

Regional road and rail transport networks

Density highest not only in capital regions

Statistics in focus

TRANSPORT

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Contents

Highlights	1
Road network: very dense in the Netherlands' western provinces	2
Most powerful regions in economic terms obviously rely on other factors than just motorways for their access	4
Rail network: density influenced by economic structure.....	4

Highlights

- Most dense motorway networks are found in the Netherlands, Luxembourg and Cyprus.
- At regional level, highly urbanised regions dominate. The western regions of the Netherlands display ratios of over 100 km of motorways per 1000 km² of territory.
- High GDP regions do not systematically show high motorway density ratios. But this is the case for the regions *Düsseldorf* and *Köln* (Germany), and *Comunidad de Madrid* (Spain).
- Railway network density is highest in the Czech Republic, Belgium and Germany.
- Highest rail density ratios are often displayed by capital regions (Berlin, Prague, Bucarest).
- Regional rail density figures are influenced by economic activities such as the presence of heavy industries or seaport infrastructures.

Table 1: Top 10 NUTS 2 regions – Motorway and railway density (in km/1000 km²), 2005

NUTS2	Name of the region	Motorway density km/1000km ²	NUTS2	Name of the region	Railway density km/1000km ²
1 PT17	Lisboa	220	DE30	Berlin	681
2 DE50	Bremen	176	CZ01	Praha	490
3 UKD3	Greater Manchester	140	DE50	Bremen	416
4 NL31	Utrecht	122	DE60	Hamburg	373
5 DEA1	Düsseldorf	118	CZ04	Severozapad	175
6 DE60	Hamburg	107	PL22	Slaskie	172
7 NL33	Zuid-Holland	104	RO32	Bucuresti-Iilfov	165
8 AT13	Wien	101	DEC0	Saarland	142
9 UKD5	Merseyside	100	CZ05	Severovychod	135
10 NL41	Noord-Brabant	95	NL31	Utrecht	135

Source: Eurostat

Transport performance is closely linked to the development of the economy. A flourishing economy will result in increasing transport demand while stagnation has parallel effects for the transportation sector. This is particularly true for goods transport but also for passenger transport, to a smaller extent.

The EU possesses one of the world's most dense transport networks. For rail and motorway networks, the EU counts considerably more infrastructure per 1000 km² than the United States*, and not much less than Japan**. This density reflects a number of factors, including of course relative population density and transport demand.

Transport demand in urban, industrial and other densely populated areas is especially high. The infrastructure in place to meet this demand is hence of particular importance in these areas and can be expressed as a ratio between their length and the area of the territorial unit on which they are built.

Table 1 shows those regions (according to the NUTS regional breakdown – see Methodological Notes) that feature the highest motorway and railway densities. For both motorways and railways, especially purely urban regions are listed.

With regards to railways, it should be noted that urban rail systems, such as undergrounds or tramways are not included in the density ratios.

* Source: North American Transportation Statistics Database ** Source: OECD



Road network: very dense in the Netherlands' western provinces

Table 2 shows road network densities for both motorways and other roads. As the definition of 'other roads' is not harmonised across countries, the latter data should be looked at with care. Motorways are therefore preferred for further analysis.

When relating motorway length to the population, Cyprus comes first with 36 km per 100 000 inhabitants, followed by Luxembourg (32 km), Slovenia (28 km) and Spain (26 km). Related to the territory, the ranking changes: here, it is the Netherlands which leads with 63 km of motorway per 1000 km², closely followed by Luxembourg (57 km). At a considerable distance comes Germany with 35 km. The motorway density of the Netherlands is three and a half times that of the EU's average (18 km, calculated on the basis of available data).

Turning to the individual regions, the length-over-area ratio can be as high as 220 km, as displayed by *Lisboa* in Table 1 and Map 1. At a considerable distance follow other urban regions such as *Bremen* (176 km) in northern Germany (regrouping the city of Bremen and the maritime port of Bremerhaven) and *Greater Manchester* in the United Kingdom (140 km).

Apart from these city-regions (in addition to those quoted above, *Düsseldorf*, *Hamburg* and *Wien* also appear in the top-10) there are three Dutch provinces for which ratios of 100 km or above were calculated. These three provinces (*Utrecht*, *Noord-Brabant* and *Zuid-Holland*) are all part of the so-called 'Randstad', the very densely populated western part of the Netherlands.

