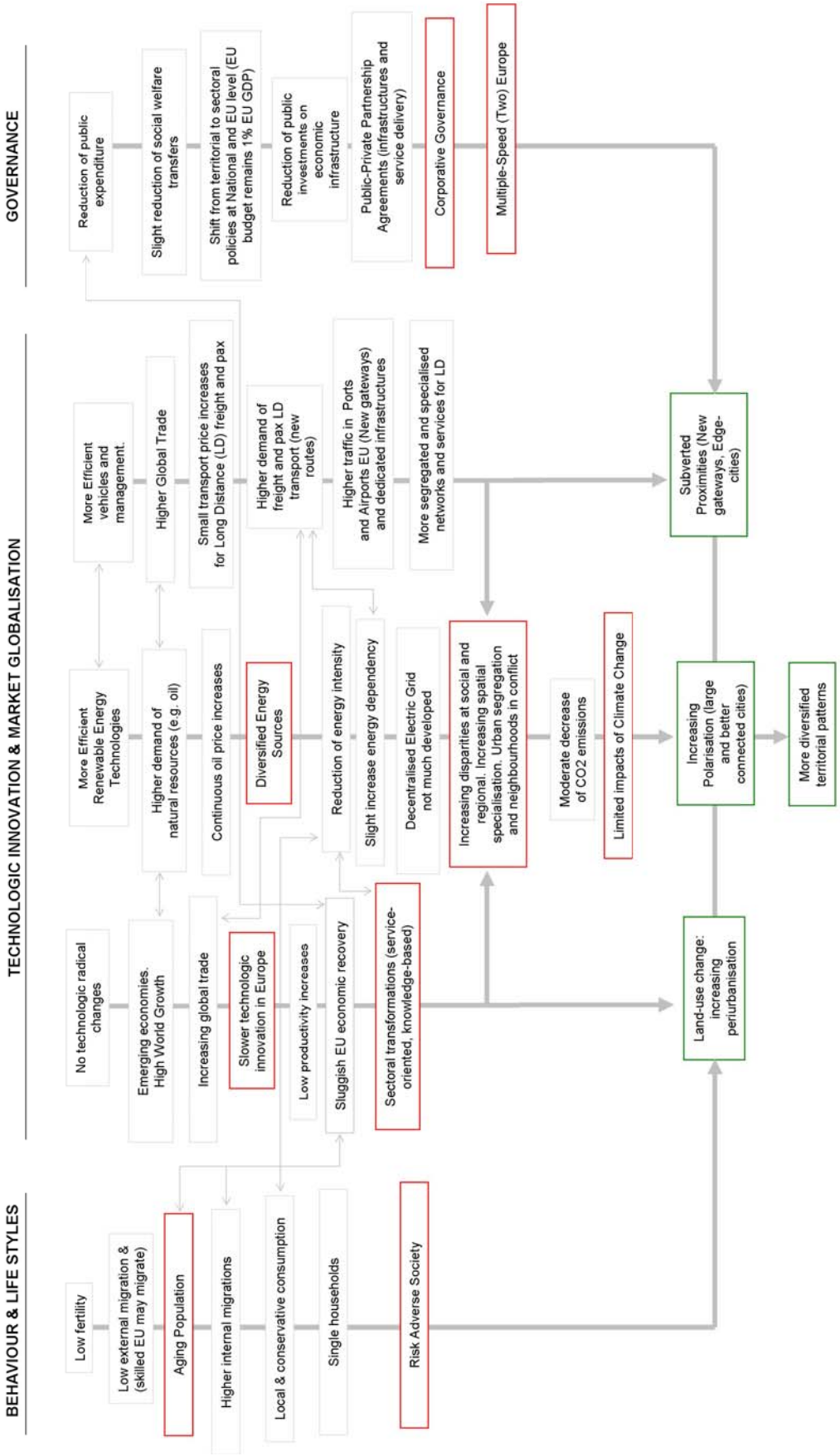


Figure 4-4 Logic framework for the Baseline Scenario

5. Exploratory Scenarios

5.1 Approach

A review of almost 100 prospective studies defining scenarios for 2030 and 2050 (approximately 300 different scenarios) at European and World level has been carried out to support a next step on the discussion process related to Exploratory Scenarios.

Next table shows a synthesis of most relevant scenarios studied, according to the geographic scale of reference and the consideration of main drivers.

After, the next two graphics display the same scenarios according to key policy-aims.

The analysis is based on an expert qualitative judgment when the scenario does not provide a quantitative description.

Next sections introduces the more relevant scenarios identified in the ET2050 context.

		TERRITORIAL IDENTIFICATION				MAIN DRIVERS		
REPORT / STUDY	SCENARIOS	Global	European	National	Local	Technology	Governance	Behaviour
UK OFFICE SCIENCE & TECHNOLOGY 2055	Perpetual Motion							
	Urban Colonies							
	Tribal Trading							
	Good Intentions							
FORWARD STUDIES UNIT "Five different futures for Europe" 2010	Triumphant Markets							
	The Hundred Flowers							
	Shared Responsibilities							
	Creative Societies							
	Turbulent Neighbourhoods							
CPB, "4 FUTURES 4 EUROPE" 2040	Strong Europe							
	Transatlantic Market							
	Regional Communities							
	Global Economy							
EMCC. "Trends and drivers of Change in the EU transport and logistics sector:scenarios 2017" 2008	Take the A-Train							
	I'm in love with my car							
	Riding the rainbow							
	Moonlight ride in a Diesel							

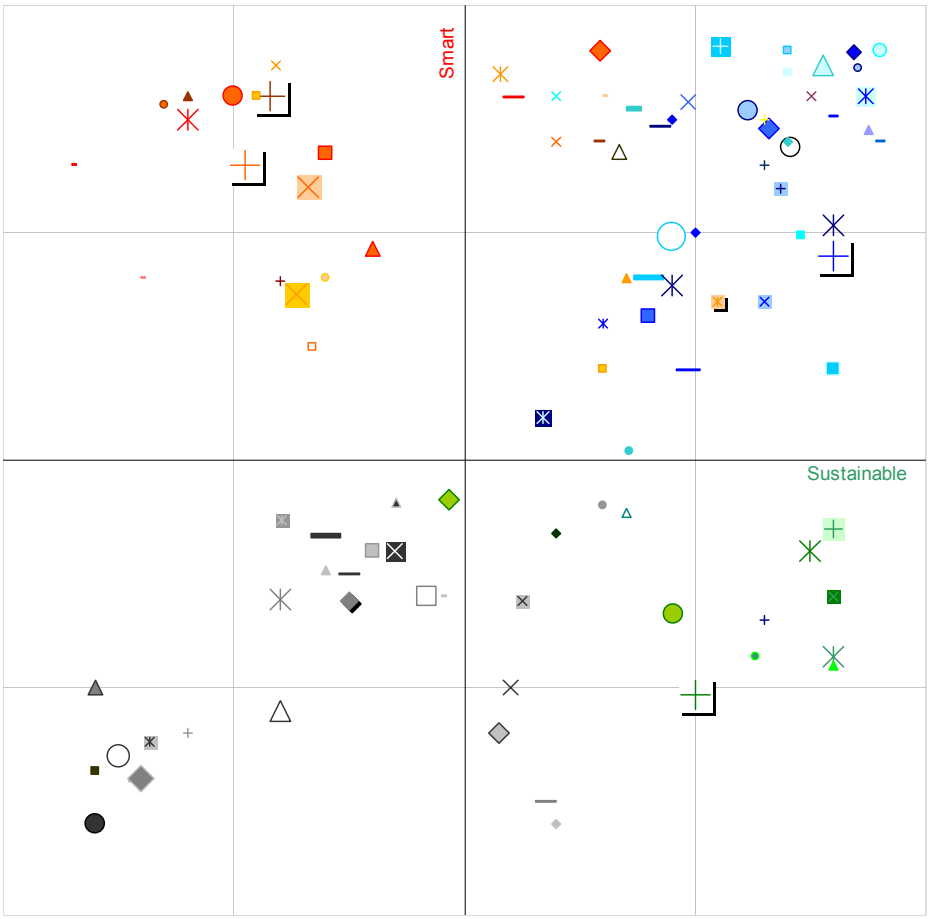
REPORT / STUDY	SCENARIOS	TERRITORIAL IDENTIFICATION				MAIN DRIVERS		
		Global	European	National	Local	Technology	Governance	Behaviour
ESPON 3.2. Europe 2030	Pro-active Europe							
	Cohesion-oriented							
	Competitiveness-oriented							
UN GEO-3	The Markets First							
	Policy First							
	Security First							
	Sustainability First							
MEDACTION 2030	Knowledge is King							
	Big is beautiful							
	Convulsive Change							
GLOBAL SCENARIO GROUP	Market Forces							
	Policy Reform							
	Great Transitions							
	Fortess World							
MILLENIUM PROJECT SCENARIOS 2025	S&T develops a Mind of its Own							
	The World Wakes Up							
	Please, turn off the Spigot							
	Backlash							
FOCI - Future Orientation for Cities 2030	Geen economy							
	Enhancing the European potential							
ReRisk 2030	Green High-Tech							
	Energy-efficient Europe							
	Nuclear Energy for Big Regions							
	Business as usual?							
SS-LR 2030	The Reference scenario							
	The Pro-active scenario ("Green Economy")							
	The Defensive scenario							

		TERRITORIAL IDENTIFICATION				MAIN DRIVERS		
REPORT / STUDY	SCENARIOS	Global	European	National	Local	Technology	Governance	Behaviour
ESPON EDORA 2030	BAU							
	Gradual response to climate change + high levels of State							
	Rapid response to climate change + low levels of State							
	Rapid response to climate change + high levels of State							
MILLENIUM PROJECT SCENARIOS 2050 (Global Exporatory Scenarios)	Cybertopia							
	The Rich Get Richer							
	A Passive mean World							
	Trading places							
Netherlands Environmental Assessment Agency 2050	Trend Scenario by NEAA							
	Challenge Scenario by NEAA							
Megacities on the Move 2040	Planned-opolis							
	Sprawl-ville							
	Renew-abad							
	Communi-city							
PASHMINA: The World in 2050	Pear World							
	Apple World							
	Orange World							
	Potato World							
Global Europe 2050	Nobody cares: standstill in European integration							
	EU under threats: a fragmented Europe							
	EU renaissance: further European integration							
Netherlands 2040	Talent Towns							
	Cosmopolitan Centres							
	Egalitarian Ecologies							
	Metropolitan Markets							
France 2040	Hyperpolisation							

REPORT / STUDY	SCENARIOS	TERRITORIAL IDENTIFICATION				MAIN DRIVERS		
		Global	European	National	Local	Technology	Governance	Behaviour
	Regiopolisation							
	Postpolisation							
	Dépolisation							
Aménager la France 2020	L'Archipel éclaté (un scénario néolibéral)							
	Le local différencié (un scénario néo-communautaire)							
	Le centralisme rénové (un scénario néo-jacobin)							
	Le polycentrisme maillé (un scénario de l'équité)							
One Planet Economy 2050	Clever and Caring							
	Fast Forward							
	Breaking Point							
	Slow Motion							
Digital Europe 2030	Open Governance							
	Leviathan Governance							
	Privatised Governance							
	Self-Governance Governance							
Innovating Futures 2025	Europe's Innovative Societies							
	European Innovation Fatigue							
	Cities Go Ahead							
	Innovations for Innovation's Sake							
Shell Energy Scenarios 2050	Blueprints							
	Scramble							
TRANSVISIONS European Transport 2050	Moving alone							
	Moving together							
	Stop moving							
	Moving less							
Logistics 2050	Mega-efficiency in Megacities							

REPORT / STUDY	SCENARIOS	TERRITORIAL IDENTIFICATION				MAIN DRIVERS		
		Global	European	National	Local	Technology	Governance	Behaviour
	Customized lifestyles							
	Paralysing protectionism							
	Global resilience – local adaptation							
PRELUDE of Europe's future	Great Escape							
	Evolved Society							
	Clustered Networks							
	Lettuce surprice U							
	Europe of Cohesion							
PLUREL "Urban development Scenarios 2025"	Sustainability							
	Hyper-Tech							
	Fragmentation							
	Extreme water							

Figure 5-1 Classification of scenarios according to geographic scale of reference and the consideration of main drivers



Triumphant Markets
Shared Responsibilities
Turbulent Neighbourhoods
Urban Colonies
Good Intentions
Policy First
Sustainability First
The World Wakes Up
Backlash
I'm in love with my car
Moonlight ride in a Diesel
Cohesion-oriented (Danubean Europe)
Know ledge is King
Convulsive Change
Transatlantic Market
Global Economy
Enhancing the European potential
Energy-efficient Europe
Business as usual?
The Pro-active scenario ("Green Economy")
Gradual response to climate change + high levels of State
Rapid response to climate change + low levels of State
Cybertopia
A Passive mean World
Trend Scenario by NEAA
Planned-opolis
Renew-abad
Pear World
Orange World
Nobody cares: standstill in European integration
EU renaissance: further European integration
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Market Forces
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S&T develops a Mind of its Own
Please, turn off the Spigot
Take the A-Train
Riding the rainbow
Pro-active Europe
Competitiveness-oriented (Rhine-Rhone Europe)
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Strong Europe
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Geen economy
Green High-Tech
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The Reference scenario
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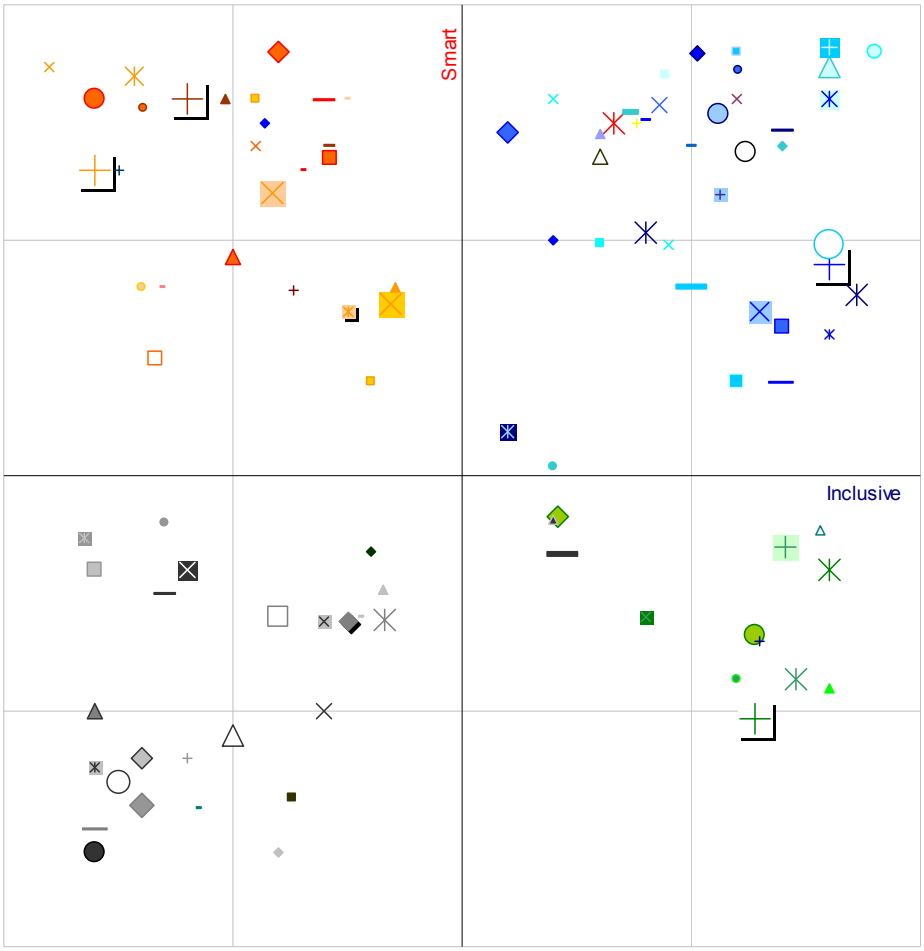
Europe of Cohesion
Hyper-Tech
Extreme w ater
Regiopolisation
Dépolisation
Le local différencié (un scénario néo-communautaire)
Le polycentrisme maillé (un scénario de l'équité)

Figure 5-2 Classification of scenarios according to Smart and Sustainable policy aims



Triumphant Markets
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Great Escape
Clustered Networks
Europe of Cohesion
Hyper-Tech
Extreme water
Regiopolisation
Dépolisation
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Le polycentrisme maillé (un scénario de l'équité)

Figure 5-3 Classification of scenarios according to Smart and Inclusive policy aims

5.2 Analysis of most relevant Scenarios for ET2050

Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON (2007)[45]

The main objective of the ESPON 3.2 project was to develop spatial scenarios. The time horizon for the spatial scenarios was set to 2015 (mid term) and 2030 (long term).

An integrated baseline scenario showed the probable evolution of the European territory in a situation of no major changes (political or external). Two prospective policy scenarios explored the effects of EU policy in a cohesion-oriented scenario (policies formulated with the goal of social, economic and territorial cohesion as top priority) and in a competitiveness-oriented scenario (overall global competitiveness of EU economy being the major objective).

The project discussed issues in the social, economic, territorial and environmental dimensions, including considerations on transport and mobility. Find below the most relevant characteristics of ESPON 3.2 scenarios in the mobility domain.

Next figure characterises considered scenarios:

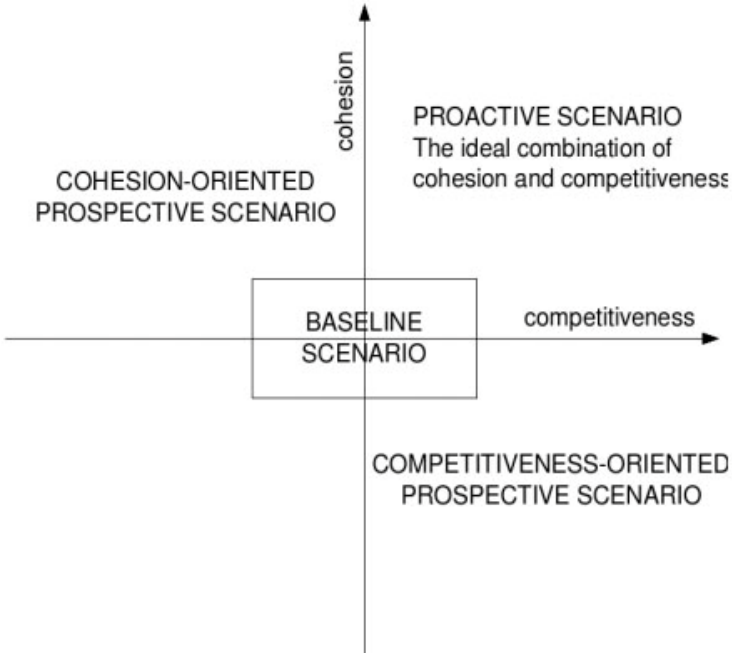

Figure 5-4 ESPON 3.2 Scenarios in a cohesion // competitiveness 2D space
Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

[45] ESPON 3.2 was carried out by a consortium constituted by IGEAT, AETS, BBR, CRS-HAS, CUDEM, DIG, MCRIT, NISR, Nordregio, UMS 2414 Riate

Baseline (trend) scenario

The territorial trend scenario for 2030 refers mainly to the impact of policy continuity in a context where new challenges emerge, adding to those already existing. Areas with good pan-European accessibility will spread from the central Pentagon area in almost all directions. However, disparities in accessibility between central and more peripheral areas will remain significant, especially regarding freight transport, and even more in terms of regional or local accessibility.

Sector	Main Characteristics
Demography	Reduced population ageing as a result of lower fertility and mortality rates Stable total European population (+ enlargement) Increasing, but globally controlled external migration Unchanged constraints on internal migration
Economy	Slowly increasing total activity rate Slowly growing R&D expenditure, but constant technological gap vis-a-vis the USA Decreasing public expenditure
Energy	Steady increase of energy prices Stable or decreasing European consumption Increasing use of renewables
Transport	Continued growth of traffic, but moderately curbed by energy price with possible modal shift Constant increase of infrastructure endowment, but below demand needs Partial application of the Kyoto Agreement
Rural development	Further liberalisation of international trade Increasing industrialisation of agricultural production, including the production of bio-fuels Further diversification of functions of rural areas; stronger dependence upon the residential economy and new forms of tourism Progressive reduction of CAP budget
Socio-cultural sector	Heterogeneous and insufficient policies related to integration Growing ethnic, religious and social tensions
Governance	Increasing co-operation between cross-border regions Increase in multi-level and cross-sectoral approaches, but limited to specific programmes (rural development); Maintenance of competition and incoherence between - policies devoted to innovation and competitiveness and Others devoted to cohesion
Climate Change	Moderate overall climate change (+1°) Increase in extreme local events Moderate emission levels due to new technologies Few (too few) structural adaptation measures
Enlargement	Bulgaria & Romania by 2007 Western Balkans (with Croatia acceding first) By 2020 Turkey By 2030 Continued combination of deepening and widening Modest impact of neighbourhood policy

Figure 5-5 ESPON 3.2 - Hypotheses of the Baseline scenario
Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

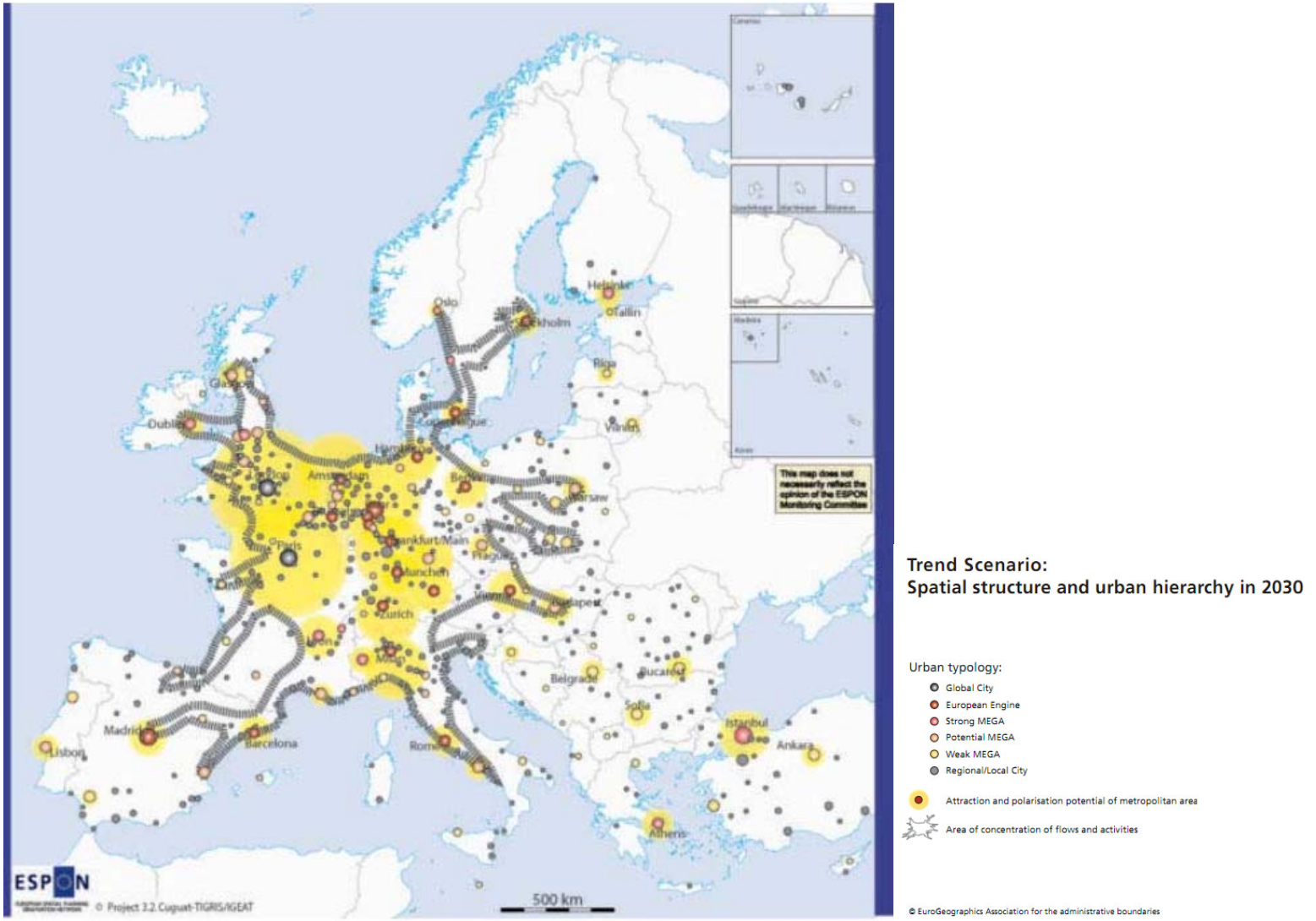

Figure 5-6 ESPON 3.2 - Spatial structure of Baseline in 2030
Source: Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

Competitiveness-Oriented scenario (Rhine-Rhone)

This scenario is a prospective, policy-oriented scenario. It is based on the assumption of a significant reshaping of EU policies originating in the disappointing results of the implementation of the Lisbon Strategy during the period 2000-2005. The EU budget is being reduced and EU expenditures are being targeted towards R&D, education, ICT and strategic external accessibility, including in structural policies. The CAP is subject to rapid and radical liberalisation, with a significant reduction of support, of external tariffs and of export subsidies. The budget of structural policies is also being reduced, with a part of former EU interventions being re-nationalised and EU support being concentrated on the most competitive areas of less developed regions. As a counterpart, public services are further liberalised and privatised, labour markets are regulated in a more flexible way and the third pillar of EU policies (foreign policy, justice, security etc.) is being strengthened.

Sector	Main Characteristics
Demography	Increase in selective external in-migration: economic sectors & destination Abolition of constraints to internal migration Increase in retirement age. Encouragement of fertility rate through fiscal incentives
Economy	Stronger reduction of total public expenditure compared with the baseline scenario Further privatisation and liberalization of public services Prioritisation of public expenditures in R&D, education, ICT and strategic external accessibility (ICT and transport) More and easily accessible venture capital 'Flexibilisation' of labour markets
Energy	Steady increase of energy prices European consumption increasing Realisation of TEN – E: investment in infrastructure according to market demand Priority to large-scale energy production for metropolitan areas as an alternative for oil and gas
Transport	Realisation of TEN-T: investment in infrastructure according to market demand Prioritisation of links between metropolitan areas Application of the Kyoto Agreement
Rural development	Rapid and radical liberalisation of CAP (reduction of tariffs, of budget and of export subsidies) Reduction of support to rural development policy Rapid industrialisation of agricultural production Strong dualisation of rural areas, resulting from market forces
Socio-cultural sector	Reactive management of social problems in large cities Increase of surveillance and security systems
Governance	Abolishment of barriers to cross-border co-operation Less public intervention Wider application of the Open Method of Coordination Increased role of private sector in decision making Strengthening of the third pillar of the EU policies: foreign policy, justice, security
Climate change	Moderate overall climate change (+1°) Increase of extreme local events Constant to increasing emission levels Mitigation measures based on flexible schemes & stimulation of alternative technologies. Adaptation measures only where cost efficient
Enlargement	Continuing enlargement to widen the market: Romania, Bulgaria in 2007 Western Balkan, EFTA/EEA countries in 2015 Turkey in 2020, Strengthening of the neighbourhood policy (Maghreb, Ukraine, Russia etc.)

Figure 5-7 ESPON 3.2 - Hypotheses of the Competitiveness-Oriented scenario
Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

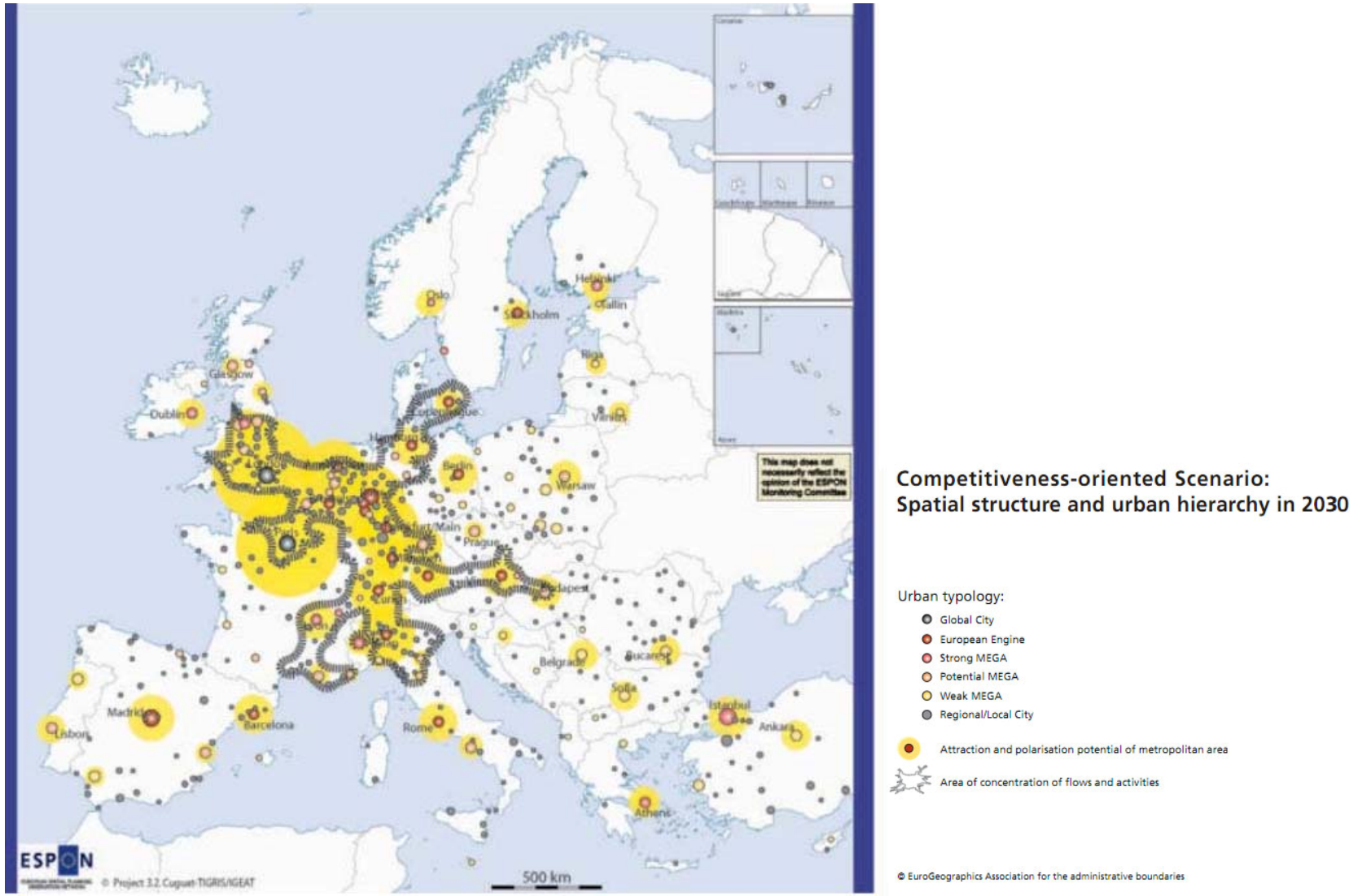

Figure 5-8 ESPON 3.2 - Spatial structure of Competitiveness-Oriented in 2030
Source: Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

Cohesion-Oriented scenario (Danube)

In this scenario, the main priorities of public policies at EU level, in a context of growing globalisation, are focused on economic, social and territorial cohesion and not on global competitiveness.

