

# TPM

## Territorial Performance Monitoring

### Annexes

Quantitative Analysis  
Catalonia

Targeted Analysis 2013/02/13

Interim Report | Version 31/August/2011



This report presents the interim results of a Targeted Analysis 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.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

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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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# 1. Methodology

In this section on quantitative benchmarking, the regions are examined under the key indicators listed above in a European, national and neighbourhood perspective.

Benchmarking an entire region as a single unit in comparison to other groupings of European countries requires some consolidation of statistical units, instead of comparing each region at its lowest possible statistical level. Since the selected regions are predominantly composed of several NUTS 3 regions, NUTS 2 or NUTS 1 regions were chosen for this benchmarking in order to capture an overall picture of their performance. Since the regions highly differ in size, population and most relevantly in their statistical reference levels, a short introduction to each region and its statistical characteristics is given.

As first approach to quantitative benchmarking, the ESPON HyperAtlas is used as analytical tool in order to simply calculate the benchmarking values of each indicator in European, national and neighbourhood deviation. This tool also allows for a quick mapping of the collected data and thus provides a comprehensive overview over the data. However, due to characteristics of the HyperAtlas as benchmarking toolkit, which only allows indicators consisting of two datasets, a nominator and a denominator, the prototype of a second, very simple, benchmarking tool has been developed for this project: the ESPON TPM regional benchmarking tool. In addition to the same type of benchmarking as the HyperAtlas, this tool allows to calculate benchmarking values for indicators which are only available already calculated and cannot be split into two single datasets due to their nature or data unavailability can be used in this spreadsheet-based tool since they cannot be uploaded to the HyperAtlas. These two methods differ in the number of reference scales and in their resulting benchmarking values since they use different approaches. However, comparability is ensured, especially through a rough classification and illustration in a graphical way, in this case through traffic lights.

The quantitative benchmarking values were derived from setting each region's performance for one indicator in relation to the overall European / national / regional performance. Thus, the values are measured against the benchmarking values and classified into 3 categories: good, average and bad. As mentioned before, the two benchmarking tools used in this study differ in their approach; benchmarking values generated by the *HyperAtlas* vary around a reference value of 100 and were classified as followed: *benchmarking value* = > 110 = *good*, 90-110= *average*, < 90 *bad*. This approach has the advantage of reflecting the customary approach in EU comparisons. However, it has the disadvantage giving quite different results depending on the overall order of magnitude of the indicator.<sup>1</sup> The second tool, on the other hand, uses another approach:

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<sup>1</sup> Take the following example concerning unemployment: region A has an unemployment rate of 4,5%, and region B an unemployment rate of 7,5% compared to a reference value of 6%. The respective

the regional deviation to the reference value is compared to the standard deviation across all of Europe at the lowest available scale. Values thus vary around 0, with e.g. -0,5 indicating a negative deviation (less than the reference value) of half of the standard deviation and 2 indicating a positive deviation of twice the standard deviation. This makes comparisons between benchmarking results of different indicators more robust. For the classification of benchmarking results, we used the following general thresholds:  $< -0.1$  *bad*,  $< 1$  *good*. According to these categories, the three traffic lights have been chosen to represent the performance in a graphical way. However, one has to be careful when interpreting the calculated values since depending on the indicator (and depending on the political interpretation of the indicator), the direction of what is considered as "good" and "bad" might change. This is why for each indicator a short description and the proposed direction of its interpretation have been provided in the introductory part of this report. Additionally, arrows of the same three colours indicate the change in time for some indicators. The direction of the arrows might vary for each deviation, since it's a measure of relative performance compared to the evolution of the same indicator at the reference level.

As using the two mentioned methods does not provide a more detailed perspective, mapping the indicators on a regional level allows for further differentiation within the regions, according to the underlying data preciseness and shall thus be suggested as another way of monitoring.

## 2. Introduction to the region for quantitative benchmarking

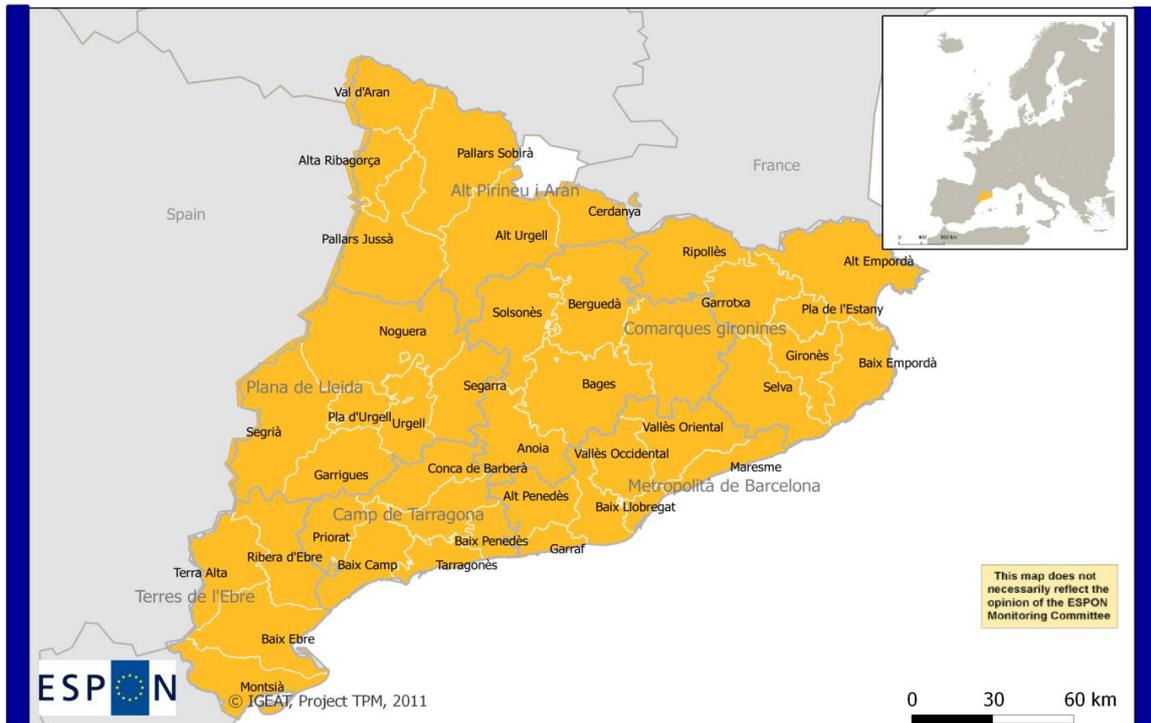
Catalonia is one of the seventeen communities in Spain and covers an area of approximately 32,000 km<sup>2</sup> and has a population of 7.5 million inhabitants, thus a population density of 234.4 inhabitants per km<sup>2</sup>. The NUTS 2 region borders on the French regions Languedoc-Roussillon and Midi-Pyrénées as well as the Spanish regions Aragon and Valencia and is itself comprised of 4 provinces. In terms of spatial planning, Catalonia is divided into 7 "àmbits funcional territorials" (aft): Alt Pirieneu I Aran, Comarque gironines, Plana de Lleida, Camp de Tarragona, Metropolità de Barcelona and Terres de l'Ebre. These afts in turn are made up of comarcas, as it can be seen on map X below.

In order to benchmark Catalonia in this chapter, the entire NUTS 2 region has been used as reference area.

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benchmarking values would thus be  $4,5/6*100=75$  and 125. If you represent the exact same fact by its complement, i.e. the employment rate, you would get the following results: (A)  $95,5/94*100=102$ , (B)  $92,5/94*100=98$ . Both regions would thus seem much closer to each other in the second case, although the indicator shows the same reality.

## Local map Catalunya



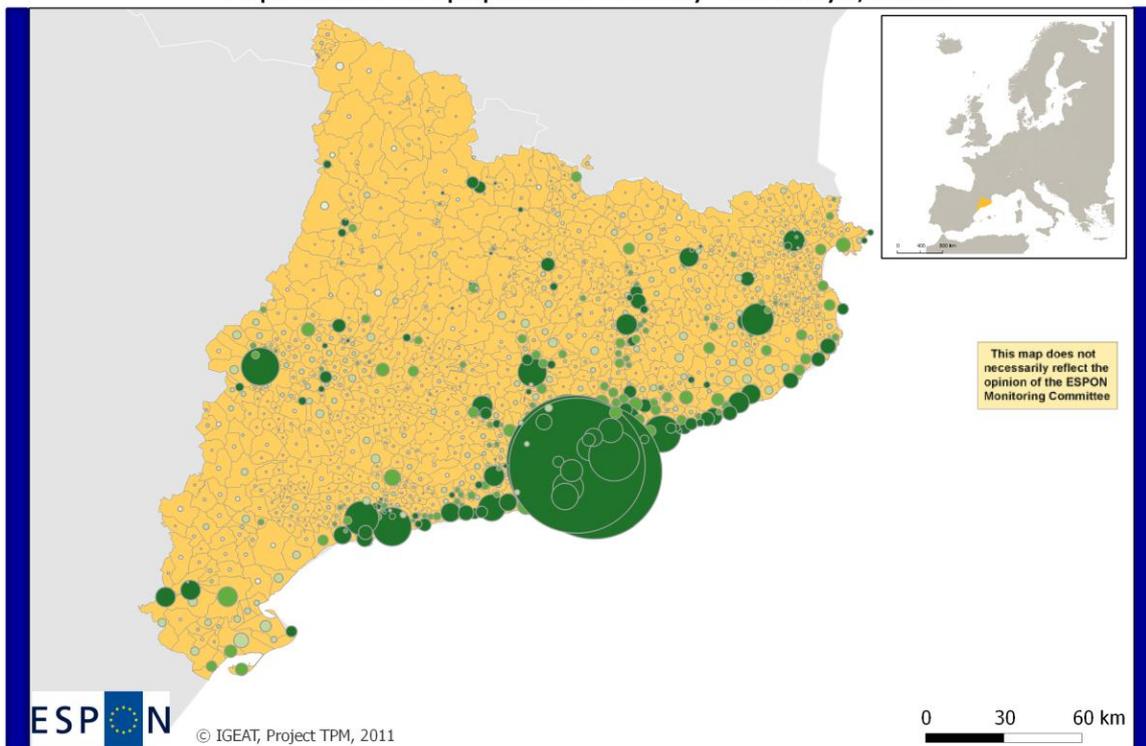
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Local level Spanish comarcas and aft  
Source: ESPON 2013 Database  
Origin of data: Institut d'Estudis Territorials, Catalunya, 2011  
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## Population and population density Catalunya, 2006



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Population density Catalunya (inh./km<sup>2</sup>)

- 1 - 25
- 25 - 142
- 142 - 590
- 590 - 789499

Population size (inh.)

