# Mapping of national road transport research activities in Europe

**Based on information from**

**ERTRAC members (2010 & 2012)**

**ERA-NET Transport (2010)**

**ERA-NET Road (2010)**

**EXTR@WEB (2010)**

Document drafted by Isabelle Lucchini (FEHRL) - June 2012

*Missing input*

*Austria*
*Bulgaria*
*Croatia*
*Cyprus*
*Denmark*
*Estonia*
*Israel*
*Italy*
*Latvia*
*Lithuania*
*Luxembourg*
*Malta*
*Portugal*
*Romania*
*Slovakia*
*Switzerland*
*The Netherlands*
*Turkey*
*some Balkan Countries*

# INTRODUCTION

## BACKGROUND

Since 2005, ERTRAC has regularly updated a survey of Member State research programmes in road transport research. The current report is the second version and includes up to date information from 6 countries (Belgium, Bosnia and Herzegovina, Germany, Slovenia, Spain and Sweden). The data of the other countries remain the ones given in the first version of 2010.

This document includes basic information about the national road transport sector, infrastructure and industry, and information about national road transport research, including objectives, strategies, resources, RTD programmes and research themes.

It further provides an excellent use of comparing national activities with EU activities and ERTRAC's research priorities, and to draw conclusions for reducing fragmentation and increasing harmonisation of funding programmes.

Initial input for this document was contributed mainly by the **Transport Research Knowledge Centre EXTR@WEB - Exploitation of Transport Research Results via the WEB**[1] and **ERA-NET TRANSPORT.**[2] More information about these two initiatives is provided in the Annex.

Additional information or updates have been made on several occasions since 2005 by ERTRAC members, with the latest updates occurring till June 2012.

The document structure for each state is:

- Country description and transport infrastructure
- Transport industry
- Transport policy related general goals
- Mapping of the country specific transport research funding system
- National RTD programmes for road transport from the last 5 years and sometimes more

The table on the following pages is a first draft overview to assign the listed national programmes to the research areas as defined by ERTRAC.

[1] The EXTR@Web project (Exploitation of Transport Research via the Web), a follow-up of the former EXTRA project, is an accompanying measure of the Fifth Framework Programme funded by the European Commission. It attempted to collect, structure, analyse and disseminate transport research results, covering not only EU supported but also nationally financed research in the European Research Area (ERA), as well as selected global transport research programmes and projects. The aim was to support the research and policy-making process over the next four years by providing timely access to the latest results and their implications. Web address is obsolete.

[2] ERA-NET TRANSPORT is an FP6 project which contributed to improving the outcome of national transport research programmes in terms of quality, efficiency and effectiveness. Participants were Federal Ministries of 11 EU countries. The coordinator was TÜV-Akademie Rheinland GmbH. http://www.transport-era.net/

| Country | Mobility Transport Infrastructure | Safety and Security | Environment, Energy, Resources | Design and Production Systems | Overlapping and other topics |
|---|---|---|---|---|---|
| Belgium | .Belgian Science Policy<br>.3-yearly Belgian Home-to-Work Travel Survey<br>.Belgian Road Research Centre<br>.Flemish authority - Dept for Mobility and Road Safety<br>.Policy Research Centre for Traffic Safety<br>.Wallonia public service | Belgian Science Policy<br>.Road Safety Knowledge Centre - Belgian Road Safety Institute<br>.Belgian Road Research Centre<br>.Flemish authority - Dept for Mobility and Road Safety<br>.Policy Research Centre for Traffic Safety | .Belgian Science Policy<br>.Belgian Road Research Centre<br>.Living Labs Electric Mobility<br>.Inter-university Centre for the Study of Mobility | .Belgian Road Research Centre<br>.Living Labs Electric Mobility | Belgian Science Policy<br>.Federal Planning Bureau<br>.Belgian Road Research Centre<br>.Flemish authority - Dept for Mobility and Road Safety<br>.Wallonia public service<br>.Inter-university Centre for the Study of Mobility |
| Bosnia and Herzegovina | Transwork d.o.o. - the first domestic on-line freight exchange in BiH | 1st Road Infrastructure Safety Management Conference, Sarajevo, 2010. Association of Consulting Engineers of BiH (ACE BiH) supported by RCC and ERF had organized the event. The main objective was to exchange the knowledge encouraging the implementation of the Directive 2008/96 in the South-East Europe countries. | The effect of application biodiesel to lubricants, and ecological characteristics of the engines“ | Laboratory for turbochargers“ - a Joint project of “CIMOS TMD AI“ | TransBonus”-Transport EU - Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 Research Activities |
| Czech Republic | Safe and Economic Transport | Safe and Economic Transport | Safe and Economic Transport | Safe and Economic Transport | |

| Country | Mobility Transport Infrastructure | Safety and Security | Environment, Energy, Resources | Design and Production Systems | Overlapping and other topics |
|---|---|---|---|---|---|
| Finland | ÄLLI - Finnish R&D Programme on ITS 2007 – 2010<br>(Finnra) infra and transport sector research<br>(Tekes) PASTORI – New business from intelligent transport services<br>(Tekes) VAMOS - Value added mobile solutions 2005-2010 | MinTC's Road Safety 2006 – 2010<br>(Finnra) EKOTULI<br>(VTT) Traffic safety 2025 - Research Programme<br>(Tekes) PASTORI – New business from intelligent transport services<br>(Tekes) Safety and Security 2007-2013 | (Finnra) EKOTULI<br>(Finnra) Economic efficiency of the transport system, TaTe TRANSECO research programme on energy efficiency and alternative energies in road transport<br>(Tekes) Sustainable community 2007-2012 | ÄLLI - Finnish R&D Programme on ITS 2007 - 2010<br>(Tekes) Ubicom - Embedded Systems 2007-2013C Cooperative Traffic | MinTC's R&D Projects Supporting Transport Policy |
| France | Mobility in urban areas (GO 3)<br>Logistics and freight transport (GO 4)<br>Competitiveness in the transport industry (GO 5) | Quality and safety of transportation systems (GO 2) | Energy and the environment (GO 1) | | PREDIT 4 Work Programme 2008 - 2012 (all "GO" programmes)<br>DEUFRAKO German-French cooperation for land transport researchTransport policy (GO 6) |
| Germany | Intelligent Logistics Research Program (BMWi)<br>Mobility of People in the 21st Century (BMWi)<br>Intelligent Infrastructure (BMWi)<br>National Cycling Plan (BMVB) | Mobility of People in the 21st Century (BMWi)<br>Materials research (BMBF)<br>ICT2020 (BMBF)<br>Microsystems (BMBF)<br>Civil security research (BMBF) | Mobility of People in the 21st Century (BMWi)<br>"Mobility 21" Initiative (BMVBS)<br>National Programme of Innovation for Hydrogen and Fuel Cell Technology<br>Renewable Resources research programm (BMELV)<br>Molecular plant research (BMBF)<br>Environment-Related Transport Research (BMU)<br>Materials research (BMBF)<br>ICT2020 (BMBF) | Mobility of People in the 21st Century (BMWi)<br>Transport Research Collaboration with the DLR (BMWi)<br>The Travel Information Meta-Platform initiative (BMBF)<br>e-Ticketing (BMBF) | Mobility and Transport Technologies - The Third Transport Research Programme of the German Federal Government<br>Departmental research into roads as a mode of transport (four individual programmes) (BMVBS)<br>Freight Transport and Logistics Masterplan (BMVBS)<br>Programme of Research into Urban Transport (BMVBS) |

| Country | Mobility Transport Infrastructure | Safety and Security | Environment, Energy, Resources | Design and Production Systems | Overlapping and other topics |
|---|---|---|---|---|---|
| Greece | EPAN II Development and Utilization of Intelligent Transport SystemsOP-RAPUD Road Axes, Ports and Urban Development | RAPT Railways, Airports, Public Transport | EPAN II Green road and sea transport | | National Programme for Research and Tecnology<br><br>Programme "THALIS"<br><br>NSRF Plan for the Development of Transport for 2007-2013 |
| Hungary | | | | | Strategy programme of the Hungarian transport research (2005-2015) |
| Iceland | | | | | ICERA´s Research and development programme |
| Ireland | | RSA research programme | RSA research programme | RSA research programme | NRA Research Fellowship Programme<br>PFC - Platform for Change Transportation Strategy (2000-2016) |
| Norway | Intelligent Freight Transport (SMARTRANS)<br>Environmentally Friendly Pavements (2004-2008)<br>Modern Road Tunnels<br>Sustainable Urban Transport | RISIT Risk and safety in transport<br>High Risk Groups in Road Traffic<br>ITS towards 2020Data Protection and Privacy Implication in Road Safety | TRANSNOVASalt SMARTClimate and Transportation | Development of Expertise within Road MaintenanceFreight Transport and Logistics | National Transport plan 2010-2019 |

| Country | Mobility Transport Infrastructure | Safety and Security | Environment, Energy, Resources | Design and Production Systems | Overlapping and other topics |
|---|---|---|---|---|---|
| | | | | | |
| Poland | MSIST Sustainable transport development<br>MSIST New technologies and innovations in transport | MSIST Transport safety | MSIST Environment protection in transport | | MSIST Transport economics (costs and financing) |
| Slovenia | SiEVA electronic converters typology, electric drive train algorithms, auxiliary electro-mechanic vehicle systems, safety and comfort in the passenger cabin,<br>SiEVA construction of electric motors for EVs and HVs<br>drive train architecture and other mechatronic solutions for EVs and HVs | SiEVA safety of pedestrians and cyclists, safety and comfort-enabling mechatronic systems | SiEVA :business impact of new technologies, and environmental influences of new technologies | | SiEVA information- and energy-transfer systems,<br>EV and HV electric energy sources |
| Spain | Strategic Infrastructures and Transport Plan (PEIT)<br>M2F, Spanish Automotive and Mobility Technology Platform<br>eMOV, Spanish Wireless Communications Technology Platform<br>PTC, Spanish Road Technology Platform<br>PTEC, Spanish Construction Technology Platform<br>LOGISTOP, Integral Logistics, Intermodality and Mobility Technology Platform | M2F, Spanish Automotive and Mobility Technology Platform<br>PESI, Spanish Technology Platform on Industrial Safety | Competitiveness Programme for the Automotive Sector<br>MOVELE Programme<br>M2F, Spanish Automotive and Mobility Technology Platform<br>FUTURED, Spanish Electrical Grid Technology Platform<br>PTE HPC, Spanish Hydrogen & Fuel Cell Technology Platform | Competitiveness Programme for the Automotive Sector<br>M2F, Spanish Automotive and Mobility Technology Platform | Applied Research National Programme. Framework of the National R&D Plan 2008-2012<br>Programme for Singular Strategic Projects (PSE)<br>Programme for Technology Platforms Support (PTE)<br>CENIT Programme<br>INNOVACCION Plan<br>CDTI activities to support R&D&I |

| Country | Mobility Transport Infrastructure | Safety and Security | Environment, Energy, Resources | Design and Production Systems | Overlapping and other topics |
|---|---|---|---|---|---|
| Sweden | VINNOVA Innovative Logistics Systems and Freight Transports<br>Vehicle Research and Innovation (FFI)<br>Renewabel motor fuels | | VINNOVA Innovative Vehicles, Vesseles and Systems<br>BISEKSRA Automotive research programme<br>MISTRA Fuel cells in a sustainable society<br>MISTRA Energy efficient reduction of exhaust emissions from vehicles | VINNOVA Infrastructure and Efficient Transport Systems<br>VINNVÄXT<br>Forska&Väx (Research and Grow)<br>Transport-Mistra | SRA The Social and Economic Impact of the Car |
| United Kingdom | Intelligent Transport Systems and Services (ITSS) Innovation Platform | | Intelligent Transport Systems and Services (ITSS) Innovation Platform<br>Technology Strategy Board (TSB) Low Carbon Vehicles Innovation Platform | | |

# BELGIUM

(Source : David Schoenmaekers, Federal Public Service Mobility and Transport, June 2012)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Belgium lies in northwest Europe and is bordered by the Netherlands, France, Germany and the Grand Duchy of Luxembourg. Its capital city, Brussels, is recognized, too, as the de facto Capital of Europe and the cities of Paris, London and Amsterdam are just two hours or so away by train. Belgium itself is strategically located between Europe's economic and urban 'backbone' to the south and the world's primary seaboard, the North Sea, to the north.
As such, it lies not only within one of the most populous and trade-intensive regions on the planet but also along a key economic and urban axis.

The country covers 30,528 sq km and has just over 10.5 million inhabitants. The population continues to rise slowly and with an average of 340 inhabitants per sq km, Belgium has one of the highest population densities in the world.

Belgium is a federal state made up of three Communities (the French Community, the Flemish Community and the German-speaking Community) and three Regions (the Brussels Capital Region in the centre, the Flemish Region to the north and the Walloon Region to the south). In terms of language, both French and Dutch are spoken in the Brussels Capital Region and the latter is officially bilingual; Dutch is spoken in the Flemish Region, while in the Walloon Region both French and German are spoken although the Region is not officially bilingual.
Belgium's three Communities are delineated by language and their main powers and responsibilities include education, culture and what are referred to as 'social matters' such as family/child support and certain aspects of healthcare. By contrast, the three Regions focus more on geographical issues and their powers extend primarily to considerations of a more economic nature such as public works, agriculture, employment, land-use planning and the environment.

The main features of Flanders with its flat landscape are its cities and ports; Wallonia, meanwhile, is a region of hills and valleys, the most famous area being the Ardennes to the south with its outstanding natural beauty and considerable appeal as a tourist destination.

