TRENDLINE project: Speed and speeding behaviour in Europe

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Content

- Context
- KPI Speed
- Key results
- Additional results
- Comparison with Baseline
- Alternative Speeding Indicators
- Recommendations

Purpose and objectives of Trendline

- The purpose of the Trendline project (2022-2025) is to promote the use of road safety KPIs (Key Performance Indicators) within the European Union.
- Collecting such KPI data on a regular basis will underpin and support road safety policies and interventions.
- By using common methodologies, the KPI values of countries can be compared with those of other countries.
- Trendline is supported by the European Commission, who funds 100% of the coordination costs and up to 50% of the costs for data collection and analysis in the EU Member States.
- Trendline is the successor project of "Baseline" (2020-2022).

- 25 EU countries
- 4 observers
  Estonia, Malta, Norway
  Switzerland

Definition of the KPI Speed

The minimum requirement was to estimate:

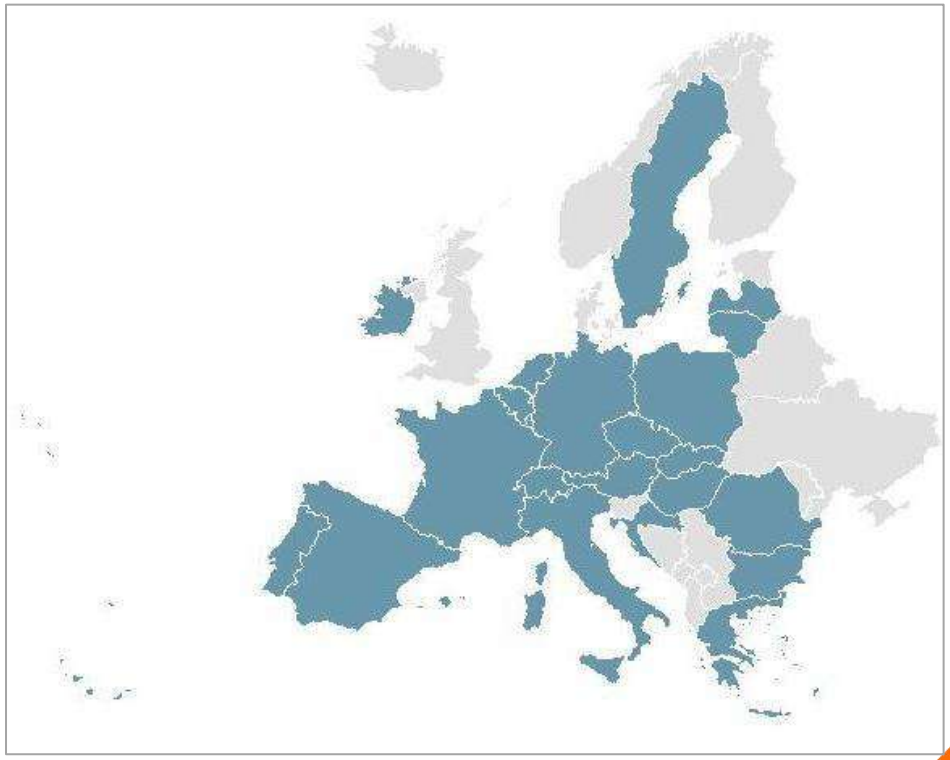
the percentage of vehicles travelling within the speed limit

Additional required measurements concerned

- speed below which 85% of drivers are driving (V85)
- average speed (including its standard error and the standard deviation of speed)

Countries collecting data on speed (20)

Country	Indicators delivered	Data collection period
Austria	KPI, Average Speed, V85	all year round, 2023
Belgium	KPI, Average Speed, V85	07/11/2024 - 18/03/2025
Bulgaria	KPI, Average Speed, V85	17/04/2024 - 30/06/24; 01/09/24 - 26/11/24
Croatia	KPI, Average Speed, V85	01.03.2023 – 01.12/2024
Cyprus	KPI, Average Speed, V85	5/6/25-29/6/25
Czechia	KPI, Average Speed, V85	04/09/23-19/10/23
Greece	KPI, Average Speed, V85	28/3/25 - 09/04/25
Hungary	KPI, Average Speed, V85	09/2024-10/2024
Ireland	KPI, Average Speed, V85	17/04/2024 - 07/05/2024
Italy	KPI, Average Speed, V85	17/06/2024 - 07/08/2024
Latvia	KPI, Average Speed, V85	01/09/2023 - 31/10/23; 21/08/23- 24/10/23
Lithuania	KPI, Average Speed, V85	04/04/2023–29/06/2023
Luxembourg*	KPI, Average Speed, V85	-
Netherlands	KPI, Average Speed, V85	01/10-2024 - 31/10/2024
Poland	KPI, Average Speed, V85	10/04/2024 - 20/06/2024
Portugal	KPI, Average Speed, V85	19/02/2024 - 15/05/2024; 30/09/2024 - 07/01/2025
Romania	KPI, Average Speed, V85	-
Slovakia	KPI, Average Speed, V85	19/09/23 - 28/06/24
Slovenia	KPI, Average Speed, V85	01/04/2024-30/6/2024
Spain	KPI, Average Speed, V85	-
Sweden	KPI, Average Speed	05/2024 - 09/2024; 09/2023

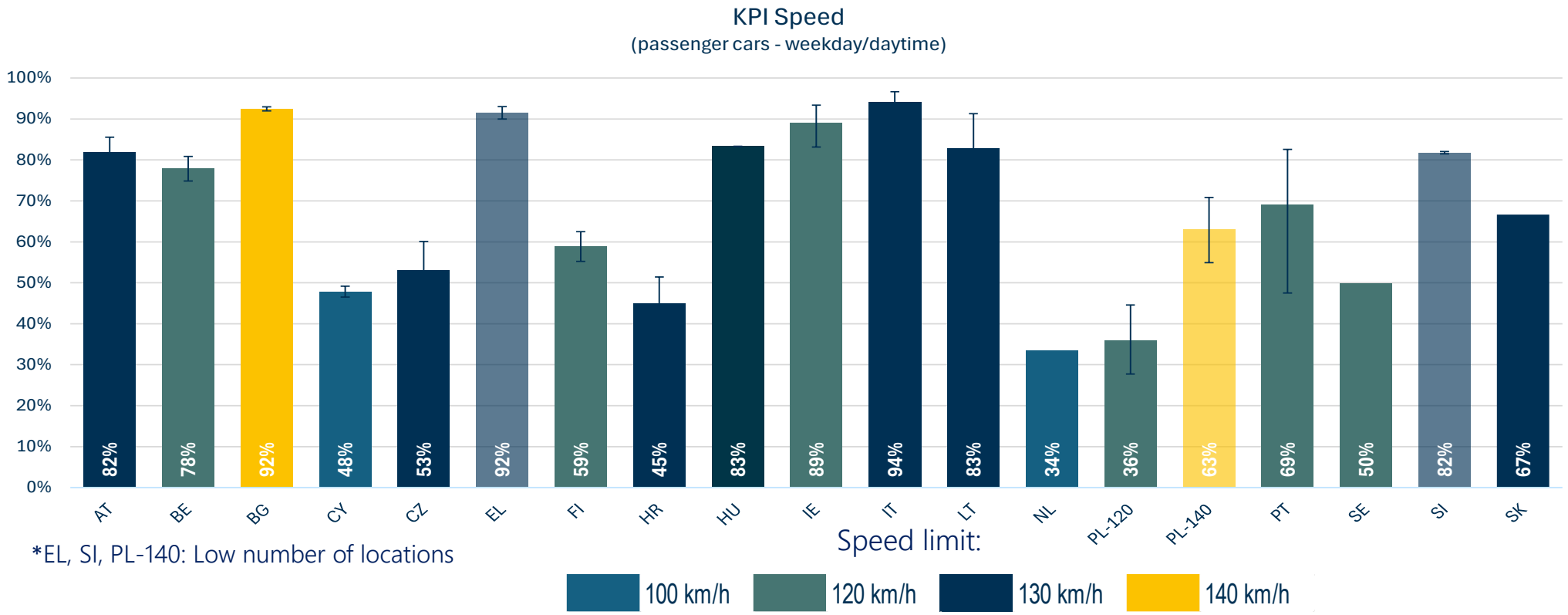


*Luxembourg is not included in the results, due to deviations from the methodological guidelines

Summary of the minimum requirements

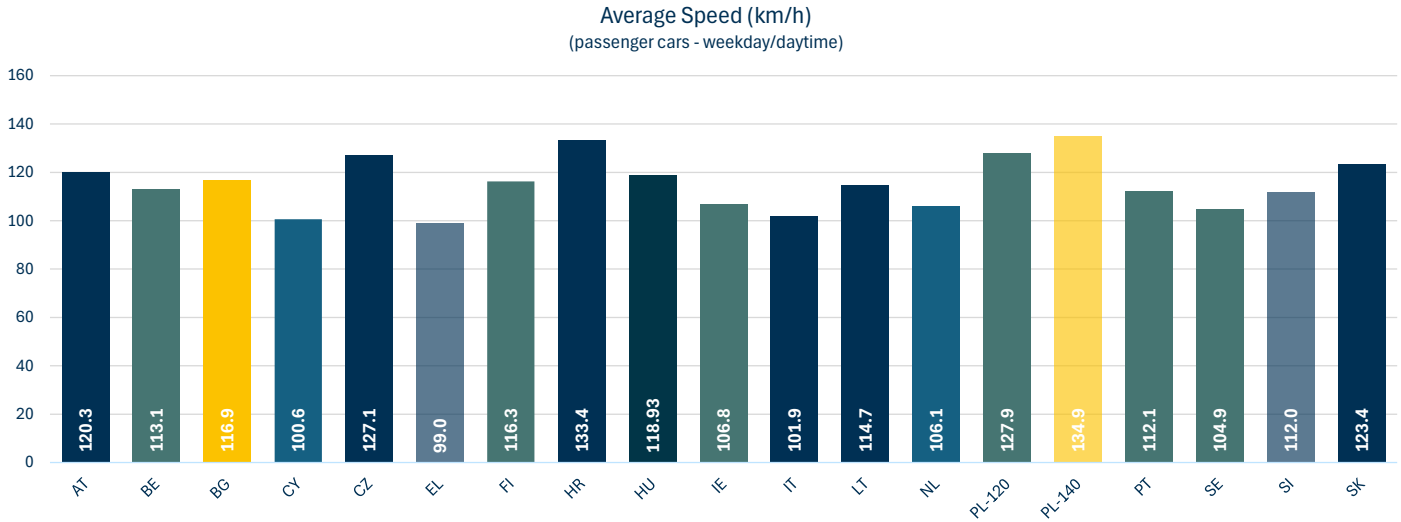
Aspect	Minimum methodological requirements
Road type	The indicator should cover motorways, rural non-motorway roads, and urban roads. Results should be presented separately for the three different road types.
Vehicle type	The indicator should include at least passenger vehicles (cars). Buses and goods vehicles (light [less than 3.5t] and heavy [more than 3.5t]) and powered two wheelers are optional in a first phase. Results should be presented separately for each vehicle type, if possible.
Location	Member States to decide on the locations of the measurements, but measurements should not take place near safety cameras whether fixed or mobile. The choice of locations should be based on random sampling if this is possible, and in any case made with the objective of ensuring a representative sample.
Time of day	All Member States should elaborate the indicator for day hours in free-flow traffic: the night indicator should be optional due to its higher cost. The results should be shown separately for day and night.
Day of the week	Measurements to be carried out on Tuesdays, Wednesdays or Thursdays. Weekend measurements also possible but optional and again should be shown separately if carried out.
Month	Measurements to be carried out preferably in late spring and/or early autumn.
Weather	Measurements should not be taken in bad weather conditions (e.g. heavy rain, snow, ice, strong winds or fog). Member States will define the exclusion criteria and report them together with the data.
Tolerance	No tolerance (beyond the error margin of the measuring device), i.e. the values recorded should be those measured by the instrument.