- 15,000
- 90,000
- 180,000

Municipis Catalunya  
Source: Institut d'Estudis Territorials, Catalunya, 2011  
Origin of data: Institut d'Estadística de Catalunya, Idescat, 2006  
© EuroGeographics Association for administrative boundaries

### 3. Synthesis of quantitative benchmarking

#### 3.1 Globalisation

Benchmarking Catalonia for economic aspects reveals in most fields a good result. The only bad achievements persistent throughout all reference scales arise from a high share of population born outside the EU, high average salaries in the manufacturing sector and a low share of employment in the communication/information and the professional/scientific/technical sector. Besides that, benchmarking Catalonia in the European perspective points out its good position in terms of accessibility, average salaries in communication /information and professional/scientific/technical activities, touristic aspects, positive migration as well as the share of population with tertiary education. Only the number of early school leavers needs reduction so that Catalonia performs above European average in this field as well.

The benchmarking results of national comparison look similar, although tending to slightly lower relative achievements: its performance in accessibility, education, employment and salaries drops down to average while its attractiveness for migration falls even below the national average.

Looking at the numbers in relation to Catalonia's neighbouring regions underlines the above mentioned results regarding its need for improvement in terms of education and scientific activities. Catalonia's low unemployment rate achieves very good benchmarking values in all deviations.

#### 3.2 Demography

Comparing Catalonia's demographic structure to the other European regions displays an overall similarity with one divergence from the referenced averages: Catalonia's median age lies with 40.6 years highly above average on all reference scales. Life expectancy at birth exceeds the European average but lies within the common range of national and typological reference values. The old age dependency ratio in Catalonia is higher than in the surrounding regions but is attended by the performance of the rest of the European regions. In sum, the benchmarking results call for slight improvement in all fields in order to perform better than other regions, neighbours or the rest of Spain.

#### 3.3 Climate change

Catalonia has a relatively high share of NATURA 2000 regions in comparison to its neighbouring regions and performs better in the number of days with ozone concentration exceeding the tolerable  $120\mu\text{g}/\text{m}^3$ . The maximum temperature in July and mean temperature in January did

increase less since 1994 in relation to other European regions and neighbours, whereas the potential energy consumption for heating calculated through change in heating degree days only reveals average achievements. However, besides that, Catalonia's achievement in climate change issues lies below the European and national averages or is attended by them. Even in comparison to other regions classified into the same climate change type Catalonia is ranked below the performance of other comparable players. This means a high share of soil that has been sealed up, high concentration of particulate matter at surface level, high increase in the minimum temperature in January since 1994 (national comparison) as well as bad results for mean temperature changes in July. Overall, the achievements in national relation are slightly better than the ones in the entire European context. This benchmarking shows some challenges for Catalonia in terms of climate change but also reveals that the region is generally in a quite good position, compared to other regions.

### 3.4 Energy

Monitoring energy aspects in Catalonia reveals a very polarized picture: while the region has been benchmarked for very high potentials for solar energy, its position in terms of wind energy as a way of generating renewable energy is very bad in comparison to all monitored regions. Furthermore, Catalonia shows very good achievements in terms of a relatively low share of employment in energy intensive industries; but on the other hand falls into a bad position when looking at the share fuel costs for freight traffic amount to of the total GDP of the region. Even in relation to the regions classified in the type «with problems and potentials» in the ESPON energy typology benchmarking results in the same polarized picture: the same very good or very bad performance for the same indicators.

These benchmarking results bare difficulties in explaining Catalonia's overall position in Europe in terms of climate change but point at the region's potentials and challenges.

## 4. Quantitative regional benchmarking

### 4.1 Globalisation

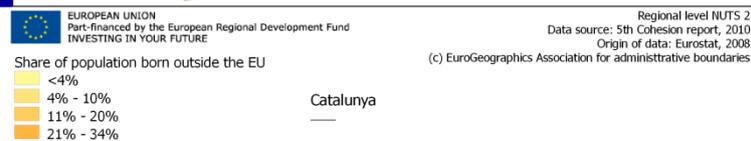
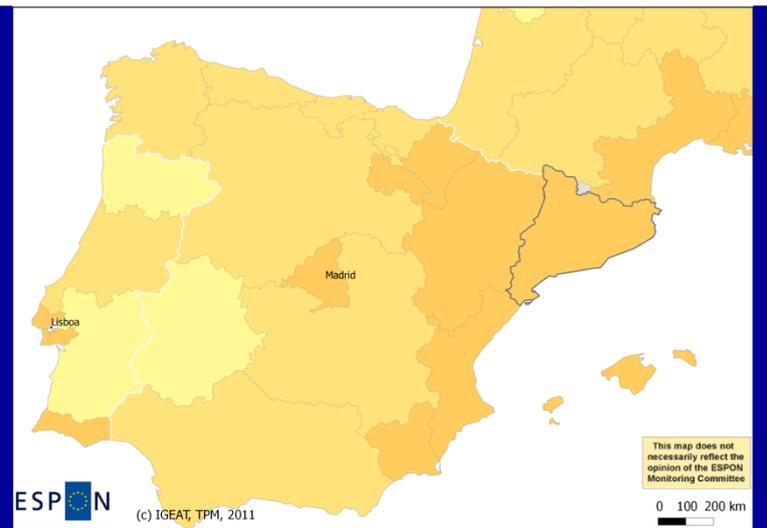
#### a) Comparative analysis globalisation

<b>Globalisation</b>							
<i>Indicator</i>	<i>value</i>		<i>EU</i>	<i>National</i>	<i>Neighbourhood</i>	<i>Typology</i>	
Population born outside the EU, 2006	18%	264		143		155	
Internet access, 2009	60%	120		118		118	
Expenditure on R&D, 2007	1.40%	88		140		71	
Relative number of patents, 2005	0.01%	59		222		108	
<i>Average salary per economic sector, 2008</i>							
Manufacturing (C)	28,807 €	124		113		121	
Information, communication (J)	32,130 €	106		103		90	
Professional, scientific, technical activities (M)	19,960 €	87		109		79	
<i>Employment per economic sector, 2008</i>							
Manufacturing (C)	14.26%	126		136		186	
Information, communication (J)	2.30%	41		115		41	

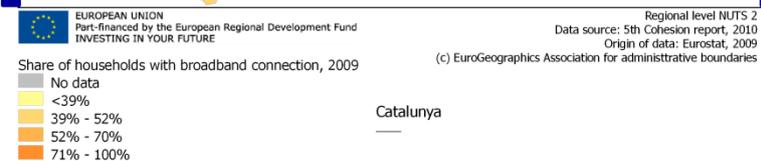
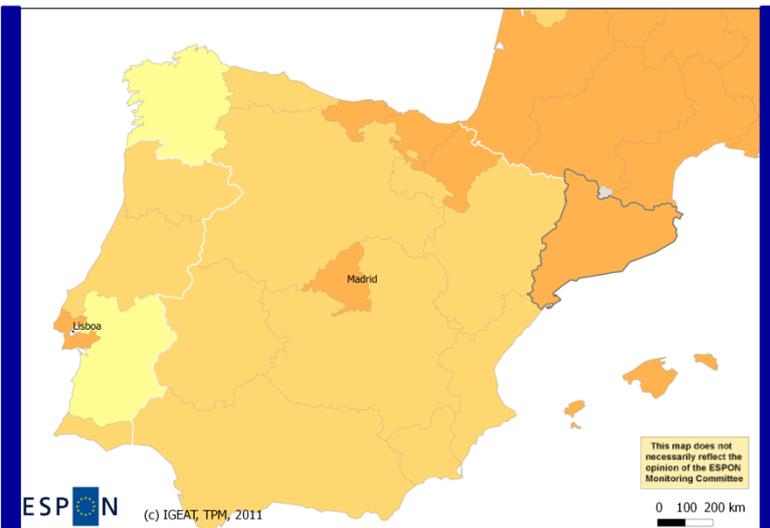
Professional, scientific, technical activities (M)	5.70%	95		120		89	
Tourism occupancy, 2009	22.80%	103		77		136	
Tourism non-residents, 2009	60.20%	150		105		177	
Daily population accessible by car, 1999	10,460	- 0.4 7		0.2 1			
Migration into NUTS 3 regions	25.72	3.9 5		2.3			
Accessibility to passenger flights	731	0.2 2		0.7 3			
Tertiary education, 2007	25.80%	128		96		105	
Early school leavers, 2007	28.60%	209		102		148	
Unemployment rate, 2009	16.20%	181		90		101	
Change in unemployment rate, 2000-2009	+103%	200		110		141	

## b) Regional maps globalisation

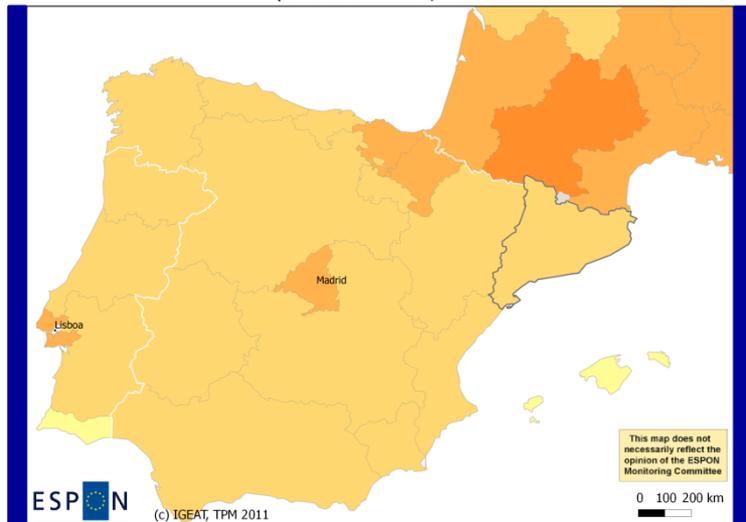
Share of population born outside the EU, 2008



