National Technical University of Athens
Road Safety Observatory
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Workshop:

Digitalisation and Road Safety Research

Friday 17 May 2019 at 14:00

FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK
6-12 May 2019

Save Lives #SpeakUp

Safety implications from electromobility

e-MOPOLI
Interreg Europe

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Together with:
Panagiotis Papantoniou, Eleni Vlahogianni, George Yannis

The eMOPOLI project partners

- Project partners:
  - Province of Brescia (Italy)
  - Calabria Region (Italy)
  - Regional Development Agency of Gorenjska (Slovenia)
  - Region of Attica and National Technical University of Athens (Greece)
  - Flemish Government Department Environment and Vrije University of Brussels (Belgium)
  - Regional Council of Kainuu (Finland)
  - Rogaland County Council (Norway)
  - Bucharest-Ilfov Regional Development Agency (Romania)
  - Zemgale Planning Region (Latvia)

The eMOPOLI project

e-MOPOLI
Interreg Europe

European Union
European Regional
Development Fund

- **Duration of the project**:
  - 54 months (June 2018 – November 2022)
- **Operational Program**:
  - Programme Interreg Europe
- **Project Budget**:
  - EUR 1,792,053.00
- **Project Objectives**:
  - Diffusion of electro-mobility for a greener, safer and more efficient traffic in European Regions

Background

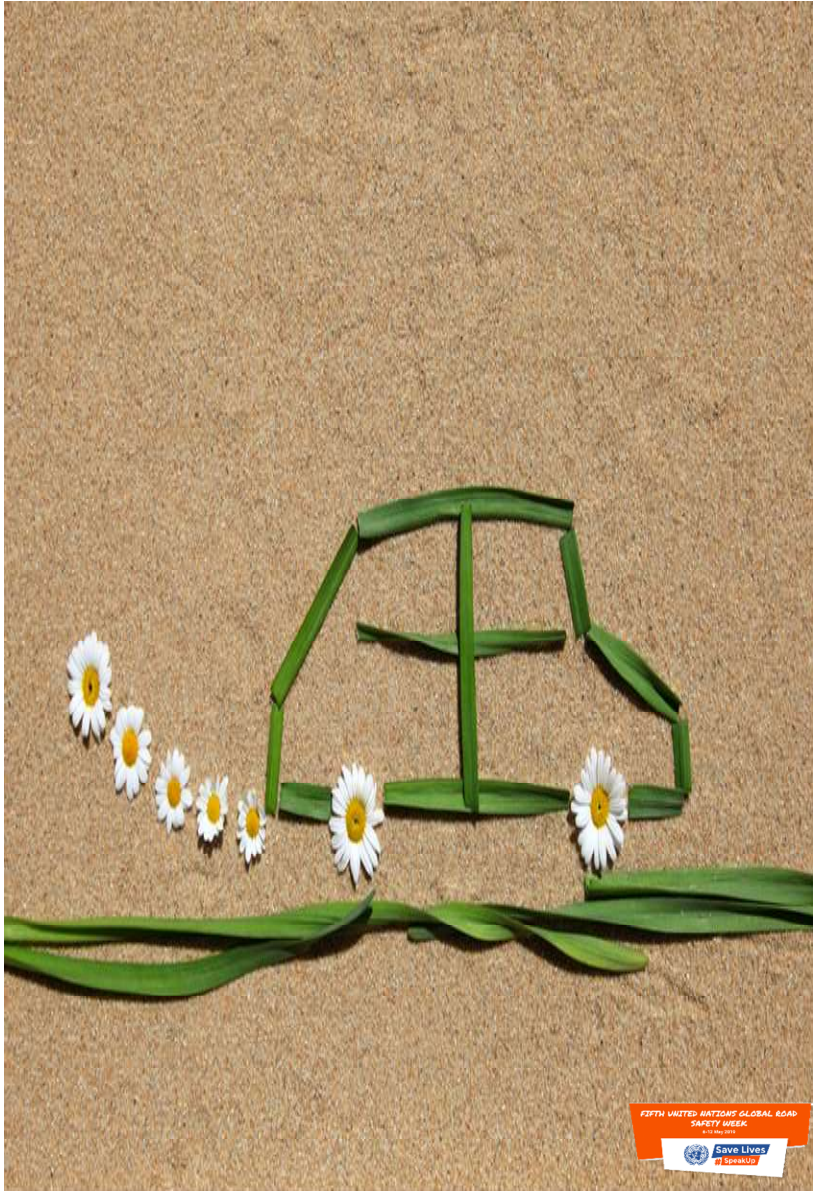
- Energy consumption and emissions production is being continuously and exponentially increased worldwide
- Based on data from the European Union, the transportation sector:
  - has the highest share in energy consumption (33% in 2015)
  - consists the second factor contributing most in CO2 emissions (28,5% in 2015)
- Road transportation field is responsible for the major percentage of CO2 emissions (72,9% in 2015).
- New features to monitor and analyze driver behavior through:
  - Electromobility
  - Alternative fuels

Research Questions

- Identification of the advantages of electromobility and alternative fuels on environment
- Identification of the impacts of electromobility and alternative fuels on mobility and the road infrastructure
- Investigate and analyze the safety issues arisen from the use of electric vehicles
  - Crash Occurrence
  - Low noise
  - Other

EVs - Environment

- Less energy consumption
- High energy efficiency
- Low emissions – Better air quality
- Electric vehicles are quiet
- Less noise pollution compared to combustion engines - Better life quality

