

EUROSTAT 2019.25.06

Inland transport infrastructure at regional level

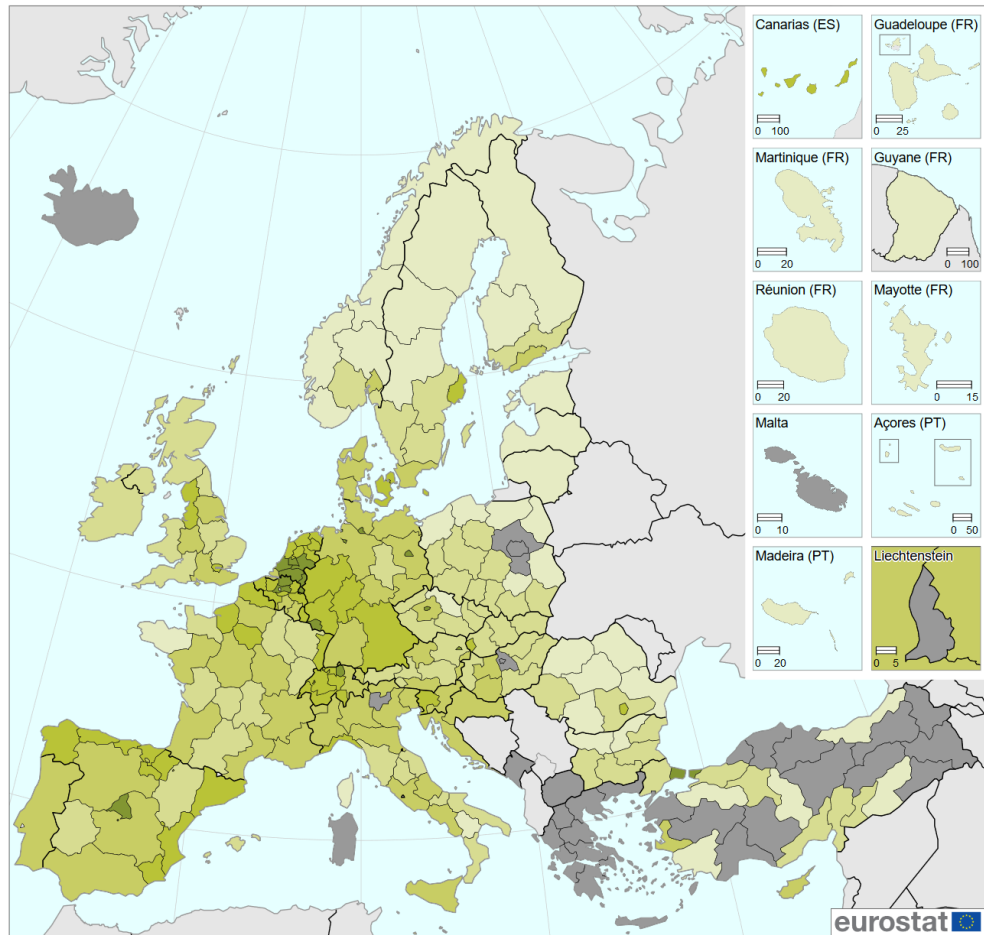
*Data extracted in May 2019.
Planned article update: June 2020.*

Highlights

In 2017, the most dense motorway networks in the EU are found around the capitals Wien, Madrid, Prague, Berlin and Amsterdam.

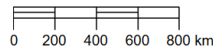
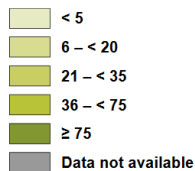
The highest density of railway lines can be found in the regions of Germany and Czechia.

Map 1: Motorway density (km/1000 km²), by NUTS 2 regions, 2017
(km/1000 km²)



(km/1000 km²)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat – IMAGE, 06/2019



Note: Croatia: 2015 data instead 2017. Belgium and Tukey: 2016 data instead 2017.
Germany, Ireland, Lithuania, Portugal and United Kingdom, NUTS level 1.
Source: Eurostat (online data code: tran_r_net)



Motorway density by NUTS 2 regions, 2017 [Eurostat \(tran_r_net\)](#)

This article presents recent data on the inland transport network of the [European Union \(EU\)](#), [EFTA](#) and [candidate countries](#): [motorways](#), [railways](#) and [inland waterways](#). The evolution of the transport network is closely linked to the general development of the economy. This is particularly true for goods transport and, to a lesser extent, for passenger transport.