Belgium's trump card is certainly its enviable geographical location, lying as it does at the very heart of a dynamic region. It is a crucial link in the transportation chain whether by air, sea or land and the country has used this inherent asset to its advantage, becoming a pivotal logistics hub in terms of transportation, assembly, refining, processing and distribution: the seaport of Antwerp is the second largest port in Europe and the fourth largest in the world, while Liège's river port is also one of Europe's key ports. Belgium has airports in Brussels, Liège, Ostend, Charleroi and Antwerp, some of which specialize in freight as well as passenger transport.
Be it seaports, inland ports, canals, airports, or rail, road and motorway networks, Belgium's transport systems are constantly being adapted to meet the needs of its thriving economy. Construction projects are on the go all the time building locks, boat lifts, high-speed trains, multimodal transport systems and more to enable Belgium to remain at the top of its game as a hub

for distributing goods and services both at home and abroad, as well as to numerous multinationals who have recognized the benefits to them of establishing their European headquarters in Belgium.

The density of Belgians transport network for roads, rail and waterway is among the highest in Europe. More precisely, the waterway network contains more than 1,500 km of navigable rivers and canals, the railway network consists of 3,582 km (mainly double-track based and electrified) and the road network counts 118,500 km of which 1,750 km of motorways.

Belgian figures played a key role as the forerunners in the development of railways. The legendary Orient Express, for example, carrying tourists and businessmen between Ostend, Paris and Istanbul was designed and built by a Belgian. Rail transport continued to be an important way of transport, accessible to the majority of the population by means of 551 stations or stop locations. Huge investments have already been undertaken to develop a high-speed-railway network, including the renovation of several key stations.

## TRANSPORT INDUSTRIES

After the Second World War, Belgium has taken advantage of the arrival of leading groups in automotive manufacturing. Till today, three main marks are present: Volvo, Ford and Audi. Furthermore, there is also a considerable activity in the construction of busses, trucks and trains. Transport equipment has a share of 11,8% in exports value.

## TRANSPORT POLICY-RELATED GENERAL GOALS

The transport policy in Belgium is the result of measures at a supranational, federal, regional and local level.
The overall vision is motivated by a concern for safety and security, the environment, competition, social requirements and the integration of the different modes of transport by land, sea and air. Cross-cutting objectives are administrative simplification (with projects like the use of electronic identity cards as a train ticket or printing train tickets at home, the digital registration of a car and a computerised pilot exam) and the fight against fraud.

Concerning transport safety, the various authorities have committed themselves to a 50% reduction in traffic fatalities on Belgian roads by 2020 in relation to 2010. The federal government is focusing on the following elements:

- stepping up the enforcement policy, paying particular attention to risk groups and risk behaviour, recidivism and awareness-raising;
- combating drink-driving: the introduction of the alcohol limit of 0.2 g/l for professional drivers and the increasing of penalties;
- the strengthening of the obligation to wear a seatbelt and the correct use of the child safety system, which must carry greater sanctions.

At the level of railway policy, the development of the European railway corridors for passenger and goods transport, via the European TEN-T financing, has a priority.

As with the other two transport modes, the watchword for air transport is also "safety": all investments for assuring safety are being given priority. Collaboration with other air navigation service providers, particularly at a European level, is being strengthened.

In line with European strategy and in coordination with the Regions, the federal government applies the powers at its disposal for the various transport-induced greenhouse gas emission and pollution reduction. One component is a large cross-over project for the comprehensive introduction of electric vehicles with low $CO_2$ emissions.

## TRANSPORT RESEARCH AND INNOVATION SYSTEM

Source: H. van Geelen. *BeMoR net - Belgian Mobility Research network "Haalbaarheidsstudie naar een platform voor wetenschappelijk overleg over het Belgische transport- en mobiliteitsonderzoek"*. Final Report. Brussels : Belgian Science Policy, 2009 – 135 p. (Research Programme 'Science for a Sustainable Development')

Regions have powers in fields that are connected with their region or territory in the widest meaning of the term.
So the Flemish Region, the Brussels Capital Region and the Walloon Region have powers relating to the economy, employment, agriculture, water policy, housing, public works, energy, transport (except Belgian Railways), the environment, town and country planning, nature conservation, credit, foreign trade, supervision of the provinces, communes and intercommunal utility companies.
They also have powers relating to scientific research and international relations in those fields.

The main bodies for transport research and innovation are in the Regional administration:

- Flemish Region
  - Department for Mobility and Public Works
  - Department for Economy, Science and Innovation
- Walloon Region
  - Ministry of the Walloon Region
  - Ministry for Equipment and Transport
- Brussels Capital Region
  - Brussels Mobility

At a federal level the following authorities are involved:

- Federal Public Programming Service for Science Policy;
- Federal Public Service Mobility and Transport;
- Federal Public Service Economy, SMEs, Self-Employed and Energy;
- Federal Public Programming Service for Durable Development;
- Federal Planning Bureau.

The federal level plays a facilitating role in the collaboration between the government bodies, in particular through consultation platforms:

- CIS-Transport, a permanent commission of the Inter-ministerial Conference for Science Policy, for international cooperation;
- ICDO/CIDD, an interdepartmental commission for sustainable development – cross-cutting for the Federal Public Programming Service for Durable Development;
- The Belgian Federal Council for Sustainable Development;

- ICMIT/CIMIT, an inter-ministerial conference for mobility, infrastructure and telecommunication.

# MAPPING OF THE COUNTRY SPECIFIC RESEARCH FUNDING SYSTEM

As mentioned, the competence for research is first and foremost at a regional level. It is from there that most of the university funding originates.
The federal level finances the policy-relevant research in the context of cooperation links between university/organisations (see below "Belgian Science Policy").

In addition, policy-relevant research in organisations and institutions is outside universities, usually with government funding and control.

# PROGRAMMES

## 1. RESEARCH FUNDED AT FEDERAL LEVEL

### 1.1. BELGIAN SCIENCE POLICY

Source: C. Macharis, Ph. Toint, A. Bernardini, X. Pauly, E. Cornelis. *"Transport and mobility: 20 years of scientific research in Belgium"*. Brussels : Belgian Science Policy, 2011.

**DURATION**: 1991- ongoing

**BACKGROUND**
Within the Belgian Federal Government's jurisdictional framework, the Federal Science Policy Office (BELSPO) implements national and international multiannual research actions with a view to consolidate Belgium's scientific and technological potential. The Belgian Federal Science Policy Office is in charge to instigate suitable research actions covering among others research projects on Transport and Mobility (T&M).
Since the BELSPO funding for transportation and mobility researches has been continued through numerous research actions, the scientific basis for supporting the federal policy in T&M areas has been maintained. BELSPO supported projects for almost 1.5 millions € (indexed € 2011) each year.

**CONTACT INFORMATION**

*Belgian Science Policy*
*Avenue Louise 231*
*BE-1050 Brussels*
*Tel: +32 2 238 34 11*
*E-mail: www@belspo.be*
*Programme website : http://www.belspo.be*

**MAP OF PARTICIPANTS**
The following research centres are involved in the projects listed below:

*a) university research bodies*

- FUNDP – Transportation Research Group (GRT)
- FUSL – Centre for sociological studies
- KUL – Institute for Social and Economic Geography; Institute for Land and Water Management; Dept. Civil and Transport Engineering and Infrastructure
- UA – Research Group Transport and Spatial Economy
- UCL – Center for Operations Research and Econometrics (CORE); Dept. Geology and Geography; Dept. Population Sciences and Development; School of Public Health
- UCL Mons – Group Transport and Mobility
- UG – Dept. Geography
- UH – Transportation Research Institute (IMOB)
- ULB – Centre for Economic and Social Studies on the Environment (CEESE); Centre for Urban Research
- ULG – Research Dept. in Basic and Applied Economic Geography (SEGEFA)
- VUB – Dept. Agogics ; Dept. Electric Engineering and Energy Technology (ETEC) ; Dept. MOSI Transport and logistics, Research group MOBI – Mobility and automotive technology; Dept. Human Physiology & Sports Medicine

*b) other research bodies*

- Belgian Road Research Centre (BRRC)
- CEPS Instead
- Federal Planning Bureau
- Centre Urbain – Brussels Energy Agency
- Research, Development & Consulting – Brussels
- Transport & Mobility Leuven (TML)
- Flemish Institute for Technological Research (VITO) – Centre of expertise for energy technology

**PROJECTS** (year = end of research project)

**Commuting in Belgium: home-workplace travel - home-school travel (2009)**
Since the mid-19th century, Belgium has organised a general population census every ten years. The objective of the census is to gain an in-depth insight into the nature of the population. Added to this is a vast amount of socio-economic data on the population itself, on households and their housing. In 2001, the priority was no longer to "count" the population, but a socio-economic survey: it places greater emphasis than previously on the collection of information of a demographic and socio-economic nature, such as level of education, housing, mobility, etc.
This study presents the situation on 1 October 2001, as well as the development since the last census in 1991, regarding home-work trips and home-school trips by Belgian residents, and in particular the subject of the school commute, that is the daily journey made by the school population.

**Bicycle Traffic indicators: identification and harmonization of data sources (BITS) (2009)**

- Base of measures leading to a possible moving of the modal shift in the direction of more environmentally friendly transportation modes.
- Development of Statistical indicators for the bikes related transport

**Methods for Estimating Belgian Traffic Abroad and foreigner traffic in Belgium (MEBETA) (2009)**

- Methodology for an estimation of the Belgian traffic abroad and foreign traffic in Belgium. Estimation applied to any type of vehicle (cars, trucks,.).

- Indication on the methods other countries use and how they address these issues.
- Evaluation whether these methods can be used in Belgium.
- Inventory of sources of relevant information available in Belgium.
- Determining which assessment methods can be applied in Belgium.
- Comparison with the figures obtained in other countries.

**Night time delivery: a potential option in urban distribution? (NIGHT DELI) (2009)**

- Verifying if overnight distribution is a feasible option for urban freight services in Belgium.
- Measure of overall socio-economic impact of overnight distribution.
- Definition of a number of practical policy guidelines enabling authorities to assess the feasibility of overnight distribution (in every aspect).

**Survey on the mobility of the Belgian population (BELDAM) (2011)**

- Survey on the Belgian's mobility.
- Study the displacements carried out by the members (of more than 6 years old) of the households, during one reference day.
- Set up of a databank placed at the administration's disposal.
- Elaboration of a trend chart and a journey model applicable to the database.

**Accessibility to places and transport: social, economic and environmental interactions (INTERACT) (2012)**

Integrating the results from accessibility-related research projects in order to develop a new vision on the accessibility issue in a context of sustainable development.

**Transition pathways to efficient (electrified) transport for households (TRANS2HOUSE) (2012)**

Investigation on how to develop driving forces and shift the social, cultural, technological, economic and political barriers to household energy consumption reduction. (Public transportation, electric scooters and bicycles are not assessed.)

**Systematic analysis of Health risks and physical Activity associated with cycling PoliciES (SHAPES) (2011)**

- Analyzing the risks and benefits of a modal shift from passenger cars to cycling.
- Enabling policy makers to make science-based choices related to commuter cycling and transport modal shift in cities.
- Building of an integrated framework to evaluate the costs and benefits of commuter cycling.

**Mobilities and long term location choices in Belgium (MOBLOC) (2011)**

- Investigating on how long-term society evolution, residential choice, transportation demand and resulting accessibility evolution are linked to each other.
- Developing evolution models.
- Analyses of scenarios chosen to clarify the roles of to the population aging effects, of the evolution of the family cell structure and of the inter-generational relationships

**Mobility and the Elderly: Successful Ageing in a Sustainable Transport System (MESsAGE) (2009)**

- Contributing to the extension of the transportation autonomy of older people.
- Increasing the use of sustainable transport modes within this target group.
- Raising awareness of local policy makers about specific mobility needs of elderly persons.

**Long-Run Impacts of Policy Packages on Mobility in Belgium (LIMOBEL) (2011)**

- Developing a fully operational modelling tool to study the impact of transport policies on the economy and on emissions.

- Producing long term projections (up to 2030) of passenger and freight transport demand in Belgium.
- Construction of:
  - A set of cost-benefit analyses of alternative policy packages.
  - A baseline scenario to be compared with alternative policy scenarios for more sustainable transport.

**Assessing and Developing Initiatives of Companies to control and reduce Commuter Traffic (ADICCT) (2011)**

- Case study analysis and a large scale business questionnaire: what characteristics (company and/or worksite related) make commuter choice programs successful in reducing (and/or controlling) commuter car traffic?
- Outcomes: improving public and private decision-making in employer-based commuter transport schemes (mobility management plans).

**Behaviour and mobility within the week (BMW) (2009)**

- Working on two complementary views of weekly mobility: the longitudinal disaggregate behavioural aspects over the week and the transversal aggregate measure of traffic for each successive day of the same week.
- First attempt to collect data about mobility behaviours over a week.
- Demonstrating the importance of taking into account the weekly rhythms in mobility behaviours for sustainable transport policies.

**Clean Vehicle Research: LCA (Life Cycle Analysis) and Policy Measures (CLEVER) (2011)**

- Creating an objective image of the environmental impact of vehicles with conventional and alternative fuels and/or drive trains.
- Investigating which price instruments and other policy measures are possible to realize a sustainable vehicle choice.
- Examining the external costs and to verify which barriers exist for the introduction of clean vehicle technologies on the Belgian market.
- Analysing the global environmental performances of the Belgian car fleet.
- Formulating recommendations for the Belgian government to stimulate the purchase and use of clean vehicles.