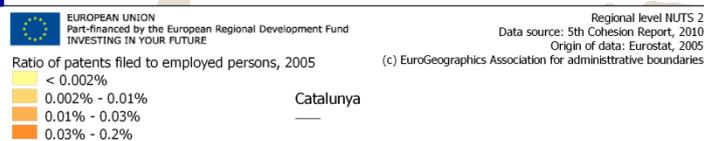
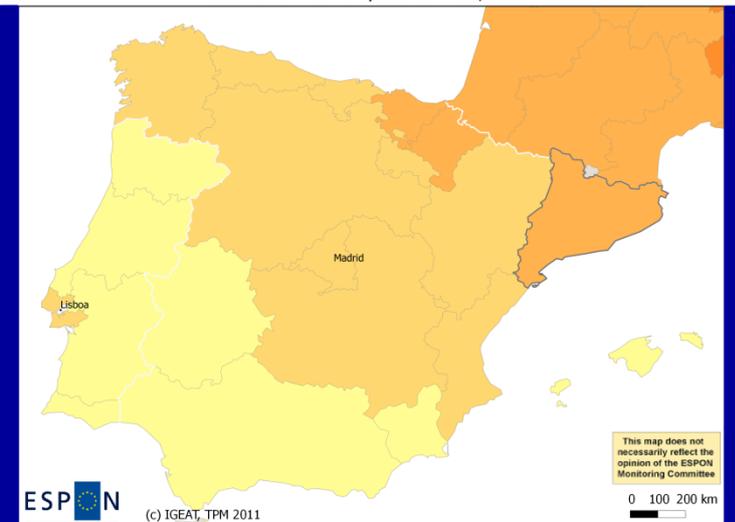
Broadband connection, 2009



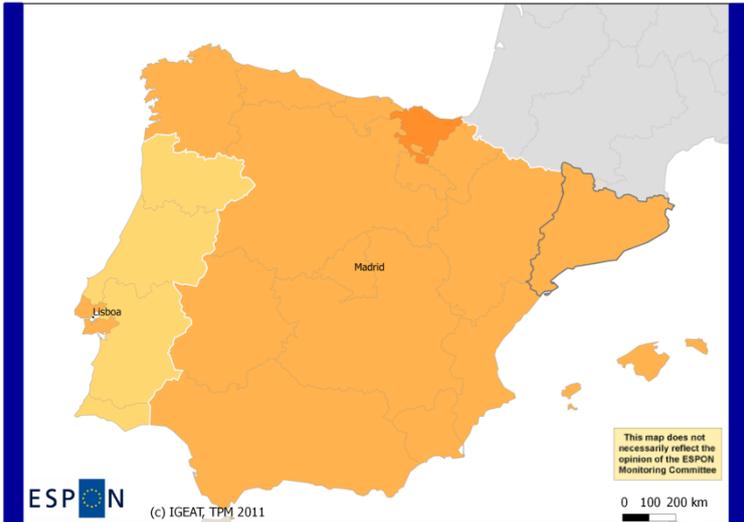
Expenditure in R&D, 2007



Relative number of patents filed, 2005



Average salary in manufacturing sector, 2008



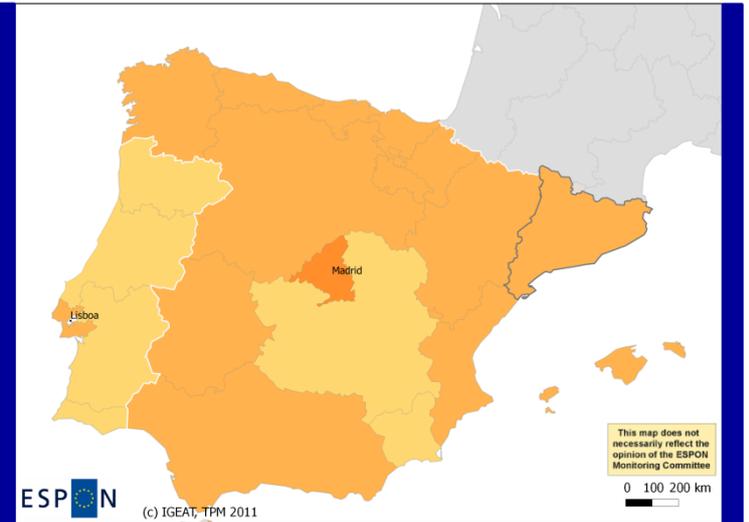
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 Regional level NUTS 2  
 Data source: Eurostat, 2011  
 Origin of data: Eurostat, 2008  
 (c) EuroGeographics Association for administrative boundaries

salary manufacturing / number of employed persons in the sector (€)

- < 1000
- 1000 - 16000
- 16000 - 30000
- >30000
- No data

Catalunya

Average salary per sector: professional, scientific and technical activities, 2008



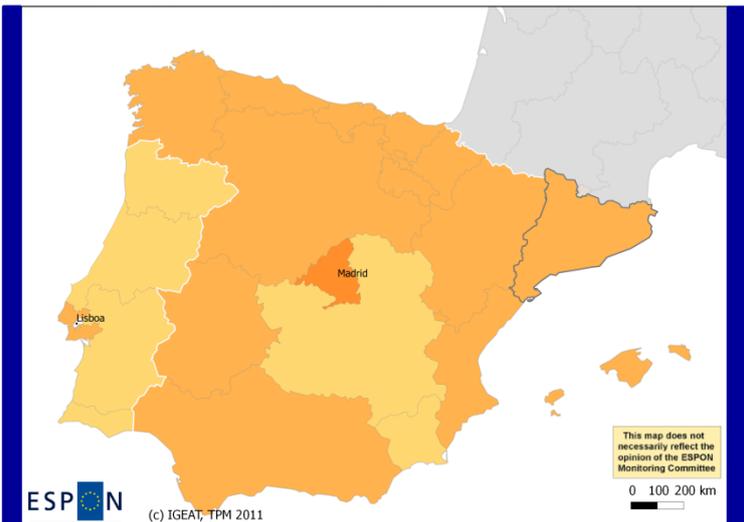
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 (c) IGEAT, TPM 2011  
 Regional level NUTS 2  
 Data source: Eurostat, 2011  
 Origin of data: Eurostat, 2008  
 (c) EuroGeographics Association for administrative boundaries

salary in this sector / number of employed persons in the sector (€)

- 1538 - 6742
- 6742 - 22738
- 22738 - 32205
- > 32205
- No data

Catalunya

Average salary per sector: professional, scientific and technical activities, 2008



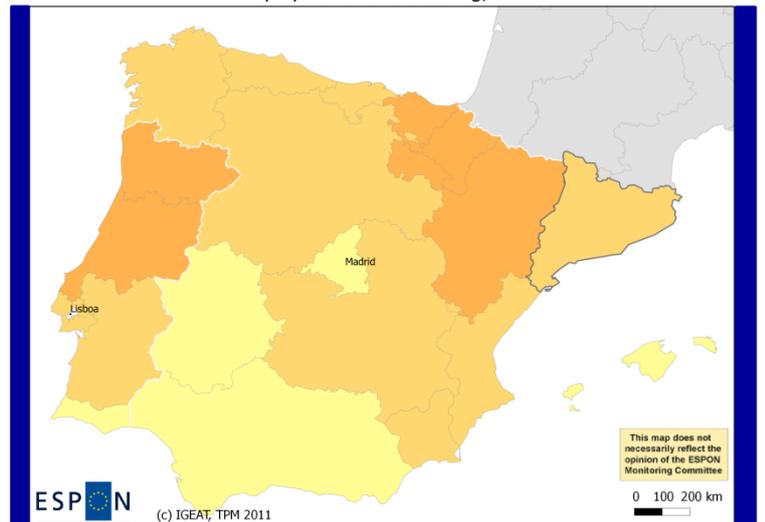
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 (c) IGEAT, TPM 2011  
 Regional level NUTS 2  
 Data source: Eurostat, 2011  
 Origin of data: Eurostat, 2008  
 (c) EuroGeographics Association for administrative boundaries

salary in this sector / number of employed persons in the sector (€)

- 1538 - 6742
- 6742 - 22738
- 22738 - 32205
- > 32205
- No data

Catalunya

Employment manufacturing, 2008



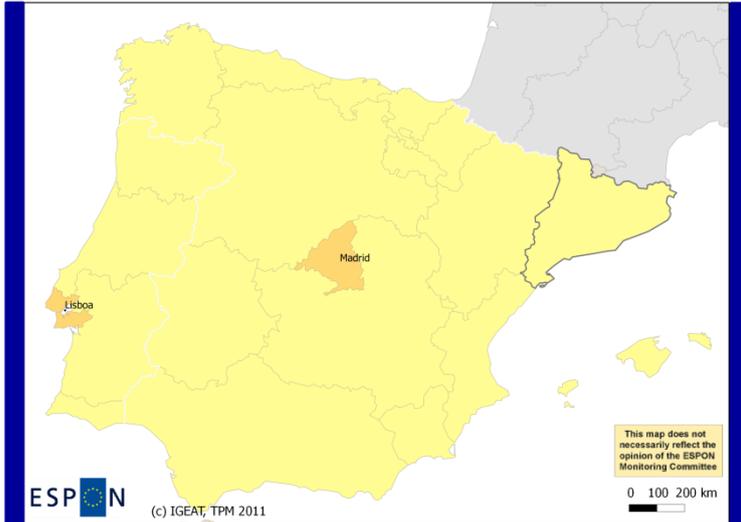
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 (c) IGEAT, TPM 2011  
 Regional level NUTS 2  
 Data source: Eurostat 2011  
 Origin of data: Eurostat, 2008  
 (c) EuroGeographics Association for administrative boundaries