KPI Speed for motorways



- KPI speed varies from 34% to 94% on motorways
- In MS with speed limit 130km/h, KPI varies from 45% (Croatia) to 94% (Italy)
- In MS with speed limit 120km/h, KPI varies from 36% (Poland) to 89% (Ireland)

Speed Indicators for Motorways



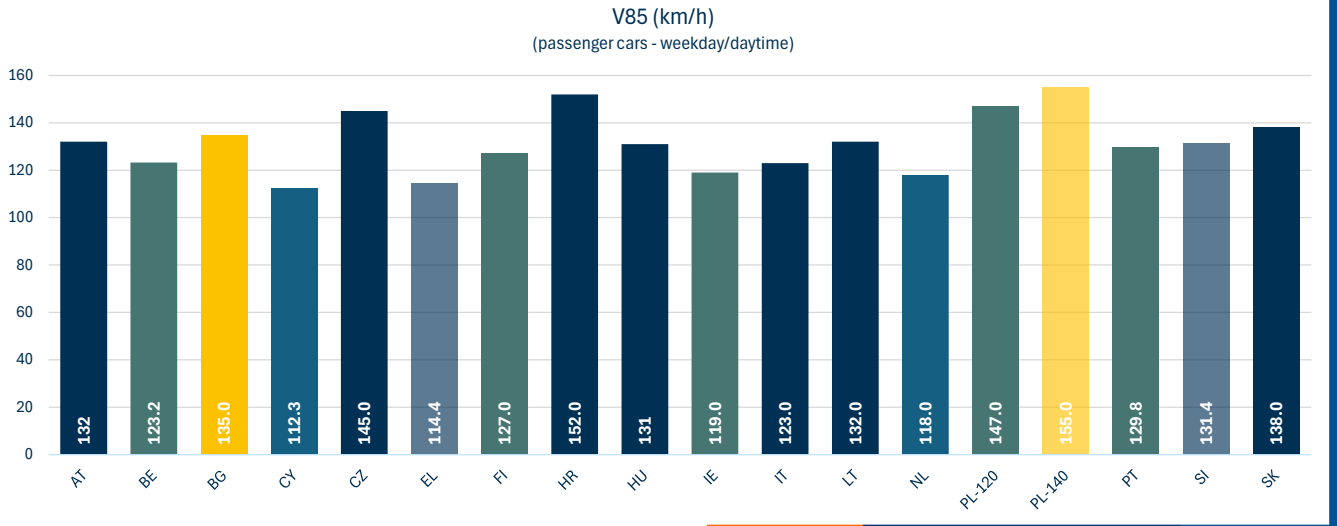
*EL, SI, PL-140: Low number of locations

Speed limit:

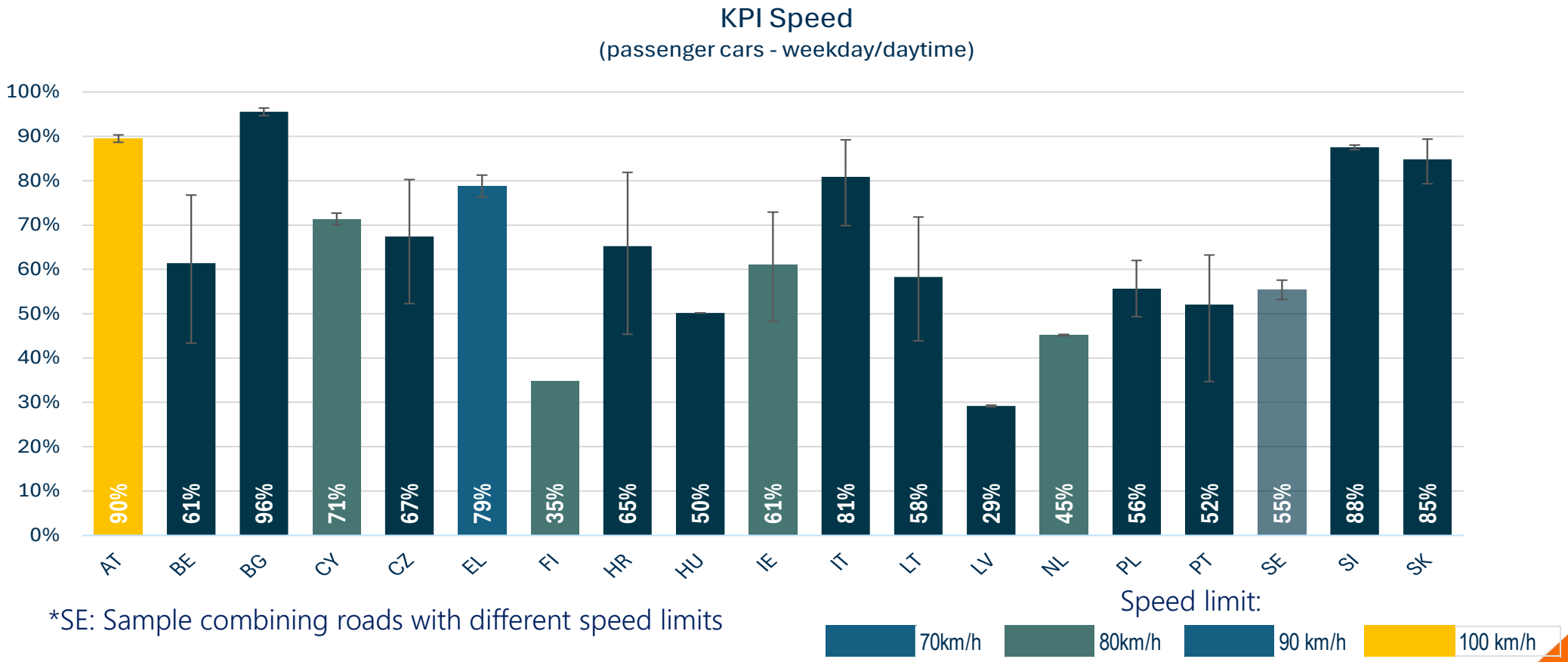
100 km/h | 120 km/h | 130 km/h | 140 km/h

- Average speed varies from 99km/h to 135km/h
- In MS with speed limit 130km/h, average speed varies from 99km/h (Greece) to 133km/h (Croatia)

- V85 varies from 112km/h to 155km/h
- In MS with speed limit 130km/h, V85 varies from 123km/h (Italy) to 152km/h (Croatia)
- V85 lies between 10km/h to 21km/h higher than the average speed



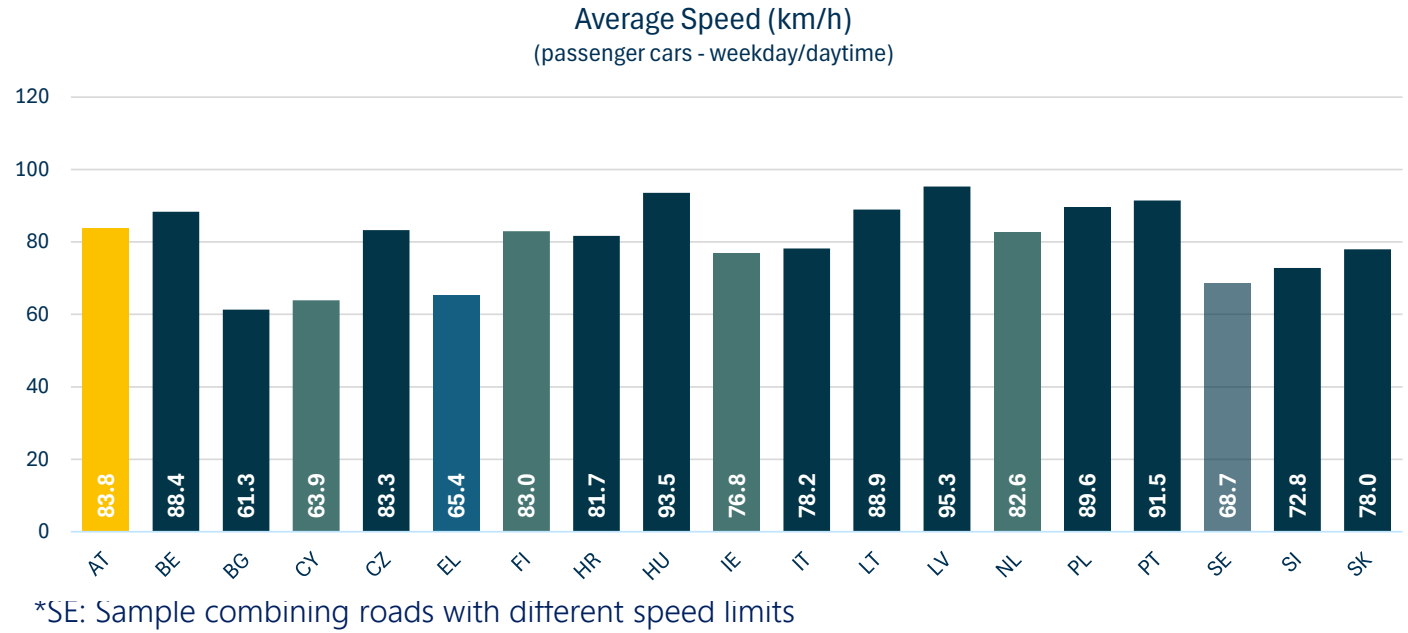
KPI Speed for Rural Roads



*SE: Sample combining roads with different speed limits

- KPI speed varies from 29% to 96%
- Among MS with speed limit 90km/h, KPI varies from 29% (Latvia) to 96% (Bulgaria)
- KPIs for the speed limit of 80km/h are lower