**Professional Mobility and Company Car Ownership (PROMOCO) (2009)**

- Verifying if company cars availability induces specific mobility patterns.
- Studying how these specific patterns contribute to the impacts of the general mobility on a sustainable society.
- Analysing the potential relationship between the use of company cars and the relative localizations of the household and work places.

**Optimising Price and Location of Parking in Cities under a Sustainability Constraint (SUSTAPARK) (2009)**

- Providing policy makers with knowledge for parking policy and tools to assess the impact of novel parking policies.
- The integrated SUSTAPARK model for city parking, intended for policy support (plus a case study for the inner city of Leuven).

## 1.2. 3-YEARLY BELGIAN HOME-TO-WORK TRAVEL SURVEY

**DURATION:** 2003 – ongoing (surveys in 2005, 2008 and 2011)

**BACKGROUND**

The home-work transport survey collects a wide range of information on the movements of employees between the home and the workplace. All companies and government institutions with more than 100 employees must carry out this diagnostic every three years. They fill in the questionnaire for each of their branch units with a minimum of 30 employees. Moreover, the advice of the works council is needed. The data is filled in online, with maximum use of other government information (crossroads bank for social security and enterprises).

**OBJECTIVES**

- The employers are legally obliged to discuss the results in their works council. As a consequence, more measures are taken to stimulate the use of alternative means of transport and thus reduce solo car use.
- Collecting data about home-work transport on a regular basis, for the management of mobility and evaluation of policies at all policy levels.

**PROGRAMME STAKEHOLDERS**

- Companies and government bodies (employers): they provide data on the basis of a questionnaire.
- The works council (private sector), the competent consultation body (public sector), the trade union representative or the employees: they discuss the diagnostic carried out by the employer and issues advice within two months.
- Federal Public Service Mobility and Transport:
  - collects, processes and analyses the data from the surveys (this processing guarantees the anonymity of the employee);
  - provides the data collected through the survey on demand, to give the applicant a better management of mobility aims;
  - suggests information available through its website, including a comprehensive report with the results of each assessment and an overview of best practices.

**LEADING INSTITUTION:** Federal Public Service Mobility and Transport

**TYPE OF FUNDING:** Public funding

**PROJECTS**

Data can be used at all levels, to manage mobility and to evaluate policies. Some recent examples:

- Study of the effectiveness of employer's measures (ADICCT project)
- Input for municipal mobility plans
- Evaluation of mobility management at Brussels Airport
- Analysis of commuting in the chemical, pharmaceutical and food industry and the financial sector
- Study of the potential of carpooling in federal public services
- Analysis of bicycle use in federal public services
- Input for sustainable development reports of federal public services
- Input for European project "Urban Audit"
- Input for mobility management in industrial areas

**CONTACT INFORMATION**

*Federal Public Service Mobility and Transport – Dept. Mobility*
*Vooruitgangstraat 56*
*BE-1210 Brussels*
*Tel : +32 2 277 31 11*
*E-mail: info@mobilit.fgov.be*
*Programme website:*
French: www.mobilit.fgov.be -> Mobilité -> Diagnostic de déplacements domicile-travail
Dutch: www.mobilit.fgov.be ->Mobiliteit -> Diagnostiek woon-werkverkeer

## 1.3. FEDERAL PLANNING BUREAU

The agreement between the Federal Public Service Mobility and Transport and the Federal Planning Bureau aims to develop a set of transport indicators, to create a model for forecasting mobility by 2030 and simulation of the effects of the measures and transport policies (PLANET) and to establish satellite accounts for transport.

*The database for indicators*
The Federal Planning Bureau has developed a databank of mobility and transport indicators. This databank provides detailed information on the situation and the evolution of transport and mobility in Belgium.
The indicators are divided into six areas:

- the transport branch;
- households and transport;
- transport infrastructure;
- vehicle fleet and transport equipment;
- traffic and transport;
- the impact of the activity of transport.

*Transport satellite accounts*
The research project aims to develop transport satellite accounts for Belgium. The satellite accounts expand the analytical capacity of national accounting for domains which are only partially represented. This allows the capacity of the central system to be expanded and improved in terms of economic analysis and policy evaluation.
Separate satellite accounts were created for road transport, local public transport, rail transport, air transport, waterborne transport, maritime transport and auxiliary transport services.

*The PLANET model*
The Federal Planning Bureau has created a model (PLANET) which maps out the interaction between the Economy and Transport. The model will be used for:

- medium and long-term projections of the demand for transport in Belgium, for freight transport as well as passenger transport;
- simulating the effects of transport policies;
- carrying out cost-benefit analyses of these transport policies.

**CONTACT INFORMATION**

*Federal Planning Bureau*
*Avenue des Arts, 47-49*
*BE-1000 Brussels*
*Tel: +32 2 507 73 11*
*E-mail : contact@plan.be*
*Programme website: www.plan.be -> Transport*

## 1.4. ROAD SAFETY KNOWLEDGE CENTRE - BELGIAN ROAD SAFETY INSTITUTE

**DURATION :** 1986 - ongoing

**BACKGROUND**
The Belgian Road Safety Institute is a non-profit organisation founded in 1986 with the objective to improve road safety. The Belgian Road Safety Institute is at the service of the government, of the State secretary of Transport and the Federal Public Service Mobility and Transport.

**OBJECTIVES**
The aim of the Road Safety Knowledge Centre is to contribute to the improvement of road safety by means of research, data-analysis and policy recommendations at the service of transport policy. Its research is focussed on all parties involved in road safety: the road user, the vehicle and the road infrastructure.

**PROGRAMME ORGANISATION**
Research at the Road Safety Knowledge Centre is mainly concentrated in its three departments.

- The Belgian Road Safety Observatory constantly collects road safety indicators in order to monitor the evolution of the road safety problem over the years. Indicators are collected at different levels: at the accident level (the Belgian Road Safety Institute is responsible for the in-depth analysis of the official Belgian accident database), at the level of road user behaviour and road user attitudes, but also at the level of measures.
- The Study and Research department executes specific research projects regarding a huge variety of road safety problems and measures. Many research projects (SafetyNet, Dacota, Pepper, Cast, Druid, alcolock, Supreme...) have been executed in close collaboration with other European institutes and with the support of the European Commission.
- The Policy department translates the available knowledge into tailored policy recommendations and reports for the public administration and policy makers.

**TRANSPORT POLICY CONTEXT**
All stakeholders involved in road safety are represented in the federal commission for road safety. General and specific objectives regarding road safety were determined by the General Assemblies on Road Safety that took place in 2002, 2007 and 2011. In 2011 the assembly adopted the European objective to cut in half the number of road accident fatalities by 2020 compared to 2010.

**PROGRAMME STAKEHOLDERS**
Research and data-collection are realised through formal and informal partnerships with all stakeholders that can make road safety indicators available: local and federal police forces, Federal Public Services (Economy, Transport, Justice, ...), private partners, representational organisations of the industry and road user organisations (insurance, manufacturers, ...).

**TYPE OF FUNDING**

The road safety knowledge centre relies both on the general funding of the Belgian Road Safety Institute as on research grants from local and federal authorities, private partners and the European Commission.

**ONGOING PROJECTS**

- Belgian Road Safety Observatory: collection, analysis and reporting of road safety indicators
- In-depth accident analysis (BLAC: blind spot accidents - funded by the Flemish public service - MOTAC: motorcycle accidents - funded by the federal public service of mobility)
- Dacota: data collection and transfer analyses
- Sartre: social attitudes to road traffic risk in Europe
- Profiles of traffic offenders
- Thematic report children in traffic
- National road side surveys on drink driving, speed, seat belt use, child restraint systems
- National surveys of attitudes towards road safety
- Statistical analysis of road accidents 2010-2011
- Road safety barometer: quick indicators

**COMPLETED PROJECTS**

- Alcolock
- Risks for young drivers in traffic
- MP3 players and traffic safety
- ROPS (driving under the influence of psychoactive substances)
- Fatal accidents on highways 2008
- Technical tools to prevent blind spot accidents
- Thematic reports (cyclists, motorcyclists, heavy vehicles, highways,...)
- Statistical analysis of road accidents: yearly, 1986-2008

**CONTACT INFORMATION**

*Belgian Road Safety Institute*
*Haachtsesteenweg 1405*
*BE-1130 Brussels*
*Tel: +32 2 244 15 11*
*E-mail: info@bivv.be*
*Programme website :*
*French: www.ibsr.be -> Statistiques & recherche*
*Dutch: www.bivv.be -> Statistieken & onderzoek*

## 1.5. BELGIAN ROAD RESEARCH CENTRE (BRRC)

**DURATION :** 1947 - ongoing

**BACKGROUND**

The Belgian Road Research Centre (BRRC) is a privately operated public utility research institute created in 1952 by application of a decree-law of 1947 aimed at promoting research in industry.
In its over fifty years of existence, it has built a solid reputation at both the national and international levels as an impartial trend-setting centre for research in the areas of road design, construction and maintenance. Moreover, it has recently extended its expertise to the fields of road safety, mobility, and environment-friendly road construction.

**OBJECTIVES**

The Belgian Road Research Centre helps private companies and public authorities find solutions for the design, construction and maintenance of an efficient high-quality road infrastructure under optimum economic conditions, as well as to the problems of safety, mobility and environment raised by modern road transport.

**MAP OF PARTICIPANTS**

Technical committees have been formed to enhance dialogue with the various players in the road industry. These committees gather professionals (contractors, road managers and experts) not only from BRRC, but also – and mainly – from the Belgian road community as a whole. They advise the Programme Committee on the subjects and priorities of the activities to be included in the annual programme of BRRC – not only for research, development and application, but also for assistance. They also regularly inform the Programme Committee of the progress of planned activities and make suggestions or recommendations for continuation, adjustment or suspension.

**PROGRAMME ORGANISATION**

The activities are performed in the following areas covered by the technical committees:

- Mobility: traffic flow monitoring, public-private partnership, urban freight transport, parking policy measures, etc.
- Traffic and safety: traffic analysis, telematics, traffic signing, weighing sensors, markings; interactions between road geometry and road safety, winter serviceability, etc.
- Environmental issues and recycling: waste prevention, sustainable construction, noise annoyance abatement, air pollution, soil pollution; secondary raw materials, tar-containing asphalt waste; aggregates from crushed concrete and asphalt waste, soil stabilization, etc.
- Concrete roads and pavings: air-entraining agents in cement concrete; design, construction and maintenance of concrete roads; tram- and busway pavements; anticracking interlayers under asphalt overlays; porous pavings; porous lean concrete; thin and ultrathin concrete pavements; geometry of road humps, etc.
- Asphalt roads and other bituminous applications: performance-oriented tests, characteristics and requirements for bitumen and asphalt, mix design, manufacture and laying of bituminous mixtures, structural design, asphalt recycling, types of asphalt surfacing (cold-mix asphalt, two-layer porous asphalt, high-modulus asphalt); waterproofing systems for bridge decks and roof-top car parks, etc.
- Road asset management: budget-constrained maintenance, road-related parameters, new developments in Europe, identification of road components, road data bases, positioning of road measurements and handling of measured data, high-yield road tests, etc.
- Geotechnics and road bases: performance testing of sewer inspection cameras and sewer cleaning equipment, soil treatment and recycling, quality control of earthworks and road bases, repeated load triaxial test, etc.

**TYPE OF FUNDING:** mixed private and public funding

**PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS**

Under the decree-law of 1947 and the royal decree of 1952, each Belgian or foreign accountable contractor is required to contribute to BRRC a 0.8 % assessment on the total costs of the works he carries out in Belgium, regardless of whether those works have been awarded by open or limited tendering or are performed under private contracts.

Another important source of income consists of funds granted by regional, federal and European authorities for scientific and technological research.

A third contribution to financing derives from the provision of services such as training courses, workshops, specific studies, tests, analyses and assistance, from the subscriptions of adherent members, from royalties, and from the sale of publications.

**ONGOING PROJECTS** (some examples)

- A preliminary study on dynamic mobility and safety management for the installation of variable message signs in the Brussels Capital Region
- Speed Adaption Control by Self Explaining Roads
- The determination of the mechanical performance characteristics of soils treated with a cementitious road binder

**COMPLETED PROJECTS** (some examples)

- Working group on longer and heavier vehicles (LHVs) in Belgium
- European project INTRO (INTelligent ROads) (FEHRL)
- BeMoR net (Belgian Mobility Research Network): a study into the feasibility of a forum for scientific consultation on Belgian transport and mobility research

**CONTACT INFORMATION**

*Belgian Road Research Centre*
*Boulevard de la Woluwe 42*
*BE-1200 BRUSSELS*
*Tel : + 32 2 775 82 20*
*e-mail : BRRC@BRRC.be*
*Programme website : http://www.brrc.be*

# 2. Research funded at regional level

## 2.1. Flemish authority - Department for Mobility and Road Safety

- Travel Behaviour Survey in Flanders: surveys 3 (2007-2008) and 4 (2009-2013)
  The travel behaviour survey aims to obtain a snapshot of a number of characteristics of families and persons related to mobility. By "characteristics of families" we mean mainly the characteristics of the means of transport which the families dispose of. "Characteristics of persons" mainly concerns the analysis of effective movements made by the persons. Alongside are obviously a number of sociological and demographic characteristics surveyed in order to do meaningful social analysis.