Share of employment in manufacturing

- No data
- < 6%
- 6% - 12%
- 13% - 20%
- 20% - 30%

Catalunya

Employment information and communication, 2008



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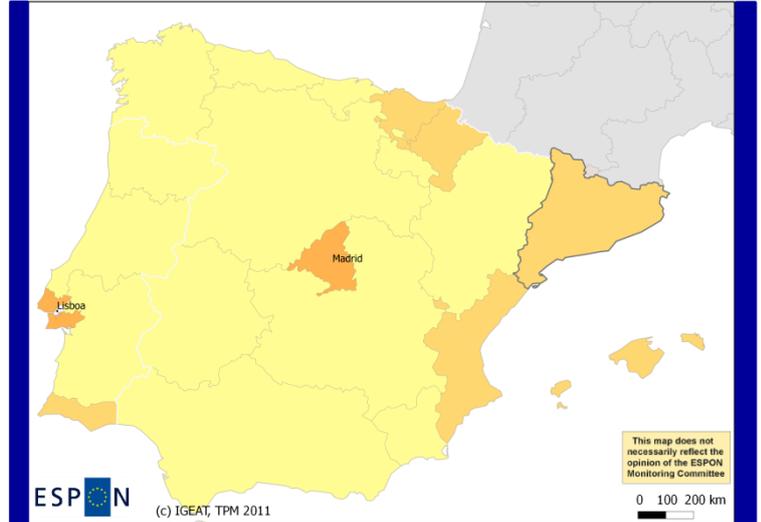
Regional level NUTS 2  
Data source: Eurostat 2011  
Origin of data: Eurostat, 2008

Share of employment in information and communication sector

- No data
- < 1.8%
- 1.8% - 5%
- 6% - 11%
- <11%

Catalunya

Employment professional, scientific, technical activities, 2008



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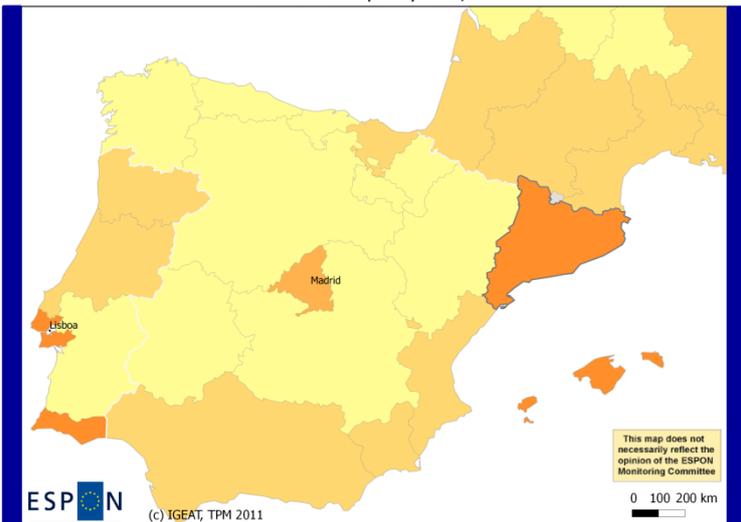
Regional level NUTS 2  
Data source: Eurostat 2011  
Origin of data: Eurostat, 2008

Share of employment in professional, scientific, technical activities

- No data
- <3%
- 3% - 5%
- 5.5% - 10%
- 10.5% - 19.5%

Catalunya

Tourism occupancy rate, 2009



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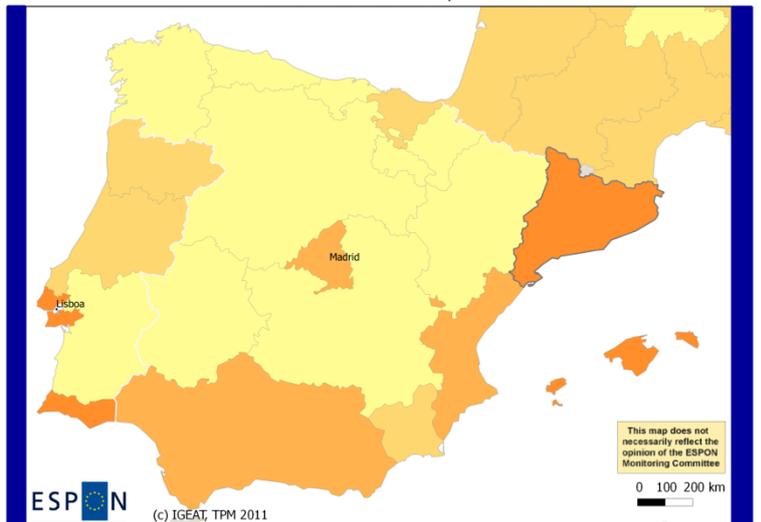
Regional level NUTS 2  
Data source: Eurostat, 2011  
Origin of data: Eurostat, 2009

Number of nights spent by tourists / yearly available bed places, 2009

- No data
- <23%
- 23% - 45%
- 46% - 60%
- 61% - 95%

Catalunya

Tourism non-residents, 2009



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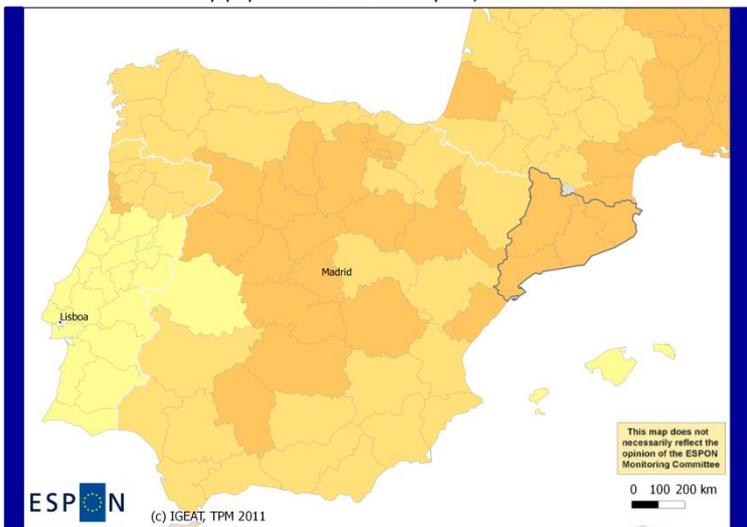
Regional level NUTS 2  
Data source: Eurostat 2011  
Origin of data: Eurostat, 2009

Share of nights spent by non-residents, 2009

- No data
- <20%
- 20% - 40%
- 41% - 60%
- 61% - 95%

Catalunya

Daily population accessible by car, 2004



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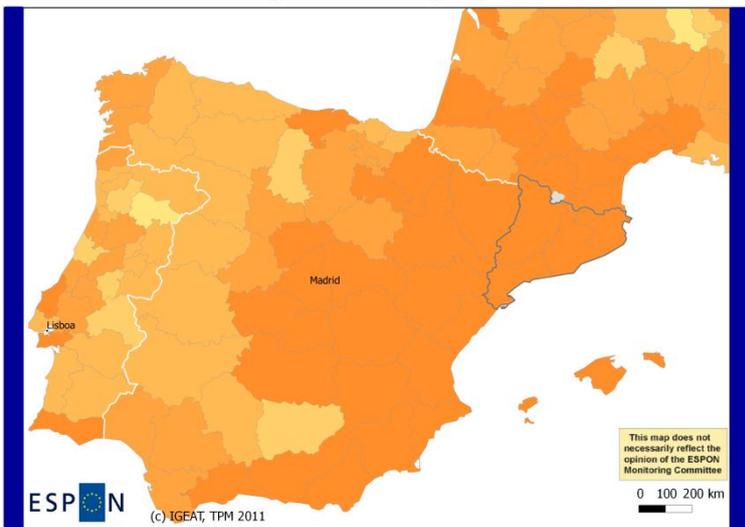
daily population accessible by car, 2004

- < 2500
- 2500 - 9000
- 9000 - 20000
- 20000 - 40000
- > 40000

Catalunya

Regional level NUTS 3  
Data source: ESPON 2013 Database  
Origin of data: ESPON Project EDORA, 2004  
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Net migration NUTS 3 regions, 2001-2007



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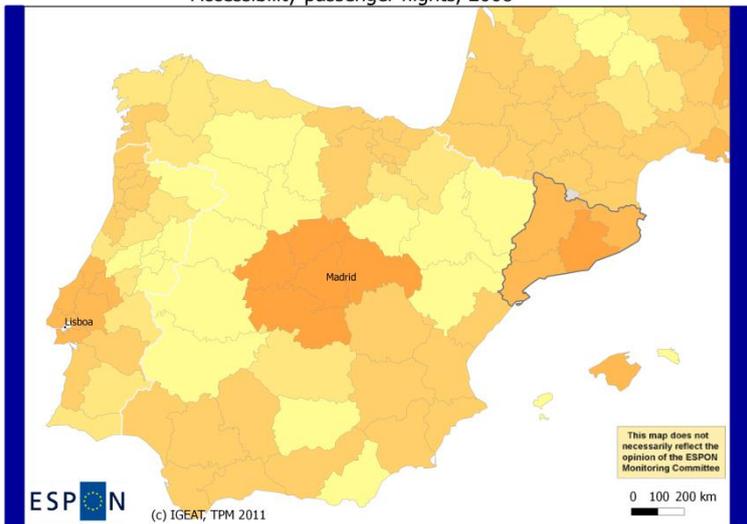
net migration per million inhabitants (annual average)

- < -1.5
- 1.5 - 0
- 0 - 1.5
- 1.5 - 5
- 5 - 10
- > 10
- No data

Catalunya

Regional level NUTS 3  
Data source: 5th Cohesion Report, 2010  
Origin of data: Eurostat, ESPON  
(c) EuroGeographics Association for administrative boundaries