Sector	Main Characteristics
Demography	Restrictive external migration policies More flexible retirement ages Better balance of population structure through encouragement of higher fertility rates More flexible arrangements for child care Unchanged constraints on internal migration
Economy	Maintaining the volume of the EU budget Reinforcement of structural funds and concentration on weakest regions Further harmonization of taxation and social security systems, as far as non detrimental to the competitiveness of less developed countries
Energy	Steady increase of energy prices Realisation of TEN-E Promotion of decentralised energy production , particularly renewables
Transport	Development of TEN-T with priority given to peripheral regions at different scales Support to transport services in rural and less developed areas Application of the Kyoto Agreement
Rural development	Minor CAP reforms, but shift from pillar 1 to pillar 2. Priority given to less developed rural regions in the field of direct payments to farmers (pillar 1) Priority given to environmental and animal health criteria Promotion of quality products Active policy for economic diversification in rural areas, including SMEs, tourism, residential functions etc.
Socio-cultural sector	Promotion of regional and European identities Integration of marginal groups like romany in peripheral areas Proactive socio-cultural integration policies, particularly in cities Increased fiscal and/or social investment in quality of life issues, like health, personal care, local environment, etc...)
Governance	Active multi-level territorial governance, particularly in areas supported by structural funds Strong role of public actors in territorial governance Stronger role for the European Commission
Climate change	Moderate overall climate change (+1°) Increase of extreme local events Constant emission levels strict mitigation measures (taxes, road pricing as far as non detrimental to peripheral regions) Wide range of adaptation measures like EU hazard funds and large investments
Enlargement	Deepening preferred to widening Brake on further enlargements (except Bulgaria and Romania) Only lip service to neighbourhood policy

Figure 5-9 ESPON 3.2 - Hypotheses of the Cohesion-Oriented scenario
Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

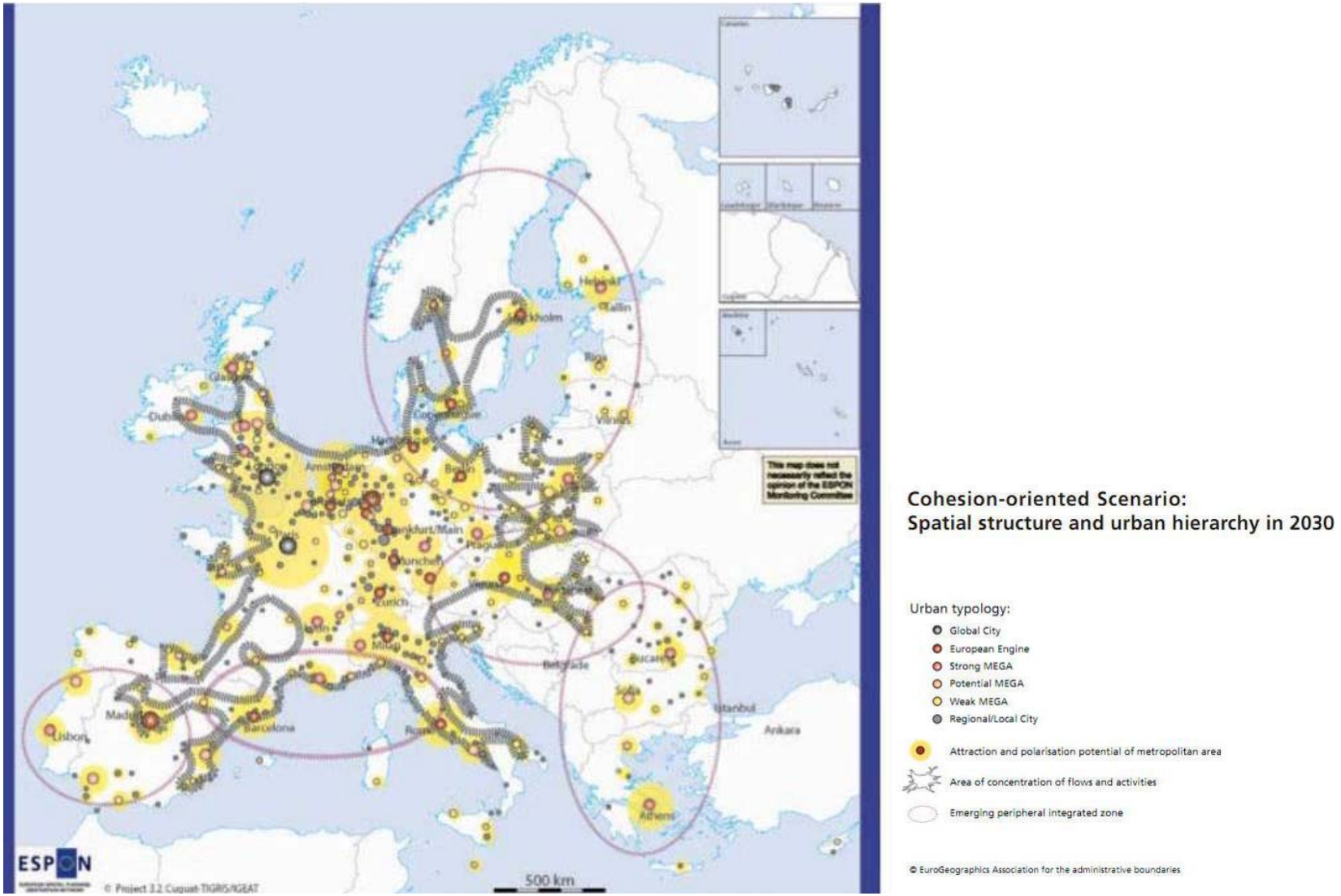

Figure 5-10 ESPON 3.2 - Spatial structure of Cohesion-Oriented in 2030
Source: Source: Spatial scenarios in relation to the ESDP and EU Cohesion Policy by ESPON, 2007

The Netherlands of 2040 by Netherlands Bureau for Economic Policy Analysis (2010)

This study develops four scenarios that can be used to think about the future of the Dutch economy in 2040.. The scenarios in this study are four consistent stories for such contingencies. They deal with two basic uncertainties: (i) the future division of tasks among workers—will it occur anywhere in the world or will production occur more locally and (ii) whether the size of cities will become larger or smaller. Together, these two uncertainties lead to the four scenarios presented in the figure below. The horizontal axis presents the options for the division of tasks; the vertical axis shows the possibilities for city size. The scenarios are labelled such that the first term reflects the characterisation of people and the second informs about the type of location.

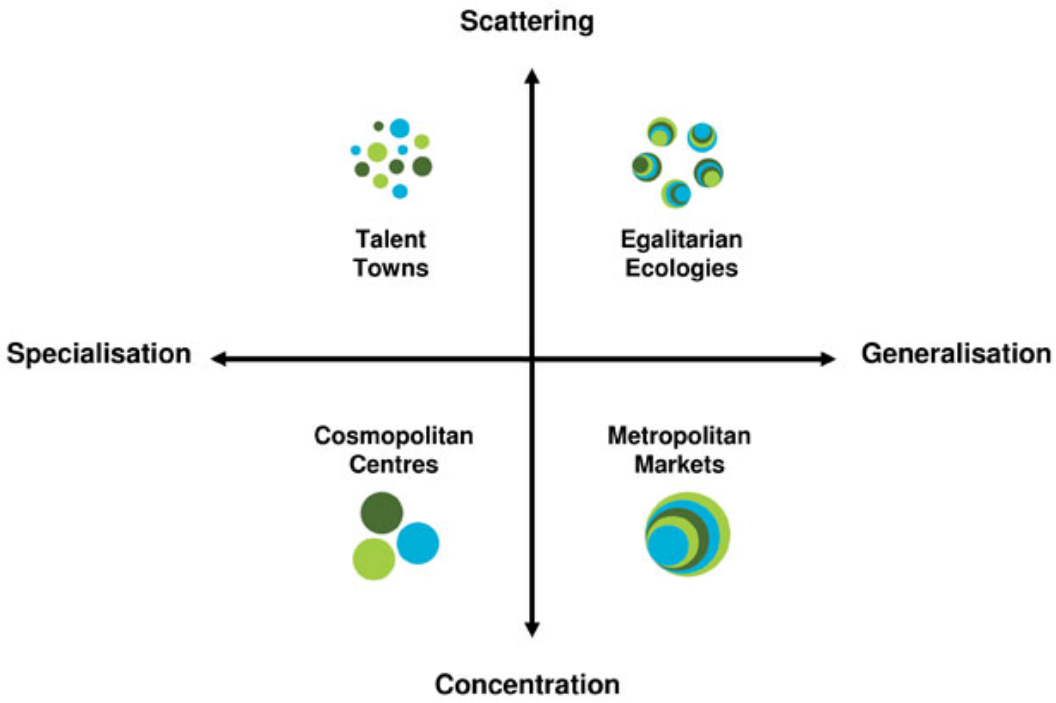

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Figure 5-11 NL2040 - Framework scenarios
Source: CPB (2010), *The Netherlands of 2040,* Netherlands Bureau for Economic Policy Analysis

Talent Towns (TT)

Imagine a world with relatively small cities (100,000 - 200,000 inhabitants) and specialised workers and firms. TT is a very dynamic world with excellent opportunities, but also major challenges. Communication technology (CT) enables specialist workers to co-operate in virtual teams. Consequently, firms employ specialists from all over the world. Specialist workers gain from personal interaction with their fellow specialists. Together with an attractive living environment, this determines their choice to live in small specialised tows. The strongly competitive environment enables high-skilled specialists to earn high incomes. However, the rising top performer of tomorrow can overtake the top performer of today. The wages of low-skilled workers suffer downward pressure due to global competition. The TT world faces the paradox of high demand for protection and redistribution, but limited supply. The comparative advantage of the Netherlands and other European countries lies within business services. Manufacturing activities move for the most part to Asia.

Cosmopolitan Centres (CC)

Envision a world of large cities (each of 2 to 8 million inhabitants) with global connections hosting specialised workers and firms. In a CC city, many specialists from all over the world combine their efforts in innovation, design and production. This global division of tasks relies on efficient and relatively cheap communication technologies, which facilitate intensive coordination between all steps in the production process. Cities develop into clusters of specialised activities. The largely science-driven expansion of bio- and nanotechnology demands close cooperation between researchers in universities and firms. The prosperity of these cities might be threatened if other cities contest or take over their comparative advantage. Therefore, income levels may differ substantially between centres and between a particular centre and its hinterland. Substantial income inequality also exists within cities, because the large CCs attract a broad range of supporting tasks. The Netherlands may host a few of these clusters in which it has a comparative advantage. Dutch CC cities may specialise in, for instance, company headquarters, water management and engineering, biomass technology, medical engineering, creative activities or logistics services.

Egalitarian Ecologies (EE)

Variety and dispersion characterise egalitarian ecologies. Economic activity spreads out over medium-sized cities (100,000 - 500,000 inhabitants) that host medium-sized firms. Successful cities are hotbeds of high-quality production, and offer opportunities for creative cooperation on a small scale. Knowledge resides largely in the minds of the country's generalist employees in combination with the databases and other IT-applications of firms. The IT systems enable firms to produce differentiated products that cater to differences in local demand. Living and working activities spread out over space. Because firms benefit little from being located near each other, they turn away from large cities and settle in medium-sized cities. These cities offer high-quality private and public services and provide agreeable living conditions for their employees. EE represents a world with little income growth and modest income differentials. Because technological progress levels off and considerable wealth flows to suppliers of raw materials, disposable income grows only moderately. Medium-sized cities the Netherlands flourish, building on their strengths in fields such as creative industries, agricultural services, healthcare products, fashion and design. Economic activity in the Randstad keeps pace, because the Netherlands retains its position in the transport of final goods all over Europe.

Metropolitan Markets (MM)

Think of a few very large metropolises with more than 10 million inhabitants dominating the world. Large factories, huge office buildings and sky-high apartment blocks characterise these cities. Economic activity is concentrated in dense areas, where economies of scale and scope are optimally exploited. Metropolitan Markets is a world in which the winning cities take all. In MM, bio- and nanotechnology break through. Their sheer complexity requires extensive research facilities and a high degree of tacit knowledge exchange within large firms to create sufficient potential for developing marketable applications. Metropolises attract firms and people. In metropolises, firms find trusted business partners, knowledge centres, a large supply of generalist workers and many consumers. People move to a MM city to select the best job, to build interesting relationships and to benefit from an appealing supply of cultural and recreational services. Where the metropolis thrives, the hinterland lags behind. The metropolis attracts all of the highly productive firms and higher-qualified people. Income inequality is large-both within the metropolis and between the metropolis and the hinterland. The Netherlands faces the challenge whether it is large enough to host a local metropolis. Given the scale and scope of MM cities there is a chance that this is impossible. In that case, the Netherlands as a whole becomes a hinterland. Neighbouring European metropolises would attract all company headquarters, research centres and talented people.

Table 8.1 Main Scenario characteristics

	Talent Towns	Cosmopolitan Centres	Egalitarian Ecologies	Metropolitan Markets
				
City size, in population	100k – 200k	2 – 8 m	100k – 500k	> 10 m
Technology, knowledge				
Direction ICT	Communication	Communication	Information	Information
New GPT	None	Research-oriented	None	Application-oriented
Knowledge	Specific	Specific	General	General
Knowledge spillovers	Similar workers	Similar workers	Different workers	Different workers
Innovation	Direct applications, strong competition	Radical, firm – university links	Applied and incremental	Fundamental and applied, within firms
World economy				
Brasil	Attracts some manufacturing	Fails to create CC	Limited trade options	Regional growth engine
Russia	Benefits from its resources	Energy-intensive industries	Benefits from its resources	Some growth from natural resources
India	Stalls	Services centres	Inward-oriented	Several metropolises
China	Manufacturing	Manufacturing hub	Social tensions	Many metropolises
South-east Asia	Manufacturing intermediaries	Manufacturing	Growth-constrained	Some metropolises
United States	Top-end innovation and design	GPT, services	IT products and local varieties	Many metropolises
European Union	Business services	High-end services	Local varieties	Metropolis less common
Trade	Global market, high trust, strong trade agreements	High and broad, trade in intermediaries	Final products; limited idea flows, resource tensions, non-tariff barriers	Limited, autarkic metropolis, battle for resources
Place of business				
Agglomeration	Scattered	Concentrated	Weak, medium city size, local varieties	Highly concentrated
Infrastructure	Virtual + air connections	Extensive, high quality	Regional	Locally high quality
Organisation of firms	Virtual teams	Specialised plants	Medium-sized plants	Conglomerate
Decision power in firm	Centralised	Centralised	Decentralised	Decentralised
Supply chain	Broken, footloose	Outsourcing	Integrated	Highly integrated
Capital market	Continental, venture capital	Global, equity	National, credit	City, bonds

Table 8.1 (continued)	Main Scenario characteristics			
	Talent Towns	Cosmopolitan Centres	Egalitarian Ecologies	Metropolitan Markets
				
People				
High-skilled workers	Talent is highly rewarded, operate from home	Talent is highly rewarded, move to CC	Moderate wages, live in suburbs	Substantial wages, live in city centre
Medium- to low-skilled workers	Strong competition, pressure on wages	Personal services, regionally mobile	Substantial demand, immigration, stable wages	Reasonable wages, live in outskirts of MMs
Social capital	Bridging	Bridging	Bonding	Bonding + bridging
Challenges and risks				
Markets for goods and services	Protectionism, large flexibility	Barriers to trade and mobility	Trade tensions	Market power of conglomerates
Resources	Lack of excellent human capital	Inadequate education and research infrastructure	High prices of natural resources	Congestion and pollution
Vulnerability to shocks	High: specific human capital and city output	High: specific human capital and large city output	Limited	Low
Income inequality	High: due to specialisation	Very high: large cities and specialisation	Low	High: due to large metropolises
Social	Weak solidarity, weak protection	Weak social structures	Ethnic tensions	Crowded cities

Figure 5-12 NL2040 - Scenario's Characteristics

Source: CPB (2010), *The Netherlands of 2040,* Netherlands Bureau for Economic Policy Analysis

France 2020 by DATAR (2002)[46]

DATAR offers in this book the result of forward thinking on France in 20 years. After an analysis of issues critical to the future, the tensions at work and they can induce reversals, four exploratory scenarios are presented. They are built around one key variable: the dominant mode of public action and territorial frameworks privileged. They set out the implications of the options on the spatial dynamics and the main features of the organization of the territory.

Archipelago exploded (a neoliberal scenario)

This scenario is characterized by a fragmented territory in which opposing dynamic cities, economically efficient and internationally competitive and marginalized areas. The action of the state is primarily to provide efficient framework for market development. The state should help, without real success, and difficulties in territories away from the predominant dynamic that, in this model are not supported by regional solidarity.

Local differentiated (a scenario New Community)

Local differential scenario shows an area where the creative initiatives of economic values and socio-cultural multiplied decentralized levels of giving shape to many heterogeneous entities forging links between them cooperation on thematic projects. Not having anticipated and set rules, the state is in a position to mediate disputes between territories. He tries to temper imbalances and to ensure access of all citizens to public services. He is forced to reinvent its role in the direction of greater flexibility, to reintroduce an overall coherence.

Centralism renovated (neo-Jacobin a scenario)

Centralism renovated features a state legitimized in its desire to retain a role on behalf pre-eminent issues of national solidarity, cohesion, and even environmental protection in the context of European integration measured. Spatial embodies this voluntarism; local initiatives are firmly framed without going back on the principles of decentralization. The aim of the government interventions is to integrate the areas lagging behind in a pattern that still has much to center-periphery model.

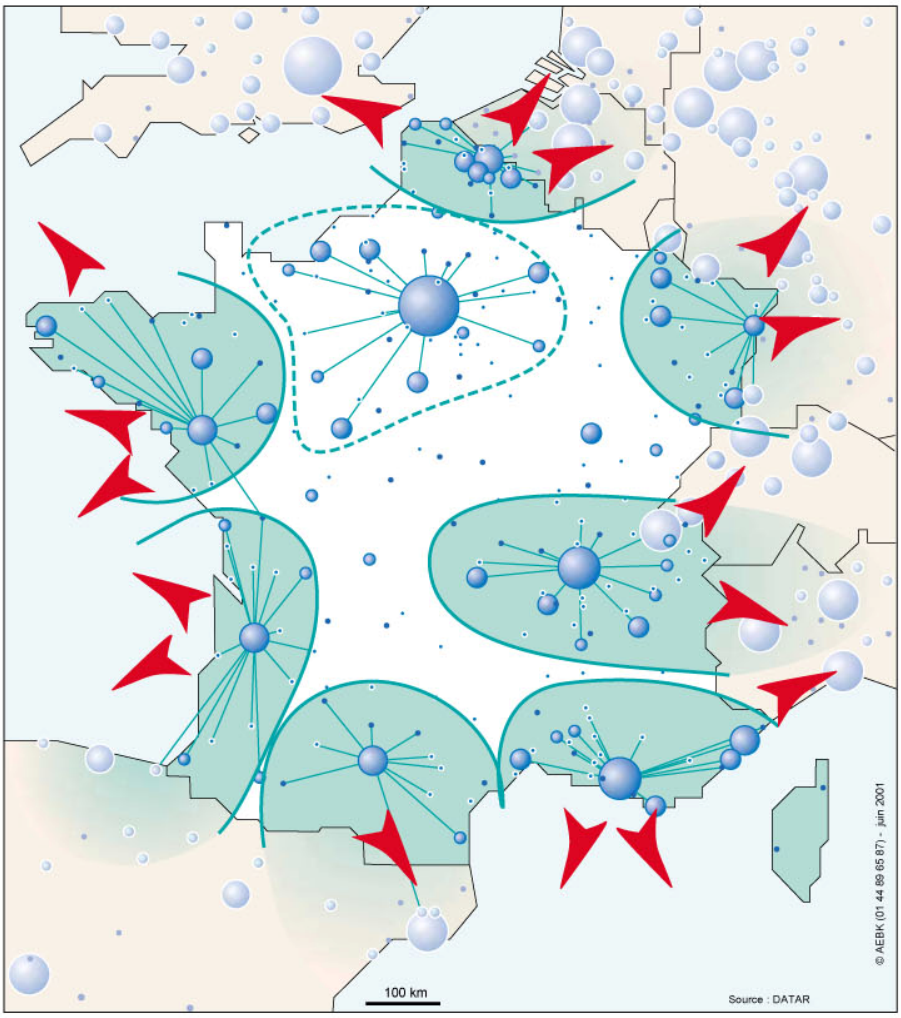
Networked Polycentrism (a scenario of equity)

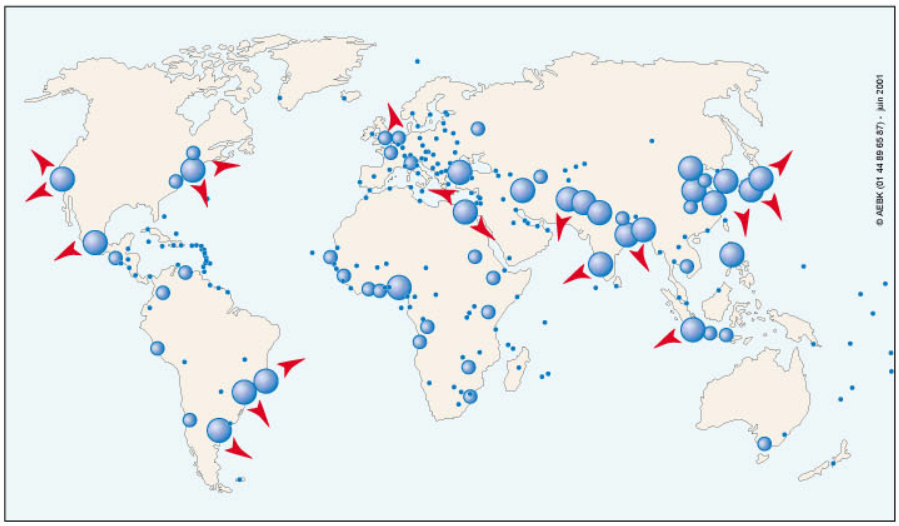
This scenario puts on the restructuring of territories and redefining the mission of public power. The territorial dynamics based on the one hand, on participatory approaches in project areas: cities, countries, regional parks, and, secondly, on creative cooperation between cities and regions, around issues of interregional scope to the scale of large river settlement. The structuring of simultaneous network micro-territorial level and the macro-poles makes a territorial integration of the territory that reinforces in a Europe which was also the choice of polycentrism. The state envisages a policy of adaptation to the territories and lived spaces issues, but mainly engages in strategies measured on territorial differentiation supported a renewed concept of "regional balance".

[46] DATAR (2002) *Aménager la France de 2020*

Scenario 1: Archipelago exploded

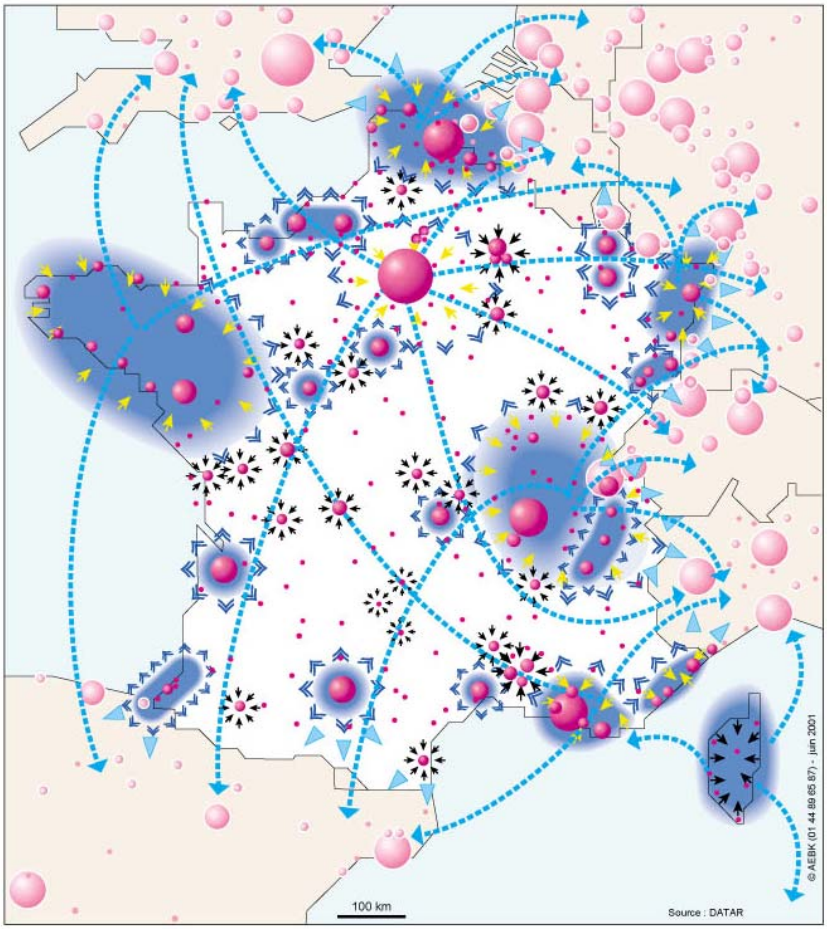
Globalisation stimulates certain urban nodes and prompts competition between localised networks. Spaces polarised by the most performing regional metropolis are not able to organise the whole of the territory

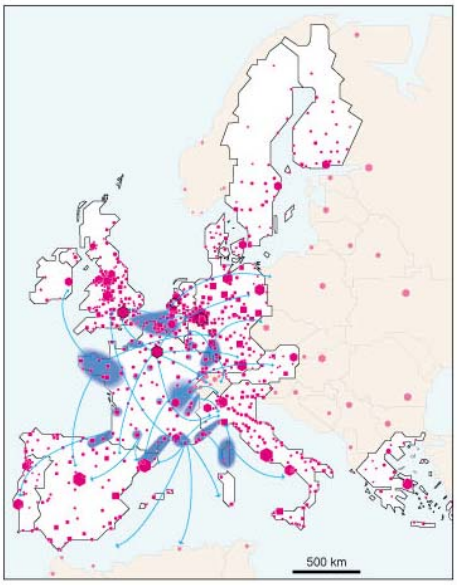




Scenario 2: Local differentiated

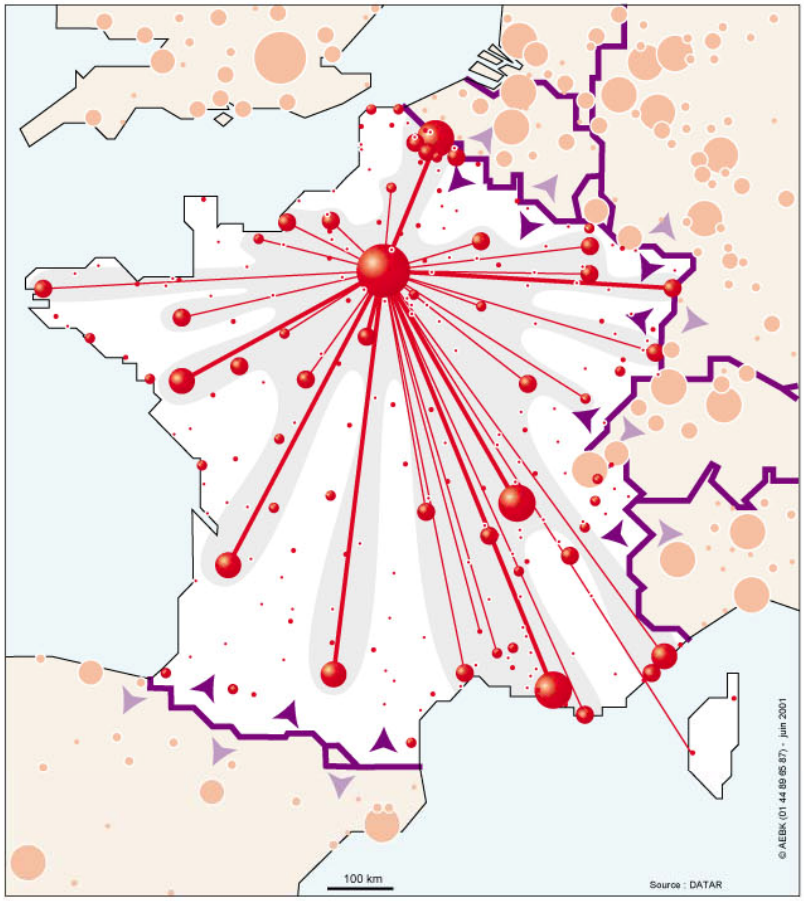
The organisation of the territory is largely a function of local initiatives which favour different forms and degrees of polarisation, based on national and European networks of interchange. In absence of national initiative, certain territories have trouble in getting structure, i.e. in developing.

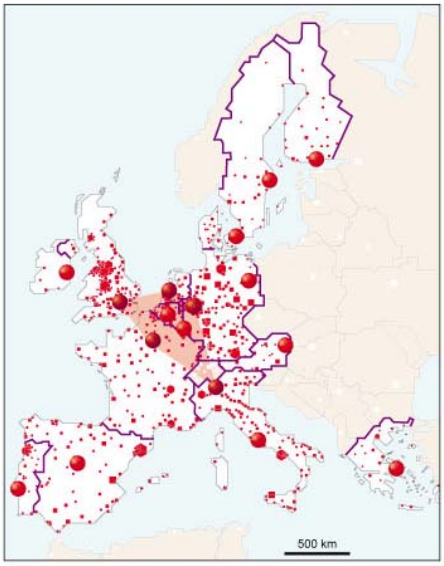




Scenario 3: Centralism renovated

Hierarchies are reinforced: the State promotes a centralised regulation of all territories by limiting the autonomy of local communities. On the other hand, public solidarity is devoted to benefit territories with difficulties





Scenario 4: Networked Polycentrism

Development is structured over an urban network where polycentricism is reinforced at two territorial scales: first at interregional level with frameworks of cooperation-competition between cities, and second at agglomeration / national level with new networks of local project management

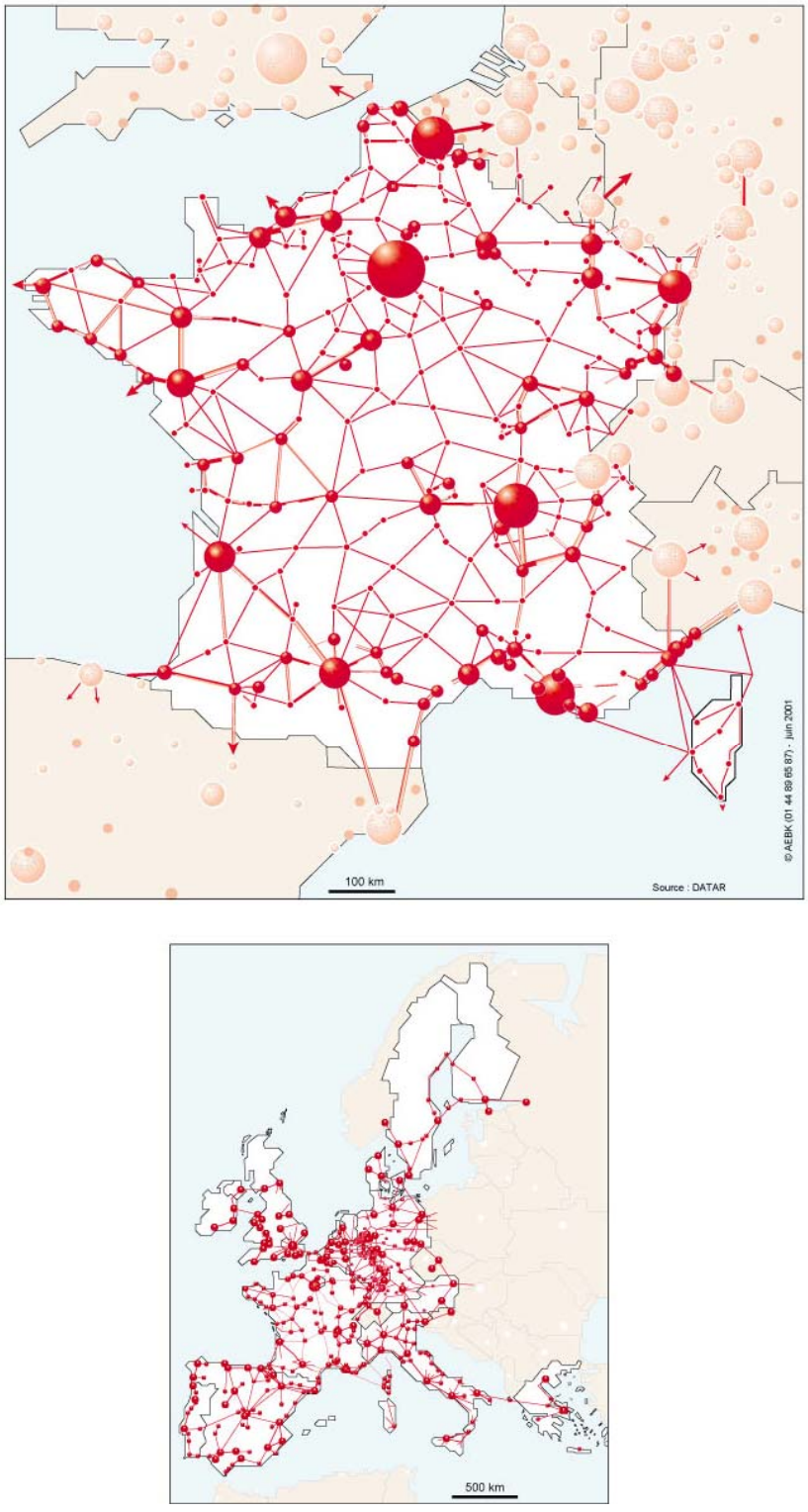


Figure 5-13 FRANCE2020 – Four Scenarios
Source: DATAR (2002), *Aménager la France de 2020*

Territoires2040 by DATAR (2011)[47]

DATAR officially launched on October 2009 a programme of prospective on a national scale entitled *Territories 2040, developing the change*. By promoting this cycle of reflection-oriented strategy and action, DATAR reshapes the way it has practiced foresight over the last 50 years. In the third number of the Territories2040 magazine, M.Lussault presented in the framework of the workshop "The network of French metropolises in the World-Economy"[48] the main variants in which French metropolises built different "connecting" territorial systems aimed at enhancing the links between France and the Globalisation.

