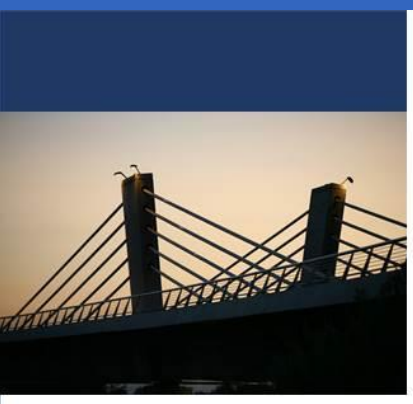
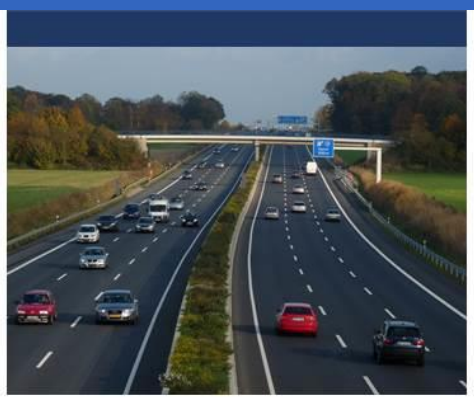
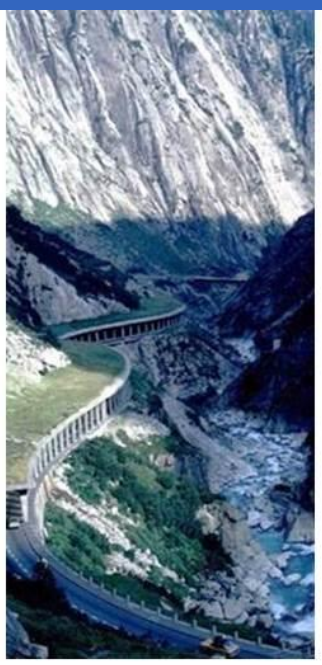
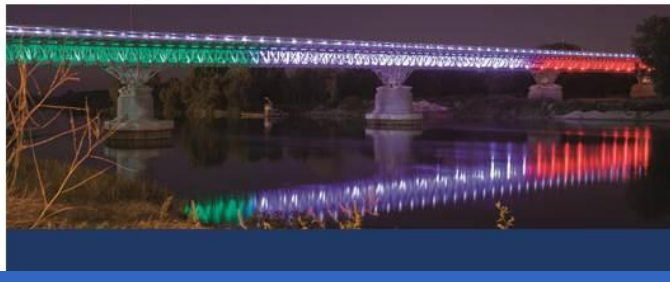
Conférence Européenne
des Directeurs des Routes

Conference of European
Directors of Roads

Trans-European Road Network, TEN-T (Roads)
2017 Performance Report



October 2018

Prepared by: CEDR WORKING GROUP PERFORMANCE OF THE ROAD NETWORK (3.5)

Group leader	Jan Pettersson	Sweden
Group members	Stefan Resch	Austria
	Eric thor Straten	Denmark
	Hanna-Mari Miettinen	Finland
	Roman Limbach	Germany
	Katerina Romaidou	Greece
	Sandro La Monica	Italy
	Pier Paolo Cartolano	Italy
	Jenne van de Velde	Netherlands
	Randi Harnes	Norway
	Grzegorz Obara	Poland
	Anton Švigelj	Slovenia
	Kenneth Natanaelsson	Sweden
	Alice Crossley	United Kingdom (England)
	Yan Cerf	Switzerland
	Modestas Lukošiūnas	Lithuania
Other contributors	Christian Wampera	Austria
	Bert Boterbergh	Belgium (Flanders)
	Niels Groenen	Belgium (Flanders)
	Simon Simonsen	Denmark
	Claus Bo Nielsen	Denmark
	Jaan Ingermaa	Estonia
	Hartmut Treichel	Germany
	Olympia Stratigaki	Greece
	Judit Tóbiás	Hungary
	Valtýr Þórisson	Iceland
	Sigurður Björn Reynisson	Iceland
	Brendan Kennedy	Ireland
	Paul Mangen	Luxembourg
	Peter Schout	Netherlands
	Jan Kristian Jensen	Norway
	Smiljana Ivanc	Slovenia
	Manuel de Lucas Tellez Meneses	Spain
	Anders Nilsson	Sweden
	Jonas Noreland	Sweden
	Andrew Rattan	United Kingdom (England)

Approved by: CEDR's GOVERNING BOARD on 4th October 2018

Edited and published by: CEDR's Secretariat-General

CEDR report: 2018-01

ISBN: 979-10-93321-47-9

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The 2017 TEN-T (Roads) Performance Report is the fifth biennial report published by CEDR on this subject and is intended to document the performance of the TEN-T road network within CEDR participating countries on 1 January 2017.

The Trans-European Transport Network (TEN-T) is a European Commission policy directed towards the implementation and development of a Europe-wide network of roads, railways, inland waterways, maritime shipping routes, ports, airports, and rail-road terminals. It consists of two planning layers:

- the **Comprehensive Network** covering all European regions and expected to be completed by 2050;
- the **Core Network** consisting of the highest strategic connections within the comprehensive network linking the most important nodes and expected to be completed by 2030.[1]

Following a 2013 review of TEN-T policy, nine **Core Network Corridors** (CNCs) were identified to streamline and facilitate the coordinated development of the TEN-T Core Network. Core Network Corridors cover the most important long-distance flows in the Core Network and are intended in particular to improve cross-border links within the union.

CEDR's intention in producing the TEN-T (Roads) Performance Report is to establish a stable set of data with which to monitor trends and identify changes in the performance of the TEN-T road network. The fact that this is the fifth biennial TEN-T (Roads) Performance Report illustrates the value that CEDR members attach to the information this report delivers and to its capacity to serve benchmarking purposes and to monitor the evolution of TEN-T network performance over time. The report provides very detailed information on TEN-T road structure and performance that is not available from any other centralised information source.

Data collected for this report are based on the **CEDR performance reporting framework**. This framework comprises a common Location Referencing Model for the TEN-T road network and a set of common definitions for base data that is used to calculate performance indicators. The TEN-T Location Referencing Model is a link-node model with nodes defined at the intersection of TEN-T links. The methodology for the definition of the model is documented in the report 'TEN-T (Roads) Location Referencing Model: Handbook & Implementation Guidance' published by CEDR's Planning Working Group in 2008.

With 22 national road authorities (NRAs) providing data on a voluntary basis, the 2017 report has the highest number of participating countries of all TEN-T (Roads) Performance Reports produced to date. It is worth mentioning that the 2017 TEN-T (Roads) Performance Report includes data from the Slovak Republic (which participated in this report for the first time) and Hungary (which was missing from the 2015 report).

The TEN-T (Roads) network in the participating countries is approx. 84,700 kilometres long. Approx. 42% of these roads are Core Roads and 58% of Non-Core Roads. Participating countries are crossed by about 25,800 km of Core Network Corridors (CNCs).

The TEN-T (Roads) network comprises approx. 61% of motorways and 39% of non-motorway roads.

[1] 'Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network'

53% of the entire TEN-T (Roads) network (about 40,280 km) has more than two and up to four lanes, 20% has more than four and up to six lanes, and only about 3% (about 2,073 km) has more than six lanes.

The TEN-T network has also about 18,570 km of roads (almost 24% of the total length) with only two lanes or less.

The TEN-T (Roads) network has a limited share of civil engineering structures with bridges[2] and tunnels[3], totalling about 1,454 km (1.9% of the total network length) and about 1,038 km (1.4%) respectively.

Not surprisingly, most of the TEN-T (Roads) are situated in a rural environment. However, about 6,850 km (i.e. 8.9% of the total network) are located in urban areas and carry more traffic than rural roads.

A look at the average annual daily traffic flow (AADT) reveals that 55.5% of the entire TEN-T (Roads) network carries less than 20,000 vehicle per day, while 41% of the network carries more than 20,000 and less than 100,000 vehicles per day. Only 3.4% of the entire network is very heavily trafficked with more than 100,000 vehicles per day.

Traffic flows vary considerably from country to country: Belgium (Flanders), the Netherlands, and the United Kingdom (England) have the most trafficked TEN-T roads, with more than 20% of their network carrying more than 80,000 vehicles per day.

On average, 13.7% of the traffic using the TEN-T network is made up of HGVs, with this share remaining consistent for both motorways and non-motorways.

Regarding the future development of the report, the group basically has two goals: firstly, there is the natural ambition to get complete geographical coverage of all CEDR members and European Union members. In this respect, pursuing the involvement of missing member states (and missing road authorities) is to be regarded as one of the key goals for improving the quality of the report. Secondly, new data could be collected with the support of CEDR members. To this end, the working group has already started a discussion to identify new indicators that could enrich the description of the TEN-T network without posing an excessive burden on data collection.

[2] Only road-carrying bridges longer than 100 m are reported.

[3] Only tunnels longer than 300 m are reported.

1 Introduction

1.1 Purpose of the document

The 2017 TEN-T (Roads) Performance Report is the fifth biennial report published by CEDR on the performance of the TEN-T road network within CEDR participating countries.

The Trans-European Transport Network (TEN-T) is a European Commission policy directed towards the implementation and development of a Europe-wide network of roads, railways, inland waterways, maritime shipping routes, ports, airports, and rail-road terminals. It consists of two planning layers:

- the **Comprehensive Network**, covering all European regions and expected to be completed by 2050;
- the **Core Network**: consisting of the highest strategic connections within the Comprehensive Network linking the most important nodes and expected to be completed by 2030.[4]

Following a 2013 review of TEN-T policy, nine **Core Network Corridors** (CNCs) were identified to streamline and facilitate the coordinated development of the TEN-T Core Network. Core Network Corridors cover the most important long-distance flows in the Core Network and are intended, in particular, to improve cross-border links within the union.

CEDR's intention in producing these reports is to establish a stable set of data with which to monitor trends and identify changes in the performance of the TEN-T road network. As such, the report is a particularly useful source of information for individual national road authorities (NRAs), regulatory bodies, and others for benchmarking purposes and for setting national performance targets.

The data collected for this report refers to 1 January 2017.

1.2 Background and context

CEDR has long recognised the need for high-quality, comparable information about the performance of the TEN-T road network and has, therefore, undertaken work to develop a simple, low-cost performance reporting framework that could be used by all members to provide such data.

This framework comprises a common location referencing model for the TEN-T road network and a set of common definitions for base data that is used to calculate performance indicators.

The TEN-T location referencing model is a link-node model with nodes defined at the intersection of TEN-T links. The methodology for the definition of the model is documented in the report 'TEN-T (Roads) Location Referencing Model: Handbook & Implementation Guidance' published by CEDR's Planning Working Group in 2008.

The performance reporting framework has been the basis of the biennial CEDR report on the performance of the TEN-T (Roads) network since 2009.

This framework has advantages over other systems because:

- all data is referenced to a common, stable location referencing model,

[4] 'Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network'

- all data is based on common data definitions, and
- data is provided directly by NRAs.

The framework therefore improves data quality and consistency and makes comparison of this information more meaningful.

1.3 Structure of the document

The document is divided up into four main sections and five annexes.

Section 2 provides an overview of the number of countries participating to the reporting activities and compares key network indicators with key national indicators.

Section 3 describes the structure of the TEN-T (Roads) network in terms of the number of lanes, length of bridges and tunnels, physical environment, and ITS equipment.

Section 4 analyses the performance of the road network by describing transport activity in terms of traffic density, volume, and proportion of heavy goods vehicles traffic, fatal accidents rates, and capacity improvement planned on the network.

Section 5 includes overall conclusions from the whole study and provides indications for future developments.

The methodology applied to the data collection process is described in **Annex 1**. The definitions for the collected data are provided in **Annex 2**.

Thematic maps showing indicators at link level on the whole TEN-T (Roads) network are given in **Annex 3**. Maps showing the TEN-T Core Network Corridors and their length within the participating countries are provided in **Annex 4**.

Annex 5 concludes the report by providing background information on key socio-economic indicators and on the national road network of each participating country together with a brief profile of the national road authority.

1.4 TEN-T (Roads) Performance GIS web map

GIS technology has long been valued as a means of enhancing communication and collaboration in decision-making, effectively managing resources and assets, enhancing the efficiency of workflows, and improving the accessibility of information to the public.

The development of web maps further increases the possibility of information-sharing as users do not need to purchase and install software and become GIS experts since they are made available through a regular web browser with a simple, user-friendly interface.

A GIS web map has been developed to support the visualisation of collected data and to give higher visibility to CEDR's valuable 'TEN-T (Roads) Performance Report'.

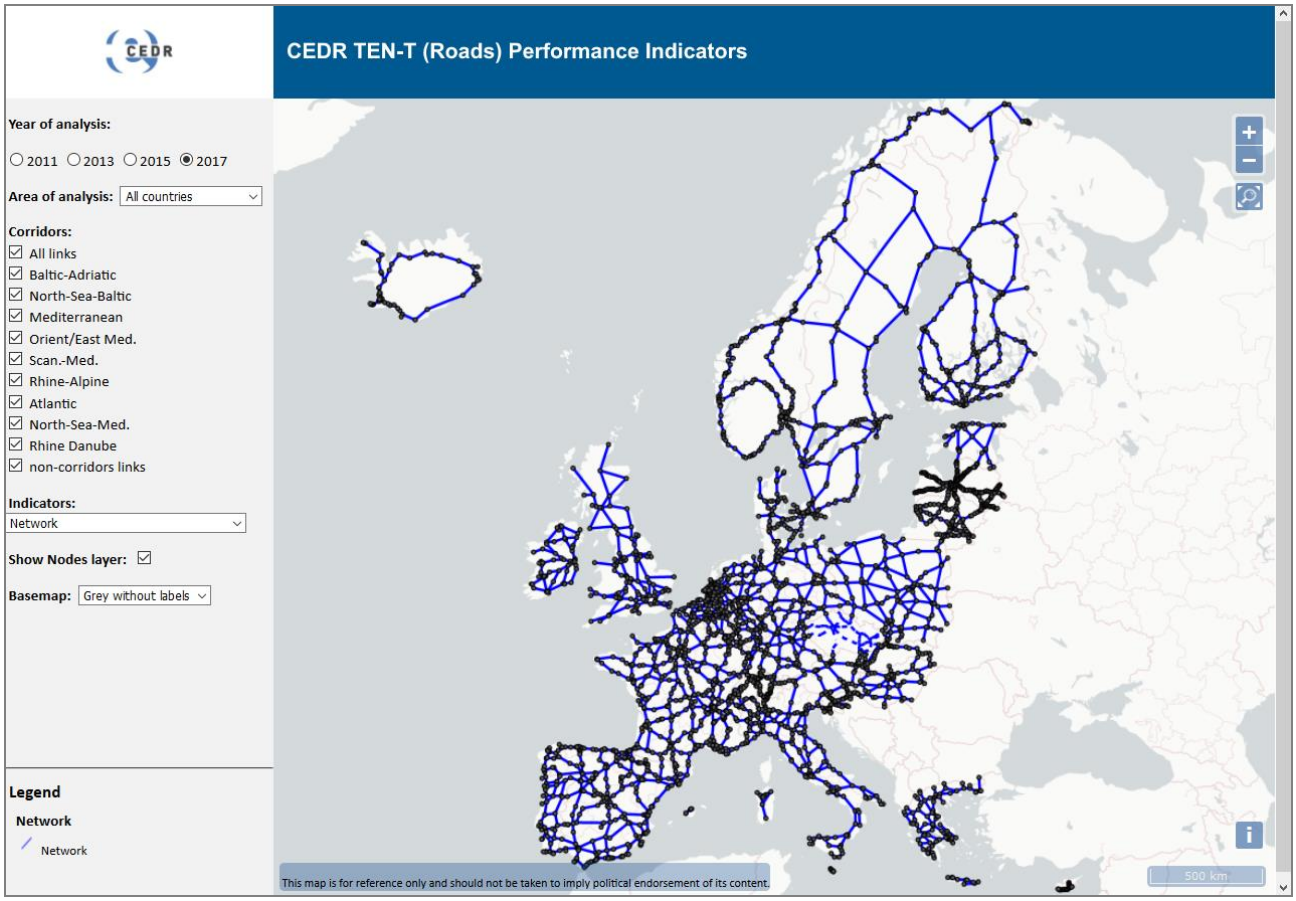


Figure 1: CEDR TEN-T (Roads) Performance GIS web map

The development of the web map was based on open source software in order to maximise its potential and minimise costs, offering the possibility to install the platform on the most widely used operating systems (Windows, Linux, Mac OSX) without the need to purchase any additional software licence.

The web map displays the GIS layer of CEDR's logical network, in conformity with CEDR's Location Referencing Model, and allows for the visualisation of thematic maps showing road performance indicators at link level (e.g. road type, number of lanes, etc.) and for different years (on the basis of previous CEDR's TEN-T (Roads) Performance Report data at 2015, 2013, and 2011).

Moreover, by clicking on the specific link, it is possible to access the whole set of link-based indicators through a pop-up. The GIS web map is currently available at:

http://trt.serverlet.com/cedr/index_cedr.php#

2 About the TEN-T (Roads) Network

2.1 Participating countries in 2017

In total, 22 countries voluntarily provided data for the 2017 report.

It is worth mentioning that the 2017 TEN-T (Roads) Performance Report includes data from the Slovak Republic (which participated in this report for the first time) and Hungary (which was missing from the 2015 report). Furthermore, the 2017 report includes complete network data and indicators for Poland. *Table 1* below provides with an overview of the countries that have been included in all CEDR TEN-T (Roads) performance reports since 2009. It shows that the 2017 report has the highest number of participating countries to date.

Table 1: Countries participating in the TEN-T (Roads) Performance Report

Country	2009	2011	2013	2015	2017
Austria	■	■	■	■	■
Belgium (Flanders)			■	■	■
Belgium (Wallonia)	■	■	■	■	■
Cyprus	■	■	■	■	■
Czech Republic					
Denmark	■	■	■	■	■
Estonia	■	■	■	■	■
Finland	■	■	■	■	■
France	■	■	■	■	■
Germany	■	■	■	■	■
Greece	■	■	■	■	■
Hungary	■	■	■	■	■
Iceland	■	■	■	■	■
Ireland		■	■	■	■
Italy	■	■	■	■	■
Latvia					■
Lithuania	■	■	■	■	■
Luxembourg	■	■	■	■	■
Malta			■	■	■
Netherlands			■	■	■
Norway	■	■	■	■	■
Poland				■	■
Portugal					■
Slovenia	■	■	■	■	■
Slovak Republic					■
Spain	■	■	■	■	■
Sweden	■	■	■	■	■
Switzerland			■	■	■
United Kingdom	■	■	■	■	■

■ Network and updated data included in the analysis
■ Network included in maps, data not included in the analysis
■ Network only, data not included in the analysis

As far as data coverage is concerned, it should be noted that:

- for Belgium, only the Flemish road authority contributed to the 2017 report. Consequently, all Belgium (network and traffic) data in this report relate to Flanders region only;
- traffic data for Italy covers only the sections of the road network managed by ANAS[5] and not those sections managed by motorway concessionaires;
- traffic data for the United Kingdom covers the road network of England only.

[5] ANAS S.p.A. is an Italian government-owned company deputed to the construction and maintenance of state motorways and primary roads with the Italian Ministry of Economy and Finance as its sole shareholder and subject to the supervision of the Ministry of Infrastructure and Transport. Since January 2018, ANAS has been part of the Gruppo Ferrovie dello Stato Italiane, the Italian railway infrastructure manager.

2.2 National statistics

Table 2 shows the length and performance of the TEN-T road network computed for the 22 participating countries on the basis of the data delivered.

Table 2: Length and performance of the TEN-T (Roads) network

Country	National statistics		TEN-T (Roads) network length (km)					TEN-T (Roads) network use (Average)		
	Population[6] [1,000s]	Total area [km²]	Comprehensive[7]	Core	Non-Core	Motorway	Non-motorway	Traffic Flow [AADT]	Traffic Density [AADT/Lane]	HGV [%]
AT	8,690	83,872	1,735	1,100	635	1,735	-	41,042	9,032	11.0%
BE	11,311	30,510	948*	604*	344*	820*	128*	63,383*	12,401*	18.0%*
CH	8,327	41,290	1,325	300	1,025	1,123	202	41,552	9,909	6.0%
DE	82,176	357,021	10,700	6,365	4,335	10,341	359	48,884	10,266	15.2%
DK	5,707	43,098	1,556	769	787	1,139	417	28,952	7,042	11.9%
EE	1,316	45,228	1,350	480	870	-	1,350	10,545	4,819	11.8%
ES	46,440	504,030	12,198	5,940	6,259	10,884	1,314	21,714	5,173	13.4%
FI	5,487	338,424	5,220	1,098	4,121	795	4,425	8,368	2,851	10.1%
GR	10,784	131,990	4,816	1,782	3,034	1,846	2,970	5,895	1,528	15.0%
HU	9,830	93,030	1,450	1,058	392	1,105	344	30,600	7,647	17.6%
IE	4,725	70,280	2,163	499	1,664	990	1,172	18,805	5,841	6.7%
IS	333	103,001	1,804	53	1,751	3	1,801	2,647	974	7.1%
IT	60,666	301,338	8,715	4,302	4,413	7,943	772	7,134**	1,754**	8.8%**
LT	2,889	65,200	1,652	597	1,055	320	1,332	9,228	2,975	17.7%
LU	576	2,586	90	90	-	90	-	40,703	10,121	16.4%
NL	16,979	41,543	1,886	643	1,243	1,886	-	72,042	14,610	13.7%
NO	5,211	385,252	4,816	163	4,653	620	4,196	7,153	2,579	14.7%
PL	37,967	312,685	7,622	3,884	3,738	2,429	5,193	18,349	5,494	19.8%
SE	9,851	449,964	6,417	3,012	3,405	1,913	4,504	14,298	4,823	14.4%
SI	2,064	20,273	594	467	127	537	57	30,018	7,524	13.1%
SK	5,426	48,845	686	686	-	481	205	20,628	5,893	24.8%
UK	65,383	223,010	6,989	2,077	4,912	2,727***	1,704***	44,284***	8,410***	11.9%***
Total/ Average	**402,138**	**3,692,470**	**84,732**	**35,969**	**48,763**	**49,729**	**32,445**	**26,647**	**6,439**	**13.6%**

Source: Eurostat, CEDR data on TEN-T road network

** Belgium-Flanders only*
*** ANAS network only*
**** England network only*

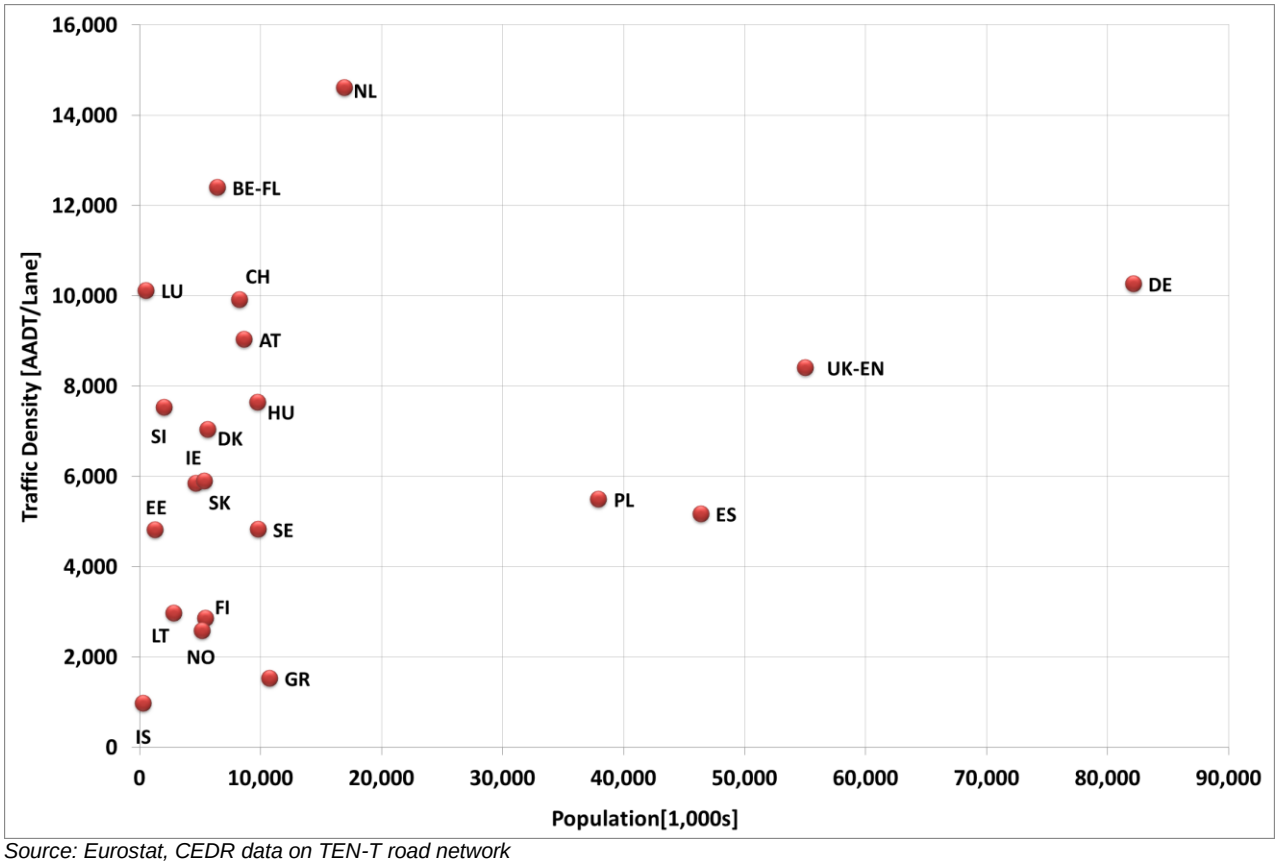
Table 2 shows a high proportion of HGVs for Eastern European countries and in particular for the Slovak Republic (24.9%), Poland (19.8%), Hungary (17.6%), and Lithuania (17.0%), and a low

[6] Population as at 1 January 2017 from Eurostat.

[7] The Comprehensive network comprises the Core and the Non-core networks. The sum of Motorway and Non-motorway road lengths equals the length of the Comprehensive network.

proportion for Iceland (7.1%), Ireland (6.7%), and Switzerland (6%). The lowest value for Switzerland should be considered in the light of local regulations that impose limits on the number of transiting HGVs.

Figure 2 compares the Traffic Density on the TEN-T road network (calculated from data provided on the Annual Average Daily Traffic and Number of Lanes) to the national population (from Eurostat) for each participating country.



Source: Eurostat, CEDR data on TEN-T road network

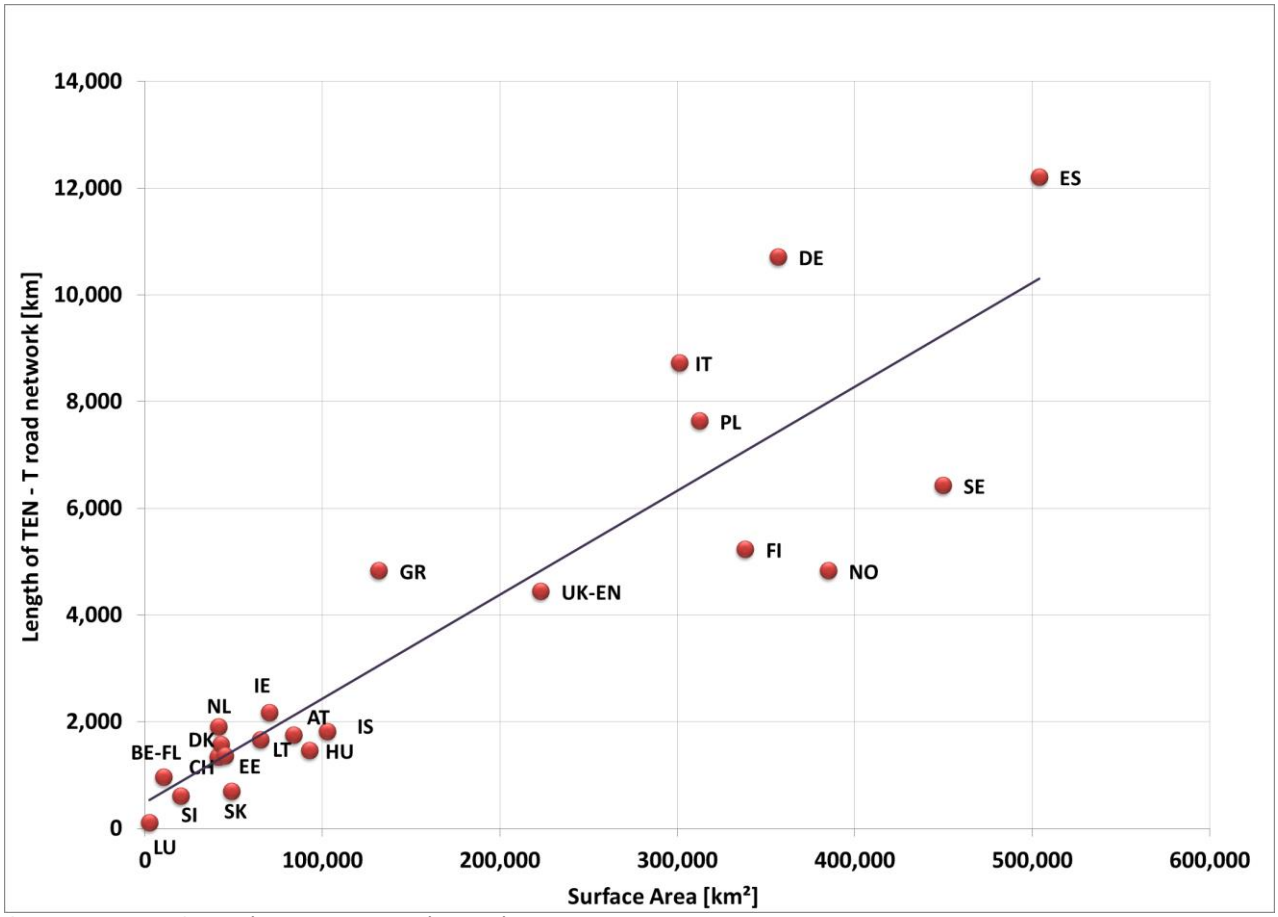
Note: The data for Belgium refers to Flanders only. The data for the United Kingdom refers to England only. Italy not included in the chart given the limited data coverage.

Figure 2: Comparison of Population and Traffic Density on TEN-T (Roads)

The correlation between the length of the TEN-T road network and the surface area of each participating country is provided in *Figure 3*. It can also be seen that most of the participating countries have a surface area of less than 100,000 km^2 and a TEN-T road network shorter than 2,200 km.

The trend line clearly shows that the length of the TEN-T network is proportional to the size of the country.

Moreover, this figure shows how the countries form two groupings based on their surface area and length of TEN-T road network: bigger countries (i.e. those with a surface area greater than 100,000 km^2), which can be further broken down into countries with a relatively long TEN-T network (above the trend line) and countries with a relatively short network compared to their surface area (below the trend line), and smaller countries (i.e. those with a surface area smaller than 100,000 km^2).

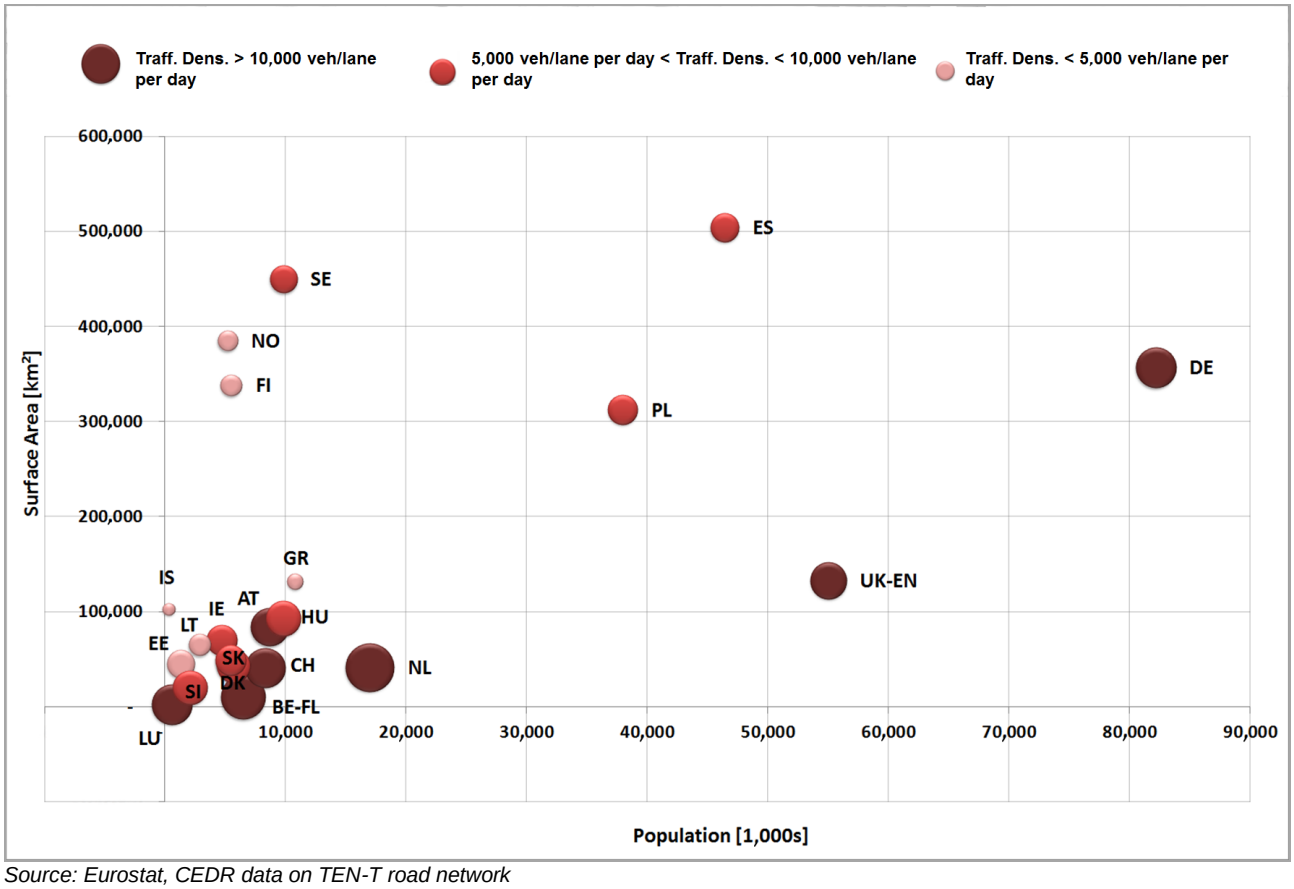


Source: Eurostat, CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only. Data for the United Kingdom relates to England only.

Figure 3: Comparison of the length of the TEN-T (Roads) network and the surface area of CEDR countries

Figure 4 combines the surface area (y axis), population (x axis), and relative Traffic Density (size of the circles). It shows that Switzerland, Austria, Luxembourg, and the Netherlands have a relatively high traffic density on their TEN-T network in relation to their population and surface area when compared with Germany.



Source: Eurostat, CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only. Data for the United Kingdom relates to England only. Italy is not included in the chart given the limited data coverage.

Figure 4: Traffic density vs. surface area and population

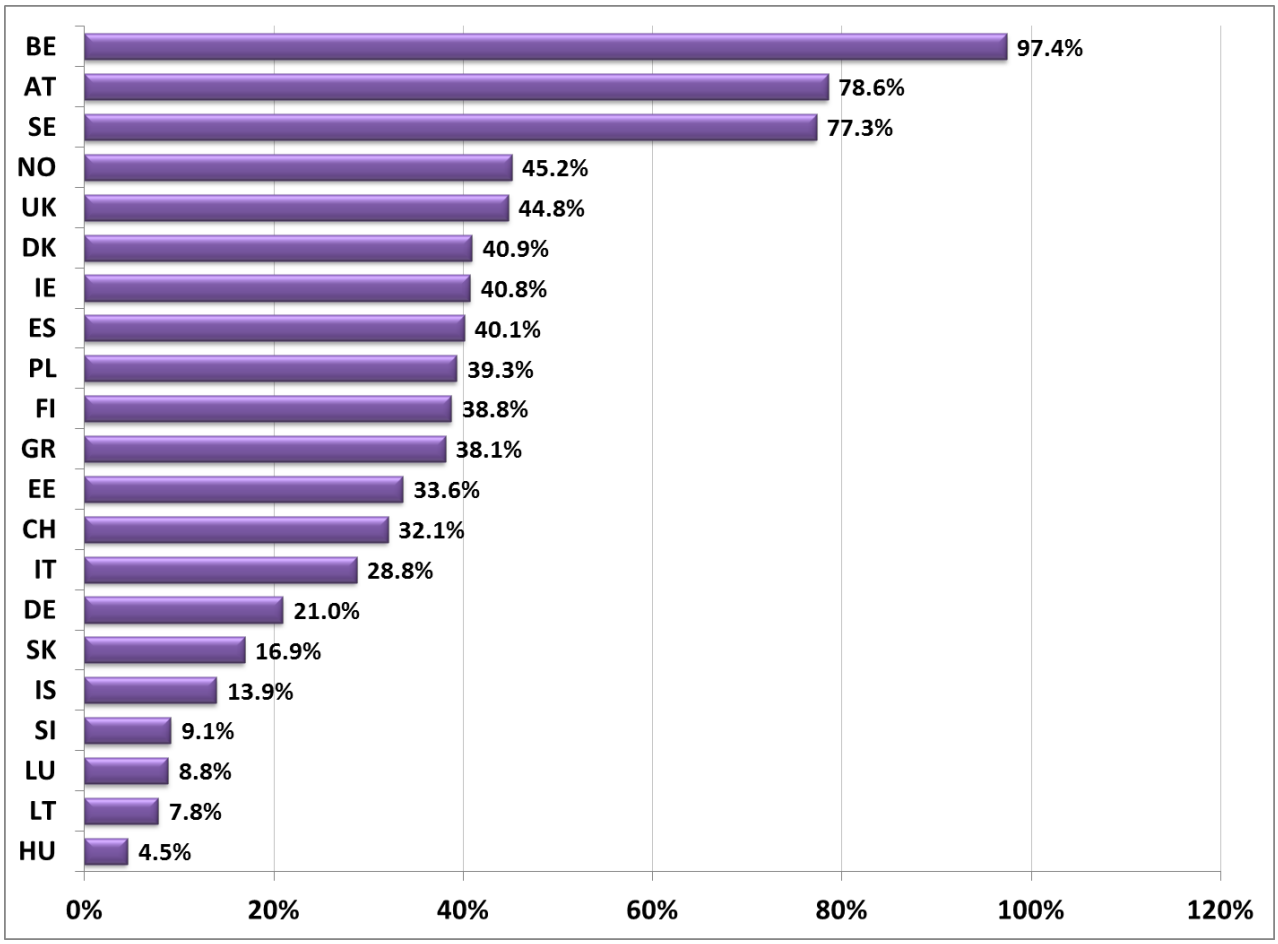
Table 3 compares the length of the TEN-T network with (i) the length of the Strategic network (i.e. primary roads according to the definition in each country) and (ii) the length of the County/Provincial network (i.e. secondary roads, excluding communal ones). The data concerning the size of the Strategic and County/Provincial networks was provided by participating NRAs.