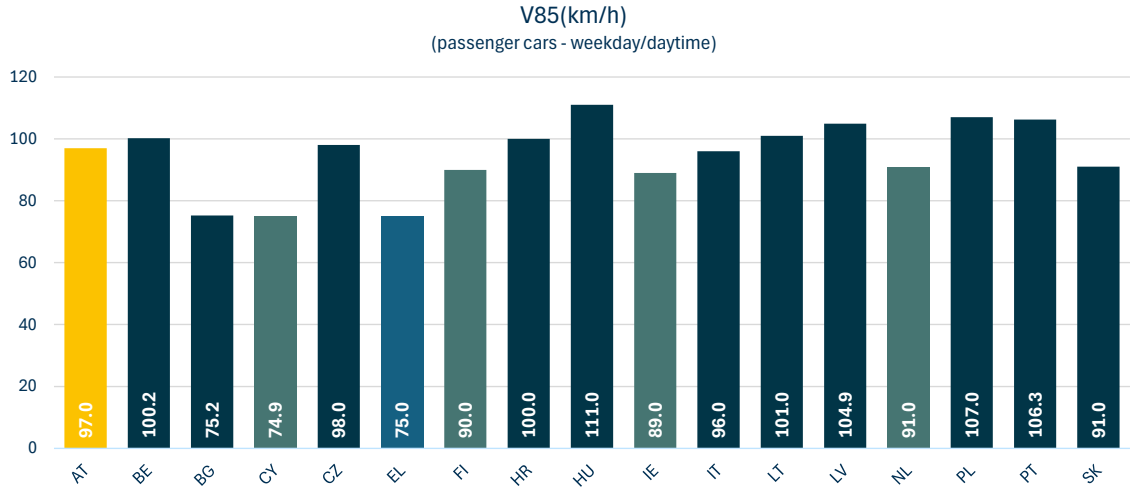
Speed Indicators for Rural Roads



*SE: Sample combining roads with different speed limits

- Average speed of MS with 90km/h speed limit varies from 61.3km/h (Bulgaria) to 91.5km/h (Portugal)
- Average speed of MS with 80km/h speed limit is close to that of the remaining MS

- V85 varies from 75km/h (Greece and Bulgaria) to 111km/h (Hungary)
- V85 of MS with 90km/h speed limit varies from 75.2km/h (Bulgaria) to 111km/h (Hungary)
- V85 of MS with 80km/h speed limit varies from 74.9km/h (Cyprus) to 91km/h (Netherlands)
- V85 lies between 7km/h to 18km/h higher than the average speed



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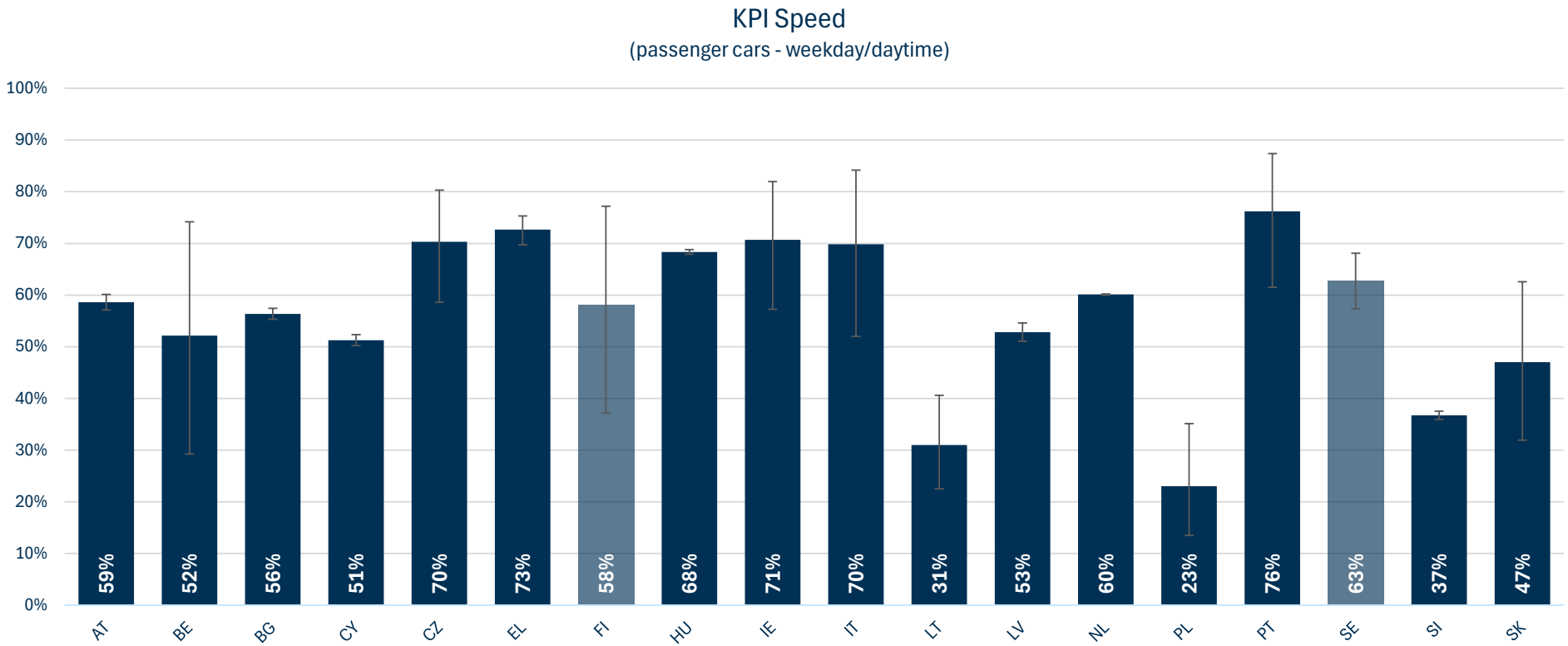
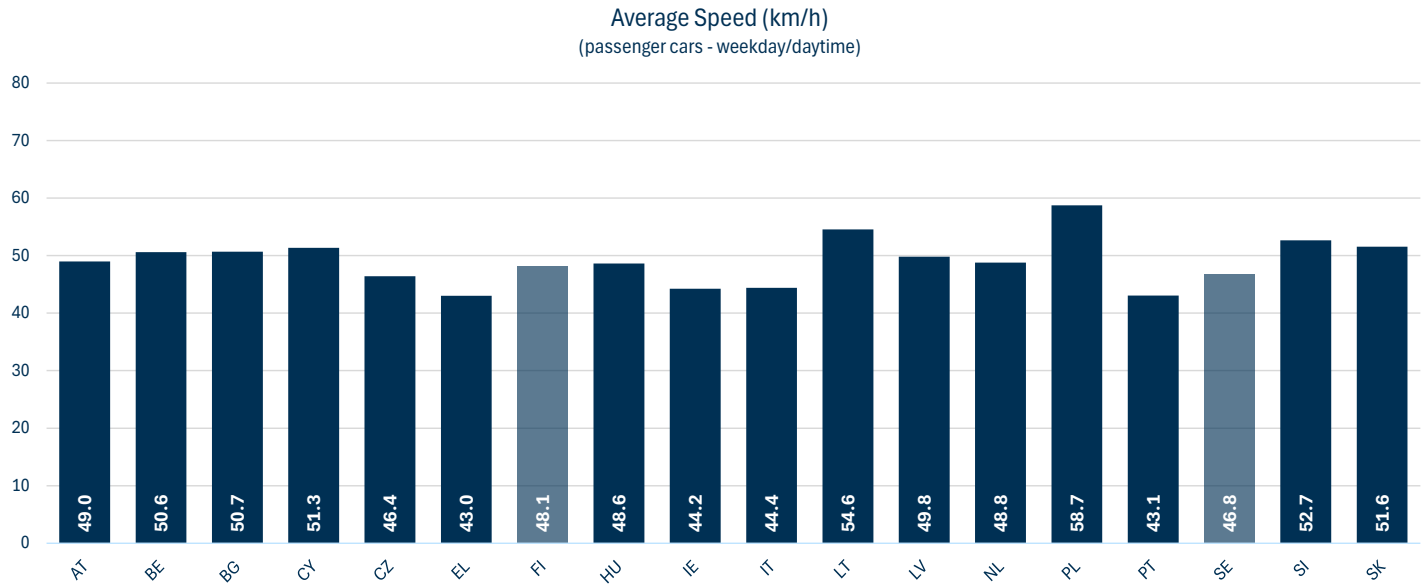
KPI Speed for Urban Roads



*Speed limit: 50km/h; SE: Sample combining roads with different speed limits; FI: Low number of locations

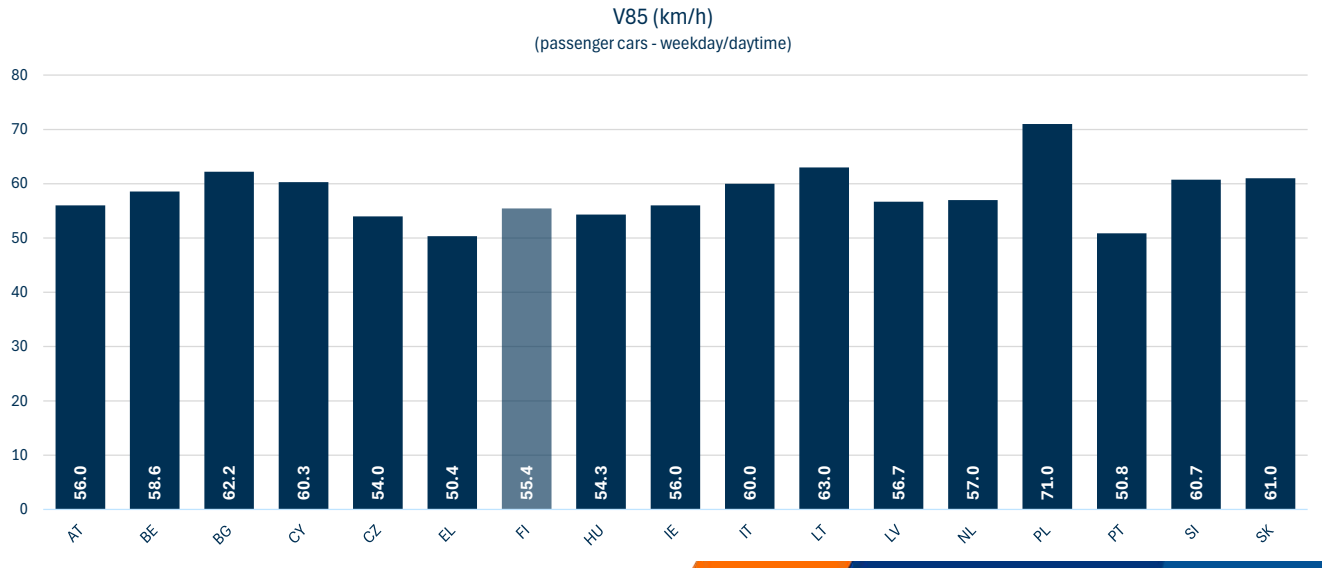
- KPI speed varies from 23% (Poland) to 76% (Portugal)
- KPIs for urban roads are lower than the KPIs for the other road types for most MS