Hyperpolisation

In 2040, the dynamics of global urbanization have led to the formation of a single network hyperpolarised in France, characterized by the metropolitan coopetition between its nodes. Coopetition can be defined as a mixture of competition and cooperation between the different poles. Each metropolitan node is to base its economic development on the concentration of creative functions (research, higher education, culture) and their application, being now central to national and international attractiveness and value added production. This concentration will be accompanied by a branding strategy through major events and the exploitation of the image of central metropolitan nodes. Across the territories, the hyperpolisation strengthens logical concentration in multifunctional centres, constituting overall systems centralities strongly polarised. Large networks will be strongly structuring urban territorial dynamics and allow the functional efficiency and accessibility to spaces. University campuses and creative spaces become metropolitan attractors, around which many will develop public policy.[49]

Regiopolisation

In 2040, it will be found in France a strong very differentiation of the different territories in the framework of formation of mega-polarised regions, being called regiopoles. This powerful process will lead to a restructuring of the current national regional divisions. The scale nation-state will become a lower reference in terms of territorial control. A deep tax reform will give cities and regions real capacity to gather the necessary resources to develop their public policies. Planning policies attempt to contain the suburban sprawl phenomena and we witness actions of densification as well as targeted operations of requalification of iconic areas in some new agricultural and forestry areas. Mobility systems are organised in such a way to provide better access to various regional centres. The mobility paradigm based on private automobile will only remain relevant in most periurban spaces, while in the densest suburbs effective public mobility systems will be implemented. [50]

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[47] L'urbain-metropolisé français dans la mondialisation – processus et scénarios, Michel Lussault, for *Territoires 2040,* DATAR 2011

[48] "Le réseau des métropoles françaises dans l'économie-monde"

[49] In original French, *"Hyperpolisation. En 2040, la dynamique de l'urbanisation mondiale aura abouti à la constitution d'un seul réseau hyper-polisé en France, caractérisé par la coopétition entre ses nœuds métropolitains. On définit ici la coopétition comme un mélange de compétition et de coopération entre les différents pôles. Chaque nœud métropolitain fondera son développement économique sur la concentration des fonctions créatives (recherche, enseignement supérieur, culture) et leurs applications, devenues essentielles à l'attractivité nationale et internationale et à la production de valeurs ajoutées. Cette concentration s'accompagnera d'une stratégie de branding, via les grands événements et l'exploitation de la capitale image d'un nœud métropolitain. À l'échelle des territoires de vie, l'hyperpolisation renforcera les logiques de concentration dans des pôles multifonctionnels, constituant globalement des systèmes de centralités fortement polarisants. Les grands réseaux et les commutateurs urbains seront puissamment structurants des dynamiques territoriales et permettront l'efficacité fonctionnelle et l'accessibilité maximale aux espaces. Les campus universitaires et les espaces créatifs deviendront aussi et vraiment de nouveaux attracteurs métropolitains, autour desquels s'élaboreront bon nombre de politiques publiques."*

[50] In original French, *" Régiopolisation. En 2040, on constatera en France une différentialisation territoriale forte (donc un maintien voire une accentuation des polarités) dans le cadre de la constitution de méga-régions polarisées par l'urbanisation métropolisante, appelées régiopoles. Ce mouvement puissant conduira à une recomposition du découpage régional national actuel. L'échelle stato-nationale deviendra une référence plus faible en matière de contrôle territorial. Une réforme fiscale profonde donnera aux métropoles et aux régions de véritables capacités de collecte des ressources nécessaires aux politiques publiques. Les politiques d'aménagement tentent de contenir les phénomènes d'étalement périurbain et on assiste même à des actions de densification ciblées ainsi qu'à des opérations de requalification emblématique d'espaces pavillonnaires très peu denses en territoires néo-agricoles et forestiers. Le système mobilitaire est organisé pour assurer à la fois la meilleure accessibilité aux diffé-*

Postpolisation

In 2040, urbanisation and globalisation have infused the entire national territory and signs of this will be felt everywhere mostly through widespread suburbanization. So this is the scenario with most evident signs of victory of low density peripheries over centralisation and generalisation of the principle of diffusion, conceived both as a principle of development and an urban form, valid at all scales in the same time. Postpolisation will be a largely self-organizing and self-promoted process by actors but with a real support by the public sector, mostly through the intervention of networked territorial governances (the scale of governance is chosen depending on the type of issue addressed) relying on the local scale, whose powers will be enhanced (the State falls back on the role of regulator). In particular, public operators make possible the enhancement of urbanisation, that is to say the process of suburban development permitted by financial transfers by state, local or private actors.[51]

Dépolisation

In 2040, the urban evolution will tend to weaken significantly the effects of polarisation of the territories in favour of a hierarchical spatial organization distributing the little realities as a generalized principle of low density. Centralities will no longer be functionally important or referential of social practices. There has been a triumph of digitising companies and in particular the success of social networks that become reference of communicative modes. The diseconomies of scale of large technical systems and urban infrastructure are growing, as funding opportunities are increasing and individuals fleeing dense areas. The emergence of new technical solutions for self-sufficiency can take a stall and ensure domestic autonomy of individuals and / or neighbourhood groups. Faced with the loss of link business-territory that had been constitutive of metropolitan urbanization, there is the formation of micro-markets both local and networked[52]

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rents pôles régionaux. Le modèle de l'automobile individuelle ne reste notable que dans les espaces les plus périurbains, alors que même les périphéries plus denses se dotent de moyens mobilitaires efficaces"

[51] In original French, *"Postpolisation. En 2040, l'urbanisation et la mondialisation auront infusé l'intégralité du territoire national et les manifestations s'en feront sentir partout, sous la forme d'une périurbanisation généralisée. Il s'agit donc du scénario qui signe la victoire de la périphérisation la moins dense sur la centration et la généralisation du principe de la diffusion, conçue à la fois comme un principe d'évolution et une forme urbaine, valable à toutes les échelles en même temps. La postpolisation sera donc un processus largement auto-organisé et auto-promu par les acteurs mais avec un réel accompagnement par la puissance publique, notamment via l'intervention de gouvernances territoriales en réseau (l'échelle de gouvernance est choisie en fonction du type de question abordée), appuyée sur les territoires locaux aux compétences renforcées (l'État se replie sur une fonction de régulateur). En particulier, les opérateurs publics rendront possible l'accentuation de la résidentialisation, c'est-à-dire du processus de développement du pavillonnaire permis par les transferts financiers redistributifs de l'État, des collectivités, voire des acteurs privés"*

[52] In original Frenc, "*En 2040, l'évolution urbaine tendra à affaiblir significativement les effets de la polarisation des territoires au profit d'une organisation spatiale très peu hiérarchisée distribuant les réalités selon un principe généralisé de faible densité. Les centralités ne seront plus fonctionnellement importantes, ni référentielles des pratiques sociales, des imaginaires territoriaux et des actions politiques. On assiste à un triomphe de la numérisation des sociétés et en particulier au succès des réseaux sociaux communicationnels qui deviennent référentiels des modes de définition des proximités acceptables et légitimes pour tout un chacun; La déséconomie d'échelle des grands systèmes techniques et des infrastructures urbaines s'accentue, à mesure que les possibilités de financement s'accroissent et que les individus fuient les secteurs denses. L'apparition de nouvelles solutions techniques d'autosuffisance permet d'assumer le décrochage et d'assurer l'autonomie domestique des individus ou/et des groupes de voisinage restreints. Face à la disparition du lien entreprises-territoires qui avait été constitutif de l'urbanisation métropolitaine, on assiste à la constitution de micromarchés à la fois locaux et en réseaux"*

		SCÉNARIOS			
		Hyperpolisation	**Régiopolisation**	**Postpolisation**	**Dépolisation**
COMPOSANTES	**Géographie**	Un seul réseau hyperpolisé en France et des espaces en décrochage	Constitution de mégarégions à dimension européenne avec des interfaces transfrontalières ou/et des façades maritimes	Périurbanisation et périphérisation généralisée Persistance de quelques lieux de centralité fonctionnellement importants	Espaces de peuplement diffus et entités de voisinages multicentrées Déprises des centralités Subsistance de commutateurs mobilitaires
	Dynamique et cohérence	Exacerbation de la concurrence économique mondiale Politiques de densification et de maîtrise des externalités environnementales Raréfaction de l'argent public et focalisation des financements	Concurrence économique mondiale forte Politiques européennes structurantes Affaiblissement du rôle de l'État Construction d'identités régionales territoriales	Infusion de l'intégralité du territoire par l'urbanisation et la mondialisation Individualisation des comportements Mobilité généralisée Promotion des circuits courts et des solutions environnementales individualisées Système de décroissance	Sortie du modèle urbain métropolitain Numérisation des sociétés et solutions de production énergétique autonome Nouvelles régulations infra-locales et focalisation sur la cellule domestique Décroissance assumée
	Acteurs clés	État Métropoles Opérateurs de réseaux Acteurs de l'économie de la connaissance	Europe / International Régions Gouvernements métropolitains Intercommunalités Collectifs de voisinage	État limité à une fonction de régulateur Régions et intercommunalités Gouvernances territoriales en réseau Individus et ménages	Individus Communautés + TIC
	Impact sur les territoires	Logiques de polarisation urbaine Concentration des fonctions créatives dans les métropoles Prégnance des grands réseaux techniques Fortes ségrégations sociospatiales Risque d'hyperpole offshore par rapport à des territoires qui décrochent	Étalement périurbain contenu Intégration des espaces agricoles, forestiers, de nature dans les régiopoles Excellente accessibilité du territoire aux échelles régionales et infra Système mobilitaire durable	Fin de la hiérarchie urbaine Ségrégation socio-spatiale Fortes inégalités entre territoires bénéficiant de revenus résidentiels et ceux en déprise Gestion durable locale des territoires et préservation des ressources	Déterritorialisation des pratiques et prégnance des réseaux mondiaux et sociaux Nouvelles identités a-territoriales ou repli communautaire Diminution des mobilités
	Enjeux principaux	Nouvelle organisation institutionnelle Enjeu de la capacité financière Préservation des équilibres sociaux Effets d'entraînement sur les territoires	Invention d'une Europe des régions Question du périmètre pertinent pour permettre des effets d'entraînement Redéfinition des politiques agricoles et forestières Maintien d'une cohérence globale entre régiopoles	Soutenabilité économique, sociale et environnementale Efficacité des circuits courts Impacts de la dématérialisation Gouvernance multi-échelle associant les citoyens	Réorganisation spatiale en situation de dédensification Nouvelles formes politiques de proximité Justice spatiale et équité à une échelle globale

Figure 5-14 Territoires2040 –"*L'urbain-metropolisé français dans la mondialisation*", scenario description

Source: Michel Lussault (2011) for Territoires 2040

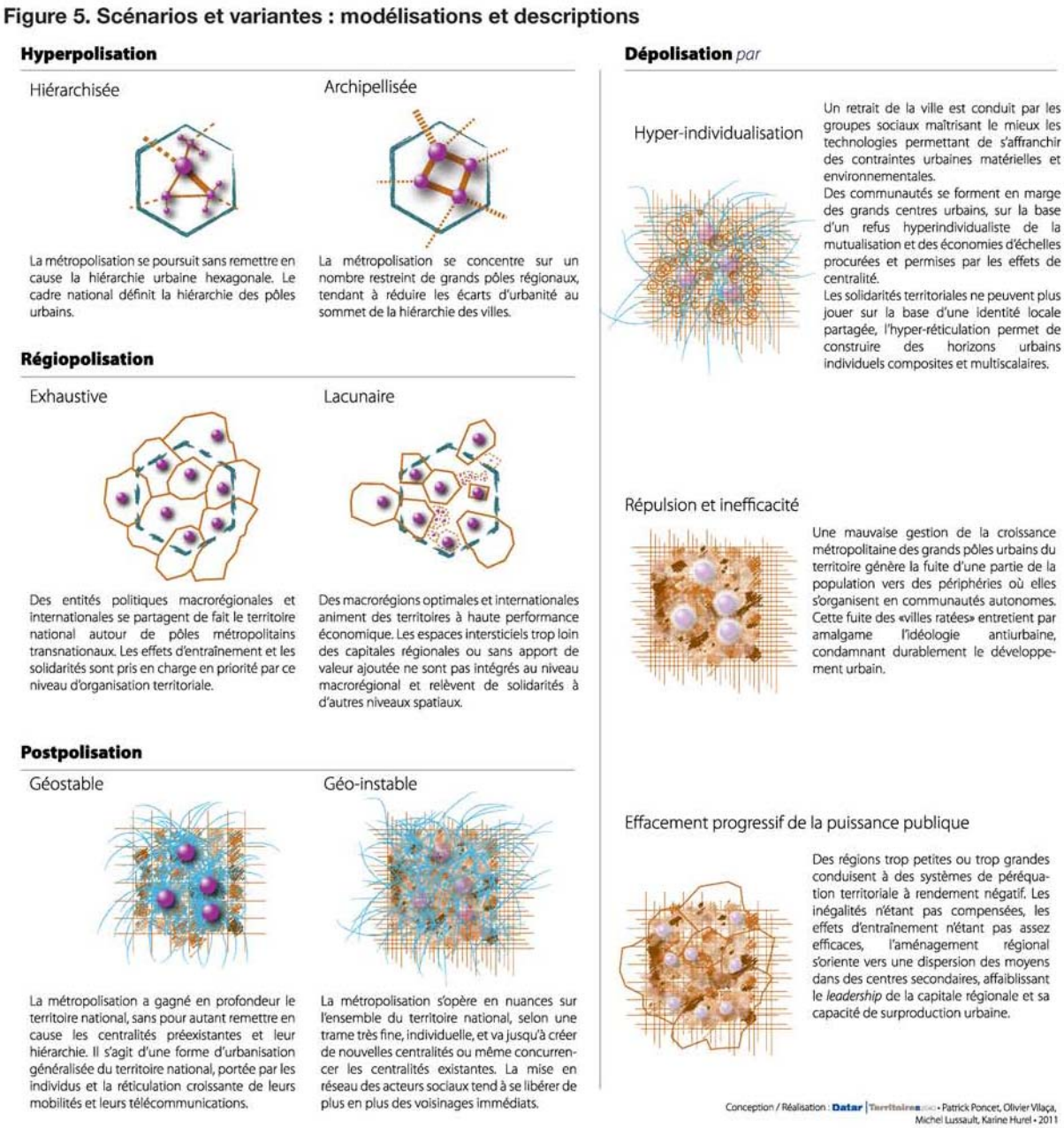

Figure 5-15 Territoires2040 –"*L'urbain-metropolisé français dans la mondialisation"*, scenario sketches

Source: Michel Lussault (2011) for Territoires 2040

Europe 2030 by CRPM (2002)[53]

The ESDP, adopted in Potsdam in 1999 by the Ministers in charge of spatial planning, set as a priority the principle of a "Polycentric and balanced spatial development within the EU". The present study was designed with a view to examining this concept in greater detail and imagining what kind of configuration this particular option might take in Europe's peripheries, both in terms of content (policy options) and form (mapping scenario). The work was organised at European level under the coordination of the CPMR and its Maritime Peripheries Forward Studies Unit and was contracted out to a team of experts in charge of the national and thematic approaches, further enriched by a number of "test" interviews with public- and private-sector players.

Two scenarios were established: i) a "straight-line" scenario, taking into consideration a continued progression of the various developments identified, without any specific public intervention in favour of a polycentric project at European level; and ii) a "voluntarist" scenario which, while remaining realistic, would result in the implementation within the next 20 or 30 years of a voluntarist policy in favour of this model, involving all spheres of government

Straight line Scenario

The "straight-line" hypothesis would lead quite quickly to a gradual expansion of the Pentagon, as it spreads its influence towards the centre of the UK, northern Italy, south-eastern France and the southern Baltic area. It would also see the emergence of a number of peripheral gateways such as Madrid and the North European capitals. Very few peripheral urban systems will emerge strongly outside of the extended Pentagon area. Only Lisbon, Barcelona, Toulouse and Göteborg seem to show a reassuring level of drive. A few promising urban systems located along the major transport corridors could emerge here and there, while a large number of dilemma or highly peripheral areas will continue to face a very uncertain future. Such a scenario would soon result in a reinforcement of polarisation and specialisation phenomena to the advantage of a limited number of peripheral urban systems, thus contributing towards increased territorial asymmetries.

[53] CRPM (2002) *Construction of a polycentric and balanced development model for the European territory 2030.*

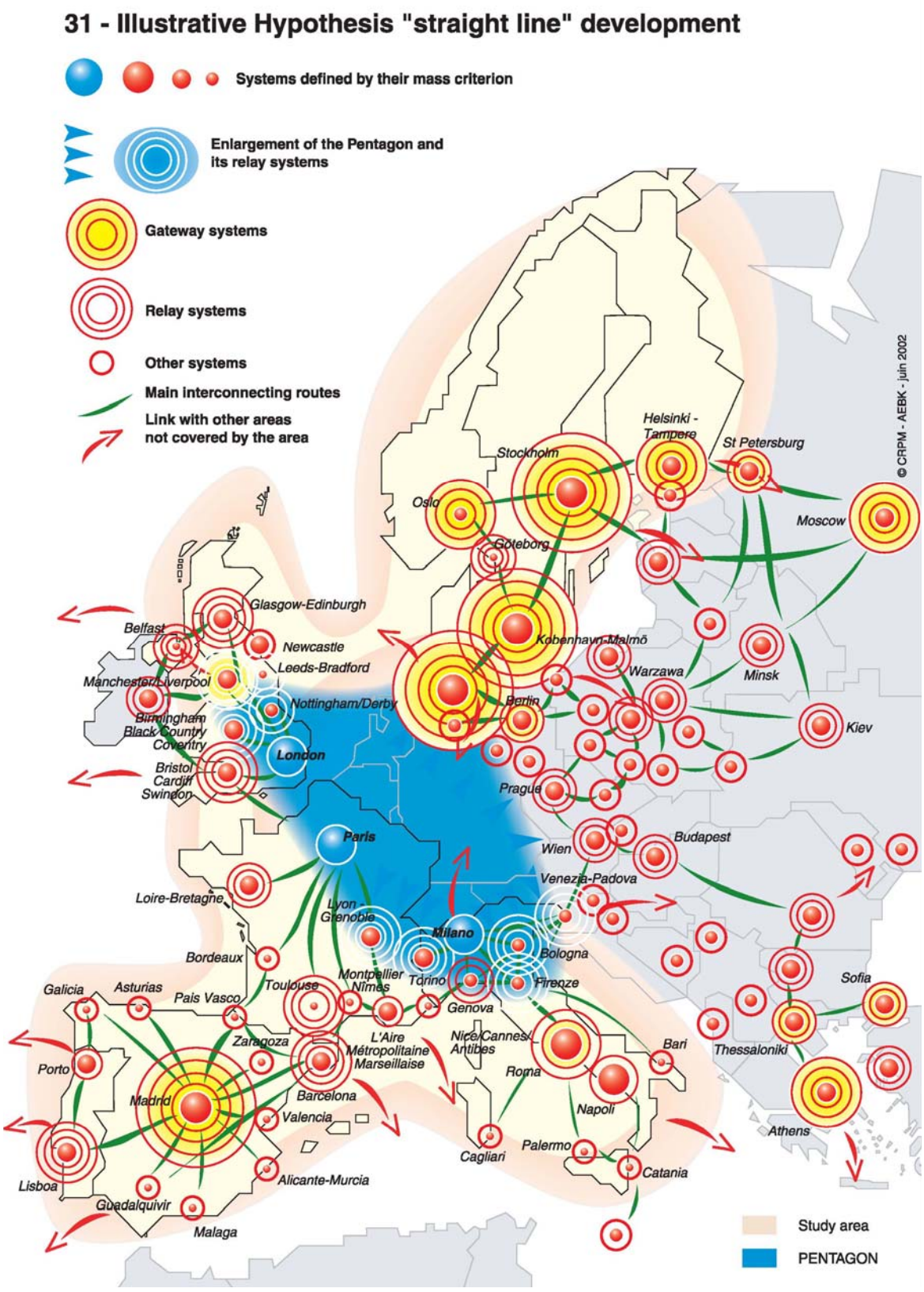

Figure 5-16 Europe2030 – Straight line development scenario sketch

Source: CPRM 2002. Introductory Briefing Note on the relevant context material available to partners and contributors to the PolyMETREXplus Interreg IIIC project on the development of polycentric studies, visions and strategies for the spatial planning and development of the wider Europe. METREX, 2002

Long term voluntarist scenario

A voluntarist hypothesis in favour of redressing the balance of the European territory and developing polycentrism is based on a situation where all political levels – from European level, to national, regional and urban level – contribute towards structuring cooperation areas that are able to better polarise certain development factors. In order to achieve this, it would be necessary to work on three different scales. In order of priority, they are as follows:

- Strengthening of the "Metropolitan European Growth Areas" (MEGA). These are areas comprising the identified urban systems and their wider sphere of influence, and polarising factors of competitiveness. Priority would be given to encouraging cooperation at this level, which would require the strong intervention of a certain number of sectoral policies, a significant adaptation of the current regional policy, accompanying measures for national policies to break up the concentration of economic activity, and finally a strong involvement and cooperation on the part of the regional and urban areas;
- Accompanying measures to aid the emergence of new development corridors resulting from the networking and cooperation efforts between several MEGAs, mainly through transport policies;
- Progressive accompanying measures over a more long-term period for what the ESDP refers to as global economic integration zones (GIZ).

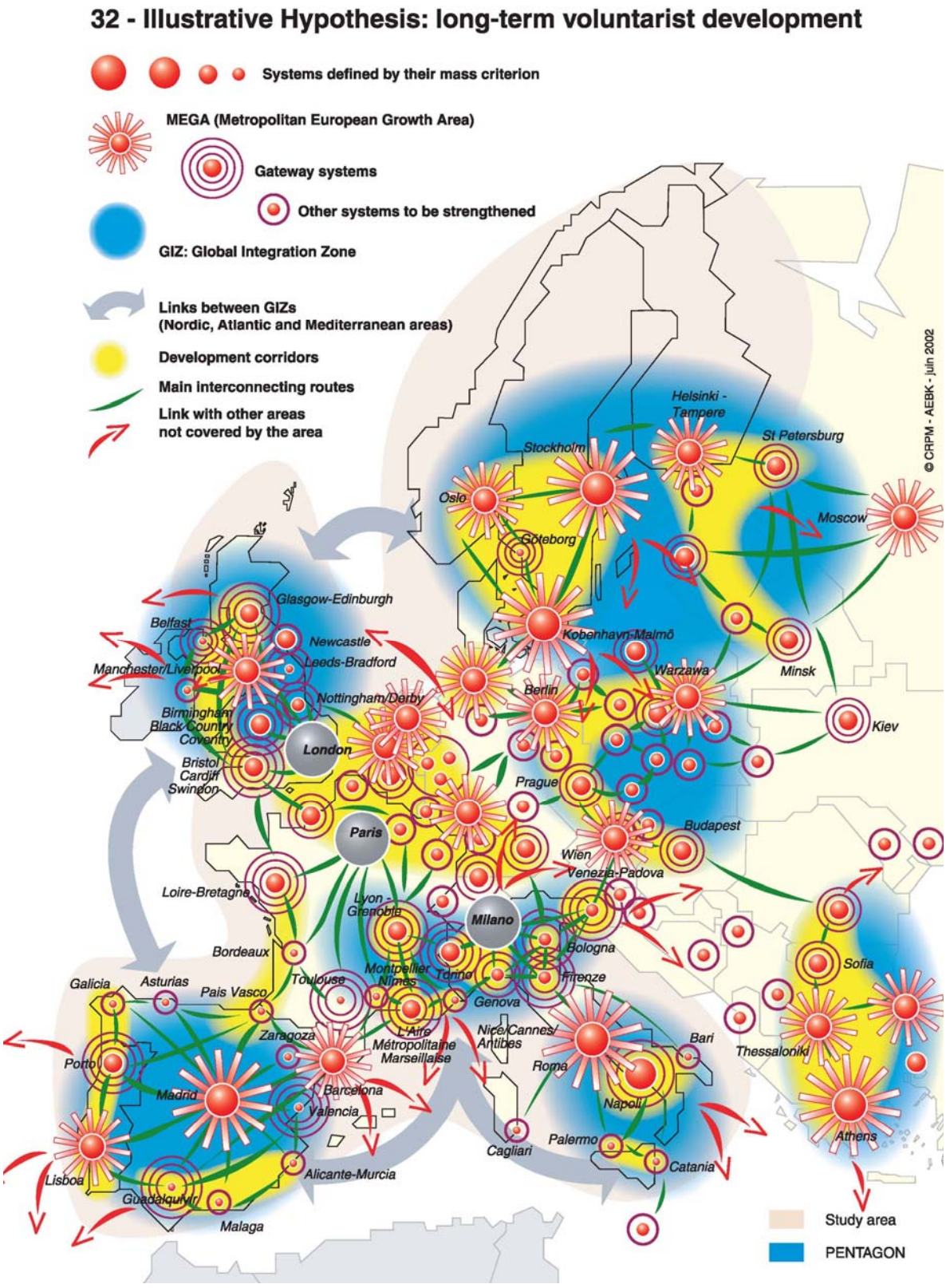

Figure 5-17 Europe2030 – Long-term voluntarist scenario sketch

Source: CPRM 2002. Introductory Briefing Note on the relevant context material available to partners and contributors to the PolyMETREXplus Interreg IIIC project on the development of polycentric studies, visions and strategies for the spatial planning and development of the wider Europe. METREX, 2002

Urban development scenarios by PLUREL 2025 (2008)[54]

Changing land use relationships within emerging rural-urban regions and their manifestation in phenomena such as urban sprawl and development of large transport corridors have long-lasting consequences for the regions' sustainability. The scenario framework should fulfil a number of key criteria for use within the PLUREL project, such as being manageable by limiting the number of scenarios, appropriate to the urban-rural issues addressed in PLUREL, and related to the concerns of end users.

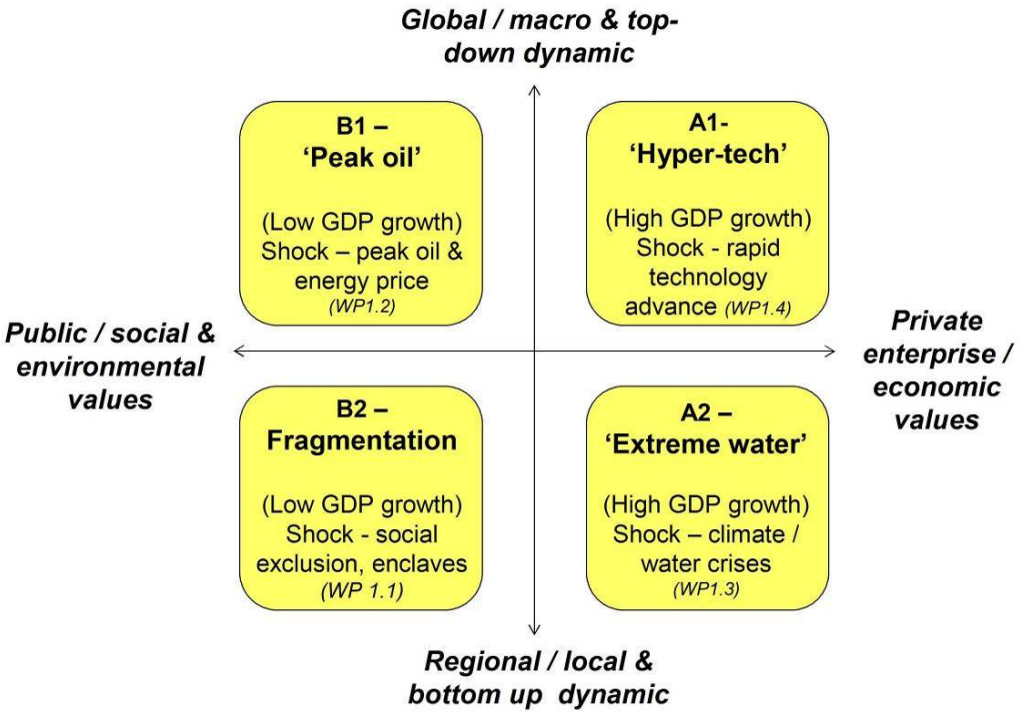

Figure 5-18 PLUREL Urban Development Scenarios – Framework
Source: PLUREL 2008

High growth scenario (hyper-tech)

This describes a future world of rapid economic growth, global population that peaks in mid-century, and the rapid spread of more efficient technologies. Investment in research and development is high and nations share knowledge and pool resources in a global research market place. Energy prices decline because supply is driven by new developments in renewable energy production and nuclear fission. The shock concerns the rapid acceleration of ICT which transforms home and work as never before.

For peri-urban areas in Europe, this scenario is likely to see small »polycentric« towns and cities become even more popular. New transport technologies lead to more rapid journeys and the expansion of the commuting distances around towns and cities. This leads to peri-urbanisation and *metropolitanisation* of rural areas on a massive scale.

Drivers: rapid development in ICT leading to reduced commuting and transport needs, with no constraints on the location of new build.

[54] By Kjell Nilsson , Thomas Sick Nielsen1, Stephan Pauleit1, Joe Ravetz and Mark Rounsevell, 2008

Self-reliance scenario (extreme water)

This describes a more heterogeneous world of self reliance and preservation of local identities. While the population increases, economic development is primarily regionally-oriented, and per capita economic growth and technological change are more fragmented and slower than in the other storylines. The shock here is subtitled *extreme water*, and this sees rapid increase in flooding, drought and sea level rise. A year does not go by without a major event, and in some cities and regions development is seriously constrained.

Peri-urban areas are strongly affected; affluent yet vulnerable city-regions such as London or the Dutch Randstad spend huge sums of money on defence and adaptation strategies. Population growth due to climate-induced migration puts more pressure on urban infrastructure and services.

Drivers: climate change reaches a tipping point leading to impacts including rapid sea level rise, flooding and water resource constraints.

Sustainability? scenario (peak oil)

This describes a future of environmental and social consciousness – a global approach to sustainable development, involving governments, businesses, media and households. Economic development is more balanced with rapid investment in resource efficiency, social equity and environmental protection. The »shock« in this scenario is driven by the real possibility of »peak oil«, that is, a decline in global oil production after reaching maximum production, leading to rapid rises in energy prices, with many social and economic effects.

For peri-urban areas, high energy prices have an enormous effect on location choices as transport costs limit commuting distances. Although tele working is encouraged, most people attempt to return to larger cities and towns, and more remote rural areas decline.

Drivers: an energy price shock leading to rapidly increasing energy and transport costs and consequent changes in mobility and trade flows.

Fragmentation scenario (walls and enclaves)

Europe sees a fragmentation of society, in terms of age, ethnicity and international distrust. The voter-strong elderly population becomes increasingly dependent on the younger generation, but the working-age population is disinclined to transfer their resources, with growing intergenerational conflicts.

The »shock« in this scenario will be an accelerated development towards fragmentation and social exclusion in Europe. The ethnic division of cities is driven by the increased in-migration of the working-age population from outside and within the European Union. Cities become more dispersed as younger migrants dominate city centres and older natives populate the outskirts and enclaves outside the cities – so that peri-urban areas become peri-society areas.

Drivers: low growth and accelerated fragmentation leading to behavioural shifts within society.

	A1	A2	B1	B2
Ethnographic parameters	'Hyper-tech'	'Extreme water'	'Peak oil'	'Fragment ation'
	globalizing / privatizing	*localizing / privatizing*	*globalizing / public*	*localizing / public*
Define	Our landscape & society is defined by market values on a global scale	Our landscape & society is defined by market activities at the local & regional scale	Our landscape & society is defined by public values on a top-down basis.	Our landscape & society is defined by community-based values and activities on a local basis
Relate	Social relations are organized on a global market exchange basis, even within households and communities	Social relations become more localized, but stratified by value, status, ethnicity and culture	Social relations are organized by EU / global values: diversity, empowerment and dematerialization.	Social relations are community based, but segmented by race, class, age, lifestyle and ethnicity.
Connect	Advanced ICT enables virtual immersive connections: coupled with advanced high speed responsive transport modes.	Both virtual & physical networks are slow and unreliable, with reduced coordination & investment.	Virtual & physical connections are organized top-down, with large investment in public transport, and large ICT firms which are publicly owned.	This society is well connected within local groups, but fragmented between communities. Web 2 & 3 is the basis for virtual & transport networks, but seems to create many divisions.
Create	Supply chains are highly organized and integrated at both global and local levels	There is a revival of small businesses, as the stagnation of the global economy makes room for local entrepreneurs	Employment is organized at global level with public-private partnership firms: supply chains are integrated & responsive to social needs.	Many firms are local cooperative or social enterprises with complex supply chains and trading systems. Low production efficiency is balanced by better fit to demand.
Consume	Materialist consumption as a status chasing activity, but with the benefit of advanced technology.	Materialist consumption is defensive and risk-avoiding, often with yesterday's technology	Personal consumption is geared to community values, with narrowing gaps between rich and poor.	Much consumption is within the household or community, with less materialism and more socio-cultural meaning.
Other: implications for the peri-urban	The peri-urban becomes segmented by carefully graded differences in value & status, coupled with risk & opportunity.	The peri-urban is a chaotic zone of hazardous areas, private appropriations and enclaves, with increasing floods & storms, while planning & investment reduces.	The peri-urban is carefully planned at national and regional level, with green infrastructure & multi-functional land for food, biodiversity & climate adaptation.	The peri-urban is the ideal space for self-contained communities to grow, with many functions of food, energy, water etc, in an archipelago of enclaves.

Figure 5-19 PLUREL Urban Development Scenarios – Ethnography's parameters by scenarios
Source: PLUREL 2008

PASHMINA Scenarios 2030 - 2050 (2010)[55]

PASHMINA project's objective is to model global scenarios based on changes of paradigm in long term time perspective (2030—2050) derived from new behavioural trends in Earth societies, especially considering the challenges of energy provision, climate change and land-use equilibrium. The project involves a large number of parties and several different models and sub-models studying different dimensions of the problem, like the evolution of cities, of rural and natural environments, or the evolution of transport.

PASHMINA defined 4 scenarios associated with 4 different fruits/vegetables (pear, apple, orange and potato). Scenarios had strong consequences for spatial development and urbanisation, as portrayed in the following figures. Transitions were considered as means of evolving over time from one scenario onto another.