Overview

The EU has one of the densest transport networks in the world. This reflects a number of factors, including population density and transport demand. Transport demand is especially high in urban, industrial and other densely populated areas. The highest motorway density is found in the regions of Germany, the Netherlands and Austria (see Table 1).

Regions with the highest motorway density in 2017

(km/1 000 km²)

Rank	NUTS 2	NUTS 2 description	Length of motorways (km)	Land area (km ²)	Motorway density (km/1000 km ²)
1	DE50	Bremen	80	391	191
2	NL31	Utrecht	176	1 405	121
3	AT13	Wien	43	396	109
4	NL33	Zuid-Holland	368	2 884	108
5	DE60	Hamburg	81	710	107
6	NL41	Noord-Brabant	504	4 961	99
7	NL42	Limburg (NL)	216	2 157	98
8	ES30	Comunidad de Madrid	771	7 972	96
9	DEC0	Saarland	240	2 565	93
10	CZ01	Praha	44	485	89
11	CH04	Zürich	151	1 654	87
12	DE30	Berlin	77	846	86
13	TR10	Istanbul (*)	451	5 189	85
14	BE24	Prov. Vlaams-Brabant (*)	175	2 114	83
15	BE21	Prov. Antwerpen (*)	220	2 804	77
16	NL22	Gelderland	393	5 000	77
17	BE32	Prov. Hainaut (*)	284	3 800	75
18	NL32	Noord-Holland	297	2 753	73
19	CH03	Nordwestschweiz	139	1 934	71
20	BE10	Région de Bruxelles-Capitale	11	162	70

(*) 2016 data instead of 2017

Source: Eurostat (online data codes: tran_r_net and reg_area3)

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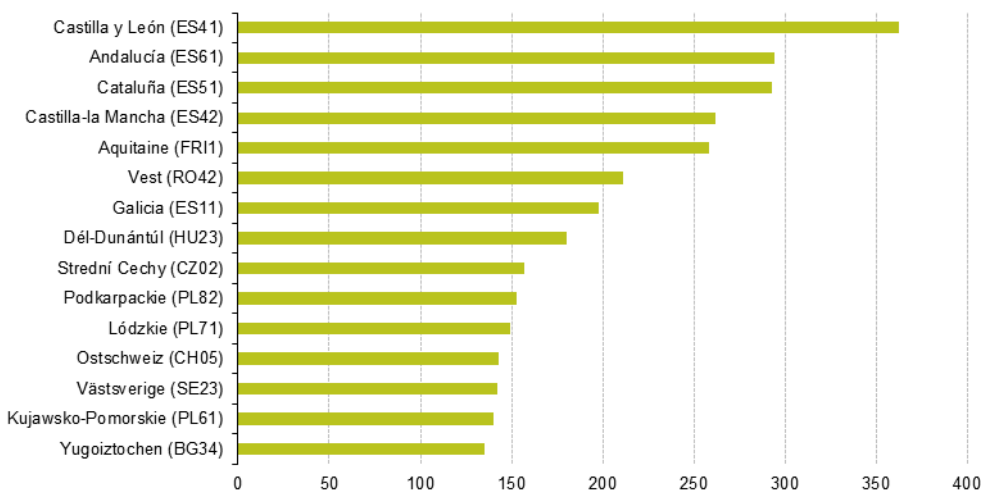
Table 1: Regions with the highest motorway density in 2017 (km_1000 km²) [Eurostat](#) ([tran_r_net](#)) and ([reg_area3](#))

Transport networks concentrated around economic hubs

The motorway network is especially dense in regions with urbanised areas. The most significant motorway expansion between 2008 and 2017 took place in regions of Spain, France, Romania and

Hungary (see Figure 1). This reflects the general development programmes of the motorway network in these countries over the last decade.

Regions with the most significant motorway expansion between 2008 and 2017
(in kilometres)



Source: Eurostat (online data code: tran_r_net)



Figure 1: Regions with the most significant motorway expansion between 2008 and 2017 (in kilometres) [Eurostat \(tran_r_net\)](#)

Motorways

The densest motorway networks are located around key economic hubs

Comparing the length of the motorways to the area of the regions gives a good picture of the motorway infrastructure and concentration within the EU.

