CEDR

Conférence Européenne
des Directeurs des Routes

Conference of European
Directors of Roads

Trans-European Road Network, TEN-T (Roads)
2015 Performance Report

December 2016

Prepared by: CEDR TASK GROUP N1 (PERFORMANCE INDICATORS)

Group leader	Lars Bergman	Sweden
Group members	Stefan Resch	Austria
	Christian Wampera	Austria
	Frederic Plumier	Belgium (Wallonia)
	Elpida Epamenonda	Cyprus
	Bo Ekman	Denmark
	Eric thor Straten	Denmark
	Roman Limbach	Germany
	Katerina Romaidou	Greece
	Olympia Stratigaki	Greece
	Sandro La Monica	Italy
	Randi Harnes	Norway
	Grzegorz Obara	Poland
	Anton Svigelj	Slovenia
	Bine Pengal	Slovenia
	Manuel de Lucas Tellez Meneses	Spain
	Yan Cerf	Switzerland
	Colin Bird	UK (England)
Other contributors	Thomas Spiegel	Austria
	Hartmut Treichel	Germany
	Peter Høier	Denmark
	Jaan Ingermaa	Estonia
	Matti Raekallio	Finland
	Pekka Ovaska	Finland
	Eirikur Bjarnason	Iceland
	Brendan Kennedy	Ireland
	Pier Paolo Cartolano	Italy
	Arunas Rutka	Lithuania
	Paul Mangen	Luxembourg
	Sarah Anastasi	Malta
	Peter Schout	Netherlands
	Paal Tvedt	Norway
	Jan Kristian Jensen	Norway
	Aleksandra Cybulska	Poland

Approved by: CEDR's GOVERNING BOARD on 6 October 2016

Edited and published by: CEDR's Secretariat General

CEDR report 2016/04

ISBN: 979-10-93321-21-9

EXECUTIVE SUMMARY

This is the fourth biennial report that CEDR has published on the performance of the TEN-T (Roads) network within CEDR member countries. CEDR's intention in collecting and publishing this information is to establish a stable set of data with which to monitor trends and identify changes in the performance of the TEN-T (Roads) network. As such, the report is a useful source of information for individual National Road Administrations (NRAs), regulatory bodies, and others for benchmarking purposes and for setting national performance targets.

The first Performance Report was published in 2009 and since then, despite being voluntary, 24 of CEDR's 28 member countries have chosen to participate in at least one of the four reports. Together, these 24 countries cover approximately 90,000 km of the total 103,000 km TEN-T (Roads) network. This network represents the most important roads in Europe. More than two billion vehicle kilometres are driven on this network every day.

The 2015 report provides a detailed snapshot of the performance of the TEN-T (Roads) network in CEDR member countries in 2015 and identifies overall trends in the performance of the network as a whole. The report shows that:

1 The TEN-T network includes the most important roads in Europe. 60% of the network consists of motorways (this proportion is gradually increasing) and 17% is made of up roads with more than 4 lanes. The network also includes 1,200 km of bridges and more than 1,000 km of tunnels. Investment in the TEN-T network is continuing, with planned capacity improvements identified on nearly 25% of the network.

2 The network is also very heavily trafficked. More than 40% of the network carries in excess of 20,000 vehicles per day while 6% carries more than 80,000 vehicles per day, Traffic Density exceeds 12,000 vehicles per lane per day on 15% of the network, and HGVs comprise more than 20% of all traffic on nearly 20% of the network. The Traffic Flow for both all vehicles and HGVs specifically is increasing, particularly on motorways.

3 However, despite this, the network is relatively safe. The average Fatal Accident Rate on motorways is less than 2 fatal accidents per BVehKm and less than 6 per BVehKm on non-motorways. However, at the same time, there are wide variations across the network.

The main change impacting on the 2015 report has been the implementation of the new TEN-T Guidelines in January 2014, which have resulted in CEDR members making significant changes to the roads included in the TEN-T as well as some re-categorisation of motorways and non-motorways.

The 2015 report again demonstrates CEDR's ability to collect and report consistent data about network performance that can enable meaningful comparison of information and benchmarking between NRAs and that can support wider CEDR initiatives both now and in the future.

CONTENTS

1 INTRODUCTION 6
1.1 Purpose of document 6
1.2 Background and context 6

2 ABOUT THE TEN-T (ROADS) NETWORK 7
2.1 Scope of the report 7
2.2 Content changes for the 2015 report 7
2.3 Participating countries in 2015 10
2.4 National statistics 11
2.5 Core and comprehensive networks 15

3 NETWORK TRENDS 16
3.1 Road Type 16
3.2 Traffic Flow – All Vehicles 17
3.3 Traffic Flow - HGV 18

4 STRUCTURE OF THE NETWORK 20
4.1 Road Type 20
4.2 Number of Lanes 23
4.3 Length of Bridges 26
4.4 Length of Tunnels 28
4.5 Physical Environment 30
4.6 Intelligent Transport Systems (ITS) 33

5 PERFORMANCE OF THE NETWORK 34
5.1 Average Traffic Flow 34
5.2 Traffic Density 37
5.3 Proportion of Heavy Goods Vehicles 40
5.4 Heavy Goods Vehicle Traffic Flow 43
5.5 Fatal Accident Rate 46
5.6 Planned Capacity Improvements 49

6 CONCLUSIONS AND FUTURE DEVELOPMENTS 52

7 APPENDIX 1: METHODOLOGY AND DATA VALIDITY 53

8 APPENDIX 2: BASE DATA DEFINITIONS 54
8.1 Road Type 54
8.2 Section Length 54

8.3 Number of Lanes 55
8.4 Length of Bridges 55
8.5 Length of Tunnels 56
8.6 Physical Environment 56
8.7 Intelligent Transport Systems (ITS) 57
8.8 Traffic Flow 57
8.9 Proportion of HGVs 58
8.10 Fatal Accidents 58
8.11 Planned Capacity Improvements 59

9 APPENDIX 3: PERFORMANCE INDICATOR MAPS 60
9.1 Road Type 61
9.2 Number of Lanes 62
9.3 Length of Bridges 63
9.4 Length of Tunnels 64
9.5 Physical Environment 65
9.6 Average Daily Traffic Flow 66
9.7 Traffic Density 67
9.8 Proportion of Average Daily Traffic comprising HGVs 68
9.9 Average Daily HGVs 69
9.10 Annual Average Fatal Accident Rate 70
9.11 Planned Capacity Improvements 71

10 APPENDIX 4: TEN-T CORRIDORS 72
10.1 Scandinavian–Mediterranean Corridor 73
10.2 North Sea–Baltic Corridor 74
10.3 North Sea–Mediterranean Corridor 75
10.4 Baltic–Adriatic Corridor 76
10.5 Orient/East–Med Corridor 77
10.6 Rhine–Alpine Corridor 78
10.7 Atlantic Corridor 79
10.8 Rhine–Danube Corridor 80
10.9 Mediterranean Corridor 81

11 APPENDIX 5: LIST OF FIGURES 82

1 INTRODUCTION

1.1 Purpose of document

The 2015 TEN-T (Roads) Performance Report is the fourth biennial report that CEDR has published on the performance of the TEN-T (Roads) network within CEDR member countries.

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 (Roads) network. As such, the report is a particularly useful source of information for individual NRAs, regulatory bodies, and others for benchmarking purposes and for setting national performance targets.

It is also expected that the Performance Report and underpinning data will continue to evolve to provide the backbone for the collection, referencing, and graphical representation of any other data required by CEDR (e.g. customer consultation, environmental data, Open Data) in the future.

This framework is considered to be the state of the art and represents the best source of performance data on the TEN-T (Roads) network.

1.2 Background and context

CEDR has long recognised the need for high-quality, comparable information about the performance of the TEN-T (Roads) 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 (Roads) network and a set of common definitions for base data that is used as basis of the calculated performance indicators.

The performance reporting framework was successfully implemented in SP1 and has been the basis of the biennial CEDR report on the performance of the TEN-T (Roads) network since 2009. Despite being voluntary, 24 of CEDR's 28 member countries have chosen to participate in at least one of the four reports.

This framework has advantages over other systems that member countries have to use to provide data to the Commission and others because:

- all data is referenced to a common, stable location referencing model,
- all data is based on common data definitions, and
- objective data is provided directly by NRAs.

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

2 ABOUT THE TEN-T (ROADS) NETWORK

2.1 Scope of the report

Since the first TEN-T (Roads) Performance Report was published in 2009, 24 of CEDR's 28 member countries have chosen to participate in at least one report.

Together, these 28 countries account for 96,000 km of the total 103,000 km TEN-T (Roads) network. This network represents the most important roads in Europe. More than two billion vehicle kilometres are driven on the network every day. The total TEN-T (Roads) network within CEDR member countries is shown in Figure 1 overleaf.

	km	%	CEDR member countries
Length of TEN-T (Roads)	103,000	-	-
Length of TEN-T (Roads) in CEDR member countries	96,000	100	28
Length covered in all Performance Reports to date	90,000	94	24
Length covered in the 2015 Performance Report	74,000	77	19

The 2015 TEN-T (Roads) Performance Report includes data from 19 member countries, covering 74,000 km of the TEN-T (Roads) network.

With the implementation of the new TEN-T Guidelines in January 2014, the concept of a 'core network' was introduced. The 74,434 km covered in the 2015 report includes 29,721 km of core network. Based on data provided by the countries themselves, Figure 2 shows the core and comprehensive networks covered by the 2015 report. Later sections of the report compare the performance of the core and comprehensive networks.

At the same time, the Commission introduced nine 'core network corridors' to facilitate the coordinated implementation of the core network. The nine corridors are shown in Appendix 4, but no analysis of them has been included in the 2015 report. Future analysis could include the corridors and could provide performance information to the Corridor Committees on, for example, service stations, charging points for electric vehicles, etc.

2.2 Content changes for the 2015 report

As well as introducing the concept of core and comprehensive networks in accordance with the new TEN-T Guidelines, a number of other changes have been introduced in the 2015 report:

- The previous road type categories 'Expressway' and 'Ordinary Roads' have been combined into a single category of 'Non-motorway' due to the lack of consistent definitions of 'Expressway'.
- Network trends now include data from 2011, 2013, and 2015.
- Some new indicators have been added: 'Physical Environment', 'ITS', and 'Planned Capacity Improvements'.
- A number of indicators have been dropped or modified.
- The performance of national networks is compared to the average of all participating countries.

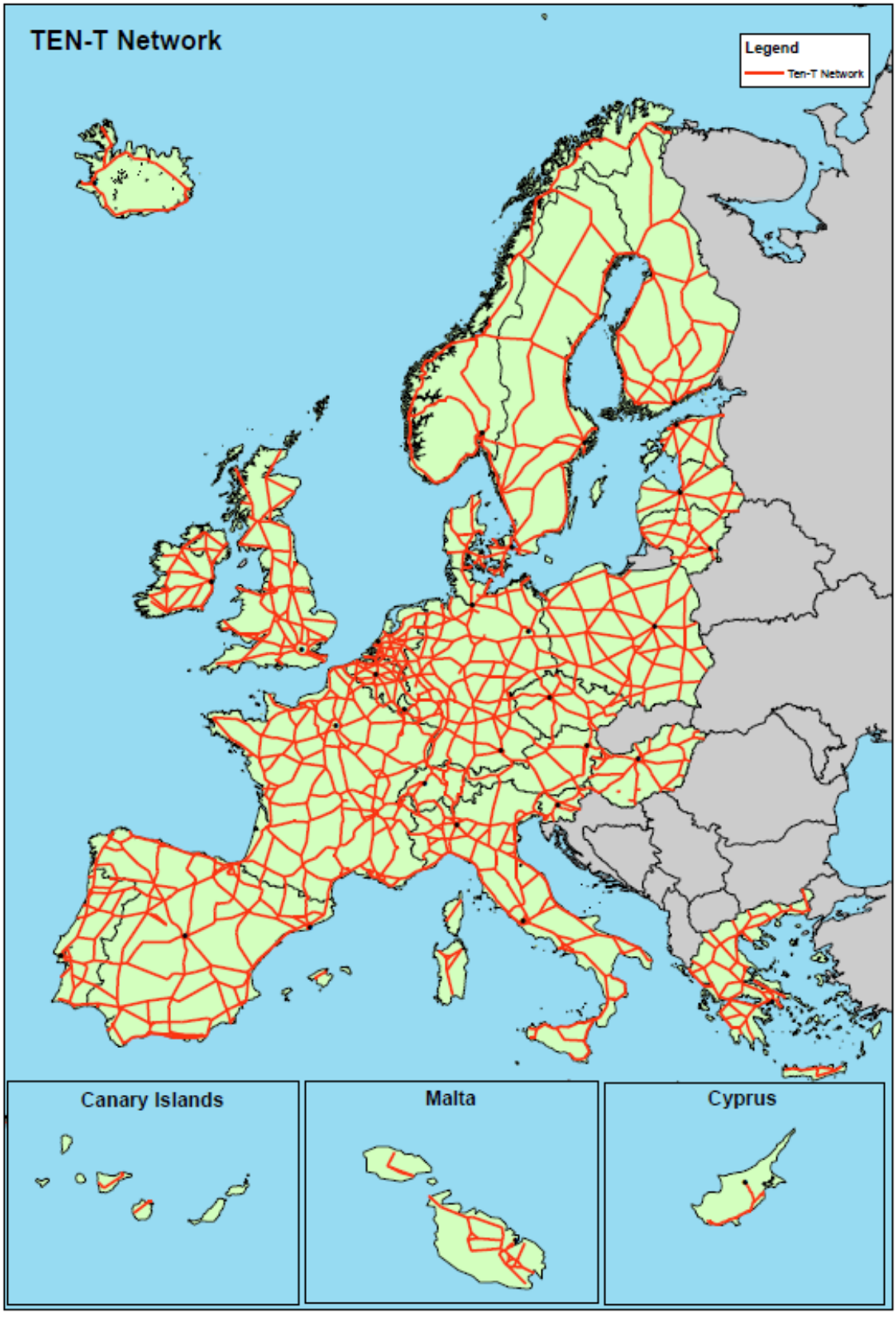


Figure 1: The TEN-T (Roads) network within CEDR member countries

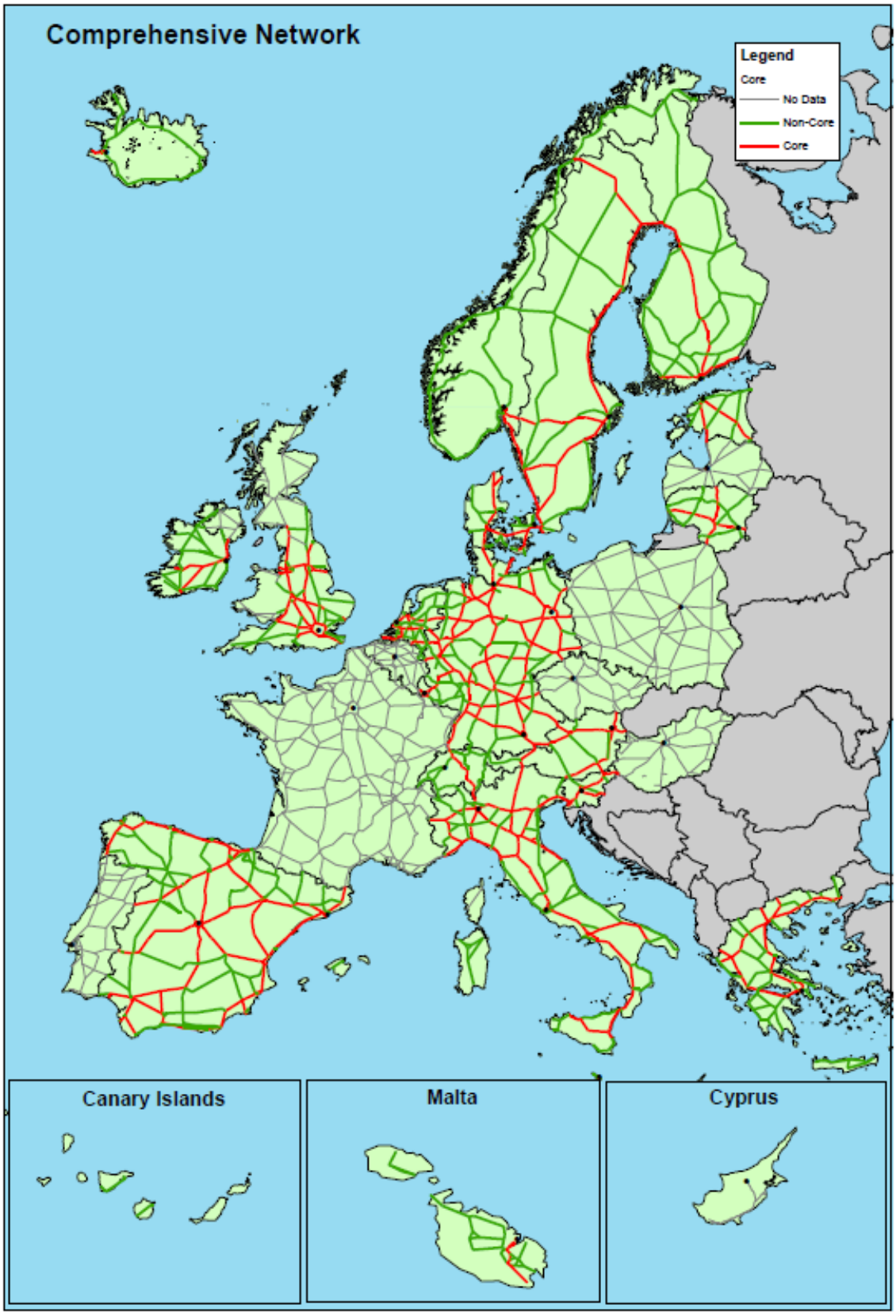


Figure 2: The TEN-T core and comprehensive road networks covered by CEDR Performance Report (2015)

2.3 Participating countries in 2015

This is the fourth biennial report published by CEDR on the performance of the TEN-T (Roads) network. Although participation in the report is entirely voluntary, 19 out of a possible 28 CEDR member countries have provided data for the 2015 report as shown in Figure 3[1].

The key changes in 2015 are the non-involvement of Belgium (Flanders) and Belgium (Wallonia) and the continued non-involvement of Cyprus, France, and Hungary. Although the networks for all 24 participating countries have been included on the maps, the subsequent tables and graphs are based only on performance data provided for 2015[2].

	2009	2011	2013	2015	Comments on 2015 data provision
Austria					
Belgium (Flanders)					*Most recent network data included in maps only*
Belgium (Wallonia)					*Most recent network data included in maps only*
Cyprus					*Most recent network data included in maps only*
Czech Republic					*No performance data, only network included in maps*
Denmark					
Estonia					
Finland					
France					*Only most recent network data included in maps*
Germany					
Greece					
Hungary					*Only most recent network data included in maps*
Iceland					
Ireland					
Italy					*Some data only available for roads administered by ANAS*
Latvia					*No performance data, only network included in maps*
Lithuania					
Luxembourg					
Malta					
Netherlands					
Norway					
Poland					*Preliminary data only, not included in detailed analysis*
Portugal					*No performance data, only network included in maps*
Slovenia					
Spain					
Sweden					
Switzerland					
UK					*Includes performance data for England only (2013 also included data from Scotland)*

Figure 3: Countries participating in the 2015 TEN-T (Roads) Performance Report

1 Preliminary data was also provided by Poland although this has not yet been included in any detailed analysis.
2 UK performance data for 2015 only includes data from the TEN-T (Roads) network in England. Some performance data for Italy includes only roads that are administered by ANAS.

2.4 National statistics

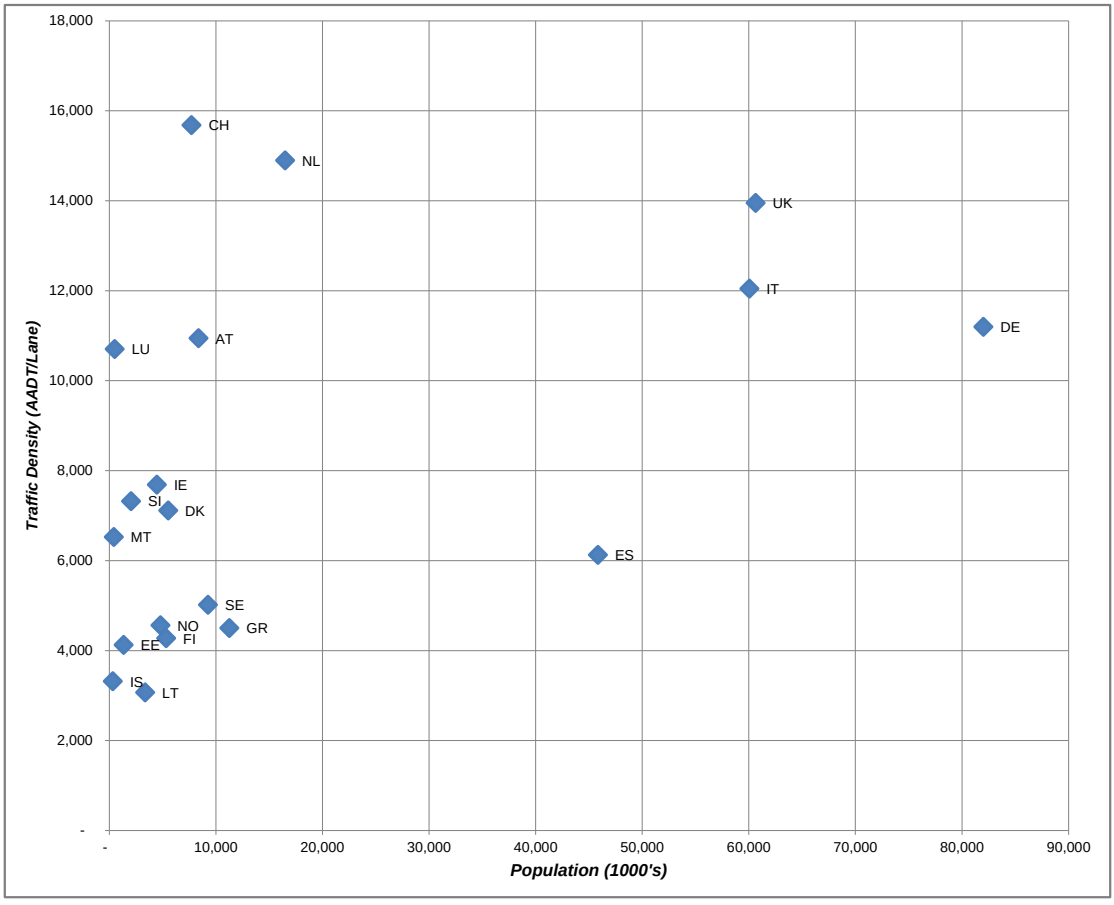
The length and performance of the TEN-T (Roads) network in each of the countries that provided data for the 2015 report, as well as other general statistics such as population and surface area, are given in the table and graphs below for information.

Country	National Statistics		TEN-T (Roads) Network Length (km)					TEN-T (Roads) Network Use (Average)		
	Population (1000's)	Total Area (km^2)	Comprehensive Network	Core Network	Motorway	Non-Motorway	No Data	Traffic Flow (AADT)	Traffic Density (AADT/Lane)	Proportion HGV (%)
Austria	8,355	83,872	1,689	1,072	1,689	-	-	54,705	10,943	10.9
Denmark	5,511	43,098	1,554	749	1,113	441	-	30,626	7,117	12.5
Estonia	1,340	45,228	1,350	480	-	1,350	-	10,800	4,126	13.4
Finland	5,326	338,424	5,229	1,094	799	4,430	-	13,927	4,275	10.1
Germany	82,002	357,021	10,700	6,365	10,341	359	-	55,127	11,199	15.2
Greece	11,260	131,990	4,831	1,780	1,695	3,136	-	18,698	4,500	16.1
Iceland	319	103,001	1,803	53	3	1,800	-	11,913	3,319	7.1
Ireland	4,450	70,280	2,258	499	907	1,350	-	27,125	7,688	6.5
Italy	60,045	301,338	8,809	4,259	6,832	1,977	-	28,161	12,045	15.5
Lithuania	3,350	65,200	1,652	597	320	1,332	-	9,568	3,071	19.2
Luxembourg	494	2,586	90	90	90	-	-	43,097	10,703	16.4
Malta	414	364	109	23	-	109	-	21,058	6,526	0.0
Netherlands	16,486	41,543	1,886	643	1,886	-	-	77,556	14,898	14.1
Norway	5,166	385,252	4,928	242	552	4,376	-	14,849	4,562	14.4
Slovenia	2,032	20,273	593	467	537	56	-	29,252	7,322	13.3
Spain	45,828	504,030	12,311	5,976	10,636	1,675	-	28,483	6,127	13.4
Sweden	9,256	449,964	6,391	2,972	1,952	4,439	-	19,208	5,017	14.4
Switzerland	7,702	41,290	1,325	300	1,123	202	-	53,895	15,680	6.1
UK	60,631	223,010	6,926	2,060	2,674	1,694	2,558	78,703	13,951	11.6
Total/Average	**329,969**	**3,207,764**	**74,434**	**29,721**	**43,150**	**28,727**	**2,558**	**32,987**	**8,056**	**12.1**

AT	Austria	GR	Greece	NE	Netherlands
CH	Switzerland	IE	Ireland	NO	Norway
DE	Germany	IS	Iceland	SE	Sweden
DK	Denmark	IT	Italy	SI	Slovenia
EE	Estonia	LT	Lithuania	UK	UK
ES	Spain	LU	Luxembourg		
FI	Finland	MT	Malta		

Figure 4 compares the Traffic Density (calculated from the data provided on Traffic Flow and Number of Lanes) on the TEN-T (Roads) network to national population for each participating country. This shows that the majority of countries with a population of less than 20 million have a Traffic Density of less than 8,000 AADT/lane apart from Austria, Luxembourg, the Netherlands, and Switzerland, which all have a Traffic Density of more than 10,000 AADT/lane. The four countries with a population greater than 40 million have a Traffic Density of more than 10,000 AADT/lane apart from Spain, which has a Traffic Density of 6,000 AADT/lane.