Table 2 : Length of road network 2005 – Key indicators

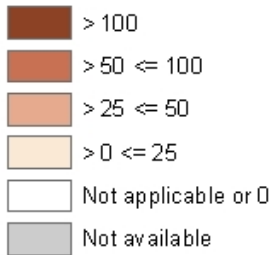
NUTSO	COUNTRY	MOTORWAYS			OTHER ROADS		
		km	km/100 000 inhab	km/1000km ²	km	km/100 000 inhab	km/1000km ²
BG	Bulgaria	331	4	3	18 957	244	171
CZ	Czech Republic	564	6	7	54 945	537	697
DK	Denmark	1 032	19	24	71 225	1 314	1 653
DE	Germany	12 363	15	35	219 117	266	614
EE	Estonia	99	7	2	57 013	4 235	1 305
IE	Ireland	247	6	4	91 091	2 190	1 305
ES	Spain	11 432	27	23	154 214	355	305
FR	France	10 801	17	17	980 442	1 565	1 549
IT	Italy	6 542	11	22	168 888	289	560
CY	Cyprus	276	37	30	11 870	1 566	1 283
LV	Latvia	-	-	-	66 319	2 883	1 027
LT	Lithuania	417	12	6	79 080	2 316	1 211
LU	Luxembourg	147	32	57	2 728	597	1 055
HU	Hungary	636	6	7	30 172	299	324
NL	Netherlands	2 602	16	63	131 616	806	3 168
AT	Austria	1 677	20	20	105 663	1 281	1 258
PL	Poland	552	1	2	381 463	999	1 220
PT	Portugal	2 341	22	25	:	:	:
RO	Romania	228	1	1	79 676	368	334
SI	Slovenia	569	28	28	37 916	1 895	1 870
SK	Slovakia	334	6	7	43 417	806	885
FI	Finland	693	13	2	78 417	1 495	232
SE	Sweden	1 685	19	4	98 491	1 091	223
UK	United Kingdom	3 638	6	15	409 040	681	1 678
EU	* European Union	59 205	14	18	3371 760	1 221	1 075
HR	Croatia	792	18	14	27 644	622	488
TR	Turkey	1 775	2	2	347 571	485	444
IS	Iceland	11	3	0.1	13 027	4 390	126
LI	Liechtenstein	-	-	-	401	1 154	2 005
NO	Norway	219	5	1	92 863	2 009	287
CH	Switzerland	1 358	18	33	69 938	940	1 694

Motorways: 2004 data for: DK, UK. No data provided for: BE, EL, MT, LI. Other roads: 2004 data for: AT, DK, UK. No data provided for: BE, EL, MT, PT. HU: State roads only.
* European Union: Motorways : EU-23 (data not available for: BE, EL, MT) — Other roads : EU-23 (data not available for: BE, EL, MT, PT)

Source: Eurostat

Map 1: Motorway density by NUTS 2 region, 2005 (EU27 + CC + EFTA)

