European Green Cars Initiative

Cooperative Advanced Driver Assistance System for Green Cars

EcoGem

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OVERVIEW

Funded in the context of the **European Green Cars Initiative PPP** (www.green-cars-initiative.eu), EcoGem aims at providing efficient ICT-based solutions to sustainable mobility by designing and developing a **Fully Electric Vehicle (FEV)-oriented highly-innovative Advanced Driver Assistance System (ADAS)**, equipped with suitable monitoring, learning, reasoning and management capabilities that will help increase the FEV's autonomy and energy efficiency.

EcoGem will base its approach on rendering the FEV:

- capable of reaching the desired destinations through the most energy efficient routes possible;
- fully aware of surrounding recharging points/stations while on move.

EcoGem's view is that the success and user acceptability of Fully Electric Vehicles will predominantly depend on their electrical energy consumption rate and the corresponding degree of autonomy that they can offer. FEVs must provide their drivers with the highest possible autonomy, as well as with a high degree of reliability and robustness in terms of energy performance. EcoGem argues that appropriate innovative ICT solutions must be pursued and adopted to assist the driver in dealing with such energy-related issues and strengthen FEVs' autonomy and reliability.

EcoGem's key-objective is to **integrate intelligence and learning functionalities to on-board systems** for FEVs, enabling autonomous as well as interactive learning through V2X interfacing.

EcoGem vehicles will **learn** over time to **predict** (and thus avoid) congested routes, based on experience that they gather.
This learning process will eventually render each EcoGem FEV capable of autonomously classifying routes according to their degree of congestion, enabling energy-driven route planning optimization.

OBJECTIVES

- Development of an on-board ADAS equipped with monitoring and machine learning functionality, targeted for route planning and recharging optimisation

- Development of an enhanced traffic and recharging management platform at the infrastructure side

- Provision of secure and open interfaces to the knowledge and information of the platform

- Definition and development of V2V interactions and interfaces

- Definition and development of V2I/I2V interactions and interfaces

- Development of mechanisms and software tools for data security, user privacy, safety and acceptability

- Development of a FEV-oriented traffic simulation platform

- Validation through simulation trials

- Validation through field trials with test vehicles

To achieve these goals, EcoGem will innovate and implement a range of advanced technologies and solutions tailored for the FEV:

- **Continuous monitoring of the vehicle's battery level and energy consumption**

- **Autonomous optimised route planning**

- **Cooperative optimised route planning**

- **Continuous awareness of recharging points and optimised recharging strategy**

- **Online management of recharging points**

- **Holistic approach for energy efficiency and operational cost optimisation**
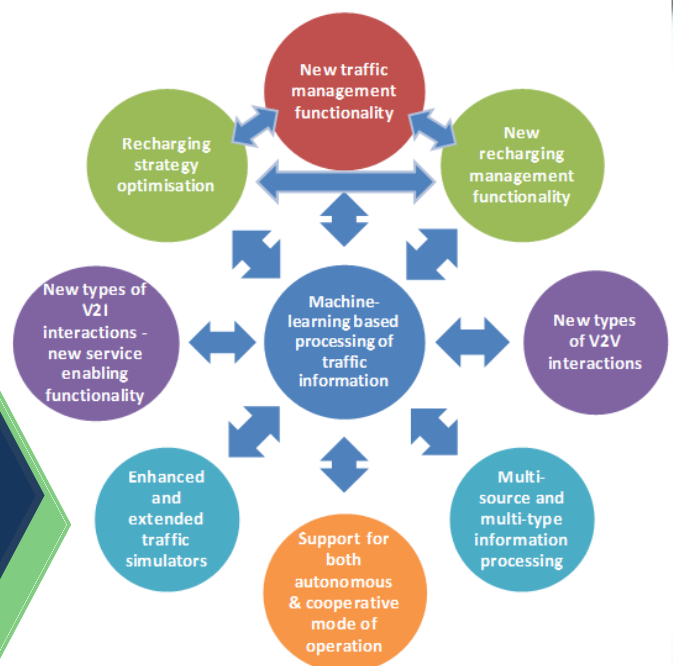
Overview of EcoGem innovations

DEMONSTRATION

To allow the demonstration and trial of a completely functional solution – and minimise time-to-market – for the integration and testing of the proposed technologies and solutions, EcoGem will use actual FEVs provided by

- **Pininfarina** – Pininfarina BLUECAR (www.bluecar.fr) an electric vehicle which will go into production in Italy, and

- **TEMSA** – two alternative platforms for public transportation
  - o small size vehicle – 20/22 passengers
  - o large size vehicle – 30/35 passengers

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