However, care should be taken when making this kind of comparison because different interpretations of the TEN-T Guidelines, as well as local decisions, have resulted in different countries selecting different types of road for inclusion in the TEN-T network.



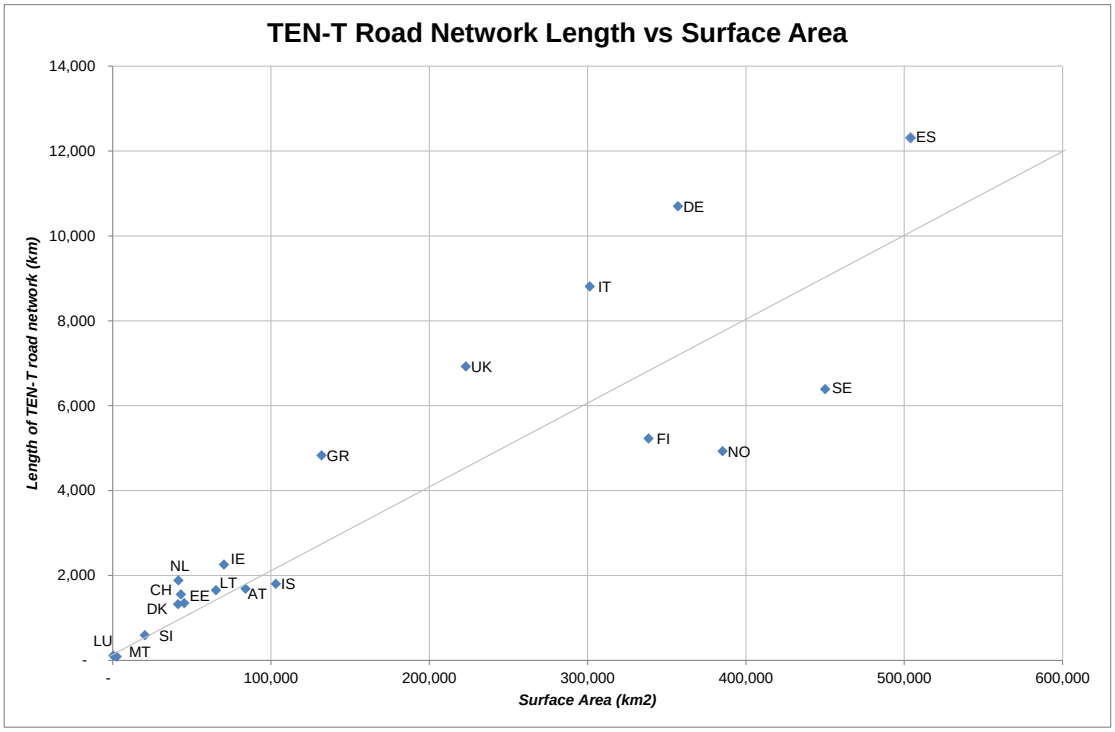
AT	Austria	GR	Greece	NE	Netherlands
CH	Switzerland	IE	Ireland	NO	Norway
DE	Germany	IS	Iceland	SE	Sweden
DK	Denmark	IT	Italy	SI	Slovenia
EE	Estonia	LT	Lithuania	UK	UK
ES	Spain	LU	Luxembourg		
FI	Finland	MT	Malta		

Figure 4: Comparison of population and Traffic Density on TEN-T roads

Figure 5 compares the length of the TEN-T (Roads) network and the surface area of each country participating in the 2015 report.

Not surprisingly, this shows not only that the length of the TEN-T network is largely proportional to the size of a country, but also that there are broadly two groups of countries: the first are those countries with a surface area of less than 110,000 km^2 and a TEN-T (Roads) network of less than 2,100 km. These countries are all very close to the line.

The second group includes countries with a surface area greater than 110,000 km^2 and a much wider spread in terms of network length, ranging from 5,200 km (Norway) to more than 12,300 km (Spain). In this second group, it is possible to differentiate between those countries with a relatively long network compared with the surface area (countries above the line) and those countries with a relatively short network compared with the surface area (countries below the line).



AT	Austria	GR	Greece	NE	Netherlands
CH	Switzerland	IE	Ireland	NO	Norway
DE	Germany	IS	Iceland	SE	Sweden
DK	Denmark	IT	Italy	SI	Slovenia
EE	Estonia	LT	Lithuania	UK	UK
ES	Spain	LU	Luxembourg		
FI	Finland	MT	Malta		

Figure 5: Comparison of the length of the TEN-T network and the surface area of CEDR countries

Figure 6 combines surface area, population, and relative Traffic Density, the latter of which is represented by the size of the circles. This shows that, overall, the most populated countries (Germany, Italy, Spain, and the UK) have the largest lengths of network in Europe, and together with Austria, Switzerland, and the Benelux countries, the busiest in terms of Traffic Flow and Traffic Density.

Again, care should be taken when making this kind of comparison because different countries have selected different types of road for inclusion in their TEN-T network.

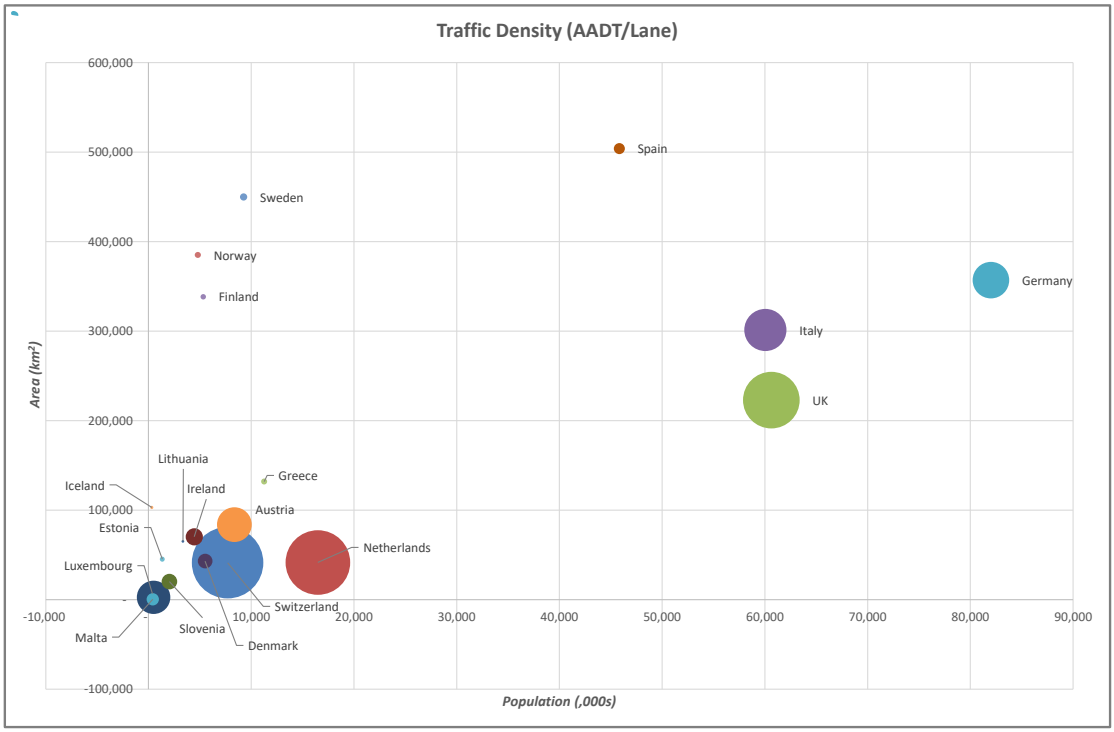


Figure 6: Traffic Density vs. area and population

Regarding other national data, the proportion of HGVs is relatively consistent across the whole of Europe, with all countries reporting overall network averages of between 10% and 16% except at the lower end (Ireland (6%), and Iceland (7%)) and at the upper end (Lithuania (19%)). In Switzerland, only 6% of traffic is HGV. However, this is explained by local regulations that stipulate that transiting HGVs must travel by rail. No HGV data was available from Malta.

2.5 Core and comprehensive networks

In 2014, the new TEN-T Guidelines introduced the concept of the 'core network'. Figure 7 shows the length of core and non-core network in each of the participating countries compared with the network average figures (the percentages are the proportion of the comprehensive network in each country that is identified as core).

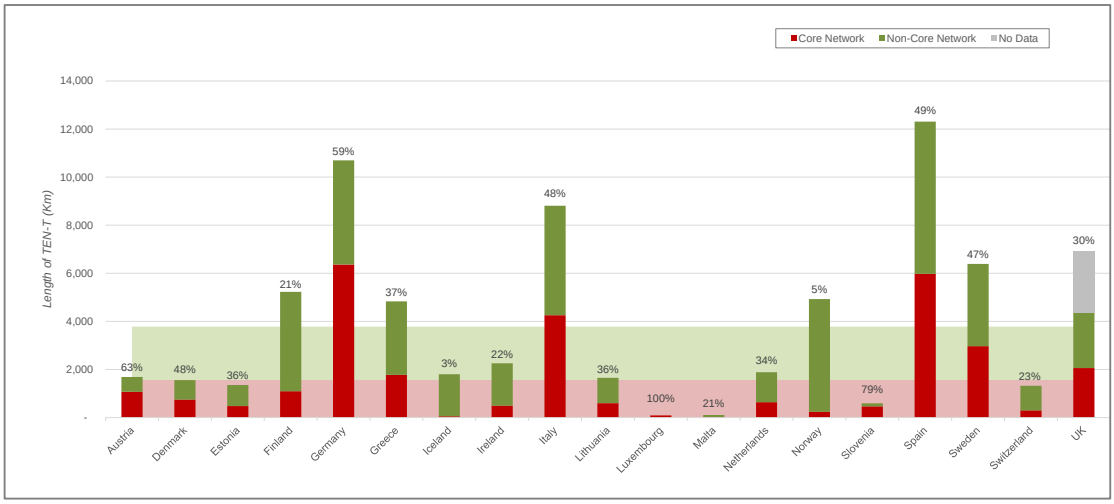


Figure 7: Comparison of core and non-core network lengths on TEN-T roads

The figures in Figure 7 show that Luxembourg (100%) Slovenia (79%), Austria (63%), and Germany (59%) have the highest proportion of national core network, while Iceland (3%) and Norway (5%) have the lowest.

The core and comprehensive networks in the participating countries are shown on a map in Figure 2.

It should be noted that as many of the performance indicators in this report are shown as percentages of network length, countries with relatively short TEN-T (Roads) networks such as Luxembourg and Malta can have disproportionately high results. It should also be noted that the selection of sections for inclusion in the core network has to be negotiated with the Commission. Care should therefore be taken when interpreting this data.

3 NETWORK TRENDS

This is the fourth TEN-T (Roads) Performance Report produced by CEDR, and there is now a core set of performance data within a subset of 11 participating countries that is considered relatively stable and can enable simple trends to be highlighted over the period 2011 to 2015. This subset comprises the following countries:

- Austria
- Denmark
- Estonia
- Finland
- Germany
- Iceland
- Lithuania
- Norway
- Slovenia
- Spain
- Sweden

This subset represents 48,000 km of TEN-T roads. This is 47% of the total length of the TEN-T (Roads) network and 50% of the network within CEDR member countries.

The changes over the period 2011 to 2015 are shown below at a network level. For this subset of countries and indicators, there is reasonable confidence that any changes are due to genuine changes in network performance rather than corrections or amendments to the data.

3.1 Road Type

At a network level, Figure 8 shows that between 2011 and 2013, the overall length of the network in these countries remained constant, with a slight increase in the length of motorway coupled with an equivalent reduction in the length of non-motorway roads.

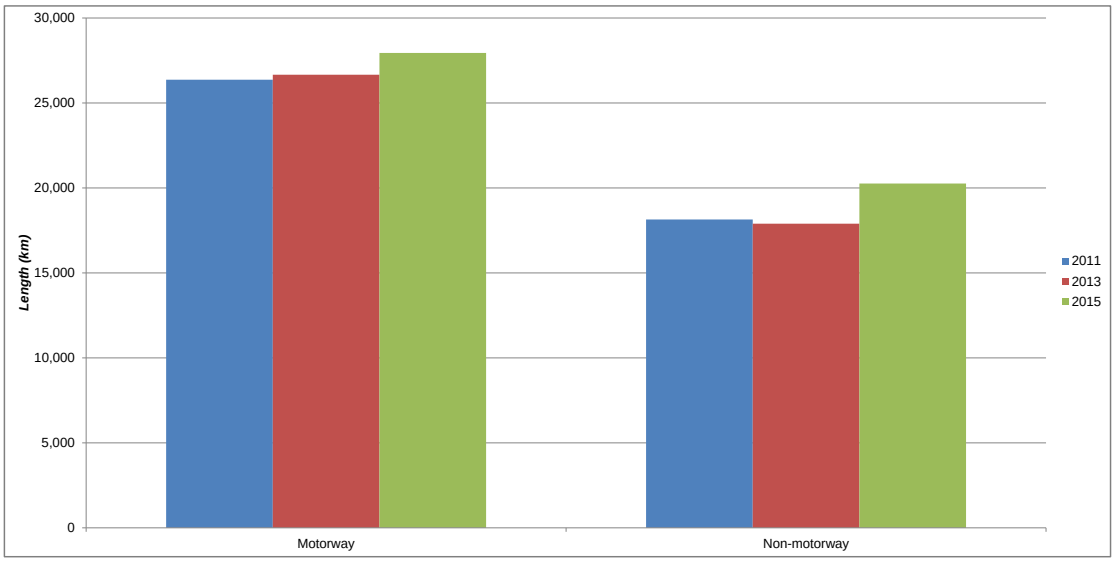


Figure 8: Network-trends in Road Type (2011–2015)

However, between 2013 and 2015, there has been an 8% increase in the overall length of the network in these countries as additional national roads have been included in the TEN-T network in response to the new TEN-T Guidelines. This has

particularly been the case in Denmark, Estonia, Finland, and Sweden. The changes in network length from 2013 to 2015 are shown in the table below.

Country	Length of TEN-T (Roads) network				
	2011	% change	2013	% change	2015
Austria	1,782	0%	1,782	-5%	1,689
Denmark	916	0%	916	70%	1,554
Estonia	1,018	0%	1,017	33%	1,350
Finland	4,056	0%	4,058	29%	5,229
Germany	10,137	0%	10,150	5%	10,700
Iceland	1,803	0%	1,803	0%	1,803
Lithuania	1,657	0%	1,652	0%	1,652
Norway	3,726	32%	4,900	1%	4,928
Slovenia	607	0%	609	-3%	593
Spain	12,091	0%	12,114	2%	12,311
Sweden	5,603	0%	5,617	14%	6,391

3.2 Traffic Flow – All Vehicles

At a network level, Figure 9 shows that between 2011 and 2013, the overall Traffic Flow on the network in these countries increased by nearly 2% with a slight increase on both motorways (1.0%) and non-motorways (1.5%).

However, while the overall increase in Traffic Flow remained at 2% between 2013 and 2015, the increase on motorways was nearly 8%. On non-motorways, it reduced by nearly 8%. There could be a number of reasons for this change: the additional roads that have been included in the TEN-T network in response to the new TEN-T Guidelines could have higher levels of traffic, or the increased traffic could be due to economic recovery or a transfer of traffic from ordinary roads to TEN-T roads as part of an additional mobility shift.

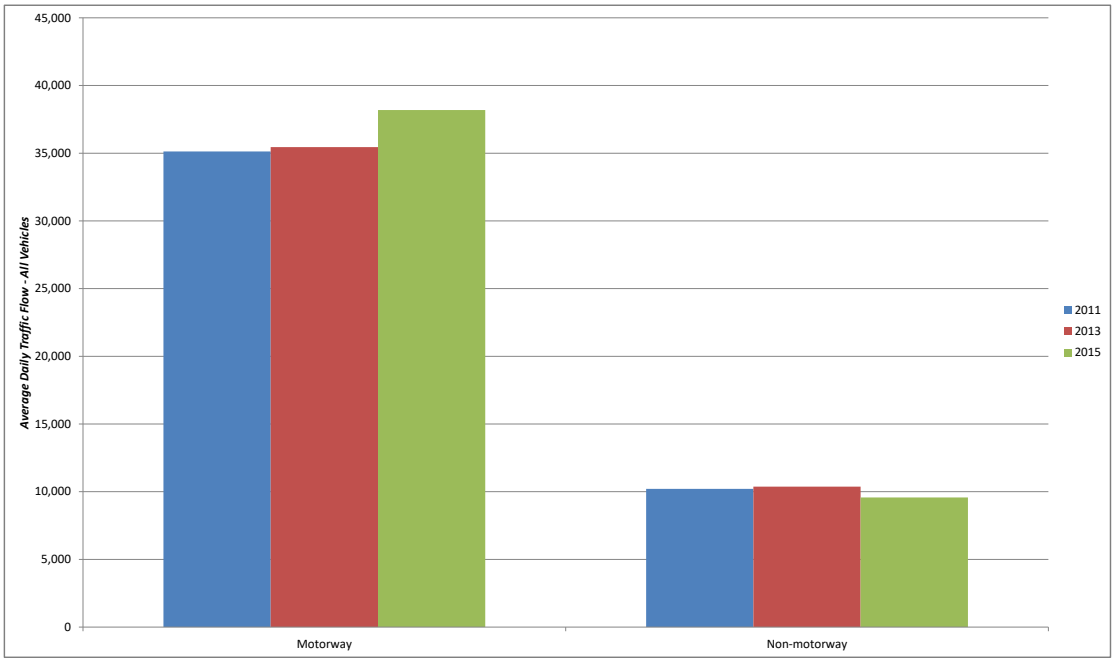


Figure 9: Network trends in All Vehicle Traffic Flow (2011–2015)

3.3 Traffic Flow - HGV

At a network level, Figure 10 shows that between 2011 and 2013, there was an overall increase of 5% in HGV Traffic Flow in these countries, with an increase of 3% on motorways and 6% on non-motorways.

However, between 2013 and 2015, the figures show an overall decrease of 7% in HGV Traffic Flow, which includes an increase of 2% on motorways and a decrease of 12% on non-motorways. There could be a number of reasons for this change: the additional roads that have been included in the TEN-T network in response to the new TEN-T Guidelines could have higher levels of HGV traffic, the increased traffic could be due to economic recovery or a transfer of HGV traffic from non-motorway roads to motorways, or as a result of regulatory changes relating to HGVs.

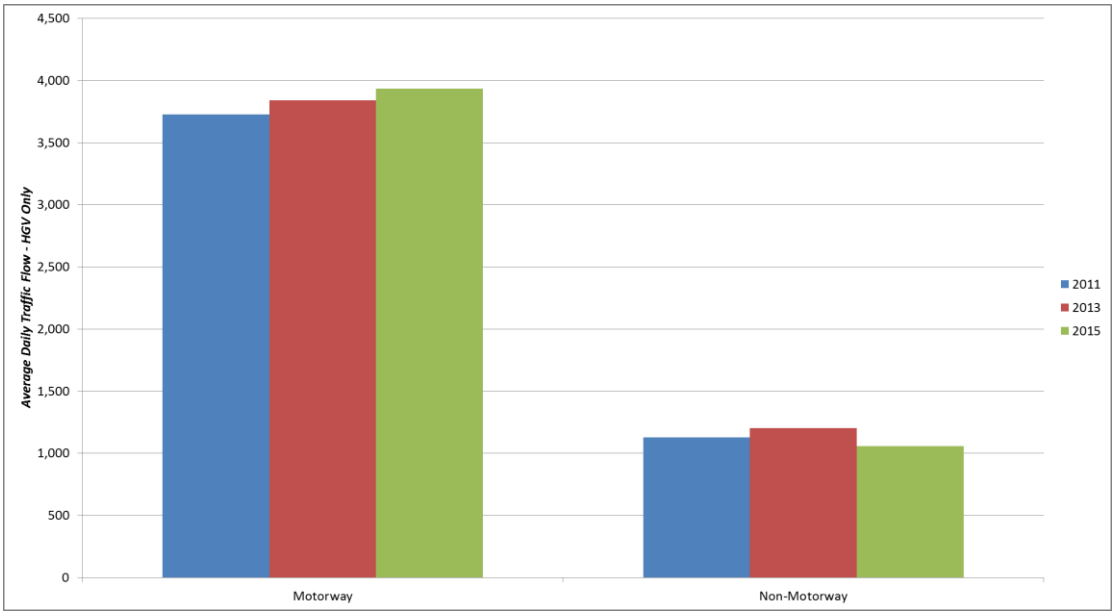


Figure 10: Network trends in HGV Traffic Flow (2011–2015)

4 STRUCTURE OF THE NETWORK

4.1 Road Type

For the purposes of the 2015 report, the TEN-T network consists of two types of road: 'motorway' and 'non-motorway'.[3] Full definitions of these road types are given in Section 8.1.

			Road Type					
			Motorway		Non-motorway		No data	
Country	Network length (km)	No of sections	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689	85	1,689	100.0	-	0.0	-	0.0
Denmark	1,554	69	1,113	71.6	441	28.4	-	0.0
Estonia	1,350	45	-	0.0	1,350	100.0	-	0.0
Finland	5,229	173	799	15.3	4,430	84.7	-	0.0
Germany	10,700	360	10,341	96.6	359	3.4	-	0.0
Greece	4,831	120	1,695	35.1	3,136	64.9	-	0.0
Iceland	1,803	78	3	0.2	1,800	99.8	-	0.0
Ireland	2,258	60	907	40.2	1,350	59.8	-	0.0
Italy	8,809	244	6,832	77.6	1,977	22.4	-	0.0
Lithuania	1,652	127	320	19.4	1,332	80.6	-	0.0
Luxembourg	90	28	90	100.0	-	0.0	-	0.0
Malta	109	48	-	0.0	109	100.0	-	0.0
Netherlands	1,886	119	1,886	100.0	-	0.0	-	0.0
Norway	4,928	206	552	11.2	4,376	88.8	-	0.0
Slovenia	593	51	537	90.6	56	9.4	-	0.0
Spain	12,311	416	10,636	86.4	1,675	13.6	-	0.0
Sweden	6,391	119	1,952	30.5	4,439	69.5	-	0.0
Switzerland	1,325	111	1,123	84.8	202	15.2	-	0.0
UK	6,926	144	2,674	38.6	1,694	24.5	2558	36.9
Total (all data)	**74,434**	**2,603**	**43,150**	**58.0**	**28,727**	**38.6**	**2,558**	**3.4**
Total (Ex No data)	**71,876**	**2,603**	**43,150**	**60.0**	**28,727**	**40.0**	**-**	**-**

As Figure 11 shows, for the network for which data is available, 60% of the TEN-T (Roads) network is motorway, 40% is non-motorway.

A number of countries (Austria, Luxembourg, and the Netherlands) have indicated that their entire TEN-T (Roads) network consists of motorway. In contrast, Estonia and Malta's networks are comprised entirely of non-motorway roads. The national distribution of road types is shown in Figure 12 against a background of the average values for the comprehensive network as a whole.

[3] This is a change from previous reports, which had two types of non-motorway sections, 'expressway' and 'ordinary road'. These categories have been combined because the term 'expressway' is not widely used within CEDR countries, leading to differences of interpretation of this category resulting in a lack of consistency in the reporting of these two categories.