Speed Indicators for Urban Roads



- Average speed varies from 43km/h (Greece and Portugal) to 58.7km/h (Poland)

*Speed limit: 50km/h; SE: Sample combining roads with different speed limits; FI: Low number of locations

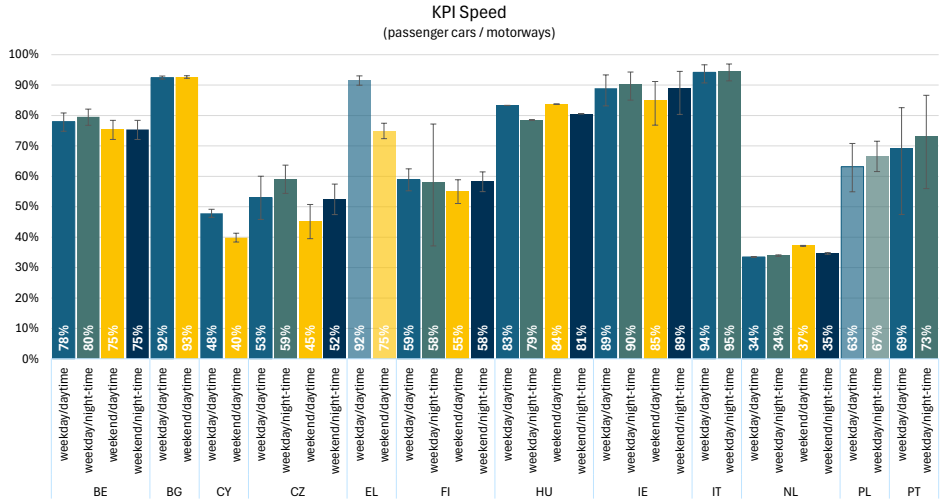


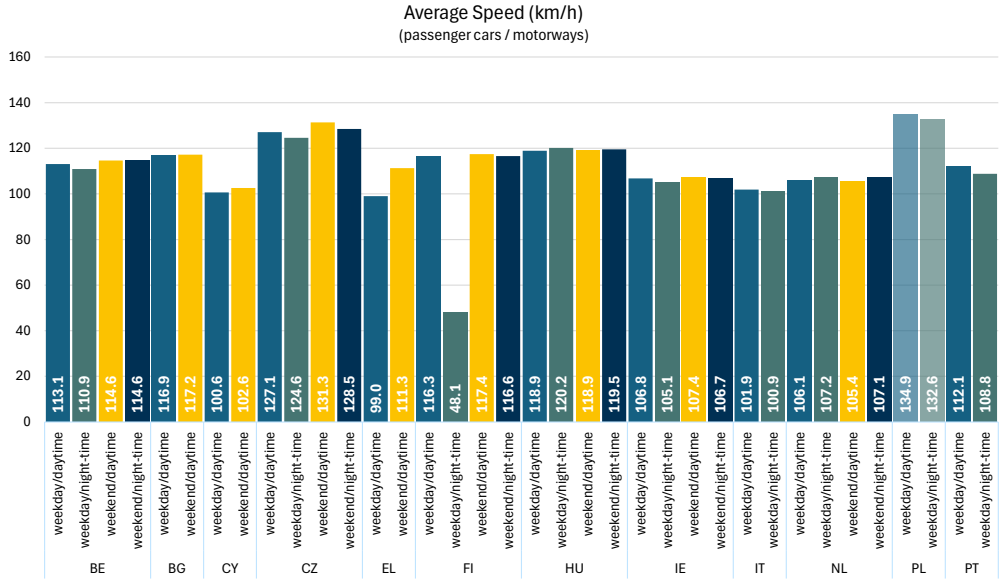
- V85 varies from 50km/h (Greece and Portugal) to 71km/h (Poland)
- V85 lies between about 6km/h to 16km/h higher than the average speed

Comparability of results across countries

- Minor methodological differences: all MS considered comparable for the minimum requested indicators
- One MS have results for mixed speed limits per road type
- All indicators provided by almost all MS:
  - percentage driving within speed limit (all MS)
  - average speed (all MS)
  - 85th percentile of speed (19 MS)
- Differences in speed limits per road type between MS make comparing more complex

KPI Speed by time period - Motorways

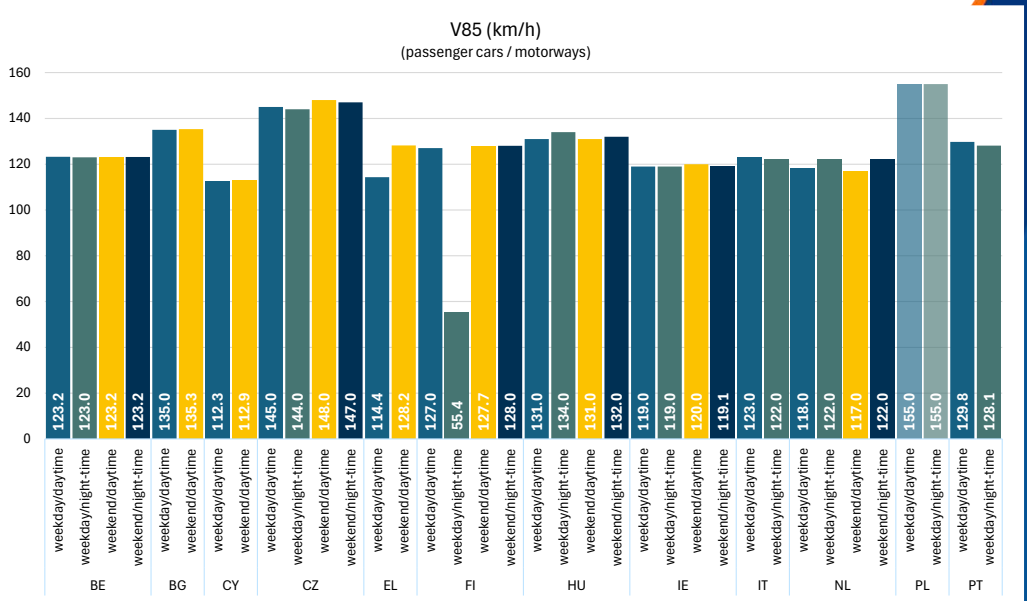




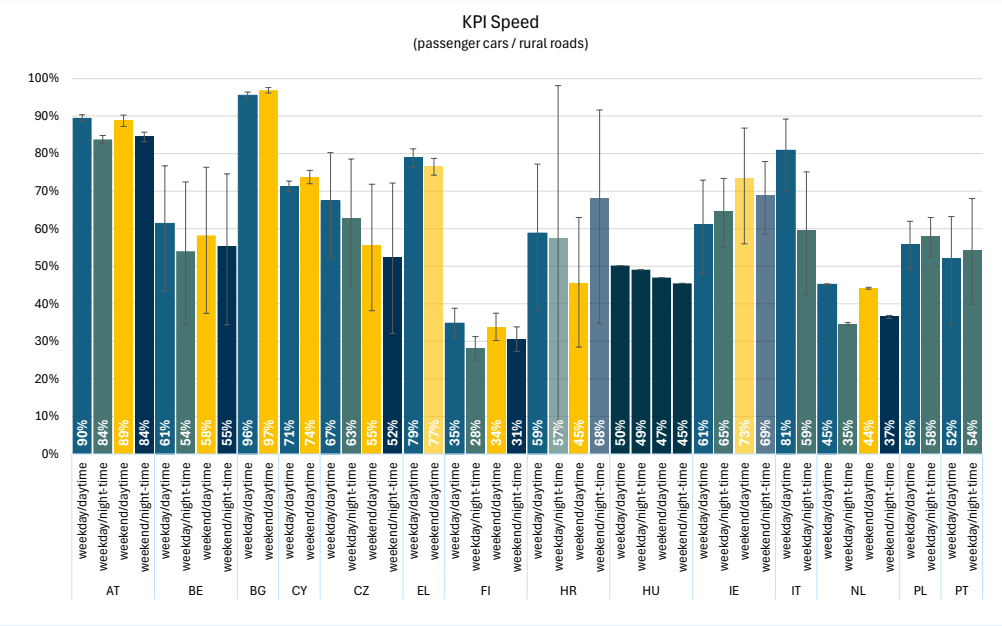
*EL, PL: Low number of locations

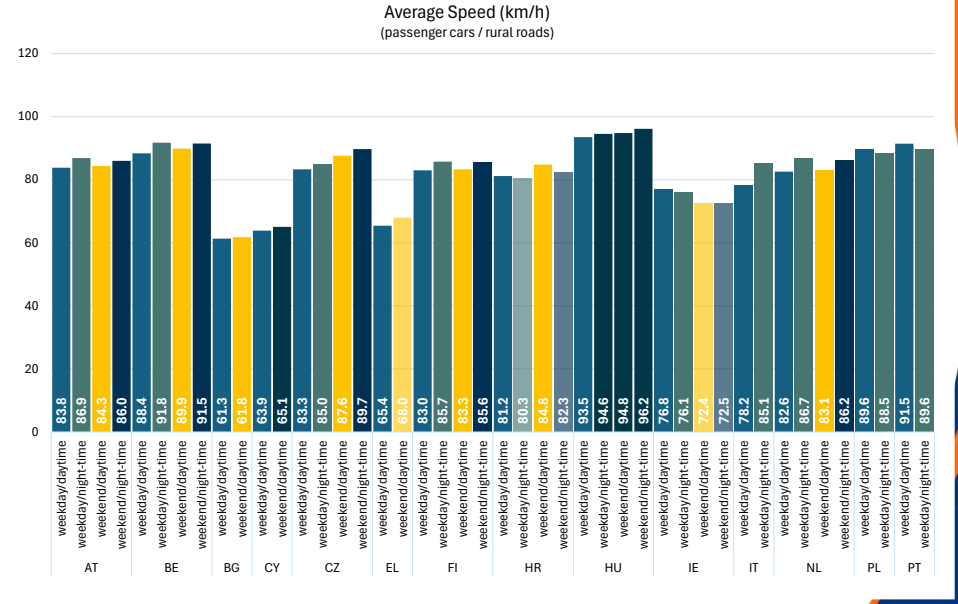
weekday/daytime | weekday/night-time | weekend/daytime | weekend/night-time