Motorway density (km/1000 km²), by NUTS 2 region, 2005

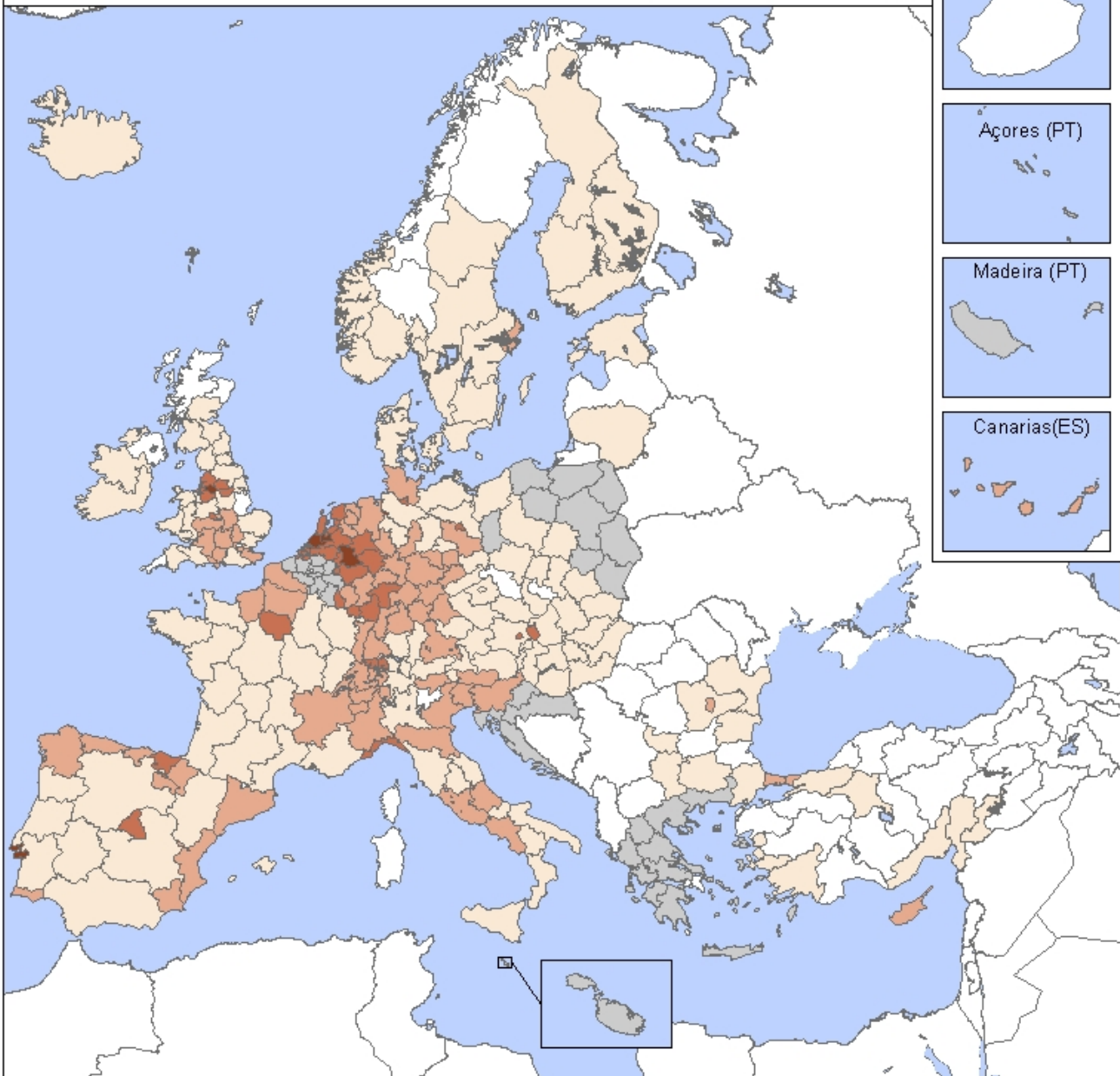
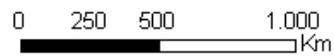


Geographic data: GISCO
 Statistical data: EUROSTAT

Data: 2005
 2004 data for DE41, DE42, DE41, DE42, DE43, DE44, DE45, DED1, DED2, DED3, DEE1, DEE2, DEE3, DK, FR91, FR92, FR93, FR94, LT, PT11, PT15, PT16, PT17, PT18, UK

For full names of NUTS 2 regions refer to methodological notes section

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High GDP regions rely on other factors than just motorways for their access

The left section of Table 3 lists the 20 regions where the highest gross domestic product was generated. The right section lists the regions with the highest motorway density.

Please note that the characteristics of the regional breakdown of the regions differ according to the country. Obviously, the region *Île de France*, incorporating the capital Paris and the surrounding regions, cannot easily be compared with for instance *Inner London*, mainly composed of a central business district.

Only *Düsseldorf*, *Comunidad de Madrid* and *Köln* appear in both rankings but those regions with the

highest motorway density do not feature the 'economic weight' one might expect.

While physical accessibility remains a factor that attracts businesses, this accessibility is obviously not related to motorway networks. Accessibility is also determined by the presence of airports, the rail network and an efficient local public transport. Only a single region (*Düsseldorf*), offers a motorway network density that exceeds 100 km per 1000 km². All other high GDP regions are well below that value. *Inner London* has less than half a kilometer of motorways.