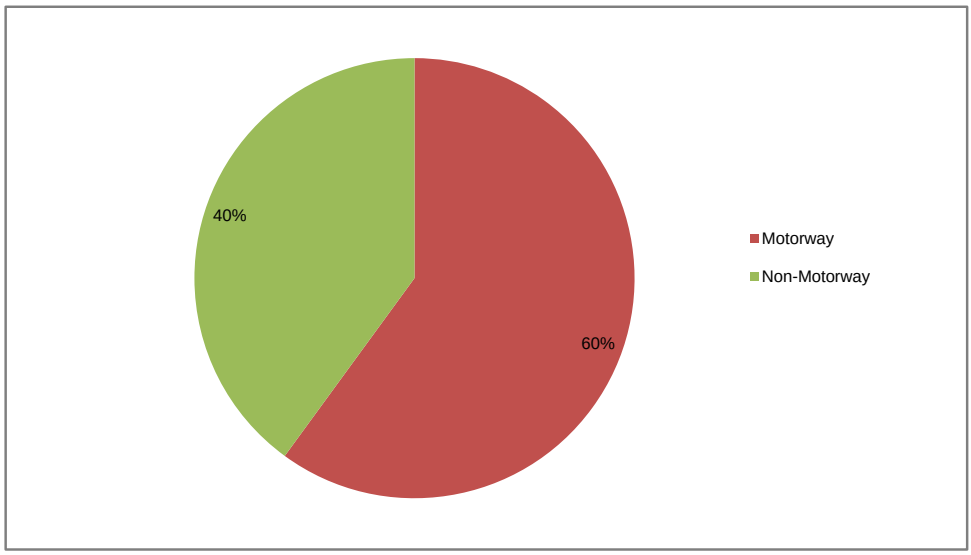


Figure 11: Overall distribution of Road Types on the TEN-T road network (2015)

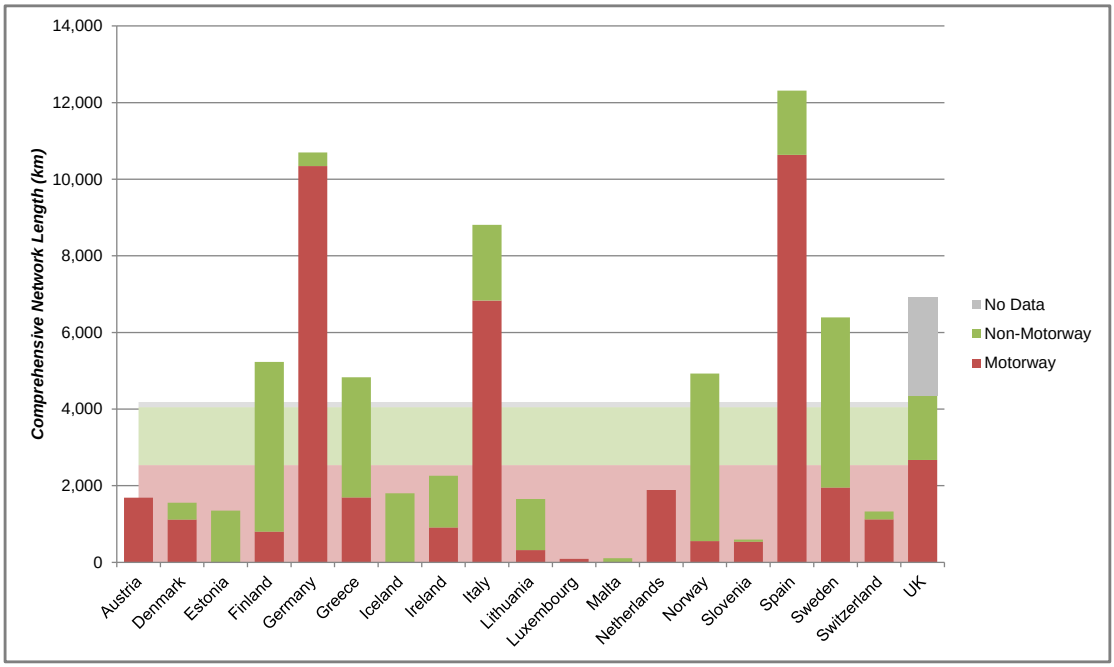


Figure 12: National distribution of Road Types on the TEN-T network (2015)

A comparison of the distribution of lengths and the split between motorway and non-motorway roads, as described in Figure 12, indicates that those countries with the largest networks (Germany, Italy, and Spain) have generally well-developed motorway networks, with over 75% of the network of motorway designation, as do Austria, Denmark, the Netherlands, Slovenia, and Switzerland.

The figures suggest that more needs to be done to improve the standard of the TEN-T (Roads) network, particularly in countries with smaller networks, such as Iceland, Estonia, and Malta. However, while many countries have plans to upgrade their networks, the key factor is to achieve an appropriate national mix of road types. Moreover, the cost effectiveness of upgrading must be considered.

Preliminary data from Poland indicates that 11% of the network is motorway and 89% is non-motorway.

A comparison of the core and comprehensive networks for which data is available (see Figure 13) shows that while 60% of the comprehensive network as a whole is made up of motorways, more than 84% of the core network consists of motorway.

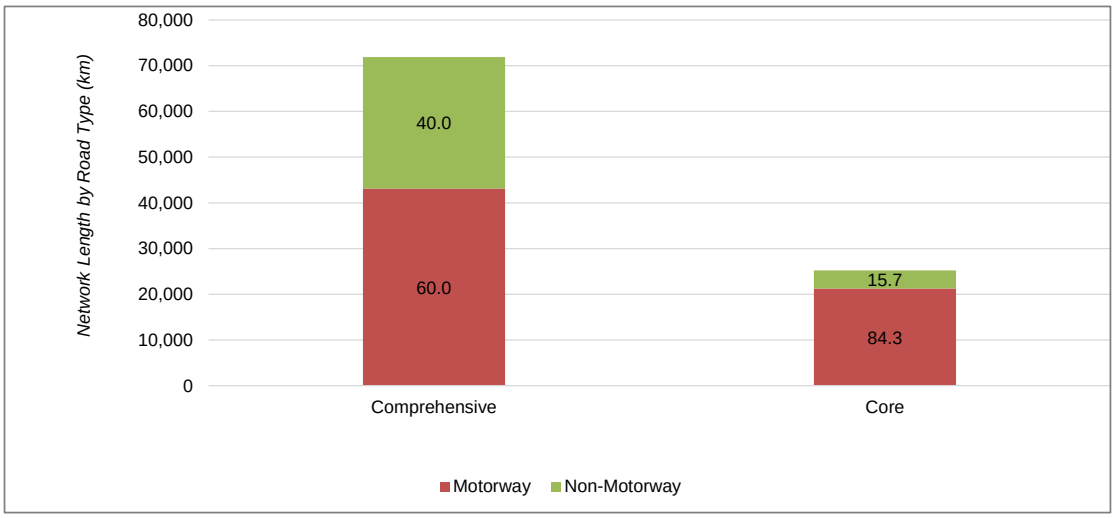


Figure 13: Comparison of Road Types on core and comprehensive networks (2015)

4.2 Number of Lanes

The Number of Lanes is defined as the average number of lanes along a TEN-T section in both directions. This figure is aggregated from the data from individual national sections so that, for example, a TEN-T section that consists of five national sections that are 2-lane roads and one national section that is a 4-lane road will have an average number of lanes greater than two and so will be included in the category 'More than 2, up to 4 lanes'. A fuller definition is given in Section 8.3.

		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	
Country	Total length	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689	16	0.9	802	47.5	821	48.6	50	3.0	-	0.0
Denmark	1,554	164	10.6	1,090	70.1	250	16.1	50	3.2	-	0.0
Estonia	1,350	1,212	89.7	138	10.3	-	0.0	-	0.0	-	0.0
Finland	5,229	2,694	51.5	2,459	47.0	76	1.5	-	0.0	-	0.0
Germany	10,700	36	0.3	5,521	51.6	4,907	45.9	236	2.2	-	0.0
Greece	4,831	2,776	57.5	1,606	33.2	429	8.9	20	0.4	-	0.0
Iceland	1,803	1,699	94.2	95	5.3	9	0.5	-	0.0	-	0.0
Ireland	2,258	1,285	56.9	885	39.2	87	3.9	-	0.0	-	0.0
Italy	8,809	6,965	79.1	1,793	20.4	-	0.0	-	0.0	51	0.6
Lithuania	1,652	975	59.0	607	36.7	-	0.0	-	0.0	70	4.2
Luxembourg	90	-	0.0	88	97.3	2	2.7	-	0.0	-	0.0
Malta	109	43	39.4	63	57.6	1	0.7	2	2.2	-	0.0
Netherlands	1,886	-	0.0	722	38.3	994	52.7	171	9.0	-	0.0
Norway	4,928	3,329	67.6	1,500	30.4	89	1.8	10	0.2	-	0.0
Slovenia	593	41	6.9	384	64.8	168	28.3	-	0.0	-	0.0
Spain	12,311	1,804	14.7	8,990	73.0	1,210	9.8	226	1.8	79	0.6
Sweden	6,391	3,275	51.2	2,964	46.4	149	2.3	3	0.0	-	0.0
Switzerland	1,325	279	21.1	1,044	78.8	2	0.2	-	0.0	-	0.0
UK	6,926	-	0.0	1,524	22.0	2,086	30.1	758	10.9	2,558	36.9

Total (all data)	**74,434**	**26,594**	**35.7**	**32,275**	**43.4**	**11,280**	**15.2**	**1,527**	**2.1**	**2,758**	**3.7**
Total (ex No data)	**71,676**	**26,594**	**37.1**	**32,275**	**45.0**	**11,280**	**15.7**	**1,527**	**2.1**	**-**	**-**

As illustrated in Figure 14, these results show that the largest category of the TEN-T (Roads) network (45%) is that of roads with more than 2 and up to 4 lanes, and 37% of the network is made up of 2-lane roads, with the other 16% being roads of more than 4 lanes.

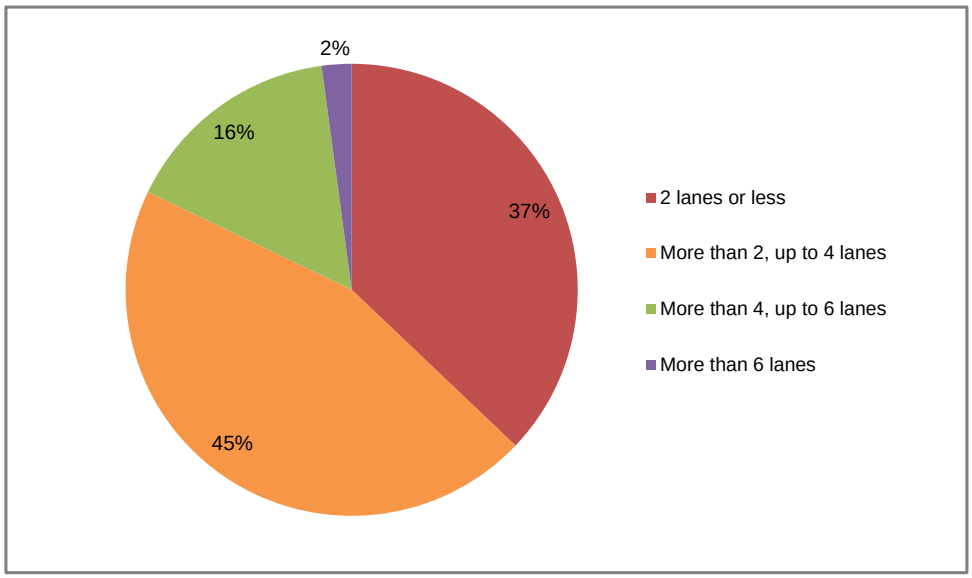


Figure 14: Overall distribution of the Number of Lanes on the TEN-T road network (2015)

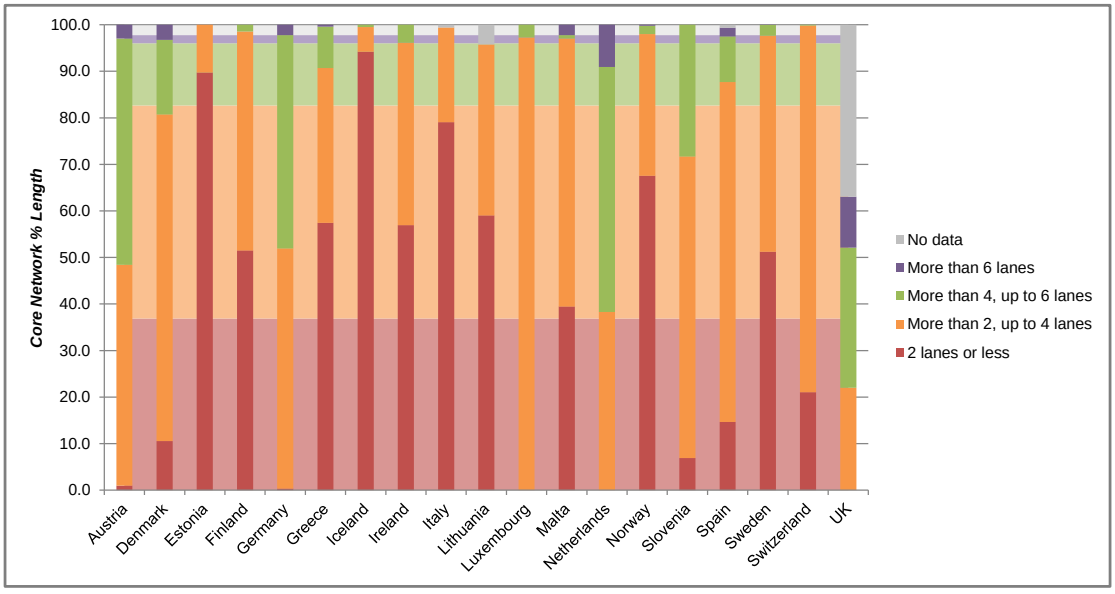


Figure 15: National distribution of the Number of Lanes on TEN-T roads (2015)

Figure 15 shows the national distribution of the Number of Lanes against a background of the average values for the comprehensive network as a whole. This shows that in Estonia, Finland, Greece, Iceland, Ireland, Italy, Lithuania, Norway, and Sweden, more than 50% of the TEN-T (Roads) network consists of roads that have 2 lanes or less.

Only 2% of the whole network has more than 6 lanes. In the Netherlands, this figure is 9% and in the UK it is as high as 11%.

Preliminary data from Poland indicates that 99% of the network has 'more than 2, up to 4 lanes' and just 1% has more than 4 lanes.

Figure 16 shows the Number of Lanes on the core network compared with the comprehensive network where data is available. This shows that 5% of the core network has 'more than 6 lanes' compared with 2% of the comprehensive network, 30% has 'more than 4, up to 6' compared with 15%, 56% has 'More than 2, up to 4 lanes' compared with 43%, and just 9% of the core network has '2 lanes or less' compared with 36% of the comprehensive network.

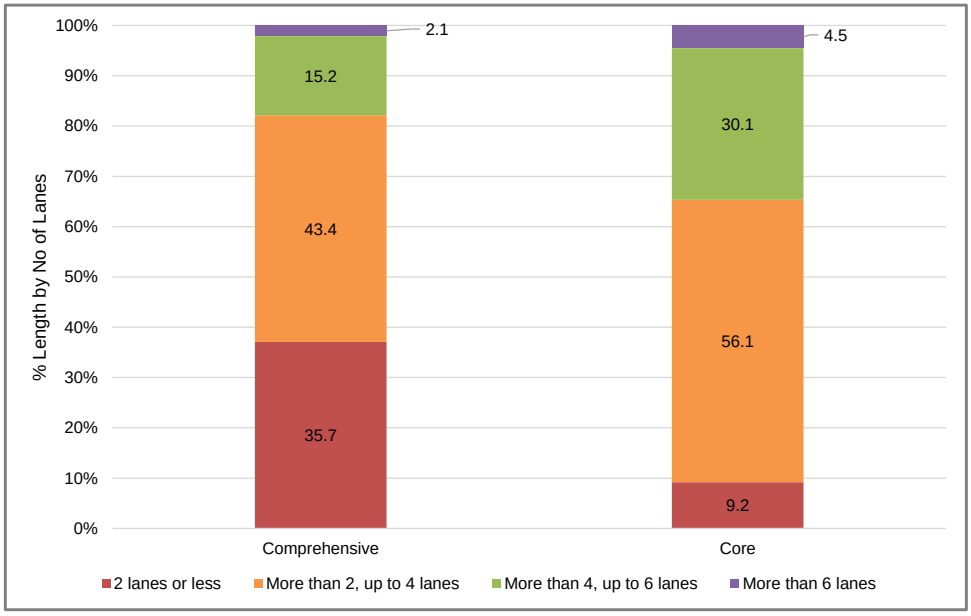


Figure 16: Comparison of Number of Lanes on core and comprehensive networks (2015)

4.3 Length of Bridges

This indicator was originally developed in response to the BEXPRAC[4] report. It shows the proportion of the TEN-T (Roads) network length that is made up of bridges. In order to focus only on the bridges that are most important at European level, only bridges that are longer than 100 m have been included. A fuller definition is included in Section 8.4.

Country	Network length (km)	Length of Bridges (km)			
		All roads	%	Motorway	Non-motorway
Austria	1,689	103	6.1	103	-
Denmark	1,554	31	2.0	28	4
Estonia	1,350	7	0.5	0	7
Finland	5,229	62	1.2	24	37
Germany	10,700	228	2.1	225	3
Greece	4,831	64	1.3	54	10
Iceland	1,803	6	0.3	-	6
Ireland	2,258	5	0.0	3	2
Italy	2,585	261	10.1	151	110
Lithuania	1,652	-	0.0	-	-
Luxembourg	90	5	5.7	5	-
Malta	109	-	0.4	-	-
Netherlands	1,886	24	1.3	24	-
Norway	4,928	50	1.0	22	28
Slovenia	593	24	4.0	24	-
Spain	12,311	220	1.8	213	8
Sweden	6,391	47	0.7	31	16
Switzerland	1,325	112	8.4	101	11
UK	6,926	-	0.0	-	-
Total (all data)	**68,210**	**1,248**	**1.8**	**1,007**	**241**

These figures show that 1.8% of the TEN-T (Roads) network for which data is available consists of longer bridges. However, there are significant national variations, as shown in Figure 17 below.

[4] http://www.cedr.eu/download/Publications/2010/e_BEXPRAC.pdf

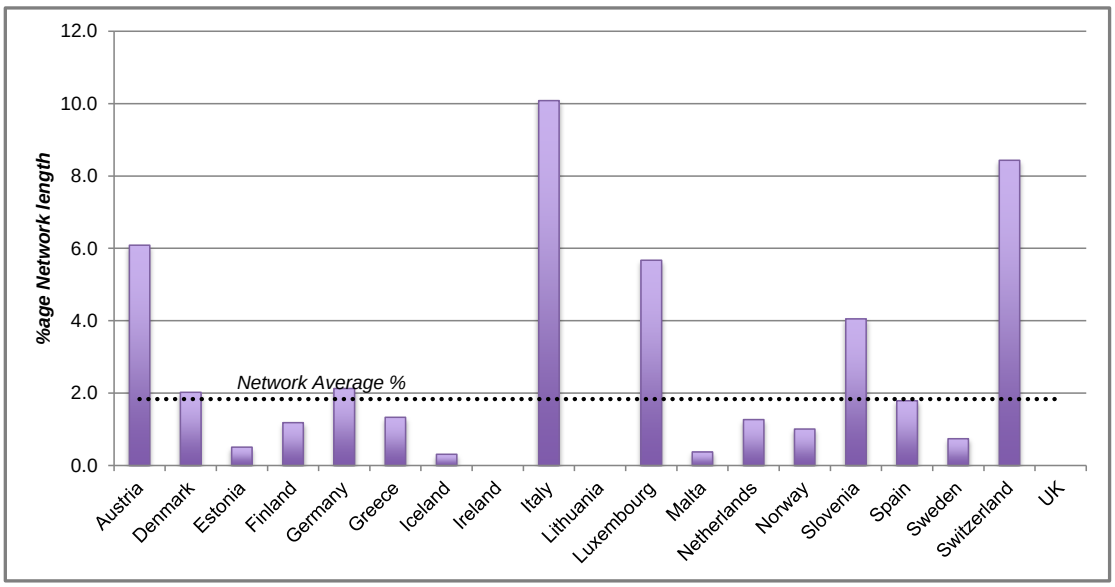


Figure 17: Proportion of the length of national TEN-T roads comprising bridges (2015)

The figure above shows that only in Austria, Italy, Luxembourg, Switzerland, and Slovenia does more than 4% of the TEN-T (Roads) network consist of bridges longer than 100 m (although the Italian data only relates to the part of the network under the administration of ANAS) compared to the network average of 1.8%. In no other countries that provided data do bridges longer than 100 m represent more than 2% of the TEN-T (Roads) network.

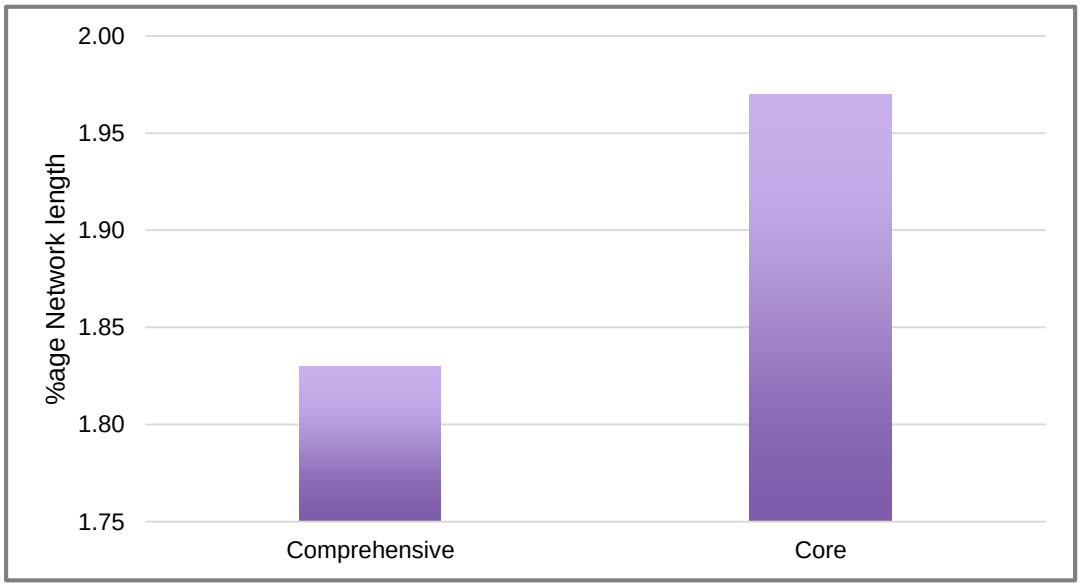


Figure 18: Comparison of Length of Bridges on core and comprehensive networks (2015)

A comparison of the core and comprehensive networks (see Figure 18) shows that the core network has a higher percentage of network with bridges at nearly 2% compared with 1.8% on the comprehensive network as a whole.

4.4 Length of Tunnels

This indicator was developed in response to the BEXPRAC report. It shows the proportion of the TEN-T (Roads) network length that is made up of tunnels. In order to focus only on the tunnels that are most important at European level, only tunnels that are longer than 300 m have been included. A fuller definition is included in Section 8.5.

		Length of Tunnels (km)			
Country	**Network length (km)**	**All roads**	**%**	**Motorway**	**Non-motorway**
Austria	1,689	161	9.5	161	0
Denmark	1,554	6	0.4	6	0
Estonia	1,350	-	0.0	-	0
Finland	5,229	6	0.1	6	0
Germany	10,700	47	0.4	46	0
Greece	4,831	72	1.5	70	2
Iceland	1,803	13	0.7	-	13
Ireland	2,258	6	0.3	6	1
Italy	2,585	109	4.2	46	64
Lithuania	1,652	-	0.0	-	0
Luxembourg	90	3	3.8	3	0
Malta	109	1	0.8	-	1
Netherlands	1,886	17	0.9	17	0
Norway	4,928	311	6.3	50	261
Slovenia	593	19	3.2	19	0
Spain	12,311	100	0.8	86	14
Sweden	6,391	2	0.0	1	2
Switzerland	1,325	125	9.5	106	19
UK	6,926	3	0.0	3	0
Total (all data)	**68,210**	**1,002**	**1.5**	**625**	**377**

These figures show that only 1.5% of the TEN-T (Roads) network for which data is available consists of long tunnels. However, there are significant national variations, as shown in Figure 19 below.

This figure shows that only in Austria, Italy, Luxembourg, Norway, Slovenia, and Switzerland does more than 2% of the TEN-T (Roads) network consist of tunnels that are longer than 300 m (although the Italian data covers only the 32.2% of the network that is administered by ANAS). Of the other countries that provided data, only in Greece does more than 1% of the TEN-T (Roads) network consist of tunnels that are longer than 300 m.