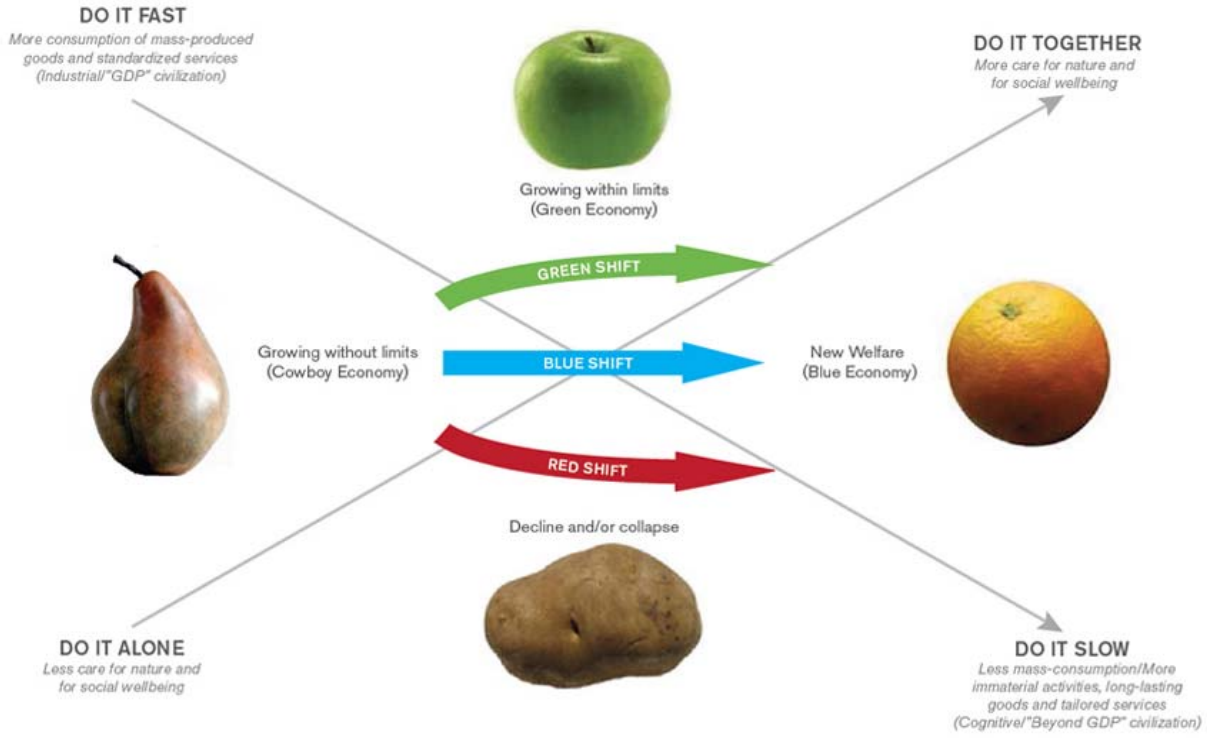

Figure 5-20 PASHMINA – Scenarios in a speed (economy) VS concentration (social) 2D space, and possible transitions between them
Source: PASHMINA 7FP 2010

[55] ISIS, Mcrit et al. for PASHMINA 7FP project (2009-2013). www.pashmina-project.eu

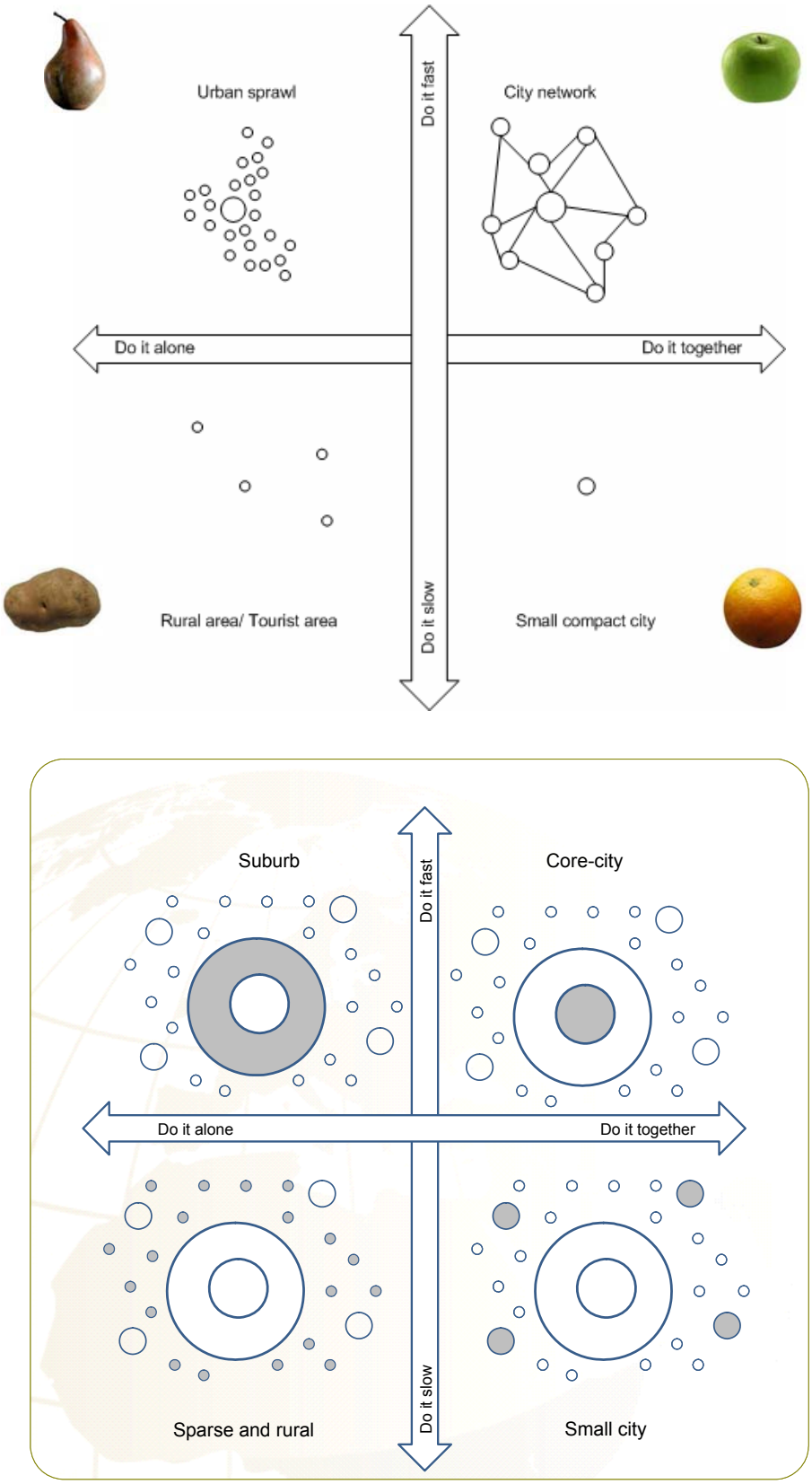

Figure 5-21 PASHMINA – Spatial implications of different scenarios
Source: PASHMINA 7FP 2010

Growing beyond limits Scenario: the Pear World paradigm.

Growing beyond limits scenario features the strengthening of corporate capitalism and market mechanisms, pursued globalization of goods and financial markets, a new technological wave in the form of ICT, nano-technologies and biotechnologies.

The technological revolution

The technological revolution allows for clean energy production, health innovations, environmental and green techs... globally relieving pressure on environment. While energy consumption will still grow at a high pace (even if energy intensity will continue to progressively decline), released emissions per unit of energy production will fall down increasingly faster due to technological innovation. Transport will still grow along with economy, invalidating the decoupling paradigm, but this does not matter anymore as vehicles have become clean and emissionless.

Irregular shape, evoking north-south disequilibriums

The pear is irregular in its shape evoking disequilibriums in different parts of the world, both economically and socially. Some countries, regions, even neighborhoods will keep progressing economically while others will have substantial difficulties to develop. Countries *growing beyond limits* have GDP annual growth rates ranging between 3% and 6% depending on the level of matureness of their economies, while lagging countries show very fluctuant instable patterns of growth, with poor average rates over time.

Soft and smooth pear peal evoking cultural uniformiy

A close look onto the surface of a pear shows a uniform smooth peal landscape, evoking progressively uniform values and habits all over the world. Globalization and increased mobility of people (migrations, global business, leisure travel) increase the trend towards social homogenization of world societies. Minorities helplessly see their identities diluted, while global homogeneous values spread around.

Growing within limits: the Apple World paradigm.

The Growing within limits scenario assumes that a low-carbon economy and adequate biodiversity protection can be achieved with currently identifiable technologies and at moderate economic costs without damaging opportunities for human development, provided that a number of barriers to achieving the right policy conditions and institutional settings are overcome.

The driving forces

The social democratic revolution

The *Global Green New Deal* is a set of new institutional conditions that are created to spur off the shift towards fundamental transitions that will help bring a "green" economy. Regulations as well as citizen behavioral changes contribute to decrease progressively energy intensity, as societies turn from being mostly consume driven to being mostly service and knowledge oriented. GDP growth therefore becomes increasingly independent from energy demand. Innovation contributes to reducing GHG emissions from power generation as well. Climate change threat progressively banishes. Dietary changes and increased efficientcy of agriculture relieve land claim pressure.

The world shape

Regular shape, evoking a more equilibrated world

The apple is spherically shaped, evoking a more equilibrated world, both economically and socially. Poor nations increase their wealth in a steady consistent way, and steered development cycles generate low social disparities. Rich nations devote significant aid to developing countries, especially through skills, knowledge and technology transfers. Countries growing within limits have average GDP annual growth rates ranging between 1'5% and 3%, decreasing as they become more mature economies.

The human landscape

Soft and smooth apple peal evoking cultural uniformity

A close look onto the surface of an apple shows a uniform smooth peal landscape, evoking progressively uniform values and habits all over. Multilateral governance and interregional cooperation promote good understanding among different cultures, increasing the trend towards progressively shared social and cultural values, diluting minority identities in favor of common progressive ideals.

New welfare: the Orange World paradigm

The present measurement of growth is abandoned in the New welfare scenario. A new frame is set up to account features of wellbeing "beyond GDP", including self-production and services rendered by nature, taking into account the realities that do not pass through the market or get irrelevant evaluation by a market. A new techno-economic and social paradigm emerges

Welfare beyond economic growth

The *New Welfare* scenario is the result of a deep behavioral social mutation, with people becoming more concerned about wellbeing and quality of life than economic wealth. Hedonism mixes up with new "social innovative" mechanisms to satisfy new social community needs. Material consume is reduced; barter becomes common. Info, digi, cyber, holo and other immaterial high-tech technologies are extremely successful, while mechanical elements progressively substitute energy driven mechanisms: it is the age of the crank, the spring, the pedal and the ladder. New eco-cultural paradigms emerge, changing the human-nature interaction, from "exploitation" to "gardening".
Education and research are at the center of social values.

Regular shape, evoking an equilibrated world

An orange is spherically shaped, evoking a world that tends to progressively harmonize different regions, becoming more equilibrated in the mid and long term. As there will be mostly small scale local economies, highly self-sufficient but well connected to networks, societies will more easily steer stable economic frameworks with little perturbations. The economy will be operating with the minimal levels of production and consumption necessary for a high quality of life, using new GDP measures where indicators such as quality of life and ecosystems' health will gain predominantly weight.

The wrinkled orange peal evoking cultural diversity

A close look onto the surface of an orange shows a soft but wrinkled peal, non homogeneous but still harmonious. This is the social spirit of the *New welfare* scenario: a world recognizing and promoting differences on communities as an enriching element to society, a rich mixed salad with an "earthly" dressing. People's attachment to institutions and nations, which was one of the bases of industrial organization, is not essential anymore. There will be mostly small scale local communities, connected to the rest of the world through social networks. Multi-level governance with bottom-up participatory approaches will largely diminish national and global powers.

Turbulent decline: the Potato World paradigm

The key question with respect to turbulent decline is whether the growth in material flows could remain within the limits for climate change, natural resources' availability, global ecosystems' health and biodiversity loss, as well as help to alleviate global poverty. The answer would be negative, and the world is set to collapse.

Failure to sustain global economic growth

Market forces are dominant. Most services are privatized or franchised. Energy shortages, lack of innovation, and low emotional social conditions make service providing inefficient at all scales: services to people, to enterprises, mobility services and goods production. R&D budgets are almost residual. Energy intensity breaks its decreasing trend and starts increasing after 2030, implying that more energy is needed to produce single units of GDP. Technologies become old, but investigation is mostly deployed to new "evading from reality" techs such as emotion controllers or virtual reality devices. Both inefficient transport vehicles and inefficient power generation increase emission factors, aggravating the problem of climate change. Polluted environment and toxic atmosphere accelerate biodiversity destruction.

The world shape: very irregular shape evoking highly fragmented world

The potato world is irregularly shaped, evoking a much disequilibrated world, both economically and socially. It is a world in crisis. Protectionism in different regional economies induces disparate economic evolutions for different nations and continents. Disparities become more evident. There is a global draw back in the global economy, with fluctuations and unstable regimes. Wealthier people get in control of governments in some parts, military in some others, even religious leaders, with many democracies tending to evolve towards lobbycracies and autocracies. Average annual GDP growth rates are negative in most regions, but in some, economic growth is extremely high (over yearly 5%).

The human landscape: rough potato skin evoking the importance of differences

A close look onto the surface of a potato shows a rough skin with wrinkles, with different local topographies from one point to another. These differences in local topologies evoke a world where the social setting stays mostly heterogeneous. Everyone goes back to his own corner of civilization. Protectionism becomes the common rule, flows of people and information become more difficult, and as a consequence, societies tend to enforce their identities and sometimes they are confronted to their neighbor's, generating conflicts. It is a world of nations, micronations and city-states. The spiritual dimension gains importance at the center of people's life, even if believes are in own personal "inspirations" rather than in "God".

5.3 **ET2050 Scenarios – Ongoing discussion**

Note. The state of discussion of scenarios as it stands in September 2012, three months after initial submission of Interim Report 1, is presented as an **Annex A** "Updated proposal for Exploratory Scenarios" at the end of this document. At this point, hypothesis on the methodology to territorialise scenarios and to introduce the analysis of wild-cards are introduced.

First sketches of three original scenarios presented in the ET2050 Project Specification were studied and debated in the first TPG meeting in Barcelona. Consistency, likelihood and desirability were tested with specific questionnaires. Following this process, scenarios were adjusted and a fourth scenario was introduced to cover a deeper locally based concept of Europe. All four scenarios were presented and discussed in the ESPON Krakow Seminar in November 2011. Again questionnaires were distributed among participants, and analysis of results revealed a positive increase in consistency, likelihood and desirability of scenarios. In the TPG meeting in Brussels (March 2012) a new discussion on Exploratory Scenario assumptions helped to further refine them.

After the review of spatial-oriented scenarios presented in the previous section, the point of departure of the discussion were the three Exploratory Scenarios suggested in the Project Specification:

- *Europe of the Flows*. This scenario provides an image of the European territory in which economic and population growth as well as public investments are mainly stimulated to take place within main corridors that structure the European territory. Europe of the Flows is characterised by strong connections between cities and transport nodes. Political focus lies on issues such as enhancing connections and long distance networks and global integration.
- *Europe of the Cities*. This scenario provides an image of the European territory in which economic and population growth as well as public investments are mainly stimulated to take place within existing cities that structure the European territory; cities that have a role as driving forces in the global, national and/or regional level. Europe of the Cities is characterised by economically strong and compact cities. Political focus lies on issues such as intensified use of urban space, strong preservation of open space, reduction of long-distance traffic.
- *Europe of the Regions*. This scenario provides an image of the European territory in which economic and population growth as well as public investments are mainly stimulated to take place on the basis of specific regional identities and strengths. Europe of the Regions is characterised by strong urban and rural territories that form a mosaic of different regions and types of territories with strong identities. Political focus lies on issues such as regional self-reliance, small-scale development and landscape protection.

After the first TPG in meeting in Brussels the discussion about the Baseline and Exploratory Scenarios continued. At the Steering Committee meeting Brussels in September 2012 the following agreement about the Exploratory Scenarios was achieved.

The three Exploratory Scenarios proposed in the Project Specification were accepted. The fourth scenario tentatively envisaged was dropped because of its extreme unlikelihood of being implemented. However, the underlying assumptions of the three remaining scenarios were extended beyond those given in the Project Specification, and alternative titles to communicate them were discussed.

In addition, the relation of the three scenarios to current strategic documents on European spatial development, such as Europe 2020 and the Territorial Agenda (2007; 2011) as well as the ongoing policy debates on the dichotomy "space-blind" v. "place-based" policies as documented in OECD (2011), Barca (2009), Barca et al. (2011) and on "smart specialisation" and "smart innova-

tion" as discussed in Foray et al. (2012) and ESPON KIT (2011) was explored to make sure that the Exploratory Scenarios will respond to the issues raised there.

Europe of Flows / Promotion of MEGAs / Metapolis[56]

This scenario provides an image of Europe in which the territory is more dynamic, flexible and adaptable to technological, social and economic change. From the global down to the local, even personal scale, networks of information and communication connect people and activities. Virtual communities become as important as territory-based communities. More integrated trans-national zones emerge by the networking of cities in cross-border areas, and transport and energy corridors link major European centres of production and consumption with neighbouring countries and the rest of the World. This scenario follows the Europe 2020 strategy of promoting global competitiveness of Europe by promoting the economic development of the largest metropolitan areas of global importance in Europe, i.e. of the 76 Metropolitan European Growth Areas (MEGAs) defined in ESPON 1.1.1 (2005, 118). The policies applied are mainly investments in European transport infrastructure, such as high-speed rail, and support of high-level R&D enhancing connections and long distance networks, linking neighbouring countries, favouring more efficient technologies and management strategies.

Europe of Cities / Promotion of large European cities (FUAs) / Metropolis[57]

This scenario provides an image of the European territory in which economic and population growth, as well as most private and public investments, take place within existing cities that give structure to the European territory: national capitals and major regional capitals as driving forces. Europe of Cities is characterised by economically strong and compact cities as centres of excellence, creativity and entrepreneurship. The increasing concentration of added-value activities in cities does not imply a process of rural decline, but its increasing functional dependency on large cities. This scenario is place-based in that it follows the priority of the European Spatial Development Perspective (1999) and the two Territorial Agendas (2007; 2011) for balanced polycentric urban systems at the macro-regional or national scale for the 261 cities of European or national significance defined in ESPON 1.1.1 (2005, 114). Policies applied are mainly in the fields of cohesion, transport and R&D policy.

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[56] This scenario is inspired by the work of the following authors. Relevant references provided in each case:
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Europe of Regions / Promotion of small and medium-sized cities / Ecopolis[58].

This scenario provides an image of the European territory in which urban and rural territories form a mosaic of different regions and types of territories with identities nourished by local and regional governments able to cooperate in areas of common interest. Strengthening the social and economic balance of Europe at the regional level, promoting endogenous development and empowering regional institutions may lead to more efficient provision of public services. Many of the changes in this scenario are much lead by changes of values and behaviour of new generations, policy becoming a support for these. This scenario responds to the challenges of energy scarcity and climate change expressed in the Territorial Agenda 2020 (2011) by promoting small and medium-sized cities as centres of self-contained ecological regions and sustainable mobility patterns yet taking account of the necessary economies of scale of services of general interest and the prospects of an ageing society. Local production and local markets gain much importance, migration of skilled people from large cities to rural areas accelerates localism, large cities become further decentralized into more productive, slow neighbourhoods. Policies applied are mainly from the fields of cohesion, transport and agricultural policy, the focus lies on promoting medium-sized cities and reducing the existing imbalances at the medium and lower level of the urban hierarchy and their functions for the surrounding regions, in particular rural regions. Policies aim at organising the settlement systems in a more polycentric approach at regional scale.

[58] This scenario is inspired by the work of the following authors. Relevant references provided in each case
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- Sessions, George, Ecocentrism, Wilderness, and Global Ecosystem Protection (1995)
- Shumacher, E.F., Small I Beautiful, (1974)
- Platt. R. H., The Ecological City, (1994)

6. Policy Assessment of Scenarios

6.1 Midterm Targets and Pathways to 2030

Sensible midterm targets (2030) that need to be met in order to guarantee that the European territory sufficiently develops into the direction of the Territorial Vision for 2050. On the background of the baseline scenarios and the territorial vision for 2050, the mid-term targets will point out the added value, which has to be achieved through appropriate policies. The midterm targets will be tangible and quantified. The targets preferably follow a territorial logic meaning that they are expected to address different types of territories. Furthermore territorially differentiated trajectories (from now towards 2030) to be followed by different types of regions will be investigated in order to reach the midterm targets.

The mid-term targets to be considered have to be in line with the general objectives contained in official EU documents (balanced economic growth, sustainable development, economic, social and territorial cohesion etc.)[59]. Indicatively, the mid-term targets for territorial development could be related to a number of thresholds concerning the population (density changes, shares of immigrants etc.); the economy (employment rate, regional disparities, unemployment); the accessibility and connectivity (Europe-wide and intra-regional); the energy sector (ratio of renewable energy production in regional energy consumption); the urban expansion (land-use change); the environment (greenhouse gas emissions, share of protected areas etc.), among others to be studied.

Next table summarises the key EU policy targets for different time horizons and sectors, with indication of the policy document that introduced them.

Sector	Horizon year	Target	Reference document
Public expenditure	permanently	Annual government deficit under 3%	Maastrich treaty
	permanently	Government debt under 60% of GDP	Maastrich treaty
Employment	2050	75% of the 20-64 year-olds to be employed	EU2020
R&D / innovation	2020	From 1.8% to 3% of the EU's GDP (public and private combined) to be invested in R&D	EU2020
GHG emissions	2020	Total greenhouse gas emissions 20% in 2020 (or even 30%, if a satisfactory international agreement can be achieved to follow Kyoto) lower than 1990	EU2020
	2020	Total greenhouse gas emissions 25% in 2020 lower than 1990	non-binding resolution 2007

[59] Art. 3 of the consolidated version of the Treaty on European Union: sustainable development of Europe (balanced economic growth, highly competitive social market economy; high level of protection and improvement of the quality of the environment; scientific and technological advance); combating social exclusion and discrimination; promotion of economic, social and territorial cohesion and solidarity among member states; respect of the rich cultural diversity; safeguard and enhancement of Europe's cultural heritage. These Treaty's provisions are the background of the Europe 2020 Strategy (developing an economy based on knowledge and innovation; promoting a more resource-efficient, greener and more competitive economy; fostering a high employment economy delivering social and territorial cohesion). The orientations of the Green Paper on Territorial Cohesion (section: turning territorial diversity into strength) will also be considered: concentration (overcoming differences in density); connecting territories (overcoming distance; facilitating access to services of general interest) and cooperation (overcoming division). The provisions of the new Territorial Agenda will equally be taken into consideration.

Sector	Horizon year	Target	Reference document
	2050	Total greenhouse gas emissions 50% in 2050 lower than 1990	Energy Policy, 2007
	2050	Total greenhouse gas emissions 80% in 2050 lower than 1990	G8 and EU agreement, july2009
	2030 // 2050	Transport emissions (including CO_2 aviation, excl. maritime), +20% to -9% by 2030, and -54% to -67% by 2050, in relation 1990's	*Roadmap for moving to a competitive low-carbon economy in 2050* (EC COM(2011)|112)
Energy sources	2020	20% of total energy from renewables in 2020	EUROPE 2020
	2020	10% of transport energy from renewables in 2020	Renewable Energy Roadmap Communication by the EC, 2007
	2020	10% of transport energy from biofuels in 2020	(European Council, 2007)
Energy consumption	2020	20% increase in energy efficiency by 2020	EUROPE 2020
	2030	50% increase in energy efficiency by 2030	EUROPE2030 report by the Reflection. Group on the Future (F.González)
	2020	20% decrease in primary energy consumption by 2020	20-20-20 targets
General Transport	2020	10% of transport energy from renewables in 2020	Renewable Energy Roadmap Communication by the EC, 2007
	2020	fuel suppliers reduce greenhouse gas emissions from fuel across its life-cycle by 10% by 2020	Energy Policy, 2007
	2020	10% of transport energy from biofuels in 2020	Energy Policy, 2007
	2030 // 2050	Transport emissions (including CO_2 aviation, excl. maritime), +20% to -9% by 2030, and -54% to -67% by 2050, in relation 1990's	*Roadmap for moving to a competitive low-carbon economy in 2050* (EC COM(2011)|112)
	2030	Transport emissions (including CO_2 aviation, excl. maritime), 20% lower in 2030 in relation 2008	Transport White Paper 2011
	2050	Transport emissions (including CO_2 aviation, excl. maritime), 60% lower in 2050 in relation 1990's	Transport White Paper 2011
TEN-T	2030	Multi-modal TEN-T core network by 2030	Transport White Paper 2011

Sector	Horizon year	Target	Reference document
	2050	All core network airports connected to rail network by 2050, preferably by high-speed rail	Transport White Paper 2011
	2050	All core seaports sufficiently connected to the rail freight and, where possible, inland waterway system.	Transport White Paper 2011
Urban transport	2030	Lower 50% the use of "conventionally-fueled" cars in urban transport	Transport White Paper 2011
	2050	0% use of "conventionally-fueled" cars in urban transport	Transport White Paper 2011
	2030	CO2 free logistics in cities by 2030	Transport White Paper 2011
Road transport	2010	Reduction 50% the number of road fatalities by 2010 compared with 2001 levels	
	2030// 2050	By 2020, 50% fatalities in road transport. Close to zero fatalities in road transport by 2050.	Transport White Paper 2011
	2020	Car emissions: 95 g CO_2/km target for 2020	Regulation 443/2009 h
	2030 // 2050	30% of road freight over 300km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050 (facilitated by efficient and green freight corridors)..	Transport White Paper 2011
Rail transport	2030	To triple the length of high-speed rail network by 2030.	Transport White Paper 2011
	2050	To complete a European high-speed rail network by 2050.	Transport White Paper 2011
	2050	By 2050, the majority of medium-distance passenger transport should go by rail. .	Transport White Paper 2011
Aviation	2050	Low-carbon sustainable fuels in aviation to reach 40% by 2050	Transport White Paper 2011
	2020 // 2050	Stabilisation of air emissions by 2020 (carbon neutral growth) and 50% reduction in 2050 compared to 2005	IATA
Maritime	2050	CO_2 emissions from maritime transport should be cut by 40% (if feasible 50%) by 2050, compared to 2005 levels	Transport White Paper 2011
Transport management	2020	SESAR, Modernised air traffic management infrastructure.	Transport White Paper 2011
	2020	To establish the framework for a European multimodal transport information, management and payment system	Transport White Paper 2011

Sector	Horizon year	Target	Reference document
	2050	Move towards full application of "user pays" and "polluter pays" principles	Transport White Paper 2011
Land-use		Targets in relation to land-use may be included in the EC publication of "Ressource Efficient Europe" targets, expected by 2013	
Education	2020	Reducing school drop-out rates below 10% by 2020	EU2020
Social exclusion	2020	at least 20 million fewer people in or at risk of poverty and social exclusion by 2020	EU2020

Figure 6-1 Synthesis of actual EU policy targets 2020, 2030, 2050

To accomplish set up targets by 2030, it will be elaborated pathways according to the following steps:

- Analysis of discrepancies between the present situation (2010) and mid-term targets to highlight the necessary trajectories of regions (or groups of regions) to reach the targets;
- Test of the degree of realism of the targets, using forecast and foresight models and, if necessary, adjustment of targets. Particular attention will be paid to the trajectories of less-favoured regions (lagging behind, peripheral, outermost, subject to depopulation, etc.). This step will require mostly the application of foresight meta-models, specially adapted to backcast exercises.
- Definition of a realistic pathway of territorial development for the mid-term horizon (2030). Pathways will be discussed together with midterm targets in the thematic, scientific and policy workshops.

The definition of policy inputs corresponding to the pathway for 2030 will refer to the definition and combination of public policies (policy mix), insisting on synergy effects; the adjustment of the policy mix to specific categories of regions and/or to macro-spaces; the impacts of possible changes in EU policies (intensity and content of cohesion policy; transport and energy policy, CAP etc.) analysed by the application of the modelling tools.

The requirements of the mid-term strategy (targets, pathway, policy input) for changes and improvements in the territorial governance system will refer in particular to the institutional arrangements of relevance for addressing territorial development issues at the EU level (codification, procedures); the coordination of EU policies; the vertical interactions in the definition and implementation of territorial development policies.

6.2 Territorial Impact Assessment (TIA)

The application of TIA to assess territorial impact of 2030 and 2050 scenarios is considered an essential part to give structure and provide knowledge support to the participatory process with ESPON MC and DG Regio intended at defining the 2050 Vision.

It will involve defining the criteria (or "impact fields") and the weights (attached to each criterion/impact field) to be considered in the evaluation of scenarios, and identifying the relevant indicators needed. There is no need to further improve the existing TIA software support, but, instead, to adapt it to import results from the forecast and foresight models. Criteria and respective weights will be determined through a participatory procedure involving all the TPG experts and the ESPON CU and MC. In terms of impact indicators, most of the necessary inputs

to the TIA model will be provided by the estimation and simulation procedures of the quantitative models and tools utilised in the project. Where this will prove unfeasible, sets of complex indicators will be provided built with statistical elaborations on the basis of group work and discussion inside the TPG.

The work will focus on:

- Defining the relevant criteria and a first proposal concerning their relative weights (to be subsequently validated by the ESPON MC). This task will be carried out on the basis of the EU Impact Assessment Guidelines (2009) and will involve an aggregation process leading to a smaller number of impact criteria, as defined in the ESPON ARTS project (about 40 fields to be restricted into 12-16 impact criteria). This is an important part of the consensus building process with ESPON MC and its difficulty will not be underestimated.
- In the first workshop to be organised a discussion towards the definition of criteria will be carried out, and results maybe refined and discussed again during the second policy workshop. This process will allow involving a wider arena of experts and policy makers through some light questionnaires to be distributed and collected during thematic and experts' workshops. Main questions will concern: sensitive areas to be covered through appropriate impact indicators, political acceptability of possible potential regional disparities in future trends concerning favourable and unfavourable impacts of trends and scenarios, policy options - local and/or generalized - to be devised as policy response to expected impacts.
- Identifying the most likely indicators needed for each criterion of the impact assessment: modellers will analyse the actual capacity (including possible improvements) of their models to produce these indicators, given the scope of the project. This preliminary definition of criteria and indicators will be based on the ESPON experience already available in the area of TIA applied to a relatively large number of European policies and directives, and will be validated through the participatory process.

Policy-relevant indicators for TIA

Policy-relevant indicators should be available for TIA at NUTS3 level (or a mix of NUTS3 and NUTS2 level for Germany and Belgium), the most appropriate for a really "territorial" inspection. This option has been actually pursued in some previous ESPON projects, namely in TIPTAP for the analysis of European transport policies and CAP.

However, in absence of detailed data for the whole European territory at such a disaggregated level of analysis, TIA has also been successfully applied at NUTS2 level, for example in the frame of the ESPON ARTS project.

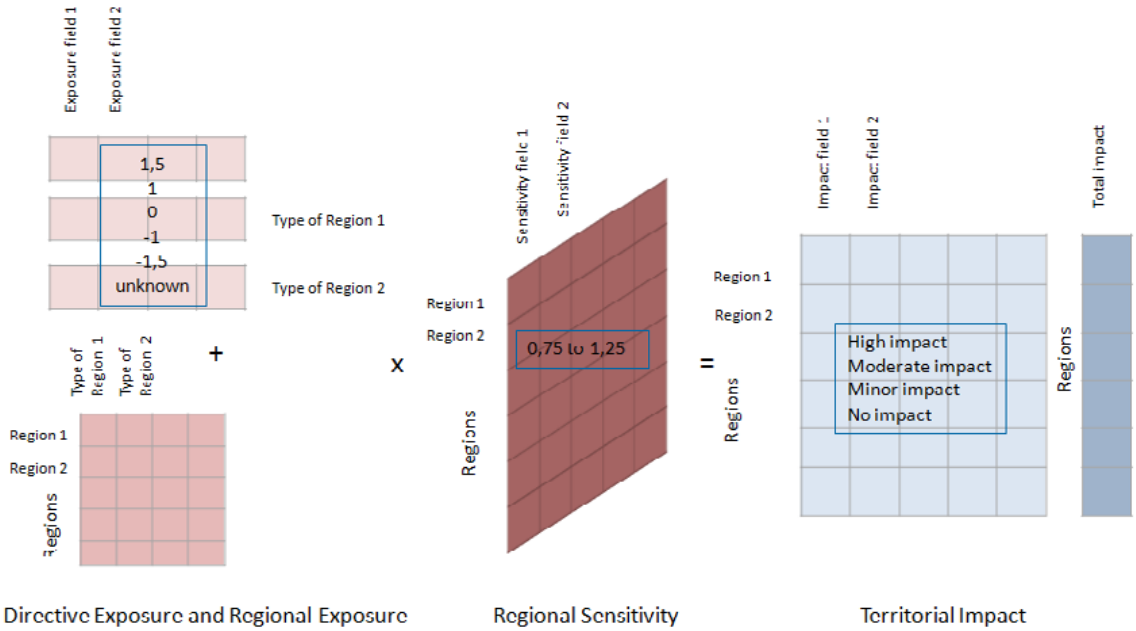


Figure 6-2 Assessment of regional sensitivity to branched EU Directives in ESPON ARTS
(Source: ÖIR, POLIMI et al; 2011: *ESPON ARTS Draft Final Report*)

Methodology

For the ET2050 project, TIA will be developed at NUTS2 level, possibly extending it to NUTS3 level for a sub-set of impact indicators, according to data availability.

In this light, it is relevant to remark that the methodology utilised in the ET2050 project mainly come from previous ESPON experience (namely, the TIPTAP and ARTS projects) and the data mainly come from the ESPON data Base and the indicators recently developed in the ESPON INTERCO project. Statistical elaborations imply alternatively:

- quantitative impacts on specific fields developed through the models implemented in the project,
- quali-quantitative impacts on other fields for which models are not available, elaborated through the construction of complex indicators and judgements collected from the all researchers involved in the project.

Replicating the methodology developed in the ARTS project (Figure 6-2) but adapting it to the new task of foreseeing territorial impact of scenarios, in case quantitative modelling of impacts will prove impossible, the logical process of building territorial impacts will imply the construction of the following 4 matrices:

a) an ***Impact Fields Matrix*** (one for each Scenario), defining for each field (criterion) the likely impact of the scenario on each typology of regions (mountain, coastal, northern, eastern, urbanised, rural, rich, poor, ...);

b) a ***Regional Typology Matrix*** (for all Scenarios), characterising each region on the previous typology (yes/no);

c) a ***Regional Sensitivity Matrix*** (for all Scenarios) defining the level of vulnerability and the level of (un-)desirability of the single impacts for each region. By-and-large, the Sensitivity Matrix built inside the ARTS project will be utilised;

d) a ***Territorial Impact Matrix*** (one for each Scenario), resulting from the linear multiplication of the previous three matrices, showing the impact of a scenario on each

region and each impact field. For each region, impacts on different fields could be aggregated in a compound indicator for each impact class (economy, society, environment, identity) and in a further "summative" impact. This last operation will imply the definition of "weights" for each impact field/criterion (the relative importance and priority attached to it, from a global, European perspective) in order to compare the different impacts. Indicators of interregional disparity could subsequently be calculated.

Therefore, each impact field will be treated through:

- Indicators on existing present conditions;
- Forecasted impact coming from the TPG modelling and/or elaborations, as described through the first two Matrices;
- Indicators of regional sensitivity to impact fields (mainly coming from the ARTS project and possibly updated).

Impact fields considered under TIA

The main impact fields to be utilised in the TIA will be selected among the following (Figure 6-3).

Aggregate impact fields	Tentative impact fields
Economy	GDP (per capita) Employment (manufacturing vs services) Innovation Tourism Entrepreneurship Accessibility
Society	Unemployment Road accidents Risk of poverty Income disparities Out-migration In-migration
Environment	Natura 2000 area Land consumption Emissions Congestion Flood hazard and land erosion Pollutants in air/soil
Identity	Landscape fragmentation Creativity Cultural heritage Natural heritage Traditions and local culture

Figure 6-3 Preliminary list of indicators considered in ET2050 TIA

The definition of weights to compute aggregate impacts on macro-criteria will be a major milestone of the project, and will be done based on inputs received during the participatory activities. Other potential enlargements could come from the Polish Presidency document (20111), after careful reflection inside the TPG.

TIA of ET2050 Baseline and Explorative Scenarios

The Baseline Scenario will be assessed using TIA techniques, as follows:

- First, the preliminary criteria to evaluate potential territorial impacts and the achievement of key policy-goals and indicators to measure them, already studied in Subtask 2.2.3, will

be discussed with the ESPON MC, in the first policy-workshop (month 9), in order to achieve consensus on one set of weights. Proposals on weights could be tested through a light questionnaire circulated at the winter ESPON meeting, in the same way as it was done, successfully, during a previous ESPON meeting in Prague.