Table 3: Motorway density relative to GDP in 2005: 20 regions with highest GDP (left) and 20 regions with highest motorway density (right)

Rank	NUTS2	Name of the region	GDP Million EUR	Motorway density km/1000km ²	NUTS2	Name of the region	Motorway density km/1000km ²	GDP Million EUR
1	FR10	Ile de France	469 047	51	PT17	Lisboa	220	53 132
2	ITC4	Lombardia	293 128	24	DE50	Bremen	176	23 868
3	UKI1	Inner London	209 514	0	UKD3	Greater Manchester	140	69 373
4	DK00	Danmark	196 158	24	NL31	Utrecht	122	42 590
5	DE21	Oberbayern	164 380	33	DEA1	Düsseldorf	118	156 422
6	FR71	Rhône-Alpes	158 329	27	DE60	Hamburg	107	78 194
7	ES51	Cataluna	157 922	32	NL33	Zuid-Holland	104	106 241
8	DEA1	Düsseldorf	156 422	118	AT13	Wien	101	64 965
9	ITE4	Lazio	153 468	27	UKD5	Merseyside	100	28 072
10	ES30	Comunidad de Madrid	148 801	92	NL41	Noord-Brabant	95	72 365
11	DE71	Darmstadt	136 935	64	DEC0	Saarland	93	26 483
12	ITD3	Veneto	132 246	26	ES30	Comunidad de Madrid	92	148 801
13	DE11	Stuttgart	130 266	37	UKG3	West Midlands	90	70 913
14	DEA2	Köln	120 880	76	NL42	Limburg (NL)	83	30 744
15	UKI2	Outer London	120 734	48	DE30	Berlin	82	79 170
16	IE02	Southern and Eastern	119 700	5	NL22	Gelderland	76	50 588
17	ITD5	Emilia-Romagna	119 278	26	DEA2	Köln	76	120 880
18	FR82	Provence-Alpes-Côte d'Azur	117 460	24	UKE3	South Yorkshire	74	28 561
19	ES61	Andalucía	115 348	23	CH03	Nordwestschweiz	70	:
20	ITC1	Piemonte	114 256	32	ITC3	Liguria	69	38 640

Note: GDP data refer to 2004

Source: Eurostat

Many Dutch regions appear in the right-hand section of the table: in total, six Dutch provinces are listed. Apart from a high population density, these ratios can also be explained by the presence of the port of Rotterdam, acting as a gateway to and from the rest of Western

Europe. As a considerable proportion of goods are carried to and from Rotterdam by lorries, the Netherlands have been covered with a dense motorway network for some decades.

Rail network: density influenced by economic structure

Germany and France possess the longest rail networks with 38 206 km and 30 832 km respectively. Related to the population, this amounts to approximately 50 km of rail network per 100 000 inhabitants. In the Netherlands, the ratio is as low as 17 km per 100 000 inhabitants. To a certain extent, this ratio illustrates the complexity of rail traffic management: a low ratio means

that many people, hence many trains, have to share the local network.

However, the latter statement is only true when the rail network is fairly evenly spread over the territory. Greece for instance offers a similar ratio (22 km per 100 000 inhabitants), but its rail network is uneven due to the geographical characteristics of the country: numerous islands and extensive mountainous regions.

Table 4 : Length of railway network 2005 – Key indicators

	km	% electrified	km/100.000 inhab	km/1000km ²
BE	3 544	84%	34	116
BG	4 154	69%	54	37
CZ	9 614	30%	94	122
DK	2 644	24%	49	61
DE	38 206	52%	46	107
EE	959	14%	71	22
IE	1 912	5%	46	27
EL	2 449	3%	22	19
ES	12 839	59%	30	25
FR	30 832	48%	49	49
IT	16 166	70%	28	54
LV	2 413	11%	105	37
LT	1 771	7%	52	27
LU	275	95%	60	106
HU	7 498	34%	74	81
NL	2 809	70%	17	68
AT	5 690	:	69	68
PL	20 253	59%	53	65
PT	2 839	51%	27	31
RO	10 948	37%	51	46
SI	1 228	41%	61	61
SK	3 658	43%	68	75
FI	5 732	46%	109	17
SE	11 050	70%	122	25
UK	16 237	32%	27	67
EU*	215 720	44%	57	57
HR	2 726	36%	61	48
TR	8 697	22%	12	11
LI	9	:	26	45
NO	4 043	62%	87	12
CH	5 002	:	67	121

2004 data for CH, CZ, DK, EL, SE; * European Union: Railways : EU-27 data not applicable for CY, MT and IS — % Electrified : EU-26 (data not available for AT)
Source: Eurostat

Table 4 presents the network-over-area ratio at national level. Only a few EU countries had over 100 km of rail network per 1000 km² of national territory in 2005: this is the case for the Czech Republic (122 km), Belgium (116 km), Germany (107 km, against still 117 km in 2000 – see Figure 1) and Luxembourg (106 km). At the other end of the scale range Finland and Greece feature ratios of under 20 km per 1000 km².