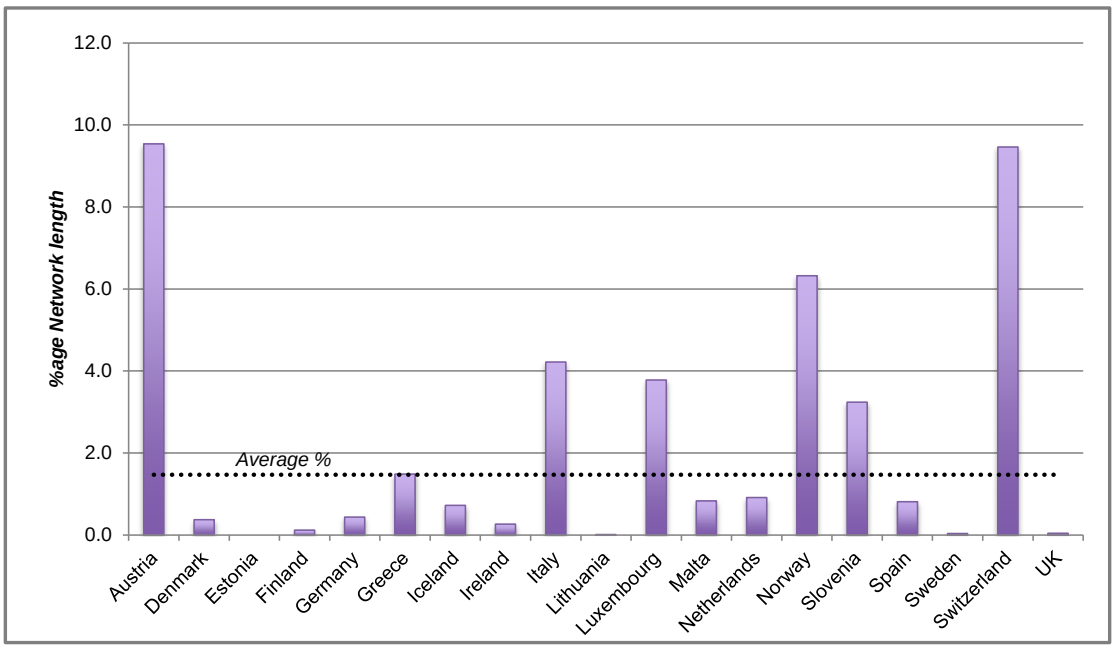


Figure 19: Proportion of the length of national TEN-T roads comprising tunnels (2015)

Figure 20 compares the core and comprehensive networks and shows that, in contrast to bridges, the non-core network has a significantly larger percentage of length with tunnels (nearly 1.5%) than on the core network (less than 1%).

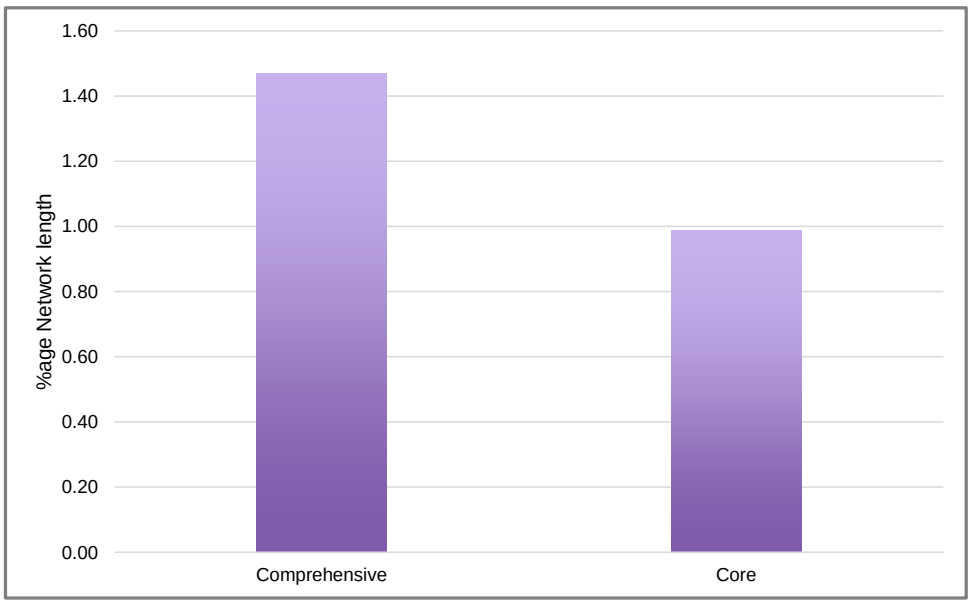


Figure 20: Comparison of the Length of Tunnels on core and comprehensive networks (2015)

4.5 Physical Environment

In previous reports, a Road Environment indicator was included in response to the BEXPRAC report , which made reference to roads in urban, rural, and mountainous environments. There were concerns about these categories as 'mountainous' was used to indicate not only the terrain, but also the existence of additional winter maintenance costs. Moreover, 'rural' and 'mountainous' are obviously not mutually exclusive categories. For this reason, a new indicator (Physical Environment) was included in the 2015 report, which is limited to the categories urban and rural. The intention is that this data could help to interpret other performance indicators.

However, it should be noted that the terms 'rural' and 'urban' are open to interpretation and may be used to mean the terrain surrounding the road or the characteristics of the network itself, e.g. traffic speed, distance between junctions. A fuller definition is provided in Section 8.6.

		Rural		Urban		No data	
Country	Network length (km)	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689	1,488	88.1	201	11.9	-	0.0
Denmark	1,554	1,554	100.0	-	0.0	-	0.0
Estonia	1,350	1,299	96.2	51	3.8	-	0.0
Finland	5,229	5,077	97.1	152	2.9	-	0.0
Germany	10,700	9,823	91.8	877	8.2	-	0.0
Greece	4,831	4,721	97.7	110	2.3	-	0.0
Iceland	1,803	1,732	96.1	71	3.9	-	0.0
Ireland	2,258	2,157	95.5	101	4.5	-	0.0
Italy	8,809	2,823	32.0	336	3.8	5,650	64.1
Lithuania	1,652	1,551	93.9	101	6.1	-	0.0
Luxembourg	90	74	82.4	16	17.6	-	0.0
Malta	109	42	39.0	66	61.0	-	0.0
Netherlands	1,886	1,439	76.3	447	23.7	-	0.0
Norway	4,928	4,606	93.5	322	6.5	-	0.0
Slovenia	593	546	92.1	47	7.9	-	0.0
Spain	12,311	11,546	93.8	765	6.2	-	0.0
Sweden	6,391	5,811	90.9	580	9.1	-	0.0
Switzerland	1,325	674	50.9	651	49.1	-	0.0
UK	6,926	4,352	62.8	16	0.2	2,558	36.9

Total (all data)	**74,434**	**61,315**	**82.4**	**4,911**	**6.6**	**8,208**	**11.0**
Total (ex No data)	**66,226**	**61,315**	**92.6**	**4,911**	**7.4**	**-**	**-**

The figures show that, of the network for which data is available, 93% is categorised as rural and 7% as urban.

The national distribution of Physical Environment on TEN-T (Roads) is shown in Figure 21 against a background of the average values for the comprehensive network as a whole. This shows that only Malta (61%), the Netherlands (24%), and Switzerland (49.1%) have categorised more than 20% of their networks as urban. Apart from Austria (12%) and Luxembourg (18%), the networks in all other countries are less than 10% urban; indeed the TEN-T (Roads) network in Denmark is 100% rural. Preliminary data from Poland indicates that 97% of the network is rural and 3% is urban.

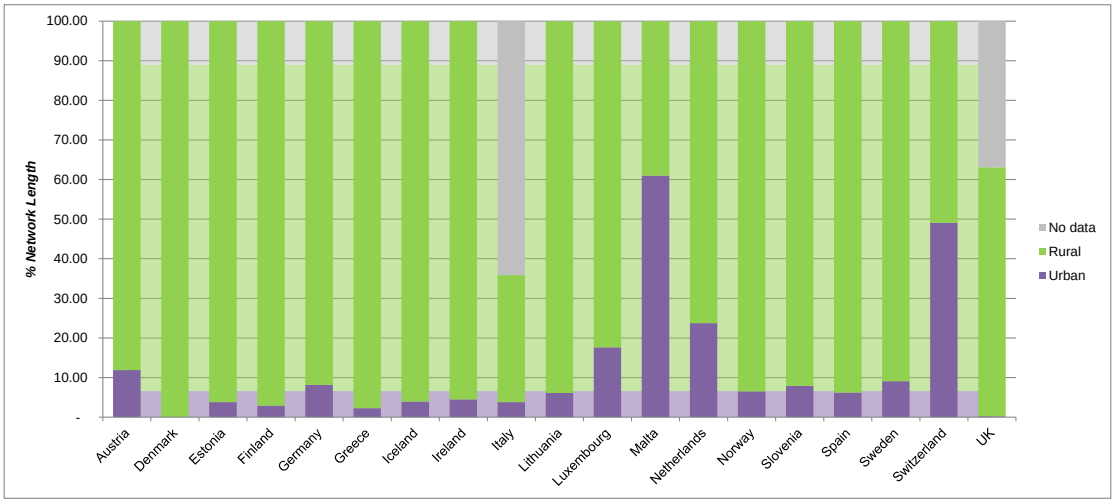


Figure 21: National distribution of TEN-T Physical Environments (2015)

Figure 22 shows the average traffic flow (AADT) on rural and urban roads on each national network. This shows that in all cases, urban roads carry more traffic than rural roads. On the TEN-T (Roads) network as a whole, urban roads carry on average twice as much traffic as rural roads.

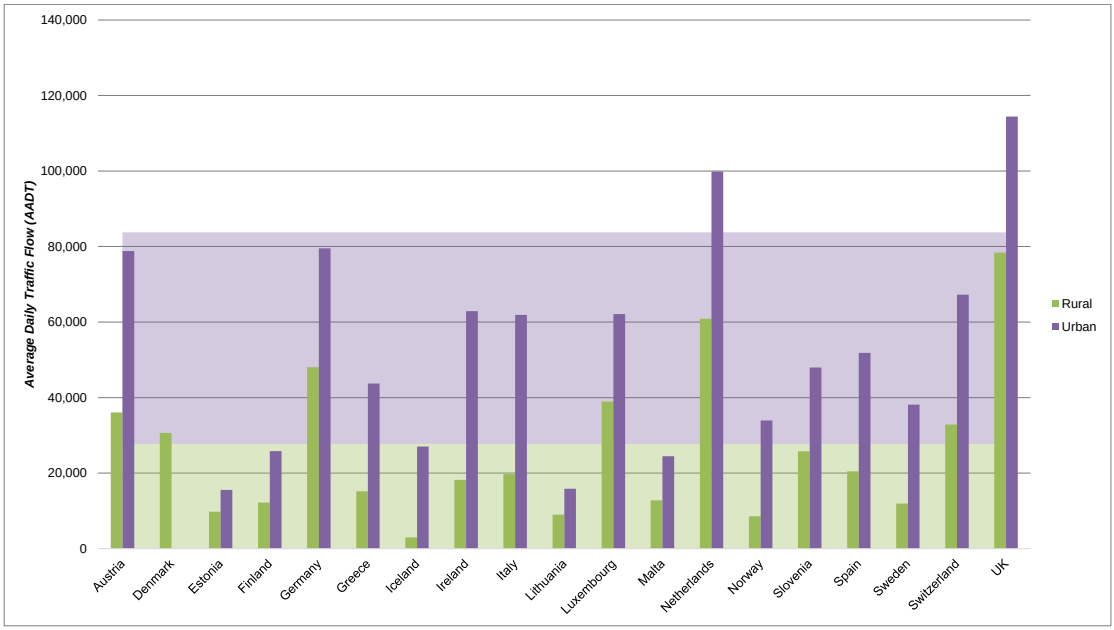


Figure 22: Comparison of traffic flow on urban and rural roads (2015)

Comparing the core and comprehensive networks where data is available (see Figure 23), the core network is 9% urban compared with 7% of the comprehensive network as a whole.

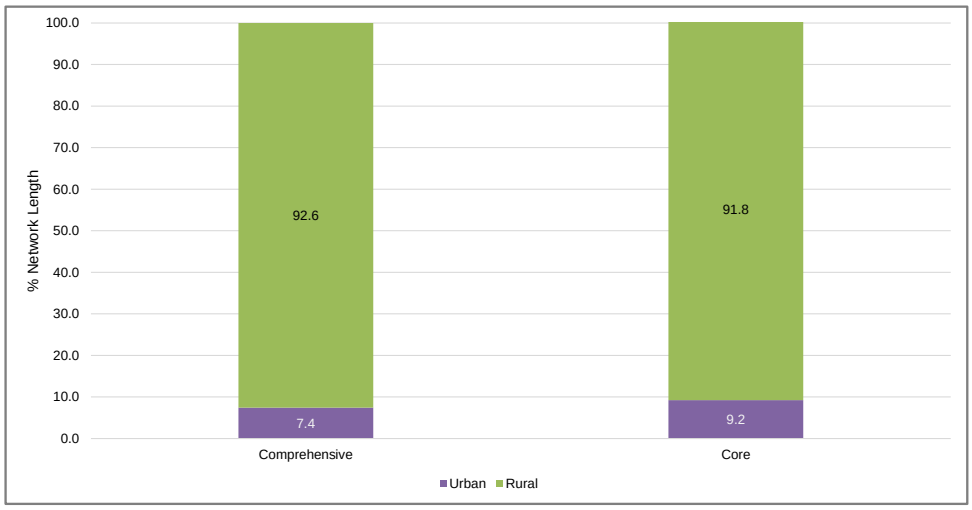


Figure 23: Comparison of Physical Environments on core and comprehensive networks (2015)

4.6 Intelligent Transport Systems (ITS)

Previous reports have included a simple indicator showing whether or not a section on the TEN-T network had ITS or not. In discussions with CEDR TG N7 (ITS for NRAs), this indicator was extended to include the *level* of ITS on a section. These levels range from zero (None) to five (Co-operative ITS) and are defined more fully in Section 8.7.

However, it was clear from returned data that different countries had interpreted the different levels of ITS differently. For this reason, this indicator has not been included in the 2015 report.

The definitions will be further reviewed to ensure they are clear before the data collection exercise for the next report.

5 PERFORMANCE OF THE NETWORK

5.1 Average Traffic Flow

Average Traffic Flow on the TEN-T (Roads) network is expressed as Annual Average Daily Traffic or AADT. A full definition is given in Section 8.8.

Across the TEN-T (Roads) network covered by the 2015 report, the average daily traffic on a section is 34,551 vehicles per day. The average traffic on a section of motorway is 47,854 vehicles per day and on non-motorway sections 11,592 vehicles per day. The following table shows the distribution of Traffic Flow in participating countries.

		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	
Country	Total length (km)	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689		0.0	111	6.6	878	52.0	607	35.9	53	3.1	33	2.0	7	0.4
Denmark	1,554	125	8.0	651	41.9	414	26.6	323	20.8	36	2.3	5	0.3	-	0.0
Estonia	1,350	242	17.9	1,059	78.5	49	3.6	-	0.0	-	0.0	-	0.0	-	0.0
Finland	5,229	2,242	42.9	2,532	48.4	371	7.1	84	1.6	-	0.0	-	0.0	-	0.0
Germany	10,700	-	0.0	1,256	11.7	3,591	33.6	4,725	44.2	697	6.5	431	4.0	-	0.0
Greece	4,831	205	4.2	1,624	33.6	284	5.9	56	1.2	65	1.3	9	0.2	2,588	53.6
Iceland	1,803	1,651	91.6	117	6.5	19	1.1	16	0.9	-	0.0	-	0.0	-	0.0
Ireland	2,258	52	2.3	1,820	80.6	224	9.9	137	6.1	8	0.4	18	0.8	-	0.0
Italy	8,809	192	2.2	960	10.9	272	3.1	60	0.7	8	0.1	20	0.2	7,297	82.8
Lithuania	1,652	602	36.4	869	52.6	146	8.8	13	0.8	-	0.0	-	0.0	22	1.3
Luxembourg	90	-	0.0	11	12.7	26	29.2	52	58.1	-	0.0	-	0.0	-	0.0
Malta	109	4	3.3	68	63.0	31	28.1	4	3.7	2	1.8	-	0.0	-	0.0
Netherlands	1,886	-	0.0	24	1.3	264	14.0	1,079	57.2	238	12.6	281	14.9	-	0.0
Norway	4,928	3,174	64.4	1,340	27.2	269	5.5	132	2.7	13	0.3	-	0.0	-	0.0
Slovenia	593	21	3.5	203	34.2	265	44.7	104	17.5	-	0.0	-	0.0	-	0.0
Spain	12,311	1,475	12.0	6,904	56.1	2,690	21.9	935	7.6	71	0.6	160	1.3	76	0.6
Sweden	6,391	2,605	40.8	2,633	41.2	906	14.2	175	2.7	33	0.5	39	0.6	-	0.0
Switzerland	1,325	20	1.5	136	10.3	400	30.2	423	31.9	53	4.0	64	4.8	229	17.3
UK	6,926	-	0.0	304	4.4	789	11.4	1,632	23.6	655	9.5	988	14.3	2,558	36.9
Total (all data)	**74,434**	**12,610**	**16.9**	**22,623**	**30.4**	**11,888**	**16.0**	**10,557**	**14.2**	**1,931**	**2.6**	**2,048**	**2.8**	**12,777**	**17.2**
Total (ex No data)	**61,657**	**12,610**	**20.5**	**22,623**	**36.7**	**11,888**	**19.3**	**10,557**	**17.1**	**1,931**	**3.1**	**2,048**	**3.3**	**-**	**-**

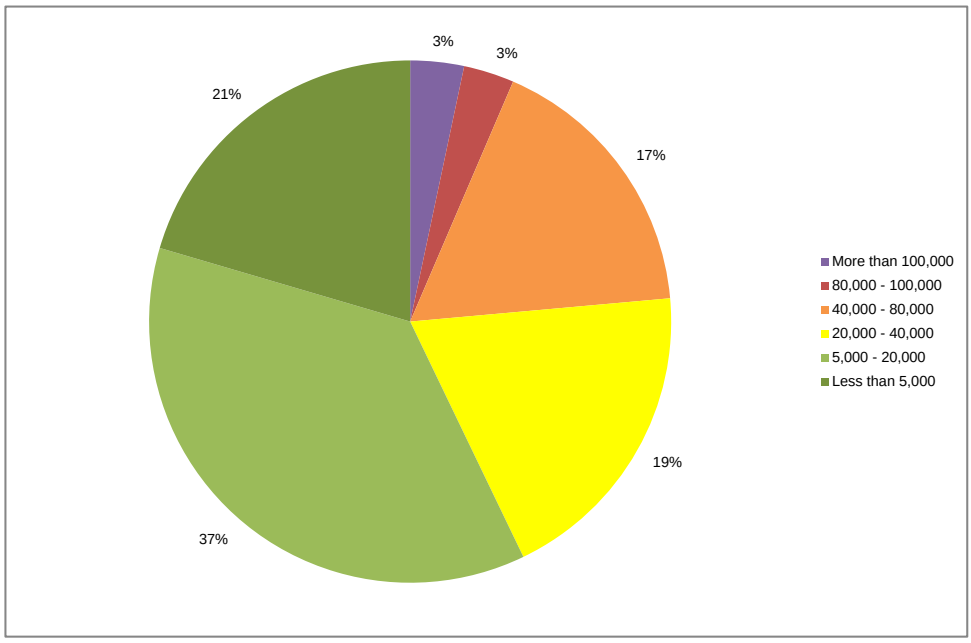


Figure 24: Overall distribution of Traffic Flow on TEN-T roads (2015)

For the network for which data is available, Figure 24 shows that the TEN-T network is split into two sections: 56% is relatively lightly trafficked and carries less than 20,000 vehicles per day, 44% is heavily trafficked, carrying more than 20,000 vehicles per day, of which 6% of the network is very heavily trafficked, carrying more than 80,000 per day.

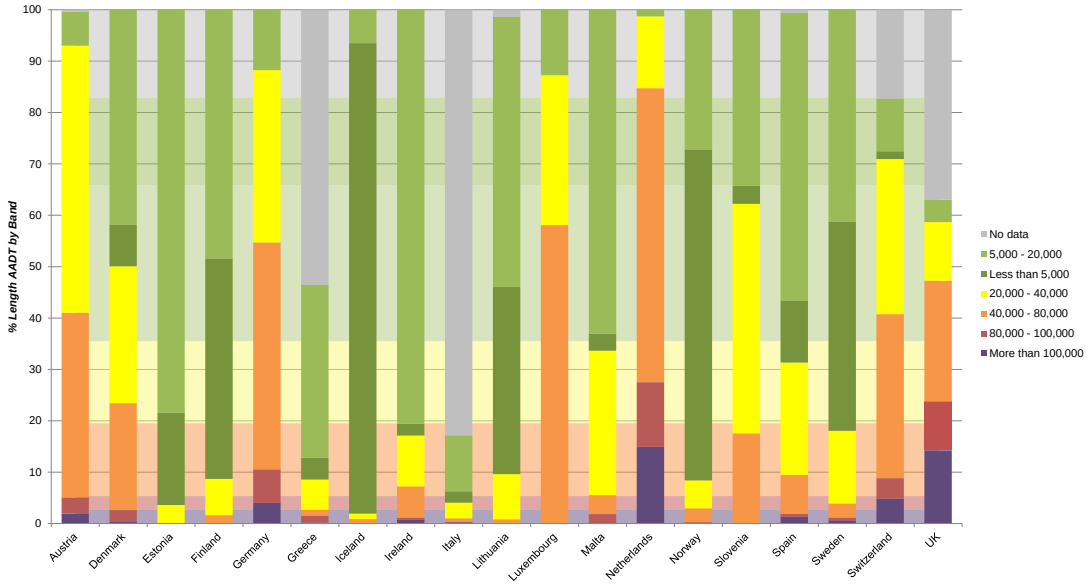


Figure 25: National distribution of Traffic Flow on TEN-T roads (2015)

Figure 25 shows the national distributions of Traffic Flow for 2015 against a background of the average values for the comprehensive network as a whole. This shows that the Netherlands and the UK have the busiest TEN-T (Roads) network, with more than 20% carrying more than 80,000 vehicles per day respectively. The

next busiest network is in Germany, where more than 10% of the network carries more than 80,000 vehicles per day.

Conversely, the countries with the lowest levels of traffic on the TEN-T (Roads) network are Iceland, Norway, and Sweden, with more than 40% carrying less than 5,000 vehicles per day.

Preliminary data from Poland indicates that the average daily traffic on a section is 25,000 vehicles per day.

Figure 26: Comparison of Traffic Flow on core and comprehensive networks (2015) compares the overall distribution of Traffic Flow on the core and the comprehensive networks. This shows that 12% of the core network carries in excess of 80,000 vehicles per day compared with 6% on the comprehensive network as a whole. Meanwhile, less than 4% of the core network carries less than 5,000 vehicles per day compared with 21% of the comprehensive network as a whole.

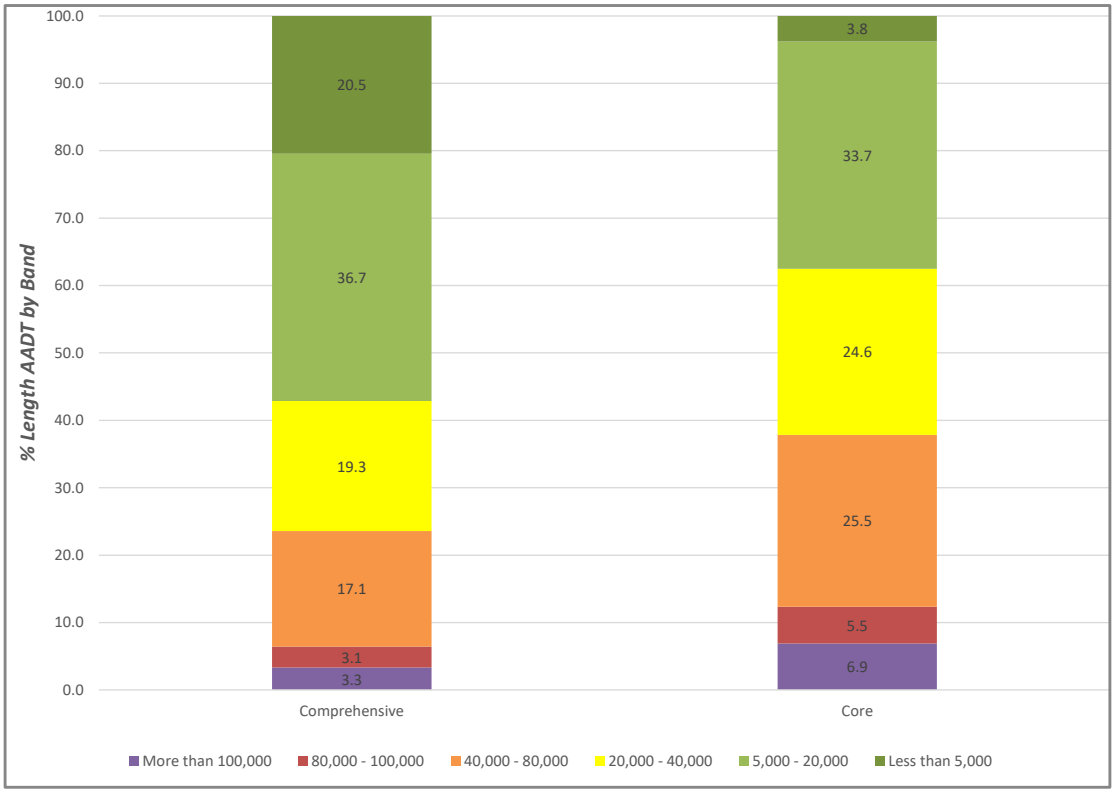


Figure 26: Comparison of Traffic Flow on core and comprehensive networks (2015)

5.2 Traffic Density

Traffic Density on the TEN-T (Roads) network is expressed as Annual Traffic Flow or AADT per lane[5] and is calculated from data provided about Traffic Flow and Number of Lanes (see Sections 8.8 and 8.3 respectively).