- Second, based on the results produced by the forecast models, TIA will be applied to the 2030 horizon and reviewed critically on each single impact criterion. The situation of different regions and transnational zones will be assessed.
- Third, the results achieved will be summarized and grouped into major impact areas (to be thought of as macro-criteria: e.g. economy, society, environment, and to be discussed with the MC), and into a single "summative" impact, providing a synthetic, at-a-glance, picture of the regions more advantaged and disadvantaged by the expected trends included in the baseline scenario.
- Fourth, the results obtained will be discussed, and the relevant weights will be adjusted as appropriate. Similarly, based on these TIA results, the 2030 scenario will be redefined if necessary.
- Fifth, TIA will be applied to the 2050 Baseline in the same way as for the 2030 scenario. Initial results will be presented and discussed in the thematic workshop (month 12)
- Sixth, presentation of the baseline scenarios (together with their assessment) to the MC in the second workshop devoted to the discussion of Baseline 2050, as well as 2030 if needed. Elaboration of a synthesis of their reactions and observations.

The assessment of the three Explorative Scenarios will comprise similar steps:

- TIA, on the basis of results produced by forecast models and foresight meta-models. The TIA results will be synthesized in a small number of major impact areas (economy, society, environment, etc.) and in a single "summative" impact providing a snapshot-differentiated picture of the positively and negatively affected regions for each scenario;
- Elaboration of short, comparative discussion documents related to the four scenarios (TIA results, main emerging territorial issues) in view of future consultations;
- Elaboration of a synthesis document gathering all elements of relevance for the preparation of the Territorial Vision.

7. ANNEX 1 - References

Resources for participation are being developed aiming to disseminate project ongoing works and activities in a communicative, user-friendly manner, exploiting different media and facilitating interaction with potential participants in the process.

The paramount aim is to generate interest for the project during the process of participation (for the stakeholders) and to increase the awareness of wider audiences once the project is over.

The work mostly consists in:

- design, development and maintenance of the website of the project as an open platform for both communication and dissemination;
- online surveys, to be implemented after or before the workshops; conclusions will be open to further electronic debate on the website.
- mobilisation of interested persons and institutions to make them participate in the participatory process;
- management of the directory of participants
- cartography and infography, animations and short videos, and various other media formats helping to make scenarios and visions better understood among stakeholders;

The central communication platform of ET2050 is the www.et2050.eu website.

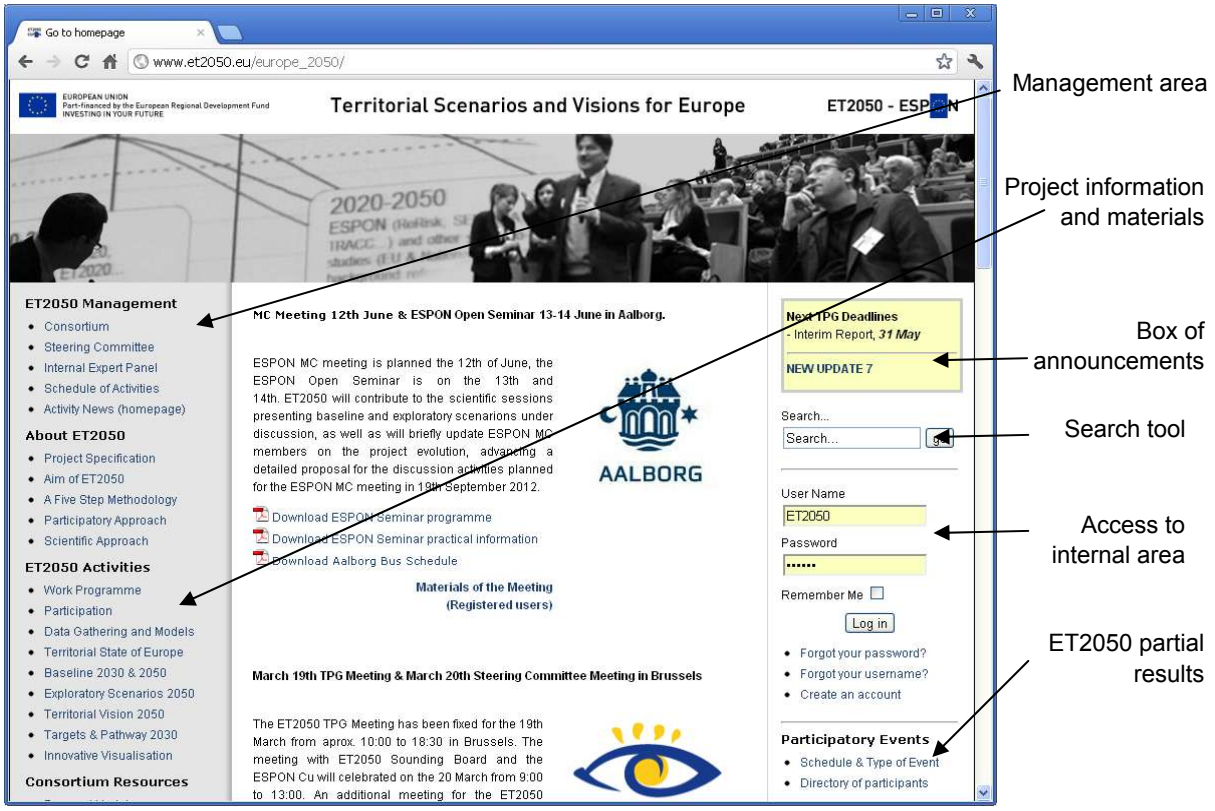


Figure 7-1 ET2050 homepage (www.et2050.eu)

The work has started by developing a virtual library of images (pictures, drawings, schemes, graphics, slide shows, animations, movies…) created to illustrate scenarios and Visions, and publish it in the website. and the work will continue by developing original infographic and multimedia products for each scenario and for the Vision.

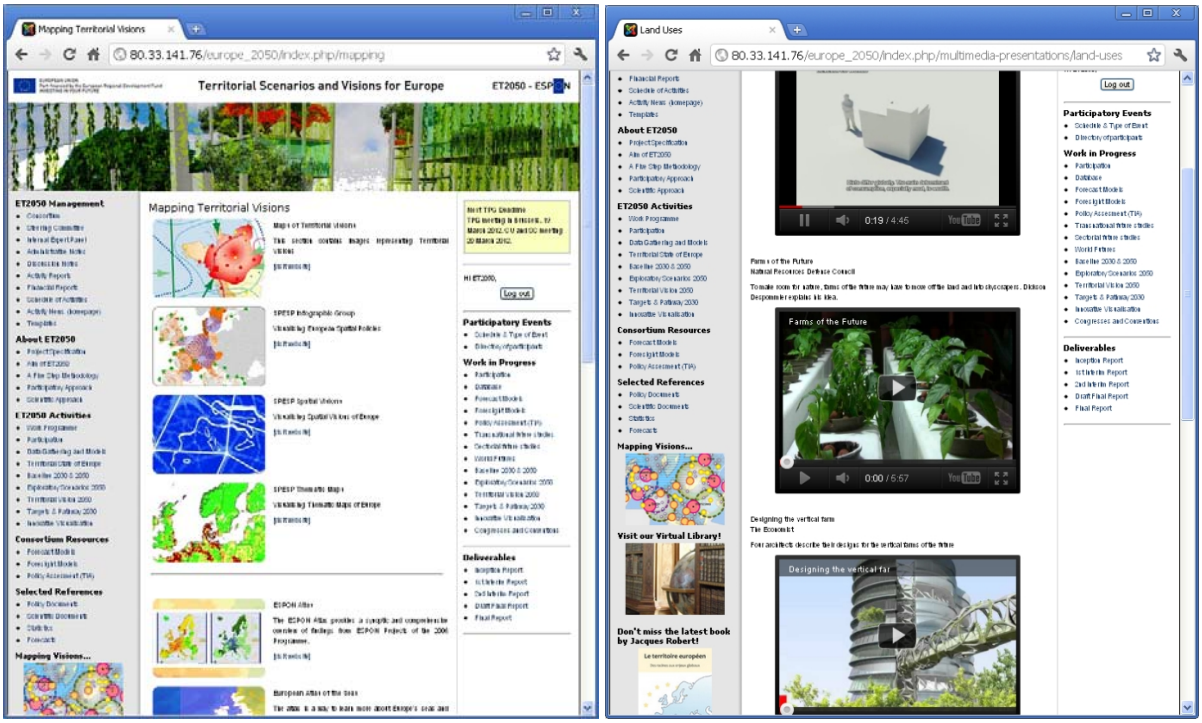


Figure 7-2 Gallery of infographic resources (www.et2050.eu)

ET2050 virtual library contains selected documents concerning future trends, technologies, scenarios, policies and databases on a set of topics from societal and demographic issues up to governance, including economy, transport, energy, environment, habitat, land-uses. Use the right menus to browse presently available documents. The library is to be kept updated with new documentation.

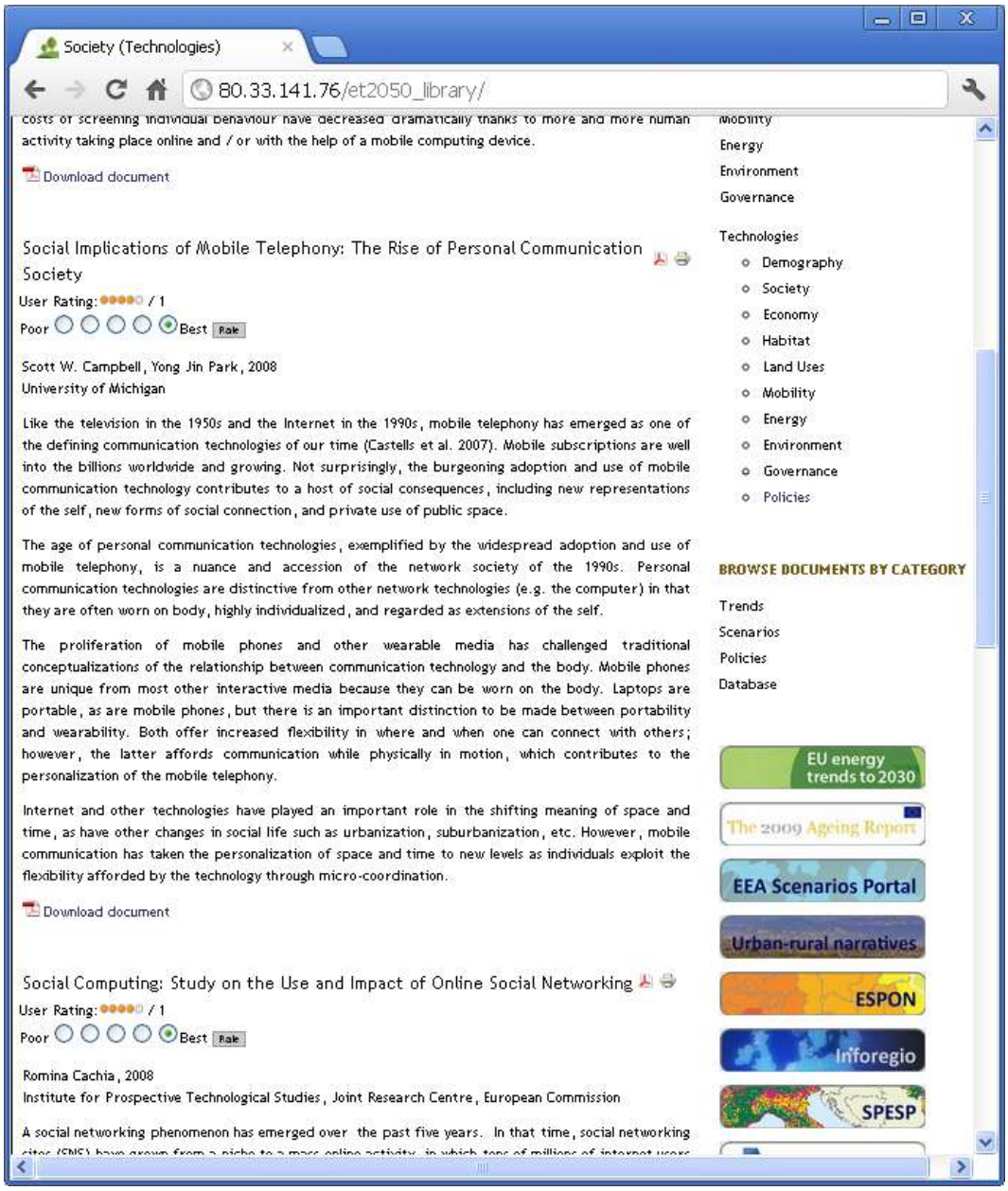


Figure 7-3 Virtual library at http://www.et2050.eu/Et2050_Library/

8. ANNEX 2: Project planning

8.1 Schedule of activities

Next figure presents the schedule of activities of ET2050, including official deliveries, participatory events, administrative significant dates.

Achieved task	Partially achieved task	Pending Task

Day	Month	Year	Month number	Event
23	June	2011	-	1st reporting period begins
	Sep.	2011	1	Kick-off meeting in Luxembourg
	Sep.	2011	1	1 Steering Committee in Luxembourg
	Oct.	2011	2	1 TPG meeting in Barcelona
29-30	Nov.	2011	3	ESPON Internal Seminar Krakow (Poland), Expert's workshop: Discussion/survey on the adjusted territorial scenarios
1	Dec.	2011	4	ESPON Internal Seminar Krakow (Poland), MC Policy-oriented workshop: Discussion of Participatory plan (and existing policy references or alternatives for the "kind" of Vision to be developed?)
31	**Dec.**	**2011**	**4**	**INCEPCION REPORT**
-	Dec.	2011	4	Small groups and interviews
1	Jan	2012	5	2nd reporting period begins
-	Feb.	2012	6	Small groups and interviews
	Feb.	2012	6	ESPON MC Internal Meeting
-	March	2012	7	ESPON CU Thematic workshop
	March	2011	7	2nd Steering Committee in Brussels
-	March	2012	7	2nd TPG meeting in Brussels with Sounding Board
-	April	2012	8	Small groups and interviews
30	April	2012	8	1st Activity Report submission to CU
-	May	2012	9	Small groups and interviews
31	**May**	**2012**	**9**	**INTERIM REPORT 1**
-	June	2012	10	ESPON Open Seminar (Denmark), Expert's workshop: Trends hypothesis for baseline and extreme territorial scenarios. Transnational specificities. World futures and Common Reference Framework.
-	June	2012	10	ESPON Open Seminar (Denmark), MC Policy-oriented workshop: Discussion on the nature of the Vision to be developed. Presentation of the Participatory activities being carried out, as well as trends hypothesis for baseline and extreme territorial scenarios.
1	July	2012	11	3rd reporting period begins

Day	Month	Year	Month number	Event
-	July	2012	11	Small groups and interviews
-	Aug.	2012	12	Small groups and interviews
-	Sept.	2012	13	ESPON MC Internal Meeting
-	Oct.	2012	14	ESPON CU Thematic workshop
-	Oct.	2012	14	3 Steering Committee Meeting
-	Oct.	2012	14	3 TPG Meeting
-	Oct.	2012	14	Sounding Board Meeting
-	Oct.	2012	14	Small groups and interviews
31	Oct	2012	14	2nd Activity Report submission to CU
-	Dec.	2012	16	ESPON Internal Seminar, Expert's workshop
-	Dec.	2012	16	ESPON Internal Seminar, MC Policy-oriented workshop
-	Dec.	2012	16	Small groups and interviews
1	Jan	2013	17	4th reporting period begins
-	Feb.	2013	18	Small groups and interviews
	Feb.	2013	18	ESPON MC Internal Meeting
-	March	2013	19	ESPON CU Thematic workshop
-	March	2013	19	4 Steering Committee Meeting
30	**April**	**2013**	**20**	**INTERIM REPORT 2**
30	April	2013	20	3rd Activity Report submission to CU
-	May	2013	21	Small groups and interviews
-	June	2013	22	ESPON Open Seminar, Expert's workshop
-	June	2013	22	ESPON Open Seminar, MC Policy-oriented workshop
1	July	2013	23	5th reporting period begins
-	July	2013	23	Small groups and interviews
-	Aug.	2013	24	Small groups and interviews
	Sep.	2013	25	ESPON MC Internal Meeting
-	Oct.	2013	26	ESPON CU Thematic workshop
-	Oct.	2013	26	5 Steering Committee Meeting
-	Oct.	2013	26	4 TPG Meeting
-	Oct.	2013	26	Sounding Board Meeting
-	Oct.	2013	26	Small groups and interviews
31	Oct	2013	26	4th Activity Report submission to CU
-	Nov.	2013	27	Small groups and interviews
-	Dec.	2013	28	ESPON Internal Seminar, Expert's workshop
-	Dec.	2013	28	ESPON Internal Seminar, MC Policy-oriented workshop

Day	Month	Year	Month number	Event
1	Jan	2014	29	6th reporting period begins
-	Jan.	2014	29	Small groups and interviews
-	Feb.	2014	30	Small groups and interviews
	Feb.	2014	30	ESPON MC Internal Meeting
28	**Feb.**	**2014**	**30**	**DRAFT FINAL REPORT**
-	March	2014	31	ESPON CU Thematic workshop
-	March	2014	31	6 Steering Committee Meeting
-	April	2014	32	Small groups and interviews
30	April	2014	32	5th Activity Report submission to CU
-	May	2014	33	Small groups and interviews
-	June	2014	34	ESPON Open Seminar, Expert's workshop
-	June	2014	34	ESPON Open Seminar, MC Policy-oriented workshop
-	June	2014	34	Small groups and interviews
30	**June**	**2014**	**34**	**FINAL REPORT**
1	July	2014	35	7th reporting period begins
	Sep.	2014	37	ESPON MC Internal Meeting
30	Oct	2014	38	6th Activity Report submission to CU
31	July	2015	47	7th Activity Report submission to CU

Figure 8-1 Schedule of activities and deliveries

8.2 Detailed work plan and partner involvement

Next table provides an updated full list of ET2050 internal milestones (including delivery dates) for a successful accomplishment of the project (*deadlines and responsible partners are subject to change to adapt to participatory events).*

Achieved task	Partially achieved task	Pending Task

Deliverable	Character	Deadline	Responsible
Management notes	Internally	Monthly	MCRIT
Updates	Internally	Periodically	MCRIT
Administrative and financial reports	To ESPON CU	Every 6th months	MCRIT
Minutes of meetings	Internal	After events	MCRIT

Deliverable	Character	Deadline	Responsible
Internal surveys and peer reviews related to reports to be submitted to ESPON CU	Website brief notes	10 on-line surveys	MCRIT

Participatory plan	Inception report	Month 4	IGEAT
Directory of stakeholders by target groups	Inception report	Month 4	MCRIT
Website hosting, design, development and maintenance	Inception report	Month 4	ERSILIA
Methods for interaction	Inception report	Month 4	MCRIT
Preparation of the participatory events (15 events in 3 years)	Documented on the website	All over	IGEAT
Reports of the events to be published in the website	Documented on the website	All over	IGEAT
Small group discussions, interviews and on-line activities	Documented on the website	Month 4	IGEAT

SPQR systematic model description	Inception report	Month 1	MCRIT
Data needs: demography (based on MULTIPOLES)	Inception report	Month 4	IOM
Data needs: economy (based on MASST)	Inception report	Month 4	POLIMI
Data needs: transport (based on T/IC+)	Inception report	Month 4	MCRIT
Data needs: land-use (based on METRONAMICA)	Inception report	Month 4	RIKS
Data needs: territory (based on SASI)	Inception report	Month 4	S&W

TV+ & PASH+ development plan	Inception report	Month 4	MCRIT
Forecast models development plans (MULTIPOLES, MASST, T/IC+, SASI, PASH+, TV+)	Inception report	Month 4	MCRIT, POLIMI, IOM, S&W, RIKS
Draft criteria for TIA to be applied in all scenarios and visions	Inception report	Month 4	POLIMI
Indicators for TIA to be applied in all scenarios and visions	Inception report	Month 5	POLIMI

Inception report	**December 2011**	**Month 4**	

Adaptation of MULTIPOLES	Documented on the website	Month 7	IOM
Adaptation of MASST	Documented on the website	Month 7	POLIMI
Adaptation of T/IC+	Documented on the website	Month 7	MCRIT
Adaptation of METRONAMICA	Documented on the website	Month 7	RIKS

Deliverable	Character	Deadline	Responsible
Adaptation of SASI	Documented on the website	Month 7	S&W
Adaptation PASH+ & TV+	Documented on the website	Month 11	MCRIT
South West Med Region	Published in the website	Month 8	MCRIT
Central Med Region	Published in the website	Month 8	POLIMI
North-West Region	Published in the website	Month 8	IGEAT
Central and Alpine Region	Published in the website	Month 8	S&W
Baltic and Nordic Region	Published in the website	Month 8	Nordregio
Danubian Region	Published in the website	Month 8	RKK
South-Eastern Region	Published in the website	Month 8	Thessaly
Eastern Region	Published in the website	Month 8	Warsow School of Economics
Outermost regions	Published in the website	Month 8	MCRIT
Demographic trends and potential territorial impacts	Published in the website	Month 8	CEFMR / IOM
Economic trends and potential territorial impacts	Published in the website	Month 8	POLIMI
Technologic trends and potential territorial impacts in Europe	Published in the website	Month 8	MCRIT
Transport trends and potential territorial impacts	Published in the website	Month 8	MCRIT
Energy trends and potential territorial impacts	Published in the website	Month 8	TERSYN
Land-use trends and potential territorial impacts	Published in the website	Month 8	RIKS
Environmental trends and potential territorial impacts	Published in the website	Month 8	IGEAT
Governance trends and potential territorial impacts	Published in the website	Month 8	IGEAT
Trends and territorial impacts by sectors. Integrated report	Interim Report 1	Month 8	MCRIT

Deliverable	Character	Deadline	Responsible
Trends by transnational zones. Integrated report.	Interim Report 1	Month 8	MCRIT
Report on reference Scenarios and Visions for Europe and the World	Interim Report 1	Month 6	ISIS / MCRIT
Thematic workshop for discussing the Present State of the European Territory	Website	Month 7	IGEAT
Report on the State of the European Territory (based on trends by sectors and zones)	Interim Report 1	Month 9	MCRIT
Reference data to be provided by modellers	Interim Report 1	Month 9	MCRIT

Interim report 1	**May 2012**	**Month 9**	

Forecast Baseline for 2030 Baseline (by enhanced MULTIPOLES, MASST, T/IC+, SASI)	Website	Month 10	MCRIT, POLIMI, IOM, S&W, RIKS
Baseline scenario 2030 (narrative, story-line by 5-10 years, forecasts)	Interim Report 2	Month 10	MCRIT, POLIMI, S&W
Policy-oriented workshop for Baseline 2030	Website	Month 10	IGEAT
Scientific-oriented workshop for Baseline 2030	Website	Month 10	IGEAT
Foresight for 2050 Baseline (mostly by enhanced PASH+, TV+)	Website	Month 11	MCRIT
Baseline scenario 2050 (narrative, story-line by 5-10 years, foresights)	Interim Report 2	Month 12	MCRIT, POLIMI, S&W
Territorial assessment of the baseline scenarios	Interim Report 2	Month 14	POLIMI
Thematic workshop with stakeholders for Baseline 2030-2050	Website	Month 14	IGEAT / POLIMI
Assumptions for the three exploratory scenarios	Website	Month 16	MCRIT, POLIMI, S&W
Scientific-oriented workshop for Baseline 2030-2050 and first insides on Scenarios	Website	Month 16	IGEAT
Policy-oriented workshop for Baseline 2030-2050 and first insides on Scenarios	Website	Month 16	IGEAT
Data produced by forecast and foresight activities	Website	Month 18	MCRIT
Thematic workshop on Exploratory scenarios	Website	Month 19	IGEAT
Three exploratory scenarios	Interim Report 2	Month 19	MCRIT, POLIMI, S&W
Forecast for 2030 Exploratory Scenarios (by enhanced MULTIPOLES, MASST, T/IC+, SASI)	Website	Month 19	MCRIT, POLIMI, IOM, S&W, RIKS

Deliverable	Character	Deadline	Responsible
Foresight for 2050 Exploratory Scenarios (mostly by enhanced PASH+, TV+)	Website	Month 19	MCRIT
Territorial assessment of the exploratory scenarios	Interim Report 2	Month 20	POLIMI

Interim report 2	**April 2013**	**Month 20**	

Scientific-workshop to consolidate Exploratory Scenarios	Website	Month 22	IGEAT
Policy-workshop to consolidate Exploratory Scenarios	Website	Month 22	IGEAT
Synthesis document with orientations for the Territorial Vision	Draft final report	Month 22	MCRIT
Foresight for 2050 Exploratory Scenarios	Website	Month 26	MCRIT
Thematic workshop with stakeholders to discuss the European Territorial Vision 2050	Website report	Month 26	IGEAT
Scientific workshop to discuss the European Territorial Vision 2050	Website report	Month 28	IGEAT
Policy workshop to discuss the European Territorial Vision 2050	Website report	Month 28	IGEAT
European Territorial Vision for 2050, reviewed by the discussions	Draft final report	Month 28	MCRIT, POLIMI, IOM, S&W, RIKS

Draft final report	**December 2013**	**Month 28**	

Thematic workshop with stakeholders to consolidate the European Territorial Vision (13)	Website report	Month 31	IGEAT
Scientific workshop to consolidate the European Territorial Vision	Website report	Month 33	IGEAT
Policy workshop to consolidate the European Territorial Vision	Website report	Month 33	IGEAT
Mid-term targets with territorial differentiation	Final report	Month 33	MCRIT
Pathways for types or regions	Final report	Month 33	MCRIT, POLIMI, IOM, S&W, RIKS
Policy recommendations	Final report	Month 29	MCRIT, POLIMI, IOM, S&W, RIKS
Territorial governance arrangements	Final report	Month 33	MCRIT, POLIMI, IOM, S&W, RIKS

Final report	**June 2014**	**Month 34**	

Deliverable	Character	Deadline	Responsible
Posters, brochures and leaflets designed and disseminated	Electronic dissemination	Month 34	ERSILIA
Multimedia products representing the scenarios and the Vision (6 in total)	Electronic dissemination	Month 34	ERSILIA
Final website as a repository of produced material	Electronic dissemination	Month 37	MCRIT
On-line survey to a wider audience	Electronic dissemination	Month 35	MCRIT
Material for ESPON Capitalisation Strategy	Electronic dissemination	Month 37	MCRIT
Redesign of communication material for wider dissemination purposes	Electronic dissemination	Month 37	ERSILIA

Figure 8-2 Updated Tentative schedule of internal milestones and partner involvement

8.3 Work towards Interim Report 2 (april 2013)

The content of the Second Interim Report shall reflect the orientations given in the Inception Report as well as the results of the discussions having taken place with the Sounding Board. The report is envisaged to include elements such as:

i) Main results on the basis of available data, developed indicators, scenarios, policies and European maps, including

- An overview on concepts and methodology on creating a territorial vision, midterm targets and policy recommendations.
- Final results of Step 1, Step 2 and Step 3.
- Overview of involvement of stakeholders up to now and planned for the next phase up to the Draft Final Report.

ii) Additional material to contribute to the ESPON 2013 capitalisation and communication strategy, including:

- Slideshows explaining the assumptions, the methodology and the results of the project so far.
- A selection of 3-5 maps suitable for the communication of project progress and results at the different stages on the ESPON website, but as well suitable to be used for creation of posters, postcards, exhibition materials, etc.
- Input (text, maps, images) for the updating of a specific section of the ESPON 2013 Web-site dedicated to the project.
- Written contribution for the elaboration of at least 4 leaflets/brochures to inform policy makers on the assumptions, the methodology and the results of the project so far (focusing on the baseline scenario and the three prospective scenario);

iii) Concrete plan for the applied research and stakeholder involvement to finalise Step 4 and Step 5 towards the draft Final Report as well as the Table of Content envisaged for the Final report.

9. ANNEX 3: Full Baseline Quantitative Description

In this section first reference values for key indicators are provided as starting point for the modelling exercise. Values are obtained from a large number of sources at global and European level and made consistent, at aggregated European level, by using TV+ and PASH+ Meta-models.

Based on the actual results to be obtained from forecast models, integrated through the meta-analysis process**,** the values presented next will be refined and adjusted whenever needed. Main sources used for reference are always indicated (MM means ET2050 Meta-model, in the cases no other source has been used as reference).

A description of the ET2050 Meta-model, which integrated TV+ and PASH+ meta-models, is to be found in ANNEX 3 of this Interim Report, using SPQR format.

a) World Framework (exogenous variables)

WORLD	*Time series source*	*Forecast source*
World Population (millions of people)	UN DESA	UN DESA
World Urban Population (% over total population)	UN DESA	UN DESA
World illiteracy rate (% of population 15+)	UNICEF	UNICEF
World Gini Coeficient (Income Disparities)	Bourguignon/ Morrison (2002)	E.Hillebrand
World GDP (1000 milions of 2010 €)	World Bank	PASHMINA 7FP
World total trade (goods % services in 1000 million €)	UNCTAD	CItYBANK
Global seaborne traffic (billion tonne·km)	UNCTAD	IMO
Global air traffic (billion RPKs)	airbus/boeing	airbus/boeing
World Tourism (million overnight visitors per year)	UNWTO	UNWTO
World energy consumption (MTOE)	BP	IEA
World CO2 emissions (million tones)	BP / DG Energy	IEA
Oil price (€2010 per barrel)	BP	DG ENERGY // US EIA[60]

Figure 9-1 World Framework – Reference sources for exogenous variables

WORLD	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
World Population (millions of people)	2.531	3.039	3.708	4.473	5.308	6.125	6.910	7.670	8.323	8.889	9.214
World Urban Population (% over total population)	29%	33%	36%	39%	43%	46%	50%	55%	59%	64%	69%
World illiteracy rate (% of population 15+)	44%	41%	37%	30%	24%	18%	17%	14%	11%	9%	7%
World Gini Coeficient (Income Disparities)	0,63	0,64	0,65	0,66	0,66	0,66	0,64	0,64	0,64	0,64	0,64

[60] EIA (2012), *INTERNATIONAL ENERGY OUTLOOK 2012 Early Release*,

WORLD	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
World GDP (1000 milions of 2010 €)	4.501	7.422	13.535	19.367	26.411	34.214	43.338	60.565	84.638	106.888	134.986
World total trade (goods % services in 1000 million €)	125	178	479	2.250	5.625	13.027	19.947	36.060	65.189	100.272	154.236
Global seaborne traffic (billion tonne·km)	4.862	7.197	10.654	16.777	16.440	22.927	32.746	48.472	69.707	100.246	144.163
Global air traffic (billion RPKs)	226	368	600	1.100	2.100	3.381	4.621	7.491	12.145	19.688	31.918
World Tourism (million overnight visitors per year)	25	64	109	170	319	560	940	1.281	1.746	2.379	3.241
World energy consumption (MTOE)	2.900	3.754	4.884	6.469	7.192	8.441	10.182	13.442	17.747	20.758	24.280
World CO2 emissions (million tones)	10.000	11.802	14.908	18.990	21.977	24.224	29.905	38.875	50.537	56.757	63.741
Real crude oil price (€2010 per barrel)	13	12	9	82	33	30	67	108	121	130	138

Figure 9-2 World Framework – Table of exogenous variables quantified

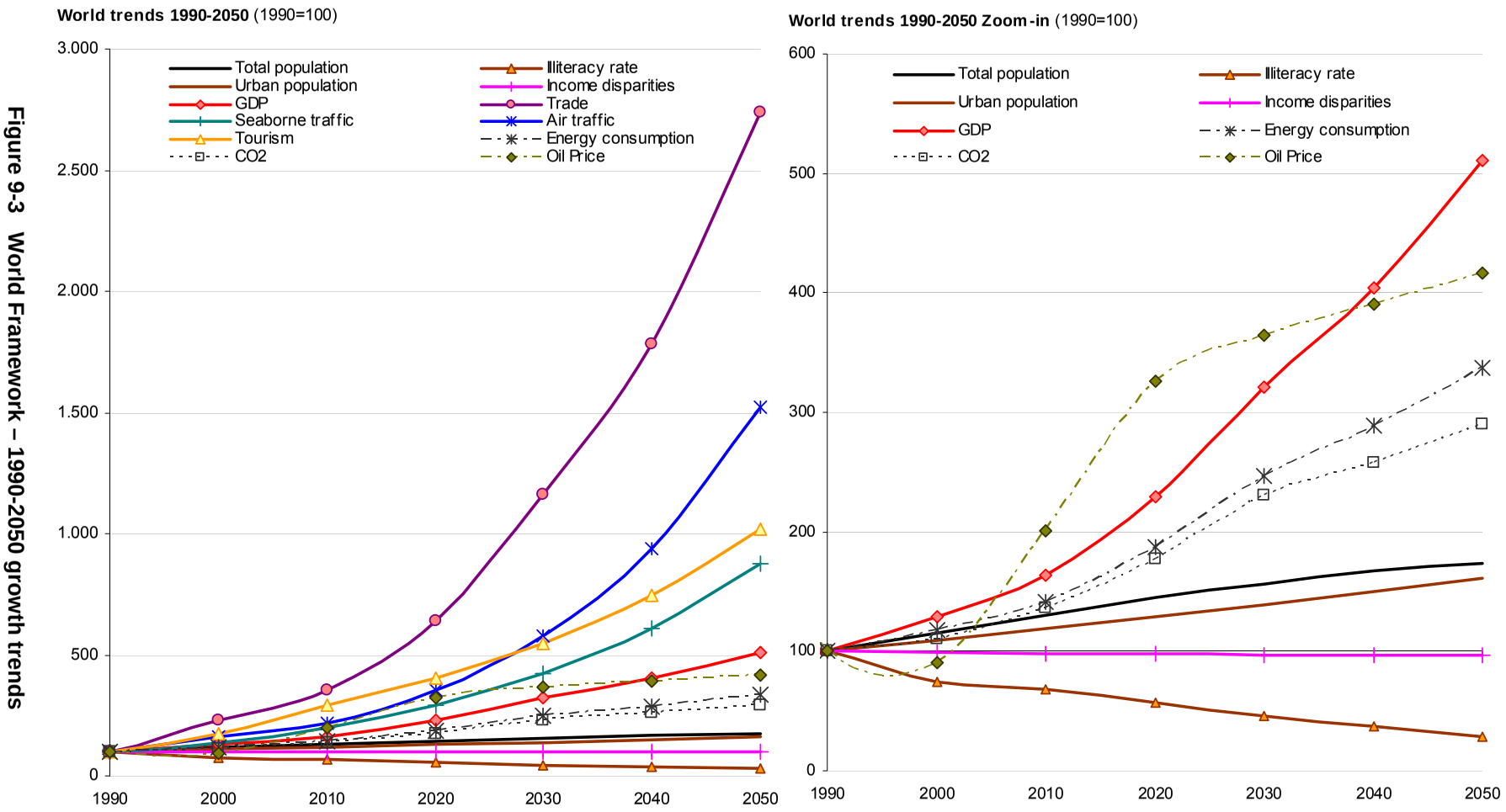


Figure 9-3 World Framework – 1990-2050 growth trends

WORLD **annual growth rates**	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
World Population (millions of people)	1,8%	2,0%	1,9%	1,7%	1,4%	1,2%	1,0%	0,8%	0,7%	0,4%
World Urban Population (% over total population)	1,4%	0,9%	0,8%	0,9%	0,9%	0,8%	0,8%	0,8%	0,8%	0,7%
World illiteracy rate (% of population 15+)	-0,8%	-0,9%	-2,0%	-2,1%	-2,8%	-0,9%	-1,8%	-2,2%	-2,0%	-2,5%
World Gini Coeficient (Income Disparities)	0,2%	0,2%	0,1%	0,0%	0,0%	-0,2%	-0,1%	0,0%	0,0%	0,0%
World GDP (1000 milions of 2010 €)	5,1%	6,2%	3,6%	3,2%	2,6%	2,4%	3,4%	3,4%	2,4%	2,4%
World total trade (goods % services in 1000 million €)	3,6%	10,4%	16,7%	9,6%	8,8%	4,4%	6,1%	6,1%	4,4%	4,4%
Global seaborne traffic (billion tonne·km)	4,0%	4,0%	4,6%	-0,2%	3,4%	3,6%	4,0%	3,7%	3,7%	3,7%
Global air traffic (billion RPKs)	5,0%	5,0%	6,2%	6,7%	4,9%	3,2%	5,0%	5,0%	5,0%	5,0%
World Tourism (million overnight visitors per year)	9,8%	5,5%	4,5%	6,5%	5,8%	5,3%	3,1%	3,1%	3,1%	3,1%
World energy consumption (MTOE)	2,6%	2,7%	2,8%	1,1%	1,6%	1,9%	2,8%	2,8%	1,6%	1,6%
World CO2 emissions (million tones)	1,7%	2,4%	2,4%	1,5%	1,0%	2,1%	2,7%	2,7%	1,2%	1,2%
Oil price (€2010 per barrel)	-1,0%	-3,1%	25,4%	-8,6%	-0,9%	8,2%	1,7%	1,5%	0,9%	0,9%