Table 3: Comparison of the TEN-T (Roads) networks and the national networks

Country	Total TEN-T [km]	Strategic roads* [km]	TEN-T/ Strategic	County/Provincial roads [km]	TEN-T/ County/Provincial
AT	1,735	2,208	78.6%	131,389	1.3%
BE**	948	973	97.4%	3,631	26.1%
CH	1,325	4,129	32.1%	68,890	1.9%
DE	10,700	51,064	21.0%	178,906	6.0%
DK	1,556	3,800	40.9%	70,713	2.2%
EE	1,350	4,014	33.6%	30,811	4.4%
ES	12,198	30,390	40.1%	135,093	9.0%
FI	5,220	13,465	38.8%	64,516	8.1%
GR	4,816	12,630	38.1%	33,600	14.3%
HU	1,450	31,986	4.5%	174,578	0.8%
IE	2,163	5,306	40.8%	n.a.	n.a.
IS	1,804	12,936	13.9%	13,023	13.9%
IT	8,715	30,300	28.8%	152,100	5.7%
LT	1,652	21,244	7.8%	63,250	2.6%
LU	90	1,017	8.8%	1,891	4.8%
NL	1,886	n.a.	n.a.	n.a.	n.a.
NO	4,816	10,666	45.2%	83,784	5.7%
PL	7,622	19,388	39.3%	153,865	5.0%
SE	6,417	8,299	77.3%	90,213	7.1%
SI	594	6,529	9.1%	32,243	1.8%
SK	686	4,057	16.9%	13,974	4.9%
UK	6,989	15,603	44.8%	n.a.	n.a.

Source: CEDR data on TEN-T and national road networks

** Strategic roads' length without ramps*
*** Belgium-Flanders only*

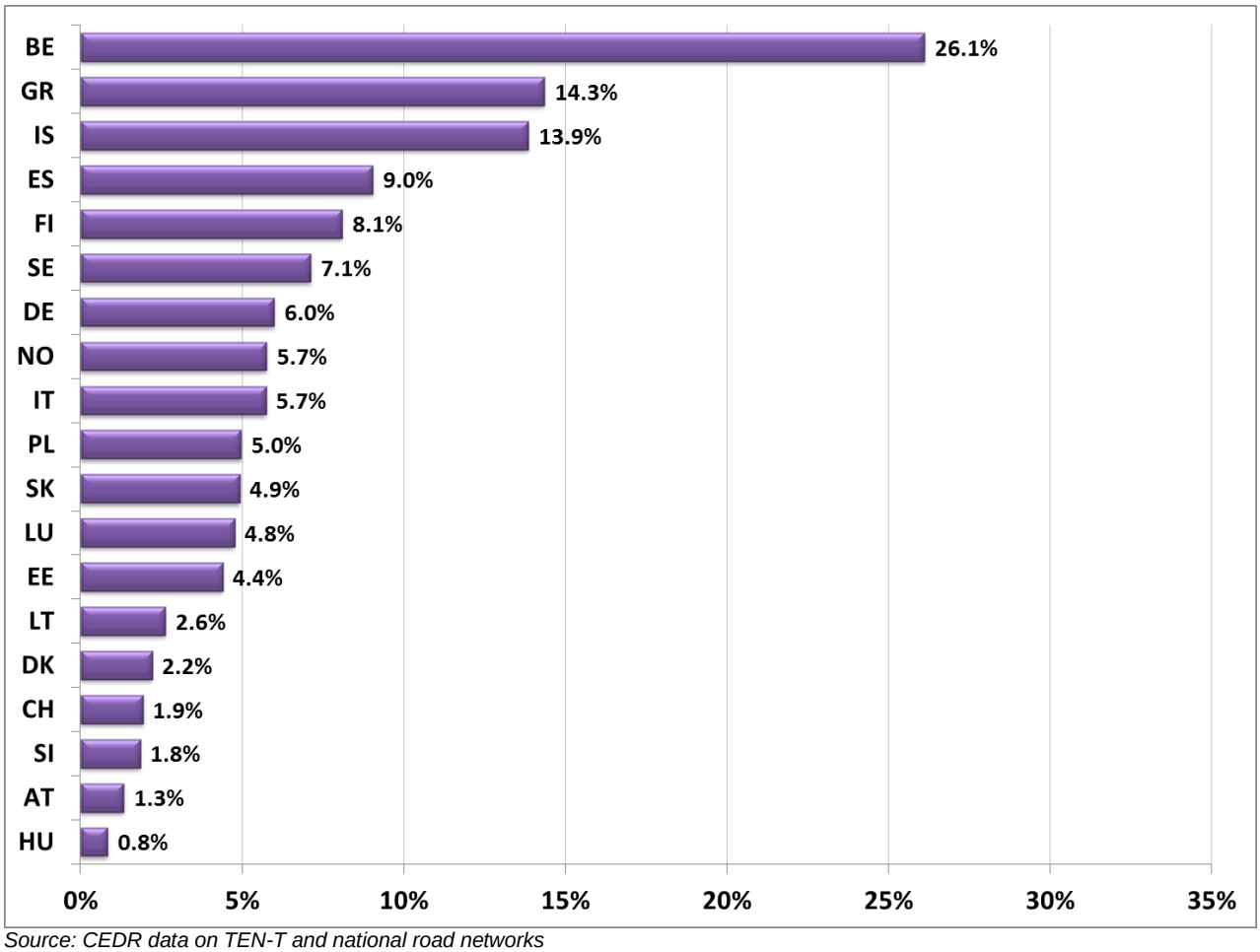


Source: CEDR data on TEN-T and national road networks

Note: Data for Belgium relates to Flanders only. Netherlands not included due to lack of data.

Figure 5: Ratio of the TEN-T (Roads) network on the Strategic network

Figure 5 indicates the ratio of the TEN-T network to the Strategic network. In Sweden, Austria, and Belgium, more than 70% of the domestic Strategic network belongs to the TEN-T network. High shares can be also observed in Norway, the United Kingdom, Denmark, Ireland, Spain, Poland, Finland, and Greece, with the TEN-T network accounting for about 40% of first-level roads. Other countries have lower shares, and in Hungary, Lithuania, Luxembourg, and Slovenia, the TEN-T network accounts for less than 10% of first-level roads.



Source: CEDR data on TEN-T and national road networks

Note: Data for Belgium relates to Flanders only. United Kingdom, Netherlands, and Ireland not included due to a lack of data.

Figure 6: Ratio of the TEN-T (Roads) network to County/Provincial roads

Figure 6 shows the ratio of TEN-T roads to the County/Provincial network for each country. Only countries for which data was available have been considered in the analysis. This figure shows that with the exception of Iceland, Greece, and Belgium, the share for each country is generally less than 10%.

2.3 TEN-T Core and Non-Core Networks

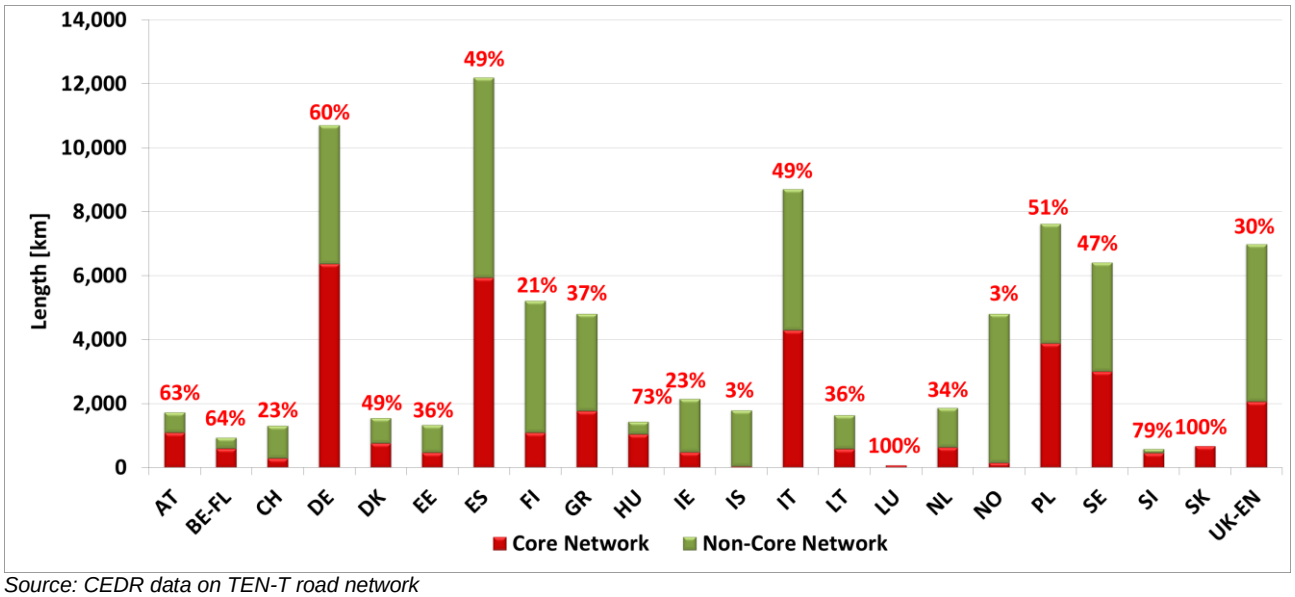
Table 4 and *Figure 7* show the length of Core and Non-Core TEN-T Network in each of the participating countries. The percentages given indicate the proportion of the Core and Non-Core Networks with respect to the Comprehensive Network (i.e. Core and Non-Core Network) in each country.

Table 4: Length of the TEN-T (Roads) network by Core and Non-Core Networks

Country	Comprehensive Network [km]	Core Network		Non-Core Network	
		Length [km]	%	Length [km]	%
AT	1,735	1,100	63.4%	635	36.6%
BE*	948	604	63.7%	344	36.3%
CH	1,325	300	22.6%	1,025	77.4%
DE	10,700	6,365	59.5%	4,335	40.5%
DK	1,556	769	49.4%	787	50.6%
EE	1,350	480	35.6%	870	64.4%
ES	12,198	5,940	48.7%	6,259	51.3%
FI	5,220	1,098	21.0%	4,121	79.0%
GR	4,816	1,782	37.0%	3,034	63.0%
HU	1,450	1,058	73.0%	392	27.0%
IE	2,163	499	23.1%	1,664	76.9%
IS	1,804	53	2.9%	1,751	97.1%
IT	8,715	4,302	49.4%	4,413	50.6%
LT	1,652	597	36.1%	1,055	63.9%
LU	90	90	100.0%	-	-
NL	1,886	643	34.1%	1,243	65.9%
NO	4,815	163	3.4%	4,652	96.6%
PL	7,622	3,884	51.0%	3,738	49.0%
SE	6,417	3,012	46.9%	3,405	53.1%
SI	594	467	78.6%	127	21.4%
SK	686	686	100.0%	-	-
UK	6,989	2,077	29.7%	4,912	70.3%
Total	**84,732**	**35,969**	**42.5%**	**48,763**	**57.5%**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*



Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 7: Comparison of Core and Non-Core Network lengths of TEN-T (Roads)

Countries with highest proportion of Core Network are Austria (63%), Germany (60%), Hungary (73%), Luxembourg (100%), Slovenia (79%), and the Slovak Republic (100%). Switzerland (23%) and Ireland (23%) have a lower share, while Iceland (3%) and Norway (3%) have the lowest shares. For the map illustrating the extent of the Core and Non-core Networks in participating countries, see *Figure 8*.

Source: CEDR data on TEN-T road network

Figure 8: TEN-T Core and Non-Core Networks

2.4 Core Network Corridors

For the first time ever, the 2017 TEN-T (Roads) Performance Report contains an analysis of the Core Network Corridors (CNCs). The nine CNCs, the concept for which was introduced in 2014, are the backbone of the TEN-T Core Network. Individual maps of the Core Network Corridors are provided in Annex 4.

Figure 9: TEN-T Road Core Network Corridors

Table 5 shows the length of the CNCs by road type. It should be noted that some road sections belong to more than one corridor and, therefore, the total CNCs' length cannot be computed by summing up the lengths of the individual corridors. Overall, Core Network Corridors account for 30.5% (25,826 km) of the entire TEN-T network under consideration.

Table 5: Length of TEN-T Core Network Corridors by Road Type

Core Network Corridor	Length [km]			
	Motorways	Non-motorways	No data	Total
Baltic– Adriatic	2,602	786	-	3,388
North Sea–Baltic	2,599	901	-	3,500
Mediterranean	4,383	141	-	4,524
Orient/East–Med	2,952	473	-	3,425
Scandinavian– Mediterranean	6,455	140	-	6,595
Rhine–Alpine	1,613	24	-	1,637
Atlantic	2,037	4	-	2,041
North Sea–Mediterranean	1,956	316	272	2,544
Rhine–Danube	2,251	274	-	2,525
Total CNCs	**22,681**	**2,873**	**272**	**25,826**

Source: CEDR data on TEN-T road network

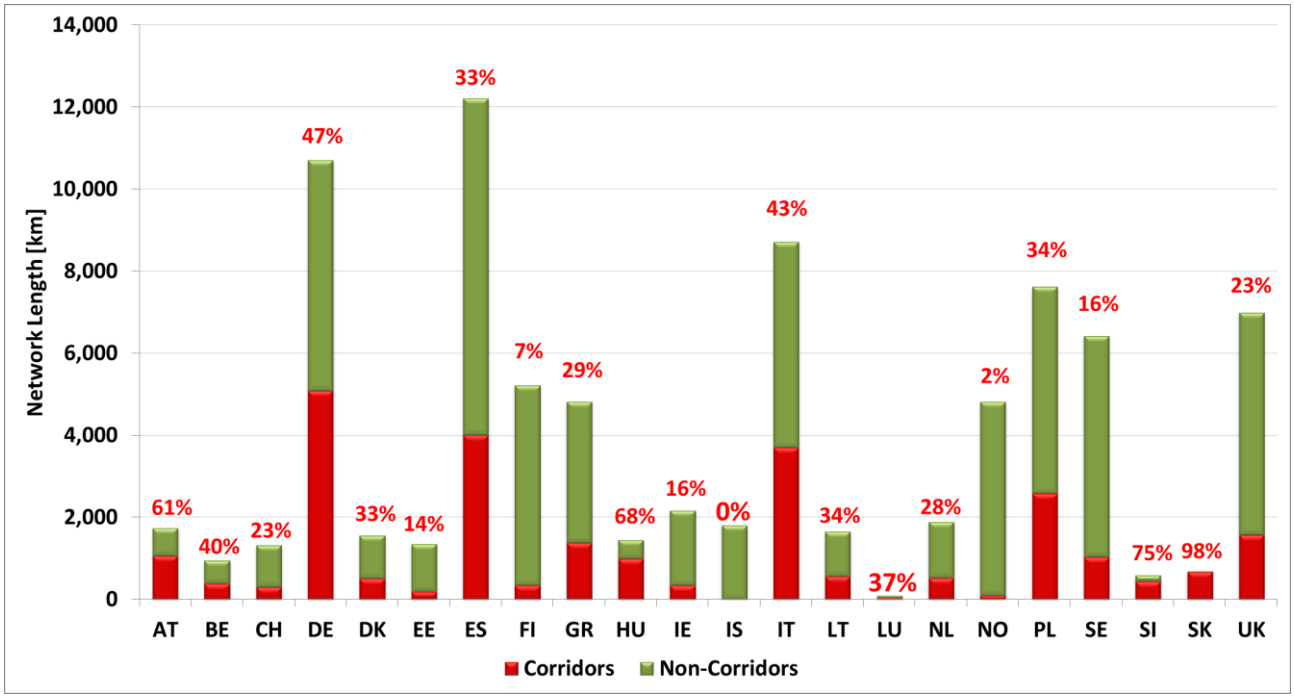
Table 6: Length of the TEN-T (Roads) network by Corridor and Non-Corridor Networks

Country	Total length [km]	Corridors		Non-Corridors	
		Length [km]	%	Length [km]	%
AT	1,735	1,092	61.2%	673	38.8%
BE*	948	379	40.0%	569	60.0%
CH	1,325	300	22.6%	1,025	77.4%
DE	10,700	5,080	47.5%	5,620	52.5%
DK	1,556	511	32.8%	1,045	67.2%
EE	1,350	195	14.4%	1,155	85.6%
ES	12,198	4,003	32.8%	8,195	67.2%
FI	5,220	343	6.6%	4,877	93.4%
GR	4,816	1,383	28.7%	3,433	71.3%
HU	1,450	986	68.0%	463	32.0%
IE	2,163	350	16.2%	1,813	83.8%
IS	1,804	-	0.0%	1,804	100.0%
IT	8,715	3,700	42.5%	5,015	57.5%
LT	1,652	568	34.4%	1,084	65.6%
LU	90	33	36.6%	57	63.4%
NL	1,886	523	27.8%	1,363	72.2%
NO	4,816	92	1.9%	4,724	98.1%
PL	7,622	2,584	33.9%	5,038	66.1%
SE	6,417	1,040	16.2%	5,377	83.8%
SI	594	445	74.9%	149	25.1%
SK	686	675	98.4%	11	1.6%
UK	6,989	1,573	22.5%	5,416	77.5%
Total	**84,732**	**25,826**	**30.5%**	**58,907**	**69.5%**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

Table 6 indicates the length of the Core Network Corridors at national level. It can be observed that Iceland has no Core Network Corridors. In contrast, CNCs account for 98.4% of the TEN-T network of the Slovak Republic.



Source: CEDR data on TEN-T and national roads network

Note: Data for Belgium relates to Flanders only.

Figure 10: Percentage of the TEN-T (Roads) network in participating countries that belongs to a CNC'

Figure 10 shows the share of Core Network Corridors on total TEN-T network by country. Differences in the shares presented in

Figure 10 and *Figure 7* show that part of the TEN-T Core Network does not belong to any corridor.

Countries showing the highest proportion of CNC length on the total TEN-T network are the Slovak Republic (98%), Slovenia (75%), Hungary (68%), and Austria (61%), followed by Germany (47%) and Italy (43%).

3 Network Structure

3.1 Road Type

The road type indicator is intended to provide an overview of the infrastructure characteristics of the network. Two types of roads are considered: motorways and non-motorway roads. Given the different technical parameters of motorways (e.g. separate carriageways, no level crossings, high operational speeds, etc.) and their ability to handle high traffic volumes, a high share of motorways on the total network length highlights higher operational performances on the TEN-T network.

Table *7* shows the total length of the road network for the participating countries and the length by road type.

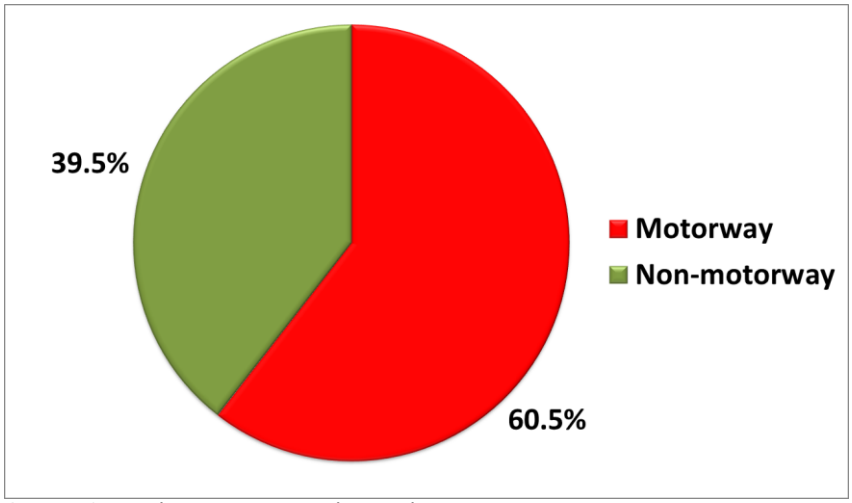
Table 7: Length of the TEN-T (Roads) network by Road Type

Country	Network length [km]	Nr. of sections	Ratio Network [Length / Nr. Sections]	Road Type					
				Motorway		Non-motorway		No data	
				Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	80	21.7	1,735	100.0%	-	-	-	-
BE*	948	61	15.5	820	86.5%	128	13.5%	-	-
CH	1,325	111	11.9	1,123	84.8%	202	15.2%	-	-
DE	10,700	360	29.7	10,341	96.6%	359	3.4%	-	-
DK	1,556	74	21.0	1,139	73.2%	417	26.8%	-	-
EE	1,350	45	30.0	-	-	1,350	100.0%	-	-
ES	12,198	421	29.0	10,884	89.2%	1,314	10.8%	-	-
FI	5,220	176	29.7	795	15.2%	4,425	84.8%	-	-
GR	4,816	120	40.1	1,846	38.3%	2,970	61.7%	-	-
HU	1,450	48	30.2	1,105	76.2%	344	23.8%	-	-
IE	2,163	58	37.3	990	45.8%	1,172	54.2%	-	-
IS	1,804	78	23.1	3	0.2%	1,801	99.8%	-	-
IT	8,715	240	36.3	7,943	91.1%	772	8.9%	-	-
LT	1,652	127	13.0	320	19.4%	1,332	80.6%	-	-
LU	90	28	3.2	90	100.0%	-	-	-	-
NL	1,886	119	15.9	1,886	100.0%	-	-	-	-
NO	4,816	208	23.2	620	12.9%	4,196	87.1%	-	-
PL	7,622	134	56.9	2,429	31.9%	5,193	68.1%	-	-
SE	6,417	119	53.9	1,913	29.8%	4,504	70.2%	-	-
SI	594	51	11.6	537	90.4%	57	9.6%	-	-
SK	686	44	15.6	481	70.1%	205	29.9%	-	-
UK	6,989	163	42.9	2,727	39.0%	1,704	24.4%	2,558	36,6%
Total	**84,732**	**2,865**	**29.6**	**49,729**	**58.7%**	**32,445**	**38.3%**	**2,558**	**3,0%**
Total (Ex No data)	**82,276**	**2,821**	**29.1**	**49,729**	**60.5%**	**32,445**	**39.5%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

Figure 11 shows the percentage of motorways and non-motorway roads for the whole TEN-T road network in the reporting countries (excluding 2,558 kilometres of roads in United Kingdom where no classification is given).

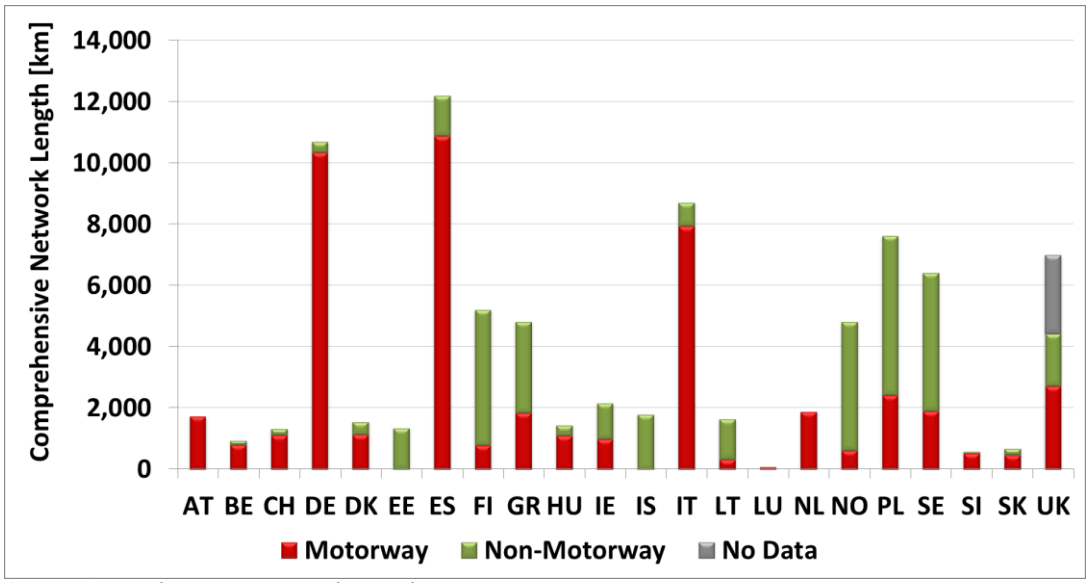


Source: CEDR data on TEN-T road network

Figure 11: Overall distribution of Road Types on the TEN-T network

In countries like Austria, Luxembourg, and the Netherlands, the TEN-T road network consists only of motorways. In contrast, Estonia's network is entirely made up of non-motorway roads. Likewise, 99.8% of Iceland's network is composed of non-motorway roads.

Figure *12* shows the national distribution of road types for each of the participating countries. Looking at countries with large TEN-T networks, it can be observed that the proportion of motorways for Germany, Spain, and Italy is 96.6%, 89.2%, and 91.1% respectively. In Poland, Sweden, Lithuania, and Norway, the share of the TEN-T network made up of motorways is lower, namely 31.9%, 29.8%, 19.4%, and 12.9% respectively.

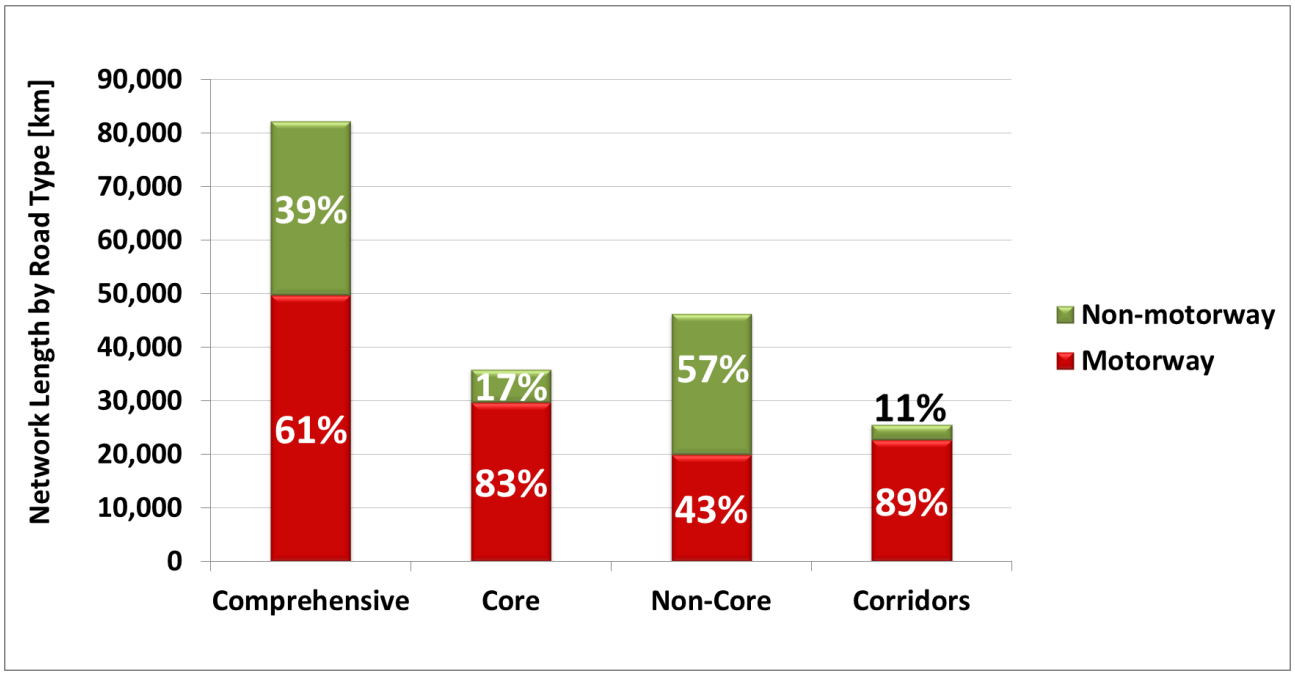


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 12: Distribution of Road Types on the TEN-T network by country

The comparison between the composition of Comprehensive, Core, Non-Core, and Corridor Networks shown in *Figure 13* indicates that the share of motorways on the Comprehensive Network as a whole is 61%. This share rises to 83% in the case of the Core Network and to 89% in the case of Corridors. Conversely, the share of motorways in the Non-Core Network is lower (43%).



Source: CEDR data on TEN-T road network

Figure 13: Comparison of Road Types on Comprehensive, Core, Non-Core, and Corridor Networks

3.2 Number of Lanes

The Number of Lanes on the road sections composing the TEN-T network provides an indication of the capacity of the network. The indicator is defined as the average number of lanes along a TEN-T section in both directions.

Table 8 shows the total length of the TEN-T road network for the participating countries and the length of the network by number of lanes. The Number of Lanes is defined as the average number of lanes along a TEN-T section in both directions.

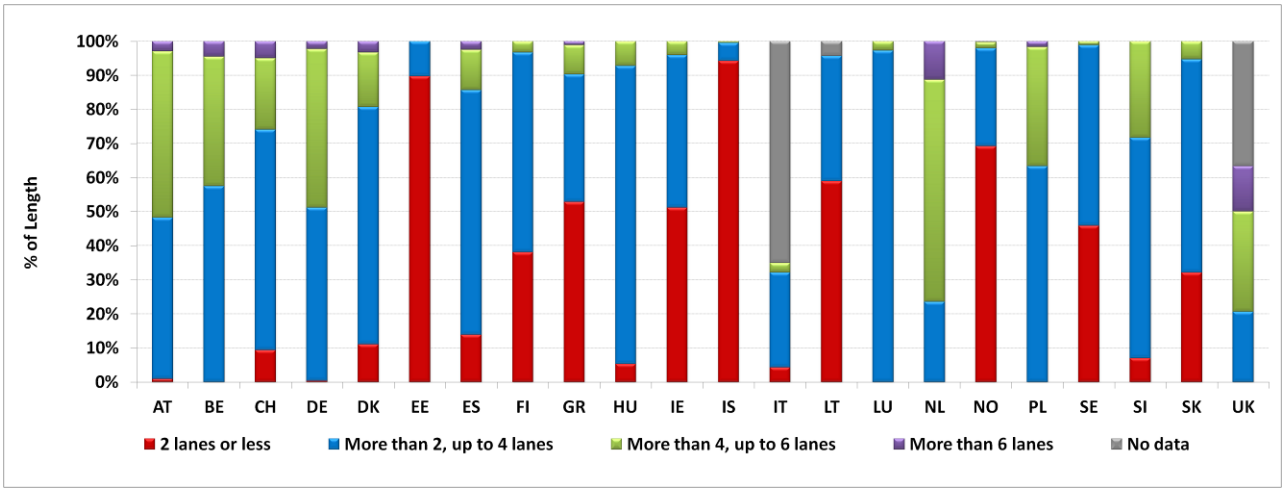
Table 8: Length of the TEN-T (Roads) network by Number of Lanes

Country	Total length [km]	Number of Lanes									
		2 lanes or less		More than 2, up to 4 lanes		More than 4, up to 6 lanes		More than 6 lanes		No data	
		Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	16	0.9%	822	47.4%	847	48.8%	50	2.9%	-	-
BE*	948	-	-	545	57.5%	360	38.0%	43	4.5%	-	-
CH	1,325	125	9.4%	857	64.7%	277	20.9%	66	5.0%	-	-
DE	10,700	36	0.3%	5,446	50.9%	4,982	46.6%	236	2.2%	-	-
DK	1,556	172	11.1%	1,084	69.7%	250	16.1%	50	3.2%	-	-
EE	1,350	1,212	89.7%	138	10.3%	-	-	-	-	-	-
ES	12,198	1,692	13.9%	8,763	71.8%	1,448	11.9%	295	2.4%	-	-
FI	5,220	1,989	38.1%	3,058	58.6%	173	3.3%	-	-	-	-
GR	4,816	2,547	52.9%	1,800	37.4%	416	8.6%	53	1.1%	-	-
HU	1,450	78	5.4%	1,267	87.4%	105	7.3%	-	-	-	-
IE	2,163	1,107	51.2%	968	44.8%	87	4.0%	-	-	-	-
IS	1,804	1,700	94.2%	95	5.3%	9	0.5%	-	-	-	-
IT	8,715	378	4.3%	2,422	27.8%	246	2.8%	-	-	5,669	65.0%
LT	1,652	975	59.0%	607	36.7%	-	-	-	-	70	4.2%
LU	90	-	-	88	97.3%	2	2.7%	-	-	-	-
NL	1,886	-	-	445	23.6%	1,228	65.1%	213	11.3%	-	-
NO	4,816	3,337	69.3%	1,381	28.7%	89	1.8%	9	0.2%	-	-
PL	7,622	-	-	4,834	63.4%	2,663	34.9%	126	1.6%	-	-
SE	6,417	2,944	45.9%	3,399	53.0%	74	1.2%	-	-	-	-
SI	594	42	7.1%	384	64.6%	168	28.3%	-	-	-	-
SK	686	221	32.2%	429	62.5%	36	5.2%	-	-	-	-
UK	6,989	-	-	1,449	20.7%	2,050	29.3%	932	13.3%	2,558	36.6%
Total	**84,732**	**18,571**	**21.9%**	**40,280**	**47.5%**	**15,511**	**18.3%**	**2,073**	**2.4%**	**8,297**	**9.8%**
Total (Ex No data)	**76,435**	**18,571**	**24.3%**	**40,280**	**52.7%**	**15,511**	**20.3%**	**2,073**	**2.7%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

Figure 14 shows the distribution of the Number of Lanes indicator for each participating country. Countries demonstrating the highest performance are the Netherlands with about 76% of its network with more than 4 lanes, followed by Austria (about 52%) and Germany (about 49%). Estonia, Iceland, Ireland, Lithuania, and Norway demonstrate the lowest performance with over 50% of the networks having 2 lanes or less.



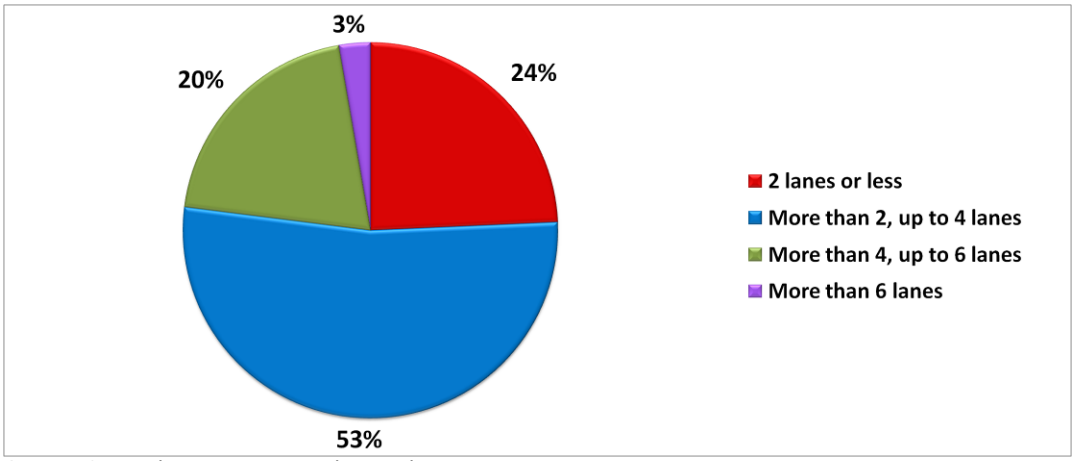
Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 14: Distribution of the Number of Lanes on TEN-T (Roads) by country

Figure 14 also indicates that data on the number of lanes is missing for part of the network in Lithuania (70 km), the United Kingdom (2,558 km), and Italy (5,669 km). The missing data in the United Kingdom relates to the sections in Scotland, Wales, and Northern Ireland, whereas in Italy, it refers to the sections not managed by ANAS.

When looking at the composition of the whole TEN-T network in the reporting countries (see *Figure 15*), it emerges that 53% of the total network has more than 2 and up to 4 lanes; 24% has 2 lanes or less, and 20% of the network is made up of roads with more than 4 and up to 6 lanes. Only 3% of the entire network has more than 6 lanes.