- Some other studies in road transport (from 2007):
  - Sustainable mobile cities
  - Development of a methodology for a general freight network for mesoscale application on 2 pilot regions
  - Driving force to design an integrated, complementary and widely accessible transport system for Flanders
  - Carpool parking Flanders
  - Transport safety on free tram and bus routes
  - Obstacles and conditions for the successful promotion of carpooling
  - Mobility measures for the sustainable opening up of the business park by the airport of Antwerp
  - The psychological determinants of speed behaviour

- Awareness-raising and influencing of behaviour through mobilisation campaigns or other communication techniques. Mobility communication in Flanders.
- Space, environment and mobility. Sample book and intermediary planning instruments in Flanders
- The relationship between location policy and sustainable mobility

**CONTACT INFORMATION**

*MOW – Policy Mobility and Road Safety*
*Koning Albert II-laan 20 bus 2*
*BE-1000 Brussels*
*Tel: +32 2 553 71 24*
*E-mail: mobiliteit.verkeersveiligheid@vlaanderen.be*
*Programme website: www.mobielvlaanderen.be*

## 2.2. Policy Research Centre for Traffic Safety

The research within the Policy Research Centre for Traffic Safety occurs in 8 lines of enquiry.

*Line of enquiry 1:* Reference databank for investigation into transport safety in Flanders

*Line of enquiry 2:* Infrastructure

- Using cross-sectional risk analysis, the current risk at junctions is studied according to the properties of traffic, road and the surroundings.
- Impact of the road infrastructure on road safety
- Evaluation of the programme 'dangerous points'
- The effect of land use and infrastructure on transport and road safety

*Line of enquiry 3:* Accessibility

The aim of this research project is to formulate a set of indicators to be able to monitor different aspects of accessibility. In addition, insight into the current state of affairs in terms of accessibility in Flanders.

*Line of enquiry 4:* Innovation and ICT for safer mobility

Follow up and analysis of the ITS developments with an effect on road safety. This will include ITS linked with traffic lights, motorways, dynamic traffic management and vulnerable road users.

*Line of enquiry 5:* Methods of evaluation

A decision support model was developed, namely the Multi-Actor Multi-Criteria Analysis, for the evaluation of road safety measures. This project divides into two sub-tasks: the development of socio-economic evaluation methods and the quantification of unit costs.

*Line of enquiry 6:* Risk assessment

- Development of models for a better prognosis of road safety with an emphasis on target group identification
- The drafting of relevant safety indicators for Flanders
- Persons with limited access to transport and the impact of the ageing population

*Line of enquiry 7:* Policy organisation and monitoring

- Sustainability assessment of traffic safety measures

- Administrative organisation of a sustainable approach to road safety: design of a methodology for local authorities
- Computational model impact, effects of road safety measures

*Line of enquiry 8:* Sustainable mobility

- Spatial development, traffic, noise pollution and impact on quality of life
- Relationship between speed and environmental impact, speed management and speed behaviour
- Traffic management and environment through a traffic model based on exhaust gases and noise so that the effect on emissions of interferences in the traffic stream for the benefit of road safety can be calculated
- Optimising and updating mobility policy from an environmental perspective

In addition, the Centre decided that free research space would be filled by the following topics:

- Effect on traffic safety of introducing long and heavy lorries
- Risk model for accidents on roundabouts
- Safety charter freight transport
- Evaluation of the suitability of unmanned cameras on regional roads in Flanders in terms of road safety
- Homogenisation of speed zones

**MAP OF PARTICIPANTS**

Hasselt University, the KU Leuven and VITO, the Flemish Institute for Technological Research.

**CONTACT INFORMATION**

*Policy Research Centre for Traffic Safety*
*Hasselt University - Campus Diepenbeek, Wetenschapspark 5 bus 6*
*BE-3590 Diepenbeek*
*Tel: +32 11 26 91 12*
*E-mail: info@steunpuntmowverkeersveiligheid.be*
*Programme website: http://www.steunpuntmowverkeersveiligheid.be*

## 2.3. Living Labs Electric Mobility

On 15 July 2011, the Flemish government approved five platforms for the living labs electric mobility, for a subsidy of up to EUR 16,250,000. This support relates primarily to the establishment and maintenance of the infrastructure for R&D projects. The main objective of the pilot project is the strengthening of the value chain with regard to electric driving in Flanders, and has therefore primarily an economic outcome.

The five approved platforms are:

- **EVA**
  This platform is coordinated by Eandis and is looking to find out about the development of loading infrastructure for electric vehicles, the impact on the electricity network and how costs can be offset to the user. The presence of regional and provincial governments (besides businesses) is important because of the impact on the public domain.
- **iMove**
  This project is coordinated by Umicore. The aim is to gain knowledge of battery technology, the development of loading infrastructure and its impact on the electricity network.

- **Olympus**
  This project is coordinated by SNCB-Holding (rail transport) and focuses on multimodality. It emphasises the sharing of vehicles and the integration of different forms of transport. The aim is to investigate how electric cars, bicycles, etc. have a role to play. The test project will start in four major Flemish train stations.
- **EV-Teclab**
  This project is coordinated by Punch Powertrain and is technically-oriented with a focus on prototypes/pre-release vehicles for so-called 'heavy duty' use (public transport, logistics and trucks) where the power train and various other parts are designed by Flemish companies.
- **Volt-Air**
  This project is coordinated by Siemens and is mainly focused on the integration of electric vehicles in vehicle fleets and the integration of these fleets in the microgrid of companies.

**Programme website:** www.proeftuin-ev.be

## 2.4. Wallonia public service

**PROJECTS**

- *Towards a transport account for the Walloon Region*: methodological study.
- *Feasibility study on the implementation of a dynamic car-sharing service in Wallonia*
  - The research intends to determine the objectives and major challenges concerning the development of a dynamic car-sharing system.
  - Research team: FUNDP (TRG); Espaces Mobilités; IBM and ITS
- *The impact of a ban on driving on Sundays and on public holidays for heavy goods vehicles*
  - Ongoing project by Sofico (public interest body of the Walloon region)
- *General balance of school mobility surveys*
  - At rush hour, school journeys represent 30% of daily commuting. School mobility is therefore a major issue. Consequently, in order to better target the journey to school routines, the Department for Mobility Planning has set up a tool for studying school mobility intended for schools in Wallonia.
  - The aim is to establish a diagnostic of the mobility behaviour of pupils as well as the obstacles to using one or other means of transport.
- *French-Belgian trans-border mobility survey* (2005-2007)
  - Before being able to take measures aiming at improving mobility in the zone Tournai-Lille-Mouscron, it was necessary to find out about journey routines and practices. Each household in the sample was interviewed about their movements on one day chosen at random and communicated in advance.
  - FUNDP (GRT) supervised the survey and analyzed the Belgian results.

**CONTACT INFORMATION**

*Wallonia Public Service*
*8, Boulevard du Nord*
*BE-5000 Namur*
*E-mail: th.transport.mobilite@spw.wallonie.be*
*programme website: http://www.wallonie.be -> Transport et mobilité*

## 2.5. Inter-university Centre for the Study of Mobility

**DURATION :** 1991 – on-going

**OBJECTIVES**
The Inter-university Centre for the Study of Mobility (CIEM) is a platform bringing together professors and researchers from the three French-speaking university academies in Belgium, in order to acquire the high-level cross-over knowledge necessary to examine the issue of mobility of persons and goods from an integrated, predictive and innovative angle.

**PROGRAMME STAKEHOLDERS**
The three French-speaking university academies in Belgium, including following institutions for this programme FUNDP, ULB, ULG, UCL Mons and FPMS.

**LEADING INSTITUTION :** ULB

**ONGOING PROJECTS**
Transportation costs and fare computation (2010- …)

**COMPLETED PROJECTS**
- Towards a transport account for the Walloon Region? (2006-2007)
- New technologies for energy storage and energy recuperation for a higher energy efficiency of the trams and busses of the public transportation company (2007-2010): Prospective research for the Brussels Capital Region
- Evaluation of external costs of transportation activities in Walloon region (2009-2010)

**CONTACT INFORMATION**

*Inter-university Centre for the Study of Mobility - CIEM*
*c/o ULB*
*50, avenue F.D. Roosevelt , CP165/7*
*BE-1050 Brussels*
*Tel: +32 2 650 27 99*
*E-mail: info@ciem.be*
*Programme website :* [www.ciem.be](http://www.ciem.be)

# BOSNIA AND HERZEGOVINA

(Source : Sasa Dzumhur, IPSA Institute Sarajevo, March 2012)

## COUNTRY DESCRIPTION

Area: 51 230 km2

Population: 3.9 millions / 76 per km2 (estimated)

Currency: Convertible Mark (1 BAM = 0.51 EUR)

GDP (in 2010): 16.2 billions USD

GDP per capita (in 2010): 4 157 USD

Republic Bosnia and Herzegovina declared independence from Yugoslavia (which was the Federation of six Republics) in March of 1992. Unfortunately, dissolution of Yugoslavia could not end peacefully so in a couple of month, the war was raging throughout the country. In December 1995, the bloodshed was finally stopped by Dayton / Paris Peace Agreement signing and accordingly, the NATO troops were sent to the country to supervise its military aspects[3]. In addition, the Office of the High Representative (OHR) has been responsible for overseeing implementation of the civilian aspects of the Agreement.

Bosnia and Herzegovina (BiH) is potential candidate for European Union (EU) membership as well as candidate for the NATO alliance membership[4]. In 1992, the country was admitted as a Member of the United Nations (UN) and the non-permanent membership of the UN Security Council in 2010/2011 is the greatest foreign policy achievement of BiH so far.

The Inter-Entity Boundary Line divides country into two Entities, with a high degree of autonomy: the ***Federation of Bosnia and Herzegovina*** (FBiH) and the ***Republic of Srpska*** (RS). Moreover, FBiH consists of ten Cantons, each comprising at least three municipalities (79 municipalities in total), while RS consists of 68 municipalities. Finally, ***Brcko District of BiH*** (BD) was established as a single administrative unit of local self-government existing under the sovereignty of BiH, while the territory of BD belongs simultaneously to both Entities, in condominium.

3 In December 2004, the EU officially took over NATO's peacekeeping mission in BiH.

4 On April 23, 2010, BiH received the Membership Action Plan from NATO, which is the last step before full membership in the alliance.

"The country's Constitution was drawn up as part of the internationally agreed 1995 Dayton / Paris Peace Agreement. It establishes a **complex political structure** that provides for governments at

State,Entity and District levels. The State-level comprises a tripartite rotating Presidency, a Council of Ministers (executive branch) and a bicameral Parliamentary Assembly consisting of a House of Representatives (lower chamber) and a House of Peoples (upper chamber)." [1] Furthermore, both Entity Governments also have the executive power, so the Entities allocate their budget resources for infrastructure, health care, science and education.

BiH is located in South-Eastern part of the European Continent, bordering with Croatia, Serbia, Montenegro and Adriatic sea (*see Figure 1 below*). Despite 26 kilometres of Adriatic Sea coastline on its South, BiH is still (acting as) a landlocked country. The most of BiH is mountainous and hilly (*Dinaric Alps*), having a mountainous or a moderate continental climate. The northern and north eastern parts of the country are in the (*Pannonia*) plain, but also have a moderate continental climate. Adriatic coast and Southern part of the country have a mild, so called "Mediterranean" climate.


*Figure 1: Topographic Map of Bosnia and Herzegovina*

*Source: http://upload.wikimedia.org/wikipedia/commons/4/45/Bosnia_and_Herzegovina_topographic_map.svg*

There are three major Ethnic groups living in BiH: Bosniacs (48.3%), Serbs (34.0%) and Croats (15.4%)[5]. Apart from those three groups of so called "constituent people", the BiH Constitution also recognizes "the others" (2.3 %) - mostly national minorities, but also those who do not declare affiliation with any ethnic group. Bosniacs and Croats mostly live in FBiH, while around 90% of RS inhabitants are Serbs. Almost a half of the population was displaced during the 1990's wartime and a significant number have never returned to their homes (people killed / died during the wartime or died in the meantime as well as people resettled in the other Entity or abroad).

The most densely inhabited areas of the country are its central part (around the country Capital, Sarajevo, and in the valleys of Bosna and Lašva rivers) as well as the plain on the North of the Country. It is estimated that 350 000 people lives in the city of Sarajevo (which is also the Capital of FBiH). Banja Luka, the Capital of RS is a city with over 200 000 inhabitants and there are another four cities in the country with more than 100 000 inhabitants: Tuzla, Zenica, Bijeljina and Mostar. The most of people in BiH lives in settlements with up to 25 000 inhabitants.

**EU ACCESSION**

*EU accession is a strategic priority for BiH* and the key events completed in the process, so far, are:

The Declaration on Special Relations with the EU adopted in 1998, followed by the BiH Council of Ministers and Parliamentary Assembly Decisions from 1999;

In 2003, the EC adopted the BiH Report for readiness to start negotiation with EU on signing the Stabilization and Association Agreement (SAA);

In 2006, BiH Directorate for EU Integration prepared The EU Integration Strategy;

Finally, in 2008 BiH and EU signed the Stabilization and Association Agreement / Interim Agreement[6].

BiH is a potential candidate for EU membership for a relatively long time period. Aspirations to acquire full membership in the EU have been based on a wide political consensus (officially proclaimed in the Statement made by heads of political parties back in 1999). On the other hand, a recent EU Report finds that "a shared vision by the political representatives on the overall direction and future of the country and its institutional setup is lacking. The EU accession process requires political will and functional institutions at all levels with an effective coordination mechanism on EU matters. The EU has reinforced its role in the country and continued to implement the objectives of the EU agenda, in line with the March 2011 Council Conclusions." [1]

"Political Directors of the Peace Implementation Council Steering Board (PIC SB) at their meeting in Brussels on 26 and 27 February 2008 set out five requirements and two conditions ("5+2 Agenda")

5 Estimated by UNDP: "Human Development Report 2002-Bosnia-Herzegovina". The last population Census from 1991 counted 43% Bosniacs, 31% Serbs, and 17% Croats.