Figure 9-4 World Framework – Table of growth rates of exogenous variables

EUROPE **in the World**	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
EU27 Population as a share of World's (%)	UN DESA	UN DESA	15%	13%	12%	10%	9%	8%	7%	7%	6%	6%	6%
Europe Gini Coeficient in relation to Worlds	Calculated	Calculated	40%	41%	41%	40%	41%	44%	47%	47%	43%	41%	39%
EU27 GDP as share of World's (%)	World Bank	PASHMINA 7FP	37%	37%	37%	36%	33%	31%	28%	24%	20%	18%	17%
Share of EU goods trade in the World (%)	UNCTAD	CItYBANK	17%	24%	22%	20%	19%	19%	15%	13%	11%	10%	9%
EU Tourism as a share of World's (%)	UNWTO	UNWTO	90%	84%	79%	74%	69%	56%	45%	42%	37%	32%	27%
EU energy consumption as a share of World's (%)	BP	IEA	28%	27%	26%	24%	23%	20%	17%	13%	10%	9%	7%
EU CO2 emissions as a share of World's (%)	BP / DG Energy	IEA	18%	22%	27%	25%	20%	18%	15%	10%	7%	6%	5%

Figure 9-5 World Framework – Table of European weight in the World

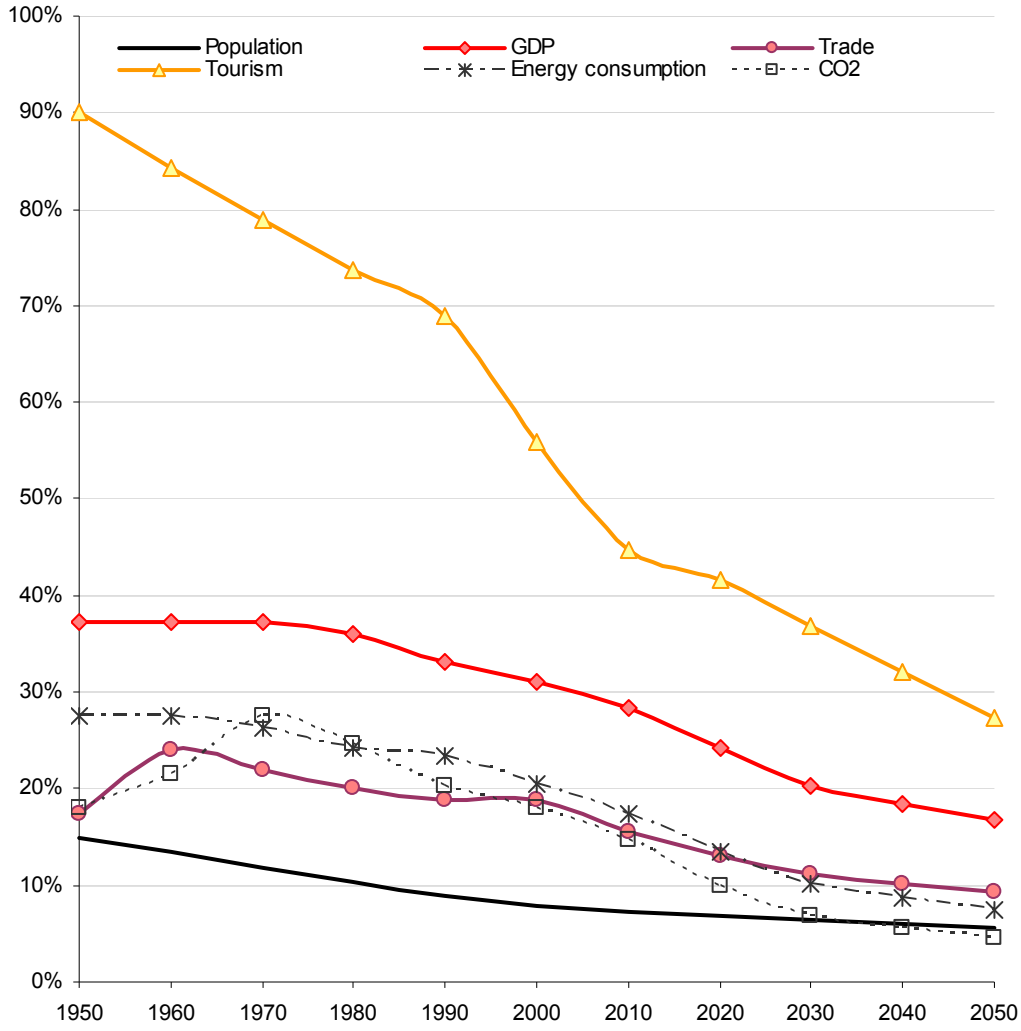


Figure 9-6 World Framework – 1990-2050 evolution of European weight in the World

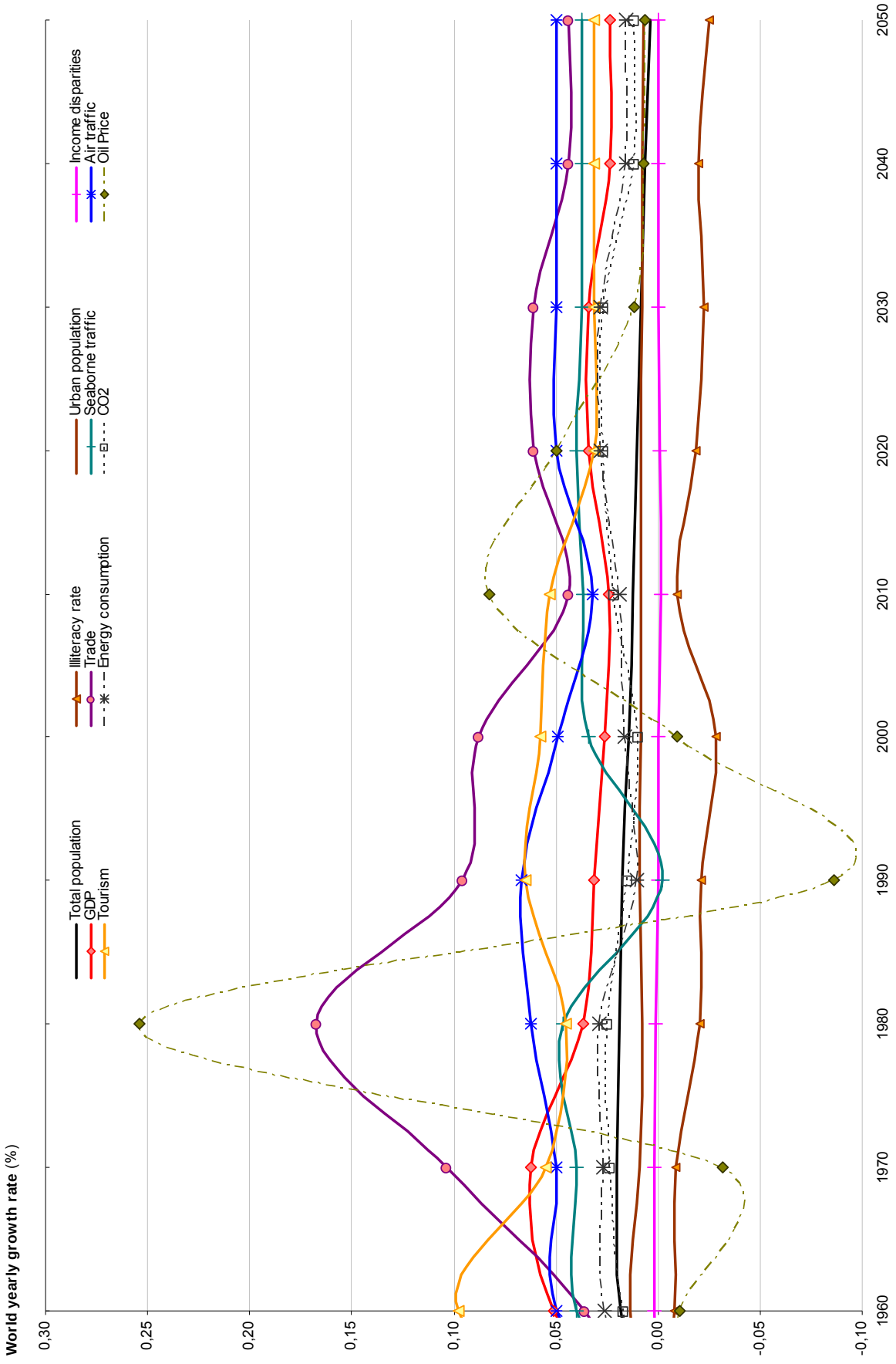


Figure 9-7 World Framework – 1950-2050 evolution growth rates of exogenous variables

b) European Main Drivers (inputs)

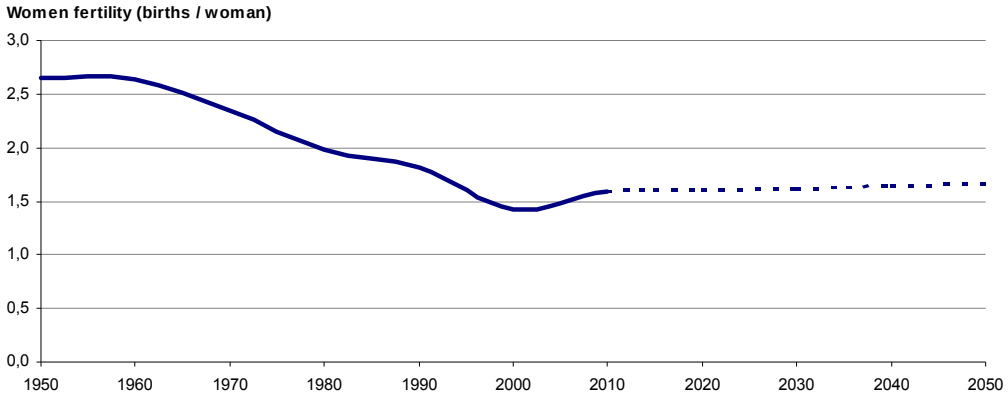
SOCIETY	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Women fertility (births / woman)	UN DE-SA	ECFIN	2,6	2,6	2,3	2,0	1,8	1,4	1,6	1,6	1,6	1,6	1,7
Life expectancy at birth (years)	UN DE-SA	ECFIN	65,6	68,0	70,3	71,2	72,9	73,1	79,2	80,8	82,4	83,7	85,1
Average household size (number of people)	Various sources	DG ENERGY	3,8	3,5	3,3	3,1	2,7	2,5	2,3	2,2	2,2	2,1	2,0
Active Population (% active over 15-64)	EC FIN	EC FIN	70%	70%	70%	71%	69%	70%	71%	71%	72%	72%	73%
% of personal income devoted to leisure	Eurostat	MM	14,6%	14,6%	14,6%	14,6%	16,4%	18,3%	17,4%	16,1%	16,1%	16,1%	16,1%
% of personal income devoted to transport	Eurostat	MM	11,3%	11,3%	11,3%	12,1%	13,0%	13,8%	13,0%	13,4%	13,4%	13,4%	13,4%

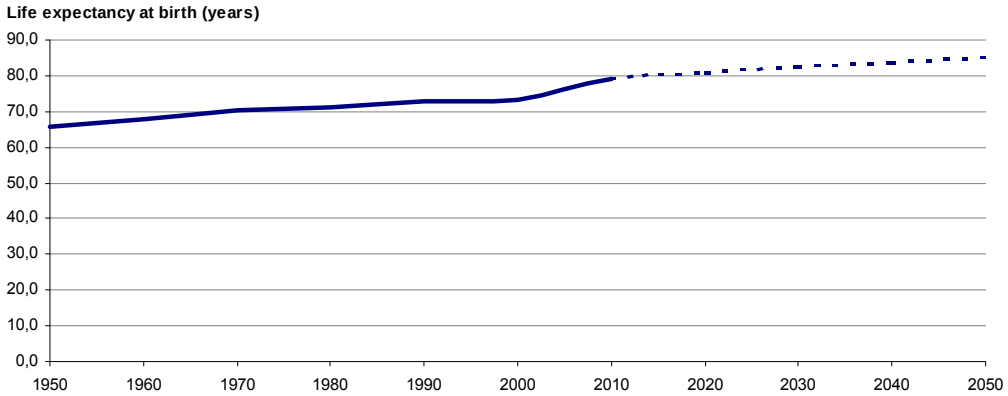
TECHNOLOGY	*Historic series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Energy Intensity (MTOE/Million,2010 euros)	BP / DG Energy	DG ENERGY / EC FIN	0,48	0,37	0,25	0,22	0,19	0,16	0,14	0,12	0,11	0,09	0,08
Carbon Intensity (Mton/MTOE)	BP / DG Energy	IEA	2,25	2,47	3,19	2,99	2,67	2,53	2,49	2,14	1,88	1,76	1,62
Digital processing capability of computers (logarithm(operations/sec))	Future of Technology	Future of Technology	1,0	2,5	4,0	5,5	7,3	9,0	10,5	12,0	13,5	15,0	16,5

GOVERNMENT	*Historic series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Market Regulation													
EU enlargements (million new inh.)	Eurostat	MM	0	189	16	72	55	33	134	0	0	0	0
Total Net Migration (million imm/year)	UN DESA	ECFIN / MM	0	-0,25	-0,71	0,59	0,66	0,72	1,04	1,33	1,29	1,23	0,92
Retirement age	ECFIN / OECD	MM	64,0	64,0	64,0	62,6	61,2	59,9	61,2	61,8	62,3	62,5	62,5
Anual worked hours per employeed (hours / year·worker)	US BLS GOV / ECFIN	Based on EC FIN	2.256	2.171	2.086	2.001	1.916	1.831	1.746	1.759	1.761	1.776	1.774
Euro to Dollar exchange rate ($ / €)	Eurpean Central Bank	MM	0,48	0,50	0,56	1,11	1,33	1,03	1,44	1,25	1,25	1,25	1,25

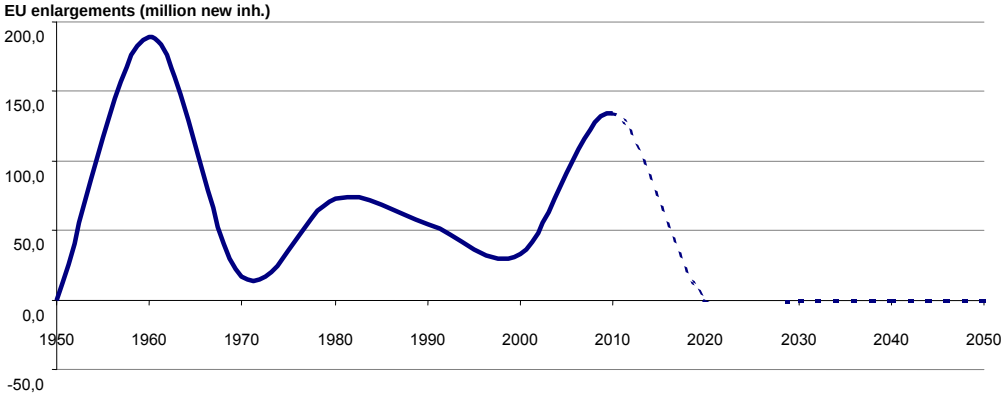
GOVERNMENT	*Historic series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Public Investment													
Public revenue (as % of GDP)	Eurostat	MM	19,8%	29,9%	39,0%	44,3%	45,4%	43,0%	44,0%	45,0%	42,0%	39,0%	39,0%
Government expenditure (as % of GDP)	EC FIN	MM	20,0%	30,1%	39,2%	48,2%	48,8%	45,2%	50,8%	46,0%	43,0%	40,0%	40,0%
Social public expenditure (as % of GDP)	ENEPRI	ECFIN	8,0%	11,0%	16,0%	24,9%	25,0%	27,0%	23,0%	23,5%	24,9%	26,4%	27,4%
Gross capital formation (% of GDP)	Eurostat	MM	18,0%	18,4%	18,8%	19,3%	19,7%	20,1%	21,3%	21,8%	21,9%	22,2%	22,2%
Expenditure in public & private R&D (% of GDP)	Eurostat	MM	1,6%	1,7%	1,7%	1,8%	1,9%	1,9%	2,0%	1,9%	1,9%	1,9%	1,9%

Figure 9-8 European Drivers – Table of input variables quantified

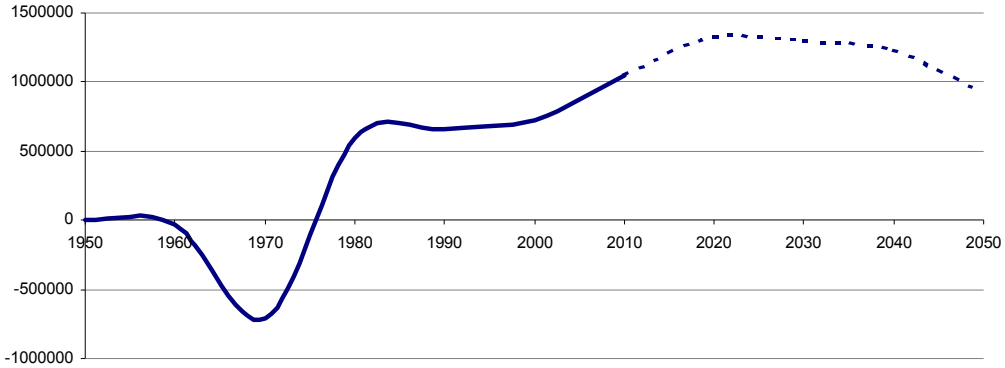




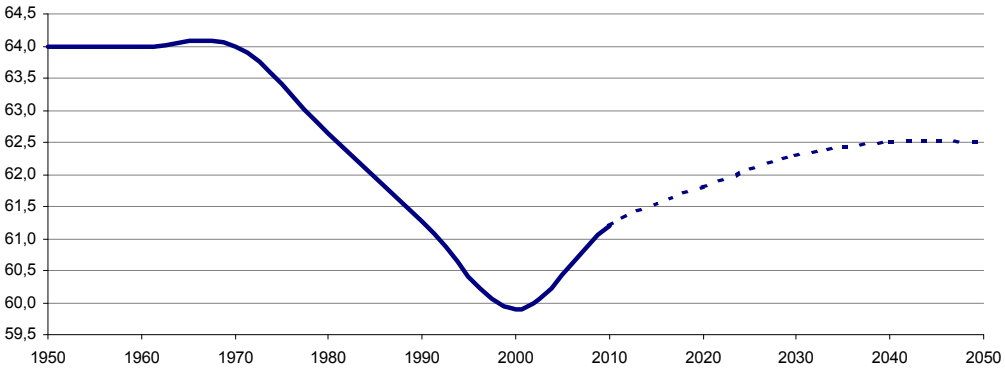
EU enlargements (million new inh.)



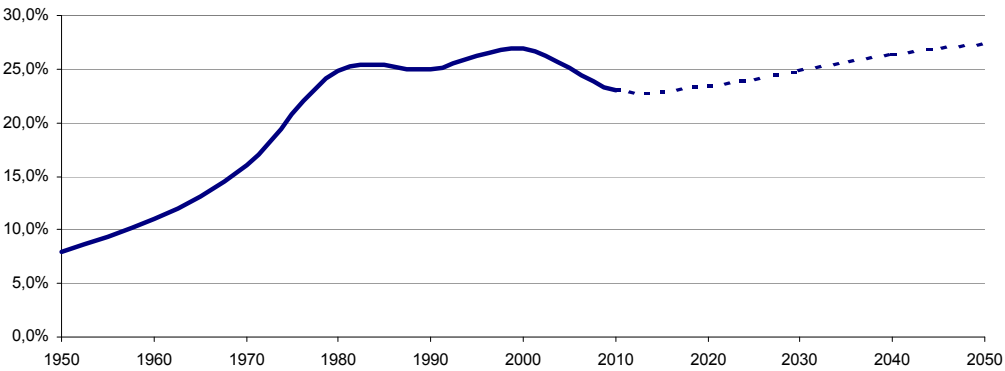
Total Net Migration (coming from outside EU27 imm/year)



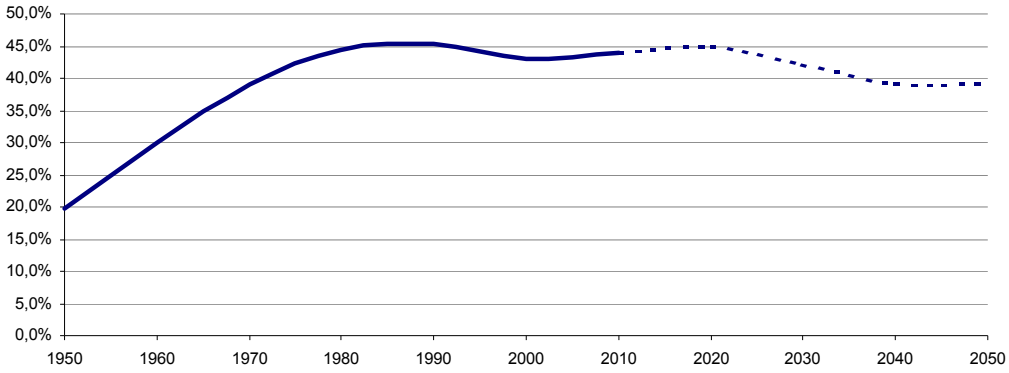
Retirement age



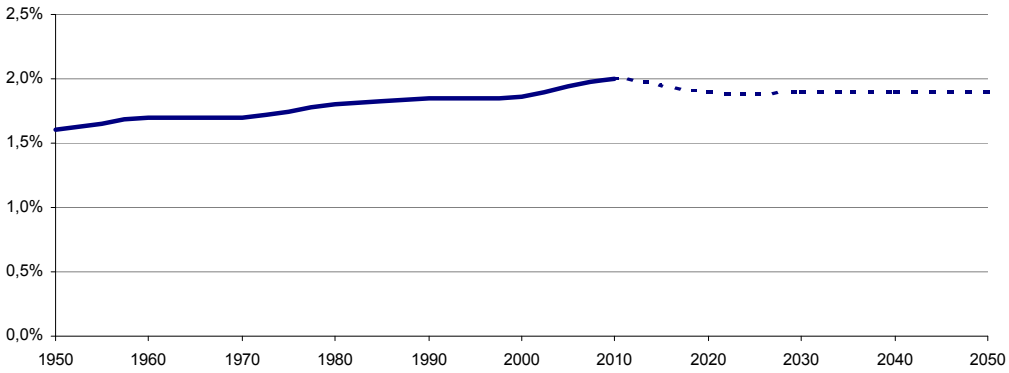
Social public expenditure (as % of GDP)



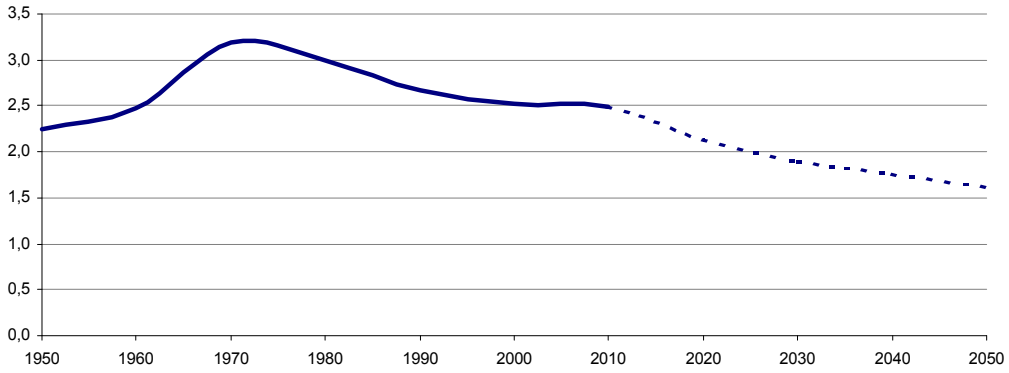
Public revenue (as % of GDP)



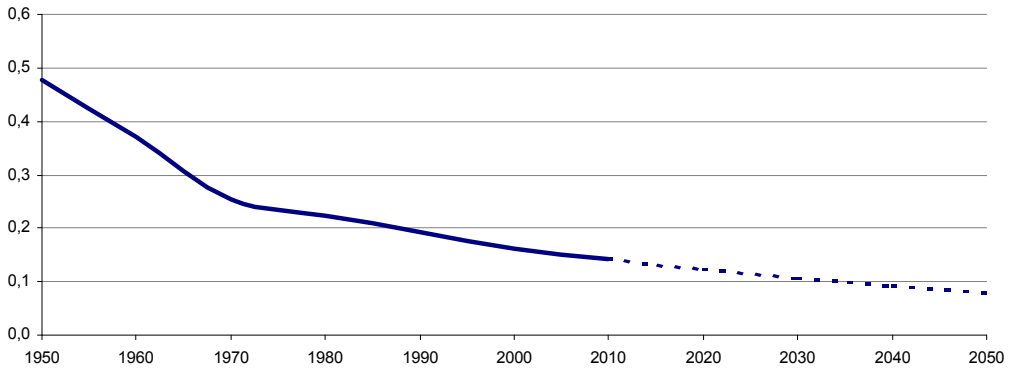
Expenditure in public & private R&D (% of GDP)

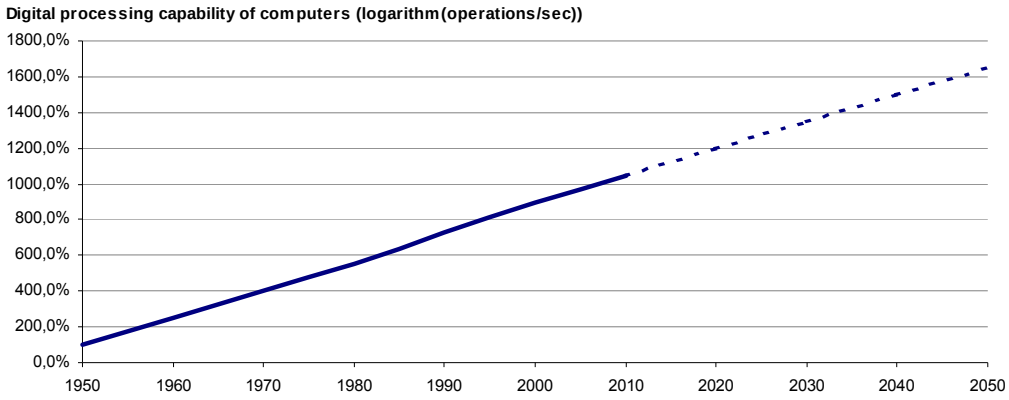


Carbon Intensity (Mton/MTOE)



Energy Intensity (MTOE/Meuros) in constant €2010





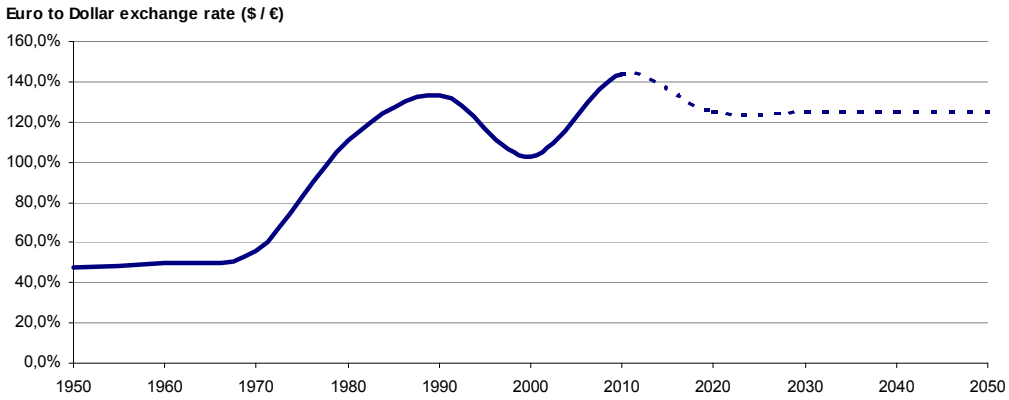


Figure 9-9 European Drivers –1950-2050 evolution for selected input variables

c) European Main Trends (outputs)[61]

POPULATION & SOCIETY	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
European Population (millions of people)	UN DESA	ECFIN / UNDESA	385	416	451	474	488	509	518	538	543	545	540
Population Ageing (People Older than 65 years (%))	Pop. Ageing	Pop. Ageing	7%	8%	9%	11%	13%	15%	16%	19%	23%	25%	27%
Dependency ratio (children+elder/15-64)	MM	MM	52%	55%	56%	53%	50%	48%	46%	54%	58%	66%	72%
Share of early school leavers (% of 18-24 with at most lower secondary education)	MM (2000-2010 Eurostat)	MM	19,8%	19,4%	19,2%	18,9%	18,5%	17,6%	14,1%	13,1%	12,8%	12,5%	12,6%
Tertiary educational attainment (% of 30-34 with university degree)	MM (2000-2010 Eurostat)	MM	12,0%	13,0%	16,0%	18,0%	20,0%	22,4%	33,6%	36,4%	37,6%	37,6%	38,5%

ECONOMY	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050

[61] These results are benchmarks against which to compare the results of ET2050 models. These preliminary figures have been determined using foresight tools, based on official forecasts and baselines by the EC.