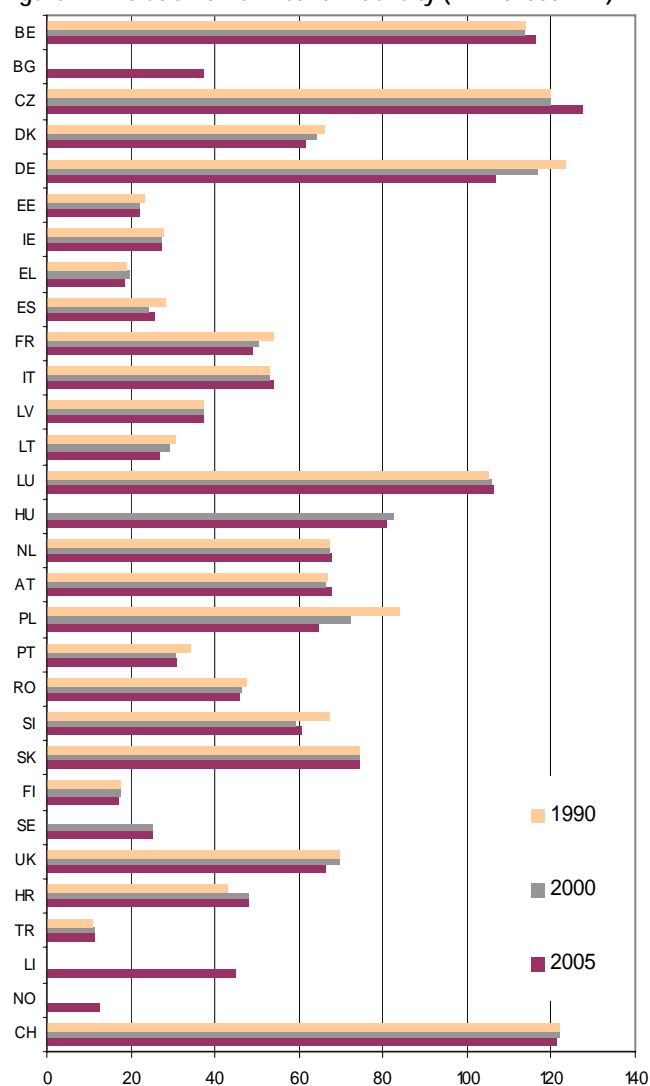
Outside the EU, Switzerland has the second highest density among all countries listed in Table 4 with 121 km per 1000 km², and this ratio has not changed much in the last 15 years.

Conversely, Norway follows the same pattern as Finland and Sweden, with only 12 km, largely due to a very uneven population distribution. The ratio for Turkey is even lower (11 km per 1000 km²), but here, it is the sheer size of the country that makes the ratio drop. The network as such is fairly evenly distributed over the country but nevertheless limited in absolute terms. Noticeable are density drops registered in Poland (1990: 84 km; 2000: 72 km, 2005: 65 km)

Turning to the individual regions, it appears that the capital regions *Berlin* and *Praha* top the list with regard to density, with 681 km and 490 km per 1000 km² respectively. The next in the ranking are *Bremen* and *Hamburg*, where extensive freight lines to and from the seaport installations contribute to the high ratios. Freight lines also play a role for the region *Saarland*, where heavy industry (steel), manufacturing (cars) and coal based electricity generation rely on an extensive rail network.

Relatively high ratios are also found for individual regions such as *Bucuresti-Ilfov* in Romania, *Comunidad Valenciana* in Spain and *Lisboa* in Portugal

Figure 1: Evolution of rail network density (in km/1000 km²)

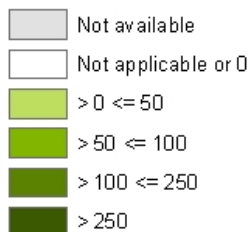


Note: on the basis of available data. 2005 data: 2004 data used for CH, CZ, DK, EL and SE. Data not applicable : CY, MT, IS
Source: Eurostat

Apart from the *Praha* capital region, two other Czech regions show up in the top-ten: *Severozapad* and *Severovýchod*. Map 2 further reveals that not a single Czech region falls below the 100 km per 1000 km² threshold. The only Polish region present in the top-10 is *Slaskie*, a densely populated and highly industrialized region bordering the Czech Republic in the south-west.