6 The Stabilisation and Association Agreement has been ratified by all EU Member States, but has not yet entered into force due to non-compliance of BiH Constitution with the European Convention on Human Rights ("The Sejdic - Finci Case").

that need to be met by the BiH authorities prior to the closure of the OHR. The PIC SB has regularly reviewed progress on this 5+2 agenda at its meetings since February 2008. While progress has been made in some areas, chronic disagreement among the main political parties has produced gridlock that has prevented the full implementation of the agenda." [2] Obviously, the next move is on Governments in the country.

**Economy - Basic Facts**

Once, BiH was a mostly industrial, planning based economy with large state-owned enterprises (e.g. **Energoinvest**, **UNIS**, etc.) acting both on domestic (Yugoslavia) and international markets. Today, BiH is a lower middle-income country, with a relatively small economy in transition, where more than 60% of GDP have been created in the service sector, approximately 25 % in industry, and around 10 % in agriculture, hunting, fishing and forestry. The private sector's share in GDP is stable at around 60 %. Main industries in the country are mining, processing industry and electric energy production.

The encouraging economic growth recorded in period 2006-2008 has been stopped in 2009 when GDP dropped for almost 3%, reflecting not only global financial crisis, but also severely curtailed cross border financial inflows, growing trade deficit and the significant increase in public spending. In 2010, GDP have just slightly recovered (estimated rise is 0.7%), while at the same time inflation raised to 2.1 %. All Governments in the country recorded budget deficits and general government debt in 2010 (both domestic and foreign) stood slightly below 37% of GDP [3].

BiH is still in the negotiation process for the WTO membership. The most important trading partners with over 90% share of total value of exports (3.59 billion Euros in 2010) and over 70% share of total imports value (BAM 6.96 billion in 2010) are EU countries and countries implementing ***Central European Free Trade Agreement*** (CEFTA). Top five trading partners of BiH are Croatia, Germany, Serbia, Italy and Slovenia. Recently, the trade deficit was reduced from 4.8 billion Euros in 2008 to 3.4 billion Euros in 2010, but still it remains one of the biggest problems of BiH economy.

Additionally, different market environment (including high level of corruption, weak rule of law and unreliable contract enforcement) reflected through a significant drop of net foreign direct investment (FDI) in the country! FDI contribution to GDP dropped from 12% in 2007 to just 1.4% in 2009 and 2010. Or in other words, 174 million Euros of net FDI in 2010 and 180 million Euros a year before equals less than 30% of average annual net FDI in the country for the previous five years period (2004-2008). [3] Still, monetary and financial stability in the country have been preserved due to the currency board arrangement (euro as the anchor currency), relatively stable banking sector and the stand-by arrangement with the International Monetary Fund.

"Following the economic crisis, the number of newly registered companies dropped by around 50% in 2010. Property registration procedures were significantly shortened during 2010 in some courts, for example from 84 to 33 days in the Sarajevo Court. The time needed to start a business was reduced from 60 to 55 days, on average, over 2010. Court registration timelines and costs are harmonised between the Entities, including the notary fees. However, the process for obtaining all the necessary documents and permits remains lengthy and companies must still register in both Entities if they want to do business in the whole country." [1] Very high unemployment rate

(estimated to 27.2% in 2010[7]), low labour costs and large public administrations (the share of public sector in total employment in BiH is among the highest in Europe) have been the main features of the BiH labour market recently. Therefore, other major challenges for BiH economy are fostering private sector-led growth and fighting the "grey economy" (estimated at around 37 percent of GDP in FBiH and 21 percent in RS[8]). In addition, fight against the corruption (improving the effectiveness and efficiency of public spending in the country) is of essence for the full transition in a functioning market economy.

The privatization and restructuring of enterprises is still ongoing, but the countries' poor ranking (the lowest within the region) in the Global Competitiveness Report 2010/2011 (including the special publication on information and technology) is discouraging the investors. It seems that business environment regulation system improvement is a pre-requisite for boosting of investment spending in the country. Moreover, the private investors should also take part in implementation of large infrastructure projects (e.g. construction of motorways).

**Automotive, Transport - related Industry and Logistics**

There is over 50 years long history of automotive industry in the country, as well as, over 40 years of praxis in producing parts / assembling vehicles in cooperation with the leading brands of world automotive industry (Volkswagen, Mercedes, MAN). Unfortunately, this successful story was stopped during the 1990's (upon the war break out and in the post-war period). However, the foreign investments have strongly supported rehabilitation of automotive industry in BiH, so the most of the factories restarted the production and even some new brands have entered the market.

"Within the past ten years, this industry has experienced dynamic development, and has become strongly export-oriented, exporting in average 90% of their production, in 30 countries all around world. In a group of companies involved in auto components supply at present, the majority is in metal processing – over 70% and plastics – about 15%. Certain number operates in electrics and electronics and a few in other segments of automotive supplies, such as filters, batteries, spark plugs, fuses and rubber parts." [4]

Major players in the BiH automotive industry today are PREVENT Group (see the Box below), CIMOS TMD AI d.o.o. Gradačac, Volkswagen Sarajevo d.o.o. Vogošća, MANN-HUMMEL BA D.D. Tešanj, UNIS TOK d.o.o. Kalesija and Bekto Precisa Goražde. According to a recent Survey, some 6.000 employees are working for 34 companies comprising BiH automotive industry. The same Survey estimated average annual value of the Industry export at around 150 million Euros9.

BOX#1: ASA - PREVENT Group is the most successful private business system in the country and leading exporter in BiH for the second year in a row. The system is gathering 4500 employees in 19 companies, including automotive leather design and production of upholstery (Prevent Sarajevo / Visoko / Zenica / Goražde) as well as brake discs and brake drums production (Fad Jelah). Prevent group is not only a strategic partner of big automotive companies, but also a Joint-Venture partner

7 For five years, the entity institutes for statistics, together with the BH Agency for Statistics, have implemented the Labor Force Survey in line with the methodological rules and principles of the International Labor Organization and requirements of the EUROSTAT, which ensures international comparability of data in the area of labor statistics.

8 ETF, 2007: Labour Markets in the Western Balkans - Challenges for the Future.

9 USAID-SIDA Project: "Fostering Interventions for Rapid Market Advancement" (FIRMA).

with Volkswagen in VW Sarajevo d.o.o. company, located in Sarajevo suburbia - Vogošća. Prevent group companies are also manufacturing different rubber products (including rubber boats), while on the other hand, ASA companies provide banking and financial services, business consulting, insurance, leasing and marketing as well as new vehicles sales.

*Source:http://www.preventgroup.com/en/success-of-asa-and-prevent-group-business-leader-of-bosnia-and-herzegovina.htm*

BiH also had a great history in production of railway rolling stock and its components. Energoinvest factory ("Vaso Miskin Crni" located in Sarajevo) produced railway wagons, tanks and coaches. Furthermore, a lot of companies in BiH produced different components and spare parts for the Yugoslav railway rolling stock industry. The most of the pre-war companies have never recovered and the "Vaso Miskin Crni" factory does not exist anymore. Nowadays, just a few companies in the country produce spare parts for the railway rolling stock (e.g. "UNIS TOK" Kalesija produce box/shell buffers, towing assemblies and coil rings for the railway rolling stock).

Soko Mostar was a military owned factory, positioned as the regional leader in military aircrafts and aviation industry components production market. In 1980's Soko cooperated with the chain of suppliers in Yugoslavia, to provide the top quality products for the biggest names in the industry of the time (Boeing, Airbus, De Havilland etc.). Unfortunately, only a small part of the company survived the horror of 1990's - Soko Transmisija d.o.o. Mostar (factory of transmission parts and components for road and agriculture vehicles).

Another military owned factory, VZ Orao Rajlovac, was specialized for the aircraft engines production and repair. During the war-time, the factory was relocated from Sarajevo suburbia to Bijeljina where it successfully continued the work for some time. In 2002, "Orao" Bijeljina was involved in jet engines and spare parts (for Russian-made MiG aircraft) sale to Saddam Hussein's regime in Iraq (and under investigation of NATO). The company is trying to recover by restructuring / finding strategic partner ever since.

Some of the big names in the EU industry are present at the BiH market today (e.g. DB Schenker, Rail Cargo Austria, SDV etc.). Still, according to a recent World Bank Group survey on trade logistics (2010 LPI)10, BiH is lagging behind the region. Low LPI scores reflect higher average times to import or export. BIH has the lowest scores in the region for Quality of trade and transport-related infrastructure and Competence and quality of logistics services. [5] The fact is that even there are over a hundred transport and logistics companies operational in the country, the multi modal / combined transport is very poor developed.

## TRANSPORT INFRASTRUCTURE AND TRANSPORT POLICY

BiH Transport infrastructure has not yet fully recovered from the 1992-1995 wartime, when over 2 000 km of the main roads, the most of the railway network as well as more than seventy bridges (on the Core Network) were partially or totally destroyed. The total transport sector damage was

10 The World Bank's Logistics Performance Index (LPI) summarizes the performance of countries in six areas that capture the most important aspects of the current logistics environment.

estimated at couple of billions USD. During the last 15 years BiH have been strongly supported by EU, International Financial Institutions (WB, EBRD, EIB etc.) and many other donors fostering investments in the different transport sector improvement projects, as follows:

- Transport infrastructure renewal and upgrade projects (e.g. rehabilitation of roads and railway networks and marking of the Sava river waterway);
- Harmonization of transport laws (and bylaws) with EU legislation / standards and strengthening of institutions in transport sector (e.g. Twinning Assistance to the MoCT in Implementation of the Bosnia and Herzegovina Law on Railways);
- Modern transport infrastructure projects preparation and implementation (e.g. Motorway in Corridor Vc through BiH).

*Core Transport Network in BiH* consists of nearly 4 000 km of main roads, just over 1 000 km long (Standard gauge) railway network, four international airports (Sarajevo, Banja Luka, Mostar and Tuzla) and river Sava waterway[11] with ports of Brčko and Šamac. The main features of the Core Transport Network today are:

- Just 75 km of modern motorways in operation (and another 30 km under construction);
- On the most sections of the poor developed BiH railway network (2 km of railways per 100 km$^2$), train speed is still limited to 70 km per hour for passenger trains and 50 km per hour for freight trains;
- Sarajevo International Airport is the only airport in the country providing regular international flights (there are no regular domestic flights at all);
- The river ports infrastructure is obsolete or missing;
- There are no modern trans-shipment terminals in the country.


*Figure 2: Bosnia and Herzegovina Core Transport Network*

11 Sava river forms the northern border of BiH for 332.4 km, running through all political entities.

According to the ***Protocol of Land Transport*** (included in SAA), adequate allocation of competencies among the Governments in the country is a prerequisite for coordinated development of transport infrastructure. The Protocol also stipulates the adoption of coordinated necessary measures by BiH and EU for the development and promotion of rail and combined transport. This section of the Protocol also refers to the aspects of infrastructure in particular to the capacity improvements required to support such development, which may call for substantial investment. However, EU is ready to support this over its financial institutions and lending instruments including the additional resources, as clearly expressed in the Protocol.

Moreover, good relations with neighbouring countries and regional cooperation are crucial for Western Balkans Countries (WBC) moving towards the EU. Therefore, BiH actively participate in numerous regional initiatives, including the ***South East Europe Transport Observatory*** (SEETO), the ***South East European Cooperation Process*** (SEECP) and the ***Regional Cooperation Council*** (RCC). BiH is also a member of European Civil Aviation Conference as well as Joint Aviation Authorities and a successful implementer of the European CAA Agreement. Ministry of Transport and Communications of BiH (MoTC) is full member of Confederation of Organizations in Road Transport Enforcement (CORTE) and an active participant in the UNECE TEM&TER Projects as well.

**Branch "c" of Fifth Pan-European Corridor** (which is connecting Budapest with Croatian port Ploče) **is the backbone of future BiH transport network.** It was estimated that almost half of the population (creating around 60% of BiH GDP) live in the wider Corridor area passing through the central parts of the country (along the North-South Axis: Doboj - Zenica - Sarajevo - Mostar). The part of the Corridor passing through BiH include 330 km long Motorway, 350 km long Railway line, international airports Sarajevo and Mostar as well as river Sava ports.

In 2006, MoTC started preparation of ***Transport Sector Policy and Strategy for BiH*** (with the support from the EBRD and the WB). The both documents were drafted in 2007, but the process of its adjustment is still ongoing. This mean the Policy is not an official paper yet and the strategic papers for different transport modes (which should also include the action plans) are still missing. Anyway, the vision articulated in BiH Transport Policy draft should remain as follows:

- An efficient, cost-effective transport system that serves the needs of the people and the economy;
- A market-driven, competition-based, development process in which service users will be protected from monopolies;
- A transport system that is fully harmonized with the regulations and standards of the EU and rules of the WTO.

The Transport Sector Policy should foster economic and social development of the country enabling sustainable development of the BiH transport system. Therefore, increasing the mobility of goods, capital and people in a new, global transport-sector environment (including deregulation, free markets and integration), have been defined as the main objective. To achieve this, each transport mode (as well as multi modal / combined transport systems) should contribute to meet the following specific objectives:

- Social and Economic requirements (socio-economic sustainability);
- The best level of services at the lowest possible cost (efficiency);
- Financial sustainability;

- High level of Safety and Information;
- Compliance with EU Standards and Regulations;
- Minimal Environmental Impact.