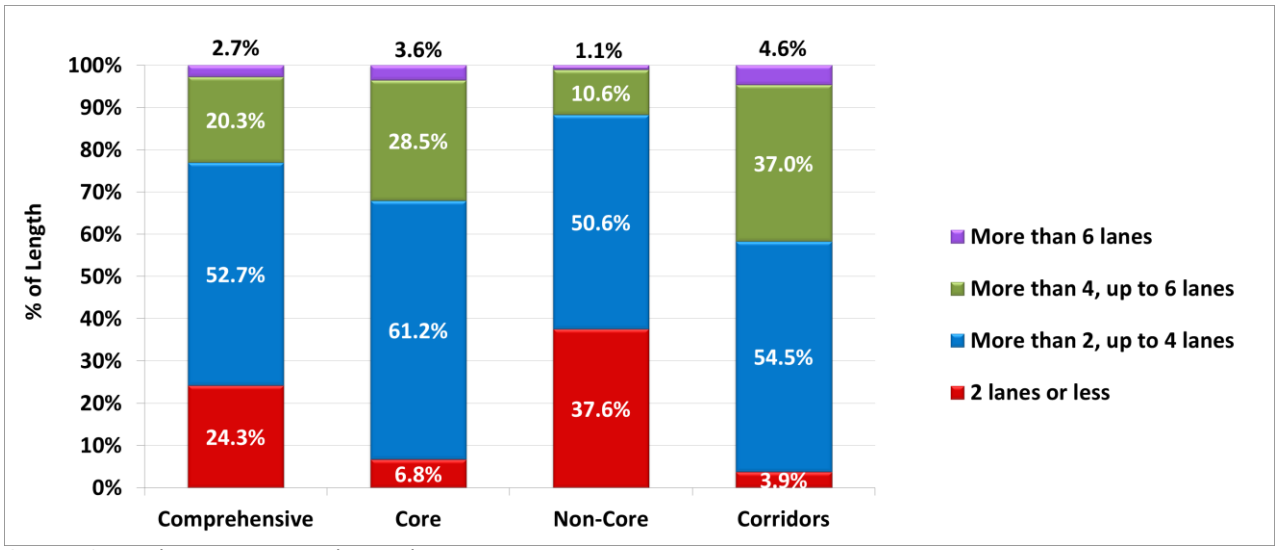


Source: CEDR data on TEN-T road network

Figure 15: Overall distribution of the Number of Lanes on the TEN-T (Roads) network

The distribution of the number of Lanes by Comprehensive, Core, Non-Core, and Corridor Networks is shown in *Figure 16*. The share of roads with more than 6 lanes on the whole Comprehensive Network is 2.7%. It is slightly higher for the Core Network (3.6%) and for the Corridor Network (4.6%). As expected, the Non-Core Network has a lower share of roads with more than 6 lanes (1.1%).

The break-down for TEN-T Corridors is as follows: 3.9% of roads have 2 lanes or less, 54.5% of roads have more than 2 and up to 4 lanes, and 37% of roads have more than 4 and up to 6 lanes.



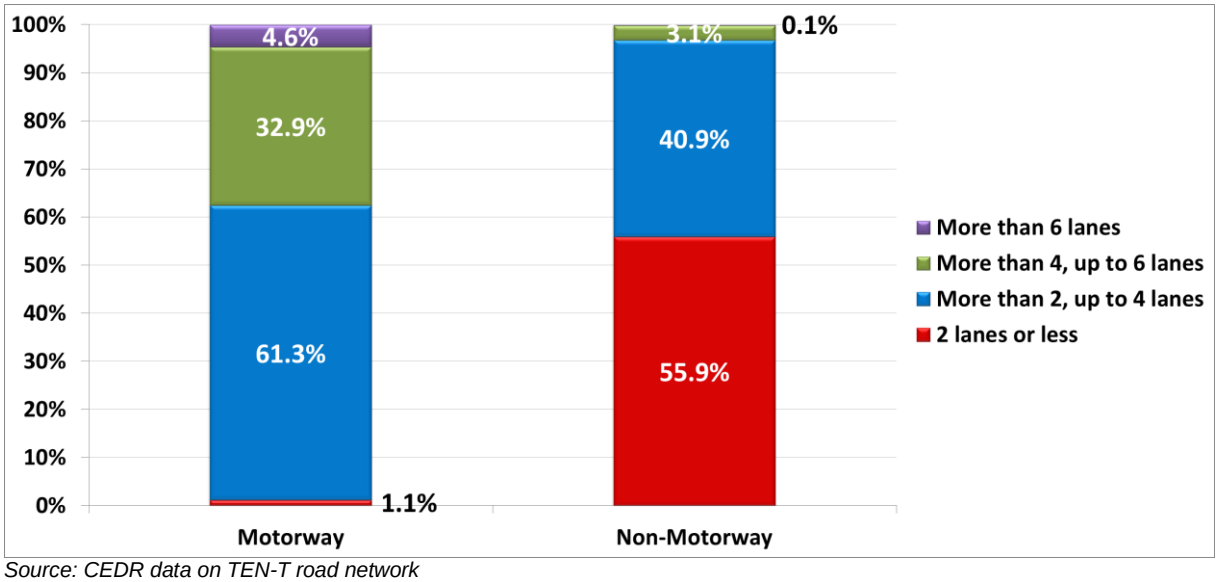
Source: CEDR data on TEN-T road network

Figure 16: Comparison of Number of Lanes on the Comprehensive, Core, Non-Core and Corridor Networks

Figure 17 shows the distribution of the number of lanes on motorway sections compared with non-motorway sections. It can be observed that 55.9% of non-motorway roads have 2 lanes or less compared with 1.1% of the motorways.

Furthermore, 40.9% of non-motorway sections have more than 2 and up to 4 lanes compared with 61.3% of the motorways.

Around 5% of the motorway sections have more than 6 lanes, while only 0.1% of non-motorway roads in the countries that participated in the data collection have more than 6 lanes.



Source: CEDR data on TEN-T road network

Figure 17: Comparison of Number of Lanes on motorway and non-motorway roads

3.3 Length of Bridges

This indicator shows the proportion of the TEN-T road network length made up of bridges (longer than 100 m).

Table 9: Length of the TEN-T (Roads) network comprising bridges

Country	Network length [km]	Length of Bridges [km]					
		All roads	%	Motorway	%	Non-motorway	%
AT	1,735	103	6.0%	102	6.0%	-	-
BE*	948	21	2.2%	18	1.9%	2	0.2%
CH	1,325	111	8.4%	100	7.6%	11	0.8%
DE	10,700	231	2.2%	228	2.2%	3	-
DK	1,556	33	2.1%	30	1.9%	4	0.3%
EE	1,350	6	0.4%	-	-	6	0.4%
ES	12,198	222	1.8%	218	1.8%	4	-
FI	5,220	61	1.2%	24	0.5%	36	0.7%
GR	4,816	53	1.1%	45	0.9%	9	0.2%
HU	1,450	37	2.5%	27	1.9%	10	0.7%
IE	2,163	5	0.2%	3	0.1%	2	0.1%
IS	1,804	4	0.2%	-	-	4	0.2%
IT**	3,046	210	6.9%	181	5.9%	29	1.0%
LT	1,652	-	-	-	-	-	-
LU	90	5	5.3%	5	5.3%	-	-
NL	1,886	24	1.3%	24	1.3%	-	-
NO	4,816	103	2.1%	62	1.3%	40	0.8%
PL	7,622	75	1.0%	46	0.6%	29	0.4%
SE	6,417	52	0.8%	29	0.5%	22	0.3%
SI	594	24	4.1%	24	4.1%	-	-
SK	686	37	5.4%	36	5.3%	1	0.1%
UK***	4,431	35	0.8%	28	0.6%	7	0.2%
Total	**76,505**	**1,454**	**1.9%**	**1,234**	1.6%	**220**	0.3%

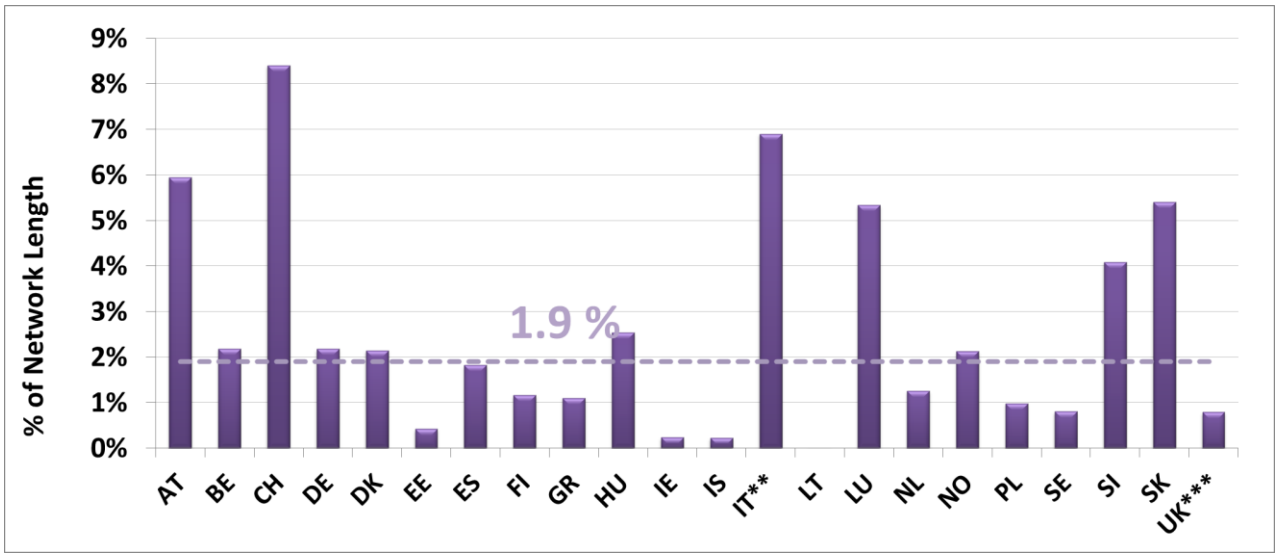
Source: CEDR data on TEN-T road network

** Belgium-Flanders only*
*** ANAS network only*
**** England network only*

Figure 18 shows that more than 5% of the TEN-T road network in Austria, Switzerland, Luxembourg, the Slovak Republic, and Italy (on the network operated by ANAS) is composed of bridges, reflecting the orography of these countries, while Lithuania has no bridges on its TEN-T roads.

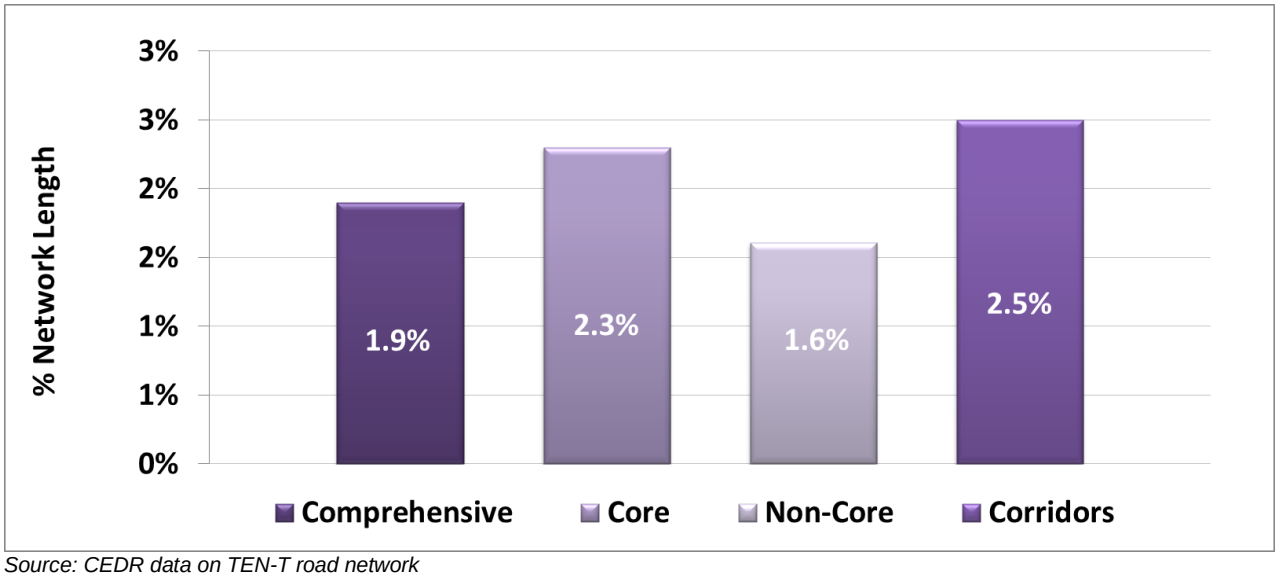
Figure 19 compares the Length of Bridges along the whole Comprehensive, Core, Non-Core, and Corridor Networks.

The percentage of bridges on the Core Network and the Corridors (2.3% and 2.5% respectively) is higher than the average for both the whole Comprehensive Network (1.9%) and the Non-Core Network (1.6%).



Source: CEDR data on TEN-T road network
*** ANAS network only*
**** England network only*
Note: Data for Belgium relates to Flanders only.

Figure 18: Length of bridges as share of total length of national TEN-T roads comprising bridges



Source: CEDR data on TEN-T road network

Figure 19: Length of bridges as share of total length of Comprehensive, Core, Non-Core and Corridors Networks

3.4 Length of Tunnels

This indicator shows the proportion of the TEN-T (Roads) network length that is made up of tunnels (longer than 300 m).

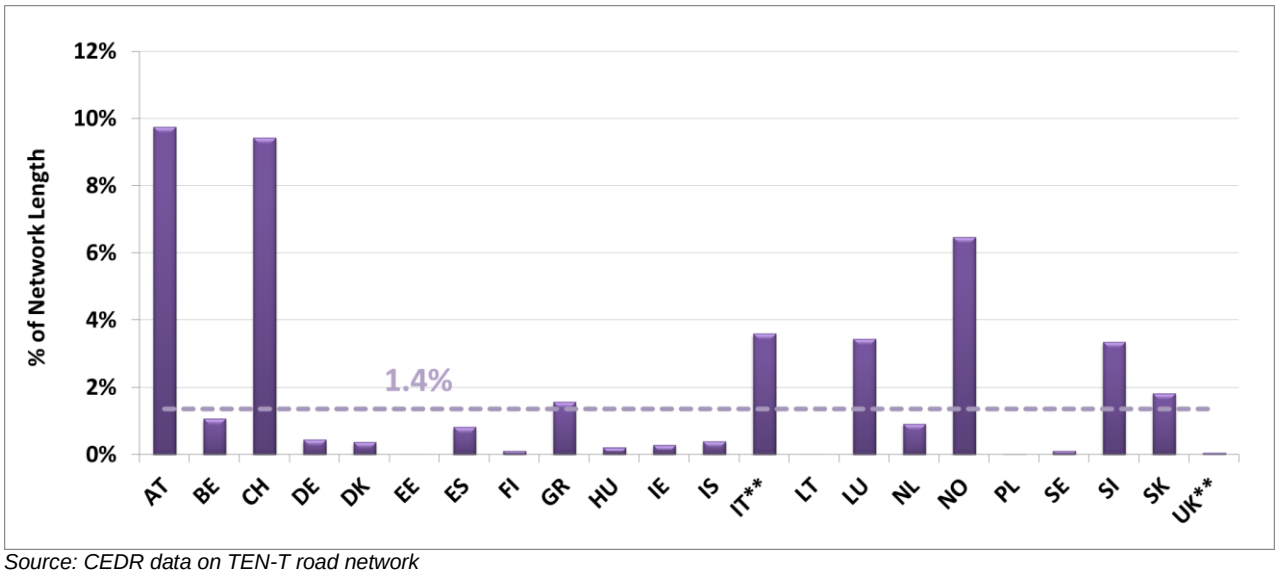
Table 10: Length of the TEN-T (Roads) network comprising tunnels

Country	Network length [km]	Length of Tunnels [km]					
		All roads	%	Motorway	%	Non-motorway	%
AT	1,735	169	9.8%	169	9.8%	-	-
BE*	948	10	1.1%	10	1.1%	-	-
CH	1,325	125	9.4%	106	8.0%	19	1.4%
DE	10,700	47	0.4%	47	0.4%	0.4	-
DK	1,556	6	0.4%	6	0.4%	-	-
EE	1,350	-	-	-	-	-	-
ES	12,198	99	0.8%	85	0.7%	14	0.1%
FI	5,220	6	0.1%	5	0.1%	1	-
GR	4,816	75	1.6%	71	1.5%	4	0.1%
HU	1,450	3	0.2%	3	0.2%	-	-
IE	2,163	6	0.3%	6	0.3%	1	-
IS	1,804	7	0.4%	-	-	7	0.4%
IT**	3,046	110	3.6%	103	3.4%	7	0.2%
LT	1,652	-	-	-	-	-	-
LU	90	3	3.4%	3	3.4%	-	-
NL	1,886	17	0.9%	17	0.9%	-	-
NO	4,816	312	6.5%	104	2.2%	208	4.3%
PL	7,622	1	0.0%	-	-	1	-
SE	6,417	7	0.1%	5	0.1%	2	-
SI	594	20	3.4%	20	3.4%	-	-
SK	686	12	1.8%	12	1.7%	1	0.1%
UK***	4,431	3	0.1%	3	0.1%	-	-
Total	**76,505**	**1,038**	**1.4%**	**775**	**1.0%**	**263**	**0.3%**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*
*** ANAS network only*
**** England network only*

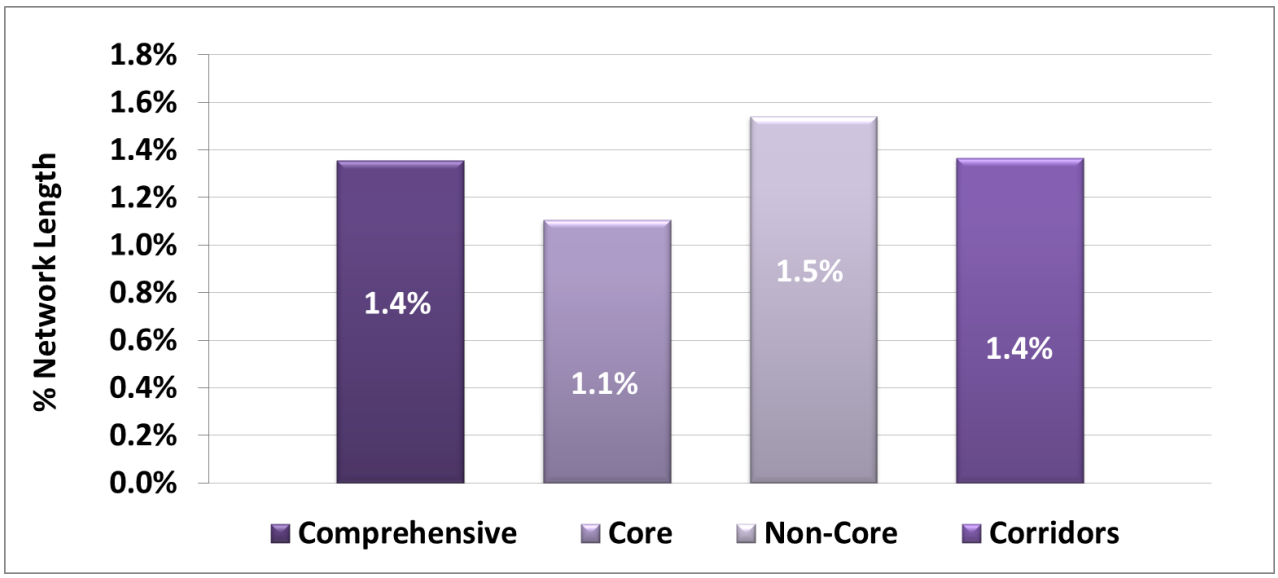
Figure 20 shows that more than 9% of the TEN-T road networks in the Alpine countries of Austria and Switzerland consists of tunnels. At 6.5%, tunnels also account for a significant share of the TEN-T road network in Norway. The share is lower in Italy (3.6%, on the network operated by ANAS), Luxembourg (3.4%), and Slovenia (3.4%). Lithuania and Estonia have no tunnels at all on their TEN-T road networks, while the Length of Tunnels for the TEN-T road networks in Poland and the UK (England) is close to zero.



Source: CEDR data on TEN-T road network
*** ANAS network only*
**** England network only*
Note: Data for Belgium relates to Flanders only.

Figure 20: Length of tunnels as share of total length of national TEN-T roads comprising tunnels

Figure 21 compares the results for the Comprehensive, Core, Non-Core, and Corridor Networks. It shows that the Comprehensive (1.4%), Corridor (1.4%), and Non-Core (1.5%) Networks have the highest percentage of tunnels, while the Core network has the lowest percentage (1.1%).



Source: CEDR data on TEN-T road network

Figure 21: Length of tunnels as share of total Comprehensive, Core, Non-Core and Corridors Networks

3.5 Physical Environment

Introduced for the first time in the 2015 report, this indicator provides information on the environment (urban or rural) in which the road is situated.

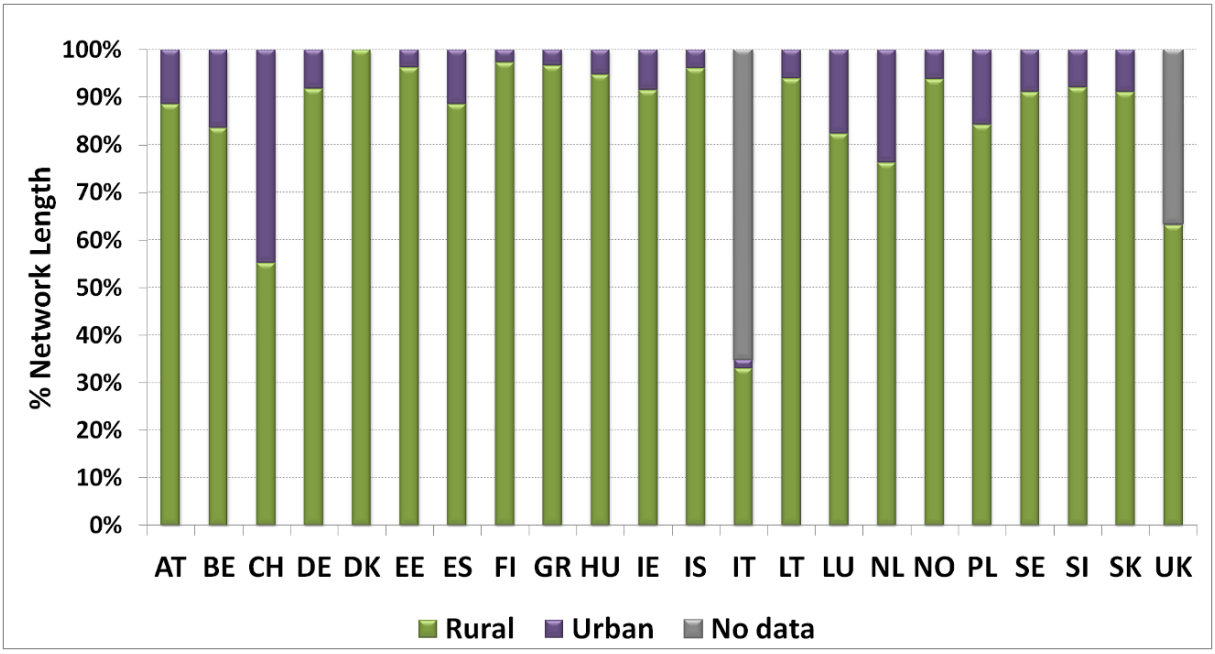
Table 11: Length of the TEN-T (Roads) network according to Physical Environment

Country	Network length [km]	Rural		Urban		No data	
		Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	1,535	85.5%	200	12.2%	35	1.9%
BE*	948	792	83.5%	156	16.5%	-	-
CH	1,325	732	55.2%	593	44.8%	-	-
DE	10,700	9,823	91.8%	877	8.2%	-	-
DK	1,556	1,556	100.0%	-	-	-	-
EE	1,350	1,299	96.2%	51	3.8%	-	-
ES	12,198	10,805	88.6%	1,393	11.4%	-	-
FI	5,220	5,077	97.3%	143	2.7%	-	-
GR	4,816	4,653	96.6%	163	3.4%	-	-
HU	1,450	1,373	94.7%	77	5.3%	-	-
IE	2,163	1,979	91.5%	184	8.5%	-	-
IS	1,804	1,733	96.1%	71	3.9%	-	-
IT	8,715	2,878	33.0%	268	3.1%	5,669	64.8%
LT	1,652	1,551	93.9%	101	6.1%	-	-
LU	90	74	82.4%	16	17.6%	-	-
NL	1,886	1,439	76.3%	447	23.7%	-	-
NO	4,816	4,513	93.7%	302	6.3%	-	-
PL	7,622	6,423	84.3%	1,199	15.7%	-	-
SE	6,417	5,844	91.1%	573	8.9%	-	-
SI	594	547	92.1%	47	7.9%	-	-
SK	686	625	91.1%	61	8.9%	-	-
UK	6,989	4,415	63.2%	16	0.2%	2,558	36.6%
Total	**84,732**	**69,667**	**82.2%**	**6,838**	**8.2%**	**8,262**	**9.7%**
Total (Ex no data)	**76,505**	**69,667**	**91.1%**	**6,838**	**9.1%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

Table 11 shows that about 91% of the TEN-T network (excluding sections where no information is available) is classified as 'rural' and only 9% as 'urban'.



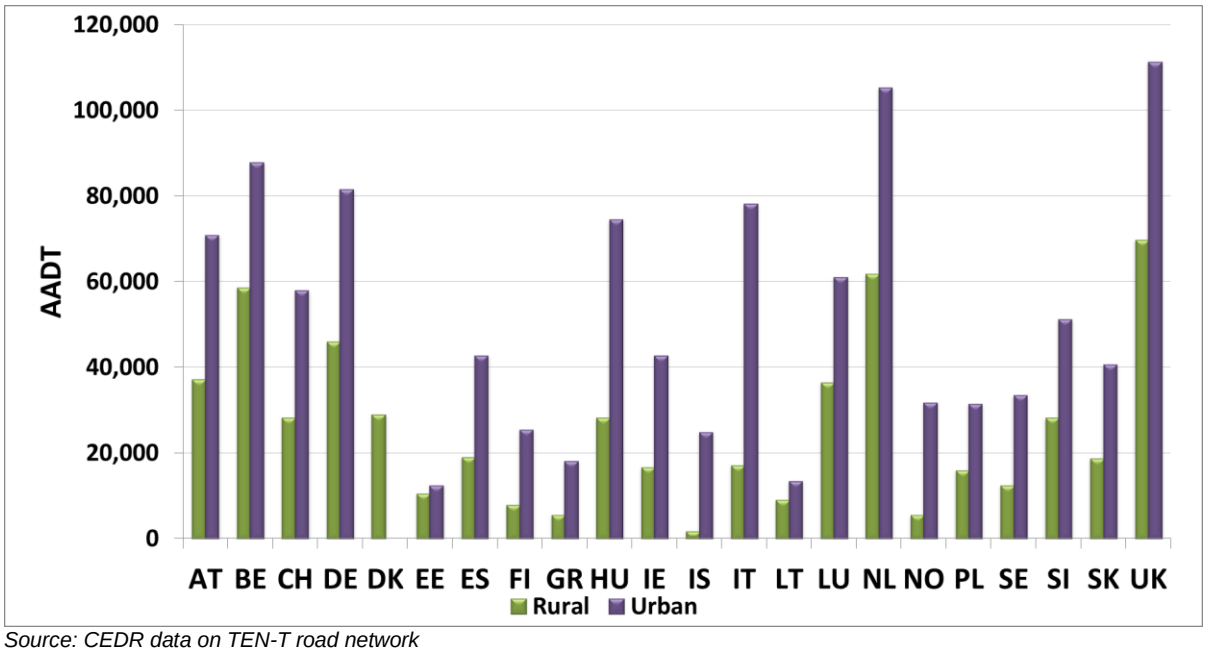
Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 22: Distribution of Physical Environments on the TEN-T network for each participating country

Figure 22 shows the national distribution of Physical Environments for the TEN-T road network in each participating country. About 45% of the TEN-T road network in Switzerland and 24% in the Netherlands is urban, followed by Belgium (Flanders) 17%, Luxembourg 18%, Poland 16%, and Spain 11%. Less than 10% of the TEN-T road network in all other countries is urban, with the exception of Denmark where the share is zero.

The weighted average traffic flow (AADT) for rural and urban sections reported in *Figure 23* shows that in all cases, urban sections carry more traffic than rural ones.

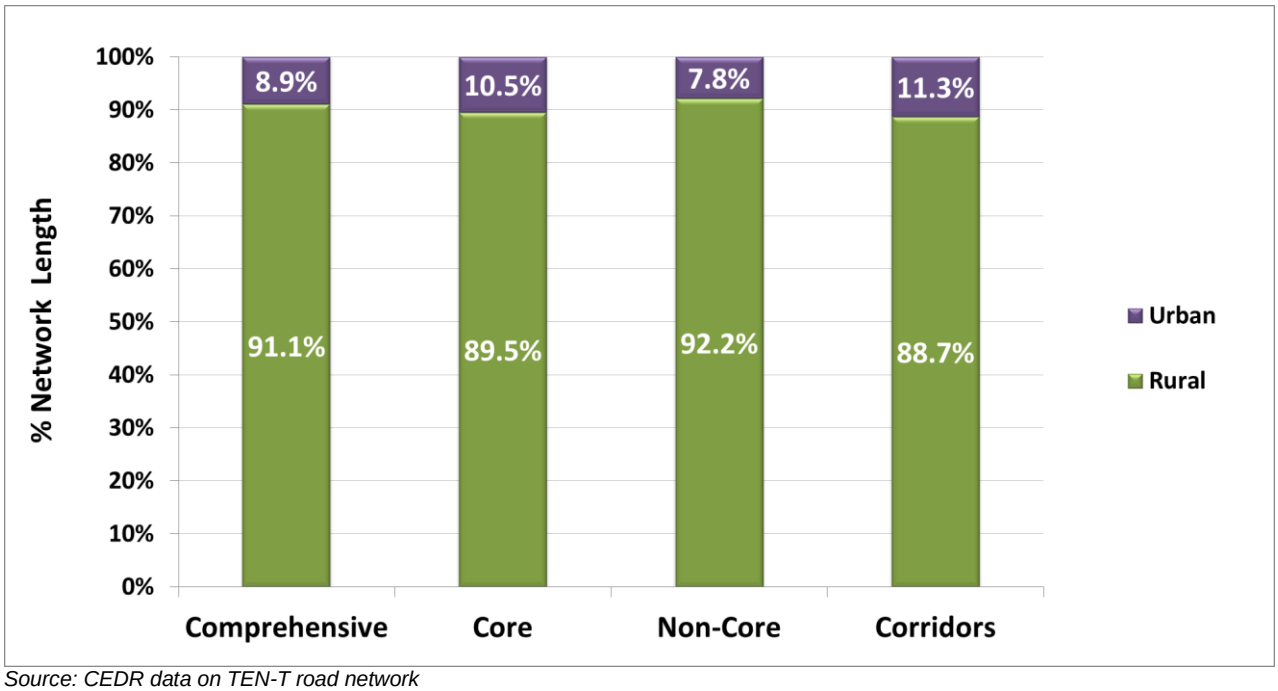


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 23: Comparison of traffic flow on urban and rural sections

Figure 24 compares the Comprehensive, Core, Non-Core and Corridor Networks and shows that Corridors have the highest percentage of urban sections (11.3%), compared with 10.5% of the Core Network, 8.9% of the Comprehensive Network, and 7.8% of the Non-Core Network.



Source: CEDR data on TEN-T road network

Figure 24: Comparison of Physical Environments on the Comprehensive, Core, Non-Core, and Corridor Networks

3.6 Intelligent Transport Systems (ITS)

For the first time, the 2017 TEN-T (Roads) Performance Report includes a performance indicator describing the deployment of Intelligent Transport Systems on the TEN-T road network. The values provided in *Table 12* show the proportion of the road network equipped with different levels of ITS, ranging from Level 0 (None) to Level 4 (co-operative ITS).

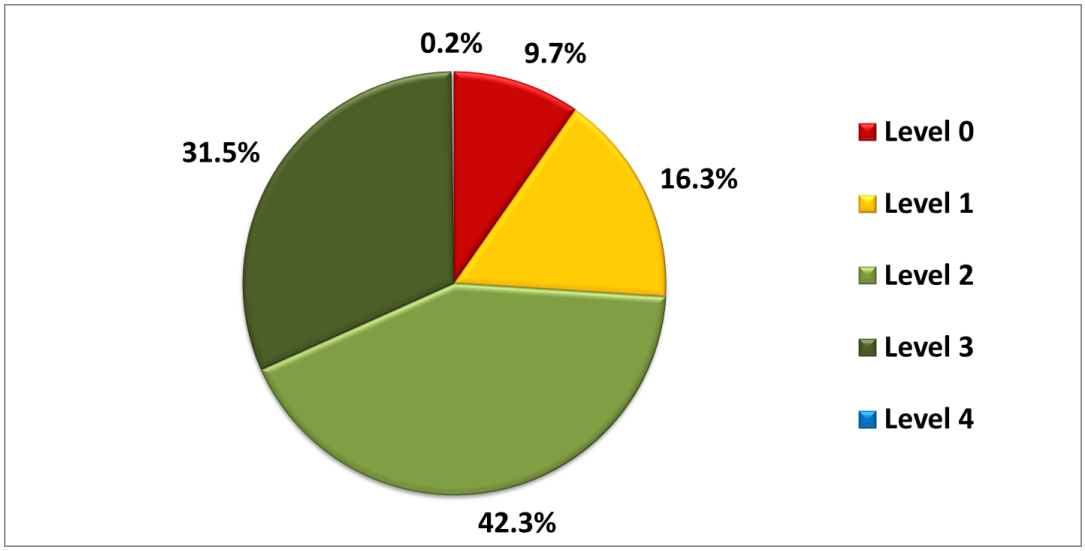
Table 12: Length of the TEN-T (Roads) network featuring Intelligent Transport Systems

Country	Total length [km]	Intelligent Transport Systems (ITS)											
		Level 0		Level 1		Level 2		Level 3		Level 4		No data	
		Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	-	-	1,424	82.1%	25	1.4%	286	16.5%	-	-	90	5.0%
BE*	948	-	-	-	-	325	34.3%	623	65.7%	-	-	-	-
CH	1,325	-	-	-	-	73	5.5%	1,252	94.5%	-	-	-	-
DE	10,700	-	-	-	-	5,290	49.4%	5,410	50.6%	-	-	-	-
DK	1,556	-	-	-	-	1,479	95.1%	77	4.9%	-	-	-	-
EE	1,350	-	-	-	-	1,350	100.0%	-	-	-	-	-	-
ES	12,198	5	-	505	4.1%	5,838	47.9%	5,850	48.0%	-	-	-	-
FI	5,220	-	-	-	-	4,299	82.4%	921	17.6%	-	-	-	-
GR	4,816	2,504	52.0%	387	8.0%	958	19.9%	877	18.2%	-	-	90	1.9%
HU	1,450	51	3.5%	92	6.4%	995	68.7%	167	11.5%	144	10.0%	-	-
IE	2,163	1,824	84.3%	163	7.5%	176	8.1%	-	-	-	-	-	-
IS	1,804	-	-	-	-	1,804	100.0%	-	-	-	-	-	-
IT	8,715	266	3.1%	1,161	13.3%	1,619	18.6%	-	-	-	-	5,669	65.0%
LT	1,652	1,160	70.2%	470	28.5%	-	-	-	-	-	-	22	1.3%
LU	90	-	-	6	6.6%	-	-	84	93.4%	-	-	-	-
NL	1,886	-	-	146	7.7%	125	6.6%	1,615	85.6%	-	-	-	-
NO	4,816	-	-	-	-	1,574	32.7%	3,217	66.8%	25	0.5%	-	-
PL	7,622	-	-	7,622	100.0%	-	-	-	-	-	-	-	-
SE	6,417	-	-	-	-	5,927	92.4%	490	7.6%	-	-	-	-
SI	594	-	-	-	-	267	44.9%	327	55.1%	-	-	-	-
SK	686	205	29.9%	481	70.1%	-	-	-	-	-	-	-	-
UK	6,989	1,393	19.9%	-	-	191	2.7%	2,836	40.6%	-	-	2,569	36.8%
Total	**84,732**	**7,408**	**8.7%**	**12,457**	**14.7%**	**32,316**	**38.1%**	**24,032**	**28.4%**	**169**	**0.2%**	**8,350**	**9.9%**
Total (Ex No Data)	**76,382**	**7,408**	**9.7%**	**12,457**	**16.3%**	**32,316**	**42.3%**	**24,032**	**31.5%**	**169**	**0.2%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

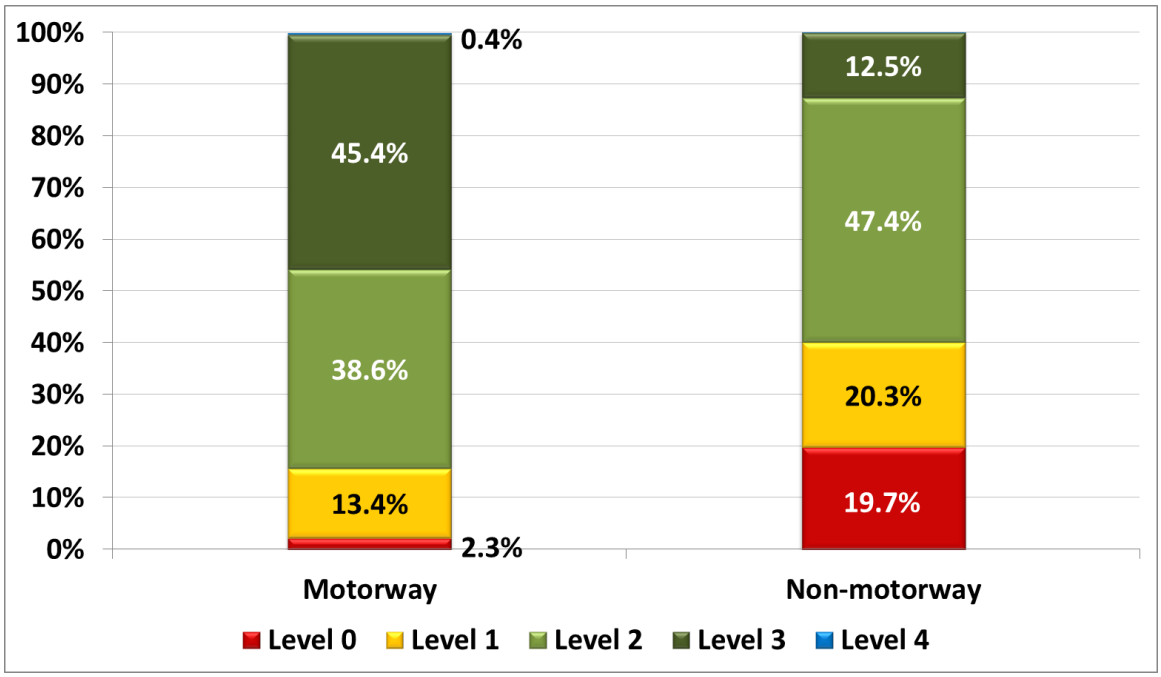
Figure 25 shows the overall distribution of ITS in the participating countries. It shows that a considerable proportion of the TEN-T network (42.3%) is equipped with Level-2 technology and that Level 4 is used on only 0.2% of the network. No ITS (Level 0) is used on 9.7% of the network length.