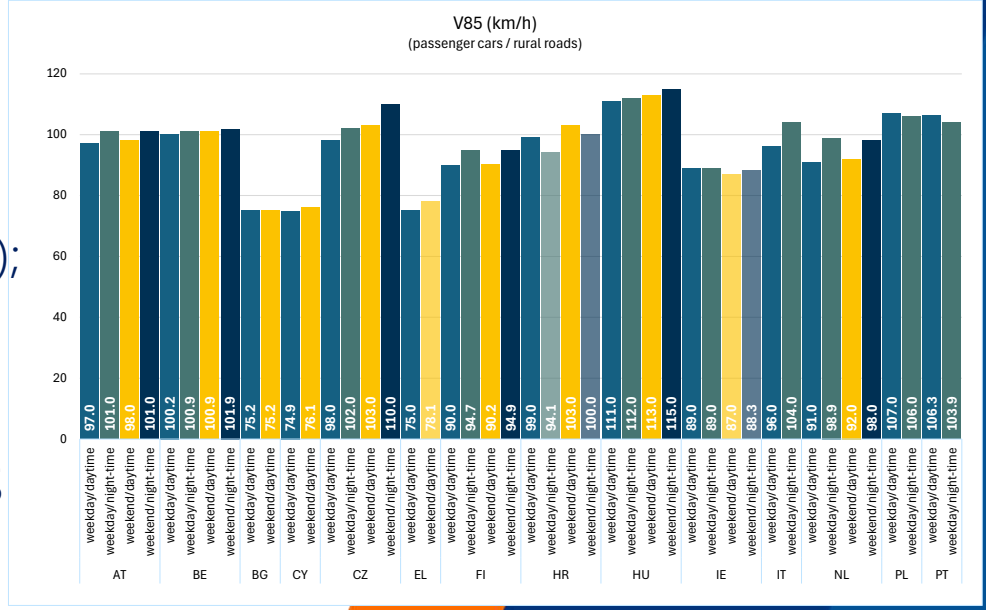
- KPIs on motorways do not differentiate significantly among different time periods for almost all MS
  - KPIs during daytime at weekends are lower than weekdays for 5 MS (BE, CY, CZ, EL, FI)



KPI Speed by time period – Rural Roads





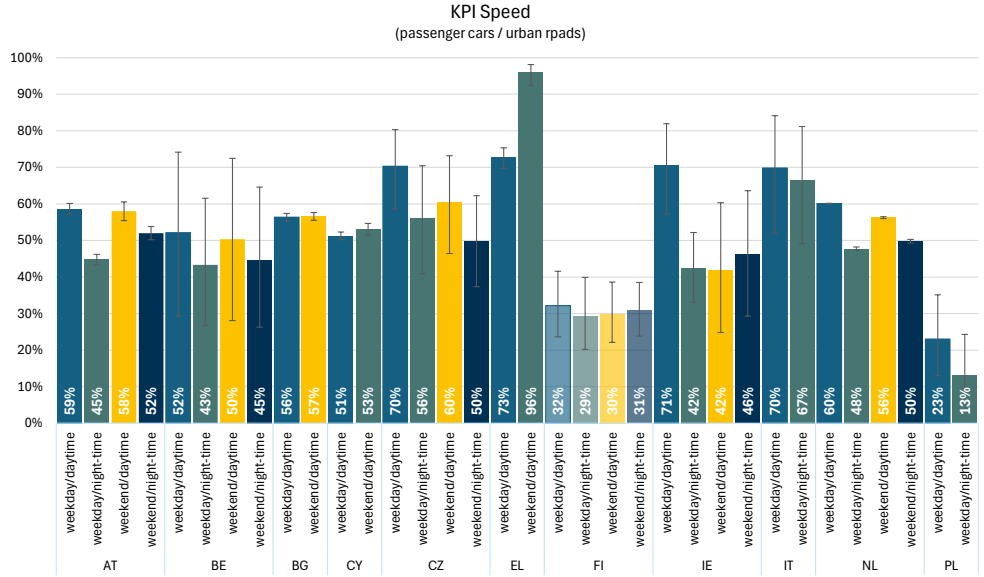


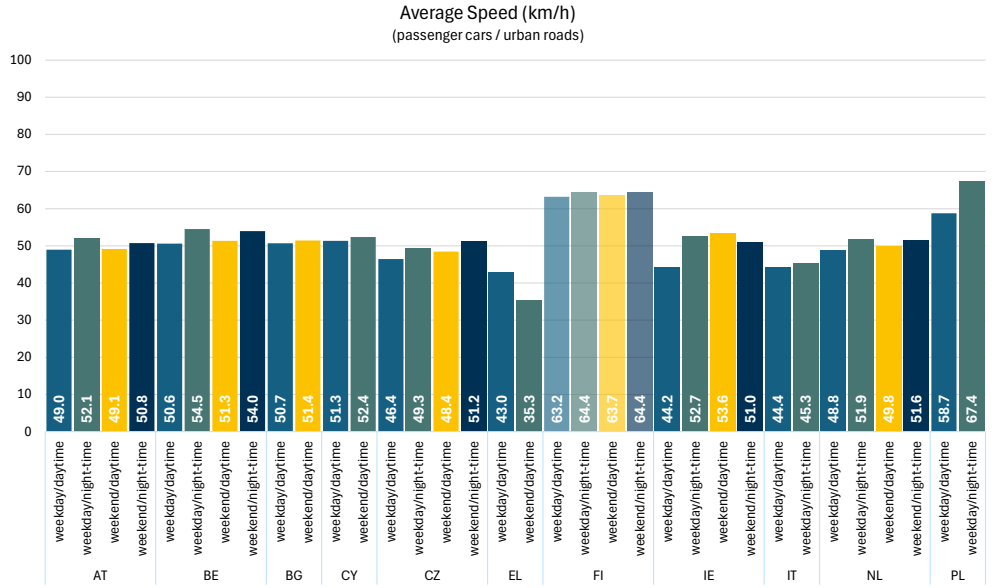
*EL: Low number of locations at weekends; IE: Low sample at weekends;
HR: Low number of locations during night-time

weekday/daytime weekday/night-time weekend/daytime weekend/night-time

- KPIs on rural roads are lower during night-time (weekday/weekend); though not statistically significant differences in some MS
- Average speed and V85 do not differentiate significantly by time period on rural roads; somehow higher during nigh-time in few MS