As long as the country transport sector does not reach the required level, EU and IFIs will assist in preparation of priority transport infrastructure projects through the ***Western Balkans Investment Framework*** (WBIF)[12]. The most of the (short-time) development priorities on the BiH Core Transport Network have already been defined and presented in the ***SEETO Comprehensive Network Development Plan 2012***[13]. The Railway projects are missing, but this will surely change upon forthcoming ***Regional Transport Study***. In addition, the forthcoming Study which was presented in ***SEETO strategic work programme for 2012-2014*** should also help BiH Governments to complete work on missing modal Strategies and corresponding Action Plans.

## TRANSPORT INDICATORS

At the beginning of new millennium, the roads carried more than 90 % of all transport work in BiH. With over 95% share in total number of passengers transported in 2010, the road passenger transport is still dominant, but in the meantime, railway freight transport succeeded to restore a significant market share. So, for instance, the performance of railways in 2010 was just over 1.2 billions of tonne kilometres comparing to the road transport performance of slightly over 2.0 billions of tonne kilometres. Air Cargo and water-borne transport share in total freight transport performance in BiH remains extremely low.


Figure 3: Bosnia and Herzegovina Road & Railway Transport (2006-2010) *Source: BH Agency for Statistics [6]*

In the analysed five-year period (2006-2010) public road passenger transport indicator increased for almost a quarter (22.7%). Passenger cars ownership is considered an excellent surrogate measure for

12 WBIF was established in 2009 to streamline cooperation and increase financing capacity for investments in the Western Balkans. "Preparation" include the reports, documents and studies essential to technical, economical and financial project appraisal.

13 SEETO was established in 2004, by the Memorandum of Understanding for the development of the Core Regional Transport Network (MoU). SEETO is a shared platform for governments of WBC and the EC to identify development priorities on the "SEETO Comprehensive Network".

the private road transport growth. In 2010, total number of registered road motor vehicles was 843 151, of which 724 787 passenger cars. This means motorization rate in BiH in 2010 was 185 passenger cars per 100 inhabitants. Number of registered passenger cars grew from 625 to 725 thousands in period 2006-2010 (16% growth rate).

At the same time a negative trend was recorded in number of railway passengers, which dropped from over 1.1 to 0.9 millions. Finally, in the analysed period there was the significant growth (over 20%) in number of passengers transported internationally from/to the BiH airports. The number of passengers increased from 486 thousands in 2006 to 591 thousands in 2010.

## THE SCIENTIFIC RESEARCH DEVELOPMENT FRAMEWORK

The Framework Law on Scientific and Research Activities in BiH was adopted in 2009. The Law highlighted special interests and defined the basic principles of scientific and research activities in BiH promoting not only international but also cooperation within the country. The Law also defined the Science development strategy scope and introduced the Science Council as the advisory body for the strategic development of science, research and innovation policy. Finally, there are also included provisions on the budgeting of international scientific-research cooperation and the scientific-research information system building.

**Ministry of Civil Affairs of BiH** (MoCA) through its Department for Science and Culture coordinates / monitor Entities' activities, defines the international level strategies and harmonize the scientific and research strategies in the country. Moreover, MoCA promotes international scientific cooperation and participation into the COST, EUREKA, FP7 as well as in EC organizations, bodies and authorities. The Ministry also promotes and fosters science as an important part of the total social and economic progress of BiH serving as advisor, preparing participation at conferences as well as collecting / analyzing all relevant information.

**Ministry of Education and Science of FBiH** activities include: Development and coordination of scientific-researching activities; Development of the scientific-researching institutions; Encouragement of fundamental applied researches; Development of investment technologies and human resources in scientific-researching field; and Protection of copyrights and intellectual property. The cantonal Ministries of Education, Science, Culture and Sport governs the research activities funding, as well.

**Ministry of Science and Technology of RS** is responsible for development of scientific research Strategy, establishing and supervising the scientific-research institutes and promotion of basic, as well as for administrative and other professional tasks related to scientific research activities, applied and development research and other forms of scientific research.

There are two **Academies of Science** in the country (*Academy of Science of RS and Academy of Science of BiH*), eight public and nine private universities, but also a number of independent faculties and international colleges. 21 Institutes (of which six are private owned) are registered in the Ministry of Science and Technology of RS database. On the other hand, the database for FBiH is still missing, so it was estimated that BiH has around 50 public and private owned Institutes (including Institute for Intellectual Property of BiH). [8]

According to the last year mapping of Innovation Infrastructures in BiH, there are just five active **Technology / Innovation Centres** in the country, while the projects aiming to establish another two are ongoing. The same Report presents two Technology and Science Parks (Banja Luka and Mostar), 18 Business Centers / Incubators throughout the country as well as two national industry clusters (Automotive Cluster and Wood industry Cluster). [7]

BOX#2: The main objective of the Automotive Cluster Bosnia and Herzegovina (AC-BiH) is, to increase the competitiveness of its members, which are companies active in the field of the automotive (supplier) industry. The AC-BiH brings together the competences of its members along the supply chain and acts as a platform and motor for technological innovations, national and international co-operations, marketing and distribution. To achieve its objective, AC BiH will conduct the following activities: Representation in trade associations, chambers and other organisations; Preparation of recommendations and strategies for the automotive industry development; Exchange of information and public relations development; Organization of workshops and conferences; Initiation and maintenance of horizontal and vertical networks; Consultancy and other services to improve competitiveness of its members, including Awareness-raising.

Source: http://www.made-in-bosnia.org/index.php?id=112&L=3

The National Institute for Accreditation (BATA) has so far granted 23 testing laboratories, seven calibration laboratories, two certification bodies and 11 inspection bodies. None of these laboratories / bodies have been included in transport - related research. In addition, the national researchers' databases are not organized according to the EU standards (e.g. www.registar.nub.ba).

## TRANSPORT-RELATED RESEARCH FUNDING AND PROJECTS

Budgetary allocations for scientific and technology research projects in the country are very limited. So, e.g. in 2008 entities allocated just 0.07-0.1% of GDP for science and technology development. [8] The allocations are distributed through numerous institutions (of which 11 ministries in FBiH and its Cantons are dealing with the Culture related issues, as well) and an adequate statistical tool (to collect and process the data on the allocations for all research projects in the country) is missing. In addition, a number of researchers and research institutions from BiH have been included in international projects funded from the abroad.

In both entities, the engineering and technology / technical sciences receive slightly larger shares of the research budget than the other fields. 28 out of 98 projects funded from budget of RS in 2010 were in field of Engineering and technology sciences, but there was no a single transport-related research project. It is almost impossible to get aggregated data or data on transport-related projects funded from (Entity and Cantonal) budgets in FBiH and BD.

BiH scientific-research organisations participated as partners (within consortia) in Fifth and Sixth Framework Programs (FP5 and FP6). However, out of 67 successfully completed projects, where organizations from the country have participated, there was not a single transport-related research project. "Participation in the Seventh EU Research Framework Programme (FP7) slightly increased. Cooperation with COST and EUREKA started. The Ministry of Civil Affairs provided financial assistance for Entities preparing projects for FP7, COST and EUREKA. However, the administrative and research

capacity to fully take advantage of association to FP7 and the means to actively stimulate the scientific community remained weak.

Participation and success rate in Marie Curie actions is weak as well as the involvement of the private sector. Some efforts were made to integrate into the European Research Area (ERA) and contribute to the Innovation Union (IU)14. The country joined the EURAXESS network aiming at mobility of researchers; the bridgehead organisation coordinating the national EURAXESS network was established at the University Banja Luka. The funding slightly increased mainly for researchers, modernization of infrastructure and equipment and publications notably by joining the COBISS library-information system. The Entities increased investment in research and development.

However, overall, investment in research remained low, in particular by the private sector. As Entities and Cantons fund their policies through their budgets, it is difficult to streamline research policies and avoid fragmentation, one of the key ERA objectives. Accurate statistics on science and technology are missing. Overall, ***alignment with European standards in the areas of education and culture is at an early stage. Strategies and framework laws need to be implemented and the Baseline Qualifications Framework to be further developed and implemented. State-level agencies for education and quality assurance structures need to be made operational***." [1]

Back in the 1980's and 90's almost all big enterprises in the country had departments performing most of the scientific and technology research. Nowadays, big enterprises are mostly transformed to SMEs and the scientific research funded by the budget allocations has been mostly performed by the Universities. Unfortunately, **National Transport-related Research Projects in BiH are still missing and research institutions are weak in technology transfer and innovations**. However, here are presented some of transport research-related projects recently performed in the country (as much in details as available from the World Wide Web) and the Report closure is a SWOT analysis of Transport-related scientific and technology research in the country.

„***Laboratory for turbochargers***" *- a Joint project of "CIMOS TMD AI" Gradačac and* The Faculty of Mechanical Engineering, University of Sarajevo

*In 2008, a local SME and public university faculty invested in the equipment for the Laboratory for turbochargers testing (by simulating work of an internal combustion enginee)*.

„**The effect of application biodiesel to lubricants, and ecological characteristics of the engines**" - Scientific research project funded by the Ministry of Science and Technology of RS in 2009;

The project was conducted by the Faculty of Mechanical Engineering, University of Banja Luka;

"**TransBonus**" (Transport EU - Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 Research Activities) - FP7 Project

The Project budget was 482 848 EUR.

Automotive centar d.o.o. Sarajevo participated as a non-governmental partner in the Project (from early 2009 until the end of 2010). The overall objective was to improve and promote closer Scientific

14 e.g. in 2010 the MoCA had a 250,000.00 EUR budget for creating a foundation for the integration of BiH in ERA.

and Technological cooperation opportunities between Europe and the Western Balkan Countries in the area of Surface Transport.

One of the Projects' outcomes is database of transport-related researchers in the country available at www.automotivecenter.ba/EU%20FP7%20Transbonus/Doc/Baza%20istrazivaca%20BiH.pdf

**1st Road Infrastructure Safety Management Conference, Sarajevo, 2010.**

**Association of Consulting Engineers of BiH** (ACE BiH) supported by RCC and ERF had organized the event. The main objective was to exchange the knowledge encouraging the implementation of the Directive 2008/96 in the South-East Europe countries.

ACE BiH, which was founded in 2004, is a member of International Federation of Consulting Engineers, EU Road Federation and International Road Federation. The Association also successfully organized three Congress (two for the roads and one for the railways) with international attendance, supported by MoTC;

**Transwork d.o.o.** - the first domestic on-line freight exchange in BiH

Transwork was founded recently by a local company („Satwork" Banja Luka) with support from The Excellence in Innovation Project (co-sponsored by the Royal Norwegian Ministry of Foreign Affairs and the USAID).

## SWOT Analysis

| Strengths | **Weaknesses** | **Opportunities** | **Threats** |
|---|---|---|---|
| Research Development Strategies are adopted both at State and Entity levels | Research priorities are not clearly defined or missing | EU pre-accession funds / FP7 projects / EURAXESS | Global financial crisis |
| All involved Institutions are willing to improve the current situation | Insufficient and fragmented funding / Poor research infrastructure | Regional cooperation / Experience of BiH researchers working abroad | "Brain-drain" |
| Established Technology Centres / Established National Contact Point (NCP) for Transport | Link between Research Institutions and SMEs is still missing | | |
| Young Researchers willing to learn / improve | Inexperience in Research Project Preparation/ Management | | |
| | Researchers' / Projects' Databases are poor organized or missing | | |

| | | | |
|---|---|---|---|
| | Poor Statistical data on availability of scientific research capacities / Poor dissemination of Project achievements | | |

## List of References:

[1] European Commission: Bosnia and Herzegovina 2011 Progress Report;
[2] Office of the High Representative web presentation (http://www.ohr.int);
[3] Central Bank of Bosnia and Herzegovina: Annual Report 2010;
[4] Investment Opportunities: "Bosnia and Herzegovina Automotive Industry ", FIPA BiH 2011;
[5] The Logistics Performance Index and Its Indicators, WB Report, 2010;
[6] Agency for Statistics of BiH: First Release – Transport – 1, 2011,First Release – transport – 1, 2010;
[7] Report on the mapping of the WBC Innovation infrastructures – BiH, WBC-inco.net, 2011;
[8] The Strategy for the Development of Science in BiH 2010-2015

### WWW:

www.seetoint.org
www.wbif.eu
www.vladars.net
www.mef.unsa.ba
mf.unibl.org
www.uki.ba
www.bhas.ba
www.bata.gov.ba
www.firmaproject.ba/en
www.wbc-inco.net
www.automotivecenter.ba
http://81.93.91.53/index.php?lang=en
http://www.mcp.gov.ba/zakoni_akti/strategije/?id=1251).

### Contact Information

***Dipl.Ing. Sasa Dzumhur***
*IPSA Institute Sarajevo*
*P u t z i v o t a b b*
*Bosnia and Herzegovina*
*Tel + 387 33 276 360*
*Fax + 387 33 276 355*
*sasa.dzumhur@ipsa-institut.com*
*sascha_dz@yahoo.com*

CZECH REPUBLIC
(Source: Vaclav Fencl, CDV-Transport Research Centre, January 2009)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

The Czech Republic is located in the heart of Europe. Following the First World War, the closely related Czechs and Slovaks of the former Austro-Hungarian Empire merged to form Czechoslovakia. After World War II, a truncated Czechoslovakia fell within the Soviet sphere of influence. With the collapse of Soviet authority in 1989, Czechoslovakia regained its freedom through a peaceful "Velvet Revolution". On January 1993, the country underwent a "velvet divorce" into its two national components, the Czech Republic and Slovakia. Now a member of NATO, the Czech Republic has moved toward integration in world markets, a development that poses both opportunities and risks. In December 2002, the Czech Republic was invited to join the European Union (EU) and in May 2004 the Czech Republic became the member of the EU.