In relative terms, the most significant motorway expansion between 2008 and 2017 took place in the Romanian region of Sud-Est, followed by the Polish region of Kujawsko-Pomorskie and Strední Morava in Czechia. These impressive growth rates are explained by the very limited motorway networks in these regions in the 2000's.

The picture looks different when absolute changes over the same period are considered. Apart from the French region Aquitaine (+258 km) and the Romanian region Vest (+211 km) and Hungarian region

Dél-Dunántúl (+180 km), five out of the ten regions that recorded the largest absolute change are located in Spain (see Figure 1): Castilla-y-León (+362 km), Andalucía (+294 km), Cataluña (+293 km), Castilla-la-Mancha (+ 262 km) and Galicia (+198 km). The fact that many Spanish regions are included is essentially the result of considerable investments (supported by European funds) realised in the framework of the Plan Estratégico de Infraestructuras y Transporte 2005-2020 (PEIT). Although the main weight of the PEIT is now shifting more towards high-speed rail transport, no other European country has experienced such massive motorway construction in such a short period of time.

The highest motorway densities are obviously found around European capitals and other big cities, in large industrial conurbations and around major seaports.

Most European capitals and large cities are surrounded by a ring of motorways in order to meet the high demand for road transport originating from these metropolitan areas. Dense motorway networks can be found around capitals: Wien (109 km/1000 km²), Madrid (96 km/1000 km²), Praha (89 km/1000 km²), Berlin (86 km/1000 km²), and Amsterdam (Noord- Holland: 72 km/1000 km²). Since the motorways are generally concentrated in a ring close to the cities, the reported density decreases when the area of the [NUTS 2](#) region concerned increases. As a result, the motorway density reported for the small NUTS 2 region of Wien is higher than for the much larger NUTS 2 region of Île-de-France, even though the motorway network of Paris is larger.

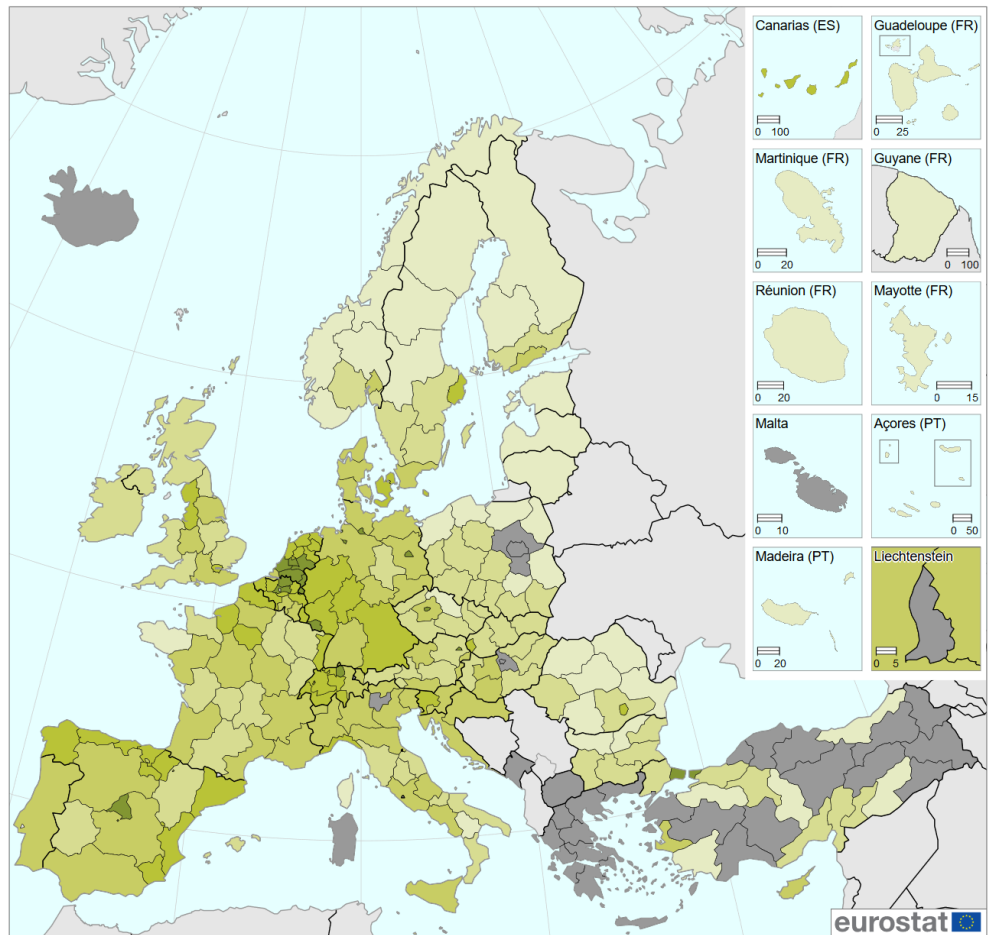
Other densely populated regions with high motorway density include the Randstad region in the western part of the Netherlands (Utrecht : 121 km/1000 km², Zuid-Holland : 108 km/1000 km², and Noord-Holland : 73 km/1000 km²) .