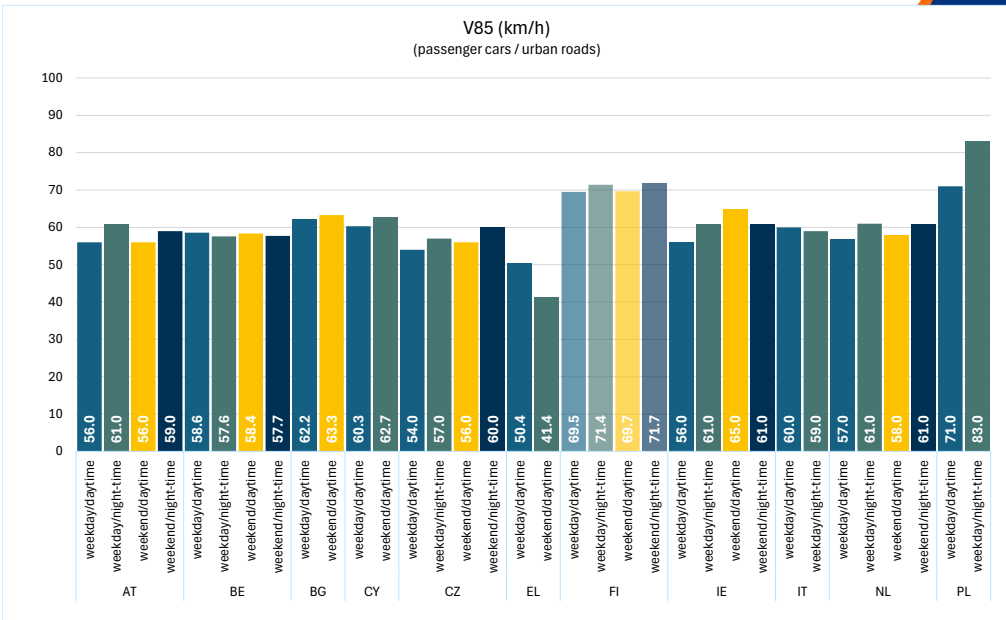
KPI Speed by time period – Urban Roads





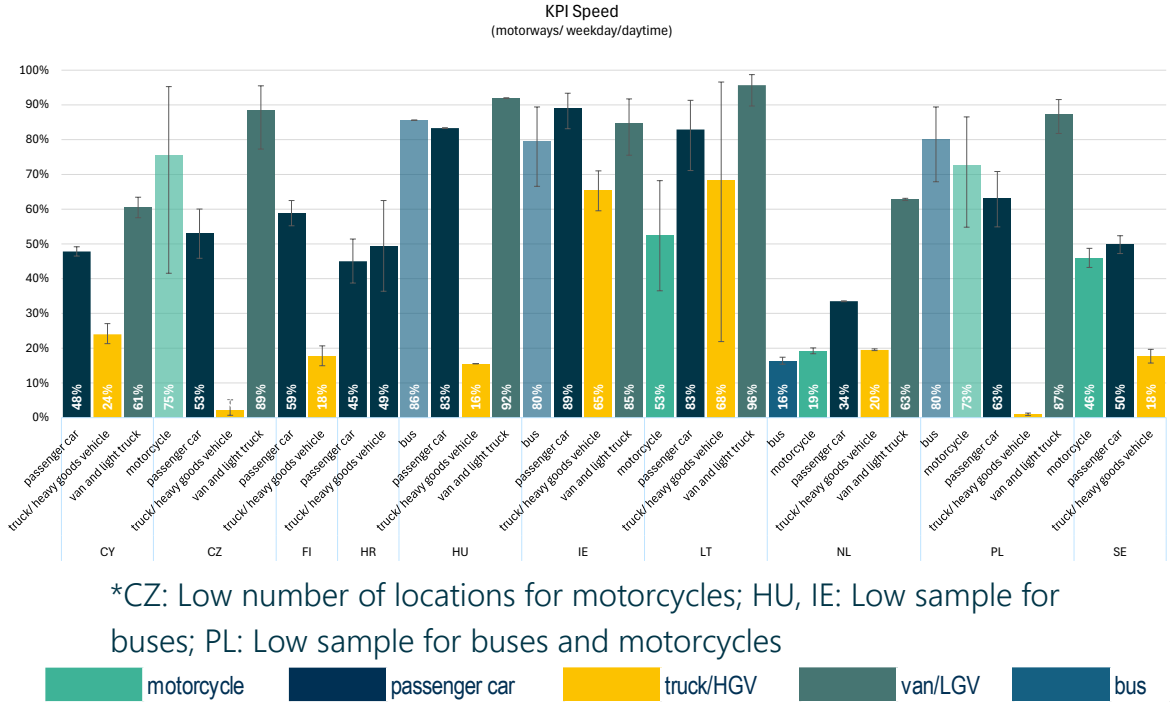
*FI: Low number of locations

weekday/daytime weekday/night-time weekend/daytime weekend/night-time



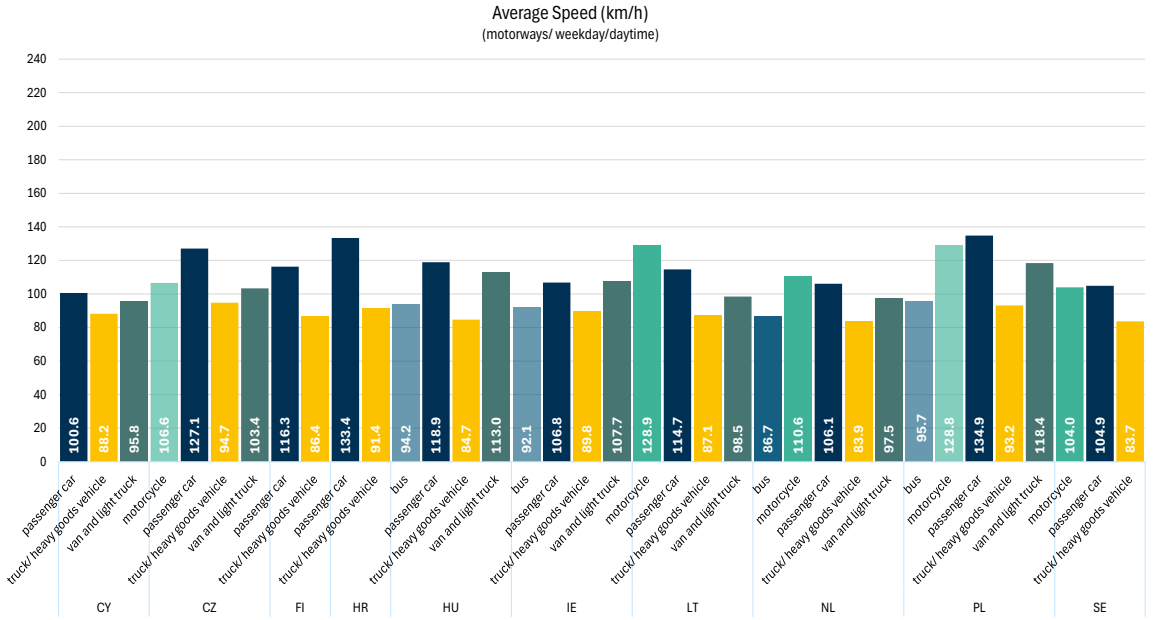
- KPIs on urban roads are lower during night-time on weekdays in most MS; though not statistically significant differences for all MS
- Average speed and V85 do not differentiate significantly among time periods on urban roads in almost all MS

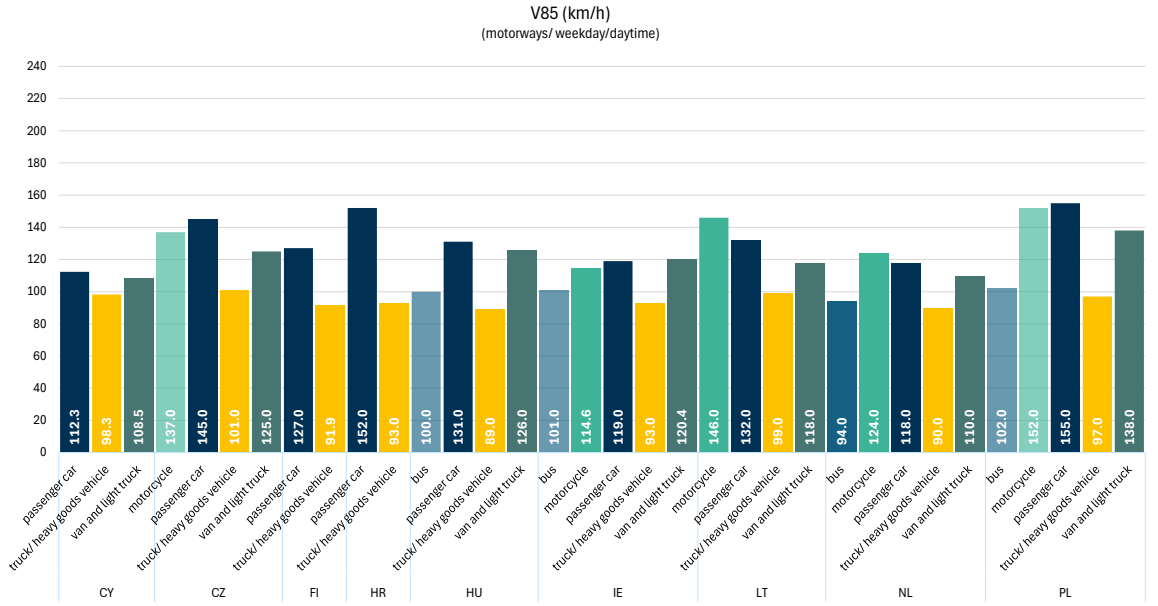
KPI Speed by vehicle type - Motorways



*CZ: Low number of locations for motorcycles; HU, IE: Low sample for buses; PL: Low sample for buses and motorcycles

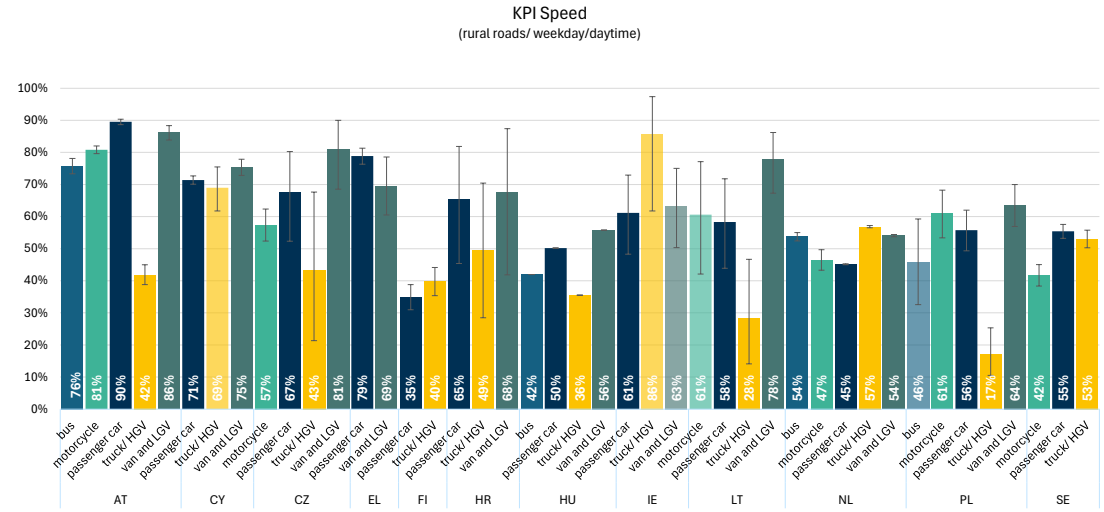
motorcycle | passenger car | truck/HGV | van/LGV | bus