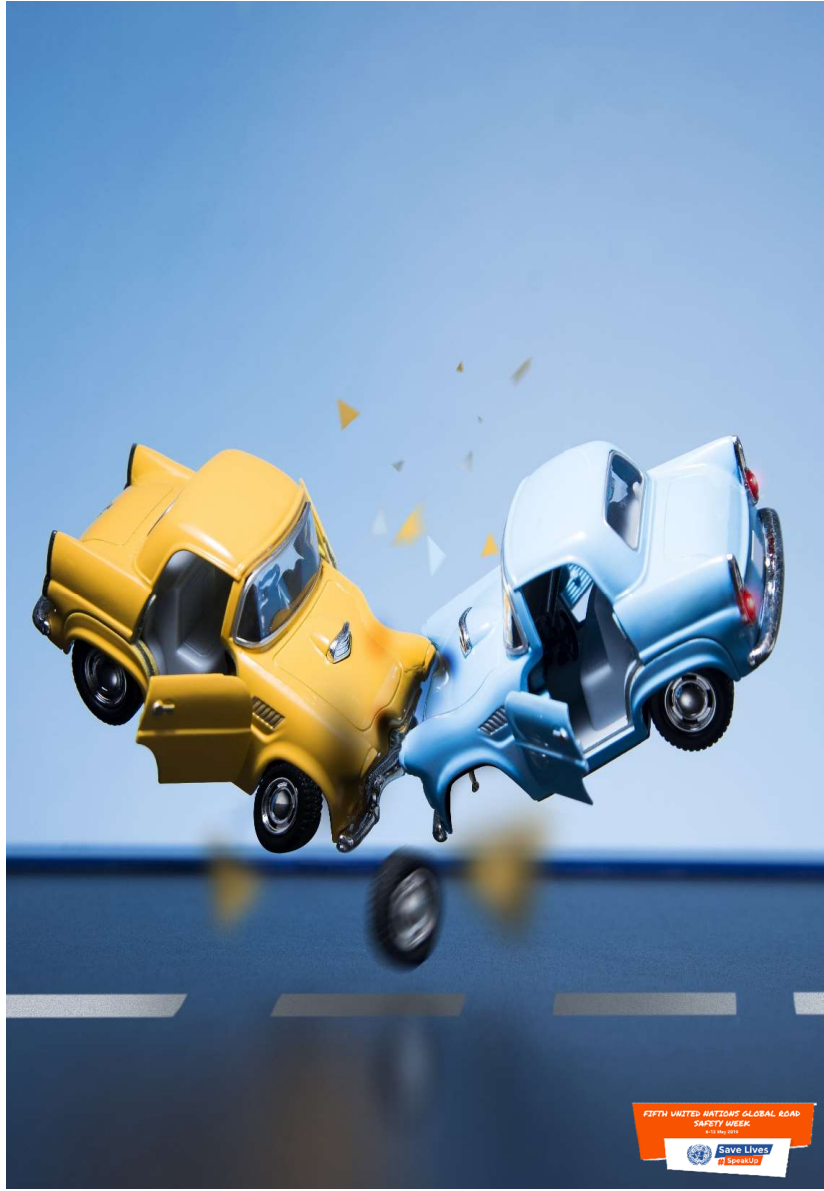


EVs – Mobility and Infrastructure

- Lower operating and maintenance costs
- Psychological benefits for driver, passenger and other road users
  - Less frustration
  - Less anxiety
  - Better mood
- Efficient network of charging stations will promote the use of EVs
- Fast charging stations (DC) on highways encourage the use of electric vehicles
  - Longer distances
  - Tourists

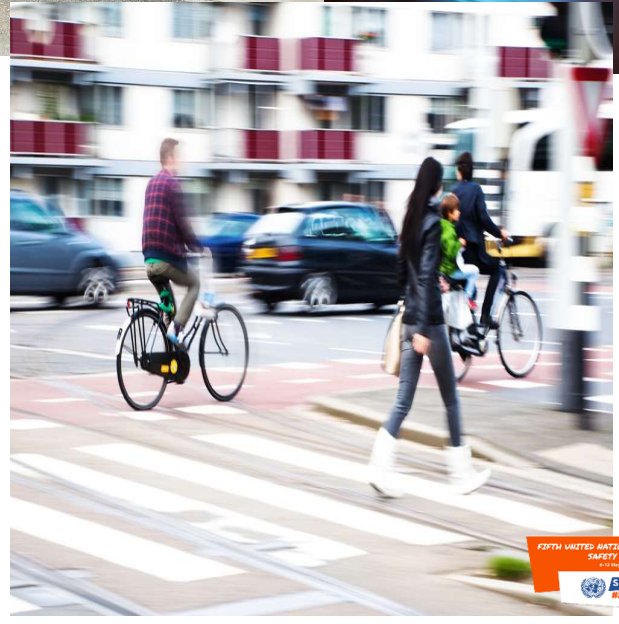
Safety Issues – Crash Occurrence

- Collision can increase the risk of electric shock
- Disconnection of rechargeable energy storage system from the rest of the high voltage circuit may lead to fire or explosion
- Increase of battery temperature may lead to explosion
- EV heavier than conventional vehicles due to the batteries
  - Safer for its occupants
  - Dangerous for the passengers of the other vehicle



Safety Issues – Noise

- No sound warning that a vehicle is approaching at low speeds
- Silent electric vehicles cannot be detected/heard by vulnerable users
- Blind or visually impaired people are exposed to high risk
- Different electric vehicle sounds cannot guarantee that the EV will be perceived on time



Other Safety Issues

- High voltages in electric vehicles
- Poor installation of the charging station may expose the users to risk
  - Good quality of the charger is essential
- Risk of fire after a mechanical failure
- Location of the battery influences
  - Driving stability
  - Risk of accident due to loss of control
- Faster acceleration than conventional vehicles

Future Challenges

- Multiple tests of electric vehicles concerning the various safety issues
- New technologies for overcoming the safety issues should be developed
- Safety regulations should be established
- Raise user acceptance towards electric vehicles

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