Accessibility passenger flights, 2008



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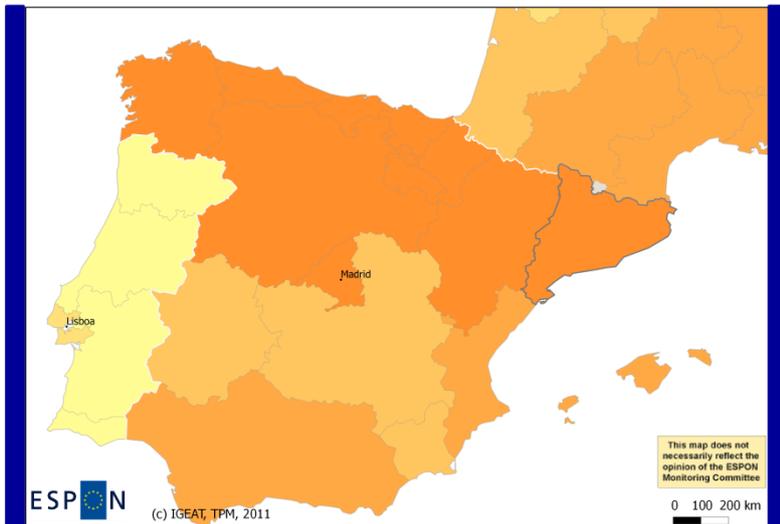
Population weighted average of passenger flights per day  
travel time to the closest airport < 90 min

- 0 - 50
- 50 - 150
- 150 - 350
- 350 - 800
- 800 - 1500
- 1500 - 3500

Catalunya

Regional level NUTS 3  
Data source: ESPON 2013 Database  
Origin of data: ESPON Project TIPTAP, 2010  
(c) EuroGeographics Association for administrative boundaries

Share of population with tertiary education, 2009



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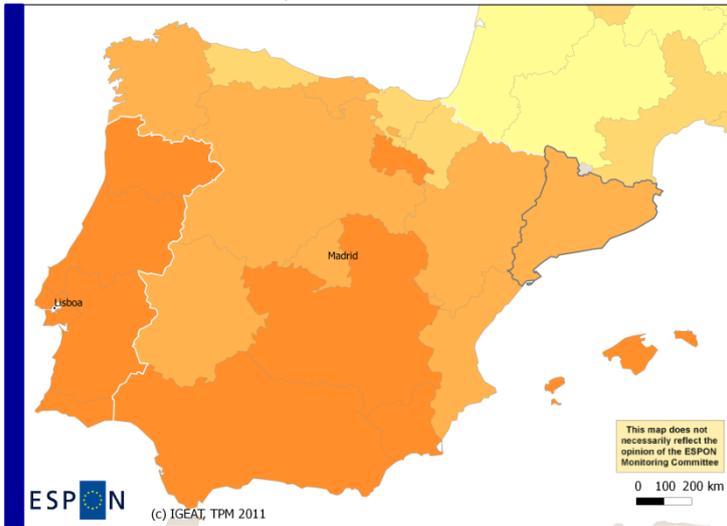
Share of population with tertiary education

- No data
- <15%
- 15% - 19%
- 20% - 22%
- 23% - 26%
- 27% - 41%

Catalunya

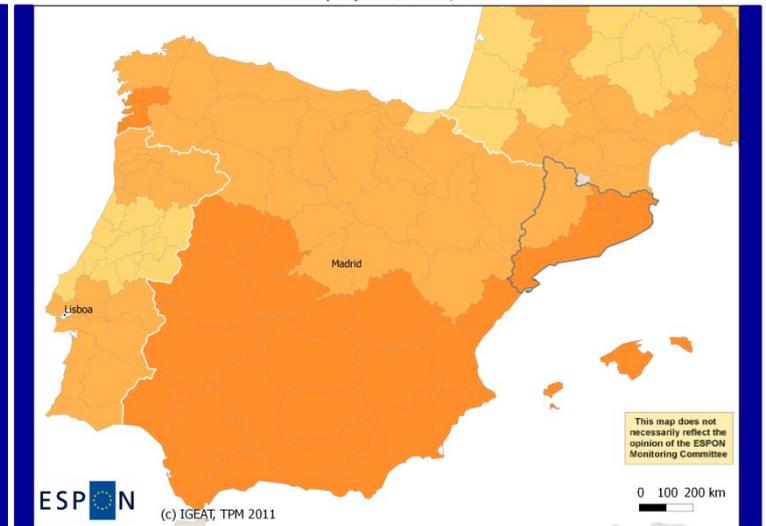
Regional level NUTS 2  
Data source: 5th Cohesion report, 2010  
Origin of data: Eurostat, 2009  
(c) EuroGeographics Association for administrative boundaries

Early school leavers, 2007



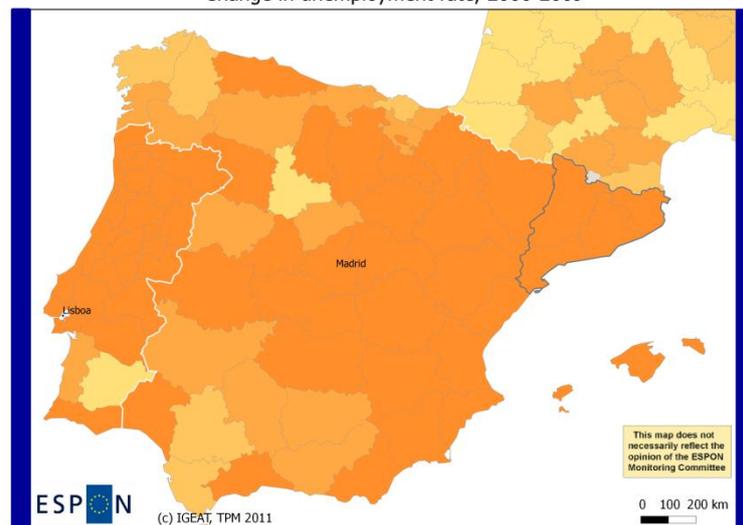
(c) IGEAT, TPM 2011  
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 Regional level NUTS 2  
 Data source: 5th Cohesion Report, 2010  
 Origin of data: Eurostat, 2007  
 (c) EuroGeographics Association for administrative boundaries  
 Share of early school leavers of population aged 18-24, 2007  
 2% - 10%  
 11% - 20%  
 21% - 30%  
 31% - 47%  
 Catalunya

Unemployment rate, 2009



(c) IGEAT, TPM 2011  
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 Regional level NUTS 3  
 Data source: Eurostat, 2011  
 Origin of data: Eurostat, 2009  
 (c) EuroGeographics Association for administrative boundaries  
 Unemployment rate of population older than 15, 2009  
 No data  
 < 5%  
 5% - 9%  
 10% - 15%  
 16% - 29%  
 Catalunya

Change in unemployment rate, 2000-2009



(c) IGEAT, TPM 2011  
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 Regional level NUTS 3  
 Data source: Eurostat, 2011  
 Origin of data: Eurostat, 2009  
 (c) EuroGeographics Association for administrative boundaries  
 Change of unemployment rate 2000-2009  
 No data  
 -358% - -200%  
 -199% - -1%  
 0% - 10%  
 11% - 30%  
 31% - 98%  
 Catalunya

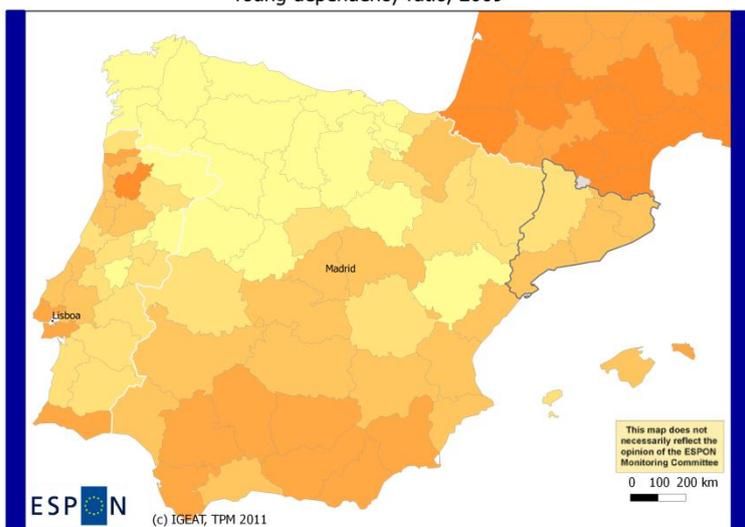
## 4.2 Demography

### a) Comparative analysis

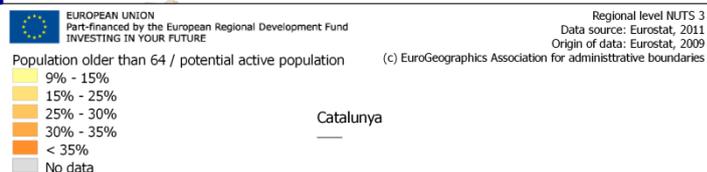
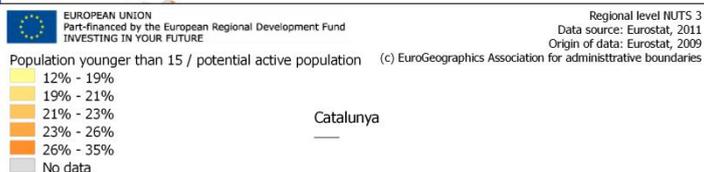
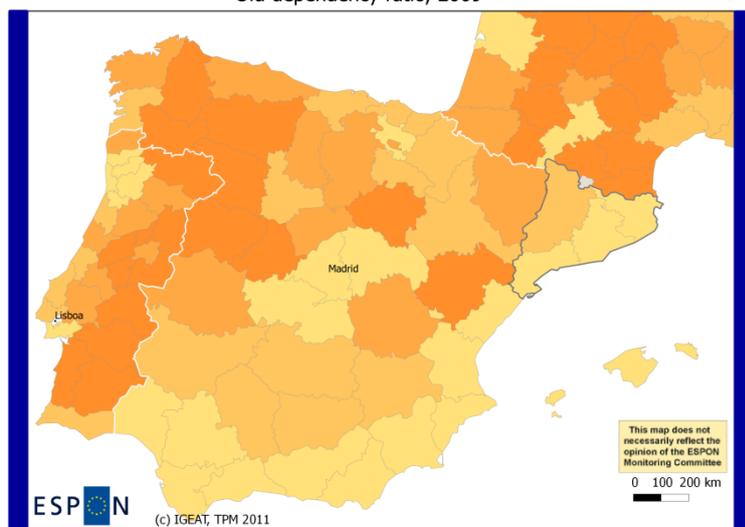
Demography							
Indicator	value	EU	National	Neighbourhood	Typology		
Young age dependency ratio, 2009	22%	95	103	93	92		
Old age dependency ratio	24%	95	100	91	116		
Life expectancy, 2004	08.75	0.90	0.13		0.31		
Median age, 2008	38	0.39	0.77		-		
Population growth, 1999-2009	+18%	113	102	100	101		