High motorway densities are also found around the major seaports of northern Europe: the motorway densities of the NUTS 2 regions of Bremen (191 km/1000 km²) with the port of Bremerhaven, of Zuid-Holland with the port of Rotterdam (108 km/1000 km²) and of Hamburg (107 km/1000 km²) are among the highest of all European regions.

Another reason for the high density of the motorway network in some central European countries (such as Germany) is the proportionately high volume of transit freight traffic.

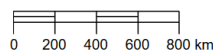
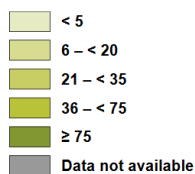
The density of motorways on islands is generally low, as islands cannot be reached directly by road. Instead, they rely on sea or air transport. Even so, the motorway density of the Canarias appears relatively high at 36 km/1000 km².

Map 1: Motorway density (km/1000 km²), by NUTS 2 regions, 2017
(km/1000 km²)



(km/1000 km²)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat – IMAGE, 06/2019



Note: Croatia: 2015 data instead 2017. Belgium and Turkey: 2016 data instead 2017.
Germany, Ireland, Lithuania, Portugal and United Kingdom, NUTS level 1.
Source: Eurostat (online data code: tran_r_net)



Map 1: Motorway density by NUTS 2 regions, 2017 [Eurostat \(tran_r_net\)](#)

Railways

Railway lines density is especially high in the regions of Germany, Czechia, Poland and Romania (see Map 2). Unsurprisingly, the highest rail density ratios are often observed in capital regions, such as Berlin, Prague and Bucharest where network nodes have developed. Regional rail density is also driven by the presence of economic activities such as heavy industries or seaport infrastructures.

High share of electrified railway lines in the [Benelux](#) countries

In general, the density of railway lines is high in western and central parts of Europe and lower in the peripheral areas. The highest network densities can be found in the regions of Germany and Czechia (all above 300 km/1000 km² on average), followed by the regions of Poland, Romania, France, the Netherlands, Slovakia, Luxembourg and Hungary (all above 100 km/1000 km²).

Looking at individual regions, the densest railway networks are observed in capital regions: Berlin (698 km/1000 km²) and Praha (476 km/1000 km²).

While central European capitals have traditionally had a strong railway infrastructure, the strikingly high values are to a large extent due to the small size of these regions within the NUTS 2 classification. Furthermore, the density of urban infrastructure tends to be much higher than the density of interurban roads and railway lines. Other capital regions with relatively dense rail networks are Bucharest (Bucuresti — Ilfov: 153 km/1000 km²), Paris (Île-de-France: 152 km/1000 km²) and Amsterdam (Noord-Holland: 89 km/1000 km²).

