European Commission

CARE Experts Group Meeting

online, 15 March 2023

Use of Road Safety Key Performance Indicators in the Greek National Strategy

George Yannis, NTUA Professor
Dimitrios Nikolaou, Researcher NTUA
Katerina Folla, Researcher NTUA

Department of Transportation Planning and Engineering,
National Technical University of Athens

Presentation Outline

1. National Road Safety Policy
2. Road Safety in Greece
3. Road Safety Targets for the decade 2021-2030
4. Road Safety Actions and Measures
5. Concluding Remarks

National Road Safety Policy

A Modern Strategic Plan

- The Hellenic Ministry of Infrastructure and Transport developed the **National Road Safety Strategic Plan** for the period 2021-2030, under the coordination of the Directorate of Road Traffic and Safety and with the scientific support of the Department of Transportation Planning and Engineering of the National Technical University of Athens.

- The National Strategic Plan concerns the definition, implementation and monitoring of the **necessary actions** to drastically reduce the number of persons killed and injured in road crashes.

- The development of the National Road Safety Strategic Plan was based on existing **international experience**, the detailed analysis of the **Greek potential** as well as on the systematic open consultation.

Strategic Plan Key Principles

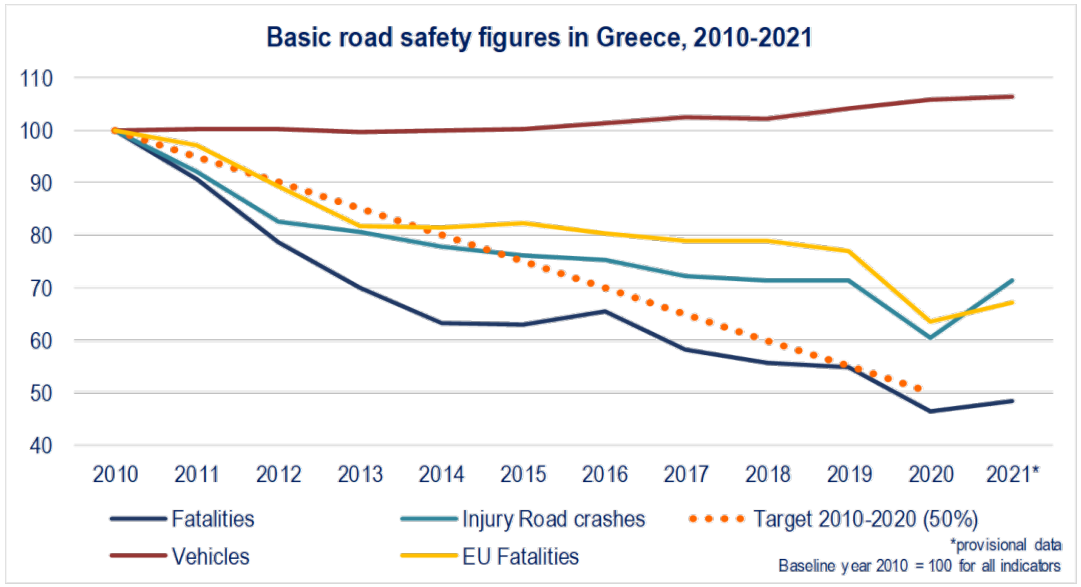
- Based on the principles of Vision Zero and Safe System Approach, a **new holistic approach to road transport system's safety** in Greece for the decade 2021-2030 has been adopted with the ultimate goal of achieving the ambitious vision zero fatalities by 2050.

Road Safety in Greece

Constant Road Safety Improvement in Greece

- During the last decade (2010-2020), Greece presented the most significant road safety improvement among the EU countries, with a **54% reduction in the number of fatalities in road crashes**, achieving the target of road fatalities' reduction by 50%.

- Moreover, a **39% reduction in road crashes** and a 72% reduction in serious injuries were recorded.



Key Crash Causes

- The comparison of Greek and EU road crash statistics reveals **the most significant road safety problems** in Greece.
- One of them is the particularly high rate of **powered two-wheeler (motorcycles and mopeds)** riders' fatalities (36%), which is twice as high as the respective EU average (18%).
- Greece also presents one of the highest rates (54%) of road fatalities **inside built-up areas** (EU average: 39%), mainly due to motorcycle road crashes.
- 41% of total road fatalities concerned **single-vehicle road crashes** (EU average 31%), mainly due to inappropriate high vehicle speeds.