Source: CEDR data on TEN-T road network

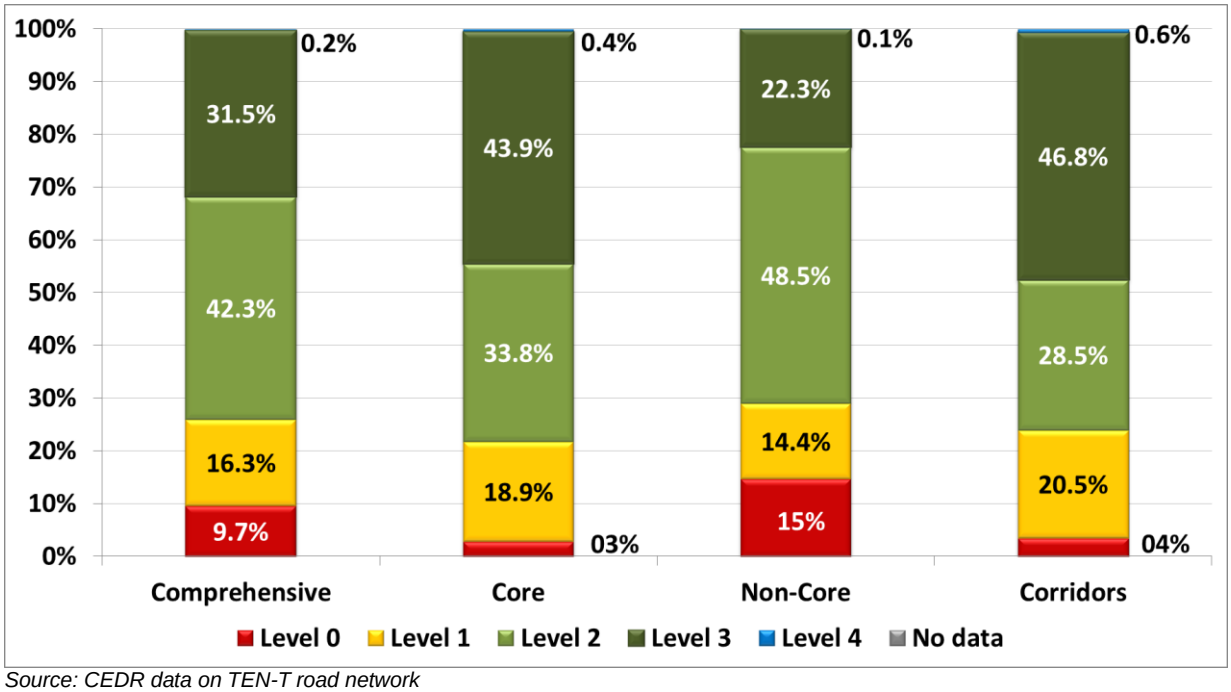
Figure 25: Distribution of ITS on the Comprehensive Network

When looking at the distribution of ITS according to road type shown in *Figure 26*, it is evident that, as expected, motorways have a higher level of technology than non-motorway roads (45.4% of motorways have Level-3 technology). *Figure 26* also shows that a lack of ITS technology mainly applies to non-motorway roads (19.7%).



Source: CEDR data on TEN-T road network

Figure 26: Distribution of ITS by Road Type

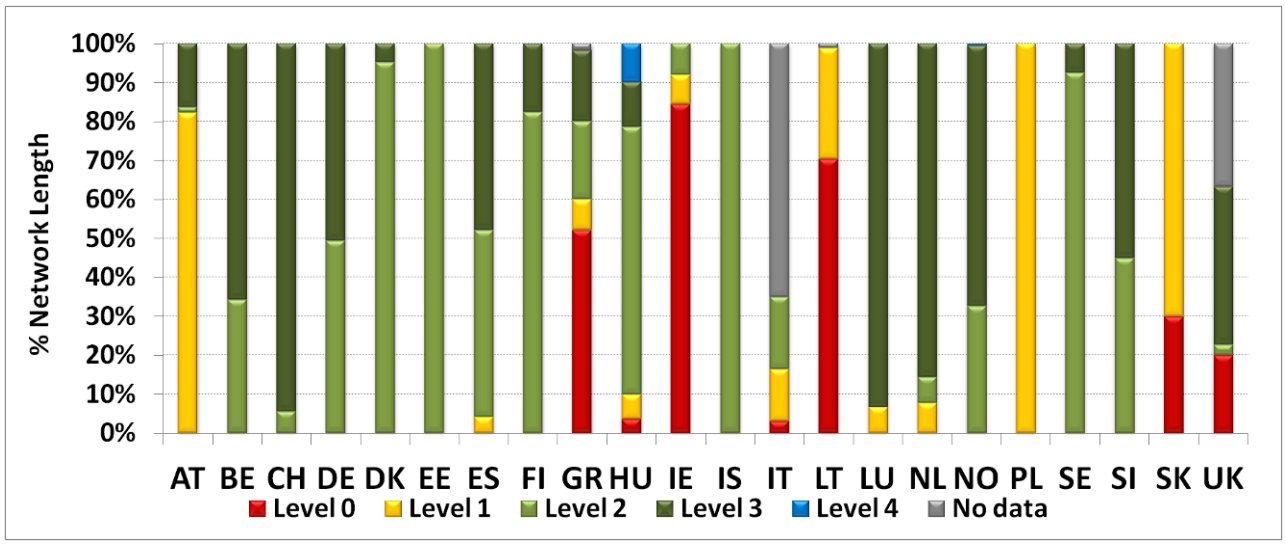


Source: CEDR data on TEN-T road network

Figure 27: Distribution of ITS on Comprehensive, Core, Non-Core, and Corridor Networks

The distribution of ITS technology on Comprehensive, Core, Non-Core, and Corridor Networks is given in *Figure 27*. The biggest share of ITS technology on the Non-Core Network (48.5%) is Level 2 technology (i.e. passive management of the road network), while Level-3 technology (active management by NRAs) dominates on the Corridor Network (46.8%).

Figure 28 shows the distribution of ITS levels for each participating country. Level 3 is currently available on 95% of the network length in Switzerland, on 93% in Luxembourg, and on 86% in the Netherlands. Other countries with an ITS Level 3 share greater than 50% are Belgium (Flanders) (66%), Germany (51%), Slovenia (55%), and Norway (67%).



Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 28: ITS distribution by country

4 Network Performance

4.1 Average Traffic Flow

The average traffic flow on the TEN-T road network, expressed as the Annual Average Daily Traffic (AADT), is given in Table 13. This indicator shows the average number of vehicles per day crossing the section. The values for traffic volumes have been further clustered into different categories to provide a better understanding of the performance of the roads.

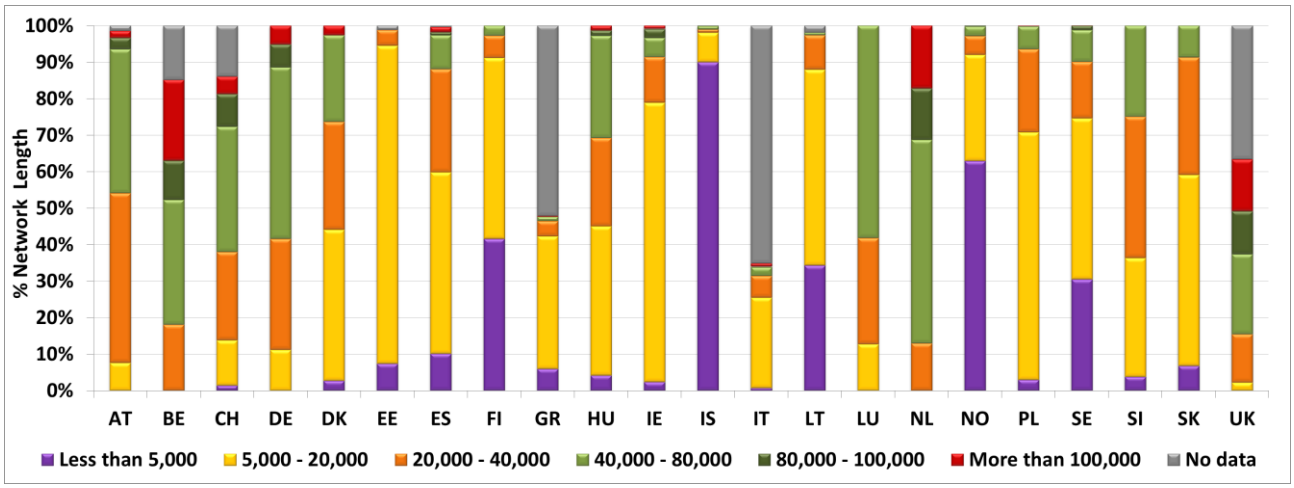
Table 13: Length of the TEN-T (Roads) network by Average Traffic Flow categories

Country	Total length [km]	Annual Average Daily Traffic Flow [AADT]													
		Less than 5.000		5.000–20.000		20.000–40.000		40.000–80.000		80.000–100.000		More than 100.000		No data	
		Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	-	-	133	7.7%	807	46.5%	684	38.0%	53	3.1%	33	1.9%	25	1.4%
BE*	948	-	-	-	-	172	18.1%	324	34.2%	102	10.8%	209	22.0%	141	14.9%
CH	1,325	20	1.5%	164	12.4%	320	24.2%	455	34.3%	118	8.9%	63	4.8%	185	14.0%
DE	10,700	-	-	1,206	11.3%	3,243	30.3%	5,034	47.0%	667	6.2%	550	5.1%	-	-
DK	1,556	43	2.8%	644	41.4%	459	29.5%	369	23.7%	-	-	41	2.6%	-	-
EE	1,350	100	7.4%	1,176	87.1%	57	4.3%	-	-	-	-	-	-	17	1.2%
ES	12,198	1,246	10.2%	6,060	49.7%	3,434	28.2%	1,133	9.3%	104	0.9%	179	1.5%	42	0.3%
FI	5,220	2,174	41.7%	2,586	49.5%	316	6.0%	144	2.8%	-	-	-	-	-	-
GR	4,816	288	6.0%	1,752	36.4%	201	4.2%	56	1.2%	-	-	9	0.2%	2,510	52.1%
HU	1,450	61	4.2%	593	40.9%	350	24.2%	406	28.0%	20	1.4%	20	1.4%	-	-
IE	2,163	52	2.4%	1,654	76.5%	272	12.6%	113	5.2%	52	2.4%	20	0.9%	-	-
IS	1,804	1,624	90.0%	145	8.0%	16	0.9%	17	0.9%	2	0.1%	-	-	-	-
IT	8,715	68	0.8%	2,160	24.8%	521	6.0%	209	2.4%	8	0.1%	80	0.9%	5,669	65.0%
LT	1,652	568	34.4%	885	53.6%	155	9.4%	13	0.8%	-	-	-	-	31	1.9%
LU	90	-	-	11	12.7%	26	29.2%	52	58.1%	-	-	-	-	-	-
NL	1,886	-	-	-	-	246	13.0%	1,052	55.8%	264	14.0%	324	17.2%	-	-
NO	4,816	3,029	62.9%	1,403	29.1%	247	5.1%	126	2.6%	11	0.2%	-	-	-	-
PL	7,622	233	3.1%	5,166	67.8%	1,734	22.8%	467	6.1%	6	0.1%	15	0.2%	-	-
SE	6,417	1,958	30.5%	2,829	44.1%	996	15.5%	560	8.7%	71	1.1%	3	-	-	-
SI	594	23	3.9%	193	32.5%	230	38.7%	148	24.9%	-	-	-	-	-	-
SK	686	47	6.9%	359	52.3%	220	32.1%	60	8.7%	-	-	-	-	-	-
UK	6,989	-	-	164	2.4%	924	13.2%	1,527	21.8%	828	11.8%	988	14.1%	2,558	36.6%
Total	**84,732**	**11,534**	**13.6%**	**29,283**	**34.6%**	**14,947**	**17.6%**	**12,950**	**15.3%**	**2,306**	**2.7%**	**2,534**	**3.0%**	**11,178**	**13.2%**
Total (Ex No data)	**73,554**	**11,534**	**15.7%**	**29,283**	**39.8%**	**14,947**	**20.3%**	**12,950**	**17.6%**	**2,306**	**3.1%**	**2,534**	**3.4%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

Figure 29 shows the distribution of the network length by Traffic Flow categories for each participating country. Belgium (Flanders), the Netherlands, and the United Kingdom (England) have the most trafficked TEN-T networks, with more than 25% of their networks carrying more than 80,000 vehicles per day. The countries with the lowest traffic levels are Finland, Iceland, and Norway, with more than 40% of their networks carrying less than 5,000 vehicles per day.

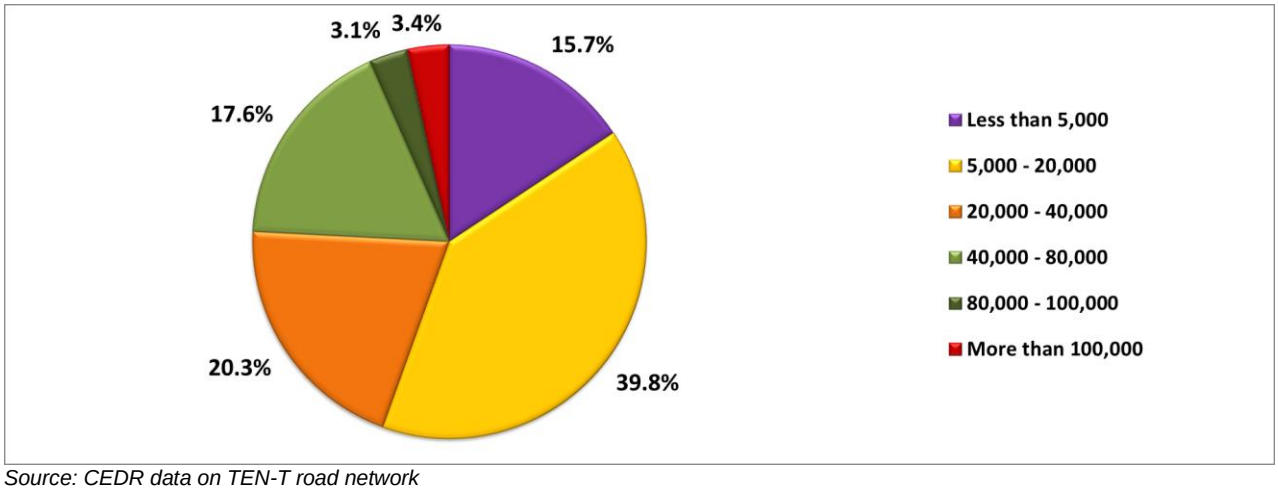


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 29: Distribution of Traffic Flow categories on the TEN-T networks of participating countries

Figure 30 shows the distribution of Traffic Flow on the TEN-T network as a whole (excluding those parts of the network where no data is available). It shows that 55.5% of the entire network carries less than 20,000 vehicle per day, while 41% of the network carries more than 20,000 and less than 100,000 vehicles per day. Only 3.4% of the entire network is very heavily trafficked, carrying more than 100,0000 vehicles per day.



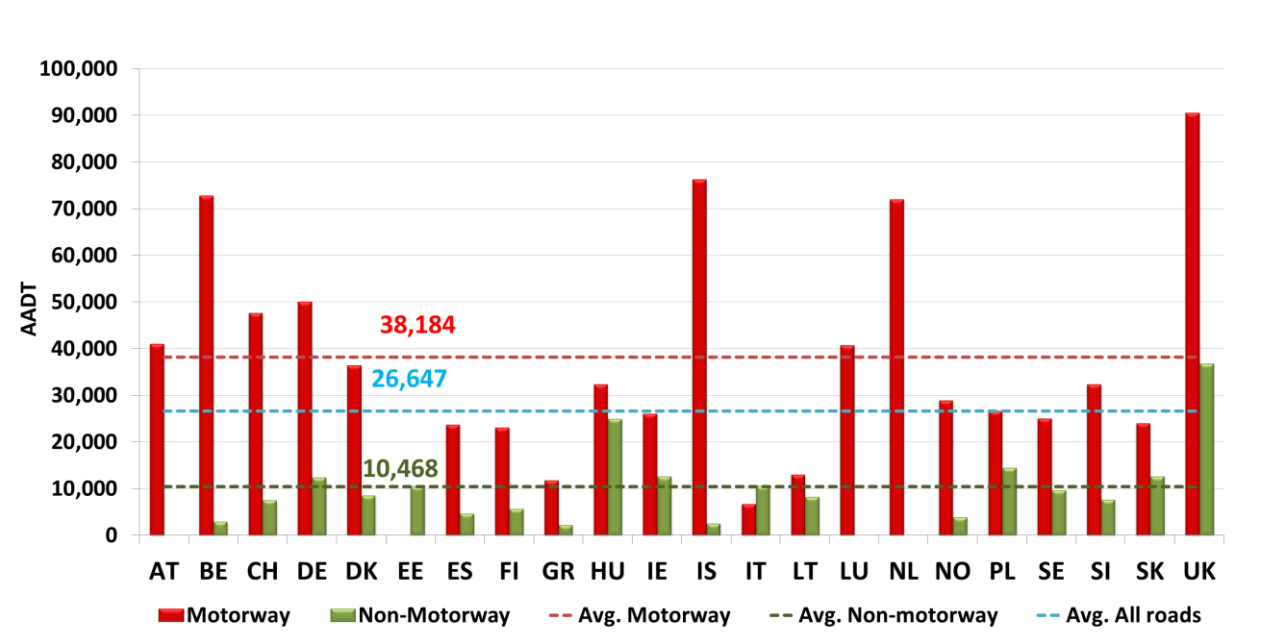
Source: CEDR data on TEN-T road network

Figure 30: Overall distribution of Traffic Flow categories on the TEN-T network

Figure 31 shows the average value for AADT on the logical sections of the TEN-T (Roads) network by country and road type. The indicator is computed as the weighted average of the AADT values on the different logical sections.

The weighted average AADT is substantially higher for motorways than for non-motorway roads in all countries, with the exception of Hungary, where the average traffic flow values are similar for both road types. The weighted average AADT for the whole Comprehensive Network is 26,647 vehicles per day. It ranges from 38,184 vehicles per day for motorways to 10,468 vehicles per day for non-motorway sections.

It is worth mentioning that the high value of the weighted average AADT for motorways in Iceland can be explained by the fact that the only two sections identified as motorways (accessing Reykjavik) show very high traffic flows.

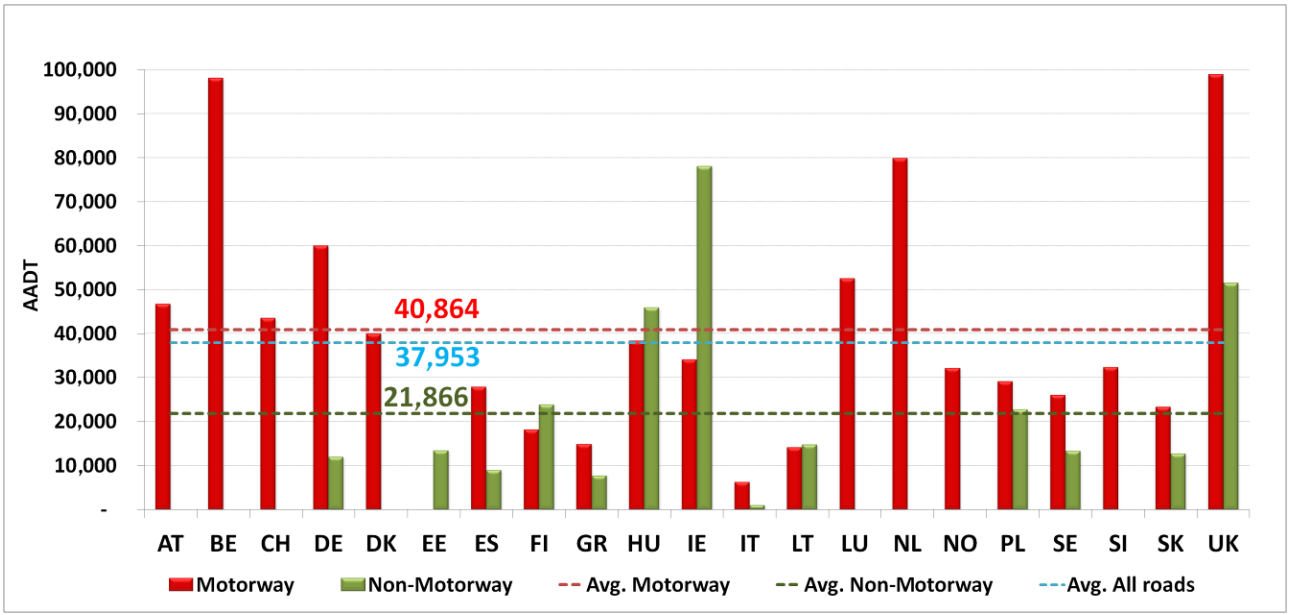


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 31: Average AADT on the logical sections on the Comprehensive Network for each participating country and road type

As shown in *Figure 32*, higher values apply in the case of the Core Network Corridors. On average, the weighted AADT on the logical sections of the TEN-T (Roads) Corridors is 37,953 vehicles per day. It ranges from 40,864 vehicles per day for motorways to 21,866 vehicles per day for non-motorway sections.



Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 32: Average AADT on the logical sections of the Core Network Corridors for each participating country and road type

4.2 Traffic Density

Traffic Density is expressed as the average annual daily traffic per lane and is calculated on the basis of data provided on Traffic Flow and Number of Lanes. By combining information on traffic flow and number of lanes, this indicator identifies the share of the TEN-T network which could experience congestion problems (for example when traffic density is higher than 18,000 AADT per lane).

Table 14: Length of the TEN-T (Roads) network by Traffic Density categories

Country	Total length [km]	Traffic density [AADT / Lane]											
		Less than 3.000		3.000–6.000		6.000–12.000		12.000–18.000		More than 18.000		No data	
		Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	-	-	577	33.3%	847	48.8%	226	13.0%	60	3.5%	25	5.0%
BE*	948	-	-	-	-	272	28.7%	388	40.9%	147	15.5%	141	14.9%
CH	1,325	60	4.5%	83	6.3%	483	36.5%	366	27.6%	148	11.2%	185	14.0%
DE	10,700	204	1.9%	1,443	13.5%	5,649	52.8%	2,931	27.4%	473	4.4%	-	-
DK	1,556	86	5.5%	711	45.7%	552	35.5%	202	13.0%	5	0.3%	-	-
EE	1,350	284	21.0%	555	41.1%	495	36.6%	-	-	-	-	17	1.2%
ES	12,198	3,921	32.1%	5,203	42.7%	2,317	19.0%	499	4.1%	215	1.8%	42	0.3%
FI	5,220	3,420	65.5%	1,277	24.5%	483	9.3%	40	0.8%	-	-	-	-
GR	4,816	1,420	29.5%	625	13.0%	247	5.1%	14	0.3%	-	-	2,510	52.1%
HU	1,450	409	28.2%	273	18.8%	443	30.5%	313	21.6%	12	0.8%	-	-
IE	2,163	272	12.6%	1,168	54.0%	591	27.3%	98	4.5%	34	1.6%	-	-
IS	1,804	1,668	92.5%	98	5.4%	33	1.8%	5	0.3%	-	-	-	-
IT	8,715	544	6.2%	1,590	18.2%	652	7.5%	49	0.6%	54	0.6%	5,826	66.9%
LT	1,652	988	59.8%	452	27.4%	130	7.9%	7	0.4%	-	-	75	4.5%
LU	90	-	-	25	27.7%	33	36.8%	32	35.5%	-	-	-	-
NL	1,886	-	-	24	1.3%	451	23.9%	1,035	54.9%	376	19.9%	-	-
NO	4,816	3,476	72.2%	752	15.6%	509	10.6%	77	1.6%	-	-	-	-
PL	7,622	580	7.6%	4,942	64.8%	2,036	26.7%	64	0.8%	-	-	-	-
SE	6,417	2,888	45.0%	1,927	30.0%	1,096	17.1%	91	1.4%	415	6.5%	-	-
SI	594	55	9.3%	212	35.7%	253	42.6%	70	11.8%	4	0.7%	-	-
SK	686	138	20.1%	246	35.9%	253	36.9%	35	5.1%	14	2.0%	-	-
UK	6,989	-	-	94	1.3%	1,857	26.6%	1,749	25.0%	731	10.5%	2,558	36.6%
Total	**84,732**	**20,407**	**24.1%**	**22,282**	**26.3%**	**19,682**	**23.2%**	**8,293**	**9.8%**	**2,689**	**3.2%**	**11,379**	**13.4%**
Total (Ex No data)	**73,353**	**20,407**	**27.8%**	**22,282**	**30.4%**	**19,682**	**26.8%**	**8,293**	**11.3%**	**2,689**	**3.7%**	**-**	**-**

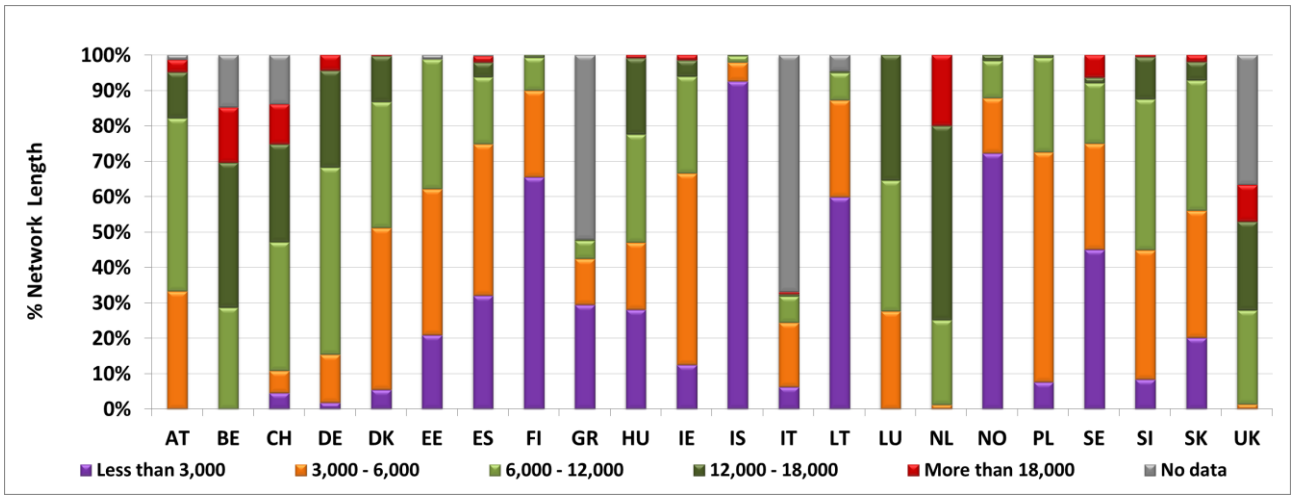
Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

The weighted average Traffic Density on the TEN-T network is 6,316 vehicles per lane per day. The weighted average Traffic Density for motorways is 8,245 vehicles per lane per day, and for non-motorway roads is 3,922 vehicles per lane per day.

Figure 33 shows the distribution of Traffic Density for each participating country. It shows that more than 10% of the TEN-T road networks in Belgium (Flanders), Switzerland, the Netherlands, and the United Kingdom (England) carry more than 18,000 vehicles per lane per day. The countries with

the lowest Traffic Density are Finland, Iceland, Lithuania, Sweden, and Norway, where more than 40% of the TEN-T networks carry less than 3,000 vehicles per lane per day. This result is consistent with the results obtained for Average Traffic Flow.

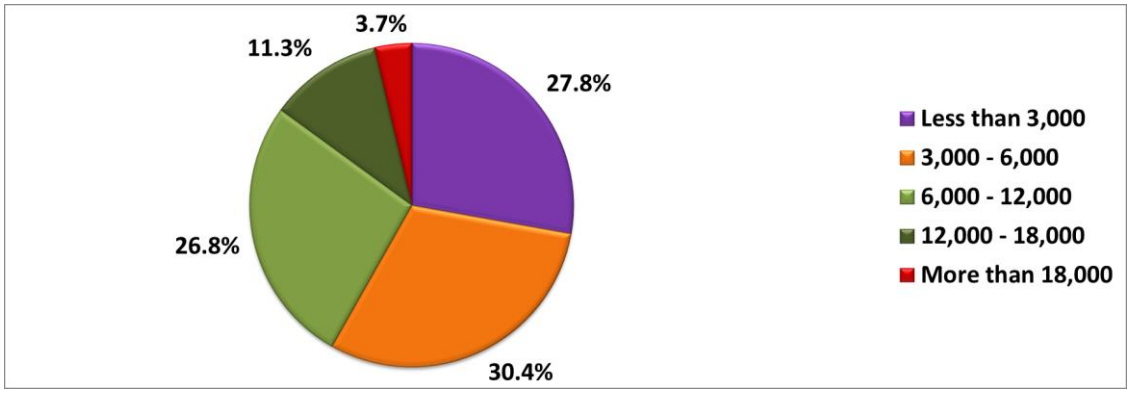


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 33: Distribution of traffic density categories on the TEN-T networks of participating countries

Figure 34 shows the overall distribution of Traffic Density on the TEN-T road network. As mentioned above, the distribution is in line with the distribution of the Average Traffic Flow: 58.2% of the network for which data is available shows a Traffic Density lower than 6,000 vehicles per lane per day while only 15% of the network has a Traffic Density higher than 12,000 vehicles per lane per day.

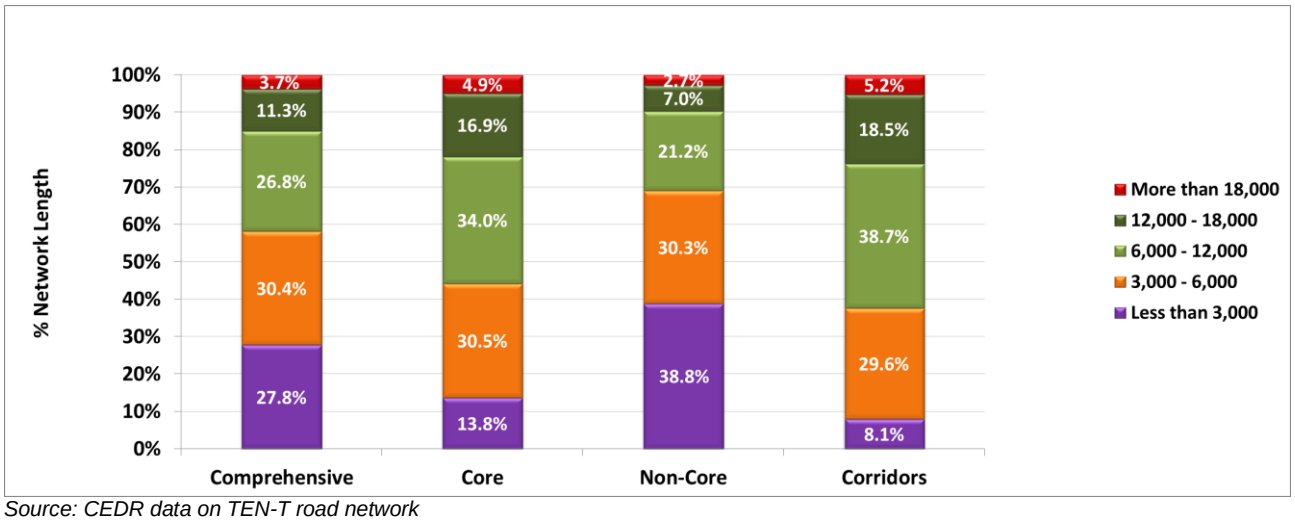


Source: CEDR data on TEN-T road network

Figure 34: Overall distribution of Traffic Density categories

Figure 35 compares Traffic Density on the Comprehensive, Core, Non-Core, and Corridor Networks. Only 8% of the Corridor Networks have a Traffic Density lower than 3,000 vehicles per lane per day. This percentage is higher for the Comprehensive, Core and Non-Core Networks (28%, 14%, and 39% respectively).

Furthermore, 50% of the Corridor Network has a Traffic Density of between 6,000 and 18,000 vehicles per lane per day compared to 46% of the Core Network and 51% of the Non-Core Network.



Source: CEDR data on TEN-T road network

Figure 35: Comparison of Traffic Density on the Comprehensive, Core, Non-Core, and Corridor Networks

4.3 Proportion of Heavy Good Vehicles

Table 15 and *Figure 36* give the TEN-T (Roads) network lengths according to the proportion of total traffic comprising heavy goods vehicles (HGVs).

Table 15: Length of the TEN-T (Roads) network according to proportion of Heavy Goods Vehicles

Country	Total length [km]	Proportion of total traffic comprising HGVs									
		Less than 5%		5%–10%		10%– 20%		More than 20%		No data	
		Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	7	0.4%	382	21.2%	1,260	72.6%	61	3.4%	25	1.4%
BE*	948	-	-	65	6.9%	410	43.2%	332	35.0%	141	14.9%
CH	1,325	434	32.8%	605	45.7%	63	4.8%	-	-	223	16.8%
DE	10,700	44	0.4%	1,329	12.4%	6,857	64.1%	2,470	23.1%	-	-
DK	1,556	45	2.9%	426	27.4%	1,020	65.6%	65	4.2%	-	-
EE	1,350	36	2.6%	465	34.4%	763	56.5%	70	5.2%	17	1.2%
ES	12,198	363	3.0%	2,599	21.3%	6,399	52.5%	2,724	22.3%	113	0.9%
FI	5,220	24	0.5%	1,861	35.7%	3,287	63.0%	48	0.9%	-	-
GR	4,816	155	3.2%	172	3.6%	1,208	25.1%	771	16.0%	2,510	52.1%
HU	1,450	48	3.3%	202	14.0%	580	40.0%	619	42.7%	-	-
IE	2,163	491	22.7%	1,541	71.3%	131	6.0%	-	-	-	-
IS	1,804	72	4.0%	597	33.1%	1,135	62.9%	-	-	-	-
IT	8,715	272	3.1%	1,434	16.5%	1,338	15.4%	2	-	5,669	65%
LT	1,652	9	0.5%	339	20.5%	843	51.0%	430	26.0%	31	1.9%
LU	90	-	-	-	-	84	93.3%	6	6.7%	-	-
NL	1,886	7	0.4%	235	12.5%	1,471	78.0%	173	9.2%	-	-
NO	4,816	-	-	168	3.5%	3,196	66.4%	1,452	30.2%	-	-
PL	7,622	76	1.0%	731	9.6%	3,113	40.8%	3,701	48.6%	-	-
SE	6,417	40	0.6%	437	6.8%	4,978	77.6%	962	15.0%	-	-
SI	594	42	7.1%	175	29.5%	289	48.7%	88	14.8%	-	-
SK	686	-	-	-	-	219	31.9%	467	68.1%	-	-
UK	6,989	-	-	1,949	27.9%	2,378	34.0%	104	1.5%	2,558	36.6%
Total	**84,732**	**2,165**	**2.6%**	**15,712**	**18.5%**	**41,022**	**48.4%**	**14,546**	**17.1%**	**11,547**	**13.6%**
Total (Ex No data)	**73,445**	**2,165**	**2.9%**	**15,712**	**21.4%**	**41,022**	**55.9%**	**14,546**	**19.8%**	**-**	**-**

Source: CEDR data on TEN-T road network

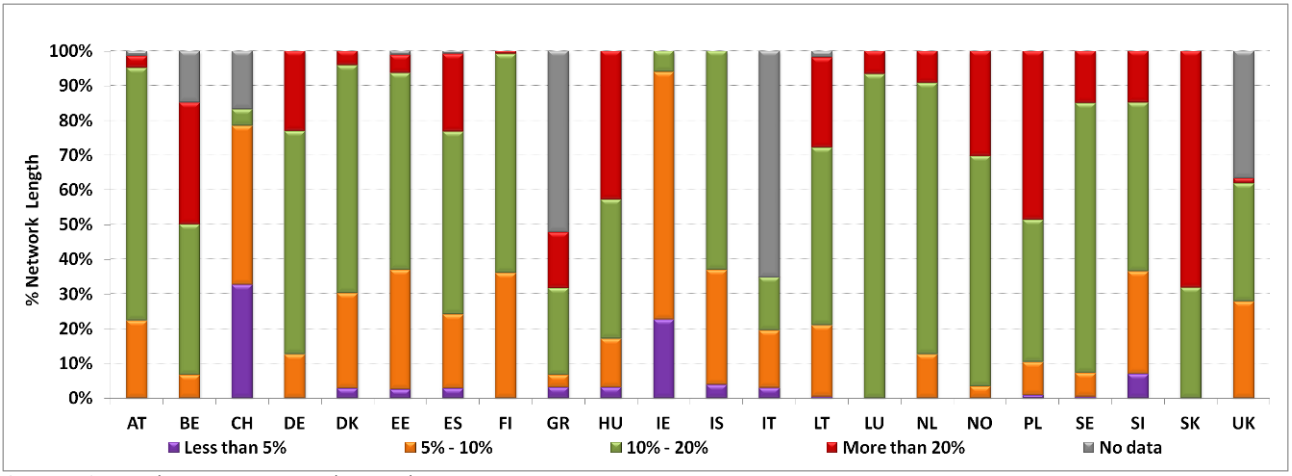
** Belgium-Flanders only*

On average, HGVs account for 13.7% of the traffic using the TEN-T network. The proportion remains consistent for motorways (13.6%) and non-motorways (13.7%).