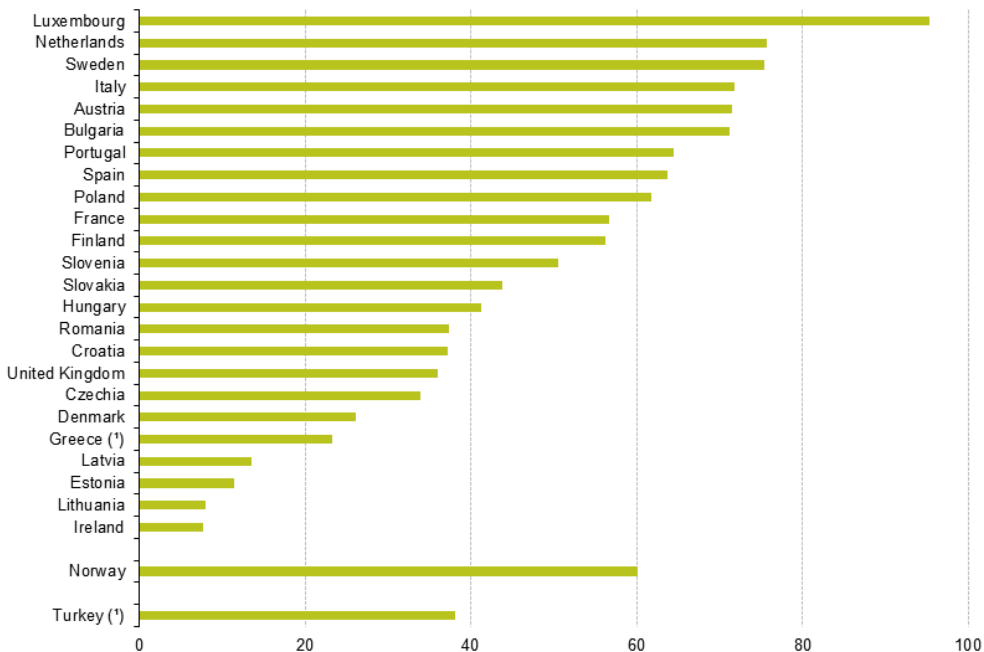
These regions are followed by Hamburg (395 km/1000 km²) and Bremen (337 km/1000 km²), two smaller NUTS 2 regions where extensive freight lines to and from seaports contribute to the high density. Like the capital regions mentioned above, Hamburg and Bremen are much smaller than regions such as Zuid-Holland and Antwerpen. These differences make it hard to draw direct comparisons with the infrastructure around other North Sea ports.

Freight transport railway lines also play a leading role in several regions where coal and steel industries remain predominant, such as the Saarland region in western Germany (134 km/1000 km²) and Śląskie in South-West Poland (160 km/1000 km²).

Focusing on railway infrastructure at country level, there are significant differences among countries with respect to the share of the network that is electrified. Luxembourg (95 %), the Netherlands (76 %)

and Sweden (75 %) registered the highest shares, while Ireland, and the [Baltic States](#) were the only Member States where less than 20 % of the network is electrified.

Share of electrified lines in total railway network length, by country, 2017 (%)



Note: Belgium, Germany, Cyprus, Malta, Iceland, Lichtenstein and Switzerland data not available.

(*) 2016 instead of 2017 data

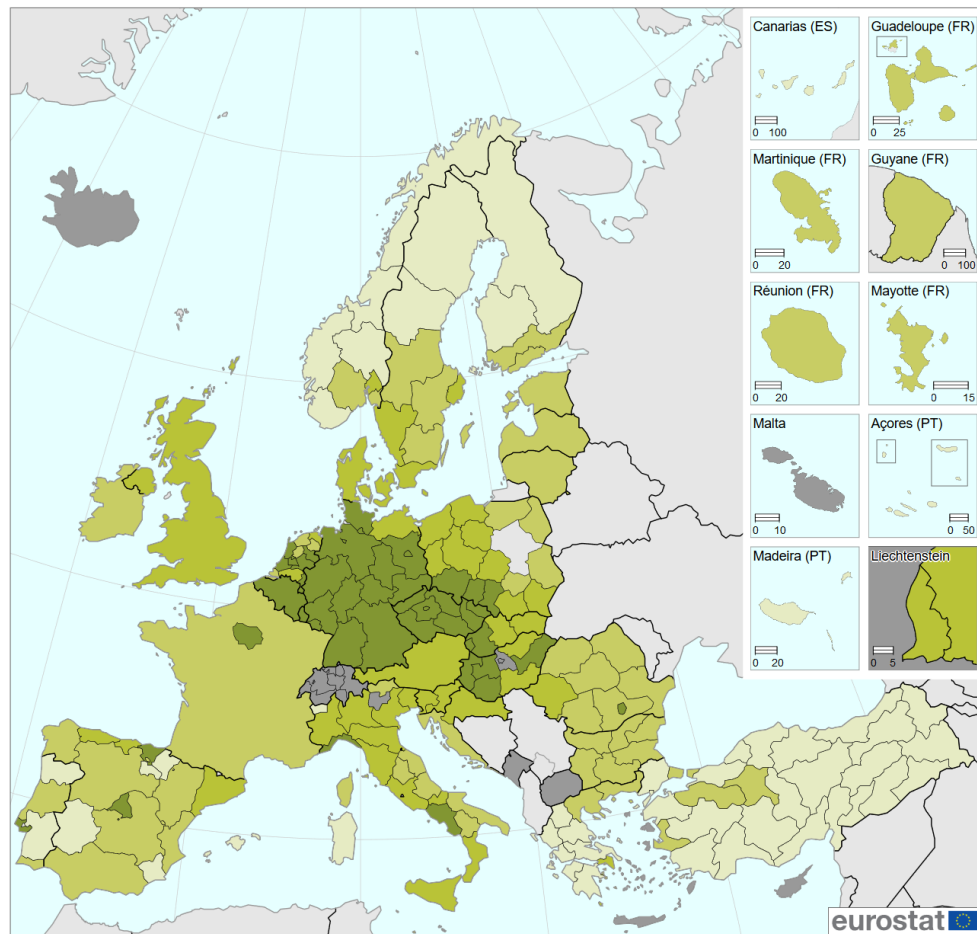
Source: Eurostat (online data code: tran_r_net)