	Greece			EU27
	2019	2010-2019 (%)	2019 (%)	2019 (%)
Total fatalities	688	-45%	100%	100%
Drivers	470	-44%	68%	65%
Passengers	73	-70%	11%	15%
Pedestrians	145	-19%	21%	20%
Inside built-up areas	370	-38%	54%	39%
Outside built-up areas	318	-52%	46%	61%
On motorways	50	-43%	7%	9%
Passenger Cars	202	-63%	29%	44%
Motorcycles/Mopeds	247	-55%	36%	18%
Bicycles	22	-4%	3%	9%
Young drivers (18-24)	61	-54%	9%	8%
Older drivers (65+)	99	-24%	14%	15%
Children (0-14)	12	-60%	2%	2%
Male drivers	441	-43%	64%	55%
Female drivers	29	-52%	4%	8%
In crashes with Heavy Goods Vehicles	40	-61%	6%	13%
Drivers/Passengers in single-vehicle crash	280	-44%	41%	31%

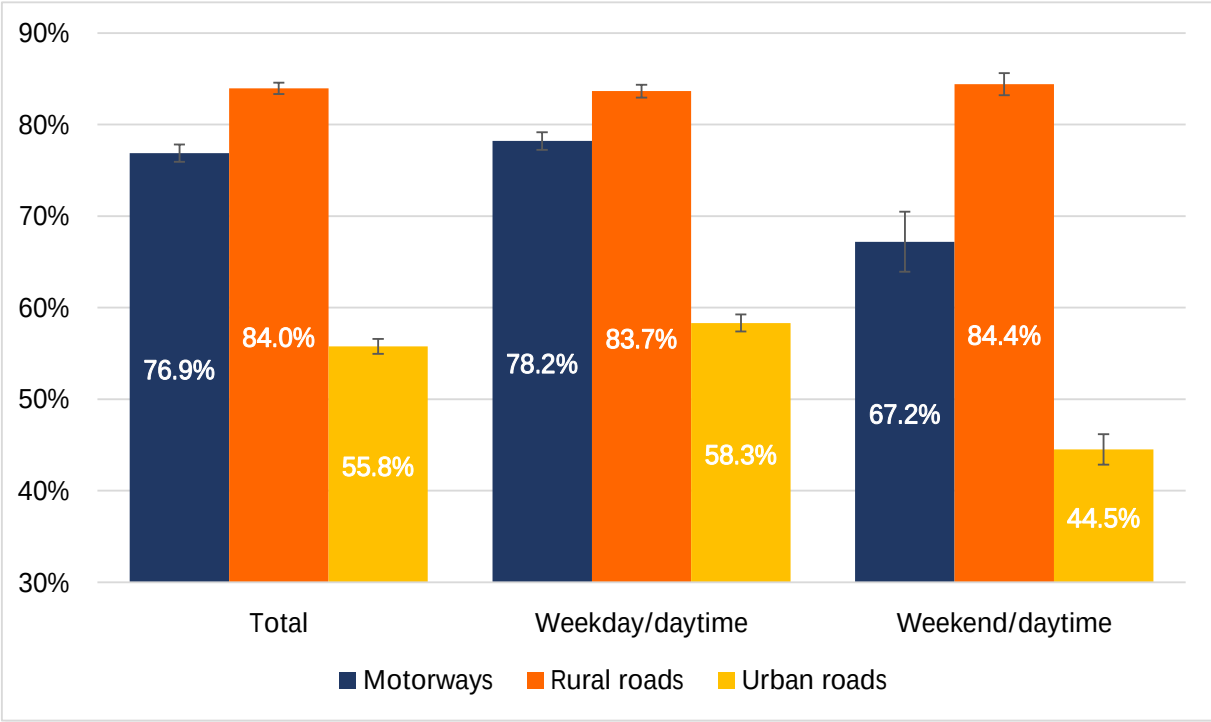
Source: CARE, ELSTAT, Processing: D.T.P.E.. / NTUA.