		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	
Country	Total length (km)	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689	21	1.2	547	32.4	844	50.0	234	13.9	36	2.1	7	0.4
Denmark	1,554	196	12.6	687	44.2	585	37.6	86	5.5	-	0.0	-	0.0
Estonia	1,350	575	42.6	529	39.2	247	18.3	-	0.0	-	0.0	-	0.0
Finland	5,229	3,229	61.8	1,553	29.7	420	8.0	27	0.5	-	0.0	-	0.0
Germany	10,700	279	2.6	1,643	15.4	5,619	52.5	2,840	26.5	319	3.0	-	0.0
Greece	4,831	1,190	24.6	639	13.2	335	6.9	14	0.3	65	1.3	2,588	53.6
Iceland	1,803	1,709	94.8	57	3.2	34	1.9	3	0.2	-	0.0	-	0.0
Ireland	2,258	322	14.2	1,240	54.9	591	26.2	79	3.5	26	1.2	-	0.0
Italy	8,809	50	0.6	667	7.6	435	4.9	323	3.7	37	0.4	7,297	82.8
Lithuania	1,652	1,058	64.0	448	27.1	71	4.3	-	0.0	-	0.0	75	4.5
Luxembourg	90	-	0.0	25	27.7	33	36.8	32	35.5	-	0.0	-	0.0
Malta	109	10	8.8	53	48.4	42	38.2	3	2.8	2	1.8	-	0.0
Netherlands	1,886	-	0.0	88	4.7	476	25.2	941	49.9	382	20.2	-	0.0
Norway	4,928	3,511	71.2	877	17.8	451	9.2	89	1.8	-	0.0	-	0.0
Slovenia	593	62	10.5	236	39.8	258	43.5	37	6.2	-	0.0	-	0.0
Spain	12,311	4,790	38.9	4,740	38.5	2,052	16.7	460	3.7	115	0.9	155	1.3
Sweden	6,391	3,481	54.5	1,972	30.9	843	13.2	95	1.5	-	0.0	-	0.0
Switzerland	1,325	20	1.5	157	11.8	426	32.2	275	20.8	218	16.5	229	17.3
UK	6,926	-	0.0	592	8.5	1,368	19.8	1,753	25.3	655	9.5	2,558	36.9
Total (all data)	**74,434**	**20,502**	**27.5**	**16,749**	**22.5**	**15,129**	**20.3**	**7,291**	**9.8**	**1,854**	**2.5**	**12,909**	**17.3**
Total (ex No data)	**61,525**	**20,502**	**33.3**	**16,749**	**27.2**	**15,129**	**24.6**	**7,291**	**11.8**	**1,854**	**3.0**	**-**	**-**

The average Traffic Density on TEN-T (Roads) network is 7,830 vehicles per lane per day. The average Traffic Density on motorways is 8,594 vehicles per lane per day, and on non-motorways is 3,694 vehicles per lane per day.

Figure 27 shows that that 33% of the TEN-T (Roads) network has a Traffic Density of less than 3,000 vehicles per lane per day. The proportion of the network with a Traffic Density of between 3,000 and 6,000 vehicles per lane per day is 27% and the proportion with a Traffic Density of between 6,000 and 12,000 vehicles per lane per day is 25%.

[5] It is recognised that there are other measures of traffic density in use within Europe. This indicator is therefore necessarily a compromise that aims to allow relative performance to be examined.

As for the busiest roads, 15% of the TEN-T (Roads) network has a traffic density of more than 12,000 vehicles per lane per day.

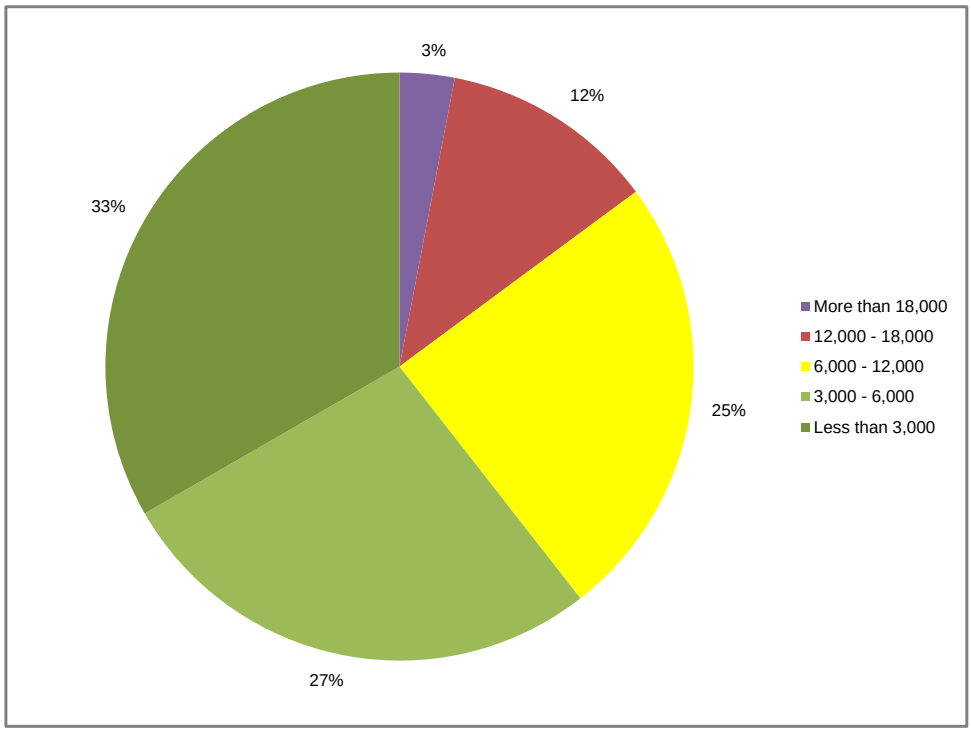


Figure 27: Overall distribution of Traffic Density on TEN-T roads (2015)

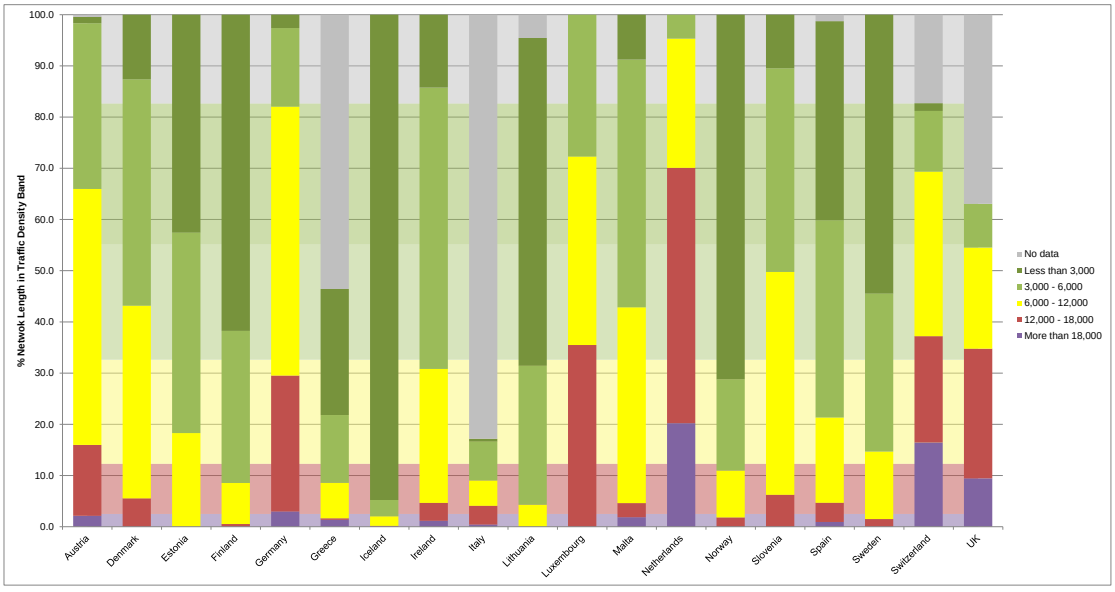


Figure 28: National distribution of Traffic Density on TEN-T roads (2015)

The national figures in Figure 28 (shown against a background of the average values for the comprehensive network as a whole) indicate that Germany, Luxembourg, the Netherlands, Switzerland, and the UK have the highest levels of Traffic Density, with more than 25% of the TEN-T (Roads) network in each of these countries carrying more than 12,000 vehicles per lane per day. In the Netherlands, 70% of the network

carries more than 12,000 vehicles per lane per day and 20% carries more than 18,000 vehicles per lane per day.

The countries with the lowest Traffic Density on the TEN-T (Roads) network are Estonia, Finland, Iceland, Lithuania, Norway, Spain, and Sweden, where more than 40% of the TEN-T (Roads) network has a Traffic Density of less than 3,000 vehicles per lane per day.

Preliminary data from Poland indicates that the average daily Traffic Density is 5,800 vehicles per lane per day.

Figure 29 shows a comparison between Traffic Density on the core and comprehensive network for roads where data is available. This shows that on the core network, some 23% has a Traffic Density greater than 12,000 vehicles per lane per day compared with 15% on the comprehensive network as a whole. Conversely, only 17% of the core network has less than 3,000 vehicles per lane per day compared with 33% of the comprehensive network as a whole.

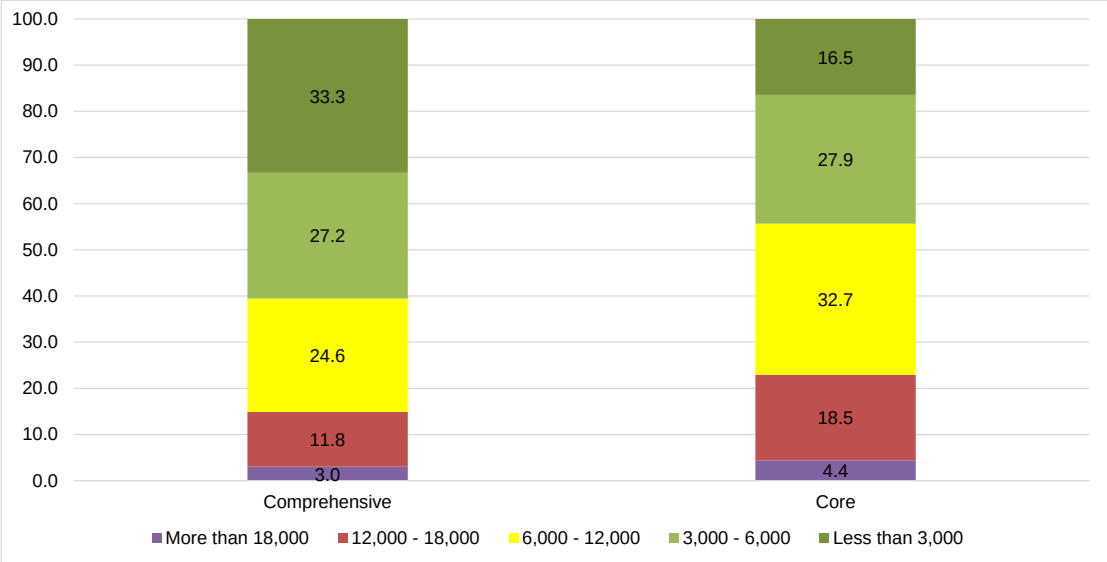


Figure 29: Comparison of Traffic Density on core and comprehensive networks (2015)

5.3 Proportion of Heavy Goods Vehicles

The proportion of the traffic on the TEN-T (Roads) network that comprises heavy goods vehicles (HGVs) is expressed as a percentage. HGVs are defined as goods vehicles weighing in excess of 3.5 tonnes (see Section 8.9).

		Proportion of total traffic comprising HGVs									
		Less than 5%		5%–10%		10%–20%		More than 20%		No data	
Country	Total length (km)	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689	5	0.3	380	22.5	1,232	72.9	65	3.8	7	0.4
Denmark	1,554	54	3.5	275	17.7	1,096	70.5	129	8.3	-	0.0
Estonia	1,350	17	1.3	244	18.1	893	66.1	196	14.5	-	0.0
Finland	5,229	37	0.7	1,957	37.4	3,208	61.3	28	0.5	-	0.0
Germany	10,700	44	0.4	1,290	12.1	6,839	63.9	2,527	23.6	-	0.0
Greece	4,831	73	1.5	171	3.5	959	19.8	825	17.1	2,803	58.0
Iceland	1,803	72	4.0	596	33.1	1,135	63.0	-	0.0	-	0.0
Ireland	2,258	377	16.7	1,643	72.8	234	10.4	4	0.2	-	0.0
Italy	8,809	15	0.2	266	3.0	567	6.4	664	7.5	7,297	82.8
Lithuania	1,652	18	1.1	173	10.5	932	56.4	507	30.7	22	1.3
Luxembourg	90	-	0.0	-	0.0	80	88.5	10	11.5	-	0.0
Malta	109	-	0.0	-	0.0	-	0.0	-	0.0	109	100.0
Netherlands	1,886	-	0.0	229	12.1	1,437	76.2	220	11.7	-	0.0
Norway	4,928	-	0.0	212	4.3	3,574	72.5	1,142	23.2	-	0.0
Slovenia	593	43	7.3	219	36.9	243	41.0	88	14.8	-	0.0
Spain	12,311	239	1.9	2,418	19.6	6,112	49.6	3,020	24.5	522	4.2
Sweden	6,391	39	0.6	175	2.7	3,991	62.4	2,186	34.2	-	0.0
Switzerland	1,325	386	29.1	594	44.8	116	8.8	-	0.0	229	17.3
UK	6,926	44	0.6	1,896	27.4	2,274	32.8	154	2.2	2,558	36.9
Total (all data)	**74,434**	**1,463**	**2.0**	**12,738**	**17.1**	**34,921**	**46.9**	**11,766**	**15.8**	**13,546**	**18.2**
Total (ex No data)	**60,888**	**1,463**	**2.4**	**12,738**	**20.9**	**34,921**	**57.4**	**11,766**	**19.3**	**-**	**-**

On average, 13% of the traffic using the TEN-T (Roads) network each day is HGVs. This proportion is fairly consistent across different road types; on motorways, the figure is 13%, on non-motorways 12%.

Figure 30 shows the overall proportion of traffic on the TEN-T network comprising HGVs. The figures show that on 24% of the TEN-T (Roads) network, HGVs comprise less than 10% of all traffic. Meanwhile, on 57% of the TEN-T (Roads) network, HGVs comprise between 10 and 20% of all traffic, while HGVs comprise more than 20% of traffic on 19% of the TEN-T (Roads) network.

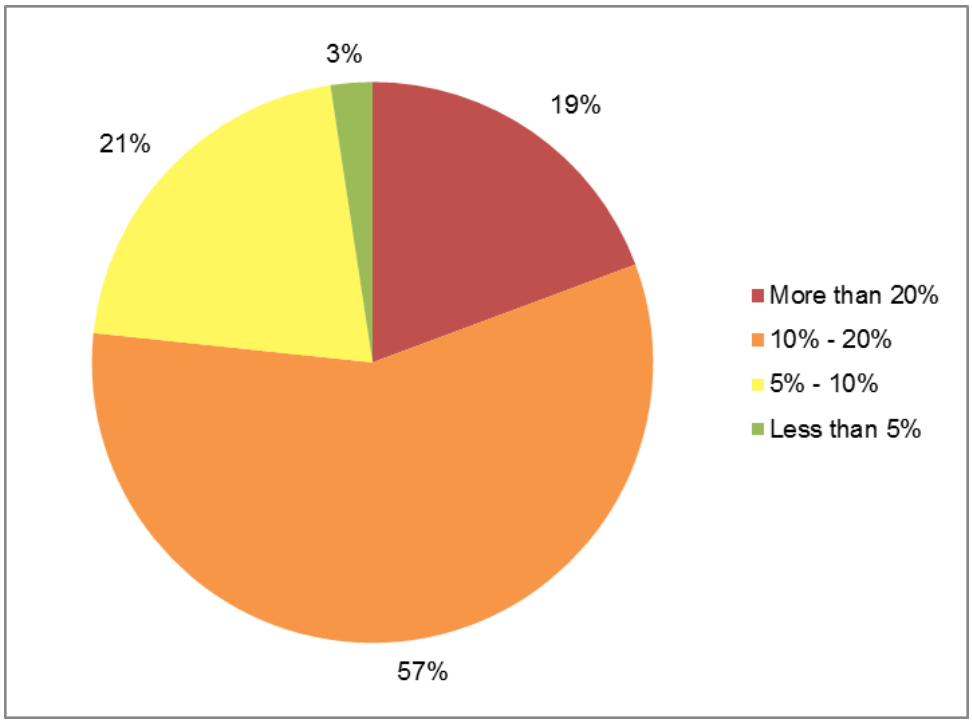


Figure 30: Overall proportion of traffic on TEN-T roads comprising HGVs (2015)

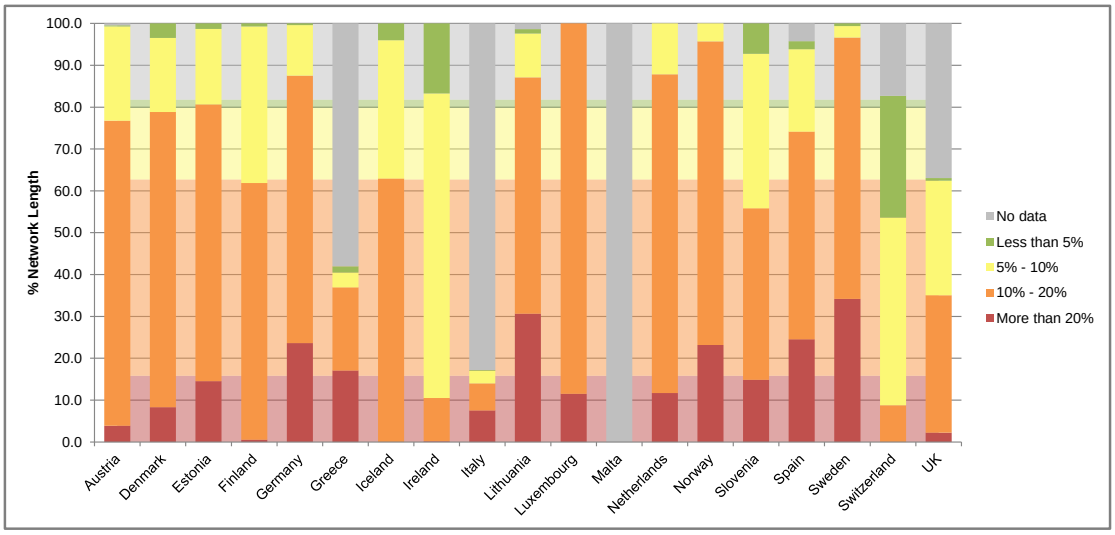


Figure 31: Proportion of traffic on national TEN-T roads comprising HGVs (2015)

Figure 31 shows the national figures against a background of the average values for the comprehensive network as a whole and indicates that the countries with the highest proportion of HGVs on the TEN-T (Roads) network are Germany, Lithuania, Norway, Spain, and Sweden, where HGVs comprise more than 20% of all traffic on more than 20% of the TEN-T roads network.

The countries with the lowest proportion of HGVs on the TEN-T (Roads) network are Finland, Iceland, Ireland, Slovenia, and Switzerland, where HGVs comprise 10% of all traffic or less on more than 35% of the TEN-T (Roads) network. Preliminary data from Poland indicates that HGVs comprise approximately 23% of all traffic.

Figure 32 compares the proportion of HGVs on the core and comprehensive networks where data is available. The figures show that HGVs comprise more than 20% of all traffic on more than 25% of the core network compared with less than 20% on the comprehensive network. Meanwhile, HGVs comprise less than 5% of all traffic on less than 1% of the core network compared with more than 2% on the comprehensive network as a whole.

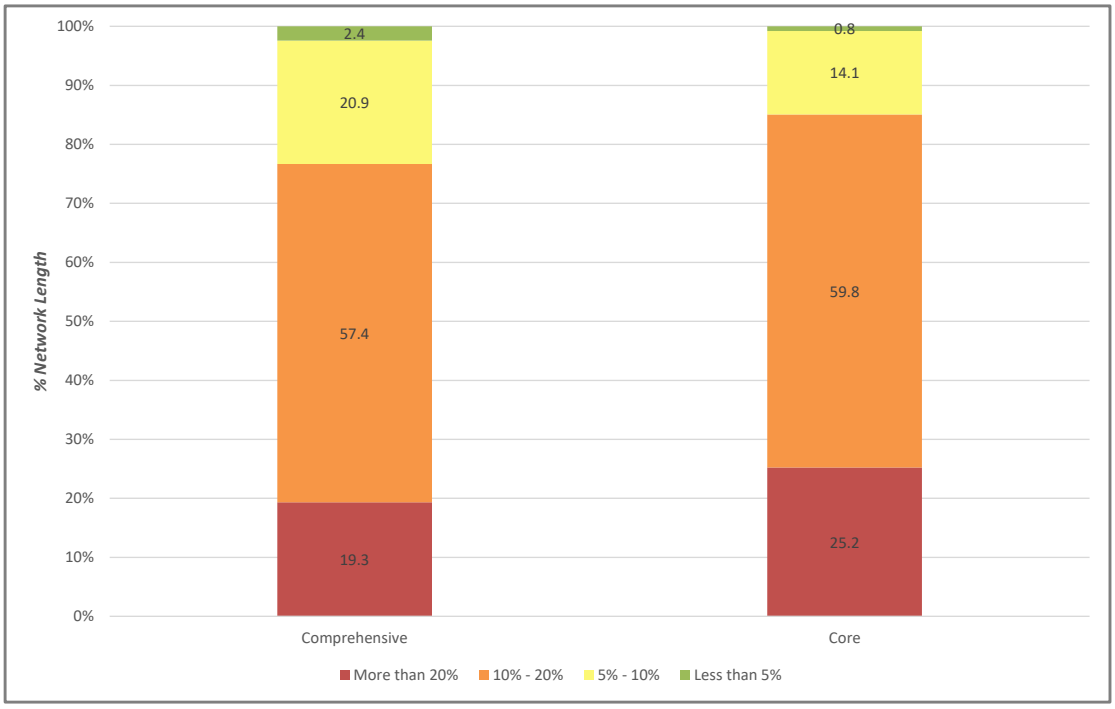


Figure 32: Comparison of HGV proportion on core and comprehensive networks (2015)

5.4 Heavy Goods Vehicle Traffic Flow

As well as understanding the proportion of vehicles using the TEN-T (Roads) network that are heavy goods vehicles (HGVs), it is useful to consider the actual volume of HGV traffic. HGVs are defined as goods vehicles weighing in excess of 3.5 tonnes.

		HGV Traffic Flow (AADT)									
		Less than 3,000		3,000–6,000		6,000–9,000		More than 9,000		No data	
Country	Total length (km)	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%	Length (km)	%
Austria	1,689	386	22.9	832	49.3	251	14.9	213	12.6	7	0.4
Denmark	1,554	859	55.3	389	25.0	216	13.9	90	5.8	-	0.0
Estonia	1,350	1,331	98.6	19	1.4	-	0.0	-	0.0	-	0.0
Finland	5,229	5,138	98.3	91	1.7	-	0.0	-	0.0	-	0.0
Germany	10,700	1,642	15.3	3,165	29.6	1,939	18.1	3,954	37.0	-	0.0
Greece	4,831	1,404	29.1	434	9.0	125	2.6	65	1.3	2,803	58.0
Iceland	1,803	1,803	100.0	-	0.0	-	0.0	-	0.0	-	0.0
Ireland	2,258	2,117	93.8	123	5.4	18	0.8	-		-	0.0
Italy	8,809	1,122	12.7	302	3.4	-	0.0	88	1.0	7,297	82.8
Lithuania	1,652	1,438	87.0	186	11.3	6	0.4	-	0.0	22	1.3
Luxembourg	90	11	12.7	33	36.2	27	30.0	19	21.1	-	0.0
Malta	109	-	0.0	-	0.0	-	0.0	-	0.0	109	100.0
Netherlands	1,886	101	5.4	352	18.6	535	28.4	898	47.6	-	0.0
Norway	4,928	4,579	92.9	288	5.8	55	1.1	6	0.1	-	0.0
Slovenia	593	308	51.9	183	30.9	102	17.2	-	0.0	-	0.0
Spain	12,311	8,188	66.5	2,631	21.4	445	3.6	526	4.3	522	4.2
Sweden	6,391	4,981	77.9	1,311	20.5	95	1.5	4	0.1	-	0.0
Switzerland	1,325	731	55.2	264	19.9	101	7.6	-	0.0	229	17.3
UK	6,926	999	14.4	727	10.5	1,357	19.6	1,285	18.6	2,558	36.9
Total (all data)	**74,434**	**37,139**	**49.9**	**11,330**	**15.2**	**5,272**	**7.1**	**7,148**	**9.6**	**13,546**	**18.2**
Total (ex No data)	**60,888**	**37,139**	**61.0**	**11,330**	**18.6**	**5,272**	**8.7**	**7,148**	**11.7**	**-**	**-**

On average 3,517 HGVs use each section per day. On motorway sections, this figure is as high as 5,023 per day, while on non-motorways it is 1,006 HGVs per day.

The figures show that 61% of the TEN-T (Roads) network carries fewer than 3,000 HGVs per day, 27% carries between 3,000 and 9,000 HGVs per day, and 12% carries more than 9,000 HGVs per day.