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Figure 2: Share of electrified lines in total railway network length, by country, 2017 (%) [Eurostat](#)
[\(tran_r_net\)](#) see [country codes](#)

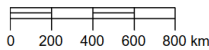
Map 2: Railway lines density (km/1000 km²), by NUTS 2 regions, 2017
(km/1000 km²)



(km/1000 km²)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat – IMAGE, 06/2019

- ≤ 25
- 25 - ≤ 50
- 50 - ≤ 75
- > 75
- Data not available



Note: Belgium: 2010 data instead of 2017. Croatia: 2015 data instead of 2017. Greece and Turkey: 2016 data instead of 2017.
Denmark, Germany, Ireland, NUTS level 1. Belgium, France, Austria and the United Kingdom: national data.
Source: Eurostat (online data code: tran_r_net)



Map 2: Railway lines density by NUTS 2 regions, 2017 [Eurostat \(tran_r_net\)](#)

Inland waterways

Very high density of inland waterways in the Netherlands

Inland waterway transport concerns mainly goods transport. This network is unequally spread over the EU, with some regions completely lacking navigable inland waterways and others having a very long

waterway system, such as the regions of the Netherlands. In the Netherlands, while the Rhine delta constitutes a natural feature for inland navigation, for most regions man-made canals constitute the main share of navigable inland waterways. There is only a single Dutch region (Gelderland) where rivers and lakes constitute the majority of inland waterways.

A very high density of more than 200 km/1000 km² is observed in eight regions of the Netherlands: Zeeland (285), Zuid-Holland (278), Flevoland and Noord-Holland (both 248), Utrecht (240), Noord-Holland (248), Friesland (NL) (227) and Groningen (213) (see Table 2). The lowest density in the Netherlands was registered in the Drenthe region (63 km/1000 km²), which still ranked 16th amongst all regions for which data are available. A part of this dense inland waterway network plays a strategic role for freight transport between the ports of Rotterdam (located in the Zuid-Holland region) and Amsterdam (Noord-Holland) and Germany and Belgium.

Only two of the top 13 regions with the highest density did not belong to the Netherlands, but to Germany: Berlin (190 km/1000 km² - essentially composed of canals) and Bremen (145 km/1000 km² - entirely composed of rivers). The regions of Hamburg and Schleswig-Holstein also have a dense network, with 70 and 47 km/1000 km² respectively, in both cases essentially constituted by rivers.

Other regions with a dense inland waterway network (in km) are found in Czechia (Prague: 65), Hungary (Budapest: 57) and France (Nord-Pas-de-Calais: 54, Île de France: 53). The network in most French regions is a mix between rivers and canals, except for Champagne-Ardenne, Picardie, Haute-Normandie, Basse-Normandie, Centre (FR), Midi-Pyrénées and Auvergne, where canals take a 100 % share and, in contrast, Poitou-Charentes where the inland waterways are entirely composed of rivers.