The countries with the highest proportion of HGVs on the TEN-T network are the Slovak Republic, Poland, and Hungary, where HGVs account for more than 20% of total traffic on more than 40% of the TEN-T road network. These countries are followed by Belgium (Flanders), Germany, Lithuania, Norway, and Spain, where HGVs account for more than 20% of all traffic on more than 20% of the TEN-T road networks. The high proportion of HGVs in Norway can be explained by the fact that

the TEN-T network in northern Norway crosses areas with low population density and, consequently, low average daily traffic and a large freight traffic share.

The countries with the lowest proportion of HGVs are Switzerland and Ireland, where HGVs represent less than 5% of all traffic on more than 20% of the TEN-T road networks.

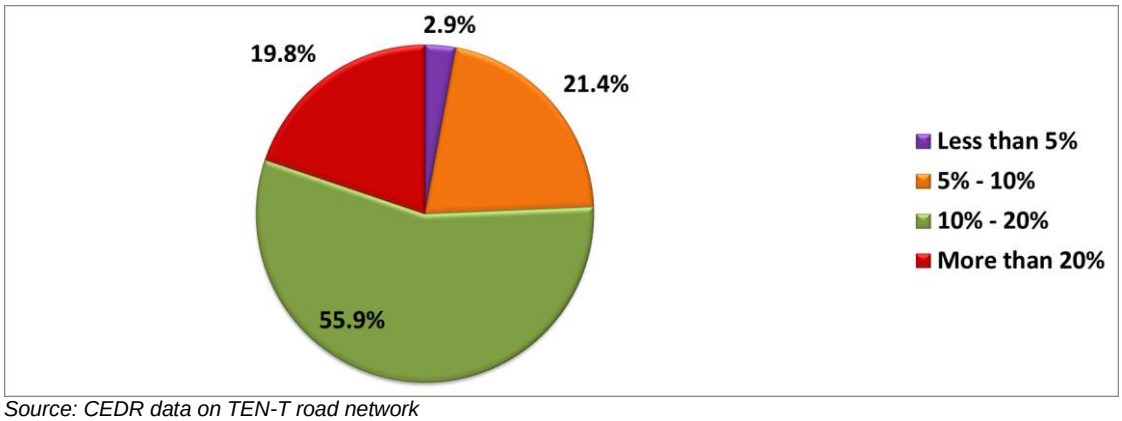


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 36: Distribution of HGV traffic proportions by country

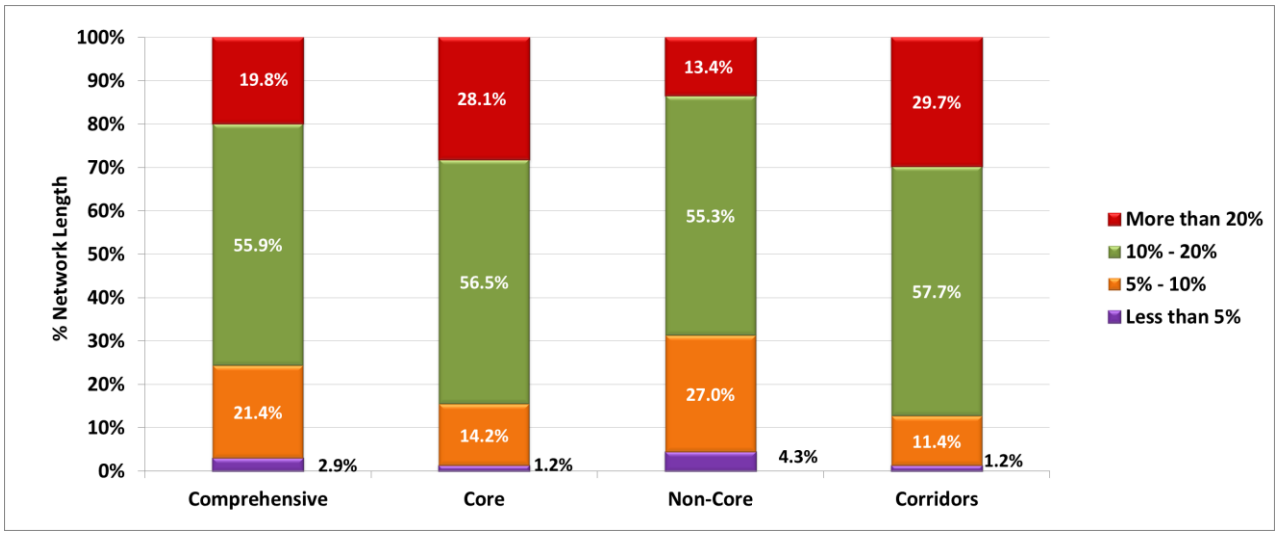
Figure 37 shows the overall proportion of HGV traffic on the TEN-T network (excluding the part of the network for which no data is available). It shows that on about 24% of the TEN-T network, HGVs account for less than 10% of total traffic. On about 56% of the network, HGVs account for between 10% and 20% of total traffic. HGVs account for over 20% of total traffic on only about 20% of the network.



Source: CEDR data on TEN-T road network

Figure 37: Overall distribution of HGV traffic proportions

Figure 38 shows the proportion of HGVs on the Comprehensive, Core, Non-Core, and Corridor Networks. Not surprisingly, the share of the TEN-T Corridor Network where HGVs account for more than 20% of total traffic is higher (30%) than on the Core (28%), Comprehensive (20%), and Non-Core Networks (13%).



Source: CEDR data on TEN-T road network

Figure 38: Comparison of HGV proportions on the Comprehensive, Core, Non-Core, and Corridor Networks

4.4 Heavy Goods Vehicle Traffic Flow

Table 16 and *Figure 39* show the length of the TEN-T (Roads) network according to classes of Heavy Goods Vehicle Traffic. These figures were obtained by multiplying the number of total vehicles with the percentage of the HGVs.

Table 16: Length of the TEN-T (Roads) network according to Heavy Goods Vehicle Traffic Flow

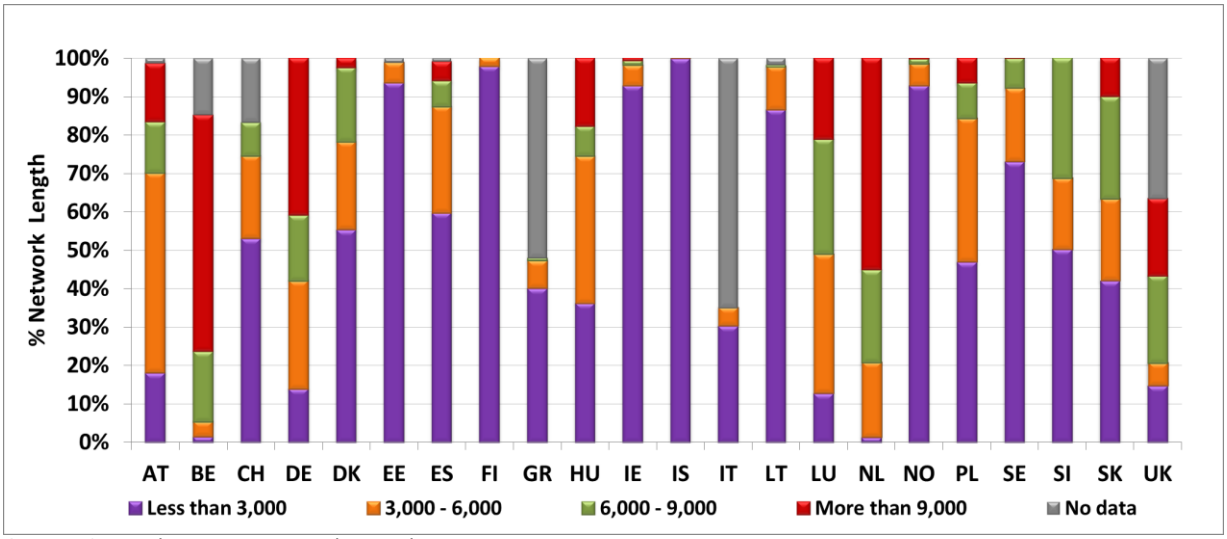
Country	Total length [km]	HGV traffic flow [AADT]									
		Less than 3.000		3.000–6.000		6.000–9.000		More than 9.000		No data	
		Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%	Length [km]	%
AT	1,735	314	18.1%	902	52.0%	231	13.3%	263	15.2%	25	1.4%
BE*	948	13	1.4%	38	4.0%	174	18.4%	582	61.4%	141	14.9%
CH	1,325	702	53.0%	286	21.6%	114	8.6%	-	-	223	16.8%
DE	10,700	1,483	13.9%	3,019	28.2%	1,826	17.1%	4,372	40.9%	-	-
DK	1,556	861	55.3%	356	22.9%	300	19.3%	39	2.5%	-	-
EE	1,350	1,263	93.6%	70	5.2%	-	-	-	-	17	1.2%
ES	12,198	7,277	59.7%	3,384	27.7%	815	6.7%	609	5.0%	113	0.9%
FI	5,220	5,105	97.8%	114	2.2%	-	-	-	-	-	-
GR	4,816	1,930	40.1%	347	7.2%	29	0.6%	-	-	2,510	52.1%
HU	1,450	524	36.2%	555	38.3%	113	7.8%	257	17.7%	-	-
IE	2,163	2,007	92.8%	115	5.3%	28	1.3%	13	0.6%	-	-
IS	1,804	1,802	99.9%	2	0.1%	-	-	-	-	-	-
IT	8,715	2,633	30.2%	413	4.7%	-	-	-	-	5,669	65.0%
LT	1,652	1,429	86.5%	186	11.3%	6	0.4%	-	-	31	1.9%
LU	90	11	12.7%	33	36.2%	27	30.0%	19	21.1%	-	-
NL	1,886	25	1.3%	367	19.5%	456	24.2%	1,039	55.1%	-	-
NO	4,816	4,467	92.8%	275	5.7%	65	1.3%	9	0.2%	-	-
PL	7,622	3,571	46.9%	2,850	37.4%	706	9.3%	494	6.5%	-	-
SE	6,417	4,682	73.0%	1,232	19.2%	499	7.8%	4	0.1%	-	-
SI	594	298	50.2%	110	18.5%	186	31.3%	-	-	-	-
SK	686	288	42.0%	147	21.4%	182	26.5%	69	10.1%	-	-
UK	6,989	1,030	14.7%	415	5.9%	1,582	22.6%	1,404	20.1%	2,558	36.6%
Total	**84,732**	**41,717**	**49.2%**	**15,217**	**18.0%**	**7,338**	**8.7%**	**9,173**	**10.8%**	**11,287**	**13.3%**
Total (Ex No data)	**73,445**	**41,717**	**56.8%**	**15,217**	**20.7%**	**7,338**	**10.0%**	**9,173**	**12.5%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

The countries that carry the greatest number of HGVs on their TEN-T roads are Belgium (Flanders), Germany, and the Netherlands. In all three countries, more than 40% of the road networks carry more than 9,000 HGVs per day. Although the share of HGVs in the Slovak Republic is quite high (as shown in *Table 15* in the previous section), the average traffic flow is lower than in the aforementioned countries. Consequently, the volume of heavy good vehicles is also lower.

The TEN-T roads networks that carry the fewest HGVs are to be found in Estonia, Finland, Ireland, Iceland, Lithuania, and Norway. In these countries, more than 80% of the TEN-T networks carry less than 3,000 HGVs per day.



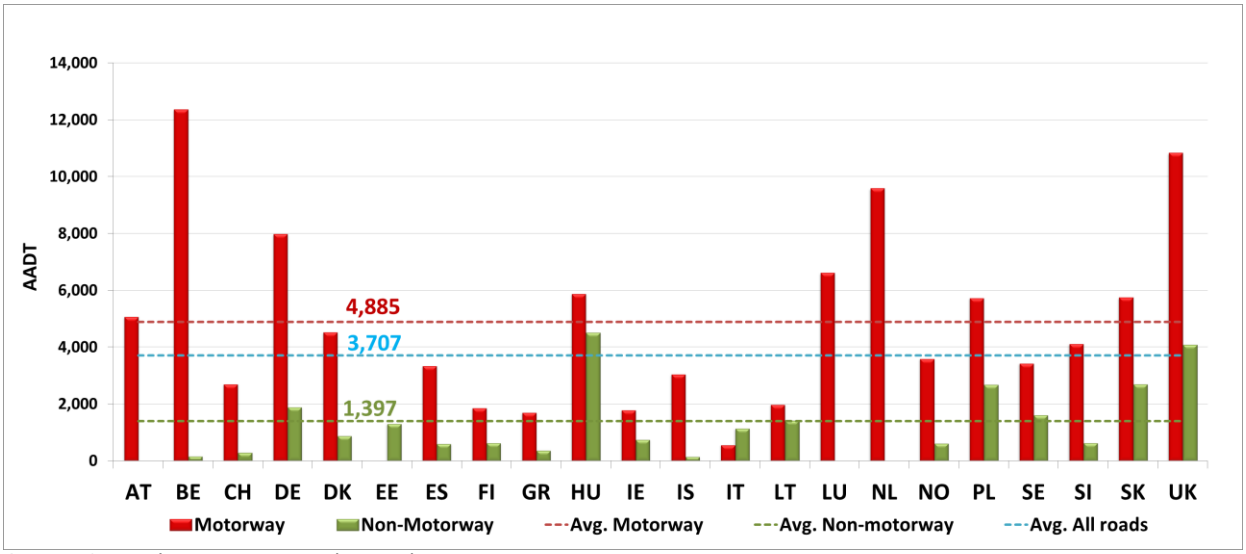
Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 39: National distribution of HGV traffic flow

Figure 40 and *Figure 41* show the weighted average values for Heavy Goods Vehicles traffic on the Comprehensive network and Core Network Corridors respectively.

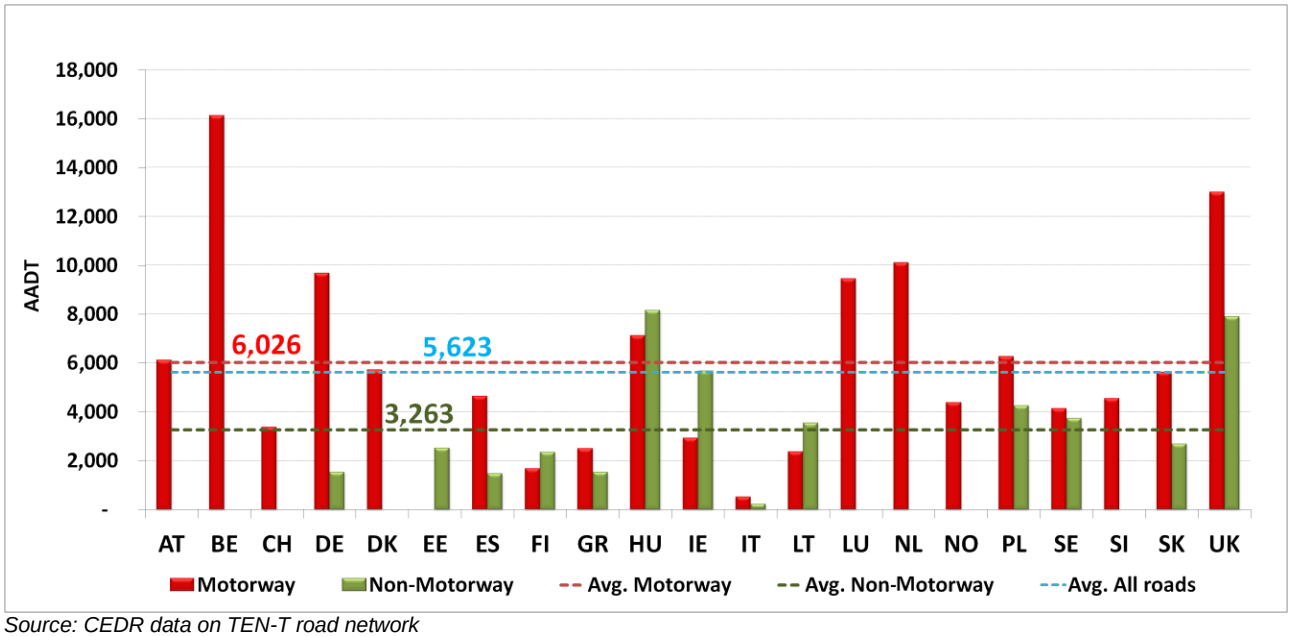
As expected, in most countries, HGV traffic on motorways is higher than HGV traffic on non-motorway roads.



Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 40: Average HGV Traffic Flow on the Comprehensive Network for each participating country and Road Type

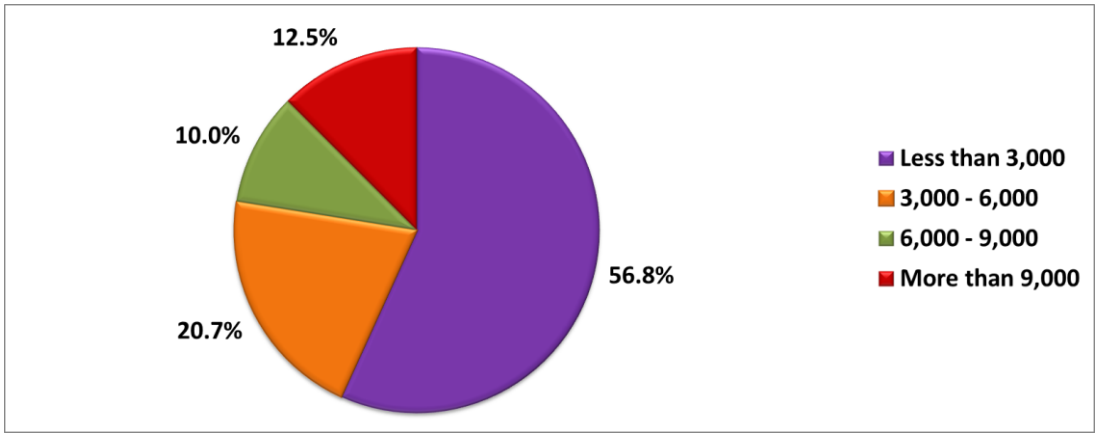


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 41: Average HGV Traffic Flow on Core Network Corridors for each participating country and road type

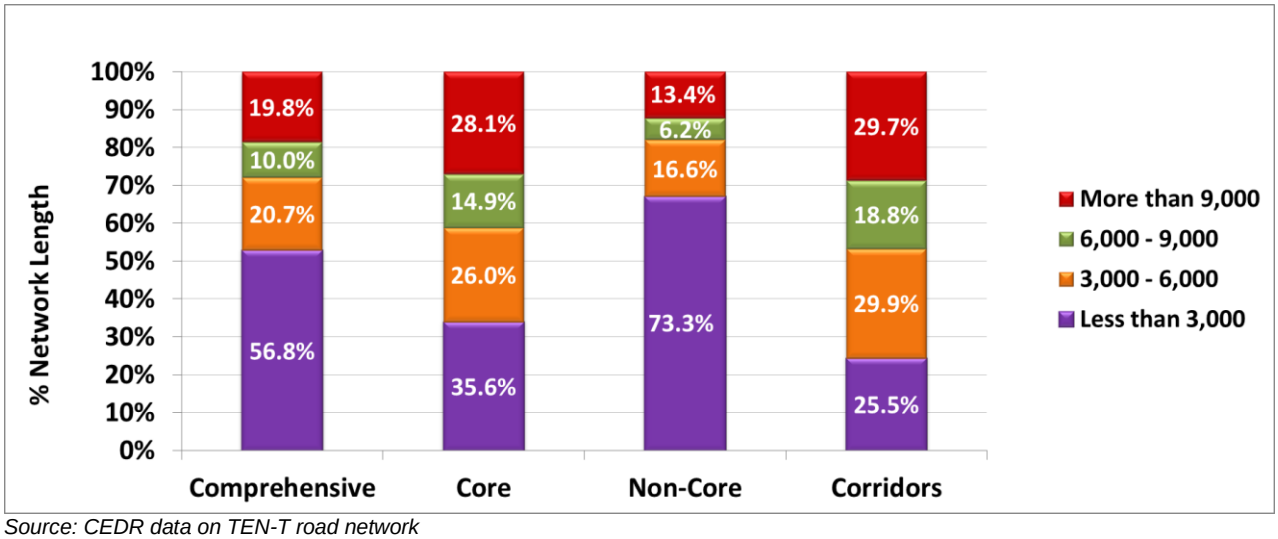
Figure 41 shows that about 57% of the TEN-T network for which data is available carries less than 3,000 HGVs per day, whereas only 12.5% of it carries more than 9,000 HGVs per day.



Source: CEDR data on TEN-T road network

Figure 42: Overall distribution of HGV traffic

Figure 43 compares HGV traffic flows on the Comprehensive, Core, Non-Core, and Corridor Networks. As expected, traffic flows are higher for the Core Network and the TEN-T Corridors than for the Comprehensive and Non-Core Networks. Indeed, the Core and Corridor Networks carry more than 6,000 HGV vehicles per day on more than 40% of their network lengths.



Source: CEDR data on TEN-T road network

Figure 43: Comparison of HGV traffic flow distributions on the Comprehensive, Core and Corridor Networks

4.5 Road Transport Mileage

The indicator on Road Transport Mileage is included for the first time in this report. Information on mileage travelled every year on the TEN-T network (expressed in terms of total vehicle kilometres per year) is an important indicator for network managers as it provides a measure of the intensity of total transport activity and allows for benchmarking between different countries' networks.

By multiplying the Average Daily Traffic Flow value along a logical section by the length in km of the section, total travelled mileage at country level expressed in terms of vehicle-kilometres is computed. The expansion from the average daily traffic value to yearly traffic value is based on a fixed conversion factor of 365 days per year.

Table 17 provides the indicator for each country, road type, and Core and Non-Core Networks.

Table 17: Road Transport Mileage on the TEN-T (Roads) network for each country, Road Type, and Core and Non-Core Networks

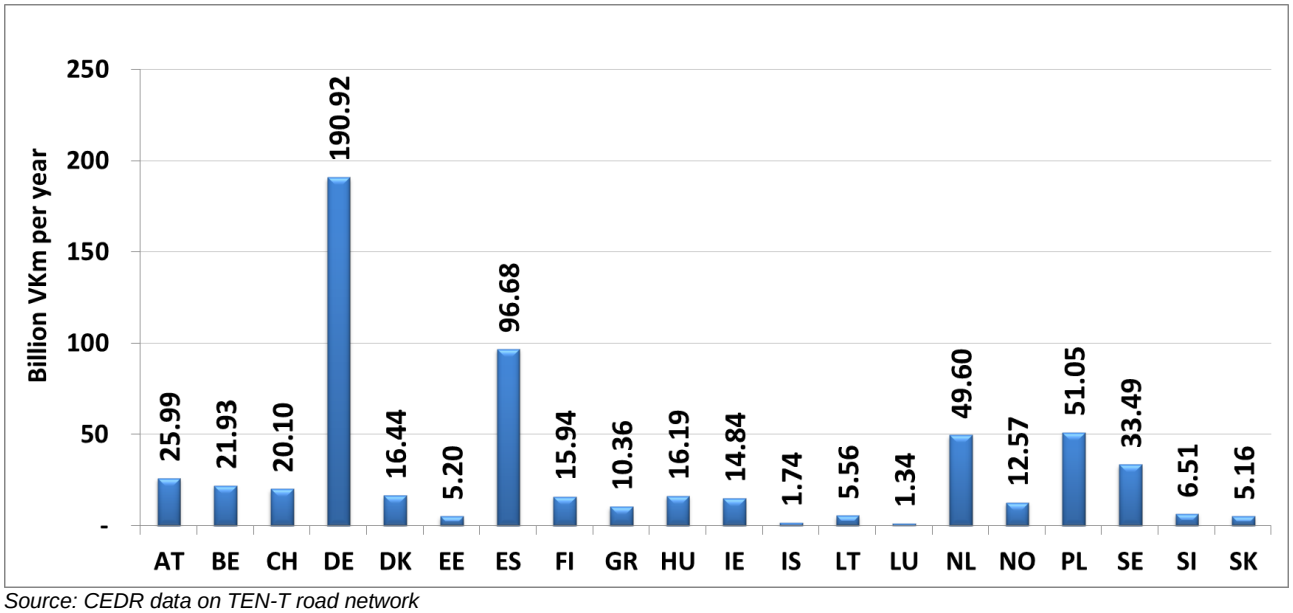
Country	Billion VKm per Year					Share %				
	Total	Motorway	Non-motorway	Core	Non-Core	Total	Motorway	Non-motorway	Core	Non-Core
AT	25.99	25.99	-	19.25	6.74	4.3%	100.0%	-	74.1%	25.9%
BE*	21.93	21.79	0.14	17.61	4.32	3.6%	99.4%	0.6%	80.3%	19.7%
CH	20.10	19.54	0.56	4.77	15.33	3.3%	97.2%	2.8%	23.7%	76.3%
DE	190.92	189.29	1.63	136.58	54.34	31.7%	99.1%	0.9%	71.5%	28.5%
DK	16.44	15.14	1.30	11.07	5.37	2.7%	92.1%	7.9%	67.3%	32.7%
EE	5.20	-	5.20	2.39	2.81	0.9%	-	100.0%	46.0%	54.0%
ES	96.68	94.43	2.25	59.62	37.06	16.1%	97.7%	2.3%	61.7%	38.3%
FI	15.94	6.72	9.22	5.85	10.10	2.6%	42.2%	57.8%	36.7%	63.3%
GR	10.36	7.95	2.41	7.57	2.79	1.7%	76.7%	23.3%	73.1%	26.9%
HU	16.19	13.06	3.13	14.53	1.66	2.7%	80.6%	19.4%	89.7%	10.3%
IE	14.84	9.44	5.40	5.83	9.01	2.5%	63.6%	36.4%	39.3%	60.7%
IS	1.74	0.08	1.66	0.42	1.32	0.3%	4.8%	95.2%	24.3%	75.7%
LT	5.56	1.52	4.04	3.04	2.52	0.9%	27.4%	72.6%	54.6%	45.4%
LU	1.34	1.34	-	1.34	-	0.2%	100.0%	-	100.0%	-
NL	49.60	49.60	-	19.48	30.13	8.2%	100.0%	-	39.3%	60.7%
NO	12.57	6.56	6.02	1.33	11.24	2.1%	52.2%	47.8%	10.6%	89.4%
PL	51.05	23.65	27.40	32.71	18.34	8.5%	46.3%	53.7%	64.1%	35.9%
SE	33.49	17.53	15.96	17.56	15.93	5.6%	52.3%	47.7%	52.4%	47.6%
SI	6.51	6.35	0.16	5.70	0.81	1.1%	97.5%	2.5%	87.5%	12.5%
SK	5.16	4.21	0.95	5.16	-	0.9%	81.6%	18.4%	100.0%	-
Total	**601.62**	**514.20**	**87.43**	**371.80**	**229.82**	**100.0%**	**85.5%**	**14.5%**	**61.8%**	**38.2%**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*

Note: Italy and United Kingdom not included due to limited data coverage

As shown in *Table 17*, Germany, Spain, Poland, and the Netherlands are the countries with the highest activity on the TEN-T network. Their total shares are 31.7%, 16.1%, 8.5%, and 8.2% respectively.

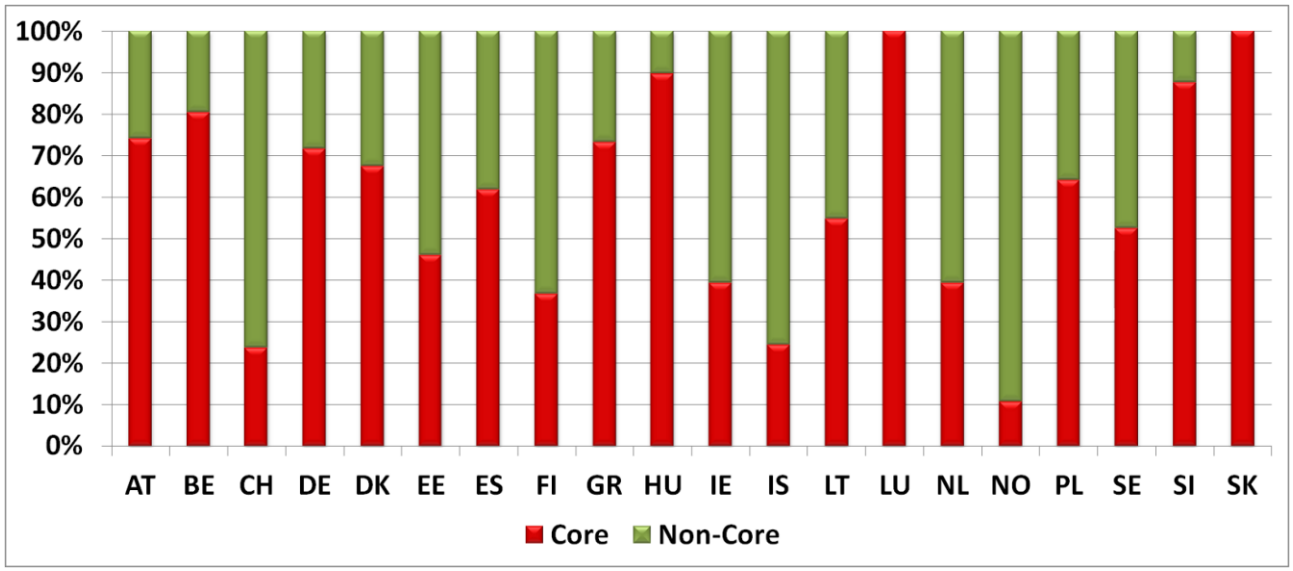


Source: CEDR data on TEN-T road network

Note: Italy and United Kingdom not included due to limited data coverage

Figure 44: Road Transport Mileage on TEN-T (Roads) networks

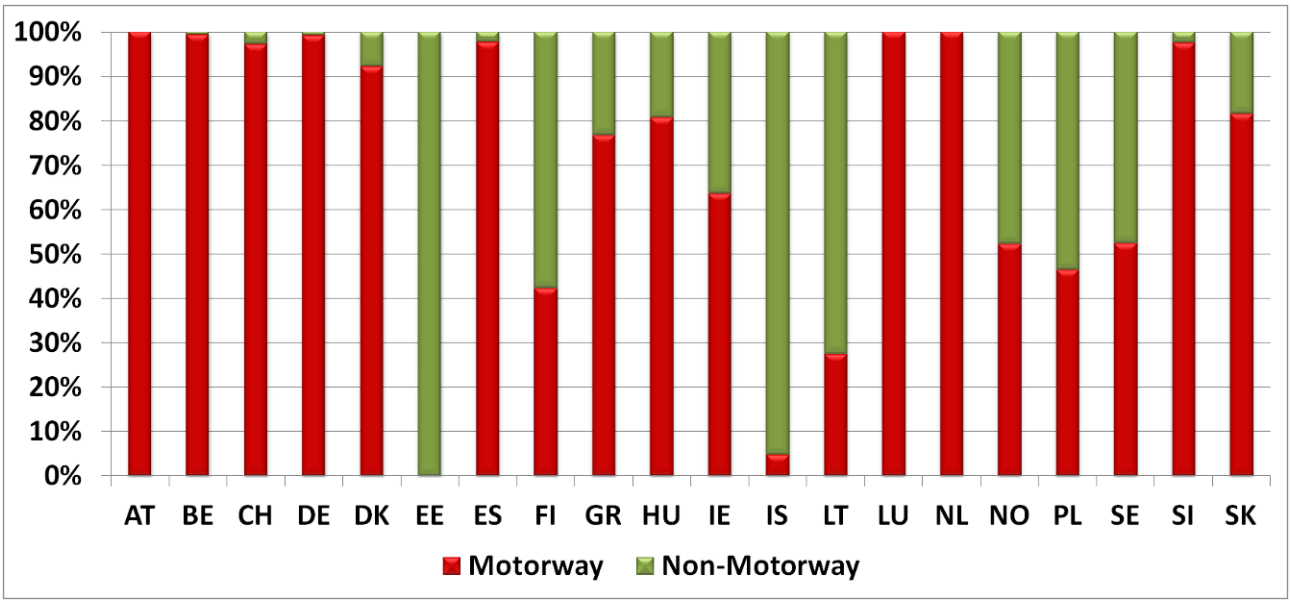
The distributions of road transport mileage on Core and Non-Core Networks and for individual road types are given in *Figure 45* and *Figure 46* respectively.



Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only. Italy and United Kingdom not included due to limited data coverage

Figure 45: Distribution of Road Transport Mileage on TEN-T (Roads) on the Core and Non-Core Networks

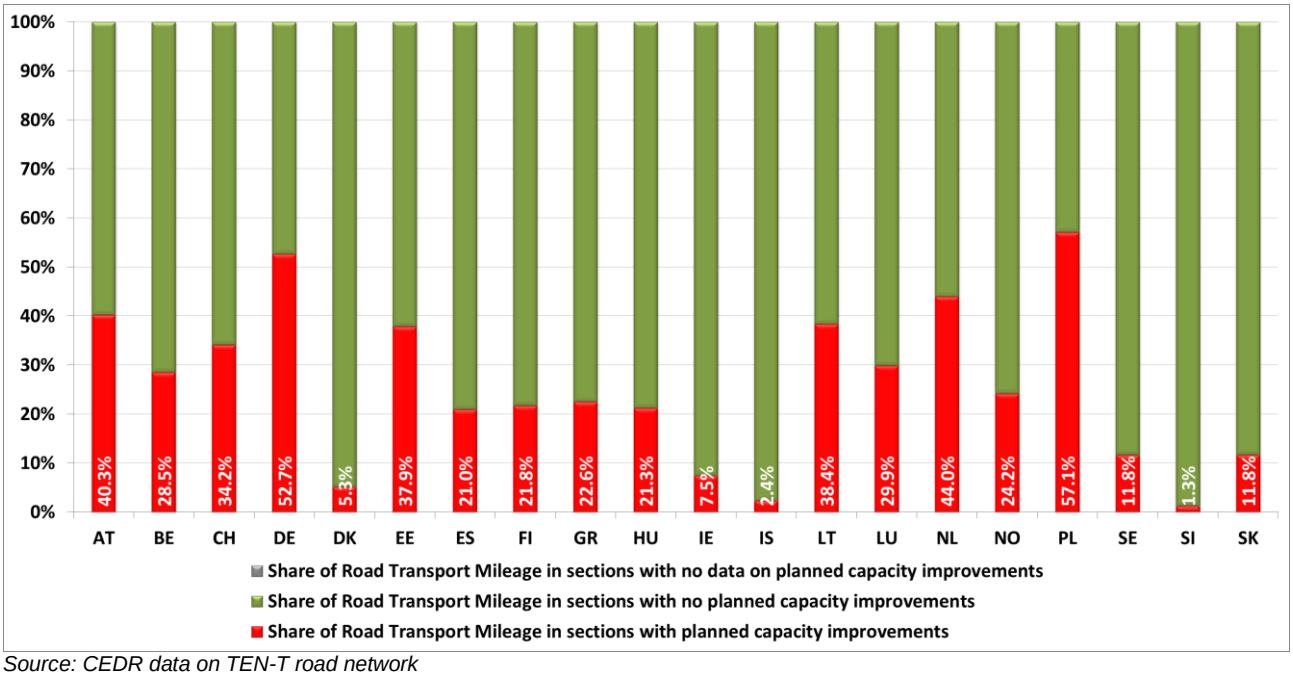


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only. Italy and United Kingdom not included due to limited data coverage

Figure 46: Distribution of Road Transport Mileage on TEN-T (Roads) network for different Road Types

Figure 47 indicates the share of road transport mileage on those sections where capacity improvements are planned (see also section 4.7). In Austria, Germany, the Netherlands, and Poland, more than 40% of total road transport activity occurs on sections with planned capacity improvements.



Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only. Italy and United Kingdom not included due to limited data coverage

Figure 47: Share of Total Road Transport Mileage on TEN-T (Roads) network in relation to planned capacity improvements

4.6 Fatal Accident Rate

Table 18 shows the average rate of fatal accidents on TEN-T road network sections in participating countries. It is designed to provide an indication of the relative safety of TEN-T sections, taking into account their length and level of use.