The Czech Republic is a landlocked country lying in the central part of Europe in the middle of the temperate zone of the northern hemisphere. The country's borders make up neighbourhood with Poland (761.8 km), Germany (810.3 km), Austria (466.3 km) and Slovakia (251.8 km). The major European watershed passes through the territory of the Czech Republic to separate the basins of the North, Baltic and Black Seas. Principal rivers are the Labe (370 km) and the Vltava (433 km) in Bohemia, the Morava (246 km) and the Dyje (306 km) in Moravia, and the Odra (135 km) and the Opava (131 km) in Silesia and northern Moravia.

The Czech Republic has a population about 10.0 million people (10 235 365 on 30th June 2005) residing on 78.868 sq km. The average density is about 130 inhabitants/sq km. The Czech Republic consists of 13 regions and City Prague (capital). Prague is the largest city with about 1,17 Mio inhabitants, followed by Brno (about 368 000 citizens) and Ostrava (about 311 000 citizens).

The Czech Republic has 55.500 km of paved roads, road and motorway network, including 546 km of motorways and 336 expressways (in 2004). The Czech Republic has a 15.925 km long railway network (9.463 non-electric and 6.462 electric). The length of the inland waterway Labe and Vltava is 303 km. There are 87 airports including 9 international airports. The most important airport is Praha-Ruzyně.

The Czech Republic can be found on the borderline of two mountain systems. The western and central parts of the country are occupied by the hilly uplands Česká vysočina and by the low mountain ranges Šumava, Český les, Krušné hory, Krkonoše, Orlické hory, and Jeseníky.

The Západní Karpaty Mountains (Beskydy) penetrate into the eastern part of the country. The climate of the Czech Republic is affected by the interaction of oceanic and continental effects. Western winds prevail and intensive cyclone type activities frequently change air masses and bring rather heavy precipitation. The maritime effect is mainly felt in Bohemia; continental climate effects have a bigger impact on Moravia and Silesia.

Altitude and relief influence the climate to a large extent. 52 817 km2 of the country's whole territory (66.97%) can be found at an altitude below 500 m, 25 222 km2 (31.68%) between 500 to 1 000 m, and only 827 km2 above 1 000 m. The average altitude of the Czech Republic is 430 m.

The fauna and flora found in the country also testify to the mutual penetration of principal directions in which fauna and flora have propagated in Europe. Forests, mostly coniferous, cover 33% of the total area.

Transport industry

The Czech Republic is an industrial country with a wide range of industrial sectors. The most important regions for transport technology industry are the region of Central Bohemia where automotive industry is located (Škoda-Auto Mladá Boleslav, TPCA Kolín, Tatra Kopřivnice e.g.). In other regions production of car parts is increasing. In the near future further investment in the automotive industry is expected. Over the past 5 years implementation in the area of intelligent transport systems (ITS) is increasing. In the Czech Republic the production of rail vehicles has a long-term tradition.

Transport policy related to the general goals

The Ministry of Transport (MoT) and Transport Research Centre (CDV) had recently prepared a new document "Transport Policy for the period 2005-2013" adopted by the Czech Government in July 2005. The Czech Republic's transportation policy for 2005 – 2013 is a complex document, which sets the strategic and conceptual goals for transportation and transportation networks. The hitherto applicable Transportation Policy, approved by the Government in 1998, by its Resolution no. 413/1998, defined the strategy for this sphere up to the country's accession to the EU. One of the main reasons for the elaboration of a new transportation policy was the publication of the EU White Paper: "European Transport Policy up to 2010: Time to Decide," in 2001. That document critically depicts the hitherto development of the inter-disciplinary division of transportation-related work, in favour of transportation fields, which have a more negative impact on their surroundings; and it gives impetus for change. Another impulse was the conclusions of the Johannesburg Summit on Sustainable Development, held in 2002. The concept of sustainable development based on three pillars (economic, environmental, and social) has led to a re-evaluation of developments in transportation, in favour of that which has the smallest negative impact on the environment. And, last but not least, the reason for updating the transportation policy was the "Strategy for Sustainable Development," approved by the Czech Government's Resolution no. 1248/2004, which has become the cornerstone for the elaboration of other sector-specific policies.

The transport policy consists of 5 specific priorities:

- Suitable modal split among all kinds of transport.
- Enhancing of quality of the transport infrastructure.
- Provide sufficient financial sources for transport sector.
- Increasing of traffic safety.
- Support of regional transport

# MAPPING OF THE COUNTRY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM

The principal body responsible for transport research in the Czech Republic (CR) is the Ministry of Transport (MoT CR). Transport research managed and funded from other public sources is negligible. National research programmes in the CR are organised centrally, so that transport programmes are, in effect, sub-programmes of general research programmes on the national level. The primary research focus is on strategic research and complex transport issues. The intention is also to gain a greater share of supra-national research, in co-operation with other transport bodies and supply organisations. The research sector is currently being re-organised, in order to facilitate efficient communication and strengthen ties between research institutes and universities and to encourage their co-operation at an international level.

For the research programme, "Transport System Optimisation and its Sustainable Development" (see below), a total overall budget of CZK 286.3 million (approximately €9 million) was allocated.

For the years 2002 until 2004, the Government's Council for Research estimated research expenditure at CZK 112.4 million (approximately €3.5 million), per year. Most research projects are entirely funded by the Government, with only a small number being partially financed by research organisations. Co-financing (with international financing institutions, commercial banks or similar) does not take place. Non-governmental research and funding in the Czech Republic is largely carried out by manufacturers and by the technical faculties of five Czech universities.

Governmental financial support of the programmes for R&D is provided especially through the Ministry of Transport and Government Council for Research and Development. At present the main support for area of the road research is provided by programme "Safe and Economic Transport" (brief description below):

Safe and Economic Transport – ongoing programme

Research focus: public transport, sustainable mobility, safety, investment models and technologies for infrastructure maintenance.

Part of the National Research Programme, with transport-related themes, is led by the MoT (Ministry of Transport).

This programme began in 2004 and will finish in 2009.

In the past, two main programmes were initiated by the Ministry of Transport and supported by the Government Council for Research and Development:

**TRANSPORT RESEARCH PROGRAMME OF THE MOT -** research programme issued in 1996 covered a wide range of topics separated in 3 sub-programmes. Programme ended in 2001 (with some projects running until 2002/3).

**TRANSPORT SYSTEM OPTIMISATION AND ITS SUSTAINABLE DEVELOPMENT -** programme was divided into 4 sub-programmes, focusing on sustainable passenger and freight transport and the restructuring of

the transport system. Programme was led by the MoT CR (Ministry of Transport). Duration 2001 - 2004 (2005).

The Ministry of Transport issued recently a document **"Conception of research and development in the area of transportation for the period of 2006-2010"**. This document defines the main areas for future development and research in transportation (future development of the transport infrastructure; technical, technological and information interoperability of the transportation chains both national and European level; support of public transport, support of intermodal and multimodal transportation, mobility management in cities, support of pedestrians and bicyclists, new forms of financing of the development of the transport infrastructure in the Czech Republic, broader implementation of telematics and information tools for advocacy of the transport policy, improve traffic safety, support of the GALILEO programme and finally the quantification of the influence of transport on health of people and environment).

In the frame of above mentioned research programmes the Ministry of Transport has prepared several sub-programmes encompassing the required topics for future research and development in the area of transport. Particular projects are announced annually by Ministry of Transport. The projects are principally joined with main research programmes of EU (FP4, FP5, FP6 and currently FP7) and other international research activities.

In connection with State Transport Policy have been created and adopted (by Government or Ministry of Transport) this important documents:

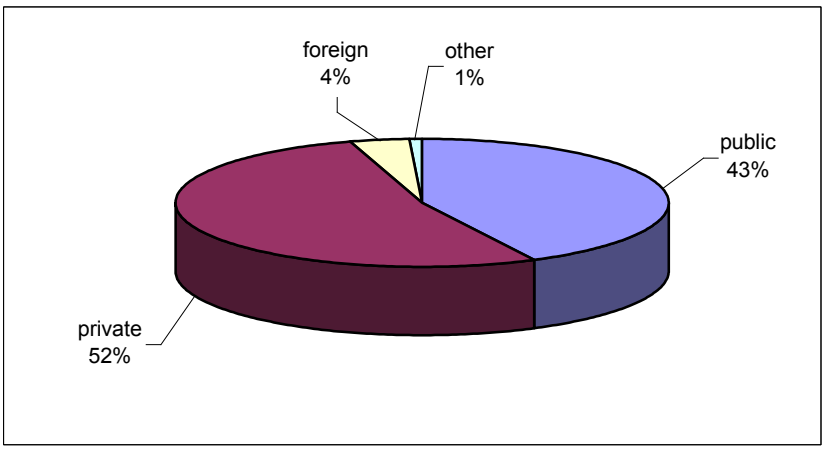
- Long-term research and development programme in the transport sector and reorganisation of science-development base (1999).
- Proposal of mid-term strategy of the transport sector, telecommunication and post (1999).
- National development programme of the Czech Republic –Part Transport, Telecommunication and Post (1999).
- Concept development of the Transport and Communications (2000).
- Development Programme of the Transport Research Centre (2002).

According the key requirements of the European Union, anchored in Artic1e 130, the Czech Government has prepared document **"National Research and Development Policy of the Czech Republic for 2004 – 2010",** which was adopted 7.01.2004 by Government Decision No. 5. Main goal of this document is to enhance the Czech research and development to the European level.

Subsequently the document **"National Research Programme for 2004 – 2009"** was developed and adopted by the governmental approval No. 417 in April 2004.

Share of the state budget on the total expenditures for R&D is in Czech Republic on the similar level as average value in EU countries.

*Fig. No. 1 Main sources of funding - general R&D in Czech Republic 1999*




Source: OECD - Main Science and Technology Indicators 2001

An overview of the total state research and development support from public funds in the period 1996 - 2004 and share of transport support to total expenditure is shown in Table No. 1 and Figure No. 1.

In the Czech Republic, further financial sources exist for research and development. Apart from the above-mentioned Ministry of Transport the other sources are:

- Ministry for Environment,
- Ministry of Interior,
- Other ministries (low part),
- Grant Agency of the Czech Republic and its grants (presently very low share),
- Local authorities and other objects partly subsidized by the state budget.

Some part of transport research in the Czech Republic is financed by:

- Research programmes EU mainly by the Frame Programmes R&D EU (5FP, 6FP e.g.),
- Research programmes OECD/ECMT and other international organisations,
- Research programmes of COST and EUREKA,
- Other sources from foreign countries.

The area of publicly supported research and development is currently managed by the Act No. 130/2002. This document concerns the support of research and development with public funds, which has been valid since 1 July 2002 and which determines in detail the basic terms, the subject and ways of the support, conditions of the support, the ownership of fixed tangible assets obtained for research and development, public tenders in research and development, the provision of information about research and development, and authorities in the field of research and development. The Act is supplemented with three Government Directives:

- Government Directive No. 267/2002 Col I. on the information system in research and development,
- Government Directive No. 461/2002 Col I. on target-oriented support in research and development from public funds and on public tenders in research and development
- Government Directive No. 462/2002 Col I. on the institutional support of research and development from public funds and on the evaluation of research plans.

The mechanism, in which funds for the support of research and development are generally proposed and made available, is described in Figure No.2. The preparatory stage of the state budget is illustrated on the left - from proposals of the administrators of individual budgetary chapters (GAČR - Grant Agency of the Czech Republic, AV ČR - Academy of Science of the Czech Republic, MŠMT - Ministry of Education, Youth, and Sports, other sectors) to the budget approval by Parliament. Research and Development Council clearly plays the most important role in the creation of the research and development budget. The Ministry of Finance then proposes the final level of the budget. After the state budget is approved by Parliament, the Ministry of Finance assigns the funds to individual administrators of the budgetary chapters.