ECONOMY	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
% employed over 20-64	Eurostat	MM	68%	68%	68%	68%	66%	67%	69%	70%	71%	72%	72%
Unemployment rate (% unemployed / active)	EC FIN	EC FIN	8%	8%	8%	8%	8%	9%	8%	6%	5%	5%	6%
Labour input in the EU (1000xmillion worked hours / year)	MM	EC FIN	359	367	380	396	384	382	394	402	400	388	373
European GDP (1000 milions of 2010 €)	IMF	MM	1.763	2.908	5.303	7.330	9.191	11.145	13.001	15.584	18.212	20.918	23.983
Total EU trade goods volume (imports&exports EU, in 1000 million €)	Eurostat, WTO	City Bank	20	39	90	380	877	1.975	2.498	3.769	5.688	7.870	10.888
Tourism (million overnight visitors per year)	UNWTO	UNWTO	30	75	120	190	247	312	339	491	643	766	888
European Public Debt (% of GDP)	IMF	MM	41,7%	29,7%	32,5%	32,8%	44,5%	61,9%	72,6%	65,0%	63,0%	55,0%	50,0%

TRANSPORT	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Total passenger·km (1000Mpax·km)	2011 WP / Energy2030	MM	815	1.344	2.451	3.384	4.242	5.200	5.961	6.778	7.708	8.125	8.564
Total freight tonne·km (1000Mt·km)	2011 WP / Energy2030	MM	501	827	1.508	2.082	2.610	3.658	3.571	4.376	5.361	6.135	7.021
Passenger Rail modal share (% passenger·km)	Passenger 2011 WP / Energy2030	MM					6,6%	6,4%	6,4%	5,1%	3,8%	5,1%	6,4%
Freight Rail modal share (% t·km)	Freight 2011 WP / Energy2030	MM					15,5%	12,6%	13,4%	14,0%	14,5%	15,1%	15,6%
Motorisation rate (cars / 1000inh)	2011 WP / Energy2030	MM	71	99	150	220	320	410	480	540	600	620	615
Road Fatalities (1000xdeaths/year)	ERF	MM	120	115	109	90	76	57	35	17	9	5	2

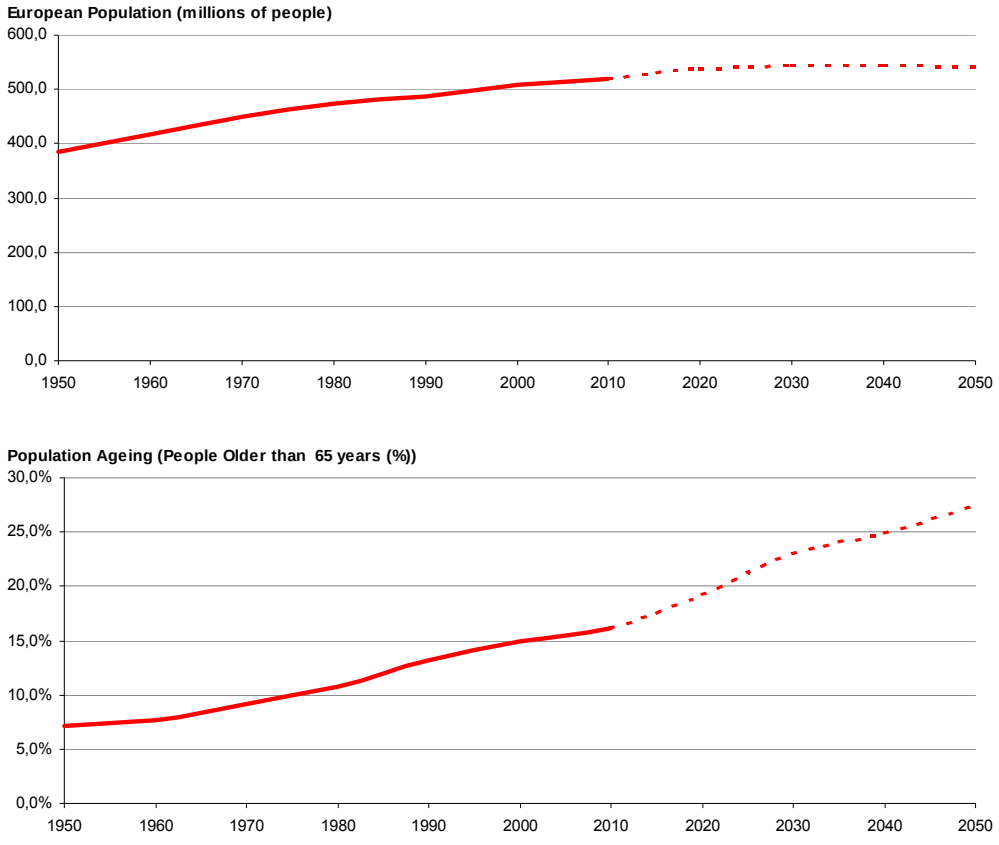
LAND USE	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
EU27 Urban Population (% over total population)	UN DESA	UN DESA	55%	59%	64%	67%	69%	70%	73%	76%	80%	85%	89%
EU27 Number of cities > 1 million inhabitants	UN DESA	UN DESA	21	25	28	30	31	34	37	41	43	45	49

ENERGY	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Primary energy consumption (MTOE)	BP / DG Energy	DG ENERGY	800	1.030	1.285	1.564	1.679	1.724	1.764	1.805	1.807	1.804	1.800
% of renewables in energy	DG Energy in energy	MM	1,1%	2,2%	3,4%	5,0%	6,9%	7,6%	10,3%	14,8%	18,4%	22,2%	26,0%

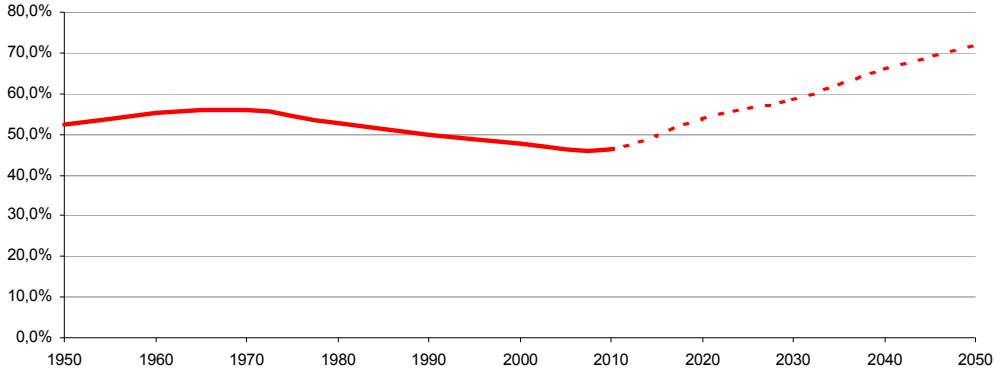
ENVIRONMENT	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Total CO2 emissions (1990=100)	Total BP / DG Energy	MM	0	57	91	105	100	97	98	86	76	71	65
CO2 emissions reduction from transport (1990=100)	DG Energy	MM	0	0	0	0	100	112	129	134	127	128	129

GOVERNANCE	*Time series*	*Forecast source*	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
European Public Debt (% of GDP)	IMF	MM	42%	30%	33%	33%	45%	62%	73%	65%	63%	55%	50%

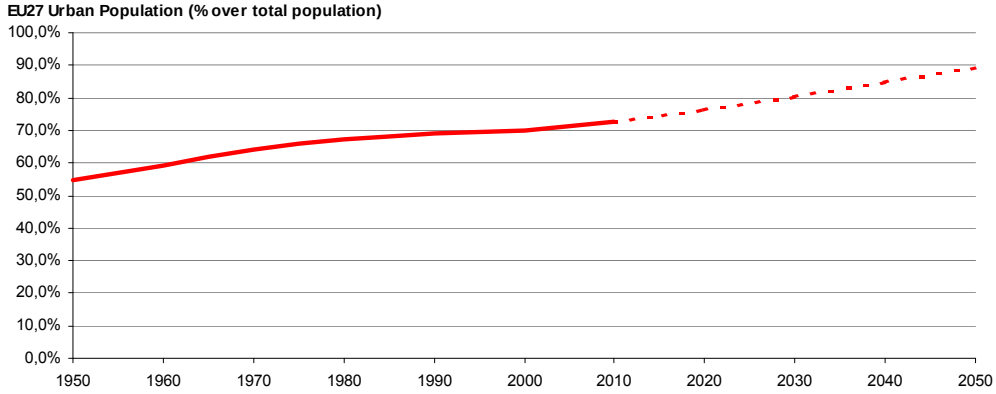
Figure 9-10 European Main Trends – Table of output variables quantified



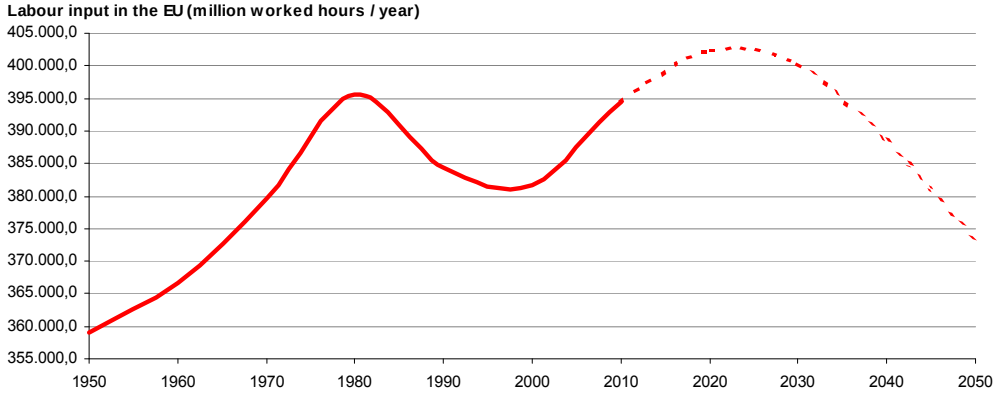
Dependency ratio (children+elder/15-64)



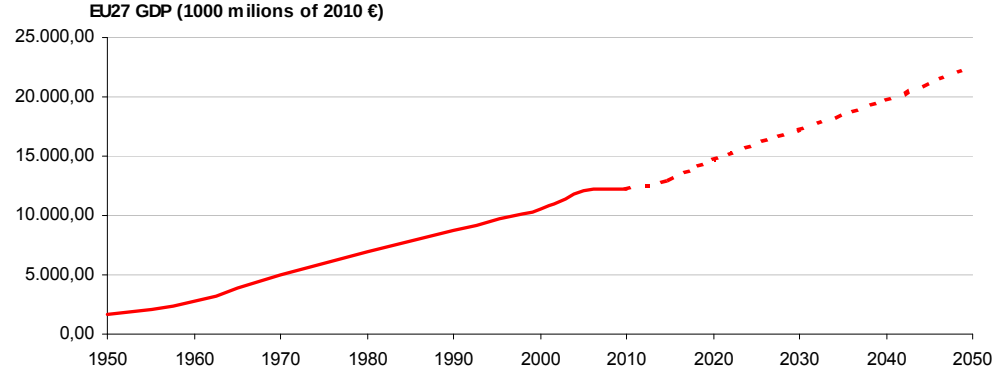
EU27 Urban Population (% over total population)



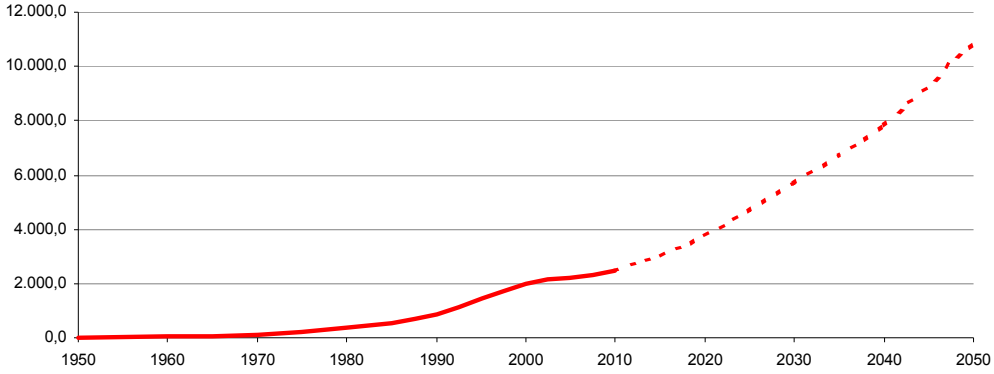
Labour input in the EU (million worked hours / year)



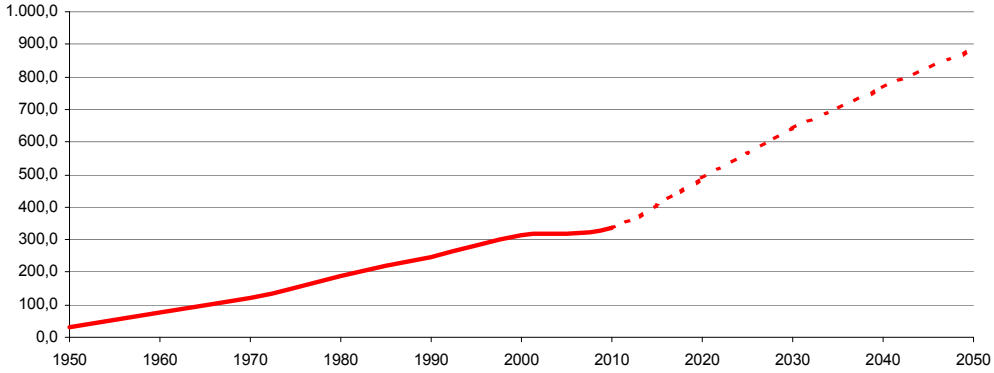
EU27 GDP (1000 milions of 2010 €)



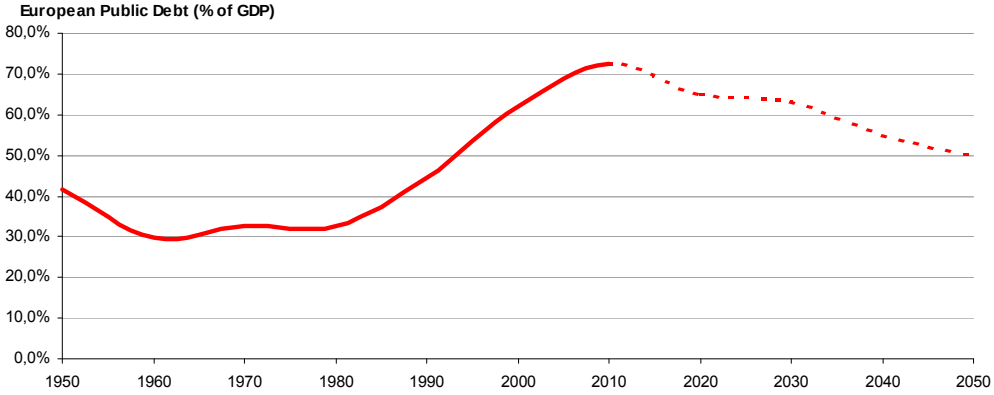
Total EU trade goods volume (imports&exports EU, in 1000 million €)



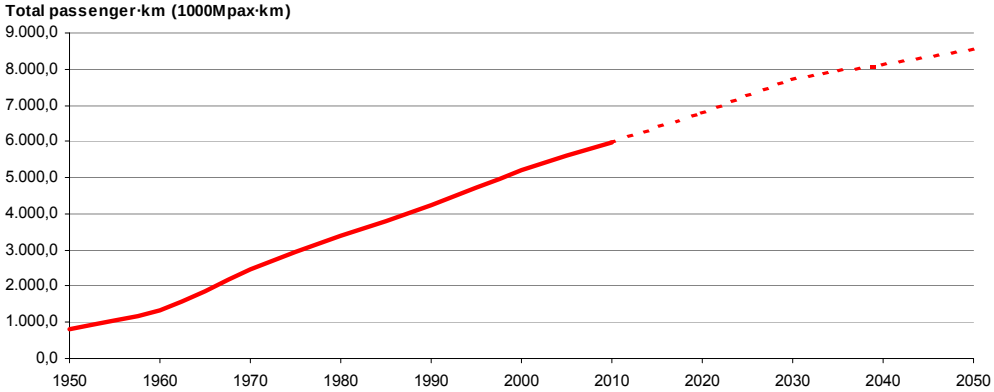
Tourism (million overnight visitors per year)



European Public Debt (% of GDP)



Total passenger·km (1000Mpax·km)



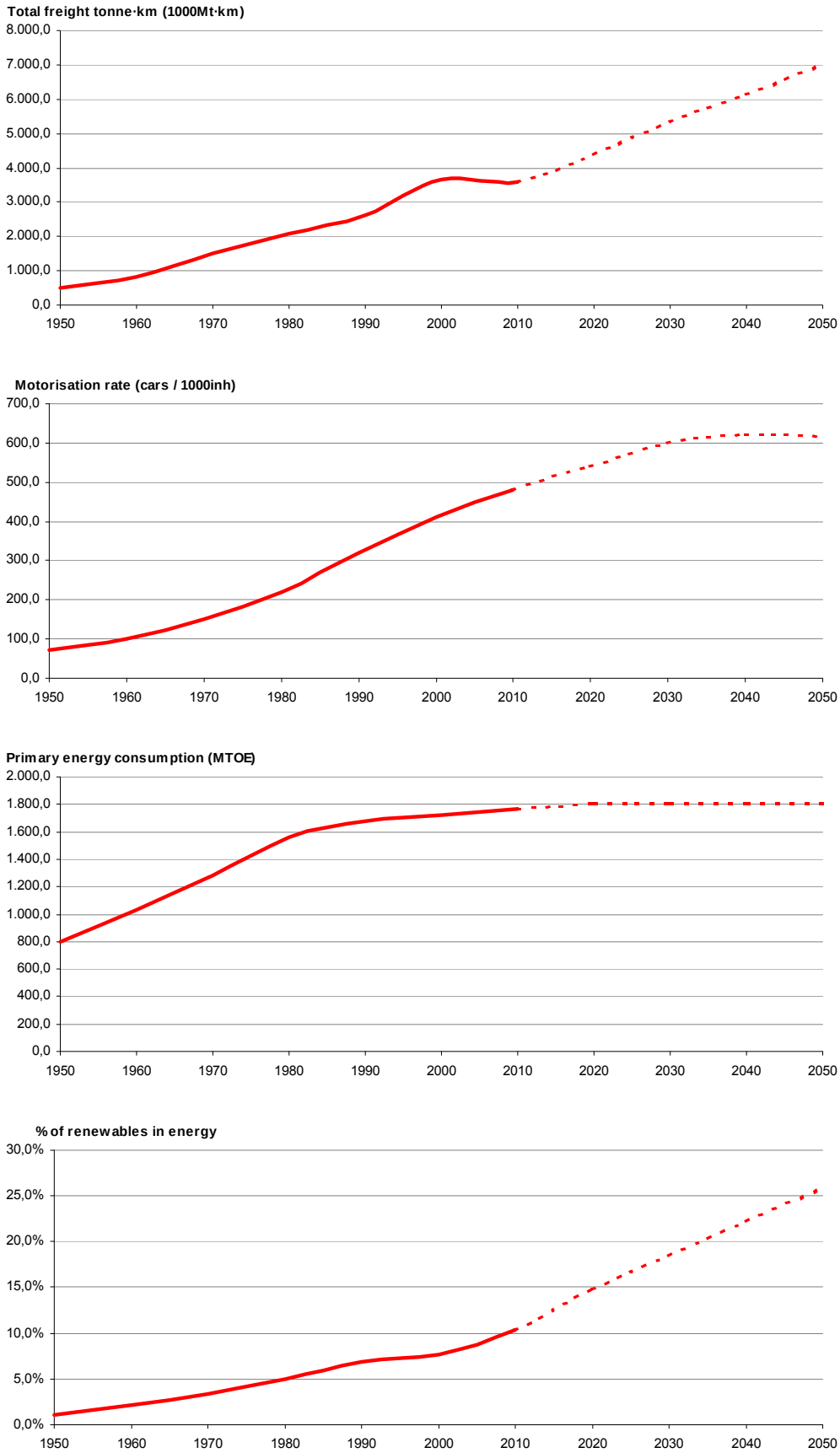


Figure 9-11 European Main Trends – 1950-2050 evolution for selected output variables

10. ANNEX 4: ET2050 Meta-model SPQR (TV+ // PASH+)

NAME	**ET2050 MM (TV+ // PASH+)**
BACKGROUND	
Last update	2012
Developer	MCRIT
Developed in the project	ET2050 based on TV+ (TRANSVISIONS, DG TREN 2009) and PASH+ (PASHMINA, DG RTD 2011)
Ownership	MCRIT co-financed by EC. No commercialised.
Main applications	Merging TV+ and PASH+ meta-models to allow for an integrated scenario designing tool interrelating key sectoral variables in all domains to provide consistent holistic image of future scenarios for Europe. . • TV+ meta-model was initially intended to design transport scenarios up to 2050, with demography / economy / energy / environment considerations. TV+ was used in Transvisions study (DGTREN, 2009) to create four alternative scenarios fulfilling transport CO2 and GHG emission targets towards 2050 using different strategies. • PASH+ meta-model was intended to design future scenarios at World level up to 2050, with demography / economy / energy / transport / environment / land-uses and governance considerations. PASH+ considered 7 world macro-regions (Europe, Russia, Asia, North America, Latin America, Africa, Oceania), and insured trend consistency for all regions
Documents of reference	TRANSVISIONS “Transport Scenarios with 20 and 40 years Horizon” Final Report (http://ec.europa.eu/transport/strategies/studies/strategies_en.htm) PASHMINA “Paradigm Shift Medelling and Innovative Approaches” D1.1 and D1.2 (http://www.pashmina-project.eu/index.php?option=com_content&view=article&id=46&Itemid=37)
Running time	< 1 minute
Size of total results	1MB
Data exchange format	Results provided in Excel
Software platform	MS EXCEL
SAMPLES	
Reference data from	1950-2010
Data for calibration	Various Sources, mostly official forecasts by EU (Europop2010, Ageing Report 2012, Energy and Transport outlook to 2030…)
Data inputs	- Socioeconomic framework 1950-2010 for approximately 100 variables - Demographic dynamics to 2050 (birth rates / mortality rates / migrations / EU enlargements) - Social dynamics to 2050 (households / personal budget on basic needs, leisure, transport / retirement age / activity rates / annual worked hours per person) - Economic dynamics to 2050 (public and private investment / R&D policies /

	public expenditure) - Technology (energy intensity, carbon intensity, vehicle technology) - Energy dynamics to 2050 (energy mix / energy prices) - Transport generation dynamics to 2050 (infrastructure policies, pricing and behavioural policies to 2050) - Land-uses dynamics - Governance dynamics
P O S T U L A T E S	
Forecast reliable up to	2050
Geographic coverage	ESPON space
Adm. desegregation	European aggregated level
Thematic scope	Demography, Economy, Technology, Energy, Transport, Environment, Land-use, Governance
Theory	Based on simple variable interrelations, between demography, economy, energy, transport and environment. Inherited from PASH+, the meta-model is able to reproduce a proxy of population cohorts based on basic demographic assumptions (birth and mortality rates, immigration, age structure). Labour market is estimated with additional labour input, activity and employment rate hypothesis. Economy growth is based on labour input and investment. For transport, the inherited TV+ module generates transport demand based on future population and available personal income (passenger transport based on individual travel budget hypothesis), and economic dynamics (freight transport). Hypothesis on travel behaviour (vehicle occupation, freight transport optimisation), public policies (pricing, taxation…) and technological developments, allow establishing transport demand and resulting GHG emissions from this transport needs. GHG emissions and land-uses dynamics are estimated from economic behaviour and transport behaviour.
Q U E R I E S	
Scenario building	The ET2050 MM is an integrated tool to design coherent holistic socioeconomic, transport, energy, environment scenarios. The model is able to produce around 100 interelated variables aimed at illustrating quantitatively the narratives of pre-established qualitative scenarios.
R E S U L T S (Main families of indicators)	
Population and Society	European Population (millions of people) Population Ageing (People Older than 65 years (%)) Dependency ratio (children+elder/15-64) Share of early school leavers (% of 18-24 with at most lower secondary

	education) Tertiary educational attainment (% of 30-34 with university degree) People at risk of poverty or social exclusion (% of total population)
Economy	% employed over 20-64 Unemployment rate (% unemployed / active) Labour input in the EU (million worked hours / year) European GDP (1000 milions of 2010 €) Total EU trade goods volume (imports&exports EU, in 1000 million €) Tourism (million overnight visitors per year) European Public Debt (% of GDP) Economic gap between regions
Transport	Total passenger·km (1000Mpax·km) Total freight tonne·km (1000Mt·km) Passenger Rail modal share (% passenger·km) Freight Rail modal share (% t·km) Motorisation rate (cars / 1000inh) Road Fatalities (deaths per year) Road Congestion
Land-use	European Urban Population (% over total population) European Number of cities > 1 million inhabitants
Energy	Primary energy consumption (MTOE) % of renewables in energy Energy consumption from transport (Mtoe) % vehicles powered with RES % transport energy from biofuels
Environment	Total CO2 emissions (1990=100) CO2 emissions reduction from transport (1990=100)
Governance	European Public Debt (% of GDP)
INTERACTION WITH OTHER ET2050 MODELS	
Required inputs	Results of ET2050 MM provide a rought image of scenarios in all sectoral dimensions, with consistency between key variables. However, due to the simplified nature of the tool, results require validation with more sound and proper models, in the case of ET2050, by MASST, METRONAMICA, SASI, MULTIPOLES and MOSAIC
Potential outputs	Results of ET2050 MM provide a common base of variables for other models to implement scenarios in a consistent way, preventing significant disparities in the different models' inputs.

11. FIRST ANNEX TO INTERIM REPORT (OCTOBER 2012): Structuring of Exploratory Scenarios, Territorialisation and Use of Wild Cards

11.1 Approach

A debate arose in the project team about the specification of the Exploratory Scenarios. There was agreement that a scenario is a combination of two kinds of assumptions: assumptions about the framework conditions that cannot be influenced by European or national policies and assumptions about European and national policies that can be influenced by political decisions.

Framework conditions may include:

- *Demography*: total European population development
- *Economy*: total European economic development
- *Energy*: energy prices, energy intensity, renewable energy
- *Environment*: carbon intensity

Relevant European and national policies include:

- *Migration: maximum volume and conditions of international migration*
- *Cohesion: expenditures of EFRE, ESF and the Cohesion Fund*
- *Agriculture: expenditures of CAP*
- *Transport: implementation of the TEN-T*
- *Research: expenditures for R&D promotion*
- *EU enlargement: accession of new member states*

The question was how the two components, the assumptions about framework conditions and the assumptions about policies, are to be combined.

- One possibility is to keep the assumptions about the framework conditions fixed while varying those about policies and, conversely, keeping the assumptions about policies fixed while varying those about the framework conditions in order to isolate the impacts of framework conditions and policies, respectively.
- The other possibility is to change both types of assumptions together in order to achieve internally consistent scenarios. That means that for each of the three Exploratory Scenarios those assumptions about framework conditions and policies are made that best promote the objectives of each scenario.

It was decided to apply both approaches. Next tables visualise the differences between the two approaches. The rows represent the assumptions about policies in the three Exploratory Scenarios and the columns the assumptions about framework conditions.

In the first approach the three scenarios are combined with alternative framework conditions, not necessarily the most favourable ones, in order to study the performance of the three scenarios under a range of alternative framework conditions. This will allow assessing the impacts of the policies assumed to be implemented in the three scenarios, everything else being fixed.

Scale	Policies	Framework conditions			
		0 Business as usual	1 Economic decline	2 Technology advance	3 Energy scarcity // climate change
	Baseline policies	00	---	---	---
A European	Promotion of global metropolitan areas (MEGAs)	A0	A1	A2	A3
B National	Promotion of large European cities (FUAs)	B0	B1	B2	B3
C Regional	Promotion of medium-sized cities (SMCities)	C0	C1	C2	C3

Figure 11-1 1st approach for Exploratory Scenarios: full matrix of framework conditions and policies

The alternative framework conditions under discussion for the first approach are:

0 *Business as usual*: The policy assumptions of the three Exploratory Scenarios are combined with no other framework conditions and policies than the Baseline Scenario.

1 *Economic decline*: Incapacity to complete in the globalisation and with emerging economies lead to real decline of the European economy.

2 *Technology advance*: New advances in productivity and transport technology result in significant reductions in production and transport costs.

3 *Energy/climate*: Rising energy costs and greenhouse gas emission taxes lead to strong increases of production and transport costs.

The first two framework conditions can also be associated with different pathways of development of the European Union:

- The business-as-usual framework conditions can also be seen as a scenario of continued though moderate further integration of EU member states and institutions.
- The economic decline framework conditions can also be seen as a scenario of failure of the European Union with growing fragmentation of EU institutions and policies.

Scale	Policies	Framework conditions			
		0 Business as usual -Piecemeal EU Integration	1 Economic decline - Fragmented EU		
	Baseline policies	00			
A European	Promotion of global metropolitan areas (MEGAs)	A0	A1		
B National	Promotion of large European cities (FUAs)	B0	B1		
C Regional	Promotion of medium-sized cities (SMCities)	C0	C1		

Figure 11-2 1st approach for Exploratory Scenarios: integrated vs fragmented EU framework conditions

In the second approach both assumptions about policies and about framework conditions are changed simultaneously to investigate the three Exploratory Scenarios under the most favourable framework conditions. This is why only the cells on the diagonal of the matrix are filled. Correspondences, of course, can be found between scenarios in this second approach and some of the scenarios defined in the full matrix of the 1st approach.

Scale	Territorial development orientations	Framework conditions			
		Business as usual	Increased global competition	Reinvented EU governance and improved regulation	Social behavioural change
	Baseline	00	---	---	---
A European	Europe of flows	---	A2	---	---
B National	Europe of cities	---	---	B0	---
C Regional	Europe of regions	---	---	---	C3

Figure 11-3 2nd approach for Exploratory Scenarios: set of scenarios with consistent framework conditions and policies

The implementation scenarios with forecast and foresight models will follow a combination of the 2 approaches above described.

On a first stage, models will apply different consistent policies to forecast 2010-2030 evolutions following the 1st approach, aiming at predicting for each scenario the *unknown* impacts of these predefined sets of policies. These policies will be defined based on the qualitative features of the different scenarios. This stage will apply a standard forecast methodology based on the definition of consistent policies from 2010 on to obtain an image of all scenarios by 2030. Scenarios under business-as-usual framework conditions (Piecemeal EU Integration) will be explored in-depth to begin with (one baseline and three explorative scenarios).

On a second stage, scenarios will be developed between 2030 and 2050 following the 2nd approach. A back-cast strategy will be applied in this second stage: having an image of the characteristics of different scenarios in 2050 based on the descriptions of scenarios in the Project Specifications (PS), it will be determined the path (and the required policies) to go from 2030 to 2050. The image of scenarios in 2030 will be already available from the application of the 1st approach. Since forecast models are pushed to their limits of knowledge when exploring scenarios very distant or very different from the present situation for which they were calibrated, foresight scenario-building tools will be applied for 2050 scenarios.

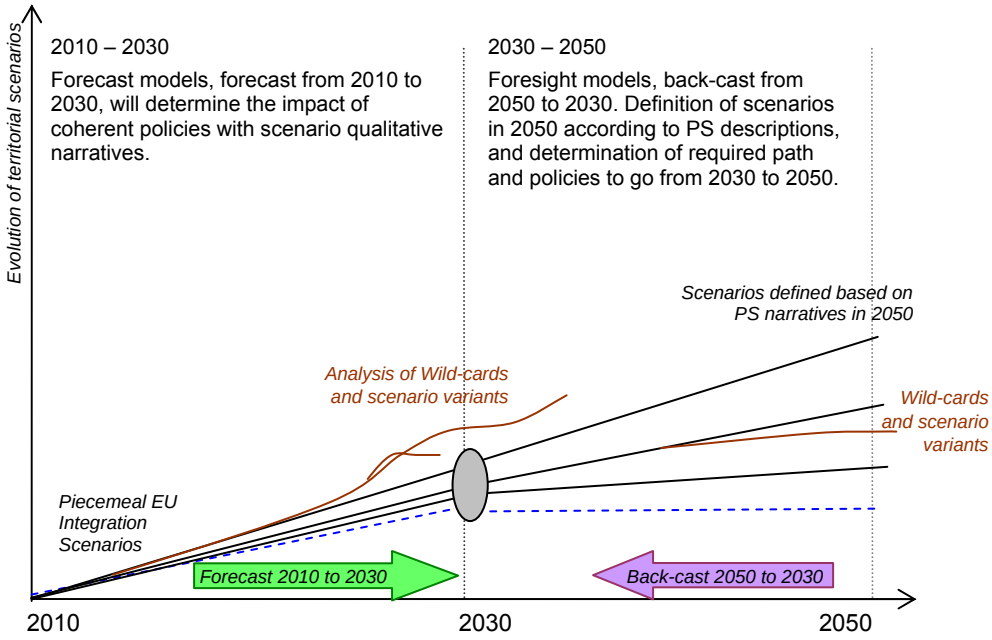


Figure 11-4 Forecast and back-cast strategies for ET2050 Explorative Scenarios

Additionally, these exercises may be complemented with full or partial analysis of scenario variants. It will be explored how much spatial scenarios in ET2050 can be affected by sudden unexpected or very extreme changes (e.g. Wild cards), as spatial patterns change in a slower pace in comparison to socioeconomic and technologic changes, and not always simultaneously. The impact of wild cards which are in the boundary of knowledge of models can be treated as a sensitivity studies, and predicted. Each modeller will define the most relevant wild cards that can be assessed based on the model available.

Scenario variants may also include scenarios resulting from the application of alternative framework conditions as proposed in the 1st approach (scenarios A1 to C3). SASI is especially

well prepared to analyse variants of main scenarios since it is a dynamic integrated model covering all sectors and able to predict the impact of comprehensive spatial development policies; other sectoral models may also carry on predictions in relation to most relevant possible changes in sectoral policies a given scenario, to be identified by each modeller as expert on its sector. The impact of wild cards and variants beyond the capacity of models will be assessed qualitatively.

11.2 Scenarios 2010 to 2030

Qualitative Orientations of Scenarios

Next tables provide the qualitative pictures of the scenarios which will be at the base for 2010-2030 modelling exercise. Modelling teams will derive policies to be implemented in their models based on the below proposed hypothesis for each of the ET2050 scenarios.

Spatial distribution of activities:

	Flows/MEGAs /Metapolis	**Cities/FUAS/ Metropolis**	**Regions/SMCities/ Ecopolis**	**Baseline Piecemeal EU Integration**
Spatial distribution of population and economic growth, (and territorial governance)	Relative accessibility and connectivity to international transport networks and agglomeration economies attract growth, following spontaneous market tendencies. World cities, mostly MEGAS grow bigger, and any place well connected to TENs. High external and internal migrations and long-distance mobility.	Larger cities , (international FUAS) attract both more people and activities because effective public policies promoting them at National scale. Internal migrations from sparsely populated areas to urban centres.	Medium-size cities and towns attract people based on their cultural and environmental quality. People then generate new activities. Change in consumer behaviour favouring proximity and self-sufficiency. Intense decentralisation at local and regional level. Limited external migrations.	Continuation of existing trends in all sectors, limited policy reforms implemented, with no relevant modification on actual spatial patterns. Relative economic decline.