Table 18: Average TEN-T (Roads) Annual Fatal Accident Rate by country

Country	Average Annual Fatal Accident Rate [Fatal Accidents/BVehKm per section]	
	Motorway	Non-motorway
AT	1.32	n.a.
BE*	2.36	4.83
CH	1.55	2.72
DE	1.50	1.73
DK	0.85	4.82
EE	n.a.	12.07
ES	3.22	4.94
FI	1.32	5.36
GR	3.45	9.22
HU	1.93	4.42
IE	0.72	4.52
IS	1.56	4.32
IT**	3.16	6.11
LT	4.27	n.a.
LU	1.12	n.a.
NL	1.09	0.00
NO	1.10	5.69
PL	4.19	12.73
SE	1.72	2.55
SI	2.50	4.66
SK	2.76	13.61
UK***	0.71	2.02
Average	**2.07**	**6.95**

Source: CEDR data on TEN-T road network

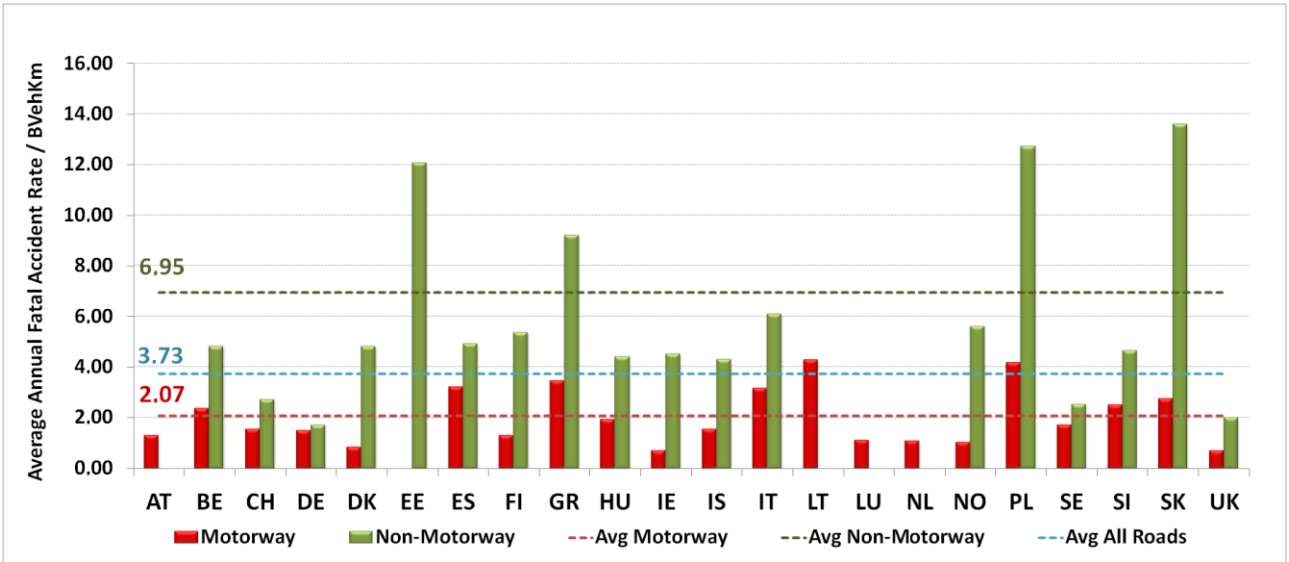
** Belgium-Flanders only*
*** ANAS network only*
**** England network only*

On motorway sections of the TEN-T road network, there are on average 2.07 fatal accidents per year for every billion vehicle-kilometres (BVehKm) driven. On non-motorway sections, this figure rises to 6.95.

With respect to the numbers obtained in 2015 (1.5 and 5.6 respectively), accident rates have increased. This increase is due to an increased number of accidents, but is also explained by the inclusion in the report of countries such as Poland and the Slovak Republic, which have rather high fatal accident rates.

Figure 48 shows the distribution of Average Section Annual Fatal Accident Rate by country and road type.

Lithuania, Estonia, Poland, and the Slovak Republic have the highest Average Section Fatal Accident Rate for non-motorway roads with values that are almost twice the average.

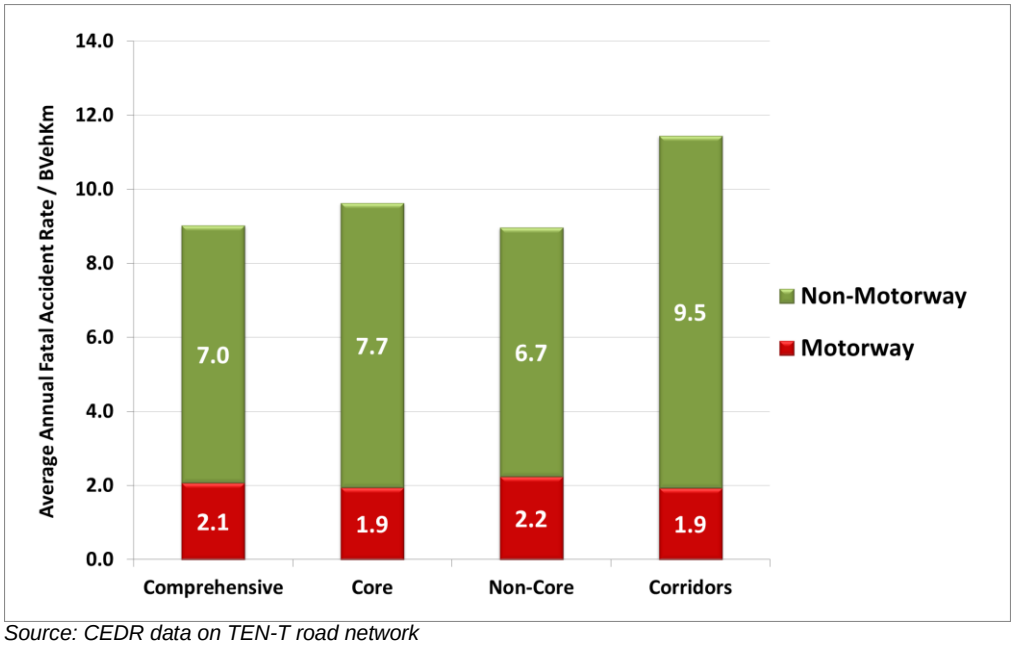


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only. Data for the United Kingdom relates to England only. Data for Italy relates to ANAS network only.

Figure 48: Average Section Annual Fatal Accident Rate by country

Figure 49 compares the Average Section Fatal Accident Rates on the Comprehensive, Core, Non-Core, and Corridor Networks. As expected, the accident rates on non-motorway roads are substantially higher than on motorways. It can be also observed that while the rate for motorways is largely stable (1.9; 2.1) for all networks, the highest rate (9.5) occurs on the non-motorway sections on Corridor Networks, which are mainly located in Eastern Europe.



Source: CEDR data on TEN-T road network

Figure 49: Average Section Annual Fatal Accident Rate by Road Type on the Comprehensive, Core, Non-Core, and Corridor Networks

4.7 Planned Capacity Improvements

This indicator is intended to be representative of capacity issues on the TEN-T network and is based on information provided by the National Road Authorities on TEN-T sections identified as being in need of capacity improvements in their current network improvement plans. The need for capacity improvements is deemed to indicate that the section experiences traffic congestion, i.e. it is a bottleneck.

Table 19: Number of TEN-T (Roads) sections with Planned Capacity Improvements

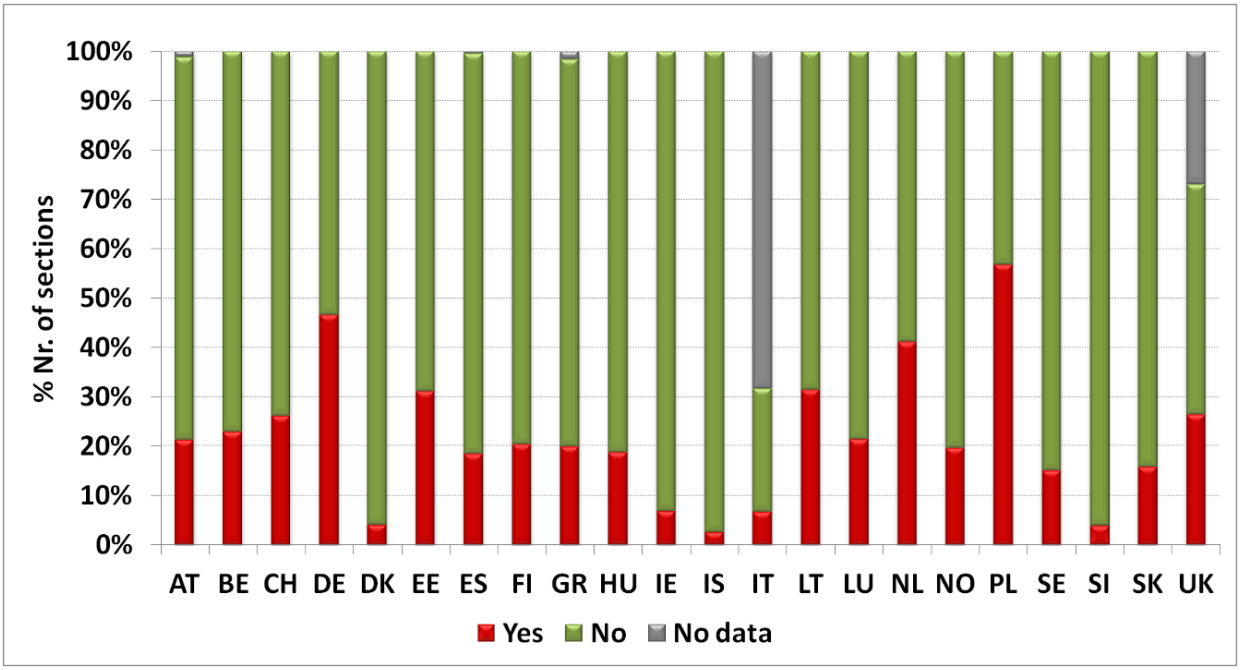
Country	Total sections	Yes		No		No data	
		Number of sections	%	Number of sections	%	Number of sections	%
AT	80	17	21.3%	62	77.5%	1	1.3%
BE*	61	14	23.0%	47	77.0%	-	-
CH	111	29	26.1%	82	73.9%	-	-
DE	360	168	46.7%	192	53.3%	-	-
DK	74	3	4.1%	71	95.9%	-	-
EE	45	14	31.1%	31	68.9%	-	-
ES	421	78	18.5%	341	81.0%	2	0.5%
FI	176	36	20.5%	140	79.5%	-	-
GR	120	24	20.0%	94	78.3%	2	1.7%
HU	48	9	18.8%	39	81.3%	-	0.0%
IE	58	4	6.9%	54	93.1%	-	-
IS	78	2	2.6%	76	97.4%	-	-
IT	240	16**	6.7%**	60**	25.0%**	164	68.3%
LT	127	40	31.5%	87	68.5%	-	-
LU	28	6	21.4%	22	78.6%	-	-
NL	119	49	41.2%	70	58.8%	-	-
NO	208	41	19.7%	167	80.3%	-	-
PL	134	76	56.7%	58	43.3%	-	-
SE	119	18	15.1%	101	84.9%	-	-
SI	51	1	2.0%	50	98.0%	-	-
SK	44	7	15.9%	37	84.1%	-	-
UK	163	43***	26.4%***	76***	46.6%***	44	27.0%
Total	**2,865**	**696**	**24.3%**	**1,956**	**68.3%**	**213**	**7.4%**
Total (Ex no data)	**2,652**	**696**	**26.2%**	**1,956**	**73.8%**	**-**	**-**

Source: CEDR data on TEN-T road network

** Belgium-Flanders only*
*** ANAS network only*
**** England network only*

Figure 50 shows the distribution of Planned Capacity Improvements on the Comprehensive Network for each participating country.

The figure shows that in Germany, the Netherlands, and Poland, more than 40% of sections have been identified as being in need of capacity improvements. The lowest proportions of sections identified as being in need of capacity improvements occur in Denmark (4.1%), Iceland (2.6%), and Slovenia (2%).

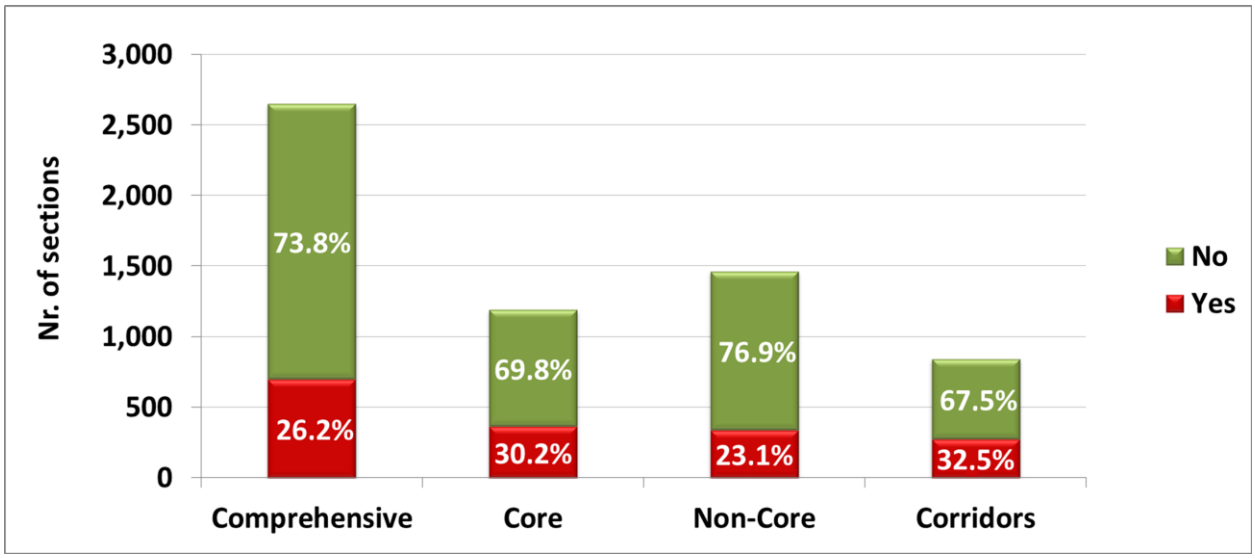


Source: CEDR data on TEN-T road network

Note: Data for Belgium relates to Flanders only.

Figure 50: Planned Capacity Improvements on the TEN-T (Roads) network

Figure 51 compares planned capacity improvements on the Comprehensive, Core, Non-Core, and Corridors Networks for those sections where data is available. Results show that about 30% of the sections on the Core Network have been identified as being in need of capacity improvements compared with 26% of the Comprehensive, 23% of the Non-Core, and 32% of the Corridor Networks.



Source: CEDR data on TEN-T road network

Figure 51: Comparison of overall Planned Capacity Improvements on Core, Comprehensive, Non-Core, and Corridor Networks

5 Conclusions and future developments

5.1 Purpose of the report

The 2017 TEN-T (Roads) Performance report is intended to provide detailed and high-quality indicators of the performance of the TEN-T road network within CEDR member countries on the basis of a set of data directly provided by national road authorities (NRAs).

The fact that this is the fifth biennial TEN-T (Roads) Performance Report illustrates the value that CEDR members attach to the information this report delivers and to its capacity to serve benchmarking purposes and to monitor the evolution of TEN-T network performance over time.

The information included in the report is of incomparable value as it is based on:

- **high-quality data** provided by the most qualified data sources in each of the participating countries;
- **a well-proven data collection process** that has been used five times with a constant increase in the quality of the data delivered;
- **an agreed set of indicators** based on definitions and models commonly approved by CEDR members, allowing for complete data harmonisation and comparability.

The report provides very detailed information on the TEN-T road structure and performance that is not available from any other centralised information source.

Performance indicators are provided at different levels: for the whole TEN-T network, for the participating country, for each road type, for the Core and Non-Core Networks, and for Core Network Corridors. This allows for a deep understanding of network performance from different points of view.

The indicators included in this report can therefore support NRAs in determining the strengths and weaknesses of their respective TEN-T roads and in evaluating their competitiveness by comparing the performance of the TEN-T roads in their countries with that in other countries. Benchmarking with peers could boost the sharing of best practice among NRAs, support policy making, and improve the services provided to customers and to society. It is important to remember that the use of the indicators provided in the report is expected to differ according to the local context and specific purpose and may require additional information to enable NRAs to interpret and use the indicators properly.

5.2 Geographical coverage

The report is based on data provided voluntarily by 22 national road authorities (CEDR members). Consequently, not all EU Member States are covered by the report.

Moreover, although most of the CEDR members contributing to the report are responsible for the management of the whole domestic TEN-T network, some exceptions occur. This is the case for:

- Belgium, where management of the TEN-T road network is shared between the two regional authorities: Flanders and Wallonia;
- Italy, where the TEN-T road network is managed by ANAS and by numerous private motorway concessionaires;
- The United Kingdom, where the TEN-T road network is managed by Highways England, Transport Scotland, the Welsh Assembly, and Transport for London.

Because not all these organisations contribute to the Working Group responsible for this report, limited data coverage for these countries posed some limitations in the calculation of performance indicators at country level.

Similarly, the lack of data for some European countries crossed by the TEN-T network limits the ability of the report to provide complete statistics for the whole TEN-T road network and for the full extent of Core Network Corridors.

5.3 Relevance of the TEN-T (Roads) network

Although it is the backbone of European transport, the **TEN-T (Roads) network represents only part of the domestic networks** of the 22[8] participating countries. Moreover, in most cases, the length of the TEN-T road network within the borders of these countries is less than 2,200 km.

A comparison of the TEN-T (Roads) network and domestic networks reveals that the percentage of the strategic road network length made up of TEN-T roads ranges from 4.5% in Hungary to 97.4% in Belgium (Flanders). Extending the comparison to County/Provincial roads, the share of TEN-T (Roads) network further decreases, ranging from 0.8% in Hungary to 26.1% in Belgium (Flanders). Therefore, the relevance of TEN-T roads within the domestic networks varies considerably from country to country.

The TEN-T (Roads) network in participating countries is about 84,700 kilometres long. Some 42% of these roads are **Core** roads and 58% **Non-Core** roads. The countries with the highest proportion of Core Networks are Germany (59%), Austria (63%), Belgium (Flanders) (64%), Hungary (73%), Slovenia (79%), Luxembourg (100%), and the Slovak Republic (100%). A lower share of Core Network can be observed in Finland (21%), Switzerland (23%), and Ireland (23%), while Iceland (3%) and Norway (3%) have the lowest shares of all.

Participating countries are crossed by about 25,800 km of **Core Network Corridors** (CNCs). Given its central geographical position with respect to the North–South and East–West transport flows crossing Europe, Germany is crossed by four out of nine CNCs, i.e. the Rhine–Alpine, North Sea–Baltic, Orient/East-Med and Scandinavian–Mediterranean, for a total length of 5,080 km.

5.4 Structure of the TEN-T (Roads) network

Almost 61% of the TEN-T (Roads) network in the participating countries for which data is available is composed of motorways and 39% of non-motorway roads.

The structure of the network varies from country to country. High shares of **non-motorway roads** generally occur in Northern and Eastern European countries: Finland, Norway, and Lithuania have a share of non-motorway roads higher than 80%, while non-motorway roads represent the whole TEN-T network in Estonia and Iceland. Conversely, high shares of motorways occur in Austria, Luxembourg, and the Netherlands, where all TEN-T roads are motorways, as well as in Germany, Slovenia, and Italy, where the share is higher than 90%.

About 53% of the entire TEN-T (Roads) network (i.e. 40,280 km) has **more than two and up to four lanes**, 20% has **more than four and up to six lanes,** and 3% has **more than six lanes** (2,073 km).

The countries with the **highest road capacity** are the Netherlands, where over 70% of its network has more than four lanes, followed by Austria (52%) and Germany (49%). However, these countries also have high traffic densities coupled with the highest proportion of HGVs. Consequently, capacity may occasionally be insufficient, especially during peak-hours.

[8] The data for Belgium relates to Flanders only.

Indeed, Germany, the Netherlands, and Poland indicated that **capacity improvements are planned for** more than 40% of their respective networks**.**

The TEN-T network also has about 18,600 km (almost 24% of the total length) of roads with **only two lanes or less.** Most of these roads are located in Estonia, Greece, Ireland, Iceland, Lithuania, and Norway, where over 50% of the network **has two lanes or less**. On 87% of these roads, **traffic density** is generally lower than 6,000 vehicles per lane per day, therefore no capacity problems are expected. However, 3% of these roads (located in Spain, Ireland, and Switzerland) have a traffic density of more than 18,000 vehicles per lane per day. Hardly any capacity problems are expected to apply to these sections.

The TEN-T (Roads) network has a limited share of civil engineering structures with **bridges** and **tunnels,** totalling about 1,454 km (1.9% of the total network length) and about 1,038 km (1.4%) respectively. Reflecting the orography of these countries, more than 5% of the TEN-T networks in Austria, Switzerland, Luxembourg, the Slovak Republic, and Italy (on the network operated by ANAS) is composed of bridges, and more than 9% of networks in the Alpine countries of Austria and Switzerland consists of tunnels. Norway also has a significant share of tunnels (6.5% of total length).

Not surprisingly, most TEN-T (Roads) are situated in a **rural environment**. However, about 6,800 km (i.e. 9.1% of the total network) are located in **urban areas** and carry more traffic than rural roads. Given their proximity to residential areas, these road sections, most of which are located in Spain (1,393 km), Poland (1,199 km), and Germany (877 km), might require specific interventions to manage traffic externalities caused by noise and air pollution.

As far as the availability of **ITS** is concerned, most of the TEN-T network (42%) is equipped with Level-2 technology (i.e. passive management of the road network) while about 24,000 km of roads (32%) is equipped with Level-3 technology (i.e. active management). The availability of cooperative ITS is still in its infancy, with only very few kilometres of network (0.2%) equipped with Level-4 technology. About 7,400 km of the network (i.e. 9.7% of the network length) has no ITS technology (i.e. Level 0). These roads are mainly non-motorway roads in Greece, Ireland, Lithuania, and England. The distribution of ITS varies from country to country. Level 3 is currently available on 95% of the network length in Switzerland, on 93% in Luxembourg, and on 86% in the Netherlands. Other countries with a share of over 50% for ITS Level 3 are Belgium (Flanders) (66%), Germany (51%), Slovenia (55%), and Norway (67%). As expected, the highest level of technology is to be found on motorways, where 45% have Level-3 technology.

5.5 Performance of the TEN-T (Roads) network

An analysis of the **average annual daily traffic flow** (AADT) reveals that 55% of the entire TEN-T (Roads) network is trafficked with less than 20,000 vehicle per day, while 41% of the network carries more than 20,000 and less than 100,000 vehicles per day. Only 3.4% of the entire network is very heavily trafficked, carrying more than 100,0000 vehicles per day.

Regardless of the road type, AADT on a generic road section is about 26,700 vehicles per day. The average traffic is about 38,200 vehicles per day on motorway sections and about 10,500 vehicles per day on non-motorway roads.

Traffic flows vary considerably from country to country: Belgium (Flanders), the Netherlands, and the United Kingdom (England) have the most trafficked TEN-T roads with more than 25% of their network carrying more than 80,000 vehicles per day. Countries with the lowest traffic levels are Finland, Iceland, and Norway, with more than 40% of their networks carrying less than 5,000 vehicles per day.

On average, 13.7% of the traffic using the TEN-T network is composed of **HGVs,** with this share remaining consistent for motorways (13.6%) and non-motorways (13.7%). Countries with the highest **HGV traffic volumes** are Belgium (Flanders), Germany, and the Netherlands, with more

than 40% of their road networks carrying an average of over 9,000 HGVs per day. Lower HGV traffic volumes apply to the more peripheral countries (e.g. Estonia, Finland, Ireland, Iceland, Lithuania, and Norway) where over 80% of their TEN-T network carries less than 3,000 HGVs per day.

The average **traffic density** on the TEN-T (Roads) network is 6,316 vehicles per lane per day (regardless of the road type). On motorways, this value rises to 8,245 vehicles per lane per day, and for non-motorway roads decreases to 3,922 vehicles per lane per day. At country level, high density is also noted in Belgium (Flanders), Switzerland, the Netherlands, and the United Kingdom (England), with more than 10% of their networks carrying more than 18,000 vehicles per lane per day. The countries with the lowest traffic density are Finland, Iceland, Lithuania, Norway, and Sweden, with more than 40% of their TEN-T networks carrying less than 3,000 vehicles per lane per day.

Germany, Spain, Poland, and the Netherlands are the countries with the highest **road transport mileage**, whose share of the total TEN-T (Roads) network is 31.7%, 16.1%, 8.5%, and 8.2% respectively.

Despite this intense road activity, road safety is not an issue in Germany, where **fatal accident rates** on both motorways and non-motorway roads are well below the TEN-T (Roads) network average. Conversely, road safety is an important issue in the Slovak Republic, Poland, Estonia, and Lithuania, where fatal accident rates are above the average.

5.6 Future developments

Regarding the future development of the report, the group basically has two goals: firstly, there is the natural ambition to get **complete geographical coverage** of all CEDR members and European Union members. In this respect, pursuing the involvement of missing member states (and missing road authorities) is to be regarded as one of the key goals for improving the quality of the report. Secondly, new data could be collected with the support of CEDR members. To this end, the working group has already started a discussion to identify **new indicators that could enrich the description of the TEN-T network** without posing an excessive burden on data collection.

6 ANNEX 1: Methodology and data validity

6.1 Methodology

The TEN-T (Roads) Performance Report is based on a common location referencing model and common data definitions that have been developed by practitioners with an understanding of the data.

Data is provided directly by NRAs and is processed centrally to produce this report and the accompanying maps as described below:

1. Individual countries referenced their local networks into Logical Nodes and Sections using the TEN-T (Roads) Location Referencing System developed by CEDR Planning Working Group in 2008.
2. They then submitted their network and performance base data (including the geographical coordinates of each node) using a standard Excel spreadsheet and a set of base data definitions (see Section 7) that they were provided with.
3. Once received, the data was checked, and errors were corrected in consultation with the individual countries.
4. The data was then systematised into a single Excel database and used for:
    a. the analysis and the production of charts and tables;
    b. the production of maps in GIS ShapeFile format.

As this is now the fifth biennial report that CEDR has produced, the participating countries are familiar with the requirements and the process and data quality has improved.

Table 20 shows the coverage of the information provided by the NRAs based on the number of sections per country.

Table 20: Sections data coverage by country

Country	Number of Sections	Section Description	Road Type	Section Length	Number of Lanes	Length of Bridges	Length of Tunnels	Physical Environment	ITS	AADT	HGV percentage	Fatal Accidents	Number of Years	PCI	Core	Corridors
AT	80	80	80	80	80	80	80	80	80	79	79	79	80	79	80	80
BE*	61	61	61	61	61	61	61	61	61	51	51	55	55	61	61	61
CH	111	111	111	111	111	111	110	111	111	77	71	111	111	111	111	111
DE	360	360	360	360	360	360	360	360	360	360	360	316	316	360	360	360
DK	74	74	74	74	74	25	3	74	74	74	74	73	73	74	74	74
EE	45	45	45	45	45	36	45	45	45	42	42	31	31	45	45	45
ES	421	421	421	420	421	338	355	421	421	414	409	418	418	419	421	421
FI	176	176	176	176	176	176	4	176	176	176	176	176	176	176	176	176
GR	120	120	120	120	120	77	78	120	118	67	67	61	61	118	120	120
HU	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
IE	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
IS	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
IT	240	240	240	240	76	76	76	76	76	76	76	76	76	76	240	240
LT	127	127	127	127	122	127	127	127	124	122	122	122	122	127	127	127
LU	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
NL	119	119	119	119	119	51	13	119	119	119	119	119	119	119	119	119
NO	208	208	208	207	208	208	208	208	208	208	208	208	208	208	208	208
PL	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
SE	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
SI	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
SK	44	44	44	44	44	21	6	44	44	44	44	44	44	44	44	44
UK	163	163	119	150	119	119	119	119	116	119	119	120	120	119	163	163
Total	**2,865**	**2,865**	**2,821**	**2,852**	**2,652**	**2,382**	**2,161**	**2,657**	**2,649**	**2,544**	**2,533**	**2,525**	**2,526**	**2,652**	**2,865**	**2,865**

Source: CEDR data on TEN-T road network

**Belgium-Flanders only*

6.2 Data quality and validity

The data included in this report is intended to accurately represent the performance of the TEN-T (Roads) network in 2017 and is assumed to be correct as of 1 January 2017.

However, as the data has been provided by individual NRAs and requires aggregation of local data and interpretation of data definitions, it is possible that the quality of data will vary.

This may particularly be the case where:

- countries are participating for the first time;
- network coverage within a country will be extended (e.g. in response to new TEN-T Guidelines).

CEDR therefore takes no responsibility for the accuracy or quality of the data that has been used to produce this report.

7 ANNEX 2: Base data definitions

7.1 Road Type

Title	Road Type
Definition	The predominant Road Type along a Logical Section
Permitted values	Motorway or Non-motorway
Definitions	A **motorway** is a road that is part of the TEN-T network that comprises two carriageways, separated by a physical barrier for most of its length. All crossings are normally grade separated. No stopping and usually a minimum speed. Access is generally restricted to certain types of vehicle. A **non-motorway** is a road that is not a motorway but is still a strategic road and is part of the TEN-T network.

7.2 Section Length

Title	Section Length
Definition	The route length of a Logical Section in kilometres
Permitted values	Integer
Definitions	The route length of a section is the distance from the start node to the end node of a Logical Section, measured in one direction only. This means that, for dual carriageways, the length is included once only and is the average of the distances on each carriageway. The route length should be rounded to the nearest kilometre.

7.3 Number of Lanes

Title	Number of Lanes
Definition	The average number of lanes along a Logical Section
Permitted values	Real number to one decimal place (e.g. 4.2)
Definitions	The length-weighted average number of permanent lanes in both directions along a Logical Section, including crawler lanes and bus lanes. The Number of Lanes should be calculated as the length-weighted average number of lanes in one direction plus the length-weighted average number of lanes in the other direction. For example, if a Logical Section has 2 lanes for 25% of its length and 1 lane for 75% of its length in one direction, and has 1 lane for 100% of its length in the other direction, then its length-weighted average number of lanes is:

	(25% x 2 + 75% x 1) + (100% x 1) = 2.25 This Logical Section will therefore be recorded as having 2.3 lanes.

7.4 Length of Bridges

Title	Length of Bridges
Definition	The total length of bridges along a Logical Section in kilometres
Permitted values	Real number to one decimal place
Definitions	The total Length of Bridges along a section is the total length of road that crosses bridges within that Logical Section, measured in one direction only. This means that, for dual carriageways, the length is included once only and is the average of the total length of bridges on each carriageway. Only road-carrying bridges that have a length greater than 0.1 km should be reported. The total Length of Bridges along a Logical Section should be rounded to the nearest 0.1 km. For example, on a 2-km Logical Section which has two bridges, one 0.5 km long and one 0.075 km long, the total Length of Bridges for that Logical Section would be reported as 0.5 km.

7.5 Length of Tunnels

Title	Length of Tunnels
Definition	The total Length of Tunnels along a Logical Section in kilometres
Permitted values	Real number to one decimal place
Definitions	The Length of Tunnels along a section is the total length of road that passes through tunnels within that Logical Section, measured in one direction only. This means that, for dual carriageways, the length is included once only and is the average of the total length of tunnels on each carriageway. Only tunnels that have a length greater than 0.3 km should be reported. The total Length of Tunnels along a Logical Section should be rounded to the nearest 0.1 km. For example, on a 2-km Logical Section which has two tunnels, one 0.5 km long and one 0.2 km long, the total Length of Tunnels for that Logical Section would be reported as 0.5 km.

7.6 Physical Environment

Title	Physical Environment
Definition	An indication of the predominant physical environment along a Logical

	Section.
Permitted values	Urban or Rural
Definitions	**Urban:** the Logical Section predominantly passes through built-up areas. **Rural:** the Logical Section predominantly passes through non built-up areas.

7.7 Intelligent Transport Systems (ITS)

Title	ITS
Definition	An indication of the type of Intelligent Transport System (ITS) in place on the Logical Section.
Permitted values	0, 1, 2, 3, or 4
Definitions	Level 0 None Level 1 Monitoring system (e.g. real-time data about traffic/weather conditions is collected by the road administration) Level 2 Traffic information system (road administration passively manages the network e.g. information about traffic/weather conditions is provided to road users) Level 3 Traffic management system (road administration actively manages the network e.g. variable speed limits, dynamic lane management, ramp metering) Level 4 Cooperative ITS (i.e. vehicle-to-vehicle or infrastructure-to-vehicle information) The types of ITS are based on the EasyWay Deployment Guidelines

7.8 Traffic Flow

Title	Traffic Flow
Definition	The annual average daily traffic along a Logical Section
Permitted values	Integer
Definitions	The length-weighted Average Annual Daily Traffic (AADT) along a Logical Section, in both directions, rounded to the nearest integer. This includes all vehicle types. The Traffic Flow should be calculated as the length-weighted AADT in one direction plus the length-weighted AADT in the other direction. See Number of Lanes for a description of length weighting. If traffic count data is not available, estimated values can be used.

7.9 Proportion of HGVs

Title	Proportion of Heavy Goods Vehicles
Definition	The proportion of annual average daily traffic along a Logical Section that comprises Heavy Goods Vehicles (HGVs)
Permitted values	Percentage to one decimal place
Definitions	The proportion of length-weighted average annual daily traffic (AADT) along a Logical Section, in both directions, that comprises Heavy Goods Vehicles, expressed as a percentage. See Number of Lanes for a description of length weighting. HGVs are goods vehicles weighing in excess of 3.5 tonnes.

7.10 Fatal Accidents

Title	Fatal Accidents	
Definition	The total number of fatal accidents that occurred along the Logical Section over the last five calendar years	
Permitted values	Fatal Accidents	Integer
	Number of Years (if <5)	Integer
Definitions	The aggregated number of fatal accidents that occurred on the section over the last five years. Any accidents that occurred at a Logical Node should be allocated to a single Logical Section as appropriate. If data is not available for the last five years, the number of years that the number of accidents is aggregated over should be provided.	

7.11 Planned Capacity Improvements

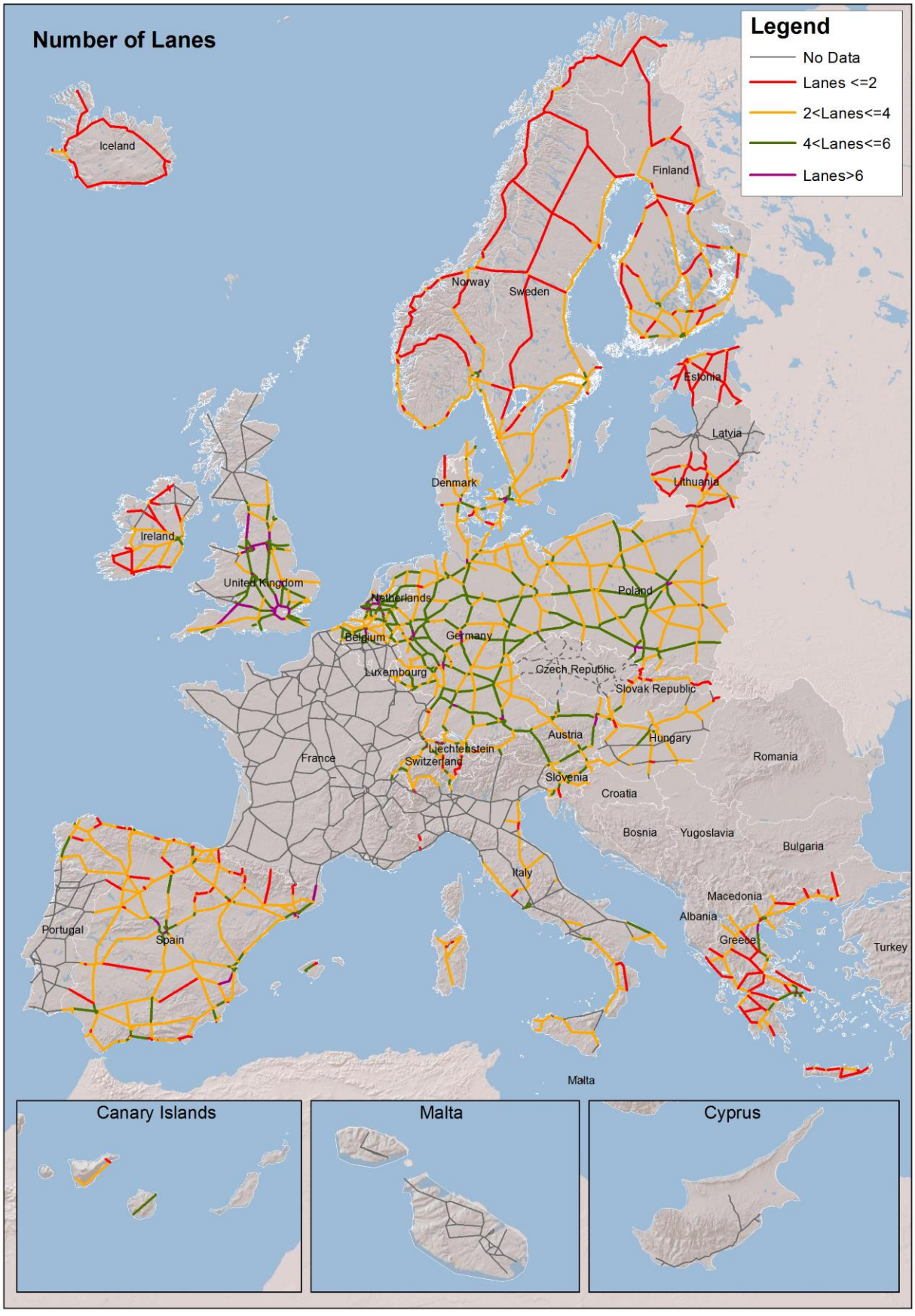
Title	Planned Capacity Improvements
Definition	An indication that capacity improvements are planned on the Logical Section
Permitted values	Yes or No
Definitions	Capacity improvements that are planned for all or part of the Logical Section within the organisation's current maintenance or investment plans. The need for capacity improvements is deemed to indicate that the Logical Section currently experiences traffic congestion, i.e. it is a bottleneck.