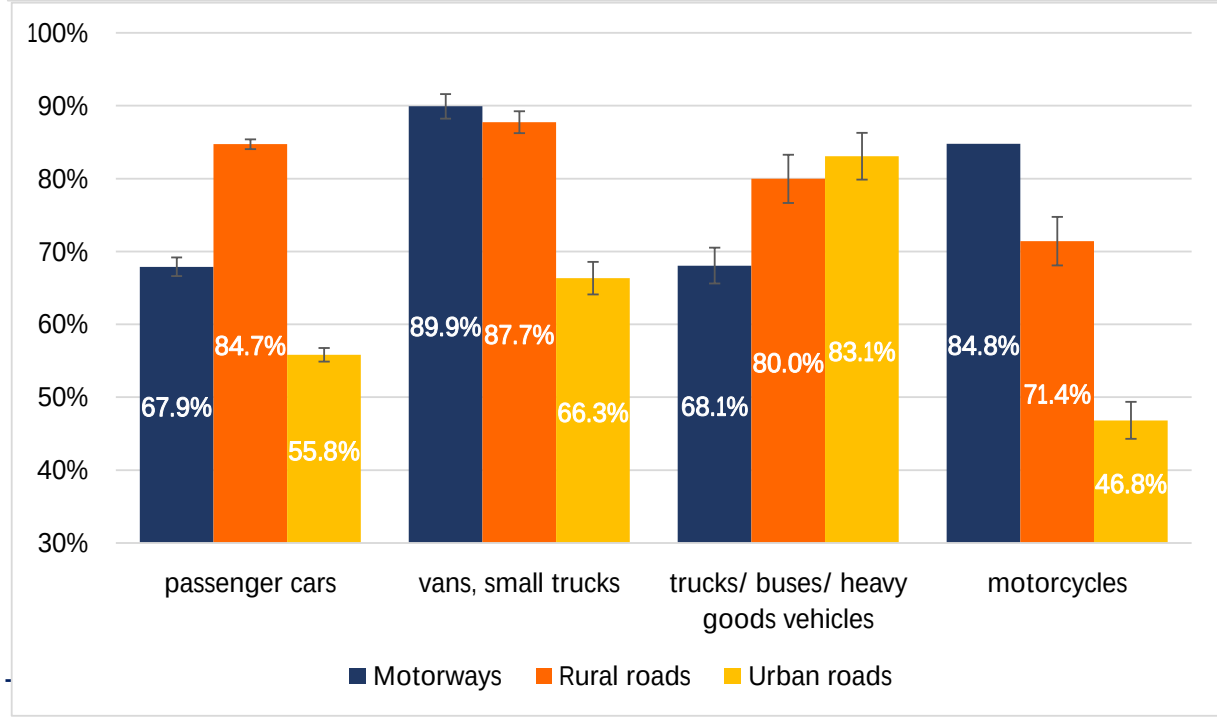
KPI Speed

- Speed data were collected for **36.346 vehicles**:
  - urban roads: 39,5%; rural roads: 39,0%; motorways: 21,5%
  - weekdays: 79,0%; weekends: 21,0%
  - passenger cars: 73,7%; vans/small trucks: 13,2%; trucks/ buses/ heavy goods vehicles: 6,8%; motorcycles: 6,3%

- The lowest percentages of vehicles moving within the speed limits were observed on **urban roads** (55,8%), while the highest percentages on **rural roads** (84,0%).

- Among the different vehicle types, **passenger cars** and **motorcycles inside urban areas** present the lowest KPI values.





KPI Seat belt use

- Data for **29.054 passenger cars** were collected
  - 36.388 front occupants and 1.910 rear passengers
  - Motorways: 23,6%; rural roads: 34,4%; urban roads: 42,0%
  - Weekdays: 77,5%; weekend: 22,5%
- Seat belt use rates for passenger car **drivers and all front occupants** (drivers and front passengers) are similar.
- For the **rear passengers**, the seat-belt use rate is significantly lower (55,8%).
- For all types of vehicle occupants, seat belt use rates are higher on **motorways** and during the **weekend**.

	KPI (95% CI)		
Road Type	Driver	Front Occupant	Rear Passenger
Motorways	**83,5%** (82,6% - 84,4%)	**85,3%** (84,6% - 86,1%)	**65,5%** (60,8% - 70,2%)
Rural Roads	**70,3%** (69,4% - 71,2%)	**70,8%** (70,0% - 71,6%)	**56,2%** (52,4% - 59,9%)
Urban Roads	**71,2%** (70,4% - 72,0%)	**72,4%** (71,7% - 73,1%)	**54,6%** (51,3% - 58,0%)
Total	**71,0%** (70,5% - 71,5%)	**71,8%** (71,4% - 72,3%)	**55,8%** (53,5% - 58,0%)

	KPI (95% CI)		
Time Period	Driver	Front Occupant	Rear Passenger
Weekdays	**69,8%** (69,2% - 70,4%)	**70,6%** (70,1% - 71,2%)	**52,4%** (49,4% - 55,0%)
Weekend	**73,6%** (72,5% - 74,7%)	**74,5%** (73,6% - 75,4%)	**63,1%** (58,6% - 67,6%)
Total	**71,0%** (70,5% - 71,5%)	**71,8%** (71,4% - 72,3%)	**55,8%** (53,5% - 58,0%)

