MIRAVEC
Modelling Infrastructure influence on RoAd Vehicle Energy Consumption
a research project of the
cross-border funded joint research programme
"ENR2011 ENERGY – Sustainability and Energy Efficient Management of Roads"

1) Introduction

"ENR2011 ENERGY – Sustainability and Energy Efficient Management of Roads" is a trans-national joint research programme that was initiated by "ERA-NET ROAD II – Coordination and Implementation of Road Research in Europe" (ENR2), a Coordination Action in the 7th Framework Programme of the EC. The funding partners of this cross-border funded Joint Research Programme are the National Road Administrations (NRA) of Germany, Denmark, Ireland, Netherlands, Norway, Sweden and United Kingdom.

2) Project Facts

Duration:	01/11/2011 – 31/10/2013
Budget:	EUR 290.000
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3) Project Description

CO_2 emissions from road transport represent an important part of the overall greenhouse gas emissions and consequently contribute to the on-going climate change. Efforts to reduce those emissions need to consider all influencing factors on energy consumption of road vehicles, which is directly linked to their carbon footprint. Besides the 'greening' of vehicle technologies the improvement of road infrastructure characteristics related to fuel consumption can contribute to an overall CO_2 reduction in road transport. This requires both a thorough understanding of those interactions and the implementation of results in current pavement and asset management practice. In contributing to both objectives MIRAVEC enables National Road Administrations (NRAs) to effectively support the reduction of road transport greenhouse gas emissions.

While some previous and on-going projects like ECRPD or MIRIAM focused on specific topics in this area, the objective of MIRAVEC is to build on existing knowledge and models. In doing so MIRAVEC aims at achieving a more holistic view considering a broad variety of effects (e.g. the interaction between road design and traffic flow). Moreover, MIRAVEC will investigate the capabilities of available models and tools and evaluate the relative importance of different road infrastructure characteristics for different settings (e.g.

topography or network type). The relationship with road safety and noise emissions will be examined. The project results will be compiled into recommendations to NRAs on how to implement the findings, models and tools in pavement and asset management systems. The dissemination to the NRAs is planned by using workshops, project presentations and a project website.

MIRAVEC achieves its objectives through the following project activities:

- Work Package 1 (WP1) will identify the most important effects contributing to road vehicle energy consumption which are governed by interaction with the infrastructure and their associated parameters. This work package will create a compilation of effects and parameters which will serve as a basis for Work Package 2 and 3.
- Work Package 2 (WP2) will evaluate the necessary modelling tools for the effects defined in Work Package 1. This will include the currently available tools and their capabilities, further developments to improve their performance and scope, the possibilities for integration of different tools and the remaining gaps.
- Work Package 3 (WP3) will consider and assess the relative importance of the effects defined in Work Package 1 in different contexts and settings and will evaluate the potential savings in vehicle energy use that could be achieved by NRAs by making changes to the road infrastructure. Work Package 3 will also consider the effects of changing vehicle fleets, including greater uptake of electric vehicles on the estimated savings.
- Work Package 4 (WP4) will build upon the output of Work Packages 1-3. Its first task is to investigate the current role of road vehicle energy consumption in road pavement and asset management systems. Based on this it will make specific recommendations how to implement the available knowledge and/or models. This will support energy efficiency considerations in the decision making processes of NRAs while also maintaining high levels of safety and low noise emissions.
- Work Package 5 (WP5) will effectively disseminate MIRAVEC's results to the NRAs and manage the overall project.

4) Expected Results

The main objective of MIRAVEC is to provide recommendations for road infrastructure design and operation leading to reduced energy consumption and associated reduced CO_2 emissions from road transport. Road infrastructure measures to achieve this aim need to complement parallel efforts in the fields of low-emission and fully electric vehicles, energy saving tyres and intelligent road transport systems. The impacts of different infrastructure designs need to be well understood and modelled to give road administrations a sound basis for management decisions. In parallel, they need knowledge about the limitations of available data and models. The final output of MIRAVEC is a report comprising recommendations on the relevant effects and parameters, their importance in different contexts, the available modelling capabilities and their implementation in pavement and asset management.