8 ANNEX 3: Performance indicator maps

8.1 Road Type


Road Type
Legend
No Data
Motorway
Non-Motorway
Iceland
Finland
Norway
Sweden
Estonia
Latvia
Lithuania
Denmark
Ireland
United Kingdom
Netherlands
Poland
Belgium
Germany
Luxembourg
Czech Republic
Slovak Republic
Austria
Hungary
Liechtenstein
Switzerland
France
Romania
Slovenia
Croatia
Bosnia
Yugoslavia
Bulgaria
Italy
Macedonia
Albania
Greece
Turkey
Portugal
Spain
Malta
Canary Islands
Malta
Cyprus

8.2 Number of Lanes

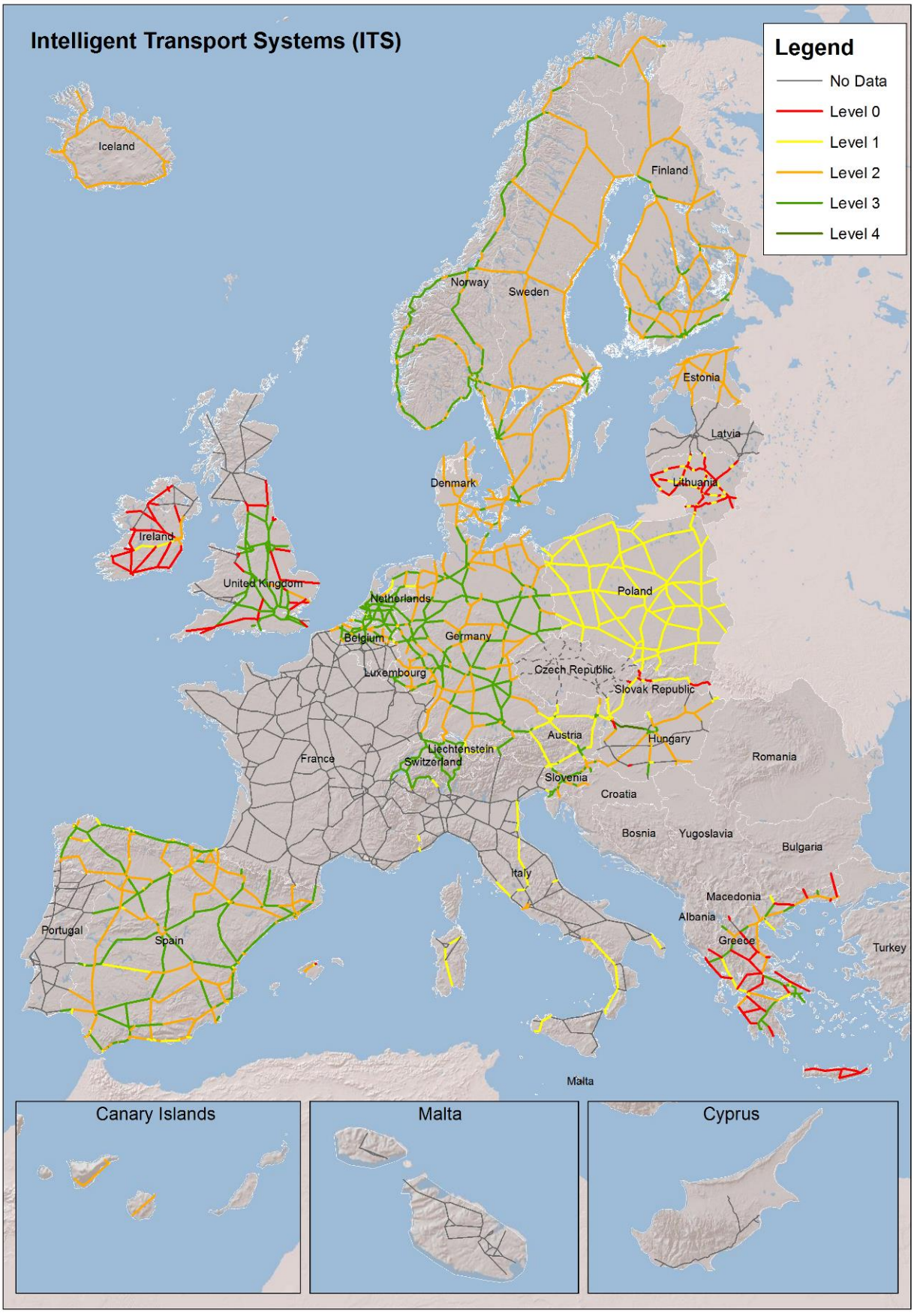


8.3 Length of Bridges

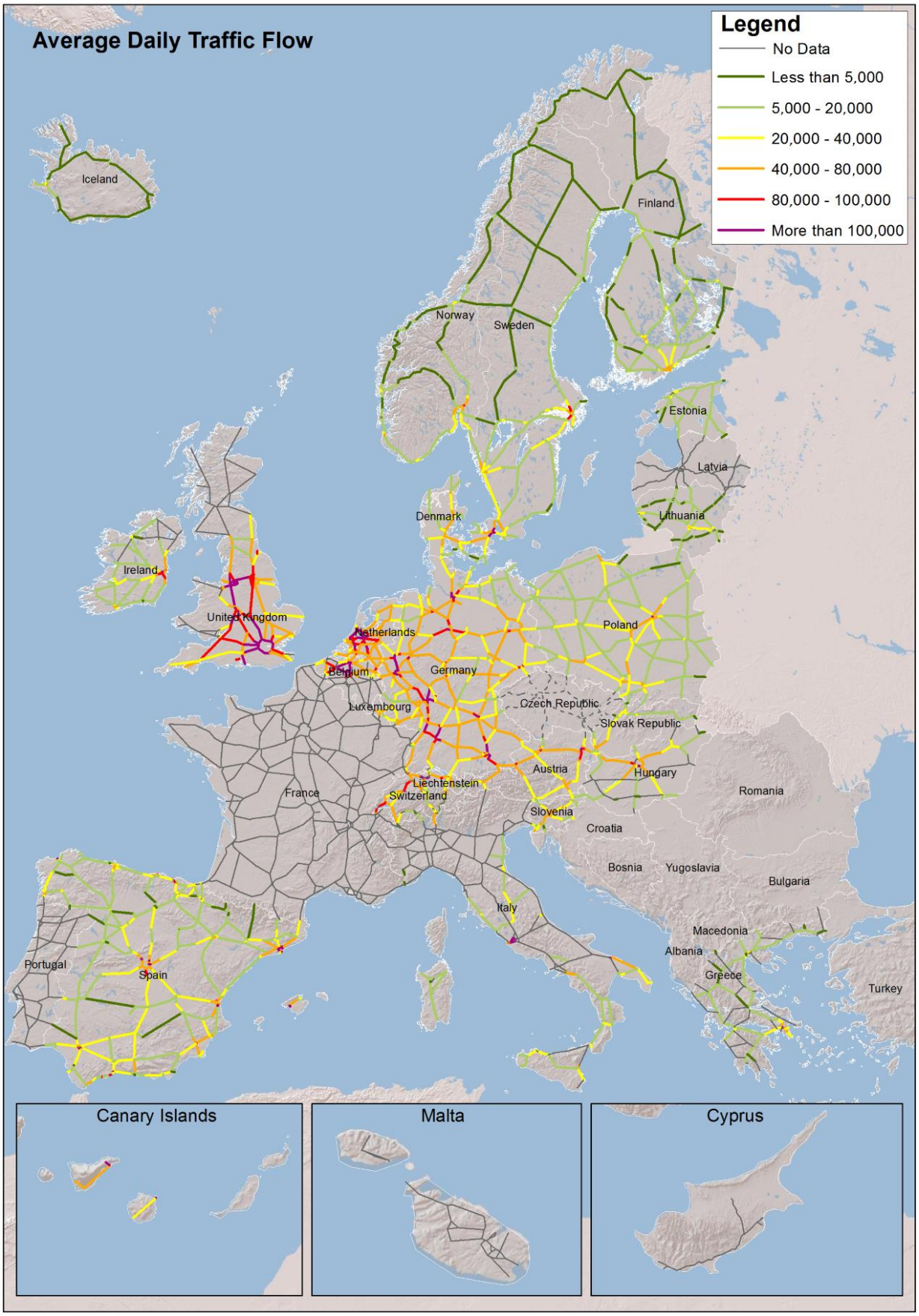
8.4 Length of Tunnels

8.5 Physical Environment

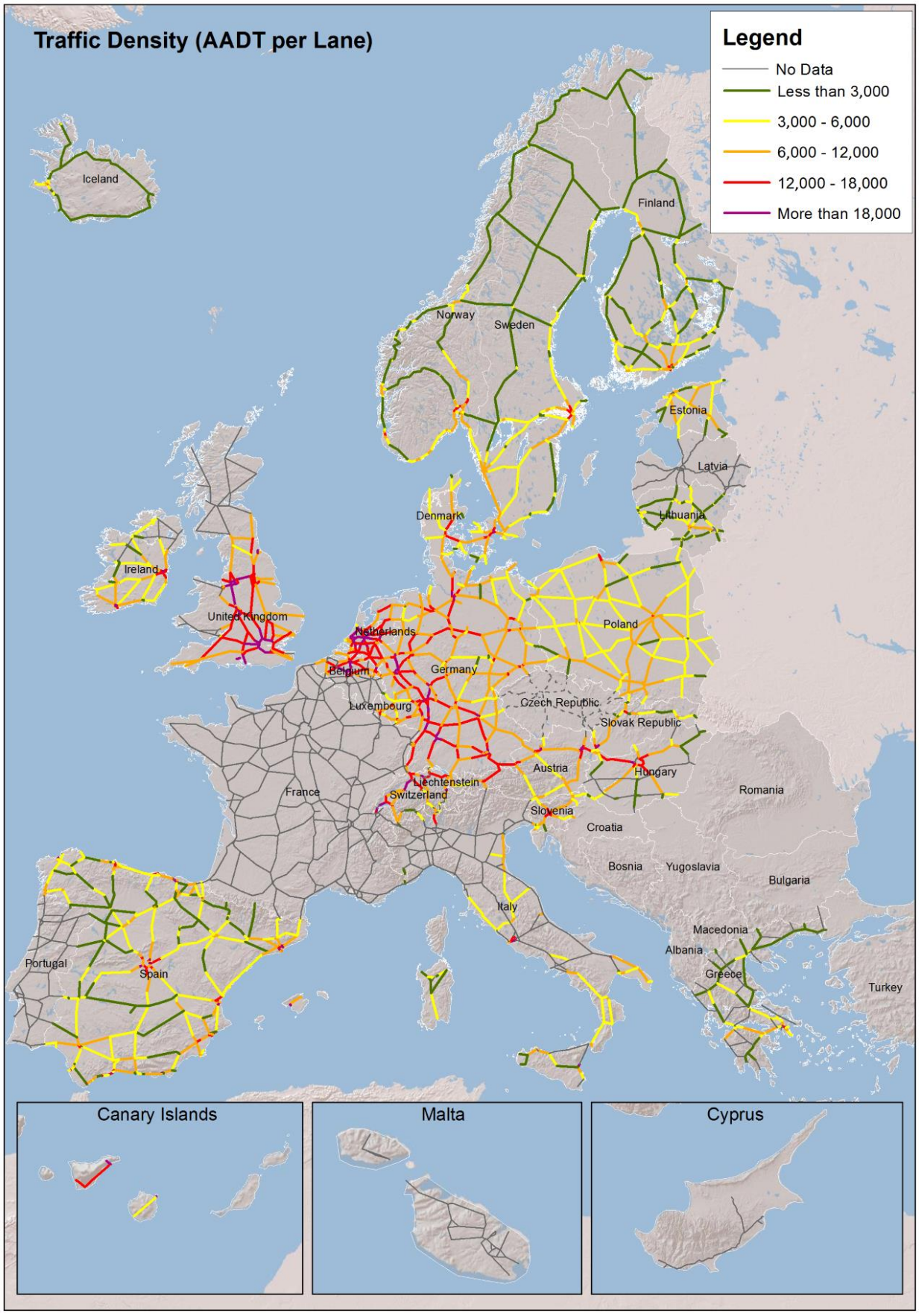
8.6 Intelligent Transport Systems (ITS)



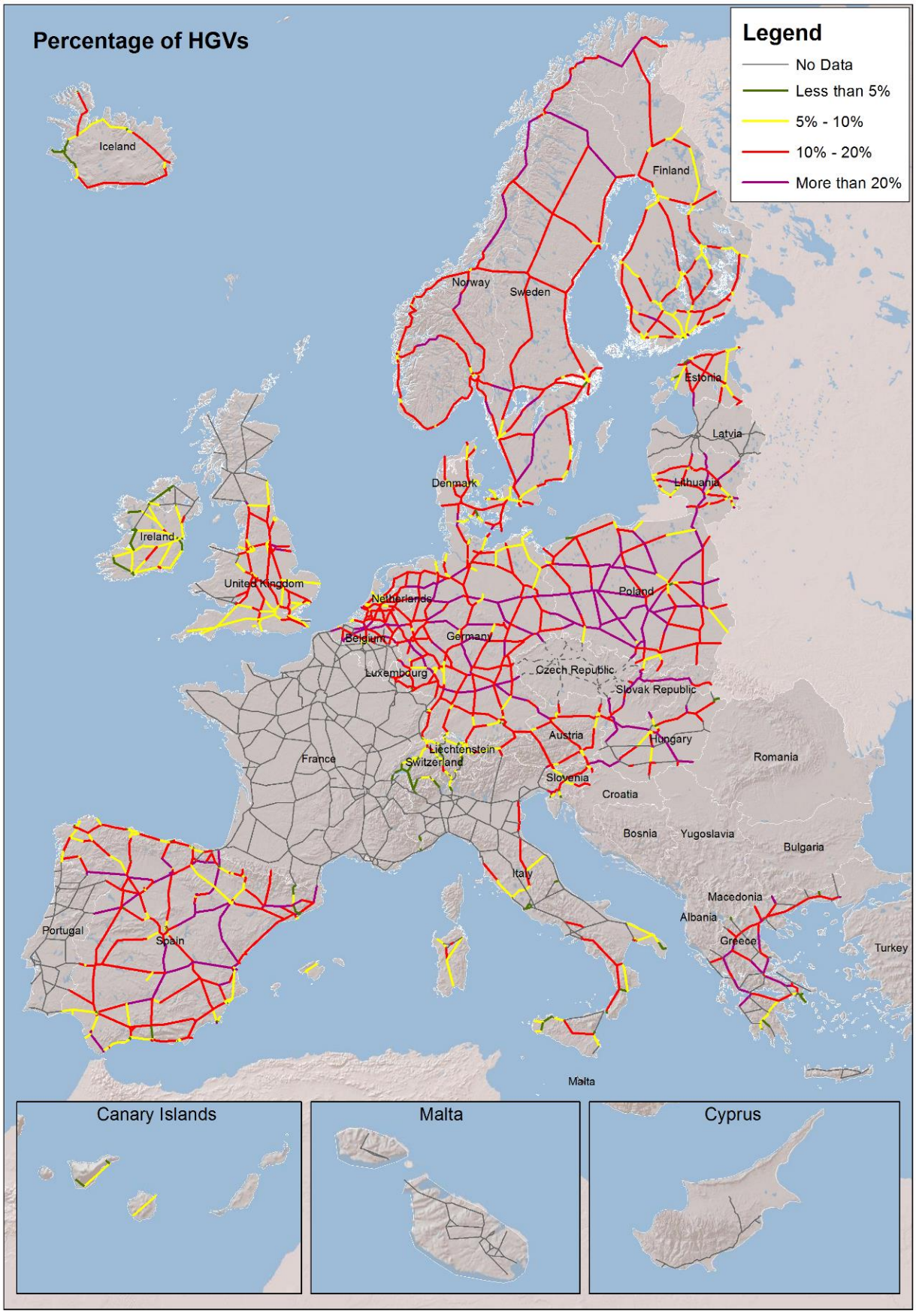
8.7 Average Daily Traffic Flow



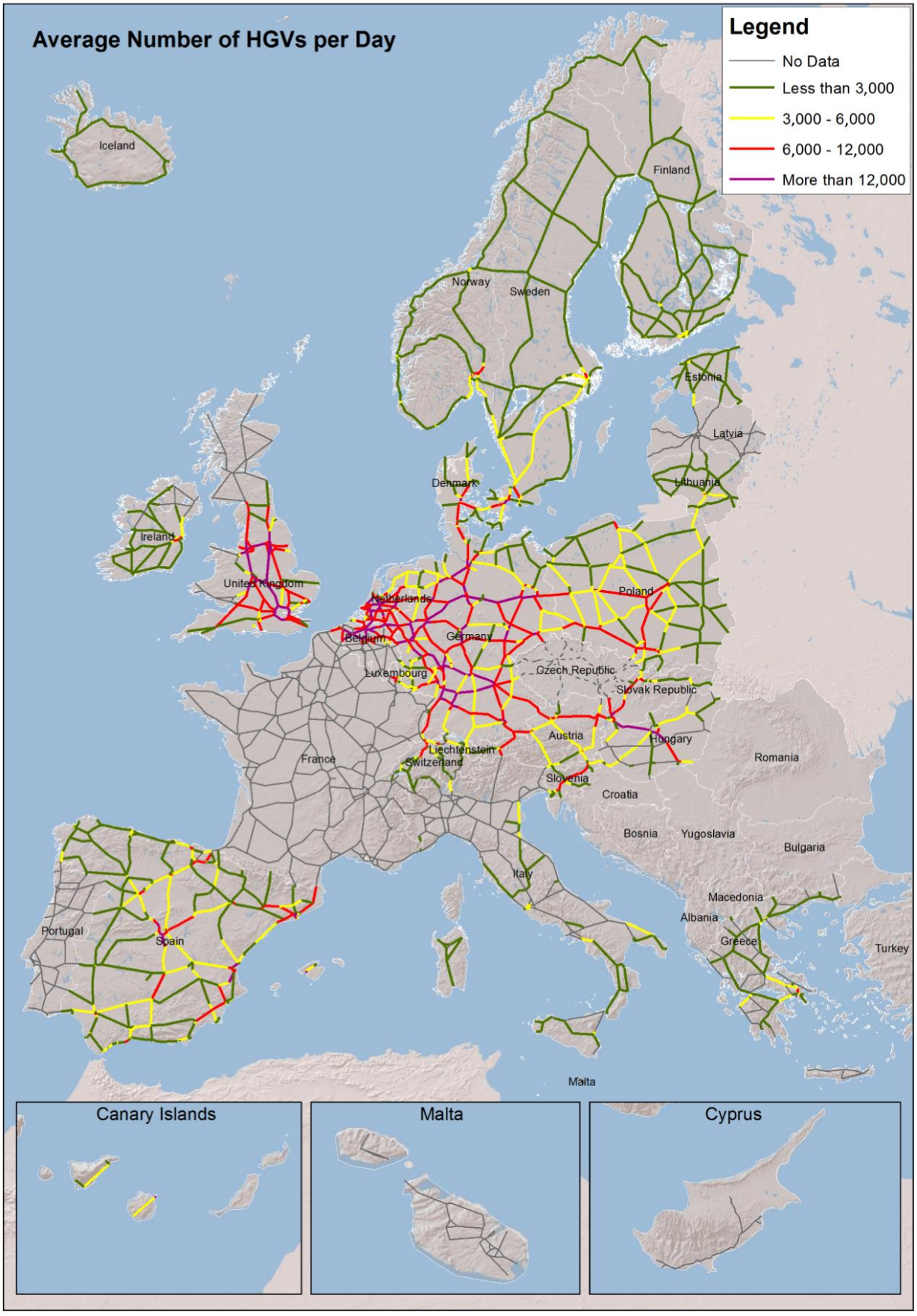
8.8 Traffic Density



8.9 Proportion of Average Daily Traffic comprising HGVs



8.10 Average Daily HGV traffic



8.11 Annual Average Fatal Accident Rate

8.12 Planned Capacity Improvements

9 ANNEX 4: Corridor maps[9]

[9] Tables in the maps show the length of the TEN-T network only for participating countries.

9.1 Baltic–Adriatic Road Corridor

9.2 North Sea–Baltic Road Corridor

9.3 Mediterranean Road Corridor

9.4 Orient/East–Med Road Corridor

9.5 Scandinavian–Mediterranean Road Corridor

9.6 Rhine–Alpine Road Corridor

9.7 Atlantic Road Corridor

9.8 North Sea–Mediterranean Road Corridor

9.9 Rhine–Danube Road Corridor

10 ANNEX 5: Country background information

10.1 Data sources

The country factsheets provided below are based on information collected from different sources.

The description of the National Road Authorities has been provided by NRAs themselves to give an overview of their structure, responsibilities, and financing sources.

As far as possible, data provided in the infographics has been gleaned from centralised international data sources (i.e. EUROSTAT, World Bank) to get harmonised data for all member states and to avoid any problems regarding a lack of comparability.

Data on population, median age, population density, GDP per capita, unemployment rate, motorisation rate, road passengers' performance, road freight performance, and road fatalities have been sourced from EUROSTAT.

Data on urban population share, rural population share, and GDP composition have been sourced from the World Bank.

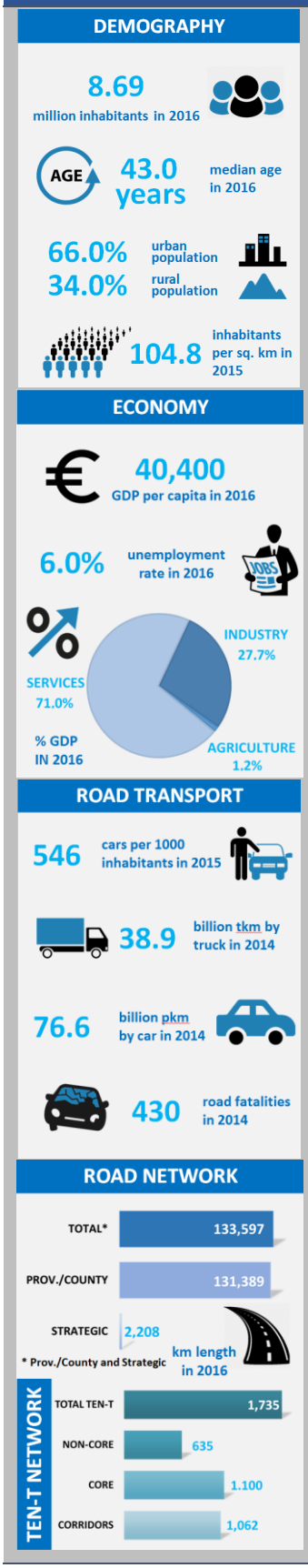
Data on road network length (total, Strategic, Provincial/County) have been collected from the National Road Authorities.

Data on TEN-T roads network length (Total, Non-Core, Core, Corridors) have been sourced from data provided by NRAs.

In some cases, more updated national statistics have been provided by NRAs. This is indicated in the footnote of each factsheet.

Data on road freight performance, which is expressed in terms of tonnes-km, are sourced from EUROSTAT's publication EU Transport Statistical pocketbook 2016 (Table 2.2.4.d) and refer to the Road Freight Performance adjusted on territoriality. Data include the **haulage performed within the territory of each country by any vehicle** including cross-trade and cabotage.

Austria



ASFINAG

General description

ASFINAG is an Austrian highway financing stock corporation which is 100% owned by the Republic of Austria. ASFINAG was founded in 1982 and is an efficiently operating user-financed builder and operator of motorways and expressways. ASFINAG provides a road network that meets its customers' requirements, is well-serviced and developed with a special focus on road safety and optimal availability as well as user-friendly tolling systems. All of the activities are directed towards fulfilling economic, environmental, and social responsibilities while strengthening Austria's position as a business location.

ASFINAG has around 2,700 employees and consists of five companies: ASFINAG Bau Management GmbH, ASFINAG Maut Service GmbH, ASFINAG Service GmbH, ASFINAG Alpenstraßen GmbH, ASFINAG European Toll Services GmbH, and ASFINAG Commercial Services GmbH. The focus of these companies is on planning & constructions, maintenance, operation, and toll collection.

The ASFINAG motorway and expressway network currently comprises approximately 2,200 kilometres of road. The company has business locations across Austria.

Responsibility

The company has a comprehensive area of responsibility, including:

- the planning and construction of new road projects;
- the operation and maintenance of the existing network;
- the tolling of motorways and expressways, and the development of telematics services;
- funding, sustainability, and a future-oriented approach.

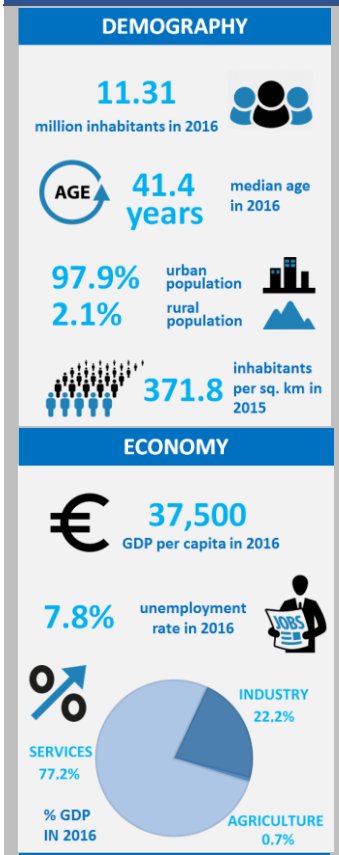
Financing

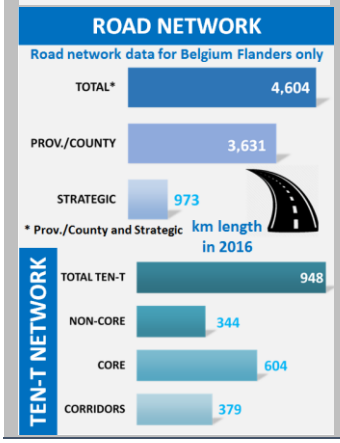
In 2016, ASFINAG invested a total of €907 million in the maintenance and construction of the main road network. ASFINAG is 100% user financed and does not receive any subsidies.

ASFINAG is financed via the capital market and is a well-established issuer of bonds that is highly regarded on the national and international financial markets. The bonds issued are provided with a guarantee by the Republic of Austria and receive the rating of Aa1/AA+ by rating agencies. International financing activities are based on the ASFINAG European MediumTerm Note Programme (EMTN), which is updated regularly and defines the legal framework for issues.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities.
ASFINAG: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Belgium (Flanders)





Agentschap Wegen en Verkeer (AWV)

General description

The Agency for Roads and Traffic (Agentschap Wegen en Verkeer/AWV) is the Flemish road authority responsible for Flemish motorways and regional roads. It operates about 7,000 km of roads and 7,700 km of cycling paths.

The agency's mission is to ensure safe, smooth, and sustainable mobility for all road users in Flanders.

In total, the agency employs about 1,400 people. AWV is divided into three horizontal and six territorial divisions. The horizontal knowledge domains (road construction, traffic engineering, and planning & coordination) work in a matrix structure and run horizontally through the territorial departments.

Head offices are in Brussels, the six territorial departments are situated in Antwerp, Ghent, Leuven, Hasselt, and Bruges.

Responsibility

AWV is responsible for the design, construction, maintenance, and improvement of the road infrastructure (including bridges and electromechanics) that is assigned to it. AWV is also responsible for traffic management and the implementation of the mobility policy of the Flemish Government.

Financing

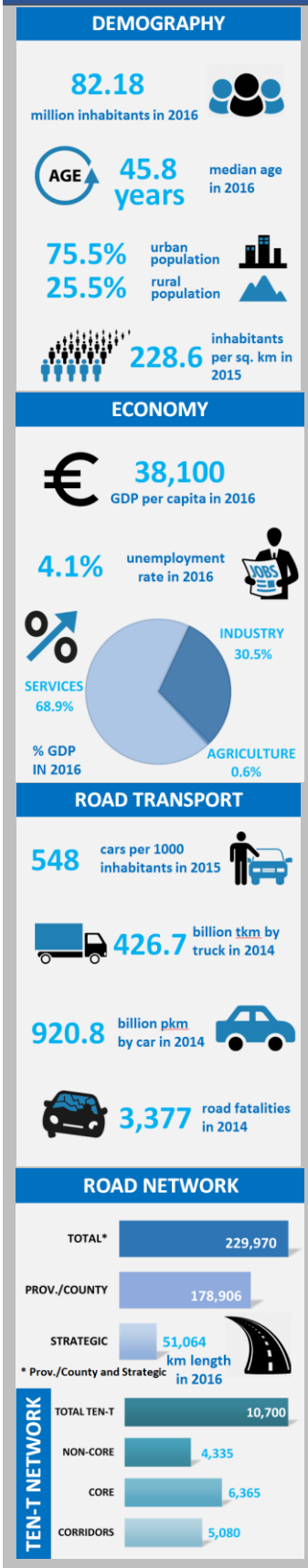
The total budget of AWV (€782 million) is distributed as follows: €470 million for investments, €170 million for maintenance, and the remainder for the cost of PPS constructions, operational costs, overheads, etc.

AWV is fully financed by the Flemish Government. €100 million of the total amount comes indirectly from road charging for lorries.

Data are provided at country level

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
AWV: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Germany



Federal Ministry of Transport and Digital Infrastructure

General description

Growing traffic and the need to ensure that Germany, as a leading exporting nation, remains a competitive site for economic activity means that the transport infrastructure, especially the road sector, has to meet enormous challenges in terms of efficiency, road safety, environmental protection, and climate change mitigation. A key question today is how to ensure that the necessary investments in maintenance and construction (for roads, bridges and tunnels) are made with the available budget. Innovations for the 'roads of the future' are necessary. According to the Federal Government's high-tech strategy, future roads will become more intelligent by means of modern traffic management, innovative road works, and better incident management. Digitalisation in traffic will help to reduce the number of accidents and smooth the traffic flow.

The Department of Road Construction within the Federal Ministry of Transport and Digital Infrastructure has about 160 employees. Together with the staff of the 16 road authorities in the federal states (*Länder*), the management of the strategic road network is done under a framework of legal and technical supervision. This framework ensures that a uniform, safe, and efficient road network is available in Germany.

Responsibility

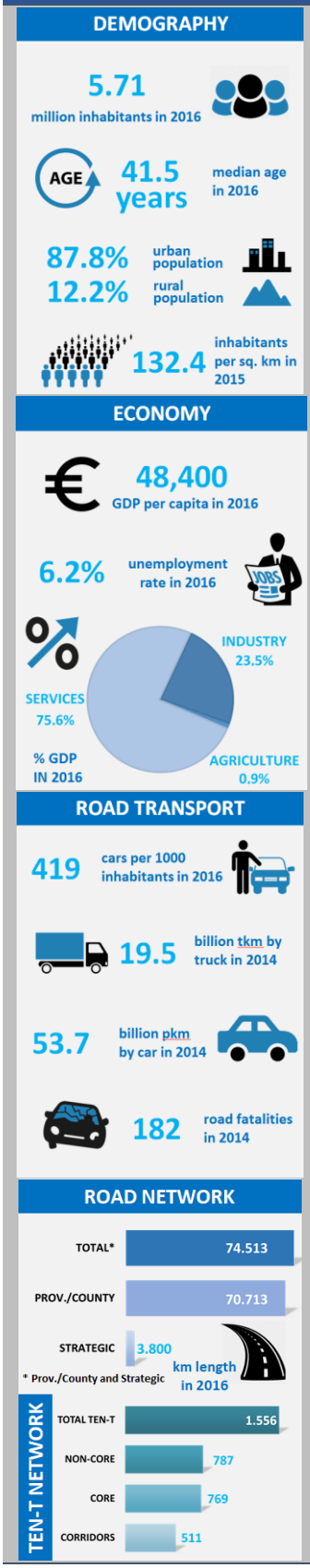
The Ministry is responsible for the construction, maintenance, extension, and improvement of the Federal Trunk Road Network (motorways and Federal highways including bridges, tunnels, service stations, etc.) These responsibilities include the financing, designing, and drafting of roads included in the overall Federal Transport Infrastructure Plan. In accordance with the Constitution of Germany, the 16 federal states build, maintain, and operate the Federal Trunk Roads on behalf of the Federal Government through their own road authorities. For this purpose, they also use procurement and tendering of contracts with private companies.

Financing

According to the new Federal Transport Infrastructure Plan 2030, Germany will invest more than €132 billion in the Federal Trunk road network between 2016 and 2030. The biggest part of the budget, namely €67 billion, is reserved for maintenance. More than €53 billion is earmarked for extension and new construction. The remaining €12 billion is reserved for additional investments in roads. For operational cost (non-investments), the annual budget is about €1.2 billion. The source of financing is mainly Federal tax funds and with increasing tendency to revenues from tolls.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
Federal Ministry of Transport and Digital Infrastructure: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Denmark



Danish Road Directorate (DRD)

General description

The mission of the Danish Road Directorate is to be responsible for the national road network. The DRD promotes a coherent road and transportation system, taking the surroundings into account and striving to ensure that people and goods reach their destinations easily and safely.

DRD employed 742 people in 2017. Six service centres are located in Copenhagen, Fløng, Næstved, Middelfart, Skanderborg, and Aalborg.

Responsibility

DRD is responsible for the national road network**:**

Its main business areas are:

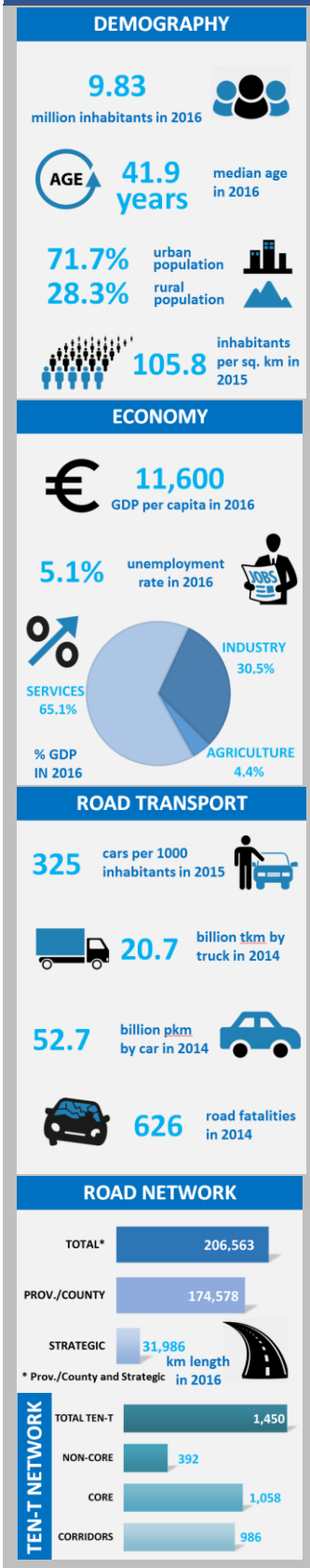
- Planning: the DRD conducts studies and plans in order to determine where new roads are to be built and where there is a need for increased traffic safety or capacity on the national road network;
- Design and construction: the DRD constructs new roads, roundabouts, cycle paths, and bridges, puts up noise barriers, and develops the existing road network;
- Traffic Management: the DRD guides road users through traffic, for example, in the event of accidents or road works via signposting, electronic information boards, and traffic information in various media;
- Maintenance: the DRD operates and maintains the roads and the surrounding areas by laying new asphalt, mowing the grass, and clearing snow from the roads.

Financing

With the exception of some minor business areas, the activities of the DRD are in general financed by national funding. Budget 2017: DKK1,500 million for construction, DKK600 million for maintenance, and DKK700 million for other services.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; road passengers' performance; road freight performance; road fatalities;
DRD: road network length (total, Strategic, Provincial/County)
Statistics Denmark: motorisation rate
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Hungary



Hungarian Public Road Non-profit PLC

General description

The Hungarian Public Road Non-profit PLC is responsible for the operation and maintenance of more than 31,000 km of national roads. The company was established on 1 October 2005 by merging several individual road operator directorates at county level. Based on its 5,300 employees and economic indicators, the company is one of the first ten state-owned enterprises in Hungary. Road operations are carried out in 19 counties, at 93 maintenance centres, under the supervision of the headquarters in Budapest.

Responsibility

The activities of the Hungarian Public Road Non-profit PLC consist of the operation and performance of routine and preventive maintenance on the state-owned public road network, which includes expressways and motorways. In addition, the Hungarian Public Road Non-profit PLC is responsible for traffic management measures on the operated network, including dynamic traffic management and traffic lights, issuance of route permits for oversized vehicles, the control of trucks at weight control stations, the provision of training for professionals across the entire road sector, the operation of the Road User Information Services, the National Road Database, and the Road Museum in the municipality of Kiskőrös. It also plays a leading role in the renewal of technical legislation. In addition to performing its duties under contract, the Hungarian Public Road Non-profit PLC is also committed to social responsibility, the education of new generations of road users towards environmentally responsible behaviour, and the improvement of traffic ethics and safety.