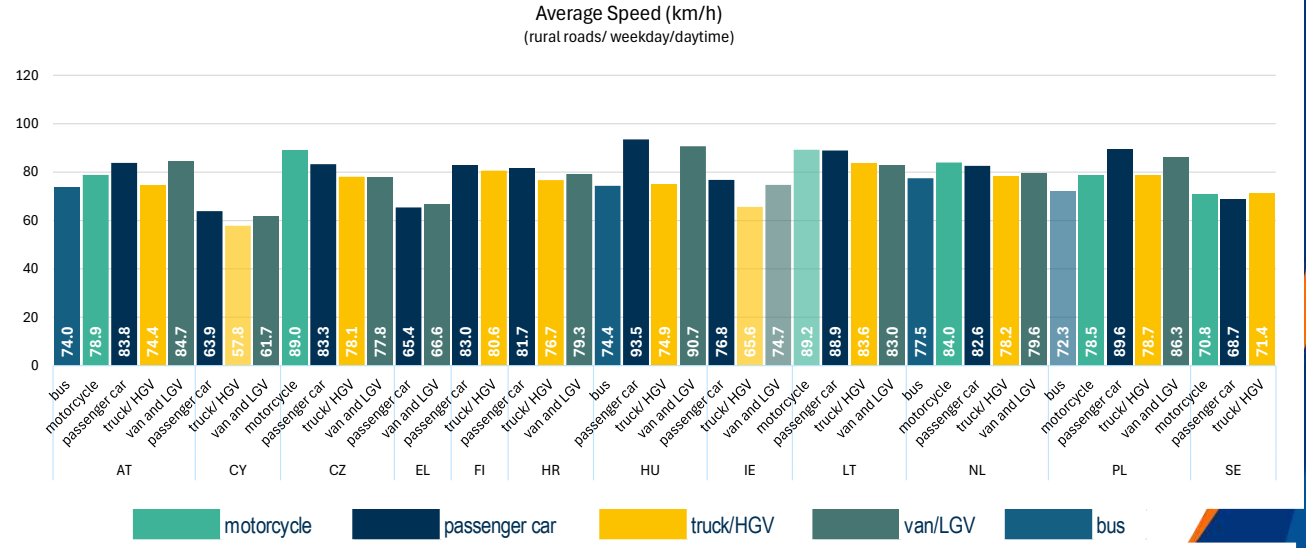




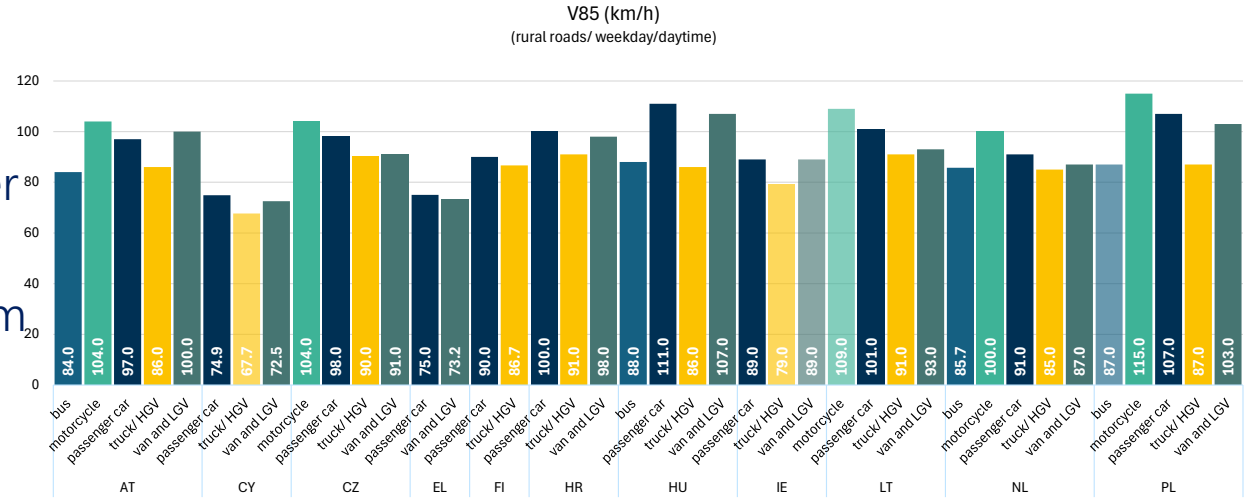
- KPIs on motorways are lower for trucks and HGVs, followed by motorcycles in most MS
- Average speed of trucks and HGVs on motorways varies from 84km/h to 95km/h and V85 from 89km/h to 101km/h
- Average speed of motorcycles on motorways varies from 104km/h to 129km/h and V85 from 124km/h to 152km/h

KPI Speed by vehicle type – Rural Roads





*CY: Low sample for trucks/HGVs; IE: Low sample for trucks/HGVs and van/LGVs; LT: Low sample for motorcycles; PL: Low sample for buses



- No common pattern by vehicle type on rural roads:
  - KPIs are lower for trucks and HGVs in most MS
  - KPIs for motorcycles are lower than KPIs for passenger cars in most MS
- Average speed of motorcycles on rural roads varies from 71km/h to 89km/h and V85 from 100km/h to 115km/h
- Average speed of vans and LGVs on rural roads varies from 62km/h to 90km/h and V85 from 73km/h to 107km/h

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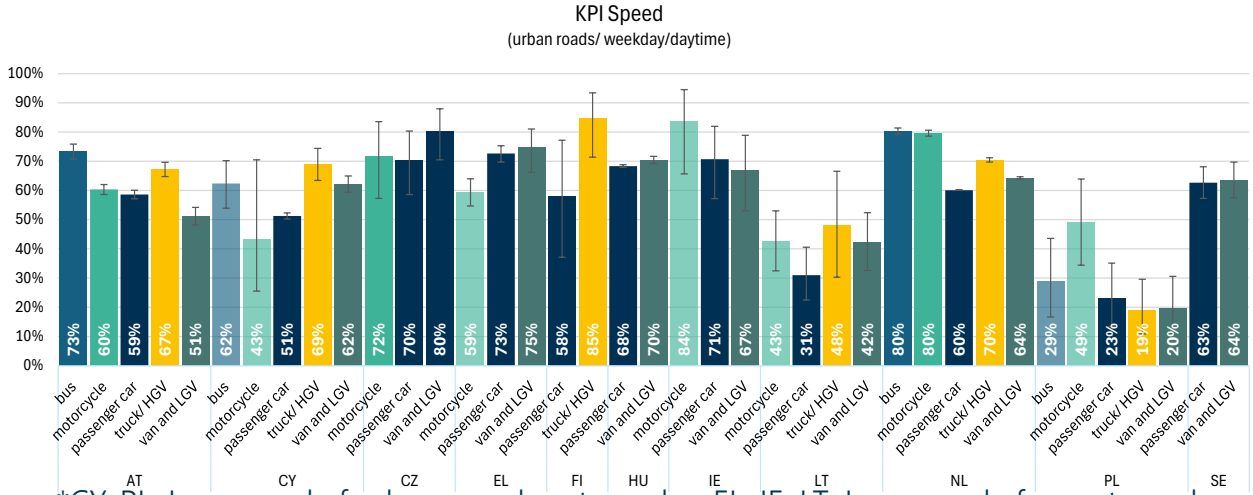
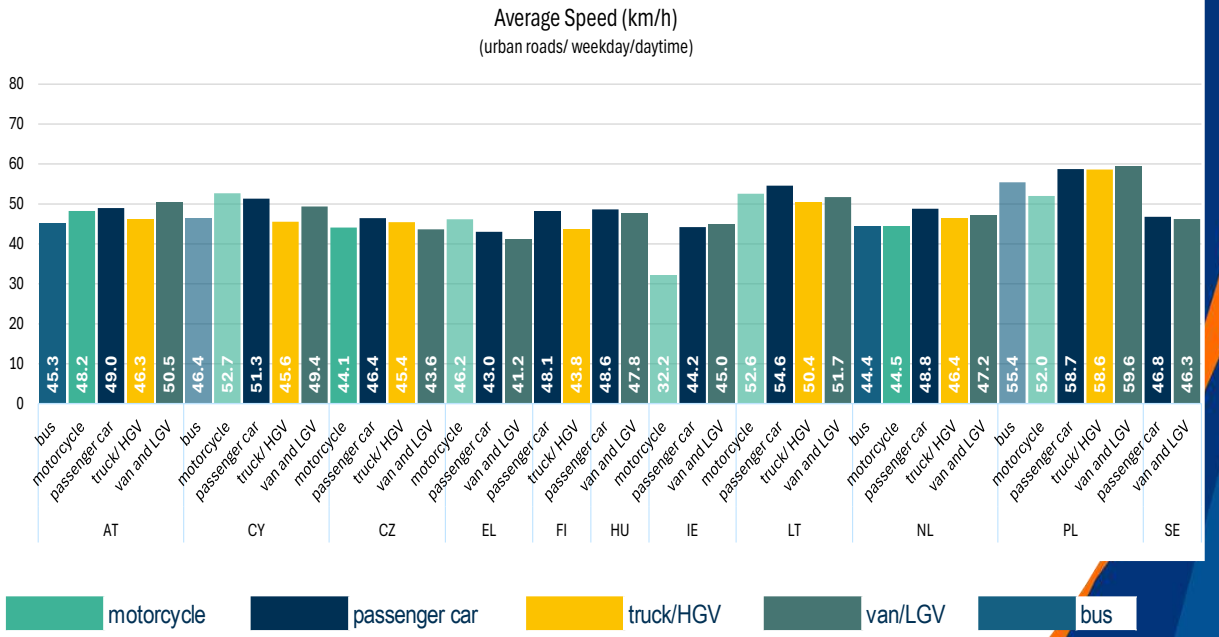
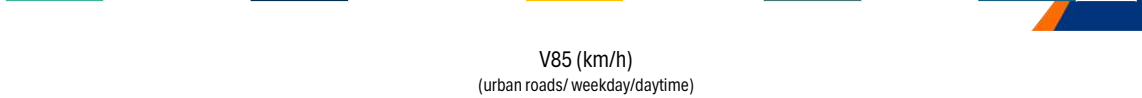
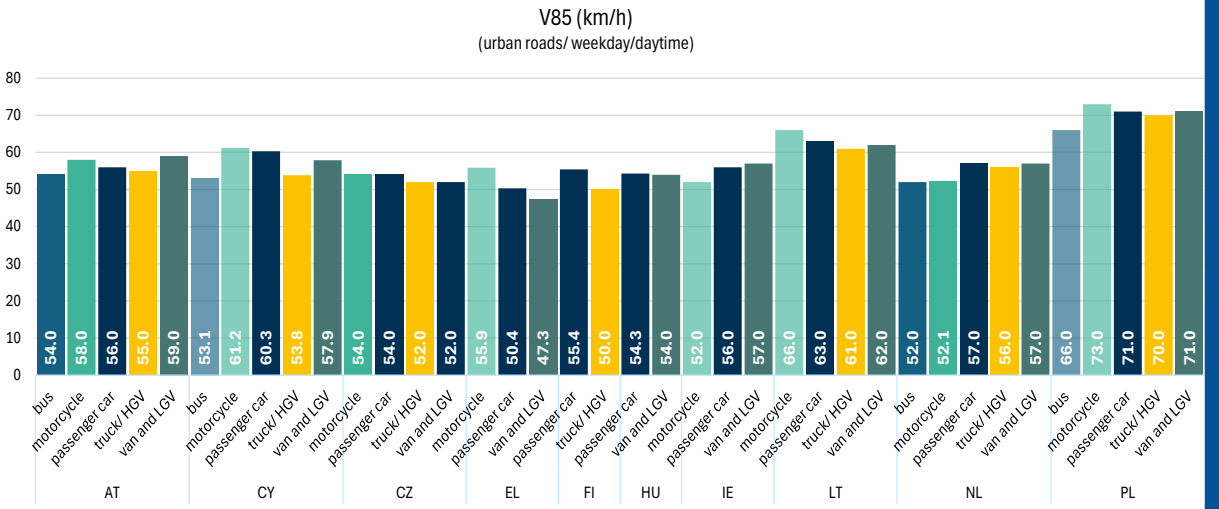
KPI Speed by vehicle type – Urban Roads



*CY, PL: Low sample for buses and motorcycles; EL, IE, LT: Low sample for motorcycles; HU: Low sample for trucks/HGVs







- No common pattern by vehicle type on urban roads:
  - In most MS, KPIs for passenger cars are lower compared to the remaining transport modes; though not statistically differences are observed in all cases
- Average speed of motorcycles on urban roads varies from 32km/h to 53km/h and V85 from 52km/h to 73km/h
- Average speed of vans and LGVs on urban roads varies from 44km/h to 60km/h and V85 from 47km/h to 71km/h

Speed Indicators by speed limit (1/2)

Motorways

Country	Speed limit (km/h)	KPI *(CIs)*	Avg Speed (km/h)	V85 (km/h)
Finland	100	**36%** *(31.2%-40.3%)*	103	112
	120	**59%** *(55.2%-62.5%)*	116	127
Poland	120	**36%** *(27.7%-44.6%)*	128	147
	140	**49%** *(45.5%-51.9%)*	121	149