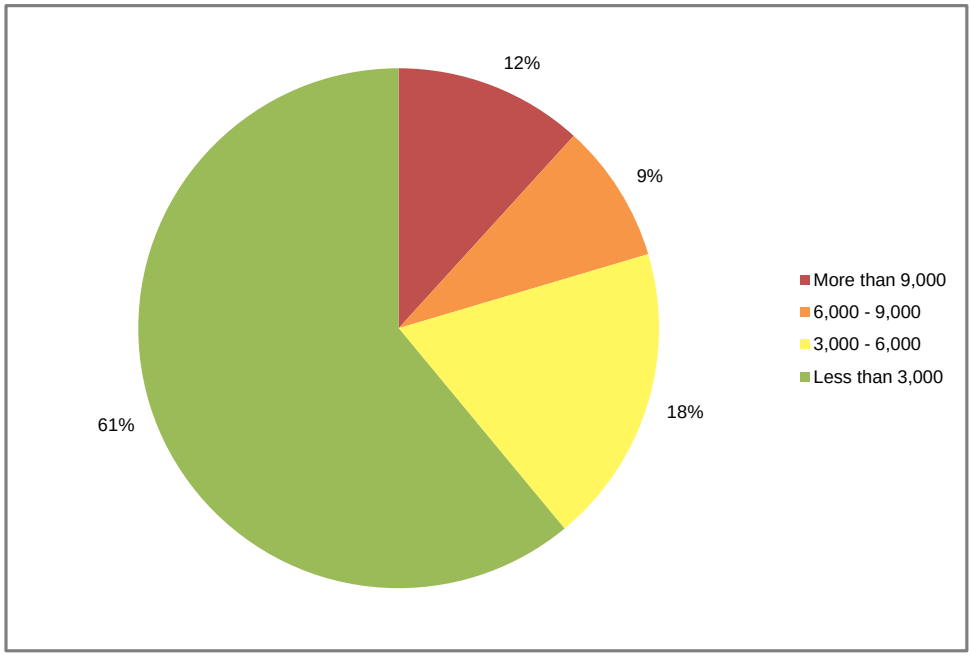


Figure 33: Overall HGV Traffic Flow on TEN-T roads (2015)

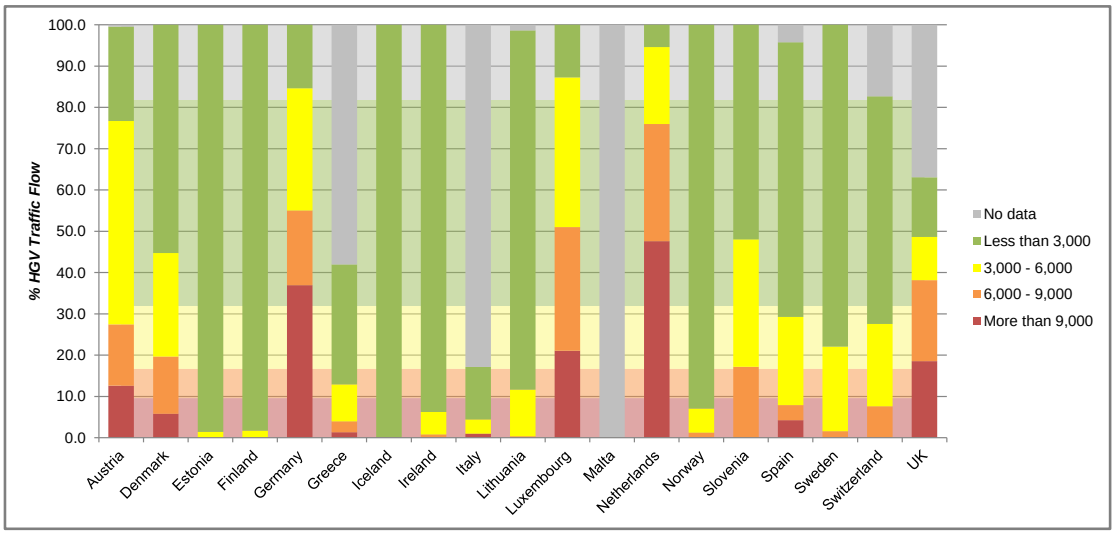


Figure 34: National distribution of HGV Traffic Flow on TEN-T roads (2015)

The national figures in Figure 34 (shown against a background of the average values for the comprehensive network as a whole) indicate that the countries that carry the greatest number of HGVs on their TEN-T roads are Germany, Luxembourg, the Netherlands, and the UK, with at least 18% of the network carrying more than 9,000 HGVs per day. The countries carrying the fewest HGVs are Estonia, Finland, Iceland, Ireland, and Norway, where at least 90% of the TEN-T (Roads) network carries less than 3,000 HGVs per day.

Preliminary data from Poland indicates that the average daily HGV Traffic Flow is 5,700 vehicles per day.

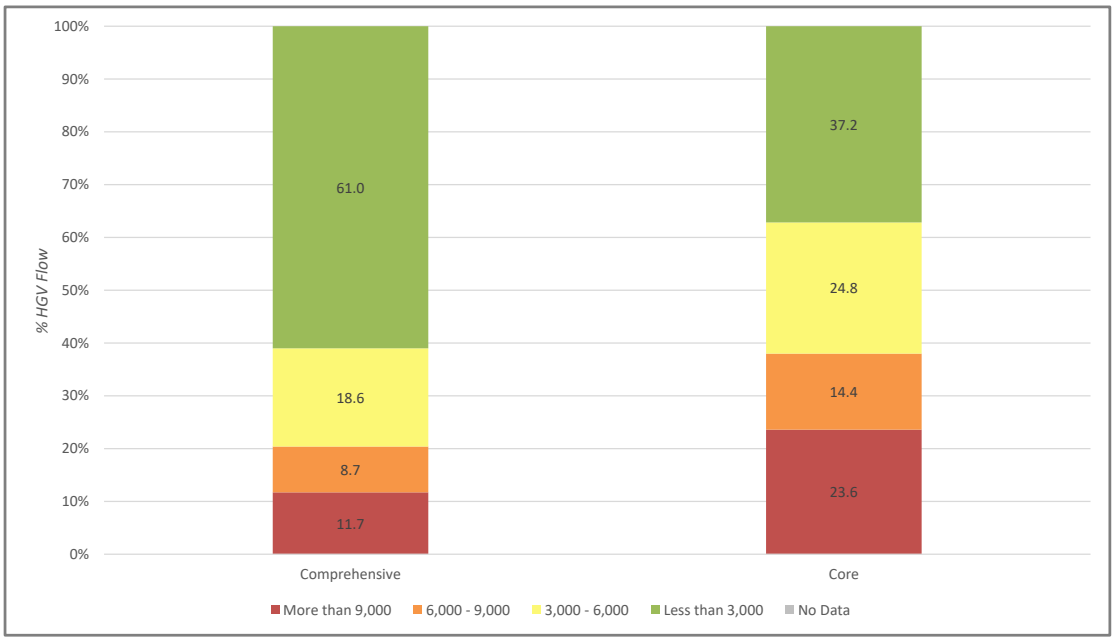


Figure 35: Comparison of HGV traffic on core and comprehensive networks (2015)

Figure 35 compares the core and comprehensive networks where data is available. This shows that 24% of the core network has HGV traffic greater than 9,000 vehicles per day compared to 12% of the comprehensive network as a whole. Meanwhile, 37% of the core network has HGV traffic less than 3,000 vehicles per day, compared with 61% on the comprehensive network as a whole.

5.5 Fatal Accident Rate

This indicator shows the average rate of fatal accidents on a TEN-T section. The indicator is expressed as average annual Fatal Accident Rate per billion vehicle kilometres or BVehKm. It is designed to provide an indication of the relative safety of TEN-T sections, taking into account their length and level of use. The definition of fatal accident base data used in the calculation is provided in Section 8.10.

Name	Average Annual Fatal Accident Rate / BVehKm per Section	
	Motorway	Non-motorway
Austria	1.62	N/a
Denmark	0.97	5.82
Estonia	N/a	10.23
Finland	2.62	9.28
Germany	1.48	1.06
Greece	1.70	0.87
Iceland	0.00	5.28
Ireland	0.95	4.46
Italy	0.79	1.00
Lithuania	4.83	12.32
Luxembourg	1.12	N/a
Malta	N/a	13.79
Netherlands	0.90	N/a
Norway	0.85	5.03
Slovenia	2.21	7.02
Spain	2.10	7.26
Sweden	0.82	2.64
Switzerland	0.98	1.91
UK	0.92	2.23

Average	**1.46**	**5.64**

On an average motorway section of the TEN-T (Roads) network, there are 1.5 fatal accidents per year for every billion vehicle-kilometres driven. On non-motorway sections, this figure rises to 5.6.

Figure 36 shows the national distribution of Fatal Accident Rates for motorways and non-motorways as well as the average figures for the comprehensive network as a whole. These figures show that motorways in Finland, Lithuania, Slovenia, and Spain have the highest Fatal Accident Rates, with more than 2.0 fatal accidents per BVehKm, while motorways in Iceland[6], Italy, Norway, and Sweden have fewer than 0.9 fatal accidents per BVehKm.

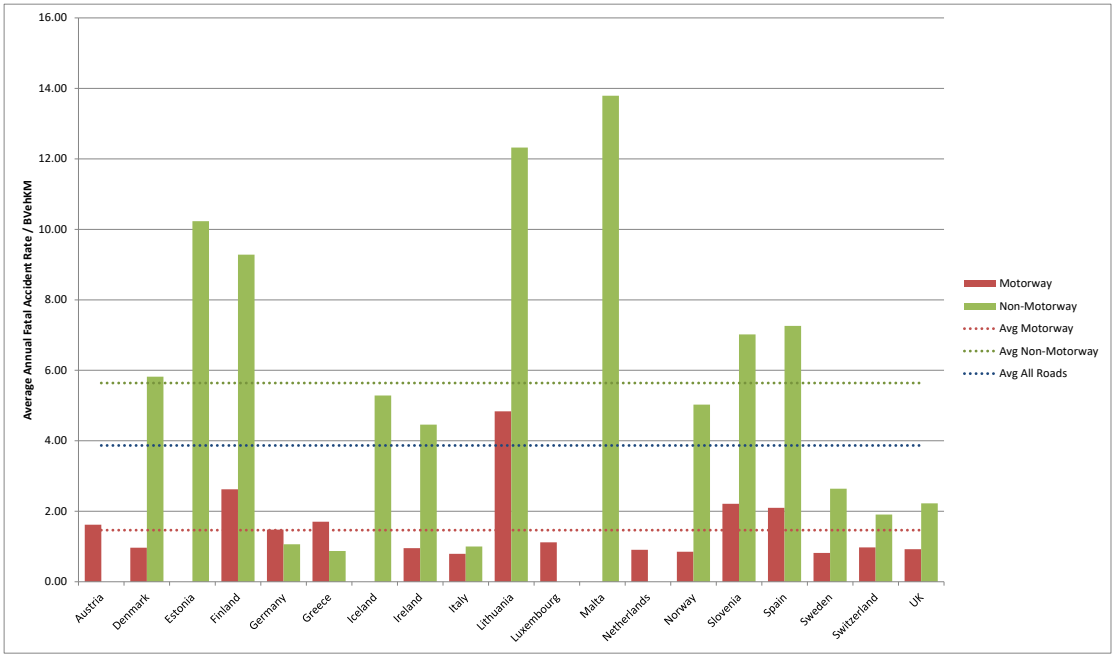


Figure 36: Average Annual Fatal Accident Rate on the TEN-T network (2015)

On non-motorway roads, Estonia, Lithuania, and Malta have the highest accident rates with more than 10.0 fatal accidents per BVehKm, while non-motorways in Germany, Greece, Italy, and Switzerland have the lowest accident rates with fewer than 2.0 accidents per BVehKm.

Preliminary data from Poland indicates that the average annual Fatal Accident Rate is 3.98 fatal accidents per BVehKm.

6 It should be noted that Iceland has only 3 km of motorways.

Figure 37 compares Fatal Accident Rates for the core and comprehensive networks. The figures show that, on motorways, the Annual Average Fatal Accident Rate is 1.5 per BVehKm on both the core and comprehensive networks; however the Fatal Accident Rate on non-motorways is slightly higher on the core network (7 per BVehKm) compared with the comprehensive network as a whole (6 per BVehKm).

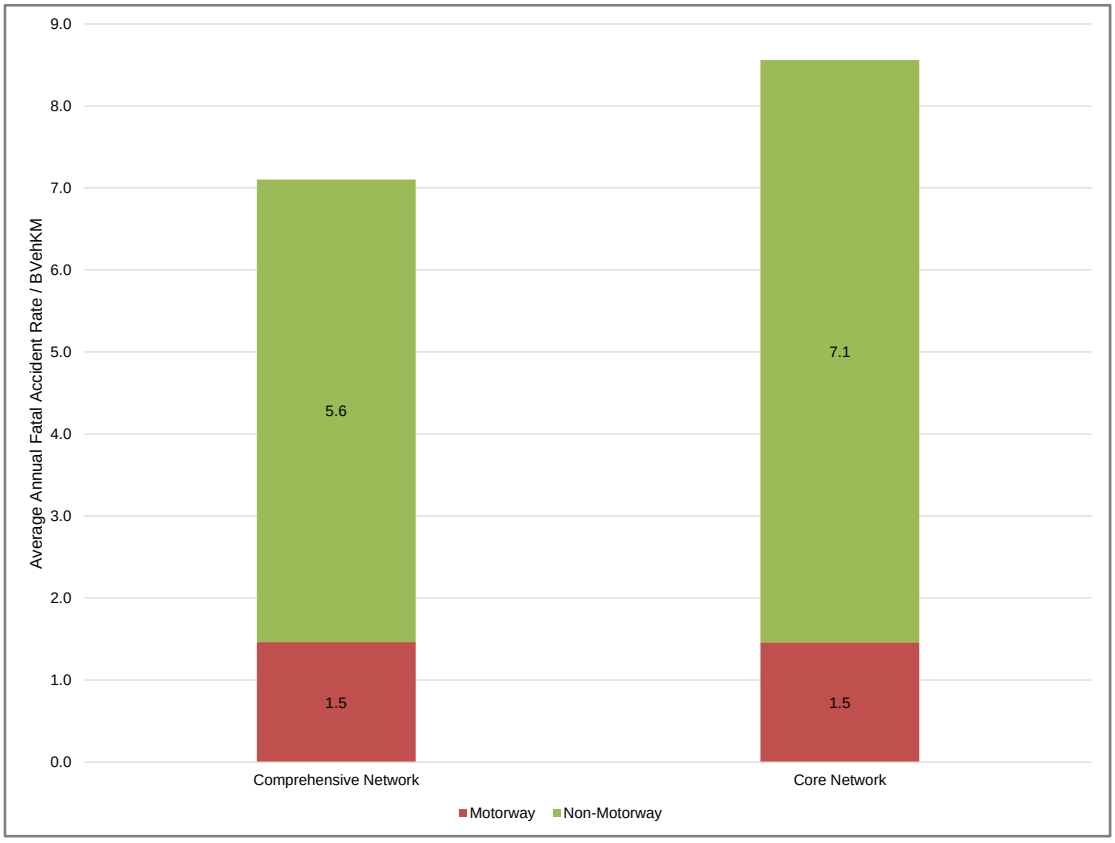


Figure 37: Comparison of Average Annual Fatal Accident Rates on core and comprehensive networks (2015)

5.6 Planned Capacity Improvements

Planned Capacity Improvements is a new indicator included in the 2015 report to represent a proxy for capacity issues, such as bottlenecks, on the network. Member countries were asked to highlight sections that had been identified as being in need of capacity improvements in their organisations' most recent network improvement plan. It should be noted that there is no indication of the currency of the plan nor whether any planned improvements have subsequently been completed. These issues will be considered in future reports. A fuller definition is provided in Section 8.11.

		Planned Capacity Improvement on section					
		Yes		No		No data	
Name	Total sections	No. sections	%	No. sections	%	No. sections	%
Austria	85	17	20.0	62	72.9	6	7.1
Denmark	69	5	7.2	64	92.8	-	0.0
Estonia	45	11	24.4	34	75.6	-	0.0
Finland	173	27	15.6	146	84.4	-	0.0
Germany	360	168	46.7	192	53.3	-	0.0
Greece	120	17	14.2	95	79.2	8	6.7
Iceland	78	2	2.6	76	97.4	-	0.0
Ireland	60	6	10.0	54	90.0	-	0.0
Italy	247	13	5.3	68	27.5	166	67.2
Lithuania	127	40	31.5	87	68.5	-	0.0
Luxembourg	28	-	0.0	-	0.0	28	100.0
Malta	48	3	6.3	-	0.0	45	93.8
Netherlands	119	52	43.7	67	56.3	-	0.0
Norway	206	28	13.6	178	86.4	-	0.0
Slovenia	51	1	2.0	50	98.0	-	0.0
Spain	416	101	24.3	315	75.7	-	0.0
Sweden	119	18	15.1	101	84.9	-	0.0
Switzerland	111	-	0.0	-	0.0	111	100.0
UK	157	19	12.1	89	56.7	49	31.2

Total/Average	**2,619**	**528**	**20.2**	**1,678**	**64.1**	**413**	**15.8**
Total (ex No data)	**2,206**	**528**	**23.9**	**1,678**	**76.1**	-	**0**

As shown in Figure 38, 24% of the TEN-T (Roads) network where data is available has been identified as being in need of capacity improvements.

Figure 39 shows the national distribution against a background of the average values for the comprehensive network as a whole. The figures show that in Estonia, Germany, Lithuania, the Netherlands, and Spain, more than 24% of the network has been identified as being in need of capacity improvements. Iceland and Slovenia have identified the lowest proportion of the network identified as needing capacity improvements (2.6% and 2.0% respectively). No data was available from Switzerland.

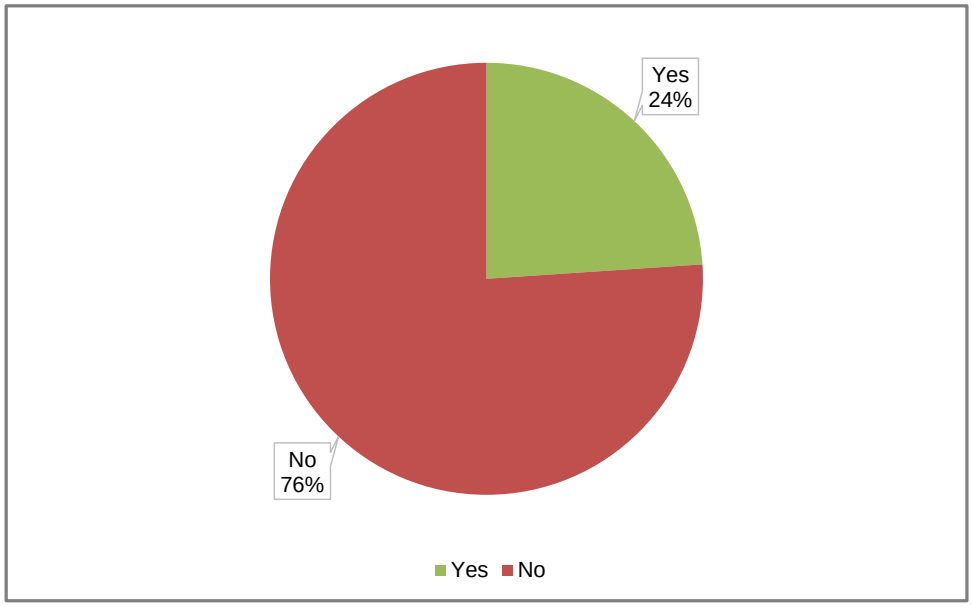


Figure 38: Overall Planned Capacity Improvements on TEN-T roads (2015)

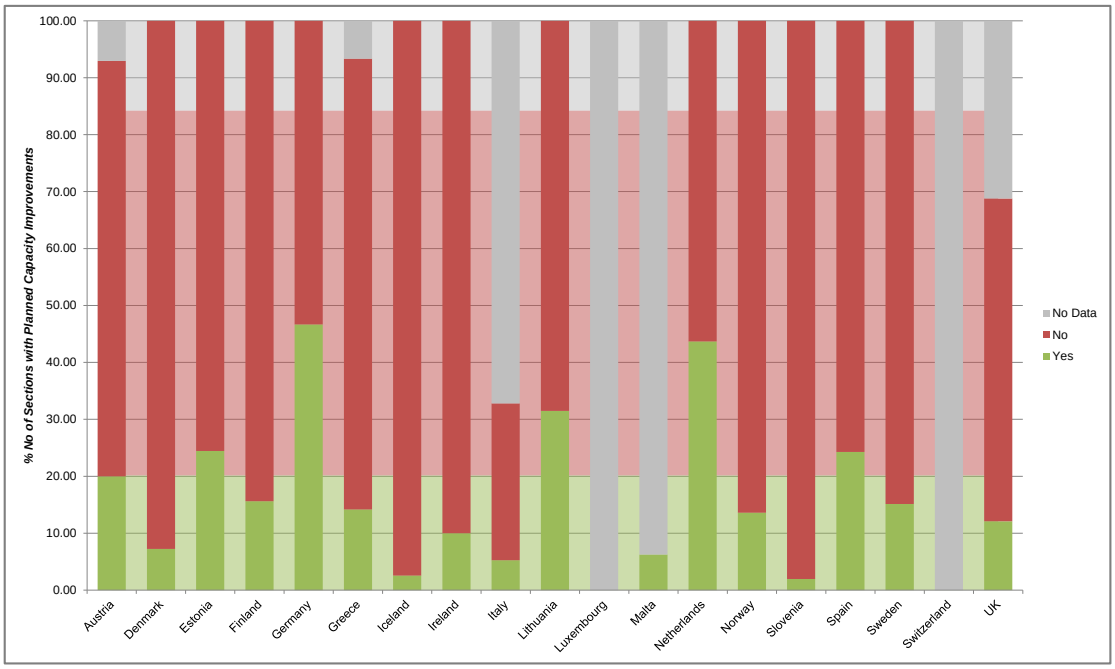


Figure 39: Planned Capacity Improvements on the TEN-T Network (2015)

Figure 40 compares the planned capacity improvements on the core and comprehensive networks where data is available. The figures show that 32% of the core network has been identified as in need of capacity improvements compared with 25% of the comprehensive network as a whole.

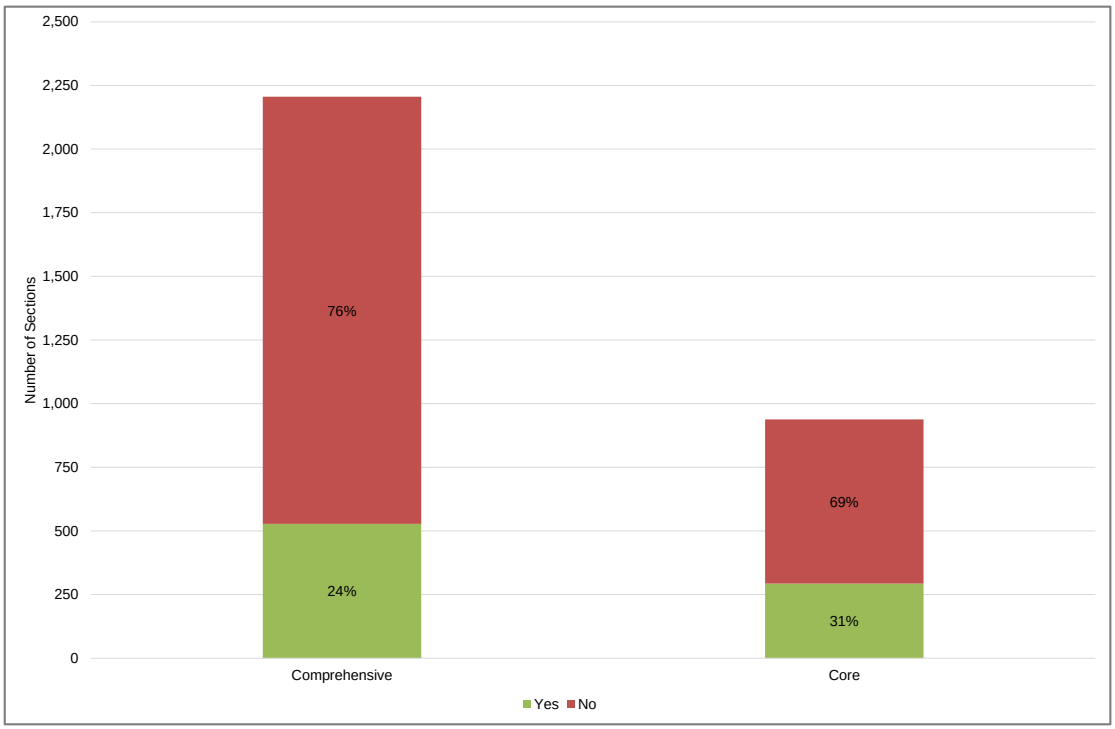


Figure 40: Comparison of Overall Planned Capacity Improvements on core and comprehensive networks (2015)

6 CONCLUSIONS AND FUTURE DEVELOPMENTS

The 2015 TEN-T (Roads) Performance Report provides a detailed snapshot of the performance of the TEN-T (Roads) network in CEDR member countries in 2015 and identifies overall trends in the performance of the network as a whole.