### b) Regional maps demography

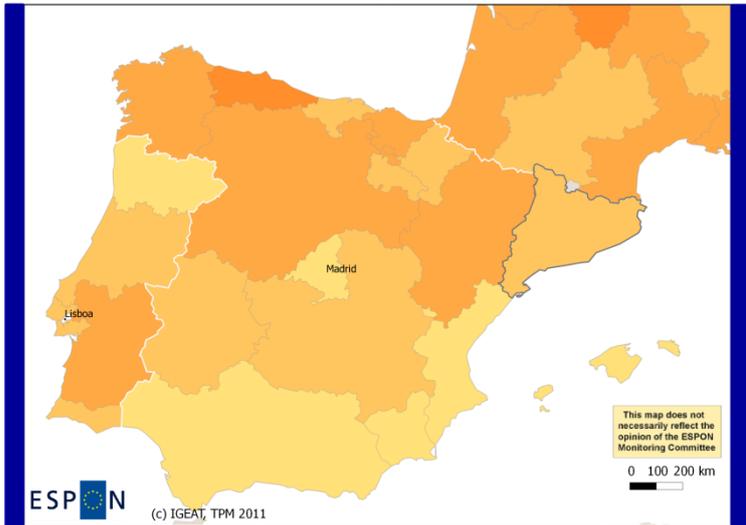
Young dependency ratio, 2009



Old dependency ratio, 2009



Median Age, 2008



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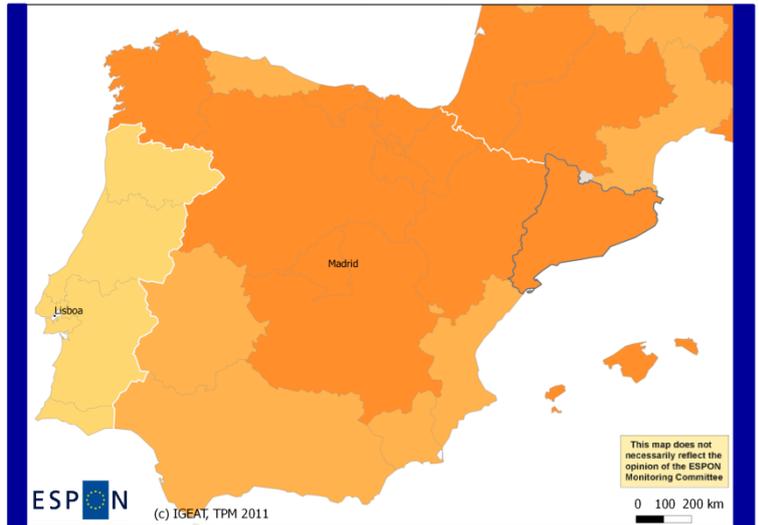
Regional level NUTS 2  
Data source: Eurostat, 2011  
Origin of data: Eurostat, 2008  
(c) EuroGeographics Association for administrative boundaries

age that divides a population into two numerically equal groups

- 31 - 34
- 34 - 37
- 37 - 39
- 39 - 43
- 43 - 46
- No data

Catalunya

Life expectancy at birth, 2004



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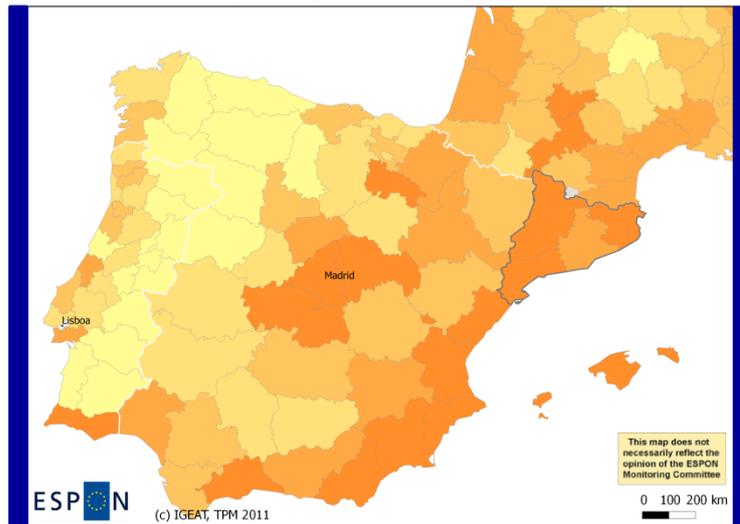
Regional level NUTS 2  
Data source: ESPON 2013 Database  
Origin of data: ESPON DEMIFER Project, 2010  
(c) EuroGeographics Association for administrative boundaries

number of years that a newborn is expected to live

- 70 - 75
- 75 - 78
- 78 - 80
- 80 - 82

Catalunya

Population growth, 1999-2009



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Regional level NUTS 3  
Data source: Eurostat, 2011  
Origin of data: Eurostat, 1999, 2009  
(c) EuroGeographics Association for administrative boundaries

change in population 2009/1999

- < 0 %
- 0 - 5 %
- 5 - 10 %
- 10 - 15 %
- >15 %

Catalunya

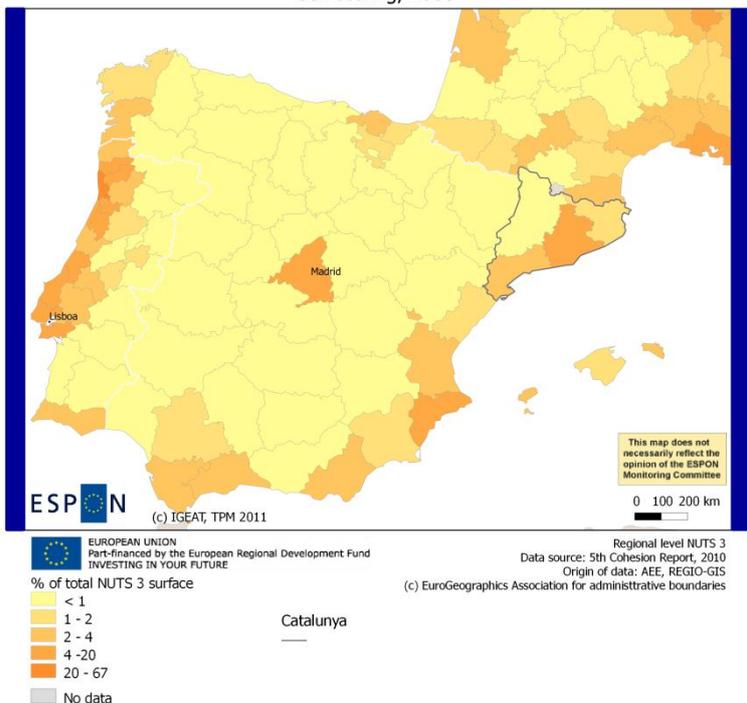
## 4.3 Climate Change

### a) Comparative analysis

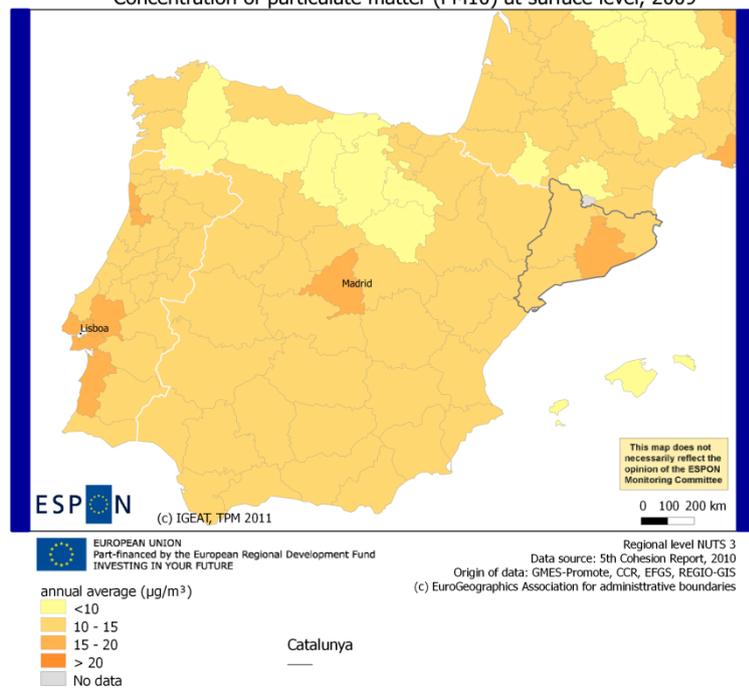
<i>Indicator</i>	<i>value</i>	<i>EU</i>	<i>National</i>	<i>Neighbourhood</i>	<i>Typology</i>
Soil sealing, 2006	2.8%	131	194	171	102
NATURA 2000 areas, 2009	29.80%	177	110	122	134
Concentration of particulate matter on surface level, 2009	15.03 µg/m <sup>3</sup>	- 0.07	- 0.57		0.06
Ozone exceedance days, 2008	13.5 days	- 0.31	- 0.72		-0.6
Energy consumption for heating, 1981-2009	-6%	95	98	97	96
Change in minimum temperature January 1994-2008	-0.46°C	0.22	- 0.49		0.02
Change in maximum temperature July 1994-2008	-0.94°C	1.53	1.46		1.57
Change in mean temperature January 1994-2008	-0.78°C	1.52	0.13		0.49
Change in mean temperature July 1994-2008	+0.85°C	- 1.18	- 1.12		- 1.13

