Safety implications from electromobility

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Together with:
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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

- **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

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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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