Map 2: Railway density by NUTS 2 region, 2005 (EU27 + CC + EFTA)

Railway density (km/1000 km²), by NUTS 2 region, 2005

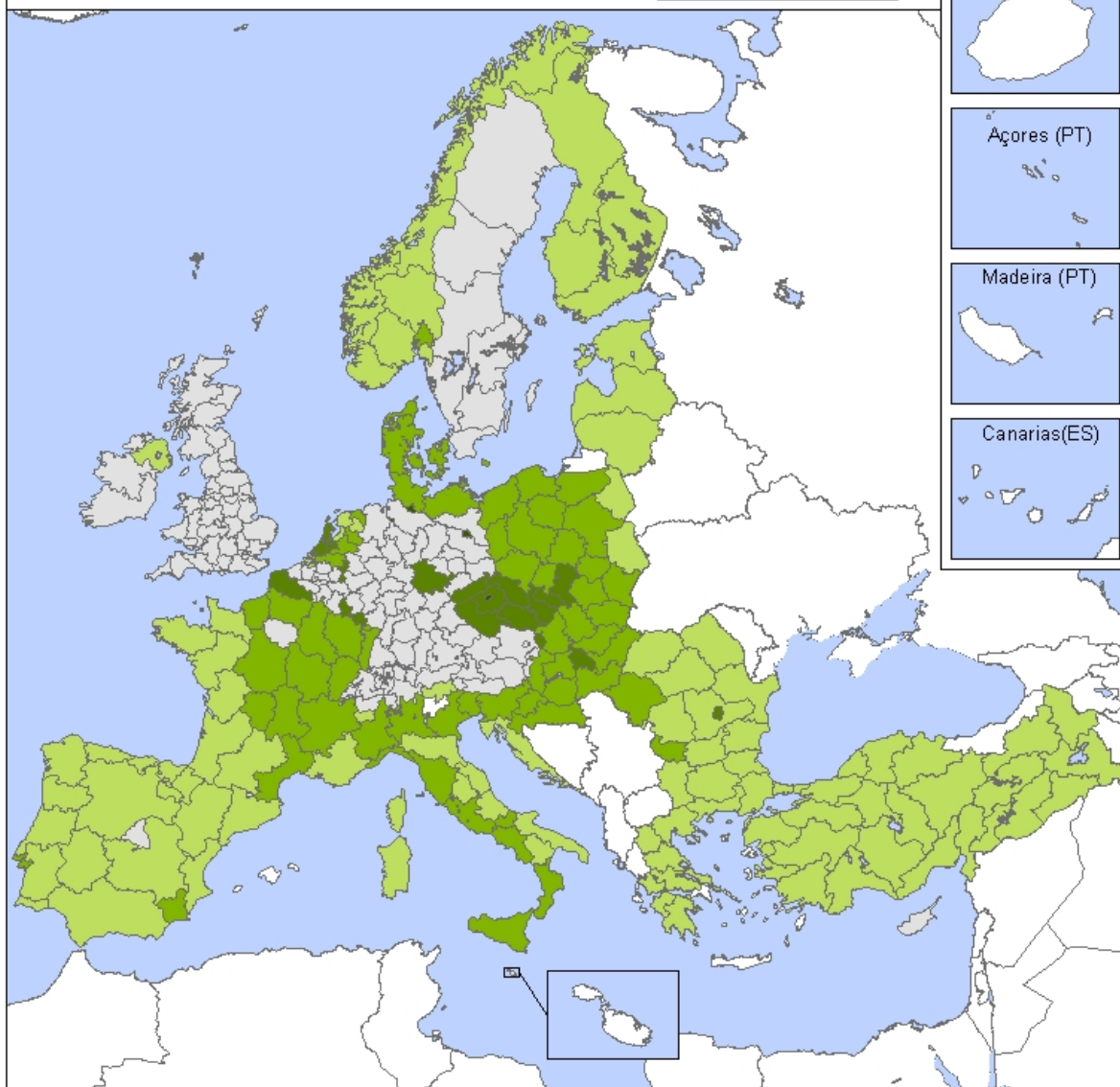


Geographic data: GISCO
Statistical data: EUROSTAT

Data: 2005
2004 data for CZ01, CZ02, CZ03, CZ04, CZ05, CZ06, CZ07, CZ08, DK, FR83, GR11, GR12, GR13, GR14, GR23, GR24, GR25