## b) Regional maps climate change

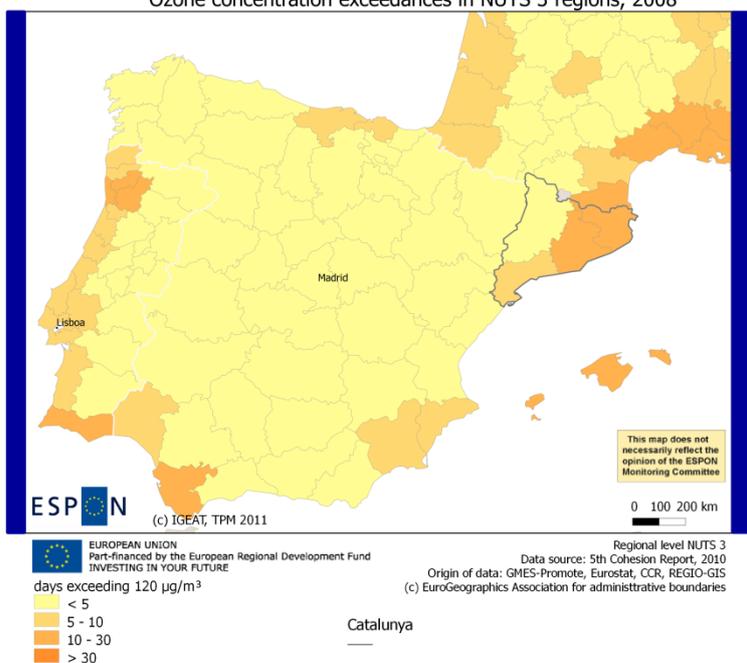
Soil sealing, 2006



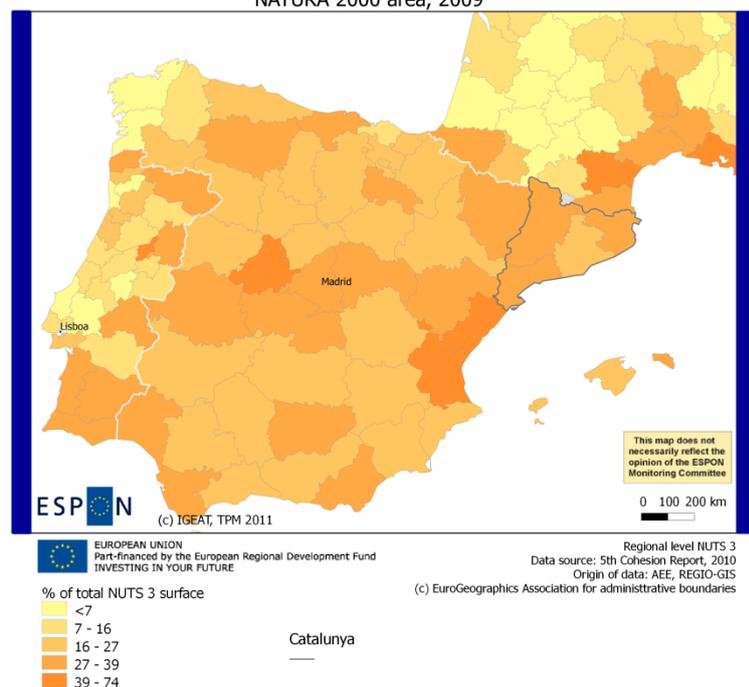
Concentration of particulate matter (PM10) at surface level, 2009



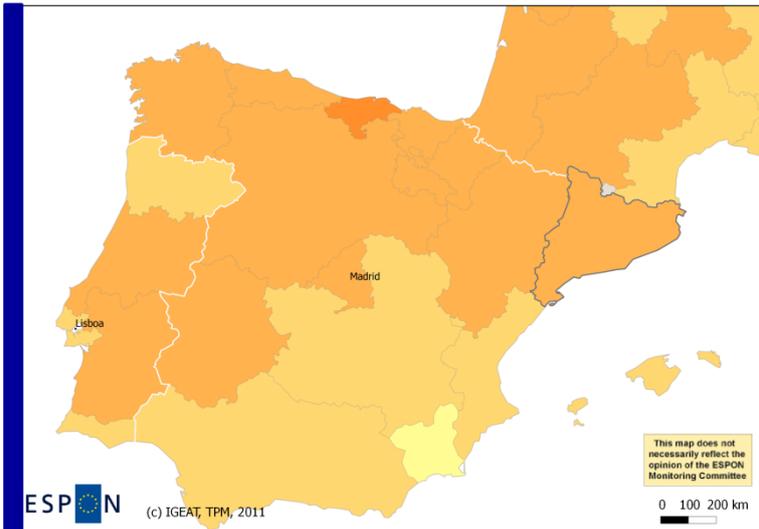
Ozone concentration exceedances in NUTS 3 regions, 2008



NATURA 2000 area, 2009



Change in heating degree days, 1981 - 2009



ESPON (c) IGEAT, TPM, 2011

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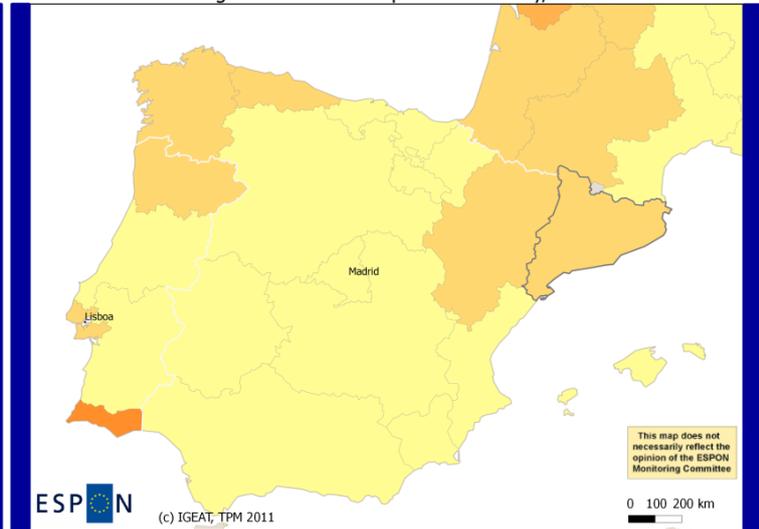
Regional level NUTS 2  
Data source: EspoN 2013 Database  
Origin of data: Eurostat, 2009  
(c) EuroGeographics Association for administrative boundaries

Change in Heating Degree Days, 1981-2009

- No data
- 70% - -21%
- 20% - -11%
- 10% - -1%
- 0% - 11%

Catalunya

Change in minimum temperature January, 1994-2008



ESPON (c) IGEAT, TPM 2011

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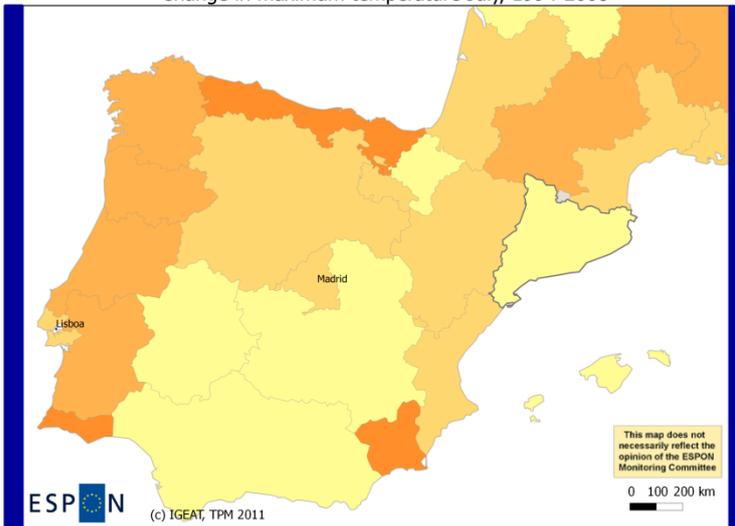
Regional level NUTS 2  
Data source: ESPON 2013 Database  
Origin of data: ReRisk ESPON Project, 2010  
(c) EuroGeographics Association for administrative boundaries

Change in minimum temperature January (°C)

- < -1.4 °C
- 1.4°C - +0.4°C
- +0.4°C - + 2.9°C
- > +2.9°C
- No data

Catalunya

Change in maximum temperature July, 1994-2008



ESPON (c) IGEAT, TPM 2011

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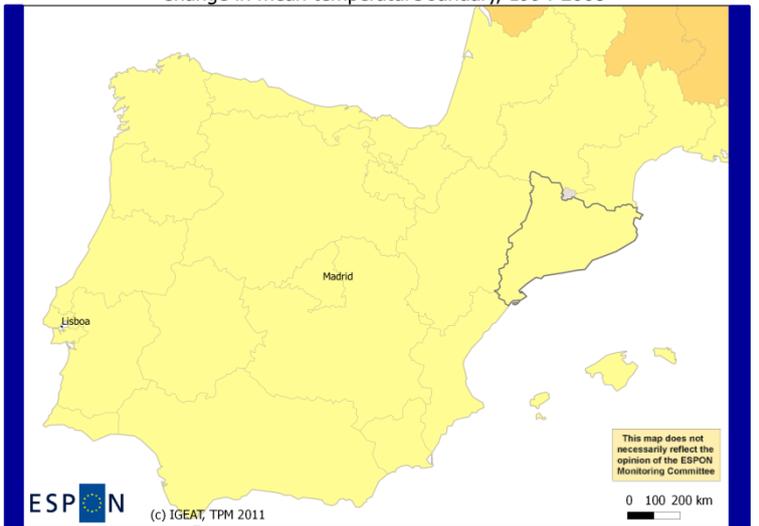
Regional level NUTS 2  
Data source: ESPON 2013 Database  
Origin of data: ReRisk ESPON Project, 2010  
(c) EuroGeographics Association for administrative boundaries