Figure 11-5 Spatial distribution of activities among ET2050 Scenarios

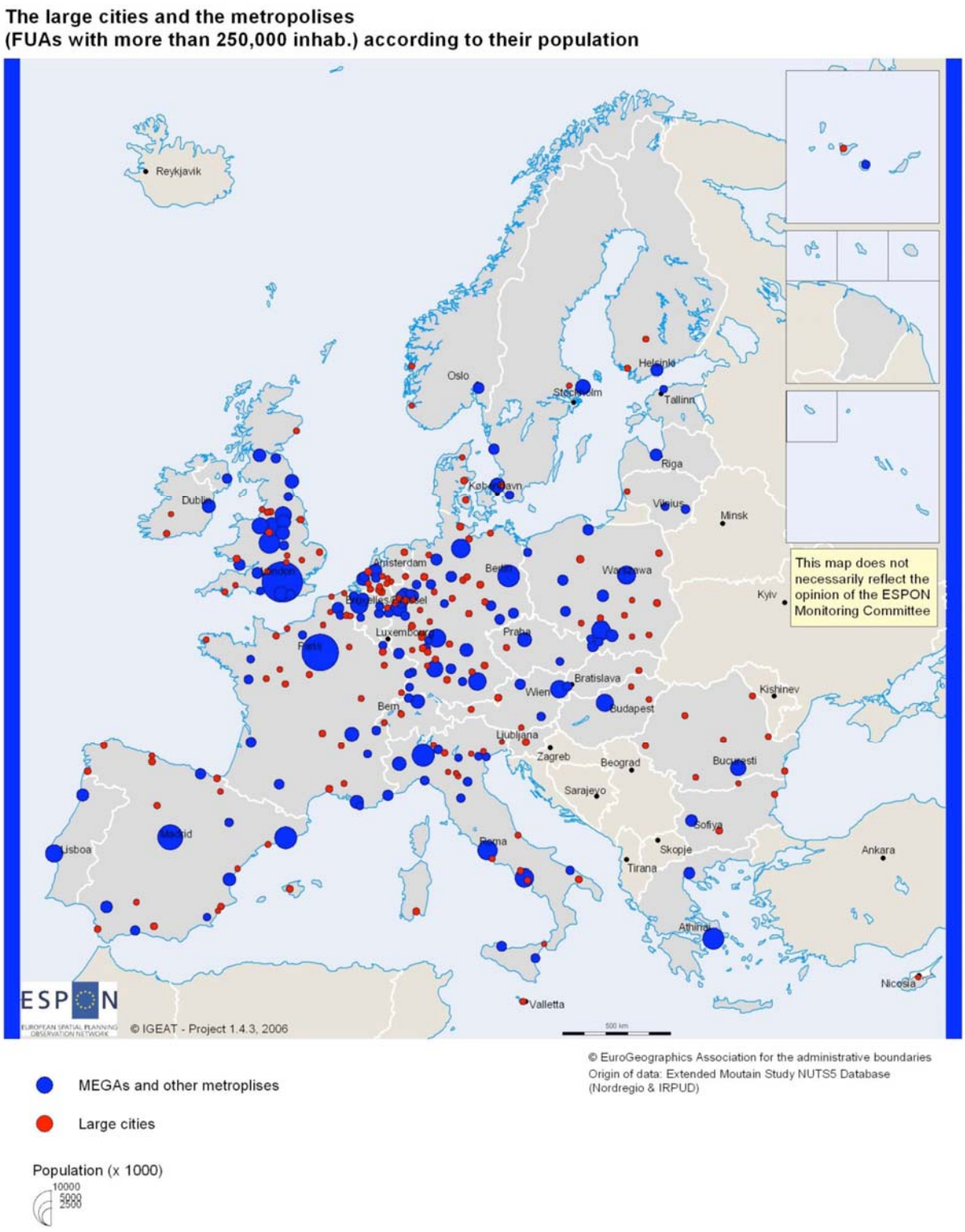


Figure 11-6 The large cities and MEGAs in Europe, according to population (ESPON 1.4.3, 2007)

Country	Global nodes	MEGA Cat 1	MEGA Cat 2	MEGA Cat 3	MEGA Cat 4	Transnational/ national FUA
FRANCE	Paris			Lille - Lyon - Marseille - Nice - Toulouse	Bordeaux - le Havre	Ajaccio - Amiens - Anger - Annecy - Avignon - Beauvais - Besancon - Brest - Caen - Chambery - Clermont-Ferrand - Dijon - Douai - Dunkerque - Grenoble - La Roche-sur-Yon - La Rochelle - Le Mans - Limoges - Lorient - Metz - Montpellier - Mulhouse - Nancy - Nantes - Nimes - Orléans - Pau - Perpignan - Poitiers - Reims - Rennes - Rouen - Saint Etienne - Strasbourg - Tarbes - Toulon - Tours - Valence - Valenciennes
UNITED KINGDOM	London		Manchester	Edinburgh - Glasgow - Birmingham - Southampton		Abderdeen - Belfast - Bournemouth - Brighton - Bristol - Cardiff - Coventry - Derby - Exeter - Guildford - Leicester - Liverpool - Luton - Norwich - Nottingham - Oxford - Portsmouth - Reading - Sheffield - Newcastle - Warwick - York - Bradfor - Huddersfield - Hull - Leeds - Stoke - Wolverhampton
AUSTRIA		Vienna				Graz - Innsbruck - Klagenfurt - Linz - Salzburg
BELGIUM		Brussels		Antwerp		Brugge - Chhaleroi - Gent - Hasselt - Kortrijk - Leuven - Liège - Namur
SWITZER-LAND		Zurich		Bern	Geneva	Basel - Lausanne
GERMANY		Berlin - Düsseldorf - Frankfurt - Hamburg - Cologne - Munich - Stuttgart		Bremen		Aachen - Augsburg - Bamberg - Bielefeld - Bochum - Bonn - Chemnitz - Dortmund - Dresden - Duisburg - Erlangen - Essen - Giessen - Göttingen - Hagen - Halle - Hannover Heidelberg - Kassel - Kiel - Koblenz - Leipzig - Mainz - Mannheim - Marburg a.d. Lahn - Münster - Nürnberg - Osnabrück - Potsdam - Regenburg - Rostock - Saabrücken - Trier - Tübingen - Würzburg
DENMARK		Copenhague		Aarhus		Aalborg - Odense
SPAIN		Barcelona, Madrid		Palma de Mallorca - Bilbao - Valencia	Sevilla	Algeciras - Alicante - Almeria - Burgos - Cadiz - Castellon - Cordoba - San Sebastian - Granada - Huelva - Ibiza - La Coruna - Las Palmas - Logrono - Malaga - Murcia - Oviedo - Pamplona - Pontevedra - Santa Cruz - Santander - Santiago - Valldolid - Vigo - Zaragoza
ITALY		Milan, Rome	Turin	Bologna - Naples	Genoa	Bari - Bergamo - Brescia - Cagliari - Catania - Firenze - La Spezia - Livorno - Padova - Palermo - Parma - Perugia - Pisa - Salerno - Trento - Trieste - Udine - Venezia - Verona
NETHER-LANDS		Amsterdam		Rotterdam		Den Haag - Den Bosch - Arnhem - Breda - Eindhoven - Enschede - Groningen - Leeuwarden - Leiden

						- Maastricht - Nijmegen - Tilburg - Utrecht - Zwolle
SWEDEN		Stockholm	Gothenburg	Malmö		Falun - Halmstad - Helsingborg - Jönköping - Kalmar - Karlstad - Linköping - Luleaa - Umeaa - Uppsala - Hernösand - Västeraas
FINLAND			Helsinki	Turku		Yväskylä - Kotka - Koupio - Lappenranta - Oulu - Pori - Tampere - Vaasa
GREECE			Athens			Iraklion - Chalkis - Chania - Larisa - Patras - Rhodos - Thessaloniki
IRELAND			Dublin		Cork	Galway - Limerick
NORWAY			Oslo	Bergen		Alesund - Kristiansand - Stavanger - Trondheim
CZECH REPUBLIC				Prague		Brno - Hradec Kralove - Ostrava - Plzen
HUNGARY				Budapest		Debrecen - Giör - Miskolc - Szeged
LUXEMBOURG				Luxembourg		Bialistok - Bielsko-Biala - Bidgoszcz - Czestochowa - Kielce - Lublin - Olsztyn - Opole - Rzeszow - Torun - Zielona Gora
POLAND				Warsaw	Gdansk-Gdynia - Katowice - Krakow - Lodz - Poznan - Szczecin - Wroclaw	Aveiro - Braga - Coimbra - Faro - Funchal
PORTUGAL				Lisbon	Porto	Banska Bystrica - Kosice - Nitra - Povazska Bytrica - Trnava - Zilina
SLOVAKIA				Bratislava		Kaunas - Klaipeda
LITHUANIA					Vilnius	Burgas - Plovdiv - Varna
BULGARIA					Sofia	Tartu
ESTONIA					Tallin	
LATVIA					Riga	
MALTA					Valetta	
ROMANIA					Bucharest	Brasov - Cluj-Napoca - Constanta - Craiova - Galati - Iasi - Oradea – Ploiesti - Timisoara
SLOVENIA					Ljubljana	Koper
CYPRUS						Nicosia - Larnaca - Limassol - Paphos

Figure 11-7 List of MEGAs and FUAs in Europe (ESPON 1.4.3, 2007)

European Policy framework:

	Flows/MEGAs /Metapolis	Cities/FUAS/ Metropolis	Regions/SMCities/ Ecopolis	Baseline Piecemeal EU Integration
Main Driver	Markets. Global Corporations and Technologic innovation.	Public Policies mostly at National level	Social behaviour and values linked to new generations.	Relative failure of public policies and adjustment
Territorial Governance	Private-Public Partnership at all scales	Renationalisation of policies. Member States reinforced.	Strong local and regional decentralisation, simultaneous to EU integration.	Combination of models
European policy framework	EU of multiple speeds, increasing disparities at all scales.	EU limited reform. Integrated fiscal system.	Limited Federalism. Increasing EU budget.	EU limited reform. Integrated fiscal system.
Cohesion policy	Overall budget reduced. Territorial Cross-border Cooperation reinforced, as well as with Neighbouring Countries and rest of the world.	Budget maintained Thematic objectives redefined favouring urban-oriented policies and innovative urban actions..	Budget significantly increased. Integrated territorial investments and community-led local development reinforced.	Budged maintained. Limited and gradual reforms favouring efficiency with no major political change
Agriculture	Budget reduced and focused on subsidies to increase the sector productivity	Limited reform of the Agricultural policy. Higher emphasis on landscape management.	Full integration of agricultural and environmental in their territorial dimension	Limited reform of the Agricultural policy.
Energy	No energy savings. Renewal and nuclear sources, as well as oil. Intelligent Grid.	Energy savings because agglomeration and industrial transformation. Limited renewal energies.	Important energy savings. High share of renewals. Full decarbonisation of the economy.	Continuation of existing trends
Transport	TENs Core Network developed if profitable positive, major ports and freight dedicated infrastructure, and airports. Transport networks worldwide connected. Induced long-distance and international mobility.	TENs Core and Comprehensive Network partially developed. Public transport investments reduced, not always profitable.	Local and regional transport networks. Reduced mobility.	Continuation of existing trends.
Environmental management	Environmental protection focused on keeping standards of environmental quality for air and water. Technologic optimism.	Protection and management of rural areas as open spaces for recreation and environmental safety. Strong mitigation. Strict public regulations.	Limits in both use intensity and quality standards and land occupation. Full adaptation to Global Warming. Significant behavioural changes.	Continuation of existing trends.

Figure 11-8 European policy framework in ET2050 Scenarios

Scenarios facing Critical Bifurcations:

	Flows/MEGAs /Metapolis	**Cities/FUAS/ Metropolis**	**Regions/SMCities/ Ecopolis**	**Baseline Piecemeal EU Integration**
Will European national economies be able to adjust to structural transformations?	Reduction of Public Administrations. Further opening and deregulation of markets. Private-Public Partnerships. Public support to R&D	Policy reforms based on reinforcing social welfare. Public investments that allow for economic recovery	Policy reforms towards post growth societies limiting both large corporations and central public administrations.	No, partially
Will migrations continue to be necessary in Europe to shirking labour market?	Strong migrations bound to most performing economic corridors and MEGAs	Moderate migrations mostly bound to large urban centres from inner regions and other EU countries	Limited external migration. Residential mobility from large cities to medium and small towns	Migrations growing slowly mostly bound to largest metropolitan regions
Will European countries be able to sustain their welfare system?	Welfare system fully privatised	Reinforced to allow its maintenance and sustained through increased taxation	Reformed to facilitate Third Sector (ONG's, social communities…) interventions.	Welfare system reduced and further privatised.
Will Europe (and its single countries) be able to find ways to finance its public debt?	Financial debt fully repaid by 2030. Surplus	Financial debt reduced, but not fully repaid by 2030	Financial debt repaid in 2050	Financial debt remains high and public administrations are substantially reduced
Will Europe be able to compete with emerging countries in high-value sectors?	Increased overall competitiveness (manufacturing, biotech, medicine)	Competitive limited to sectors like transport, design, nutrition, green energies	Limited competitiveness to sectors like tourism and welfare services	European technological advantages reduced overtime
Will Europe be decarbonised and decentralized energetically, reducing GHG emissions?	Increased efficiency of fossil fuels, some RES, emergence of CCS. Targets partially met.	High development of centralised RES and nuclear. Targets partially met.	Decentralised RES. Lower energy consumption. Targets met.	Fossil fuels remain important. Emissions reduced but targets are not met.
Will Europe will be able to tap the untapped potential of its regional diversity richness?	Continuous de-territorialisation of the economy.	Yes at National level, while regions in each country will play a secondary role.	Local differences emphasised as a major European asset.	Partially.
Will spatial development and settlement structures be more polarised?	Development focussed on global cities (MEGAs), and on corridors linking them	Development mostly focussed on large and medium cities (FUAs)	Development focussed on medium and small cities with high quality of life	Increased polarisation
Will be Europe politically more integrated?	Europe of multiple speeds. Increased cross border integration motivated by economic interests. Increased relations with neighbouring space.	Continuation of existing trends..	Limited Federalism. No new EU Members.	No significant progress in EU political integration. Limited cross-border relationships. Croatia enters EU.
Will decision and management processes of EU key policies be more decentralised?	Corporate and business dominated top-down governance	Increased role of Nations (mixed top-down and bottom-up approaches)	Strengthened principle of subsidiarity. Bottom-up governance enforced.	Top-down governance with limited decentralisation

Figure 11-9 ET2050 Scenarios facing Critical Bifurcations

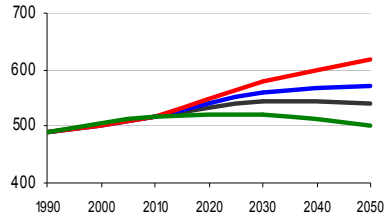
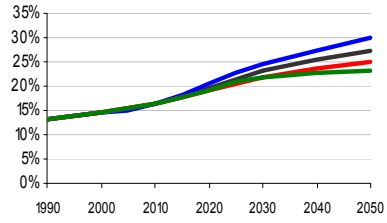
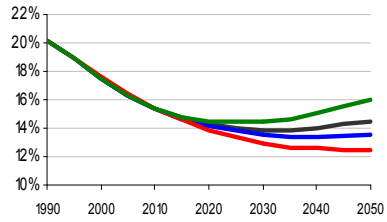
11.3 **Scenarios 2030 to 2050**

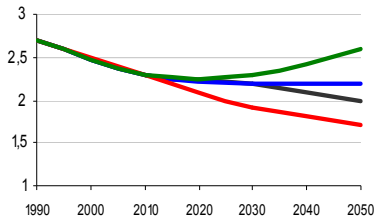
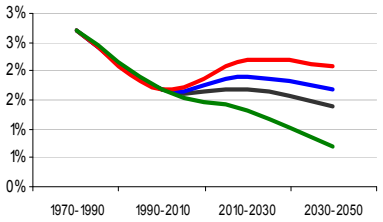
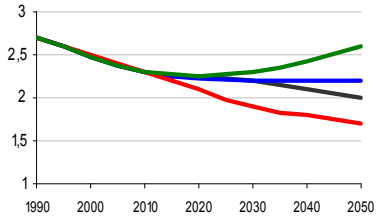
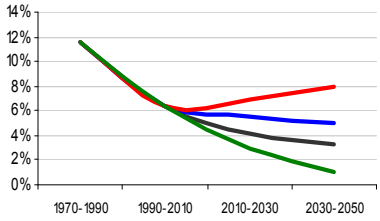
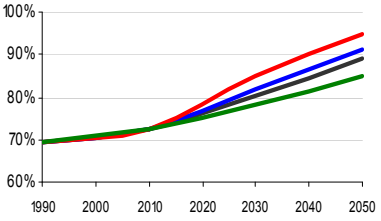
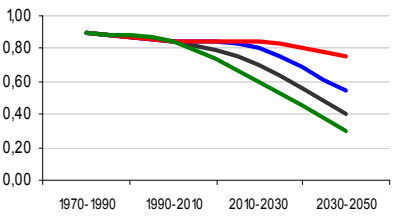
Scenarios will be constructed according to a back-cast approach. The image of scenarios in 2050 will be built from the PS description of scenarios, and back-cast methodology will be used to link the 2050 image to 2030 results obtained with Forecast models. This will be the opportunity to explore further societal changes in the long-term.

At aggregated European level, using foresight scenario-building tools (TV and PASH) reference preliminary values for 2030 and 2050 at aggregated European scale have been computed for the purpose to better frame and guide the modelling process.

For 2030, these values may be used by modellers as reference to better apprehend the nature of different scenarios, and assiste them in the definition of modelling parameters for policies and exogenous variables, so that outputs are, if feasible, *in line* with these aggregated expectations.

For 2050, new runs of foresight models will be used to refine these preliminary figures, in order to trace coherent trajectories between 2030 and 2050, considering that 2050 results will be determined a priori to match the descriptions of scenarios in the Project Specifications as much as possible, and that 2030 results will have been obtained from the forecast exercise above mentioned.

				BASELINE Piecemeal EU integration	FLOWS // MEGAs // Metapolis	CITIES // FUAs // Metropolis	REGIONS // SMCITIES // Ecopolis	
Demography	**European population** (Million inh)		1990	488	*488*	*488*	*488*	
			2010	518	*518*	*518*	*518*	
			2030	543	580	560	520	
			2050	540	620	570	500	
Society	**Age structure**	% > 65%	1990	*13,1%*	13,1%	*13,1%*	*13,1%*	
			2010	*16,2%*	16,2%	*16,2%*	*16,2%*	
			2030	22,0%	23,0%	24,5%	22,0%	
			2050	25,0%	27,4%	30,0%	23,0%	
		% < 15%	1990	*20,1%*	20,1%	*20,1%*	*20,1%*	
			2010	*15,4%*	15,4%	*15,4%*	*15,4%*	
			2030	13,0%	13,9%	13,5%	14,5%	
			2050	12,5%	14,4%	13,5%	16,0%	

			BASELINE Piecemeal EU integration	FLOWS // MEGAs // Metapolis	CITIES // FUAs // Metropolis	REGIONS // SMCITIES // Ecopolis	
	Household size (people per household)	1990	2,7	*2,7*	*2,7*	*2,7*	
		2010	2,3	*2,3*	*2,3*	*2,3*	
		2030	2,2	1,9	2,2	2,3	
		2050	2,0	1,7	2,2	2,6	
Economy	**GDP** (annual growth rate)	1970-1990	2,7%	*2,7%*	*2,7%*	*2,7%*	
		1990-2010	1,7%	*1,7%*	*1,7%*	*1,7%*	
		2010-2030	1,7%	2,2%	1,9%	1,3%	
		2030-2050	1,4%	2,1%	1,7%	0,7%	
	GDP per capita (euros / inh)	1990	19,0	*19,0*	*19,0*	*19,0*	
		2010	25,1	*25,1*	*25,1*	*25,1*	
		2030	33,5	34,6	33,8	32,4	
		2050	44,5	49,1	46,6	38,7	
Globalisation	**EU Trade** (yearly growth rate)	1970-1990	11,60%	*11,6%*	*11,6%*	*11,6%*	
		1990-2010	6,4%	*6,4%*	*6,4%*	*6,4%*	
		2010-2030	4,2%	7,0%	5,5%	3,0%	
		2030-2050	3,3%	8,0%	5,0%	1,0%	
Land-uses	**Urban population** (% urban)	1990	69,2%	*69,2%*	*69,2%*	*69,2%*	
		2010	72,7%	*72,7%*	*72,7%*	*72,7%*	
		2030	80,2%	85,0%	82,0%	78,0%	
		2050	89,0%	95,0%	91,0%	85,0%	
Transport	**GDP / pax elasticity** (€/pax·km)	1970-1990	0,90	*0,90*	*0,90*	*0,90*	
		1990-2010	0,85	*0,85*	*0,85*	*0,85*	
		2010-2030	0,70	0,80	0,85	0,60	
		2030-2050	0,40	0,55	0,75	0,30	

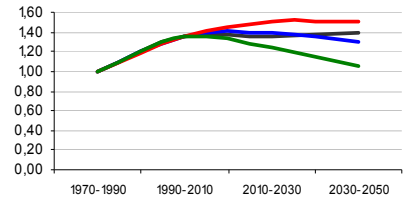
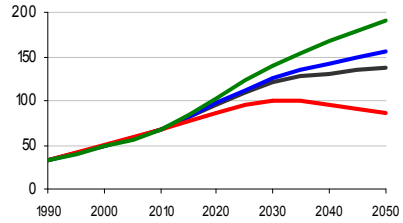
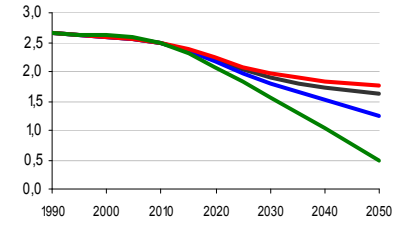
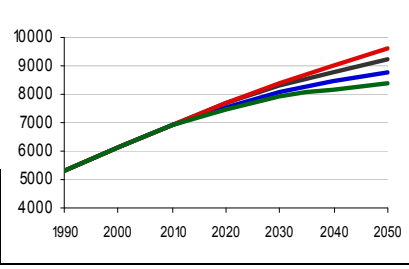
			BASELINE Piecemeal EU integration	FLOWS // MEGAs // Metapolis	CITIES // FUAs // Metropolis	REGIONS // SMCITIES // Ecopolis	
	GDP / freight elasticity (€/ton·km)	1970-1990	1,00	*1,00*	*1,00*	*1,00*	
		1990-2010	1,35	*1,35*	*1,35*	*1,35*	
		2010-2030	1,35	1,40	1,50	1,25	
		2030-2050	1,40	1,30	1,50	1,05	
Energy	Oil price **(€2010 / barrel)**	1990	33	*33*	*33*	*33*	
		2010	67	*67*	*67*	*67*	
		2030	121	100	125	140	
		2050	138	85	155	190	
	Carbon intensity **(TCO_2 / MTOE)**	1990	2,67	*2,67*	*2,67*	*2,67*	
		2010	2,49	*2,49*	*2,49*	*2,49*	
		2030	1,88	1,95	1,80	1,55	
		2050	1,62	1,75	1,25	0,50	

Figure 11-10 Quantitative expectations for ET2050 scenarios in 2050 (preliminary)

According to the 2nd approach to explorative scenarios, each scenario will be in line with a set of coherent framework conditions (or an ideal World) in which the European scenario previously described seems more likely and coherent.

			BASELINE Piecemeal EU integration	FLOWS // MEGAs // Metapolis	CITIES // FUAs // Metropolis	REGIONS // SM CITIES // Ecopolis	
Demography	**World population** (Million inh)	1990	5308	*5308*	*5308*	*5308*	
		2010	6910	*6910*	*6910*	*6910*	
		2030	8320	8390	8070	7950	
		2050	9215	9580	8770	8360	

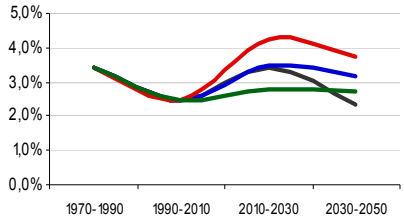
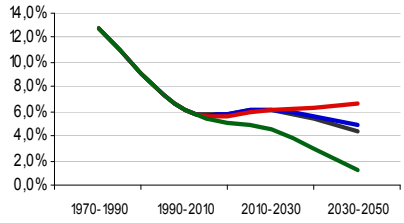
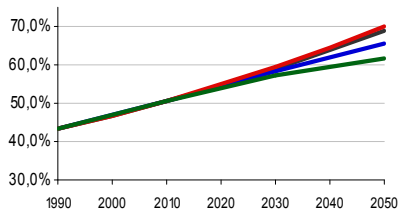
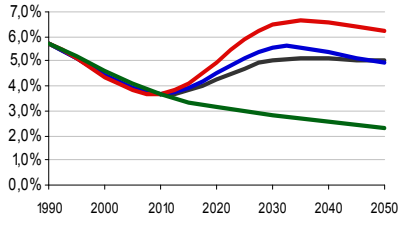
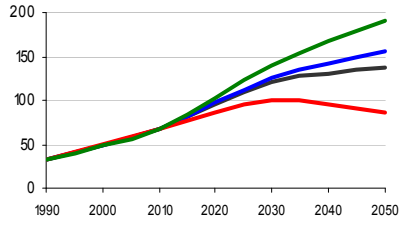
			BASELINE // Piecemeal EU integration	FLOWS // MEGAs Metapolis	CITIES // FUAs // Metropolis	REGIONS // SM CITIES // Ecopolis	
Economy	**GDP** (annual growth rate)	1970-1990	3,4%	*3,4%*	*3,4%*	*3,4%*	
		1990-2010	2,5%	*2,5%*	*2,5%*	*2,5%*	
		2010-2030	3,4%	4,2%	3,5%	2,8%	
		2030-2050	2,4%	3,7%	3,2%	2,7%	
Globalisation	**EU Trade** (yearly growth rate)	1970-1990	12,7%	*12,7%*	*12,7%*	*12,7%*	
		1990-2010	6,2%	*6,2%*	*6,2%*	*6,2%*	
		2010-2030	6,1%	6,1%	6,1%	4,5%	
		2030-2050	4,4%	6,6%	4,9%	1,2%	
Land-uses	**Urban population** (% urban)	1990	43,6%	*43,6%*	*43,6%*	*43,6%*	
		2010	50,5%	*50,5%*	*50,5%*	*50,5%*	
		2030	59,0%	59,7%	58,5%	57,5%	
		2050	68,7%	70,2%	65,6%	61,9%	
Transport	**Global air transport** (annual growth rate)	1990	5,7%	*5,7%*	*5,7%*	*5,7%*	
		2010	3,7%	*3,7%*	*3,7%*	*3,7%*	
		2030	5,0%	6,5%	5,6%	2,8%	
		2050	5,0%	6,2%	4,9%	2,3%	
Energy	**Oil price** (€2010 / barrel)	1990	33	*33*	*33*	*33*	
		2010	67	*67*	*67*	*67*	
		2030	121	100	125	140	
		2050	138	85	155	190	

Figure 11-11 Quantitative expectations for framework conditions in 2050 scenarios (preliminary)

11.4 **Overall phased and territorially differentiated evolutions 2010-2050**

The evolution of exploratory scenarios can be further specified by giving them a time dimension related to different macro-zones .

Europe of Flows / Promotion of MEGAs / Metapolis

Area of Europe	2010-2020	2020-2030	2030-2040	2040-2050
North	Promotion of global cities (MEGAs)			
Centre				
South				
East				

Figure 11-12 Phased and territorially differentiated evolutions for FLOWS scenario

Europe of Cities / Promotion of large European cities / Metropolis

Area of Europe	2010-2020	2020-2030	2030-2040	2040-2050
North	Promotion of large cities (FUAs)	Promotion of large cities (FUAs)		
Centre				
South	Promotion of global cities (MEGAs)			
East				

Figure 11-13 Phased and territorially differentiated evolutions for CITIES scenario

Europe of Regions / Promotion of medium-sized cities / Regiopolis

Area of Europe	2010-2020	2020-2030	2030-2040	2040-2050
North	Promotion of small and medium cities	Promotion of small and medium cities	Promotion of small and medium cities	Promotion of small and medium cities
Centre	Promotion of large cities (FUAs)			
South		Promotion of large cities (FUAs)		
East			Promotion of large cities (FUAs)	

Figure 11-14 Phased and territorially differentiated evolutions for REGIONS scenario

11.5 Expectations on the Territorial Impact Assessment of Exploratory Scenarios

The most likely ranking of the pure spatial scenarios with respect to the major European goals competitiveness, cohesion and sustainability could be:

Scenario	Spatial Development Policy orientation	Expected Ranking with respect to major goals		
		Competitiveness (Smart Growth)	Cohesion (Inclusive Growth)	Sustainability (Sustainable Growth)
Flows MEGAs Metapolis	Promotion of efficient transport and communication networks and competitive nodes and cross border corridors at European scale, as well as links to NC.	2on	4th	3th
Cities FUAs Metropolis	Promotion of socially inclusive large capital cities	3th	2on	4th
Regions SM Cities Ecopolis	Promotion of endogenous potentials in small and medium size towns in self-sufficient regions	4th	3rd	2nd
VISION	Virtuous Balance among three policy orientations. Open Endogenous Development. Networks of medium size and large cities.	1st	1st	1st

Figure 11-15 Expectations on TIA scoring for ET2050 scenarios

In relation to TA2020 priorities:

VISION	Flows // MEGAs // Metapolis	Cities // FUAs // Metropolis	Regions // SM Cities // Ecopolis
Polycentric and balanced territorial development	Low	Very High	High
Integrated development in cities, rural and urban regions	Very Low	Low	Very High
Territorial integration in cross-border transnational functional regions	High	Low	Low
Global competitiveness of the regions based on strong economies	Very High	High	Low
Improving territorial connectivity for individuals, communities and enterprises	Very High	Very High	Low
Managing and connecting ecological landscape and cultural values of regions	Very Low	Very Low	Very High

Figure 11-16 Expectations on TA2020 priorities' scoring for ET2050 scenarios

12. SECOND ANNEX TO INTERIM REPORT (OCTOBER 2012):: Quantitative Forecast Models

12.1 MULTIPOLES model

Request

"The project partner responsible for the Multipoles model is asked to address the availability of estimates of international migration since 2008 for the EFTA countries in an early stage with the concerned countries directly."

Response

The MULTIPOLES model requires the data or estimates on international migration (by sex and 5-year age group) between pairs of countries. For a given pair of countries such data can be potentially reported both by the origin country and the destination country (within the statistics on emigration by country of destination and statistics on immigration by country of origin, respectively). There is a known problem of the lack of comparability of data on international migration, which means that the numbers reported by the origin and destination countries differ, sometimes very significantly. The differences are due to many factors: different definitions, sources, coverage and/or reliability.

To give reliable results, the MULTIPOLES model must be based on a set of consistent numbers. In a recent ESPON project, DEMIFER (Demographic and migratory flows affecting European regions and cities), in which the MULTIPOLES model was also used, a consistent set of data on international migration was taken from MIMOSA, a 3-years project funded by Eurostat, devoted solely to the estimation of international migration. The data covered the 2002-2007 period.

We have checked the availability of data since 2008, in particular as far as the EFTA countries are concerned. Data on total immigration are available for 2008-2010 for all four EFTA countries. Data on total emigration are available for Iceland, Norway and Switzerland for 2008-2010 and for 2010 for Liechtenstein. However, comparability of statistics is still a problem, despite the 2007 EU Regulation on Community statistics on migration and international protection. To give an example, Norway, a country with generally very good statistics (probably the best among the four EFTA countries) reported that 2985 persons emigrated to Sweden in 2009, while Sweden reported 5097 persons that immigrated from Norway, so 71% more. As a consequence, although Norway does publish data on international migration by country of previous and next residence and the most recent data are for 2010, we cannot use these data directly. A similar problem refers to Iceland. The situation is even worse for Switzerland, which has data on immigration and emigration by citizenship but not by country of previous/next residence.

12.2 MASST model

Request

"The SPQR description indicates that the national and regional model will be updated up to the economic crisis. The team is asked to include as much data as possible covering the economic crisis."

Response

<u>Data in the new version of the MASST model</u>

In order to deal with the crisis, POLIMI has re-configured and re-estimated the MASST model, which will be used in a new version (MASST3) developed for this project, after the two preceding

ones: MASST (Capello, 2007; Capello et al., 2008; Capello and Fratesi, 2009 and 2010) and MASST2 (Capello et al., 2011; Capello and Fratesi, 2012).

The data used are the last available in the statistics and cover as much as possible of the crisis, which begun in 2007 but in many cases deployed its statistical effects from 2008 onwards.

In particular, the national database covers the years until 2011, i.e. with at least 4 years of economic crisis.

The regional database, due to the long delay by Eurostat in providing regional data, covers NUTS2 data up to 2009, still the last available year for regional GDP data. Those data are however enough to cover the beginning of the crisis.

Modelling the crisis in the new MASST model.

The previous versions of MASST model did not explicitly take into account the possibility for different economic regimes in periods of crisis in the estimations, since there had not been a comparable big crisis since the 1930s.

The new version of the MASST model, which will be used for ET2050, explicitly takes into account the crisis already in the estimations, both at national and at regional level.

At national level, the estimation in panel allows to detect the different coefficients for estimations in the years of economic crisis. Moreover, the presence of long-run relationships is explicitly assumed and estimated through equations including error correction mechanisms. Finally, the budget constraints of the public sectors are modelled.

At regional level, the new version of the MASST model is also estimated in panel, which allows to also have at this level different coefficients for the relationships in ordinary periods and in periods of crisis. This is especially relevant for the employment and unemployment equations. The latter, was not present in the previous versions of MASST and will allow to produce also unemployment rates as output.

In simulation, the crisis will be considered in a very detailed form, since the simulation algorithm uses, for each year, the coefficients for periods of crisis or for ordinary periods. This will allow the modellers to decide, in the time-span of simulation, which years are affected by the crisis and which years are not, making it possible to formulate assumptions on the exit from the present crisis and also on if and when a new crisis will hit the European economy.

4. References

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12.3 **Metronamica model**

Requests

i) “At the moment this model only covers the EU27 countries. The relevant Project Partner is informed that the Corine Land Cover, which has been used as data source, covers, since at least August 2011, also the EFTA countries and the Western Balkans and Turkey.”

ii) “The TPG is asked to also consider the use of the MOLAND model as this model is capable to model ‘land-take’. And limiting land-take and soil sealing is mentioned in the Roadmap to a Resource Efficient Europe (COM(2011) 571) as one of EU's actions to achieve a resource-efficient Europe“

iii) “The TPG is asked to look into the EU-LUPA project and to consider using the methodologies developed and/or results produced”.

Responses

i) To be able to include additional countries in the model, we would need to have land use maps for at least two years for these countries. In some cases we have made exceptions to this, if we felt that we could use parameters from countries with a similar behaviour, but we currently haven't modelled any countries that resemble the Western Balkans or Turkey. Due to its complexity and resource consuming intensity, the recalibration of the model is beyond the scope of ET2050.

ii) The Metronamica framework is the basis of the MOLAND model. All functionality of the MOLAND model is included in the Metronamica model. Normally the MOLAND model is updated every year or so to encompass the latest developments of Metronamica.

iii) The draft final report of the EU-LUPA project has been considered and it's analysis and findings will be taken into account whenever relevant for the present situation, the baseline and the scenarios that will be developed and run with Metronamica.

12.4 **SASI Model**

Request

In Figure 4-5 it is indicated that the SASI model will deliver data for indicators on cohesion and polycentricity. However, the indicators themselves are not further detailed. The team is asked to specify these indicators and also consider the results of the INTERCO project on indicators for territorial cohesion.

Response

For each year of the simulation the SASI model calculates cohesion and polycentricity indictors on the basis of NUTS-3 regions.

<u>Cohesion indicators</u>

Cohesion indicators are macro indicators combining the indicators of individual regions into one measure of territorial cohesion. Changes in the cohesion indicators predicted by the model for future transport policies reveal whether these policies are likely to reduce or increase existing disparities between the regions.

The following cohesion indicators are calculated;

- Coefficient of variation
- Gini coefficient

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