KPI Protective systems (Helmet)

- Data for **4.079** motorcycles were collected:
  - 3.464 Riders; 615 Passengers
  - urban roads: 72,6%, rural roads: 22,3%, motorways: 5,2%
  - weekdays: 78,1%, weekends: 21,9%
- **80,3% of motorcycle riders** wear a helmet, while the respective percentage for the motorcycle passengers is lower (65,5%).
- The highest rates of helmet use for both riders and passengers were observed on **motorways**

	KPI (95% CI)	
Road Type	Rider	Passenger
Motorways	**94,9%** (91,7% - 98,0%)	**91,7%**
Rural Roads	**83,7%** (81,1% - 86,3%)	**68,7%** (61,4% - 76,0%)
Urban Roads	**75,5%** (73,8% - 77,2%)	**60,5%** (55,9% - 65,0%)
Total	**80,3%** (79,0% - 81,6%)	**65,5%** (61,8% - 69,3%)

	KPI (95% CI)	
Time Period	Rider	Passenger
Weekdays	**80,9%** (79,4% - 82,4%)	**68,2%** (64,0% - 72,4%)
Weekend	**79,0%** (76,2% - 81,9%)	**60,0%** (51,7% - 68,2%)
Total	**80,3%** (79,0% - 81,6%)	**65,5%** (61,8% - 69,3%)

KPI Distraction

- The KPI concerns passenger cars, light goods vehicles/vans and buses.
- Data for **38.020 drivers** were collected.
  - urban roads: 39,8%; rural roads: 32,8%; motorways: 27,4%
  - weekdays: 79,3%, weekends: 20,7%
  - passenger cars: 76,4%; vans/small trucks: 15,1%; buses/coaches: 8,5%
- **92,6%** of drivers are not using a mobile phone while driving, with the highest KPI value percentage being observed for bus drivers.
- As for passenger car drivers, the highest use of mobile phone while driving is observed on **urban roads**.

Road Type	KPI (95% CI)		
	Passenger Car	Van/ Light truck	Bus
Motorway	**93,1%** (92,5% - 93,7%)	**93,7%** (92,9% - 94,5%)	**90,6%** (86,7% - 94,5%)
Rural Road	**94,0%** (93,6% - 94,5%)	**94,0%** (93,0% - 95,0%)	**98,6%** (97,1% - 100,0%)
Urban Road	**90,8%** (90,3% - 91,3%)	**93,8%** (92,9% - 94,8%)	**93,5%** (91,4% - 95,7%)
Total	**92,1%** (91,8% - 92,4%)	**93,8%** (93,3% - 94,4%)	**94,7%** (93,3% - 96,1%)

Time Period	KPI (95% CI)		
	Passenger Car	Van/ Light truck	Bus
Weekday	**91,6%** (91,3% - 92,0%)	**95,8%** (95,3% - 96,3%)	**95,3%** (93,8% - 96,7%)
Weekend	**93,6%** (93,0% - 94,2%)	**87,3%** (85,4% - 89,2%)	**93,6%** (89,7% - 97,4%)
Total	**92,1%** (91,8% - 92,4%)	**93,8%** (93,3% - 94,4%)	**94,7%** (93,3% - 96,1%)

Road Safety Targets for the decade 2021-2030

Targets for the Reduction of Road Crash Casualties

	Target			Target (% reduction)			Lives to be saved (annually)	
	Baseline year 2019	2025	2030	Baseline year 2019	2025	2030	2025	2030
1. Fatalities	688	482	344	-	30%	50%	206	344
2. Killed Motorcyclists	247	148	84	-	40%	66%	99	163
3. Cities with zero fatalities*	9	40	49	-	-	-	85	105
4. Killed on motorways	50	10	0	-	80%	100%	40	50
5. Killed on Greek islands	124	74	50	-	40%	60%	50	74
6. Killed in single-vehicle crashes	280	152	95	51%**	40%**	35%**	128	185
7. Road safety performance (fatality/population rate below EU average)	688	482***	344***	21st position	16th position	13th position	206***	344***
8. Serious injuries	652	456	326	-	30%	50%	196****	326****