**Regions with the highest inland waterways
(navigable canals, rivers and lakes) density, 2017**
(km/1 000 km²)

Rank	NUTS 2	NUTS 2 description	Length of inland waterways (km)	Total area (km ²)	Inland waterways density (km/1000 km ²)
1	NL34	Zeeland	551	1 935	285
2	NL33	Zuid-Holland	902	3 247	278
3	NL23	Flevoland	599	2 413	248
4	NL32	Noord-Holland	843	3 403	248
5	NL31	Utrecht	348	1 449	240
6	NL12	Friesland (NL)	906	3 997	227
7	NL11	Groningen	513	2 405	213
8	DE30	Berlin	169	891	190
9	DE50	Bremen	61	420	145
10	NL42	Limburg (NL)	247	2 209	112
11	NL41	Noord-Brabant	549	5 082	108
12	NL21	Overijssel	353	3 421	103
13	NL22	Gelderland	495	5 137	96
14	DE60	Hamburg	53	755	70
15	CZ01	Praha	32	496	65
16	NL13	Drenthe	170	2 680	63
17	HU11	Budapest	30	525	57
18	FRE1	Nord-Pas de Calais	674	12 444	54
19	FR10	Île de France	634	12 070	53
20	DEF0	Schleswig-Holstein	739	15 802	47

Source: Eurostat (online data codes: tran_r_net and reg_area3)

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Table 2: Regions with the highest inland waterways (navigable canals, rivers and lakes) density, 2017
(km_1000 km²) [Eurostat \(tran_r_net\)](#) and [\(reg_area3\)](#)

Inland waterways (navigable canals, rivers and lakes) density, available countries, by NUTS 2 regions, 2017
(km/1 000 km²)

NUTS 2	NUTS 2 description	Density (km/1000 km ²)	NUTS 2	NUTS 2 description	Density (km/1000 km ²)	NUTS 2	NUTS 2 description	Density (km/1000 km ²)
BG31	Severozapaden	15	FRD2	Haute-Normandie	19	HU32	Észak-Alföld	15
BG32	Severen tsentralen	13	FRF1	Nord-Pas de Calais	54	HU33	Dél-Alföld	14
CZ01	Praha	65	FRE2	Picardie	34	NL11	Groningen	213
CZ02	Střední Čechy	22	FRF1	Alsace	41	NL12	Friesland (NL)	227
CZ03	Jihozápad	9	FRF2	Champagne-Ardenne	22	NL13	Drenthe	63
CZ04	Severozápad	11	FRF3	Lorraine	33	NL21	Overijssel	103
CZ05	Severovýchod	7	FRG0	Pays de la Loire	19	NL22	Gelderland	96
CZ06	Jihovýchod	4	FRH0	Bretagne	17	NL23	Flevoland	248
CZ07	Střední Morava	4	FR11	Aquitaine	15	NL31	Utrecht	240
CZ08	Moravskoslezsko	1	FR13	Poitou-Charentes	4	NL32	Noord-Holland	248
DE30	Berlin	190	FRJ1	Languedoc-Roussillon	17	NL33	Zuid-Holland	278
DE40	Brandenburg	36	FRJ2	Midi-Pyrénées	4	NL34	Zeeland	285
DE50	Bremen	145	FRK1	Auvergne	2	NL41	Noord-Brabant	108
DE60	Hamburg	70	FRK2	Rhône-Alpes	13	NL42	Limburg (NL)	112
DE80	Mecklenburg-Vorpommern	43	FRL0	Provence-Alpes-Côte d'Azur	3	RO21	Nord-Est	1
DE90	Saarland	29	HR04	Kontinentalna Hrvatska	32	RO22	Sud-Est	22
DEE0	Sachsen-Anhalt	24	LT01	Sostines regionas	2	RO31	Sud - Muntenia	15
DEF0	Schleswig-Holstein	47	LT02	Vidurio ir vakaru Lietuvos regionas	9	RO41	Sud-Vest Oltenia	12
EE00	Eesti	9	LU00	Luxembourg	14	RO42	Vest	3
EL65	Peloponnisos	0	HU11	Budapest	57	SK01	Bratislavský kraj	15
FR10	Île de France	53	HU12	Pest	26	SK02	Západné Slovensko	10
FRB0	Centre - Val de Loire	4	HU21	Közép-Dunántúl	27	F119	Länsi-Suomi	34
FRF1	Bourgogne	29	HU22	Nyugat-Dunántúl	9	F11B	Helsinki-Uusimaa	6
FRF2	Franche-Comté	21	HU23	Dél-Dunántúl	37	F11C	Etelä-Suomi	31
FRD1	Basse-Normandie	2	HU31	Észak-Magyarország	18	F11D	Pohjois- ja Itä-Suomi	29