Financing

State financing in the framework of contract on activities of public interest granted under the central state budget support. Data from recent years:

2016: HUF56 billion

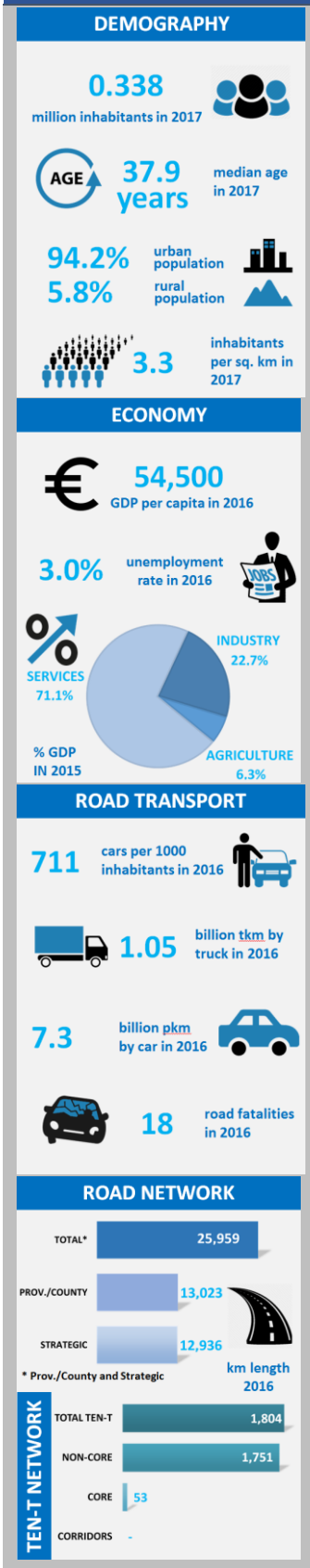
2017: HUF73 billion

2018: HUF81 billion

In case of funds for road rehabilitations, or ITS investments, EU co-financed projects (TOP, CEF etc.) are carried out with external resources.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
PLC: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Iceland



Vegagerðin, the Icelandic Road and Coastal Administration (IRCA)

General description

Vegagerðin is the Icelandic Road and Coastal Administration (IRCA). The mission of the IRCA is to develop and maintain a transport network on land and sea in the most cost-effective manner, guided by the needs of the community. The main objectives are the following:

- safe and smooth traffic on roads and secure sea transport;
- the cost-effective development and management of the transport network in harmony with the environment;
- efficient and well-organised operations;
- responsible, skilled, and satisfied staff.

Vegagerðin has approximately 300 employees and the following main divisions:

- Administration division: legal, public relations, human resources, research fund;
- Finance division: finance, economics, logistics and equipment, public transport;
- Development division: transport plans, regional planning, traffic and traffic safety, IT;
- Roads division: design, construction, maintenance, service;
- Maritime division: design, coastal construction, lighthouses;
- Regions: region west, north, east and south.

The head office is in Reykjavík. There are four regions with regional centres in Selfoss (South), Borgarnes (West), Reyðarfjörður (East), and Akureyri (North).

Responsibility

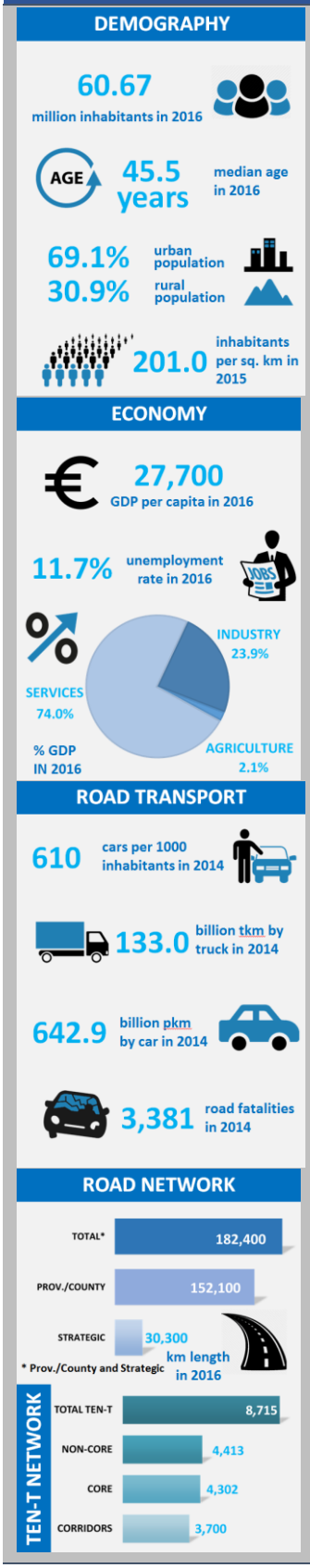
National roads are divided into state roads and public and private roads. State roads—including their design, construction, service, and maintenance—are managed by the Icelandic Road and Coastal Administration.

Financing

The IRCA's budget is approximately €238 million from national funds. €85 million is earmarked for road investments, about €63 million for maintenance, and €35 million for services (mainly winter services). €24 million is earmarked for public transport subsidies and €24 million for harbours, ferries, lighthouses, and breakwaters. The remaining €7 million is for general operations and research.

Data sources:
IRCA: population; median age; population density; motorisation rate; road passengers' performance; road freight performance; road fatalities;
IRCA: road network length (total, Strategic, Provincial/County)
Eurostat: GDP per capita; unemployment rate
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Italy



ANAS S.p.a.

General description

ANAS manages about 26,500 km of Italian roads and motorways, including junctions and slip roads. ANAS is a joint-stock company, with the Italian Ministry of Economy and Finance as its sole shareholder and is subject to the supervision of the Ministry of Infrastructure and Transport. ANAS commitment to the design, construction, and management of road infrastructure focuses on network safety, environmental protection, and energy efficiency, as well as on safeguarding the landscape.

ANAS has approximately 6,000 employees, divided into a General Directorate and eight territorial coordination centres with 23 regional offices which ensure a widespread presence, strict control over the whole road network, and facilitate direct cooperation with local authorities.

Responsibility

The main services provided are:

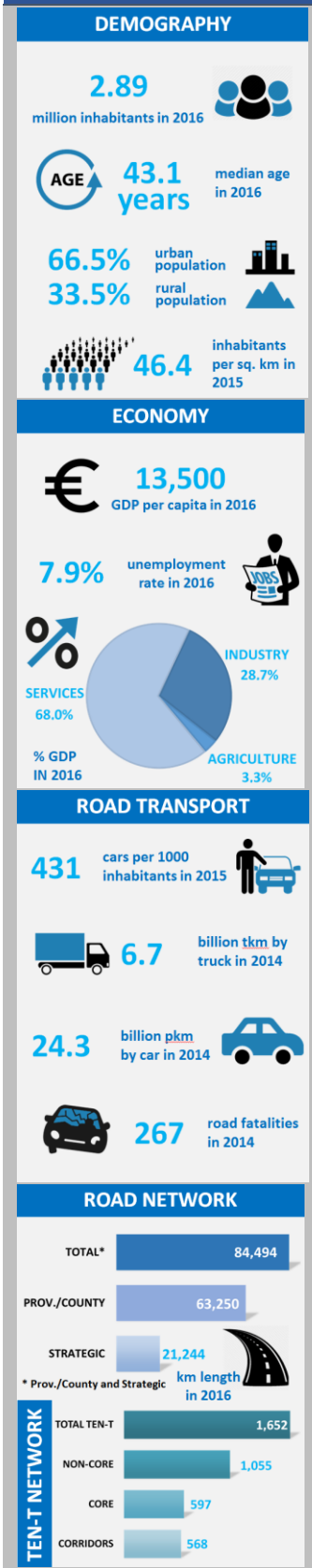
- the operation and maintenance (ordinary and special) of the roads and motorways;
- the renovation and gradual improvement of the roadway network and related signs;
- the construction of new roads and motorways, both directly and through contracts with third parties;
- the provision of information services for customers;
- the implementation of laws and regulations regarding protection of the roads and motorways, and the safeguarding of traffic and signs;
- the adoption of necessary measures to ensure traffic safety on roads and motorways;
- design and participation in studies, research and experiments on road networks, traffic and circulation.

Financing

The Multiannual Plan 2016–2020 earmarks about €23.4 billion for new investments, which mainly seek to strengthen the country's strategic infrastructure, renovating and ensuring the safety of infrastructure, and to complete routes and new works. Long-term investments are distributed as follows: 45% (€10.5 billion) for extraordinary maintenance adaptations and works to increase safety, 36% (€8.4 billion) for the completion of routes, 17% (€3.9 billion) for new works, and 2% (€0.6 billion) for road technology, technological applications, and the extraordinary maintenance of road supervisors' premises. Planned financial resources are mainly national; but European Funds are also taken into account.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
ANAS: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Lithuania



Lithuanian Road Administration (LRA)

General description

The Lithuanian Road Administration (LRA) under the Ministry of Transport and Communications is an enterprise founded by the Government of the Republic of Lithuania which is in charge of organising and coordinating the reconstruction, maintenance, and development of the roads of national significance.

The LRA aims to satisfy the needs of society and road users, to work economically and efficiently while creating adequate traffic conditions, and to ensure that transport on roads of national significance is safe, fast, convenient, and environment-friendly, to develop the roads and their network, the top priority being traffic safety improvement. The LRA has 136 employees. Its head office is in the capital city, Vilnius.

Responsibility

Its main tasks are:

- to implement the state policy regarding road maintenance and development formulated by the Seimas of the Republic of Lithuania;
- to implement the programmes on road maintenance and development drafted by the Ministry of Transport and Communications;
- to organise the development, modernisation, and functioning of the network of the roads of national significance.

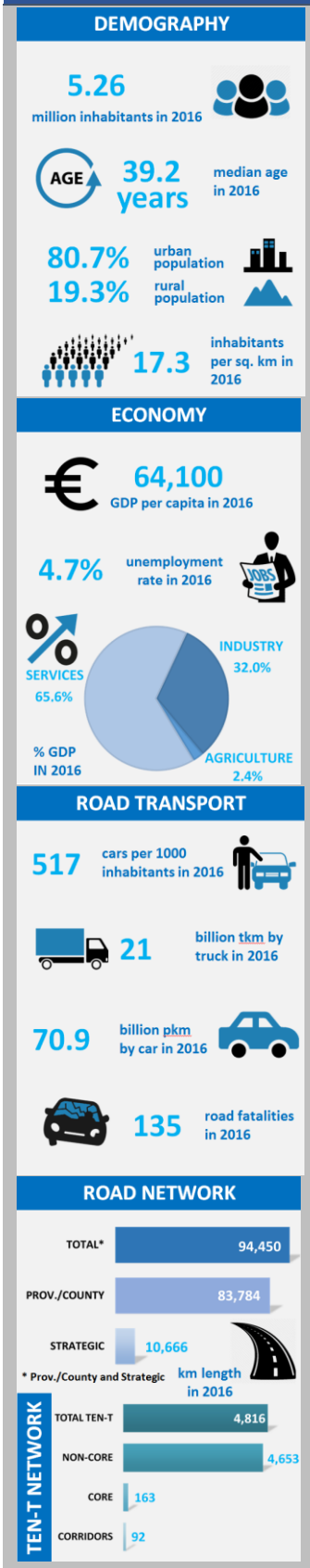
Financing

Total budget for 2017 (Road Maintenance and Development Programme + EU funds) is €590.5 million (incl. €91 million of EU funds), out of which €429.6 million is earmarked for investment (state and local significance roads); €86.6 million for state road maintenance, and €74.3 million for other expenses (research, educational activities, administrative costs, local road maintenance costs, service charge).

Financing sources are: 1) a share of the revenue from excise duty from the sale of petrol, diesel fuel, and energy products that are produced from materials of biological origin or contain their supplements and are intended for use as motor fuel; 2) a share of the revenue from excise duty for the sale of liquefied petroleum gas intended for use as motor fuel; 3) the tax on heavy goods vehicles registered in the Republic of Lithuania; 4) road user charges; 5) the tax levied for using vehicles on roads (vehicle combinations) the dimensions of which exceed those authorised; 6) the charge for the restriction of traffic; 7) targeted funds transmitted by natural or legal persons, other organisations, their affiliations and foreign states; 8) funds from the paid or recovered penalties for exceeding the speed limit registered by speed cameras installed on state significance roads.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
LRA: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Norway



Norwegian Public Roads Administration (NPRA)

General description

Statens vegvesen is the Norwegian Public Roads Administration (NPRA). It is a government agency under the Ministry of Transport and Communications with approximately 7,500 employees, 39% of whom are women. It comprises the Directorate of Public Roads and five regional units: Northern Region, Central Region, Western Region, Southern Region and Eastern Region. The NPRA has 72 Driver and Vehicle Licensing Offices and five Traffic Control Centres distributed across the county.

Responsibility

The agency has three roles: Road and Traffic Manager, Disciplines and Government Agencies.

The NPRA shall contribute to the national objectives of the government, which impose requirements for security, environment, and an efficient transportation system that is available to all. Like a road and road traffic manager, the NPRA is a road administration for the state on the national roads (10,666 km) and for counties on county roads (44,497 km). This means that the NPRA is responsible for taking care of, planning, developing, operating, and maintaining roads.

The agency is also responsible for national road ferries. As a specialist body, the NPRA is responsible for contributing to investigations, facts and proposals for the Ministry of Transport work on the National Transport Plan, the state budget and other parliamentary documents. The research and dissemination of results, the development of guidelines and guidance material and contact with relevant educational institutions is important in this context.

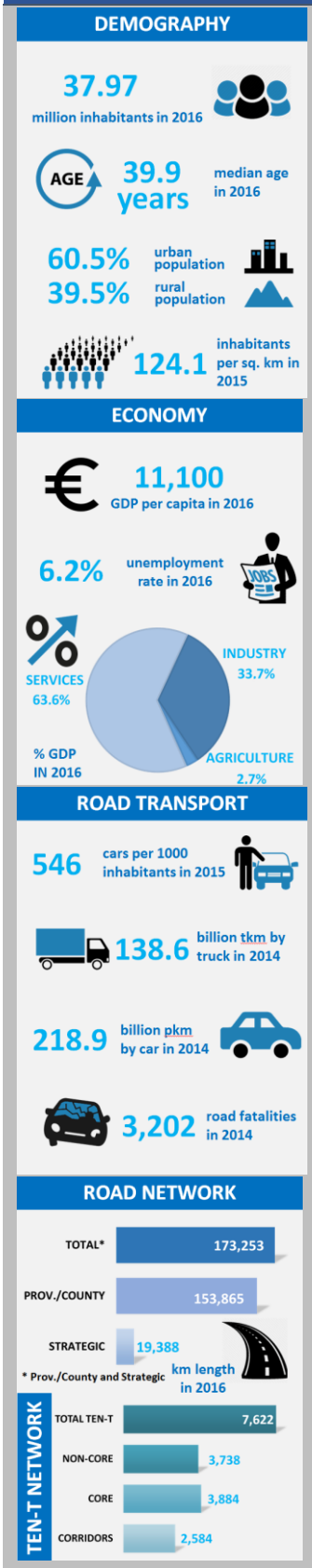
The NPRA is the authority responsible for the control of vehicles, supervisory tasks and conducting driver tests. In several areas, the agency has the authority to develop and approve regulations and make decisions that apply to road users and vehicles. The NPRA has the authority to adopt regulations and norms in certain areas of public road, and enforce laws, regulations and normal on the highway.

Financing

The budget of the NPRA in 2016 was NOK54.3 billion. NOK28.2 billion came from government funds for national road and was earmarked, among other things, as follows: traffic and vehicle supervision (NOK2 billion), Operation (NOK2.9 billion), Maintenance (NOK3 billion), Investment (NOK15.7 billion), National ferries (NOK 0.9 billion), and subsidies for county roads (NOK1 billion). The funds for county roads were NOK18 billion (44,497 km). The revenues from road toll in 2016 were NOK8.1 billion.

Data sources:
Eurostat: median age; GDP per capita; unemployment rate;
NPRA: population; population density; motorisation rate; road passengers' performance; road freight performance; road fatalities; road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Poland



Generalna Dyrekcja Dróg Krajowych I Autostrad (GDDKIA)

General description

The GDDKIA, 'Generalna Dyrekcja Dróg Krajowych I Autostrad' (General Directorate for National Roads and Motorways) is an administrative body, subordinated to the Ministry of Infrastructure. It consists of 16 regional divisions and the Head office in Warsaw. The GDDKIA employs about 4,000 people, mostly in road maintenance units. The GDDKIA manages about 19,400 km of national roads; other categories of roads (regional, county, or local) are managed locally.

The Polish national road network consists of three categories of roads:

- motorways (toll), administrated by the GDDKIA and three private concessionaires;
- expressways (toll for HGV), administrated totally by the GDDKIA;
- other trunk roads, administrated by the GDDKIA and the presidents of local councils.

Responsibility

The main goals of the GDDKIA's activities are:

- traffic management on national roads with the implementation of the National Traffic Management System;
- asset management by performance-based contracts;
- road safety by implementation of the EU Directive;
- investment management by new contracts, tender procedures, EU funds;
- technology management by quality inspection of investments as well as tests of the existing network done by regional road laboratories.

Financing

The GDDKIA is financed partly from the state budget, partly from National Road Fund (NRF), and partly from EU strategic programmes. GDDKIA's budget reaches approximately PLN13–17 billion (€3–4 billion). The National Road Fund financially supports the Programme for National Roads Construction and covers expenditure for planning, constructing, reconstructing, and renovating national roads.

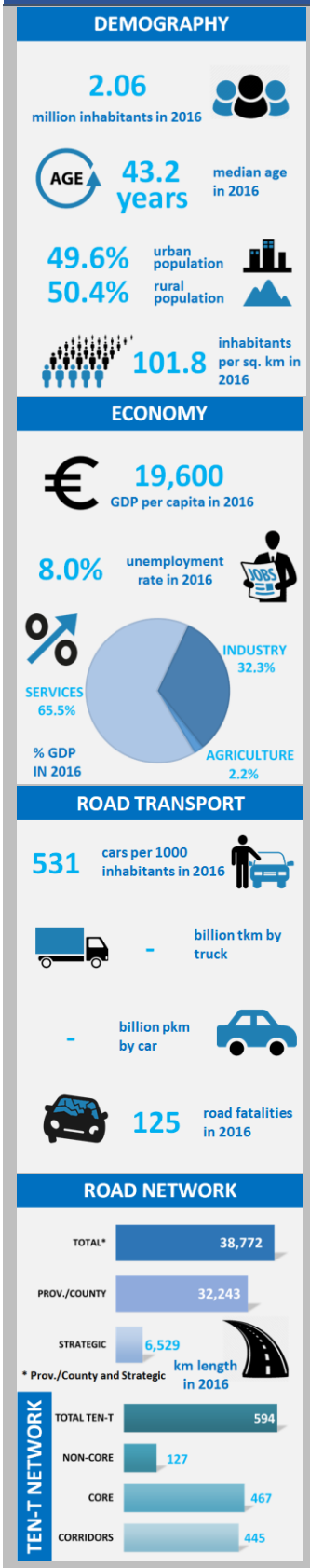
The sources of income for the NRF are:

- fuel charges
- European Investment Bank loans
- road bonds
- revenues from the ETS (Electronic Toll System)

The GDDKIA spends approximately PLN2–2.5 billion (€0.5–0.6 billion) on standard summer and winter maintenance of the national road network every year.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
GDDKIA: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Slovenia



Ministry of Infrastructure – Slovenian Infrastructure Agency

General description

As at 31 December 2016, Slovenia had almost 39,000 kilometres of public roads; 6,529 km of which were categorised as state (national) roads. Motorways and expressways are managed by Družba za avtoceste v Republiki Sloveniji (Motorway Company in the Republic of Slovenia – DARS), main and regional roads are managed by Direkcija Republike Slovenije za infrastrukturo (DRSI; Slovenian Infrastructure Agency – SIA), while the rest of the roads are managed by local communities. DARS and SIA have a joint Traffic information centre in Dragomelj, which provides online information for users about conditions on national roads.

594 km of state roads belong to the TEN-T road network (538 km of motorways and 56 km of main roads), which represents 8% of the national road network. SIA maintains 56 km of TEN-T roads, which represents only 0.9% of national network under its control.

Responsibility

DARS is a joint-stock company that is 100% owned by the Republic of Slovenia. It is responsible for the motorways of Slovenia. The head office is in Celje and a branch office in Ljubljana. It has 1,247 employees. On the motorway network, there are nine big motorway centres and six small motorway centres. DARS' mission is to ensure modern approaches to and responsibility for the environment, to optimise traffic flow, safety, and comfort on the Slovenian motorway network.

Slovenia's main and regional roads are managed by SIA, a body within the Ministry of Infrastructure based in Ljubljana, which comprises the field of road and railway infrastructure. It has 93 employees (of which 68 work in the field of road infrastructure and 25 in the field of railway infrastructure). Mission: to ensure optimal management of available resources, protection, maintenance and construction of main and regional roads and the railway network in Slovenia, so that within the scope of its competencies, SIA contributes to the improvement of mobility, ensuring road safety, accessibility, usability, minimal burden on the natural and living environment, and coherence with the economic and spatial development of municipalities, regions, and the state.

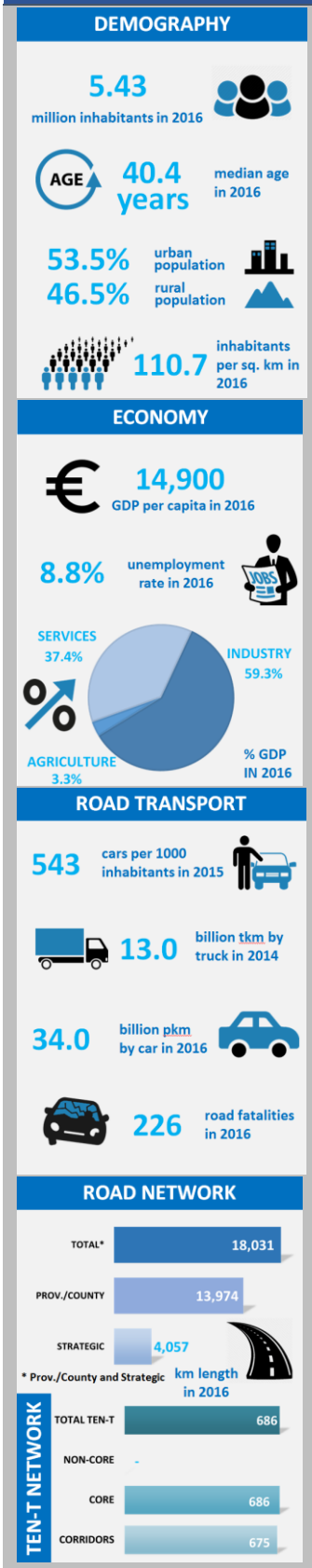
Financing

DARS is partly financed by the state budget on the basis of a concession for motorways and own-based tolls. In 2016, funding amounted to €191 million (40.9% for road construction, 15.7% for the maintenance and management of roads, and 43.4% for company management and administration).

SIA is financed from the state budget. The 2016 budget included €134 million for road infrastructure (16.5% for road construction, 80.4% for the maintenance and management of roads, and 3.1% for administration), and €273 million for rail infrastructure.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate;
Ministry of Infrastructure - Slovenian Infrastructure Agency: motorisation rate; Road fatalities; road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Slovak Republic



Ministry of Transport and Construction of the Slovak Republic

General description

The Ministry is the central government body responsible for policies of transportation on motorways, expressways, and main roads (known as 1st class roads), railways, airways, waterborne transportation, post, telecommunications, construction, and travel. With 617 employees, the Ministry functions as the State Transport Authority, Maritime Authority, Aviation and Maritime Investigation Unit, and the Public Regulated Service Authority and coordinates the drafting of regional development policies. The Ministry is based in Bratislava.

Responsibility

The ministry is responsible for railways and rail transport, road transport, combined transport, roads, inland navigation and ports, maritime navigation, civil aviation, postal services, telecommunications, public works, building regulations and territorial planning (except for environmental aspects), construction production and construction products, the development and implementation of housing policy, the provision of the state bonus for building society savings accounts and the state contribution for mortgages, tourism, energy efficiency in buildings, and the development and implementation of urban development policy.

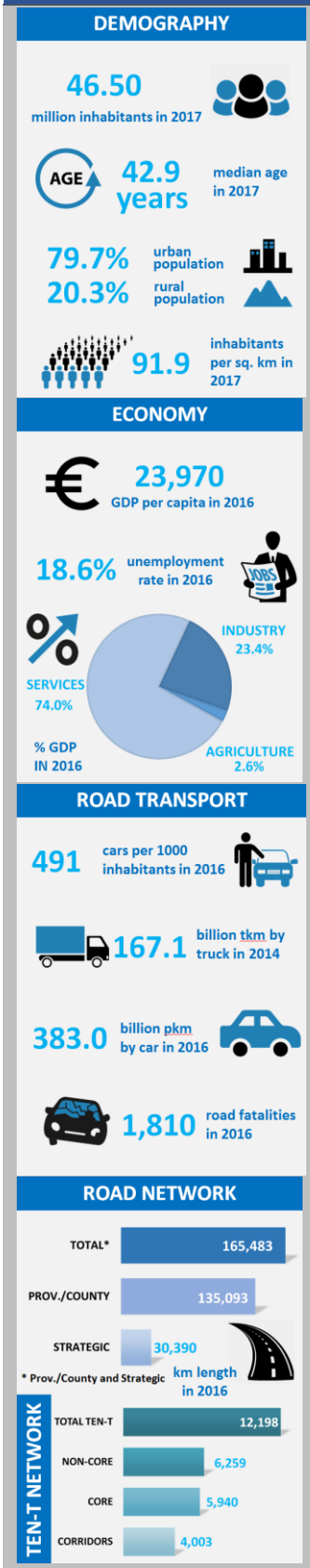
- One of the Ministry's key tasks is the construction of new motorways, expressways and 1st Class roads and the modernisation and implementation of safety measures on 1st Class roads and older sections of the D1 motorway and R1 expressway in collaboration with the National Motorway Company (established in 2005, responsible for the construction, operation, and maintenance of motorways/expressways whereas the state is 100% shareholder) and the Slovak Road Administration (an independent non-profit organisation established by the Ministry of Transport in 1996, responsible for the construction, operation and maintenance of 1st Class roads);
- The Ministry creates and stipulates conditions in the field of international road transport, transport of goods, ADR, Bus Services, Vehicle Approval (Type Approval Authority), Road Safety, Cycling;
- The Ministry is the Managing Authority for Operational Programme Integrated Infrastructure and it manages, implements, finances, and controls infrastructure projects (Roads, Railways, Public Transport, Water Transport, Informatization of Society) for which the European Commission has provided grants through the Cohesion Fund, the European Regional Development Fund, and the Connecting Europe Facility (CEF).

Financing

The Ministry's budget for 2017 is €2.149 billion of which €853.9 million is earmarked for current expenditures and €1.295 billion for capital expenditure. EU funds represent €882.9 million and co-financing by the state budget runs to €157.5 million.

Data sources:
National statistics: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road fatalities; urban population share; rural population share; GDP composition.
Eurostat: road freight performance;
Ministry of Transport and Construction of the Slovak Republic: road network length (total, Strategic, Provincial/County)
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Spain



General Directorate of Roads

General description

The General Directorate of Roads in the Ministry of Public Works and Transport (DGC) is the Spanish Road Administration responsible for the management of the State Road Network ('Red de Carreteras del Estado', RCE), which represents 16% of the overall length and carries more than 52% of the total traffic (and more than 65% of the total of heavy good vehicles traffic) on the Spanish interurban network.

The DGC is organised in Central Services, located in Madrid, and Peripheral Services (Demarcaciones de Carreteras), which are the 15 territorial organisations depending on the DGC.

Central Services are organically organised in General Sub-directorates, according to the different stages of the infrastructures development. These sub-directorates are: Projects, Construction, Maintenance, Operation (includes Road Safety), and Coordination (and economical management). Finally, there is a Technical Directorate, providing technical support for every service in the DGC.

The DGC has approximately 1,800 employees, 10% in Central Services and 90% in Peripheral Services.

Responsibility

The DGC is responsible for planning, designing, constructing, maintaining, and operating the State Road Network, RCE. It is also responsible for road safety on this network. The General Directorate of Traffic in the Ministry of Home Affairs is the authority responsible for traffic management and regulation on all road networks in Spain. Environmental evaluation on the RCE is conducted in coordination with the Ministry of Agriculture and Fisheries, Food and Environmental Affairs. The three appointed ministries are part of the Government of Spain.

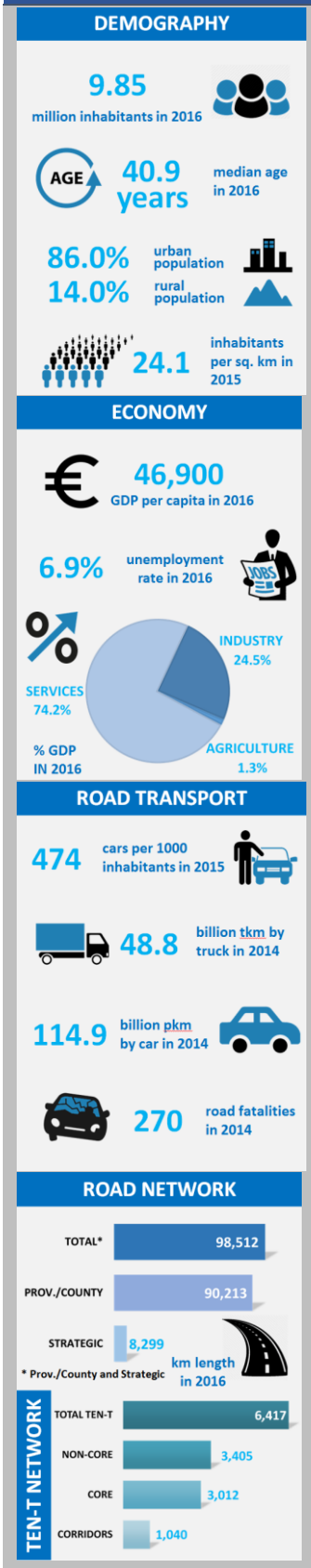
The management of other interurban road networks in Spain is the responsibility of other administrations: Autonomous Communities for regional roads, Provincial Governments for provincial roads, and City Councils for local roads.

Financing

The 2017 budget for the State Road Network RCE is about €1,913 million, of which €955 million is earmarked for new infrastructures and €958 million for the maintenance and operation of the existing network.

Data sources:
DGC: population; median age; population density; urban population share; rural population share; GDP per capita; GDP composition; unemployment rate; motorisation rate; road passengers' performance; road fatalities.
Eurostat: road freight performance;
DGC: road network length (total, Strategic, Provincial/County)
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Sweden



Trafikverket - Swedish Transport Administration

General description

Trafikverket is the Swedish Transport Administration. The mission of the Transport Administration is to make sure that the transport system works, which is a basic precondition for guaranteeing that society will function. The administration creates the prerequisites for ensuring that all transportation and travel is conducted in the best and safest way, regardless of where citizens live, with due consideration given to the environment and health.

The Transport Administration has approximately 6,600 employees. Many employees work in the following areas: traffic control work on the roads and railways, community planning and negotiation and survey work, IT-work, technical survey and development, survey, inspection and supervision work, shipping work, architectural and infrastructure design works, production planning and production management.

The Head Office is in Borlänge. There are six regions with regional centres: Kristianstad (South), Gothenburg (West), Eskilstuna (East), Stockholm (Stockholm), Gävle (Central) and Luleå (North).

Responsibility

Trafikverket's main tasks are:

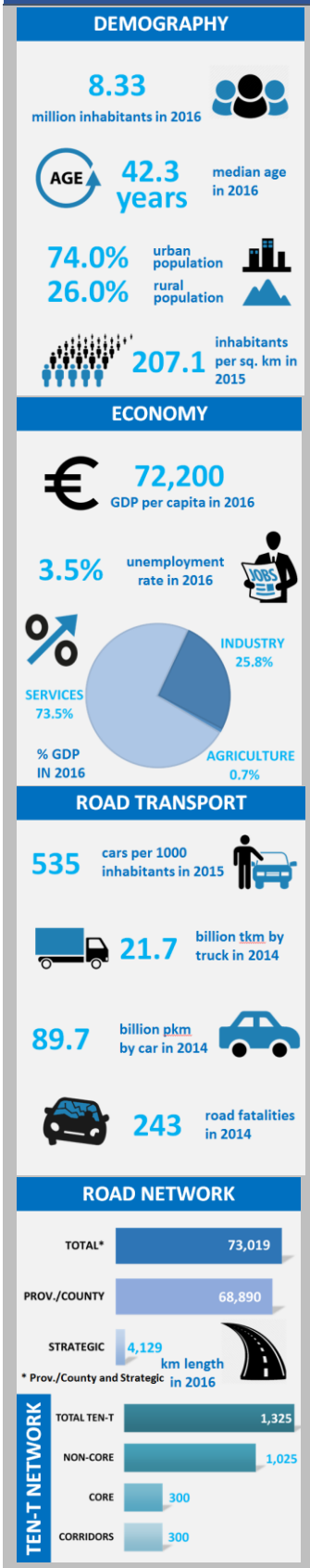
- to be responsible for the long-term planning of the transport system for road and rail traffic, shipping and aviation, and for the construction, operation, and maintenance of state roads and railways;
- to work for public passenger transport through the procurement of agreements and private aspects of state grants for the Swedish shipping industry.

Financing

SEK54 billion in business volume, of which some SEK23.5 billion for investments and about SEK19.5 billion for operation, maintenance, and traffic control. The remaining SEK11 billion includes costs for the planning process, state joint-financing (e.g. for public transport), state subsidies for private roads, contracted traffic, and support for research and innovation in the transport area.

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
Trafikverket: road network length (total, Strategic, Provincial/County)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

Switzerland



FEDRO - Federal Roads Office

General description

FEDRO is the Federal Roads Office of Switzerland. FEDRO's mission is to act as the competence centre for motorised individual traffic as a service for society as a whole. The office creates the prerequisites for ensuring that roads are used for people and vehicles in the best and safest way, regardless where people live and gives due consideration to the environment and health. FEDRO is responsible for all strategic and operational duties required to fulfil this expectation.

FEDRO has approximately 550 employees. The Head Office is in Ittigen near Bern. The national road network is managed locally in the five regional centres (from West to East): Estavayer-Le-Lac, Thun, Zofingen, Wintherthur, Bellinzona. The Traffic Management Centre is located in Emmen.

Responsibility

The main responsibilities and duties of FEDRO are:

- the construction, operation, and maintenance of the national road network (mainly motorways). The national road network is 1,900 km long. The TEN-T network represents 72% of it;
- to ensure access by persons and vehicles to all roads in the country;
- to set traffic rules and regulations for road-related topics;
- to be the Federal competence centre for motorised individual traffic.

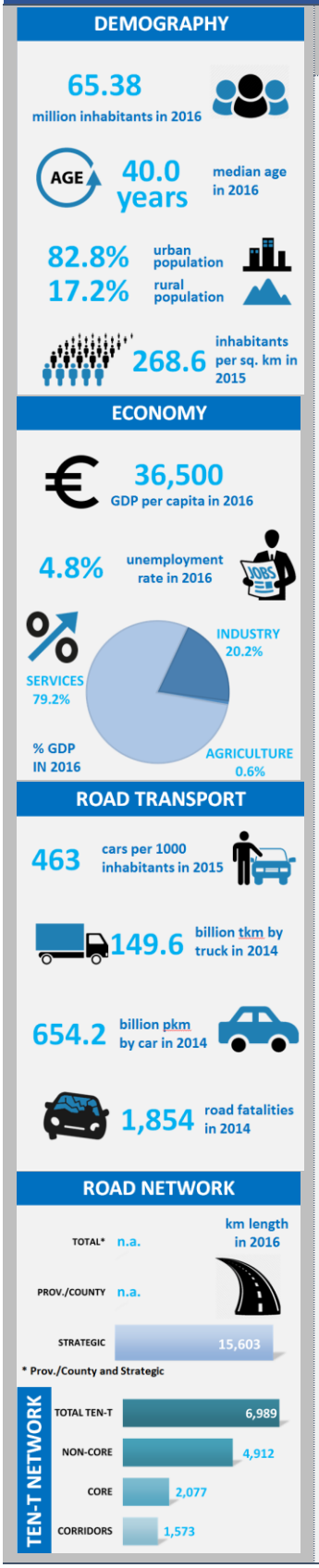
Financing

The current funding basis consists mainly of revenue from the oil tax on motor fuel and the revenue provided by motorway stickers (CHF340 million). The overall annual budget of the administration is CHF3.8 billion, of which CHF1.5 billion is spent on operations and the performance of maintenance work on the network and CHF1.0 billion on road network completion and the agglomeration of traffic. The rest of the budget includes state subsidies for main roads, multimodal transport investments, environmental protection, research, and administration.

A new funding basis was adopted in 2017 and will apply from 2018.

Data sources:
Eurostat: population; median age; population density; GDP per capita; motorisation rate; road passengers' performance; road freight performance; road fatalities;
FEDRO: road network length (total, Strategic, Provincial/County)
Amstat: unemployment rate
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

United Kingdom (England)



Highways England

General description

Highways England is the government company responsible for operating, maintaining and improving England's motorways and major A roads. Formerly the Highways Agency, it became a government company in April 2015.

Highways England has over 4,000 employees based in various locations around England

Responsibility

Highways England is responsible for motorways and major A roads (trunk roads) in England. These roads are referred to as the Strategic Road Network and total around 4,300 miles. While this represents only 2 per cent of all roads in England by length, these roads carry a third of all traffic by mileage and two thirds of all heavy goods traffic.

Highways England is responsible for operating, maintaining, and improving the Strategic Road Network.

Highways England does not manage all roads in Britain:

- Local roads are managed by the relevant local authority
- Scottish roads are managed by Transport Scotland
- Welsh roads are managed by the Welsh Assembly
- London roads are managed by Transport for London

Financing

Over the period 2015–2020, Highways England will deliver £15 billion of investment on the strategic road network as described in the government's Road Investment strategy. This includes £11 billion of capital funding committed between 2015 and 2020 as set out in our Strategic Business Plan.

Data are provided at country level

Data sources:
Eurostat: population; median age; population density; GDP per capita; unemployment rate; motorisation rate; road passengers' performance; road freight performance; road fatalities;
Highways England: road network length (Strategic)
World Bank: urban population share; rural population share; GDP composition.
CEDR: TEN-T roads network length (Total, Non-Core, Core, Corridors)

CEDR report: 2018-01
ISBN: 979-10-93321-47-9

22-28 Avenue d'Auderghem
1040-Brussels
Tel.: + 32 (0) 27 71 2478
email: information@cedr.eu