* Cities with population between 50,000 and 100,000 inhabitants

** Percentage of killed persons in single vehicle crashes in total number of killed occupants (drivers and passengers)

*** The estimation of the figures is based on population projections for Greece from the World Bank and the assumption that the same declining trend of road fatalities per population with that of the decade 2021-2030 remains for all EU countries, while Greece achieves the target of halving road fatalities in 2030

**** Seriously Injured road users to be saved (annually)

Targets for Improving Road Safety Performance Indicators

KPI Baseline data collected with the EU financial support (project Baseline)

Key Performance Indicators	Baseline year 2022	Target 2025	Target 2030
1. Speeding	29%	<20%	<15%
2. Seat-belt use	71%	>85%	>95%
3. Helmet use	79%	>90%	>95%
4. Driving under the influence of alcohol	1,2%	0,8%	0,6%
5. Mobile phone use	7%	<5%	<2%
6. Percentage of new passenger cars with 5 Euro NCAP stars	89%**	95%	>99%
7. Percentage of TEN-T network (≥3 stars i-RAP/EC)	50%*	65%	80%
8. Emergency response time (minutes)	64**	51	42

*Estimation to be confirmed after the relevant Network-wide road safety assessment

** Baseline year 2020

Road Safety Actions and Measures

Road Safety Actions and Measures by Pillar

Pillars		Actions	Measures	Decade Budget (€)
M	Road Safety Management	9	40	101.600.000 €
B	Road User Behaviour	8	40	8.100.000 €
I	Road Infrastructure and Traffic	13	61	1.017.200.000 €
V	Vehicle	8	31	4.400.000 €
P	Post-crash Care	6	28	2.600.000 €
	Total	44	200	1.133.900.000 €

Socio-economic Analysis

Crash Reduction Targets	NPV	IRR
Reduction of road crash casualties	5.741.302.000 €	97%
Reduction of motorcyclists' casualties	2.917.296.000 €	70%
Reduction of casualties in Greek cities (50.000-100.000 pop.)	2.133.692.000 €	63%
Reduction of casualties on motorways	1.049.735.000 €	47%
Reduction of casualties on Greek islands	1.419.189.000 €	52%
Reduction of casualties in single-vehicle crashes	3.469.077.000 €	76%

- The **total implementation** cost of the 200 Road Safety Measures is €1.133.900.000
- The Analysis is conducted for each of the general and individual **targets** for the reduction of road casualties for the years 2025 and 2030
- For the calculation of the Net Present Value (NPV) a **social discount rate equal** to 0.8% is taken into account

Setting Priority Measures

- The 200 Road Safety Measures were categorised based on their implementation priority, determined through a Delphi survey among 21 road safety experts in Greece:
  - 81 High Priority Measures
  - 61 Medium Priority Measures
  - 58 Low Priority Measures

- Assessment Criteria:

  Experts
  - safety effect (high, medium, low),
  - safety effect (short-term, mid-term, long-term)
  - safety effect (permanent, temporary)
  - safety effect for the VRUs (high, medium, low),
  - implementation easiness (easy, medium, difficult)
  - implementation readiness (ready to start, medium, not ready)

  - weighting factors for each criterion

  Project team
  - whether they are prerequisites for other measures (yes, no)
  - cost (to be funded) (low: 0-100k€, medium: 100k-1m €, high: >1m €)

Concluding Remarks

Conclusions (1/2)

- With the Road Safety Plan for the decade 2021-2030, Greece has adopted the **Safe System Approach** and the **Vision Zero** by 2050
- Alignment with the EU Road Safety Strategy aiming to **halve road fatalities and serious injuries by 2030** (compared to 2019)
- The New National Road Safety Plan for Greece proposes **16 targets for 2030**, with intermediate targets for 2025
  - 8 targets concern **crash casualties reduction**
  - 8 targets concern **road safety performance improvement**

Conclusions (2/2)

- Road Safety Key Performance Indicators are essential tools for:
  - monitoring the level of road safety in Greece in relation to the targets set for the decade
  - identifying the weaknesses and factors affecting the frequency and severity of road crashes

- The collection of KPIs at national level at regular intervals (every 2 years) and at a more detailed level is essential for the adoption and substantiation of targeted road safety actions

- The correlation of KPIs with road crash characteristics can lead to very useful conclusions about the true dimensions of the problem and causes of road crashes

European Commission

CARE Experts Group Meeting

online, 15 March 2023

Use of Road Safety Key Performance Indicators in the Greek National Strategy

George Yannis, NTUA Professor
Dimitrios Nikolaou, Researcher NTUA
Katerina Folla, Researcher NTUA

Department of Transportation Planning and Engineering,
National Technical University of Athens