The 2015 report has built on previous reports to provide a better, richer source of performance data that can be used by national road administrations and regulatory bodies for benchmarking and target setting, and by CEDR itself to support current and future initiatives.

The 2015 report covers 74,000 km of the 103,000 km TEN-T (Roads) network and continues to underline the importance of this network by showing that:

1 The TEN-T network includes the most important roads in Europe; 60% of the network consists of motorways – this proportion is gradually increasing – and 17% is made of up roads with more than 4-lanes. The network also includes 1,200 km of bridges and more than 1,000 km of tunnels. Investment in the TEN-T network is continuing with planned capacity improvements identified on nearly 25% of the network.

2 The network is also very heavily trafficked; more than 40% of the network carries in excess of 20,000 vehicles per day while 6% carries more than 80,000 vehicles per day. Traffic Density exceeds 12,000 vehicles per lane per day on 15% of the network, and HGVs comprise more than 20% of all traffic on nearly 20% of the network. The Traffic Flow for both all vehicles and HGVs specifically is increasing, particularly on motorways.

3 However, despite this, the network is relatively safe; the average Fatal Accident Rate on motorways is less than 2 fatal accidents per BVehKm and is less than 6 per BVehKm on non-motorways. However, there are wide variations across the network.

The main change impacting on the 2015 report has been the implementation of the new TEN-T Guidelines in January 2014, which introduced the concept of a core and comprehensive network as well as the new TEN-T corridors. The new guidelines have resulted in CEDR members making significant changes (mostly increases) to roads included in the TEN-T and some re-categorisation of motorways and non-motorways. This may make it necessary to re-baseline the network trends before any future reports.

Other potential future developments could include:

- Improved ITS base data definitions so that this can be included as an indicator
- Reporting on the performance of the nine TEN-T corridors
- Development of PIs to support future transport initiatives including electric vehicles, open data, autonomous vehicles
- Automation of data collection process to improve consistency and efficiency

Overall, the 2015 TEN-T (Roads) Performance Report continues to show that it is possible to produce comparable information on the performance of the TEN-T (Roads) network in the majority of CEDR member countries and to show trends between the performance of the network over a five-year period. The report, and its underpinning data, therefore represents a valuable resource to CEDR and its members, as well as regulatory bodies and other external stakeholders.

7 APPENDIX 1: METHODOLOGY AND DATA VALIDITY

7.1 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 in SP1.

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 that they were provided with (see Section 8).

3 Once received, the data was checked, and errors were corrected in consultation with the individual countries.

4 The data was then loaded into a database for statistical analysis using SQL queries and the production of GIS data in ESRI ShapeFile format for the production of the maps.

5 An Excel spreadsheet containing the results of the SQL queries was exported from the database and used to produce the maps and charts in this report.

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

Although relatively mature, the process is largely manual and revolves around a two-year cycle. It is possible that, in future, the process could become more automated and, therefore, more up-to-date data could be provided.

7.2 Data quality and validity

The data included in this report is intended to accurately represent the performance of the TEN-T (Roads) network in 2015 and is assumed to be correct as of 1 January 2015.

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 (not that this applies in 2015);
- definitions of base data have changed; or
- network coverage within a country has been extended (e.g. in response to the 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.

8 APPENDIX 2: BASE DATA DEFINITIONS

8.1 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.

8.2 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.

8.3 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.

8.4 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.

8.5 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.

8.6 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.

8.7 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

8.8 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.

8.9 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.

8.10 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.	

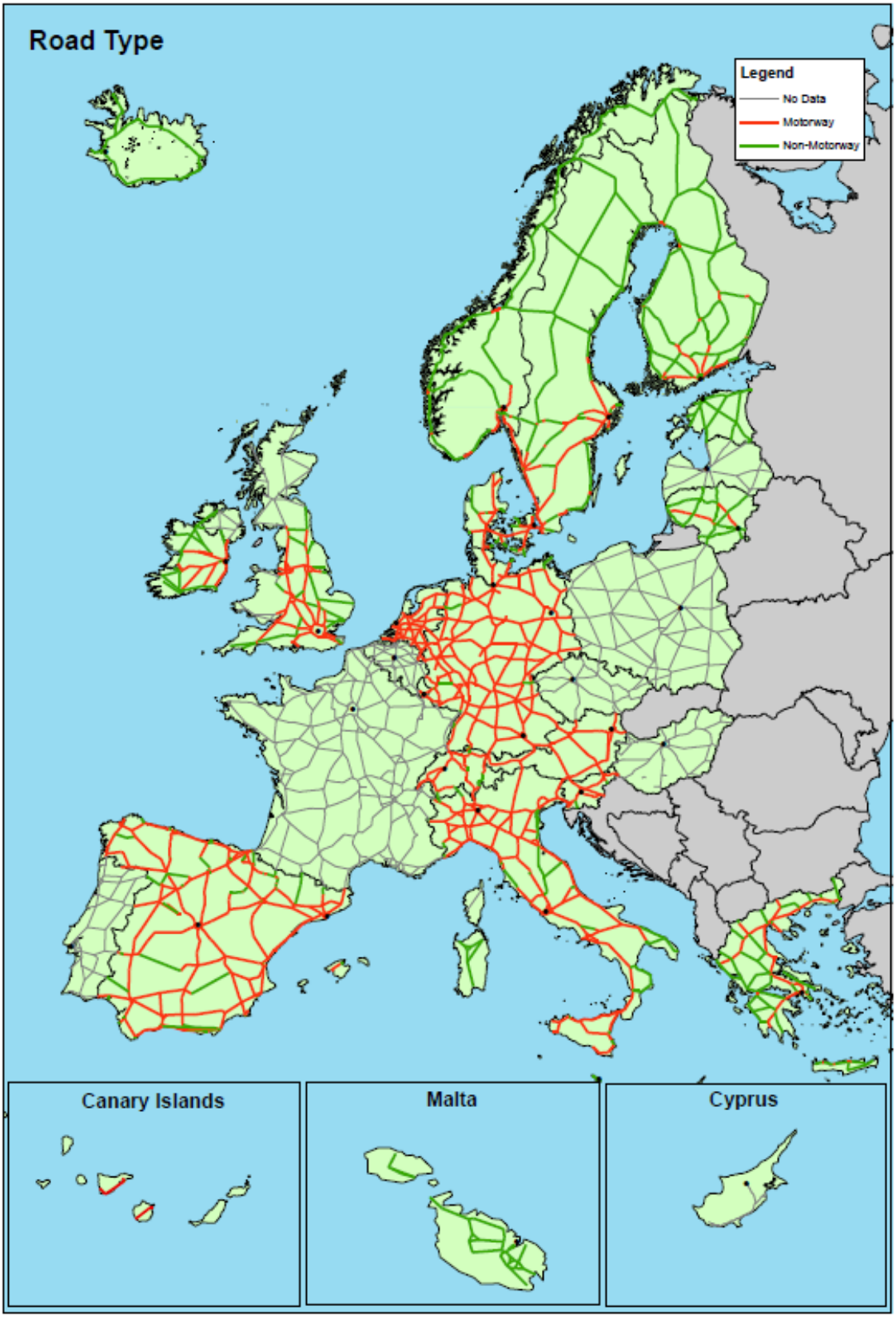
8.11 Planned Capacity Improvements

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.

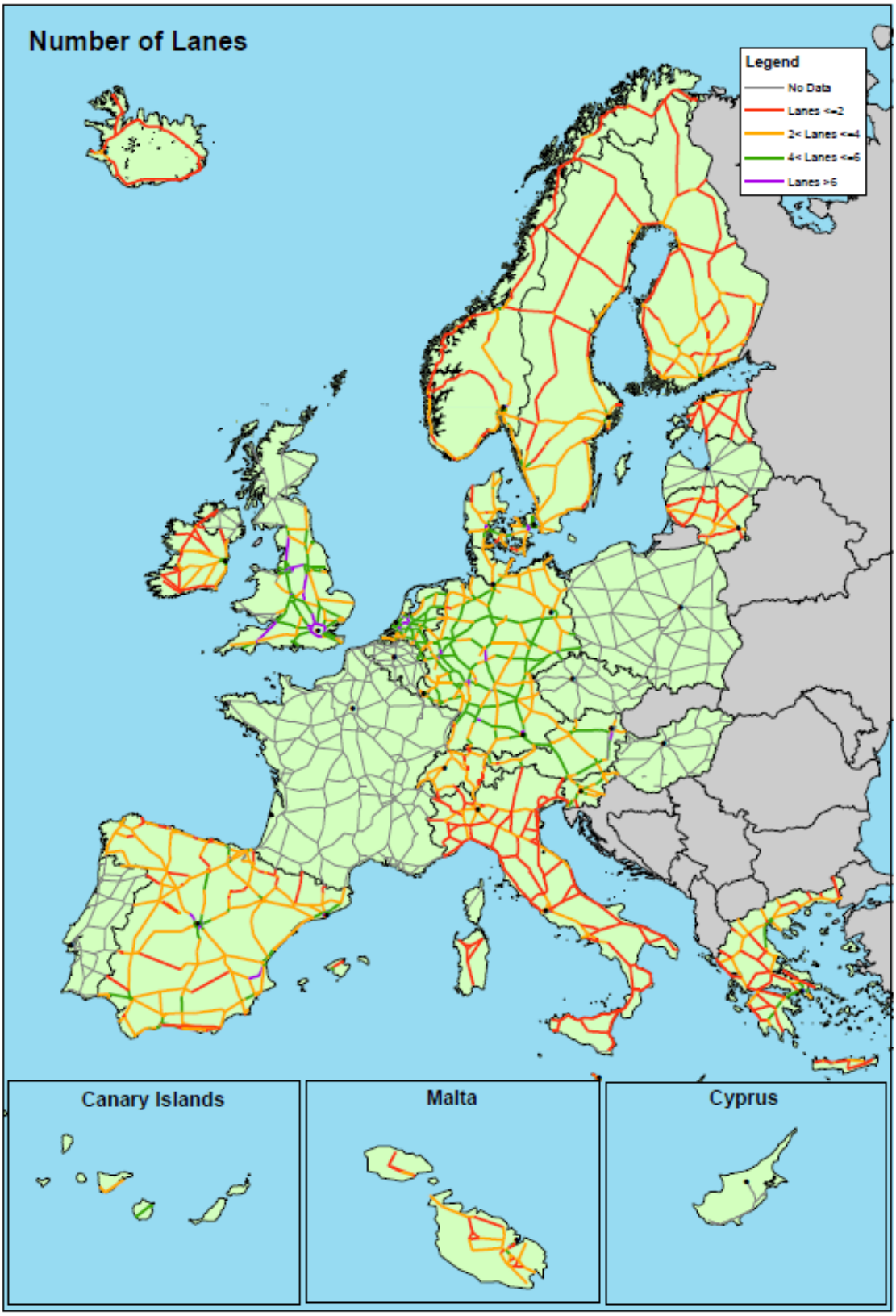
9 APPENDIX 3: PERFORMANCE INDICATOR MAPS

All maps have been produced using the performance data provided by the respective NRAs. For some maps, further calculation was carried out centrally using the data provided.

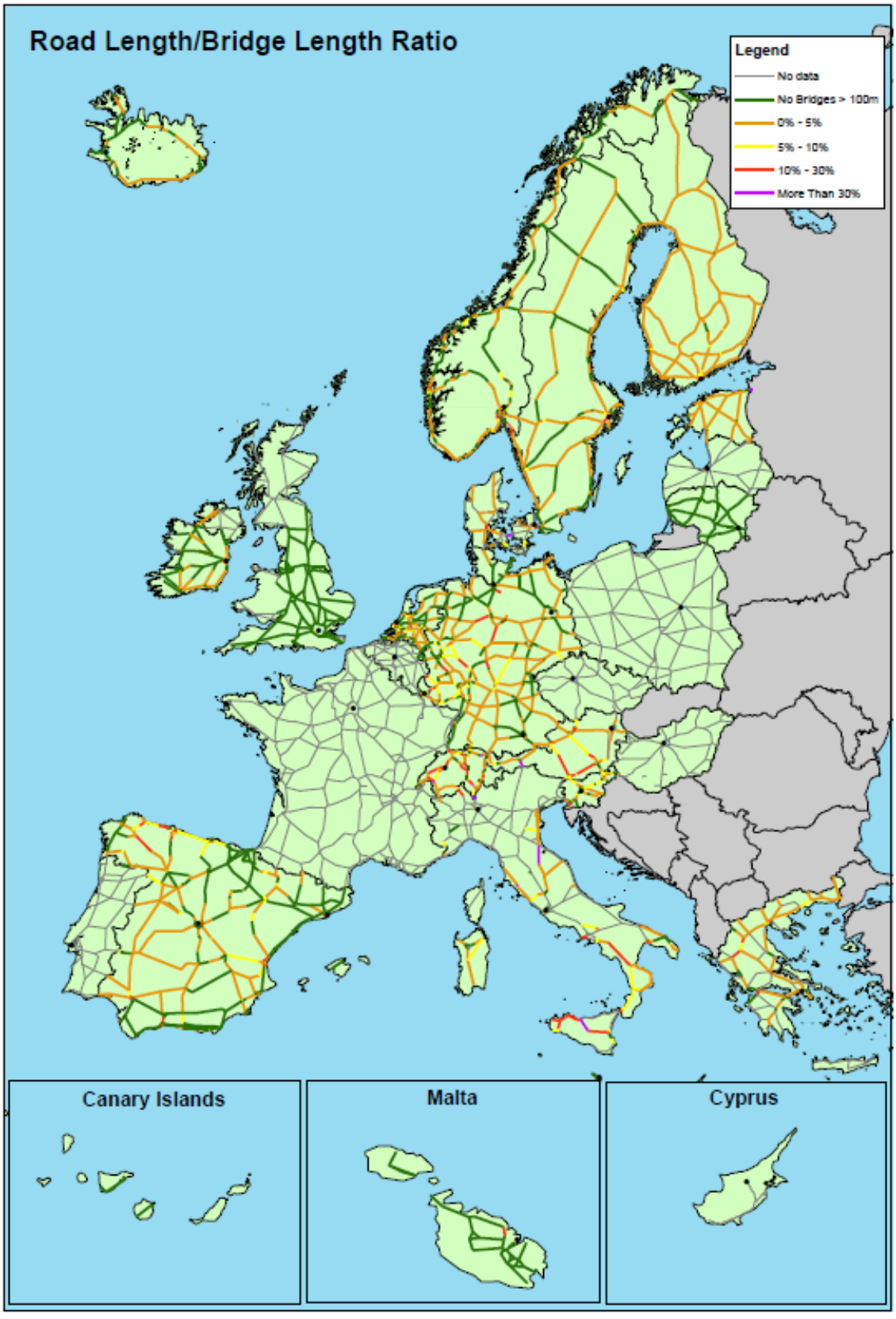
9.1 Road Type


Road Type
Legend
No Data
Motorway
Non-Motorway
Canary Islands
Malta
Cyprus

9.2 Number of Lanes

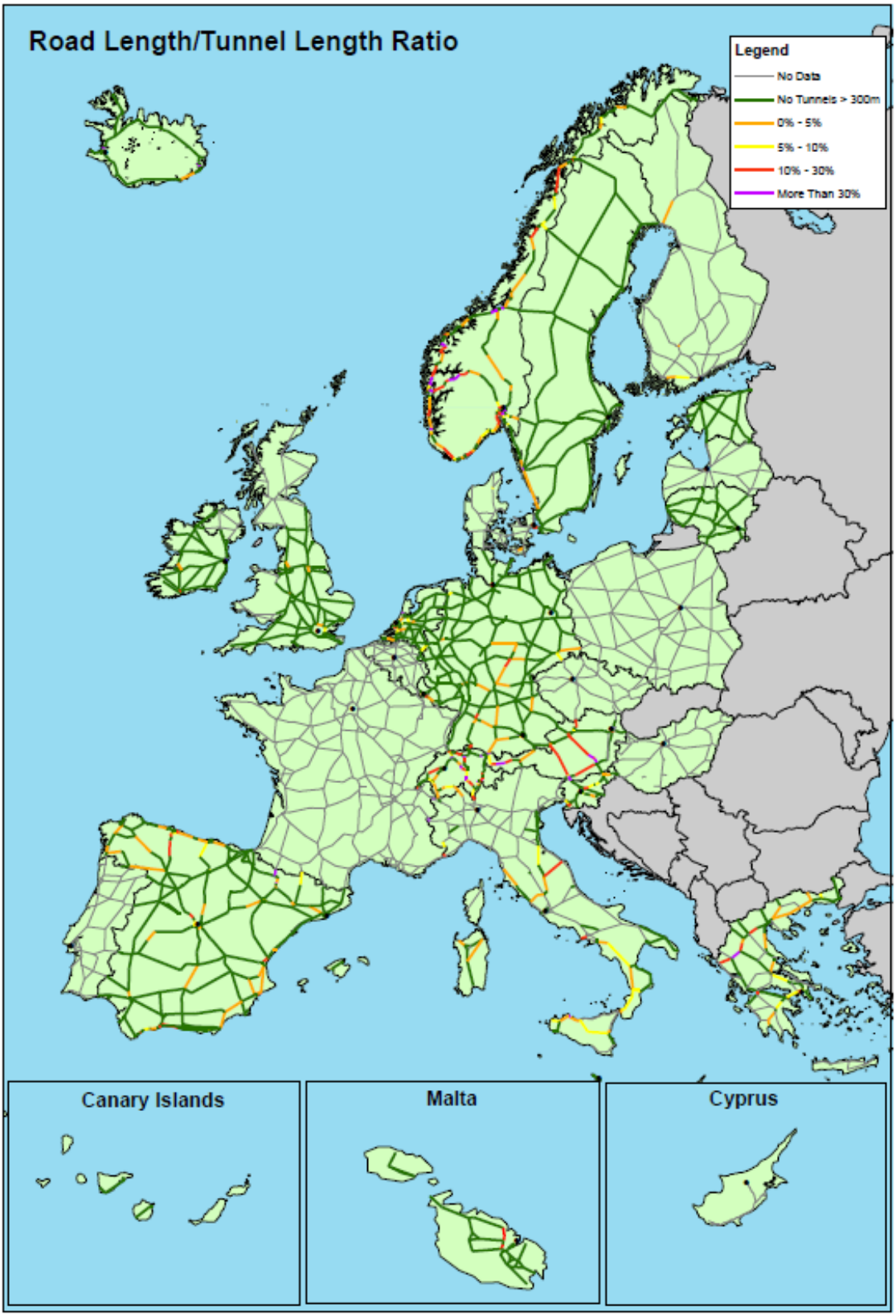


9.3 Length of Bridges



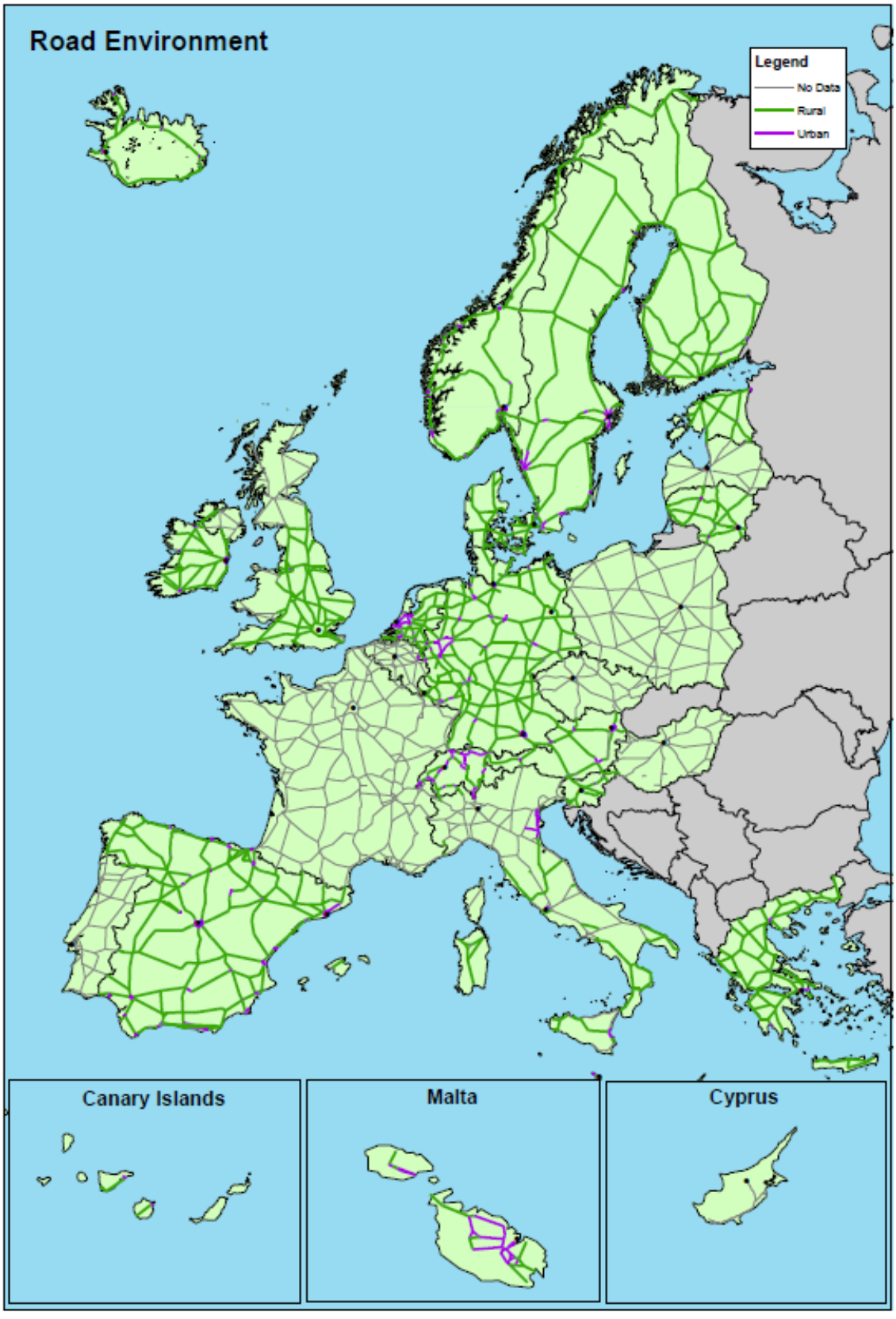
The figures shown on the map are the proportion of each section that comprises a bridge longer than 300 m.

9.4 Length of Tunnels

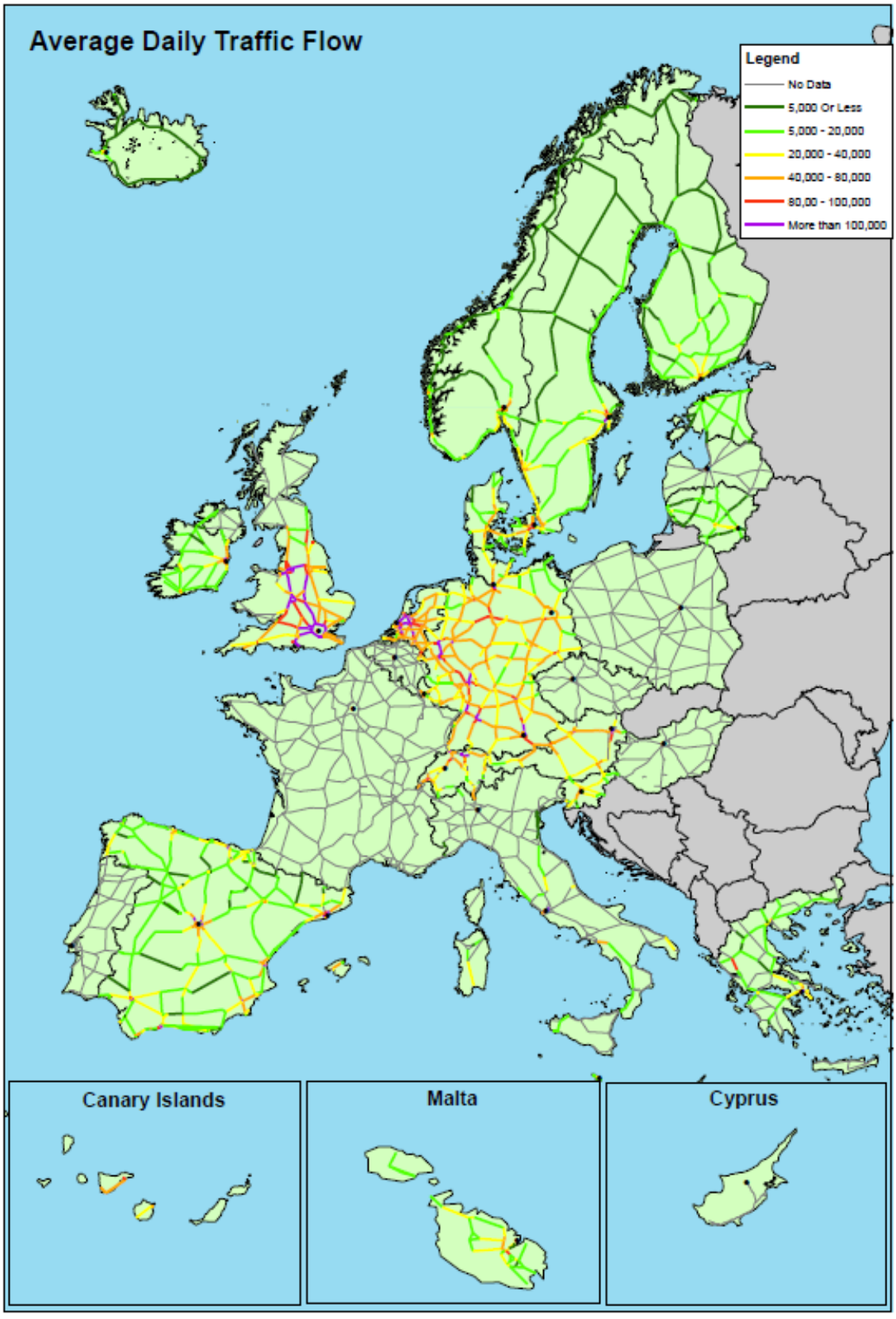


The figures shown on the map are the proportion of each section that comprises a tunnel longer than 100 m.

