The eCoMove concept rests on the idea that, for a given trip by a particular driver in a particular vehicle, there is a minimum energy consumption that could be achieved by the perfect eco-driver travelling through the perfectly eco-managed road network. The project aims to achieve cleaner and more energy-efficient mobility of goods and people through cooperative green ITS.

At a Glance

**Project type:**
Collaborative project (generic)

**Programme:**
7th EU Framework Programme

**Project coordinator**
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**Project partners:**
ASFA, AVL, BMW F+T, Bosch, Cobra, Continental, CRF, CTAG, DAF Trucks, DLR, Ford Research and Advanced Engineering Europe, GoGreen, ika RWTH Aachen University, Logica, Magneti Marelli, MAT. TRAFFIC, Meta System, NAVTEQ, NEC Europe, PEEK Traffic, PTV, Q-Free, Fundación Privada RACC, TECNALIA, Technolution, TomTom, Telecom Italia, TNO, TUM, Vialis, Volvo Technology

**Duration:**
36 months (1 April 2010 – 31 March 2013)

**Total cost and EU funding:**
€22.6 Million (EU contribution: €13.7 Million)

**Project website:**
www.ecomove-project.eu

Targeting inefficiencies

The eCoMove project will create an integrated solution for road transport energy efficiency by developing systems and tools to help drivers sustainably eliminate unnecessary fuel consumption (and thus CO2 emissions), and to help road operators manage traffic in the most energy-efficient way. The combination of these cooperative systems using vehicle-infrastructure communication have the potential to reduce energy consumption by 20% overall.

Today the main contributing factors toward wasted fuel consumption are inefficient deceleration and lack of anticipation, traffic congestion, driving too fast, inefficient traffic light control and poor management of work zones – in other words, a blend of driving behaviour and traffic management and control.

eCoMove will tackle the three main causes of avoidable energy use by road vehicles:
• Inefficient trip planning & route choice;
• Inefficient driving performance;
• Inefficient traffic management & control.

To reduce these inefficiencies means finding solutions that help drivers to achieve the lowest possible fuel consumption for a given journey, and at the same time enabling the traffic system to balance vehicle movements so that energy consumption is as low as possible for a given demand.
The inner workings

eCoMove intends to achieve this reduction through the exchange of information between vehicles (V2V) and between vehicles and traffic infrastructure (V2I). This constant communication and swapping of information between driver, vehicle and traffic system allows them to improve their overall energy performance.

This mutual data exchange is formalised by eco-messages, about a vehicle’s progress, destination, fuel consumption and the traffic conditions. Each eCoMove application uses it either as originator or recipient to improve the preview of the traffic situation ahead in order to determine the most economical route or way of driving.

eCoMove’s communication platform to fit both vehicles and roadside will be adapted from technology developed during previous EC-funded, national and industry projects, particularly CVIS and SAFESPOT.

The ecoCooperative Horizon is one of the key elements of the innovation in the project. It provides the most probable preview of the road segment ahead, and how this will evolve in the reaction horizon of the driver, taking into account fuel consumption information collected from ecoMaps (digital maps enhanced with eco-attributes), traffic management systems, other vehicles and infrastructure systems via V2V and V2I communication.

Two prediction models complete the picture: an ecoSituational Model integrating a vehicle’s driving behaviour and dynamics of nearby traffic to determine the optimal driving strategy; and an ecoStrategic Model translating the knowledge about high fuel consumption factors included in the situational (microscopic) level to the entire road network (macroscopic level), as a basis for the traffic management and control strategies.

Green mobility solutions

As well as the core technology already discussed, eCoMove is developing applications & services that can help commercial and private car drivers, freight and road operators save fuel, unnecessary kilometres driven and manage traffic more efficiently. When combined these can deliver up to 20% overall fuel savings and CO2 emissions reduction:

- ecoSmartDriving “virtual coach” providing dynamic green driving and routing guidance as well as on trip tips to tune vehicle functions for minimum fuel use, but also ecoPostTrip personalised recommendations based on driving record for eco-driving optimisation;
- ecoMonitoring information derived from vehicles’ post trip eco record is distributed in a fully anonymous way to the traffic control centre, to identify energy blackspots;
- ecoDriver Coaching for commercial vehicle drivers including training and incentive scheme;
- ecoTour Planning for logistics companies to define eco-efficient tours considering drivers’ eco-performance, vehicle payload and road infrastructure status;
- Truck ecoNavigation calculating the most fuel efficient route based on truck-specific attributes and traffic state information;
- ecoAdaptive Balancing & Control strategies for energy-optimised traffic distribution at network and local levels, e.g. traffic signal optimisation (green waves);
- ecoAdaptive Traveller Support to drivers by sending information on traffic state, route recommendations and speed profile data needed by on-board assistance systems;
- ecoMotorway Management measures for energy-optimised flow management on the interurban network coupled with ramp metering and merging assistance at individual vehicle level.

Proving the concept

The project will verify and validate the developed technologies and applications at field trials in Berlin, Düsseldorf, Helmond, Munich and on French motorways. On top of that, a simulation environment will be set up as a full evaluation of cooperative traffic management strategies requires a high penetration of equipped vehicles, which cannot be achieved in eCoMove.

In addition, an impact assessment of eCoMove solutions on driver behaviour, mobility, traffic efficiency and environmental issues will be carried out. User acceptance, cost-benefit ratios, deployment barriers and requirements will also be investigated.

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