Rural Roads

Country	Speed limit (km/h)	KPI *(CIs)*	Avg Speed (km/h)	V85 (km/h)
Austria	70	**58%** *(55.7%-59.4%)*	69	79
	80	**77%** *(75.2%-77.9%)*	74	84
	100	**90%** *(88.7%-90.4%)*	84	97
Belgium	70	**59%** *(42.3%-73.3%)*	68	77
	90	**61%***(43.4%-76.8%)*	88	100
Finland	60	**25%** *(16.2%-36.5%)*	64	71
	80	**35%** *(31.0%-38.8%)*	83	90
	100	**62%** *(59.5%-65.4%)*	97	105
Ireland	80	**61%** *(48.3%-72.9%)*	77	89
	100	**70%** *(56.9%-81.8%)*	95	108

- Few MS recorded KPIs per speed limit by road type
- Lower KPIs are observed on roads with lower speed limits by road type in each MS

Speed Indicators by speed limit (2/2)

Urban Roads

Country	Speed limit (km/h)	KPI *(CIs)*	Avg Speed (km/h)	V85 (km/h)
Austria	30	**28%** *(26.3%-29.0%)*	34	41
	50	**59%** *(57.1%-60.1%)*	49	56
Belgium	30	**19%** *(9.9%-33.4%)*	39	49
	50	**52%***(29.2%-74.2%)*	51	59
Ireland	30	**40%** *(26.9%-55.1%)*	32	40
	50	**71%** *(57.2%-81.9%)*	44	56
Italy	30	**45%** *(25.9%-65.4%)*	34	48
	50	**70%** *(52.0%-84.2%)*	44	60

- KPIs observed on roads with 30km/h are considerably lower than the KPIs on roads with 50 km/h speed limit

Comparison to Baseline -KPI Speed for Motorways (passenger cars/weekday daytime)

	Baseline			Trendline		
Country	KPI	Avg speed	V85	KPI	Avg speed	V85
AT	80.9%	120.8	131	81.8%	120.3	132.0
BE	56.4%	119.0	130.8	78.0%	113.1	123.2
BG	89.4%	116.2	136.8	92.5%	116.9	135.0
CZ	39.8%	133.5	151	53.0%	127.1	145.0
CY	46.5%	97.7	108.8	47.8%	100.6	112.3
EL	77.7%	109.2	124.8	91.6%	99.0	114.4
FI	54.5%	116.9	128.2	58.9%	116.3	127.0
IE*	*88.0%*	*106*	*119*	89.0%	106.8	119.0
LT	76.8%	118.3	135	82.9%	114.7	132.0
PT	43.6%	124.2	144	69.1%	112.1	129.8
PL-140	71.3%	130	151	63.1%	134.9	155.0
PL-120	43.7%	124.4	144	35.8%	127.9	147.0
SE*	*44.4%*	*108.1*		49.8%	104.9	

* Results for Ireland and Sweden deviate methodologically from the other MS in the Baseline project

- In most MS, an improvement is observed, reflected in the increase of the KPI values and decrease in average speed and V85
- KPIs are almost stable in 4 MS
- Only in Poland, KPIs have decreased between the two periods
- In some MS there are methodological differences in data collection and calculation of KPIs.
- CIs have been calculated differently for almost all MS, thus no statistically reliable conclusions can be drawn about the trend of all indicators.

Comparison to Baseline - KPI Speed for Rural Roads (passenger cars/weekday daytime)

	Baseline			Trendline		
Country	KPI	Avg speed	V85	KPI	Avg speed	V85
AT	88.9%	85.0	97.0	89.5%	83.8	97.0
BE	46.0%	92.9	106.1	61.4%	88.4	100.2
BG	93.4%	64.2	77.7	95.6%	61.3	75.2
CZ	54.5%	88.7	104.0	67.4%	83.3	98.0
CY	45.7%	69.4	77.7	71.4%	63.9	74.9
EL*	84.4%	68.1	78.9	78.9%	65.4	75.0
FI	38.7%	82.2	90.1	34.8%	83.0	90.0
IE*	80.0%	91.0	102.0	61.1%	76.8	89.0
LT	47.2%	92.6	104.6	58.3%	88.9	101.0
LV	29.0%	96.6	105.0	29.2%	95.3	104.9
PL	51.9%	91.2	109.0	55.7%	89.6	107.0
PT	35.5%	97.1	115.9	52.1%	91.5	106.3
SE*	51.7%	69.7		55.4%	68.7	

* Results for Ireland and Sweden deviate methodologically from the other MS in the Baseline project; Different speed limits for rural roads have been considered for Greece

- In most MS, an improvement is observed, reflected in the increase of the KPI values and decrease in average speed and V85
- KPIs are almost stable in 4 MS
- It is noted that in some MS there are methodological differences in data collection and calculation of KPIs.
- CIs have been calculated differently for almost all MS, thus no statistically reliable conclusions can be drawn about the trend of all indicators.

Comparison to Baseline-KPI Speed for Urban Roads (passenger cars/weekday daytime)

	Baseline			Trendline		
Country	KPI	Avg speed	V85	KPI	Avg speed	V85
AT	57.4%	49.8	56.0	58.6%	49.0	56.0
BE	49.9%	51.0	59.8	52.1%	50.6	58.6
BG	44.7%	52.5	63.3	56.4%	50.7	62.2
CZ	57.3%	49.6	56.0	70.3%	46.4	54.0
CY	26.1%	56.2	65.1	51.3%	51.3	60.3
EL	58.8%	46.7	55.6	72.7%	43.0	50.4
FI	43.0%	50.9	59.0	58.2%	48.1	55.4
IE*	25.0%	58.0	70.0	70.7%	44.2	56.0
LT	36.4%	53.6	63.0	31.0%	54.6	63.0
LV	41.4%	52.1	58.0	52.8%	49.8	56.7
PL	20.5%	60.8	74.0	23.0%	58.7	71.0
PT	73.0%	44.3	52.7	76.2%	43.1	50.8
SE*	66.0%	46.8		62.7%	46.8	

* Results for Ireland and Sweden deviate methodologically from the other MS in the Baseline project

- In most MS, an improvement is observed, reflected in the increase of the KPI values and decrease in average speed and V85
- KPIs are almost stable in 5 MS
- It is noted that in some MS there are methodological differences in data collection and calculation of KPIs.
- CIs have been calculated differently for almost all MS, thus no statistically reliable conclusions can be drawn about the trend of all indicators.

Trendline experimental indicators

- Driving under the influence of drugs
- Share of 30km/h road lane lengths in urban zones
- Red-light negations by road users
- Compliance with traffic rules at intersections
- Helmet wearing of PMD riders
- Self-reported risky behaviour
- Attitudes towards risky behaviour
- Use of lights by cyclists in the dark
- Enforcement of traffic regulations
- Alternative speeding indicators

Definition of Alternative Speeding Indicators

Minimum requirement:

Percentage of vehicles travelling 10km/h or 20km/h or 30km/h faster than the speed limit

(i.e. the percentage of vehicles overspeeding by less than or equal to 10km/h, 20km/h or 30km/h)

Each Member State could additionally calculate the KPI using the intervals that are more meaningful based on national law provisions.

Additionally suggested to measure:

speed variation expressed by the difference between the lowest and highest 10% of speeds per road type or area type or speed limit or vehicle type

Pilots of Alternative Speeding Indicators

KPI	Finland	Italy	Poland	Portugal
% of vehicles travelling 10km/h 20km/h or 30km/h over the speed limit	• Passenger car on weekday-daytime / road type • weekday/daytime / road type and vehicle type (passenger car, truck/HGV) • Passenger car / time period and road type Free flow	•Passenger car on weekday-daytime / road type • weekday/daytime / road type and vehicle type (passenger car, vans-buses-tracks) • vehicle type / time period and road type Free flow	•Passenger car on weekday-daytime / road type • weekday/daytime / road type and vehicle type (passenger car, vans-buses-tracks) • vehicle type / time period and road type Free flow Non-free flow	•Passenger car on weekday-daytime / road type • weekday/daytime / road type and vehicle type (passenger car) • vehicle type / time period and road type Free flow
difference between the lowest and highest 10% of speeds (variation) per road type or area type or speed limit or vehicle type	as above	as above	as above	as above
% of vehicles overspeeding using other speed intervals	Yes (≥ 31 km/h)	Yes (≤ 5, 11-39, 40-59, ≥ 60 km/h)	No	Yes (≥ 40, ≥ 60 km/h)

Lessons learned

- For the development of KPI Speed and ASI the same data are needed but differently analysed.
- Generally, the percentage of vehicles overspeeding decreases at higher overspeeding levels (i.e. 10, 20, 30 km/h over the speed limit) showing a restrained inclination to speeding.
- In most cases the higher the speed limit is, the higher the speed variation (difference between the lowest and highest 10% of speeds) gets showing different behaviours towards speeding in different contexts.
- Meaningful overspeeding intervals differ among Member States implying different levels of tolerance against speeding reflected in the respective enforcement practices and sanctions.

Recommendations on future scope

- It is recommended that the indicator be collected systematically using the same methodology to ensure the comparability of results and better assessment of performance progress at national and European level.

- It is recommended that alternative speed indicators (speed variation) be collected in combination with the KPI Speed, average speed and V85 to better assess driver behavior and performance level in each MS.

- Further analysis of the speed indicators in combination with crash and injury data (as well as time series data) could be considered in the future.

Recommendations on methodology

- In order to compare Member States, breakdowns by road type and speed limit are useful.
- Behaviour appears to depend on speed limits by road type, with lower KPIs observed on roads with lower speed limits (based on data of few MS). Therefore, breakdown by speed limit by road type is preferred for comparison among MS.
- Given that speed limits differ per vehicle type, distinction between vehicle types is also recommended.
- Behaviour appears to depend on time period, with, statistically significant differences being observed in few MS. Differences between daytime and night-time and between weekdays and weekends show that breakdown by time period should be kept for future comparisons.
- Average speed and 85th percentile of speed provide additional insight, as they complement the standard KPI.

Recommendations on policy integration

- The safe system approach is based on identifying as clear as possible the various issues affecting overall safety performance and taking early action to reduce road crashes and injuries.
- In this context, the use of KPI Speed and other complementary speed indicators, which are causally related to road crashes and fatal or serious injuries, in the policy making process can lead to this direction.
- Speed indicators included in the national road safety strategies can serve as a useful tool to monitor progress towards road safety targets and to prioritize problems.
- The systematic collection of Speed indicators, disaggregated by road type, time period and vehicle type, is recommended in order to assess the road safety performance level in each MS and progress over time.

TRENDLINE project: Speed and speeding behaviour in Europe

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