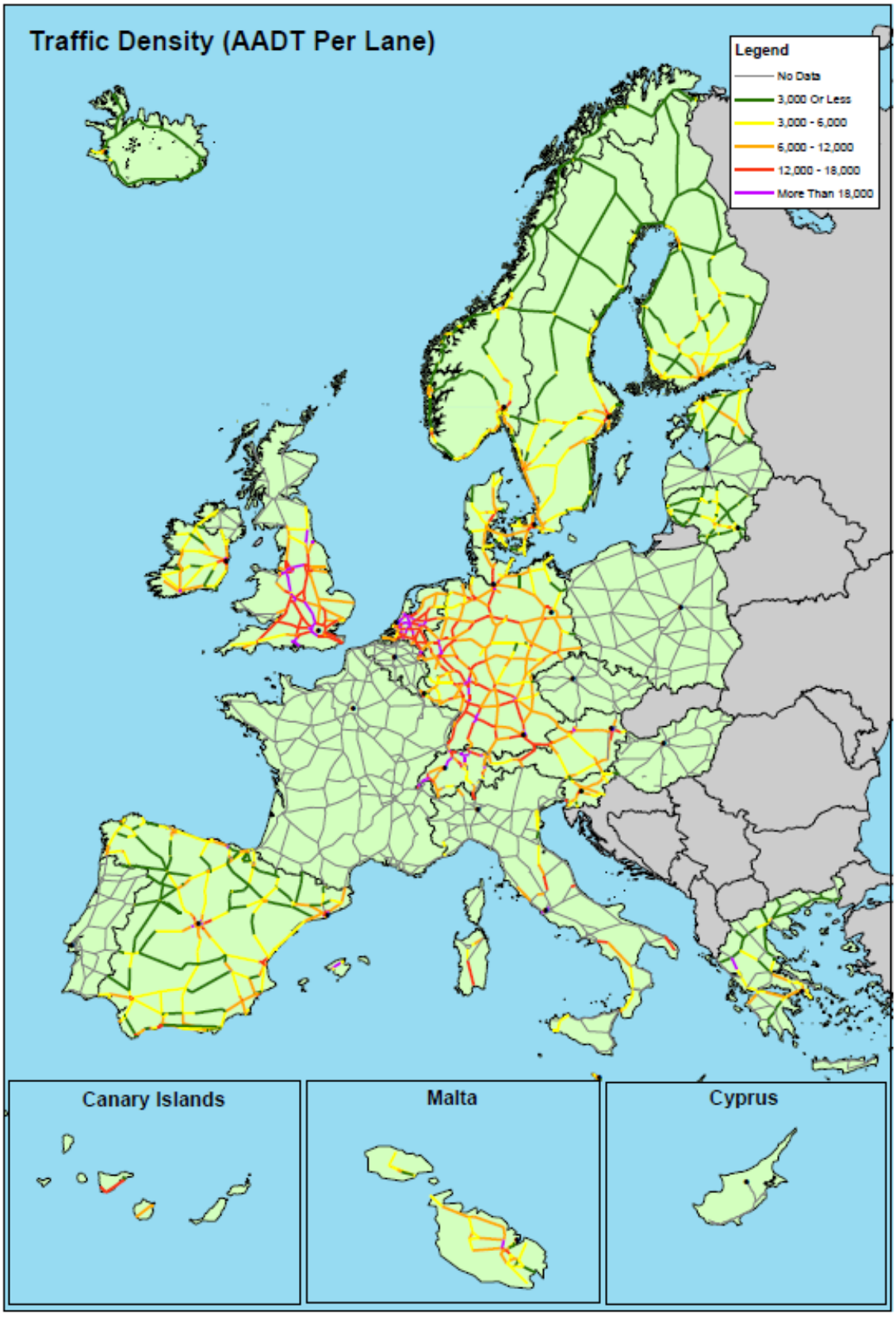
9.5 Physical Environment



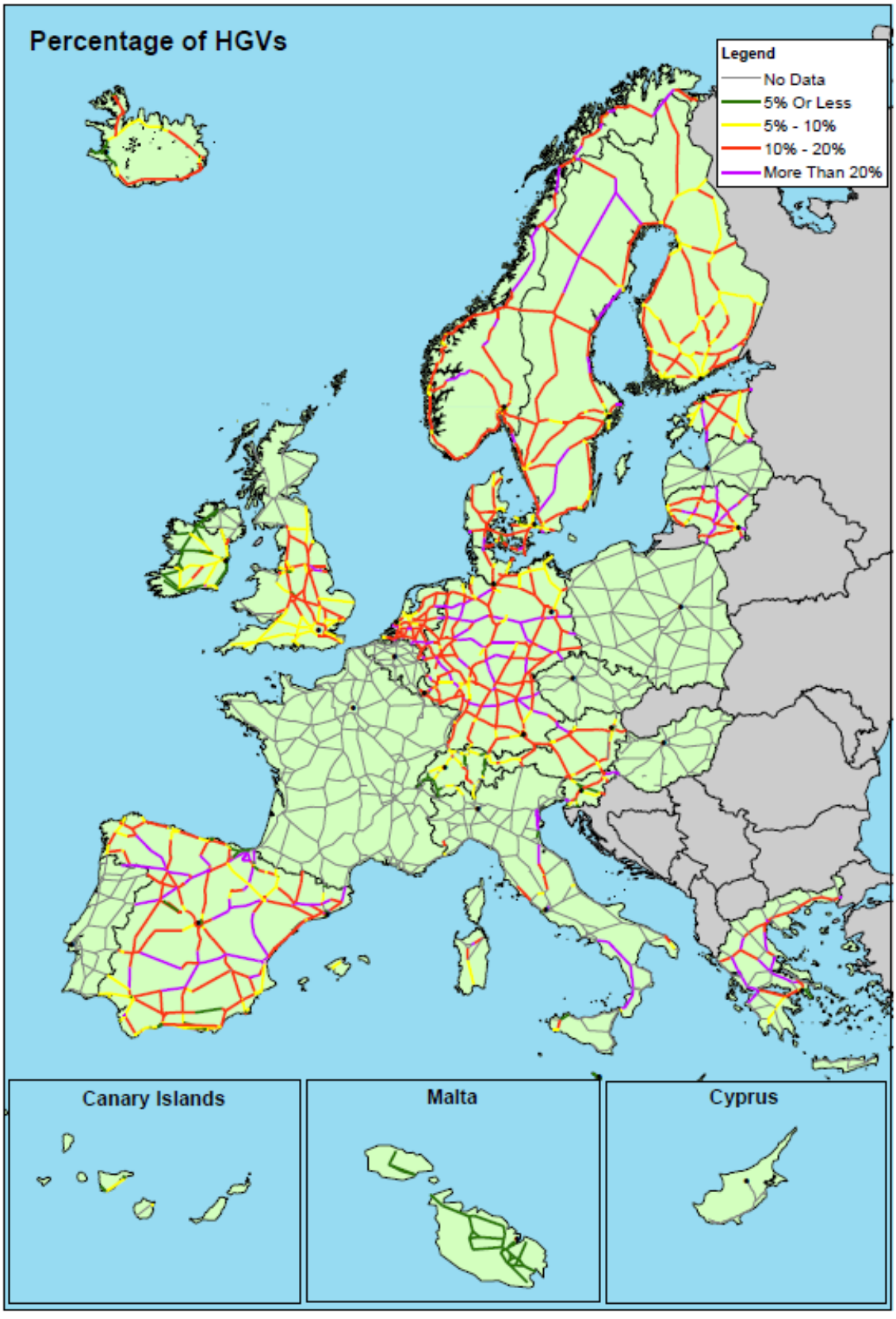
9.6 Average Daily Traffic Flow



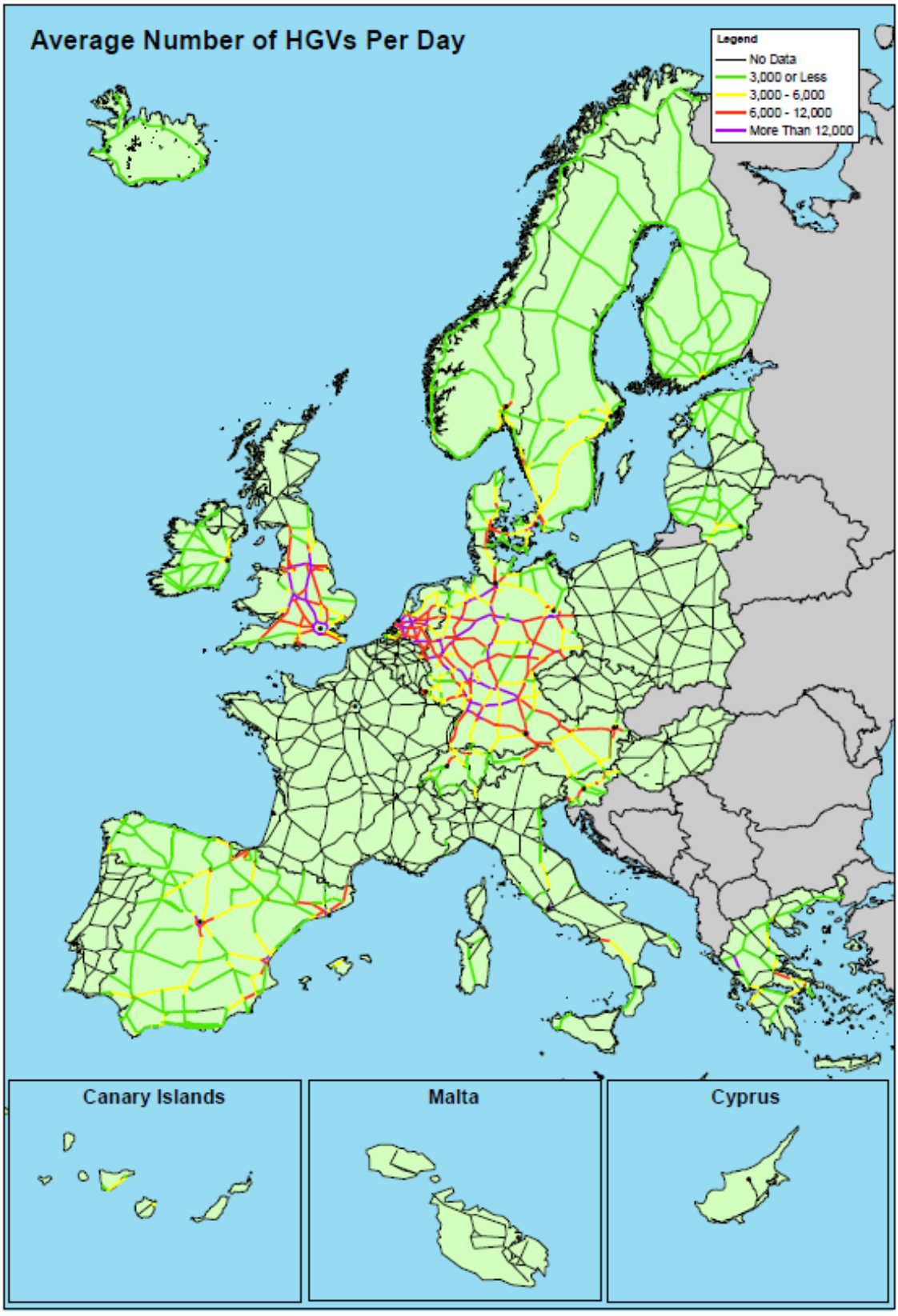
9.7 Traffic Density



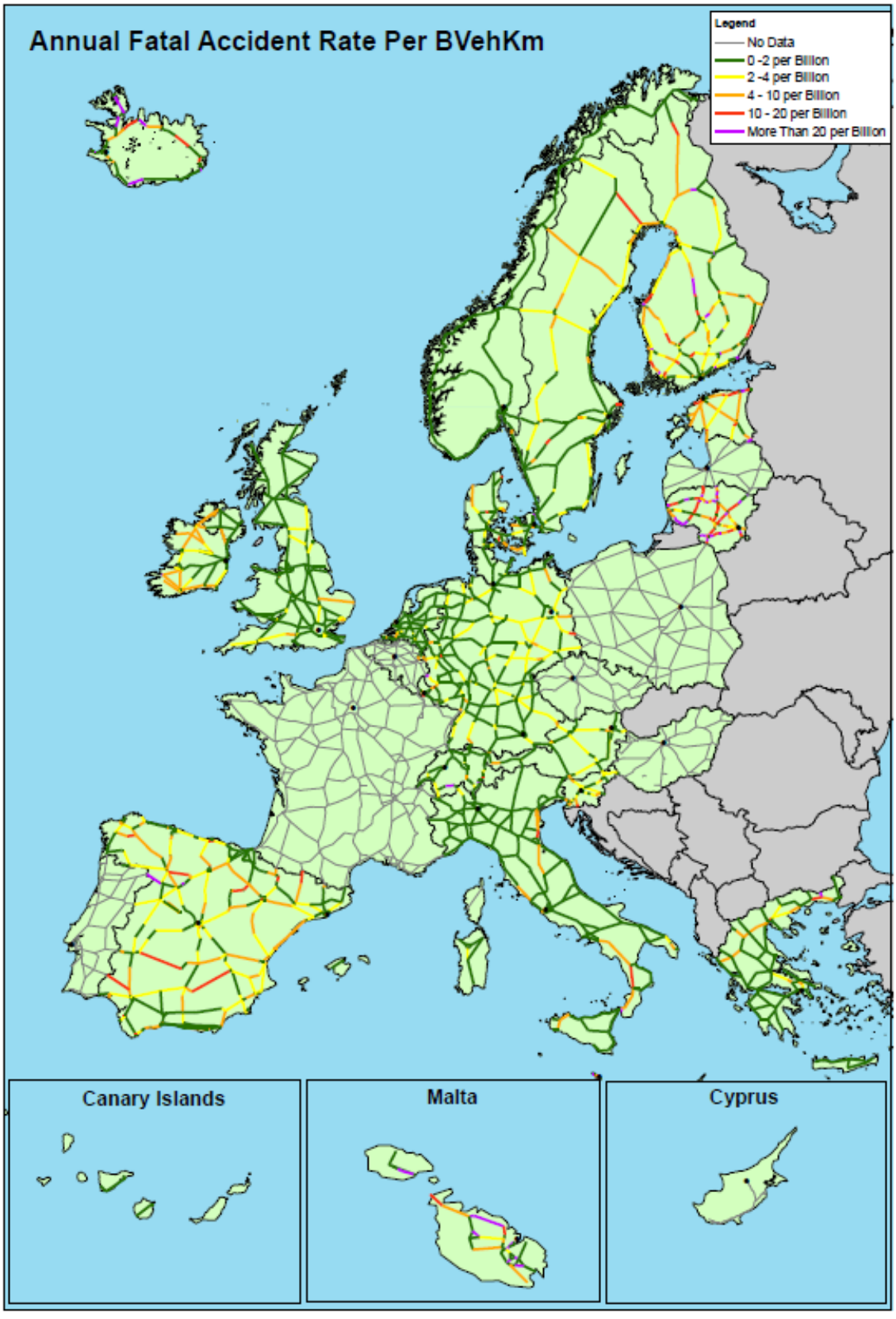
9.8 Proportion of Average Daily Traffic comprising HGVs



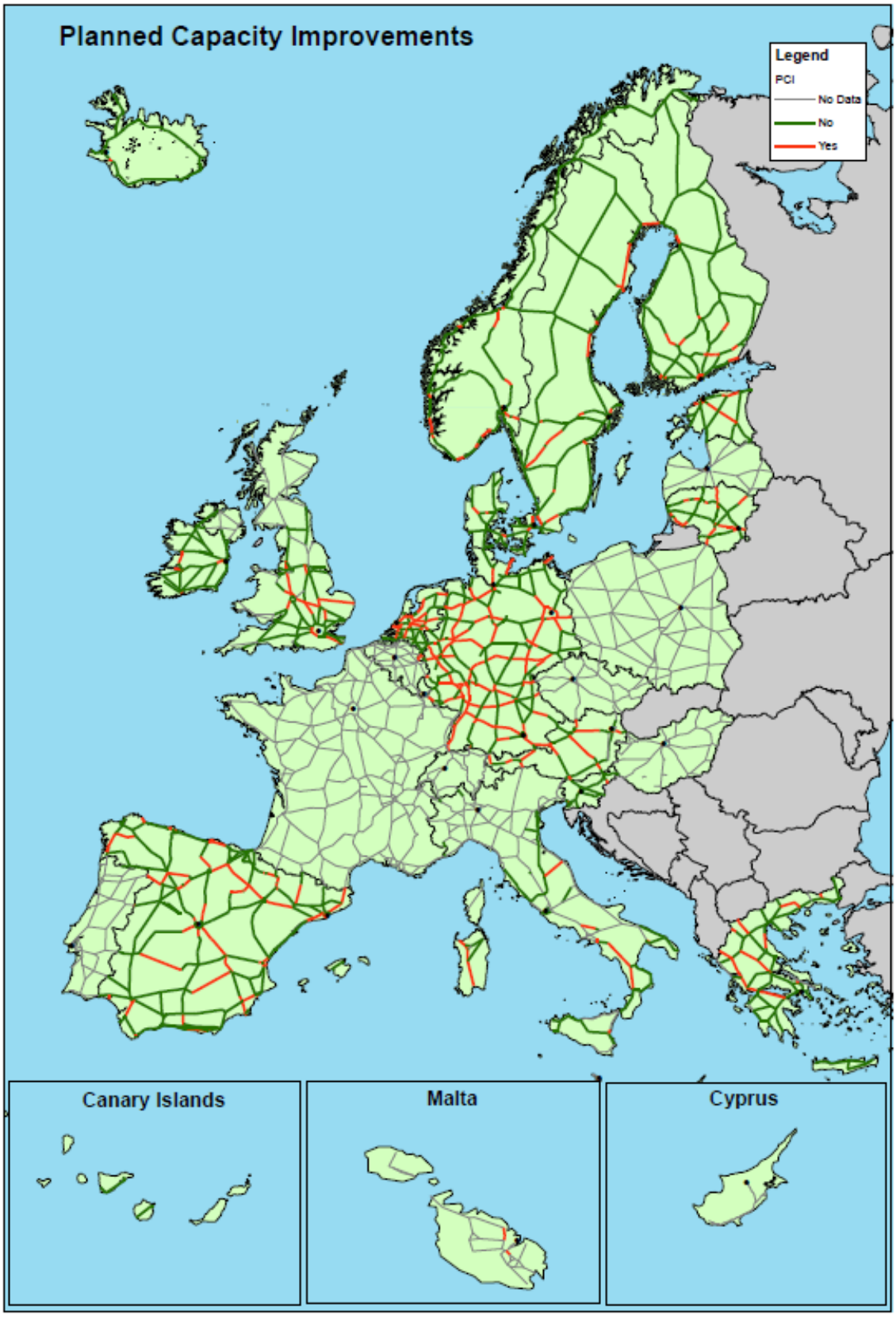
9.9 Average Daily HGVs



9.10 Annual Average Fatal Accident Rate



9.11 Planned Capacity Improvements



10 APPENDIX 4: TEN-T CORRIDORS

'Core network corridors' were introduced to facilitate the coordinated implementation of the core network. They bring together public and private resources and concentrate EU support from the Connecting Europe Facility (CEF), particularly to:

- remove bottlenecks,
- build missing cross-border connections, and
- promote modal integration and interoperability.

It should be noted that the network alignment presented in the 2015 TEN-T Performance Report is not provided by the respective NRAs directly. The alignment is based on the official maps on the EC website[7].

Each TEN-T Corridor includes all traffic modes:

- roads
- railways
- ports
- motorways of the sea (MoS)

Only roads are presented in the 2015 TEN-T Performance Report. This means that a corridor may not be presented to its full extent in the 2015 TEN-T Performance Report compared with the official map on the EC website. For example, the Scandinavian–Mediterranean Corridor continues to Malta (Valletta) via MoS from southern Italy, but not via a road. No roads in Malta are affiliated to the corridor.

[7] http://ec.europa.eu/transport/themes/infrastructure/ten-t-guidelines/corridors/index_en.htm

10.1 Scandinavian–Mediterranean Corridor

10.2 North Sea–Baltic Corridor

10.3 North Sea–Mediterranean Corridor

10.4 Baltic–Adriatic Corridor

10.5 Orient/East–Med Corridor

10.6 Rhine–Alpine Corridor

10.7 Atlantic Corridor

10.8 Rhine–Danube Corridor

10.9 Mediterranean Corridor

11 APPENDIX 5: LIST OF FIGURES

Figure 1: The TEN-T (Roads) network within CEDR member countries 8
Figure 2: The TEN-T core and comprehensive road networks covered by CEDR Performance Report (2015) 9
Figure 3: Countries participating in the 2015 TEN-T (Roads) Performance Report 10
Figure 4: Comparison of population and Traffic Density on TEN-T roads 12
Figure 5: Comparison of the length of the TEN-T network and the surface area of CEDR countries 13
Figure 6: Traffic Density vs. area and population 14
Figure 7: Comparison of core and non-core network lengths on TEN-T roads 15
Figure 8: Network-trends in Road Type (2011–2015) 16
Figure 9: Network trends in All Vehicle Traffic Flow (2011–2015) 18
Figure 10: Network trends in HGV Traffic Flow (2011–2015) 19
Figure 11: Overall distribution of Road Types on the TEN-T road network (2015) 21
Figure 12: National distribution of Road Types on the TEN-T network (2015) 21
Figure 13: Comparison of Road Types on core and comprehensive networks (2015) 22
Figure 14: Overall distribution of the Number of Lanes on the TEN-T road network (2015) 24
Figure 15: National distribution of the Number of Lanes on TEN-T roads (2015) 24
Figure 16: Comparison of Number of Lanes on core and comprehensive networks (2015) 25
Figure 17: Proportion of the length of national TEN-T roads comprising bridges (2015) 27
Figure 18: Comparison of Length of Bridges on core and comprehensive networks (2015) 27
Figure 19: Proportion of the length of national TEN-T roads comprising tunnels (2015) 29
Figure 20: Comparison of the Length of Tunnels on core and comprehensive networks (2015) 29
Figure 21: National distribution of TEN-T Physical Environments (2015) 31
Figure 22: Comparison of traffic flow on urban and rural roads (2015) 31
Figure 23: Comparison of Physical Environments on core and comprehensive networks (2015) 32
Figure 24: Overall distribution of Traffic Flow on TEN-T roads (2015) 35
Figure 25: National distribution of Traffic Flow on TEN-T roads (2015) 35
Figure 26: Comparison of Traffic Flow on core and comprehensive networks (2015) 36
Figure 27: Overall distribution of Traffic Density on TEN-T roads (2015) 38
Figure 28: National distribution of Traffic Density on TEN-T roads (2015) 38
Figure 29: Comparison of Traffic Density on core and comprehensive networks (2015) 39
Figure 30: Overall proportion of traffic on TEN-T roads comprising HGVs (2015) 41
Figure 31: Proportion of traffic on national TEN-T roads comprising HGVs (2015) 41
Figure 32: Comparison of HGV proportion on core and comprehensive networks (2015) 42
Figure 33: Overall HGV Traffic Flow on TEN-T roads (2015) 44
Figure 34: National distribution of HGV Traffic Flow on TEN-T roads (2015) 44
Figure 35: Comparison of HGV traffic on core and comprehensive networks (2015) 45
Figure 36: Average Annual Fatal Accident Rate on the TEN-T network (2015) 47

Figure 37: Comparison of Average Annual Fatal Accident Rates on core and comprehensive networks (2015) 48
Figure 38: Overall Planned Capacity Improvements on TEN-T roads (2015) 50
Figure 39: Planned Capacity Improvements on the TEN-T Network (2015) 50
Figure 40: Comparison of Overall Planned Capacity Improvements on core and comprehensive networks (2015) 51

Ref: CEDR report 2016/04 – Trans-European Road Network, TEN-T (Roads): 2015 Performance Report

ISBN: 979-10-93321-21-9

Conference of European Directors of Roads
Avenue d'Auderghem 22-28
1040 Brussels, Belgium

e-mail : information@cedr.eu
Tel. : + 32 (0) 2 771 2478