Change in maximum temperature July (°C)

- 2.8°C - 0°C
- 0°C - +0.8°C
- +0.8°C - +1.6°C
- +1.6°C - +3.5°C
- No data

Catalunya

Change in mean temperature January, 1994-2008



ESPON (c) IGEAT, TPM 2011

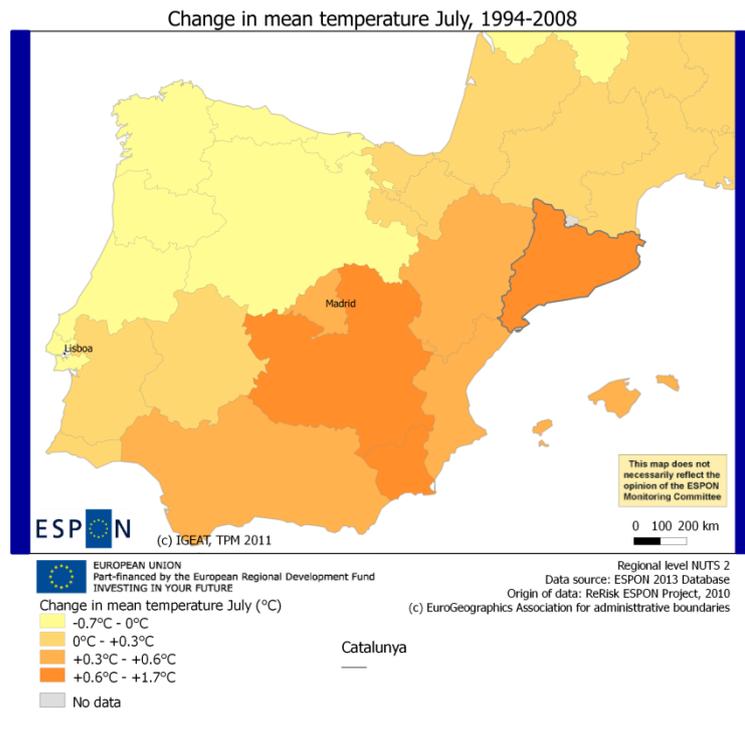
EUROPEAN UNION  
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Regional level NUTS 2  
Data source: ESPON 2013 Database  
Origin of data: ReRisk ESPON Project, 2010  
(c) EuroGeographics Association for administrative boundaries

Change in mean temperature January (°C)

- 1.5 °C - -0.1°C
- 0.1°C - +0.9°C
- +0.9°C - +1.6°C
- +1.6°C - +2.8°C
- No data

Catalunya



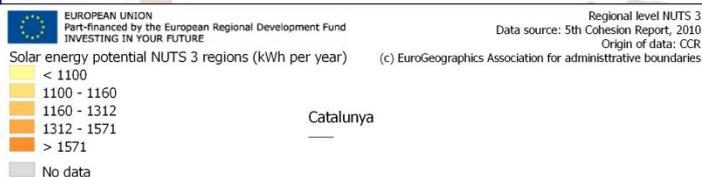
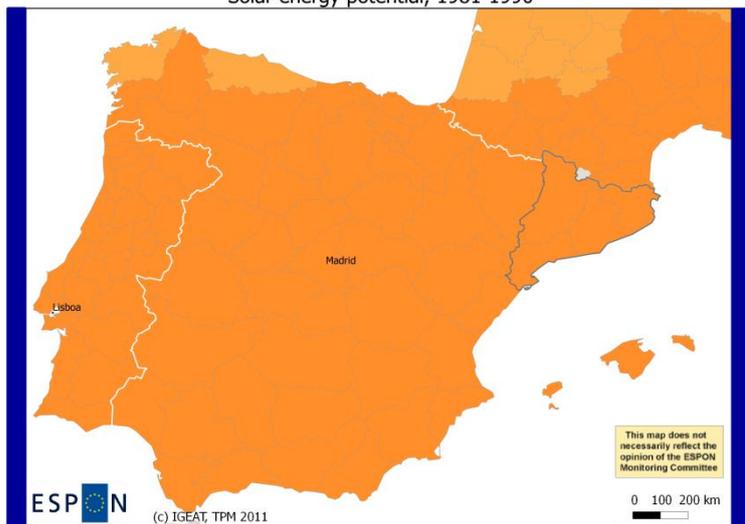
## 4.4 Energy

### a) Comparative analysis

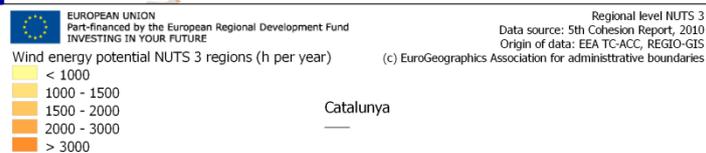
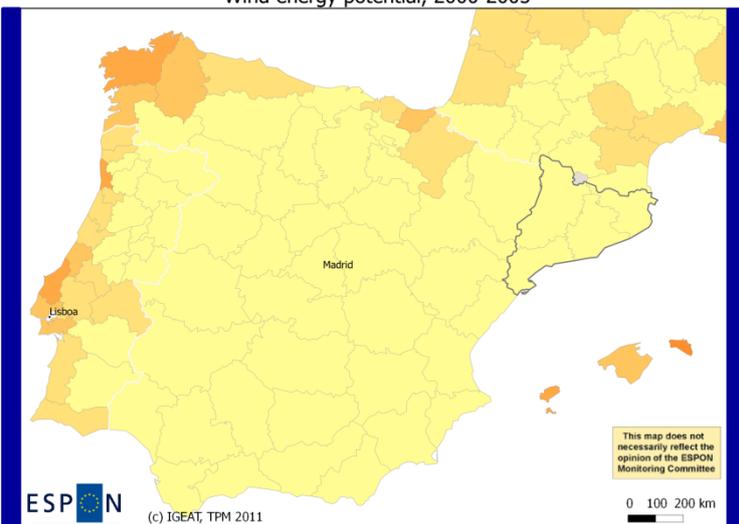
Energy					
Indicator	value	EU	National	Neighbourhood	Typology
Solar energy resources, 1981-1990	1856 kWh/m <sup>2</sup>	1.49	0.88	2.15	
Wind energy potential, 2005	350h	0.83	0.88	1.27	
Fuel costs of freight traffic as % of GDP, 2005	2.88%	0.23	0.19	0.52	
Employment in energy intensive industries, 2005	0.21%	0.62	1.29	0.03	

## b) Regional maps energy

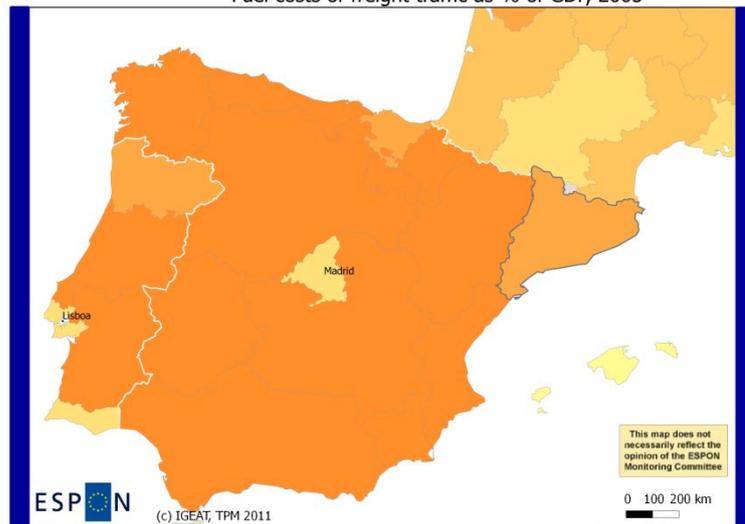
Solar energy potential, 1981-1990



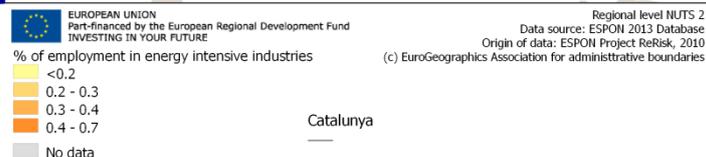
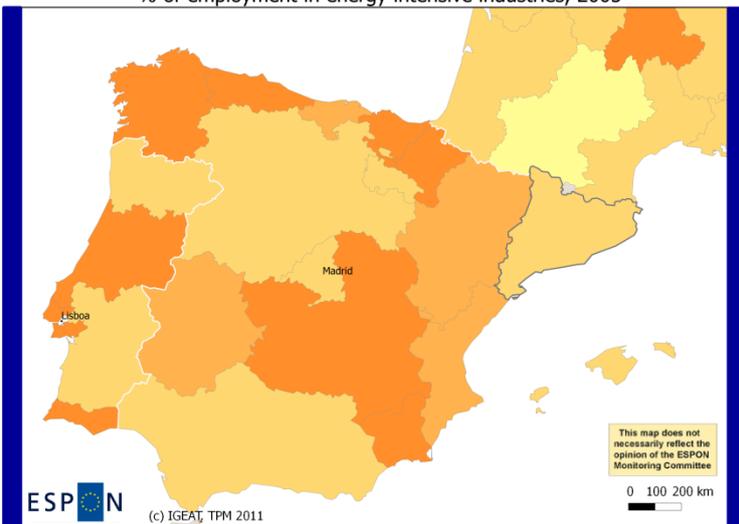
Wind energy potential, 2000-2005



Fuel costs of freight traffic as % of GDP, 2005



% of employment in energy intensive industries, 2005



[www.espon.eu](http://www.espon.eu)

The ESPON 2013 Programme is part-financed by the European Regional Development Fund, the EU Member States and the Partner States Iceland, Liechtenstein, Norway and Switzerland. It shall support policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory.

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