For full names of NUTS 2 regions refer to methodological notes section

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➤ ESSENTIAL INFORMATION – METHODOLOGICAL NOTES

Regional breakdown

Data used are figures at Level 2 of NUTS 2003 rev., Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS) (Official Journal L 154, 21/06/2003) <http://eur-lex.europa.eu/JOIndex.do?year=2003&serie=L&textfield2=154&Submit=Search&submit=Search&ihmlang=en>

The Nomenclature of Territorial Units for Statistics (NUTS) was established by Eurostat more than 25 years ago in order to provide a single uniform breakdown of territorial units for the production of regional statistics for the European Union.

Certain smaller countries are not sub-divided in NUTS Level 2 regions. This is the case for Cyprus (CY), Luxembourg (LU) and Malta (MT) but also for Denmark (DK), Latvia (LV), Lithuania (LT) and Estonia (EE).

Data source:

Data on infrastructure is collected by Eurostat via regional questionnaire on voluntary basis. Eurostat/ITF/UNECE *Glossary for Transport Statistics* definitions should be applied (http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1073.46587259&_dad=portal&_schema=PORTAL&p_product_code=KS-BI-03-002), but countries may apply national definitions. This should particularly be taken into account when comparing figures of 'Other roads' (Table 2).

Data on GDP, population and area is downloaded from Eurostat's reference database

(http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996.45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/&product=EU_MAIN_TREE&depth=1)

Definitions:

Road: Line of communication (traveled way) using a stabilized base other than rails or air strips open to public traffic, primarily for the use of road motor vehicles running on their own wheels.

Motorways: Road, specially designed and built for motor traffic, which does not serve properties bordering on it, and which:

- (a) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other, either by a dividing strip not intended for traffic, or exceptionally by other means;
- (b) does not cross at level with any road, railway or tramway track, or footpath;
- (c) is specially sign-posted as a motorway and is reserved for specific categories of road motor vehicles.

Railway lines: Line of communication made up by rail exclusively for the use of railway vehicles.

It should be noted that railway data do not apply to Malta and Cyprus.

Country codes:

EU: European Union, including the 27 Member States

(EU-27): Belgium (BE), Bulgaria (BG), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU),

Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK).

Candidate countries: Croatia (HR), Turkey (TR)

EFTA countries: Liechtenstein (LI), Norway (NO), Switzerland (CH), IS (Iceland).

Maps:

The maps present the motorway density and railway density by NUTS 2 region for the year 2005. However, data availability is such that for certain countries or individual regions, different reference years had to be taken.



Space constraints do not allow the listing of the names of individual countries and NUTS 2 regions on the maps. The codes of regions and countries are listed in the metadata section of the maps.

AT:	Austria
CZ01:	Praha
CZ02:	Stredni Cechy
CZ03:	Jihozapad
CZ04:	Severozapad
CZ05:	Severovychod
CZ06:	Jihovychod
CZ07:	Stredni Morava
CZ08:	Moravskoslezsko
DE41:	Brandenburg - Nordost
DE42:	Brandenburg - Südwest
DEA1:	Düsseldorf
DEA2:	Köln
DEA3:	Münster
DEA4:	Detmold
DEA5:	Arnsberg
DED1:	Chemnitz
DED2:	Dresden
DED3:	Leipzig
DEE1:	Dessau
DEE2:	Halle
DEE3:	Magdeburg
DK:	Denmark
FR83:	Corse
FR91:	Guadeloupe
FR92:	Martinique
FR93:	Guyane
FR94:	Réunion
GR11:	Anatoliki Makedonia, Thraki
GR12:	Kentriki Makedonia
GR13:	Dytiki Makedonia
GR14:	Thessalia
GR23:	Dytiki Ellada
GR24:	Sterea Ellada
GR25:	Peloponnisos
LT:	Lithuania
PT11:	Norte
PT15:	Algarve
PT16:	Centro (P)
PT17:	Lisboa
PT18:	Alentejo
UK:	United Kingdom
UKNO:	Northern Ireland

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