Source: Eurostat (online data codes: tran_r_net and reg_area3)

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Table 3: Inland waterways (navigable canals, rivers and lakes) density, by NUTS 2 regions, 2017 [Eurostat \(tran_r_net\)](#) and [\(reg_area3\)](#)

Source data for tables, figures and maps (MS Excel)

- [Inland transport infrastructure at regional level | Download Excel file](#) 

Data sources

[Eurostat](#) collects regional statistics on the infrastructure of road, railways and inland waterways, as well as vehicle stocks and road accidents. The data are provided by the Member States, the [Candidate countries](#) and some [EFTA](#) countries on a voluntary basis using the REGWEB online application. The data are collected at NUTS 0, NUTS 1 and NUTS 2 levels for these transport indicators.

Density calculation : the reference area for the calculation of motorway and railway line density is the land area of the regions (e.g. excluding lakes and rivers): this is the area where such infrastructure can be built; the reference area for the calculation of inland waterways density is the total area of the regions (e.g. area including lakes and rivers).

Rankings in figures and tables: as the data collection is performed on a voluntary basis, data are not available for some countries; consequently, the rankings presented are based on the available data and they should be analysed with caution.

Country coverage:

- Table 2: 2016 data on inland waterways are not available at NUTS 2 level for Belgium, Denmark, Spain, Ireland, Italy, Cyprus, Latvia, Malta, Austria, Poland, Portugal, Slovenia, Slovakia, the United Kingdom, Norway, Switzerland and Turkey
- Inland waterways data not applicable for: Denmark, Ireland, Spain, Cyprus, Latvia, Malta, Portugal, Slovenia, Sweden, Iceland, Liechtenstein and FYR of Macedonia.

Country-specific note:

- Bulgaria: the length of the railway network excludes railway lines at stations.
- Estonia: data on motorways refer to 1st class roads.
- Switzerland: data on motorways cover 4- to 7-lane highways.

Regional breakdown

The Nomenclature of Territorial Units for Statistics (NUTS) was established by Eurostat more than 30 years ago in order to provide a single uniform breakdown of territorial units for the production of regional statistics for the European Union. From 1 May 2004, the regions in the 10 new Member States were added and from 1 January 2007 the regions of Bulgaria and Romania. Certain smaller Member States are not sub-divided in NUTS regions. This is the case for Estonia (EE), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU) and Malta (MT).

Context

Efficient transport services and infrastructure are vital to exploiting the economic strengths of all regions of the European Union, to supporting the internal market and growth, and enabling economic and social cohesion. They also influence trade competitiveness, as the availability, price, and quality of transport services have strong implications on production processes and the choice of trading partners.

Transport investments enable economic growth and job creations. Investing in transport infrastructure, particularly in railways and inland navigation, also contributes to the decarbonisation of transport. The

sector currently accounts for a quarter of the EU's greenhouse gas emissions, of which 70% comes from road transport.

Transport however faces a wide range of challenges across the EU: underinvestment, lack of suitable financing solutions, insufficiently developed and non-transparent pipelines of transport projects, continuous growth of urban populations, and various regulatory and administrative barriers. The European Commission is addressing these issues, paving the way for the competitive and sustainable EU transport system of tomorrow.

Since the global economic crisis, the EU has been suffering from low levels of investment in transport infrastructure. This has held back modernisation of the EU's transport system. Collective and coordinated efforts at European level, recently boosted by the Investment Plan for Europe, need to reverse this downward trend. In particular the trans-European transport network (TEN-T) requires investment in new infrastructure, refurbishment and modernisation of the existing network. Better coordination is needed between EU countries on cross border infrastructure projects.

Building missing links at borders between EU countries and along key European routes, removing bottlenecks or interconnecting transport modes in terminals is vital for the Single Market and for connecting Europe with external markets and trade partners. The smooth functioning of the European network requires integration and interconnection of all modes of transport.

The adaptation of infrastructure to new mobility patterns and the deployment of infrastructure for clean, alternative fuels, pose additional challenges that require new investments and a different approach to the design of networks.