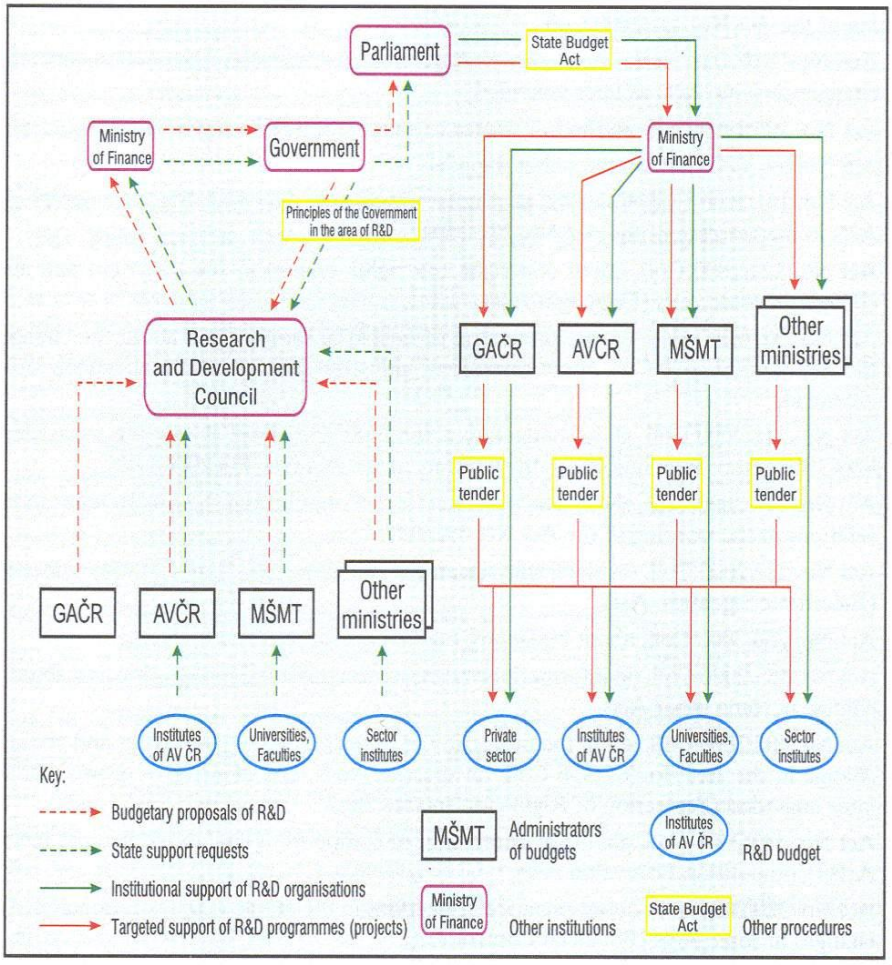



*Fig. No. 2 Current mechanism of the public support of research and development in the Czech Republic*

Source: Guidebook about State Support R&D in the Czech Republic 2004
Explanation: Grant Agency of the Czech Republic
Academy of Science of the Czech Republic - MŠMT-Ministry of Education, Youth, and Sports

**Table No. 1 Share of the transport research funding to total public research expenditure 1996 – 2004**

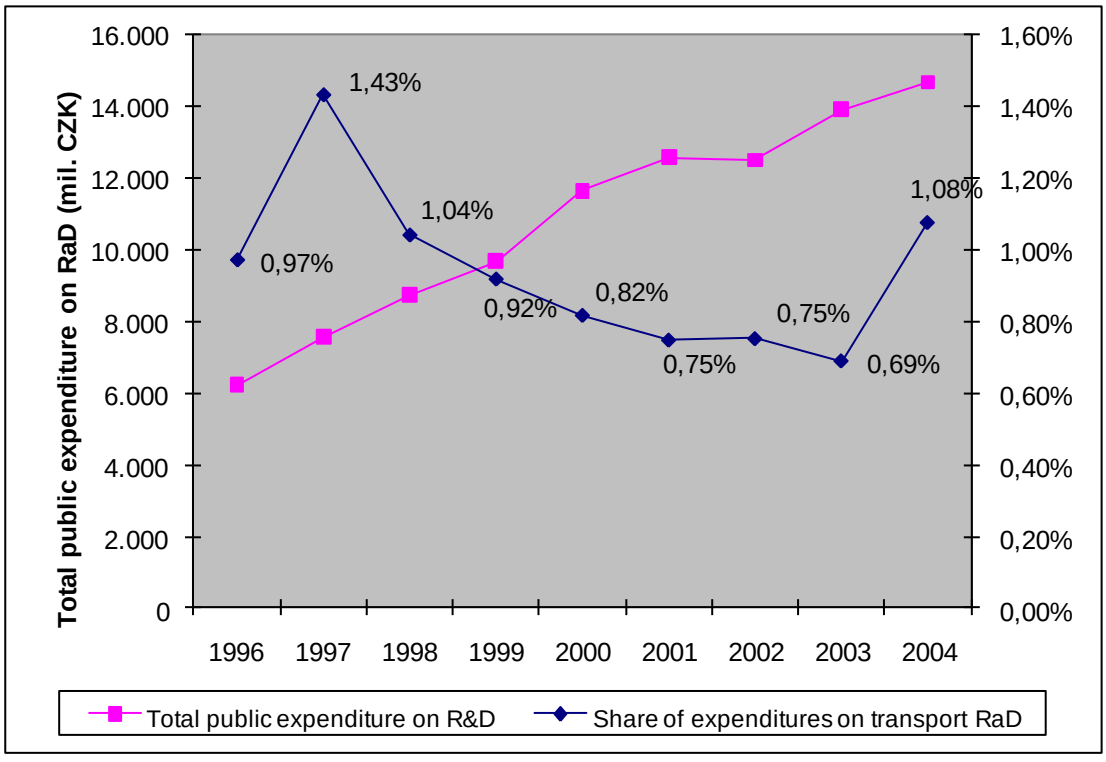
| | Public expenditure on R&D | | | Public support R&D for Ministry of Transport | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Target - oriented | Institutional | Total | | Target - oriented | | Institutional | |
| | CZK $10^3$ | | | CZK $10^3$ | (%) | CZK $10^3$ | (%) [1] | CZK $10^3$ | (%) [2] |
| **1996** | 6 233 994 | 3 386 839 | 2 847 155 | 60 596 | 0,97% | 46 520 | 1,37% | 14 076 | 0,49% |
| **1997** | 7 553 191 | 4 217 740 | 3 335 451 | 108 205 | 1,43% | 90 541 | 2,15% | 17 664 | 0,53% |
| **1998** | 8 731 593 | 5 280 635 | 3 450 958 | 90 920 | 1,04% | 65 500 | 1,24% | 25 420 | 0,74% |
| **1999** | 9 671 572 | 4 810 593 | 4 860 979 | 88 829 | 0,92% | 52 904 | 1,10% | 35 925 | 0,74% |
| **2000** | 11 641 317 | 5 892 515 | 5 748 802 | 95 115 | 0,82% | 20 000 | 0,34% | 75 115 | 1,31% |
| **2001** | 12 577 991 | 5 706 875 | 6 871 116 | 94 084 | 0,75% | 69 534 | 1,22% | 24 550 | 0,36% |
| **2002** | 12 497 535 | 5 353 569 | 7 143 966 | 93 984 | 0,75% | 68 584 | 1,28% | 25 400 | 0,36% |
| **2003** | 13 920 585 | 6 034 945 | 7 885 640 | 96 061 | 0,69% | 76 121 | 1,26% | 19 940 | 0,25% |
| **2004** | 14 663 876 | 6 795 241 | 7 868 635 | 157 796 | 1,08% | 137 766 | 2,03% | 20 030 | 0,25% |

(%) [1] - share to total target-oriented expenditures

(%) [2] - share to total institutional expenditures

From 1.1.2003 the Ministry of Transport and Communications was changed on Ministry of Transport

**Fig. No. 3. Transport research support to total expenditure on R&D Programmes 1996 –2004 (Mio CZK, %)**



# NATIONAL R&D PROGRAMMES FOR ROAD TRANSPORT FROM THE LAST 5 YEARS

Description of main ongoing and past programmes focused on research in the transport area of the Czech Republic is as shown above. The road transport research is an important part of these programmes.

Research projects and their subject, timing, financial demands are proposed and announced by Ministry of Transport and approved by "Research and Development Council". Ministerial commission yearly evaluates individual projects and level of results effect on the financing in next period.

The R&D programme for transport has been approved as part of **"National Research Programme for 2004 – 2009" (NPV I)** with total amount 475,8 Mio CZK (about 15 million EUR).

**Contact information**

***Mr. Vaclav Fencl***
*International Project Director, CDV-Transport Research Centre*
*Lisenska 33a, CZ-636 00 Brno, Czech Republic*
*Phone: 00 420 548423710, 00 420 724027355*
*Fax: 00 420 548423712*
*E-mail: fenclv@cdv.cz*

# FINLAND

(Source: ERA-NET TRANSPORT, Overview of research programming and cooperation mechanism, Jan 2005)

## COUNTRY DESCRIPTION

Finland has a population of around 5.3 million concentrated around the southern part of Finland with 1.2 million people living in the metropolitan area of Helsinki. The largest cities are Helsinki (576 632 inhabitants), Espoo (241 565), Tampere (209 552), Vantaa (195 397) and Turku (175 582).[15] The country covers 337.030 sq km, giving an average population density of around 15 people per sq km.

Except for a small highland region in the extreme northwest, the country is lowland less than 180 m above sea level. Off the southwest coast are the Swedish-populated Åland Islands (1.505 sq km), which have had an autonomous status since 1921. The close proximity to the Baltic States has created strong bonds between the countries, something that is also visible in the transport policies.

Finland has 5.919 km of railways. Paved roads account for 50.305 km, while unpaved roads 27.668 km. The coastline borders the Baltic Sea (the Gulf of Bothnia and the Gulf of Finland) and has a length of 1.126 km. Because of its northern position Finland has special transport issues regarding ice and shipping and transport lines to Europe.

## TRANSPORT INFRASTRUCTURE

Finland has a small-scale automotive industry, e.g. Oy Sisu Auto Ab manufactures Sisu trucks and Valtra manufactures tractors. Finland has one car manufacturing company, Valmet Automotive, which is produces cars for Porsche AG, Fisker Automotive and Think Global. The Finnish automotive manufacturers are mainly subcontractors. One of the main industry sectors in Finland is telecommunications. With that Finland is strongly involved in Transport Telematic applications.

Transport policy related general goals

Finnish transport policy is defined in the document “Transport 2030, Major challenges, new directions”. (http://www.mintc.fi/fileserver/transport%202030.pdf) It gives a view of the objectives and challenges facing Finnish transport policy. It presents the most important aspects of the framework covering the next few years, which will help the transport sector to respond to its challenges in a sustainable and measured fashion, and will ensure that Finland and Finns have a functioning transport system for the coming decades. The central principles in Transport 2030 are

[15] Statistics Finland, Situation 31.12.2008.

customer orientation, management of an integrated transport system, sensible and efficient use of resources as well as flexibility, dynamism and a proactive approach in the face of changes to the operating environment.

Trends in transport policy will be guided by the challenge of climate change. The amount of greenhouse gas emissions from the transport sector must be reduced. But at the same time, care must be taken to ensure the competitiveness of the logistics sector and ease of daily travel. A balanced transport policy must find ways of reconciling these objectives.

The main challenges to the development of the transport system in Finland are listed in the document. They are:

- Climate change
- Competitiveness of business
- Expanding and congested suburban areas
- Changing and quieter rural areas
- Quality of the local environment
- Transport safety
- New, intelligent technology
- Efficiency of the transport sector
- Unpredictable trends in development (values and attitudes; development of the neighbouring areas; energy prices)

As set out in *Transport Vision 2030* section of "Transport 2030", the objective of transport policy is well-being for Finland. Essential journeys and business related transport operations are carried out both nationally and internationally every day, providing people with a good quality of life, making business competitive and injecting life into the regions. Travel and transport are safe and the transport system is ecologically, socially and economically sustainable.

The section *Transport policy framework* of "Transport 2030" presents the elements of the framework that are the most influential for long-term development of the transport system. Above all, the framework outlines the changes in transport policy that are needed for sustainable development of the transport system in the best manner possible to meet people's day-to-day and business needs. Some of the actions required need to be taken fairly soon, while others will not be needed until much later.

Transport policy framework highlights the following elements:

- Reducing greenhouse gases from transport
- Maintaining competitiveness in logistics
- Smooth daily travel
- Together, better, more efficient (moving from optimising parts of the transport sector to optimising the whole system)
- Efficiency in maintenance and development of transport infrastructure

The Ministry of Transport and Communications' "Operating strategy and financial plan (2008-2011)" is a strategic document that also gives guidelines to transport research policy and sets up research priorities concerning the goals of Finnish transport policy. In the plan, special emphasis is given to:

- Long term transport policy design
- Transport 2030
- Sustainable investments and maintenance
- Implementing suggestions that were brought forward by the "Ministerial Group of Transport Infrastructure Policy"
- Enhancing cooperation between the modal administrations
- Enhancing logistics
- Implementing the logistics programme;
- Making the logistics chains more effective
- Functional markets and efficient competition
- Furthering competition in infrastructure construction branch;
- Total/quality responsibility together with development and implementation of the life-span model;
- Enhancing competition between different transport modes
- Efficient use of the infrastructure
- Use of technology in utilising the existing infrastructure more efficiently (big shift)
- Removal of the congestion from the railroad network
- Better public transport level of service
- Promoting the use of "trip aggregation"
- New and more efficient modes of financing

A rapporteur's proposal for Finnish National ITS Strategy was commissioned in the spring of 2009. The proposal is formulated so that the national strategy:

- creates a vision for intelligent transport in 2020
- defines the principles under which intelligent transport will be developed
- affirms the transport policy objectives that intelligent transport should help to attain in as concrete terms as possible
- defines clear points of emphasis for the strategy
- outlines the key projects from different focus domains, the realisation of which will be monitored closely
- describes the roles of the various stakeholders and creates co-operation models for the sector
- presents an action plan for intelligent transport, which will allow the strategy's objectives to be reached
- estimates the costs of and financial responsibilities for the strategy's key projects and action plan.

The strategy stresses that in the 2010's it is possible to carry out an entirely new kind of transport policy facilitated by intelligent transport. This change will also be influenced by the transport administration reform carried out in early 2010, which will expand the traditional focus of transport

administration from individual transport modes to the transport system as a whole. It is also necessary to adjust the thinking behind transport policy from transport infrastructure maintenance towards customer-oriented transport system operations. The strategy regards intelligent transport as a central transport policy tool and ensures sufficient resources for intelligent transport.

The Finnish Road Administrations (Finnra) "Operating strategy and financial plan TTS (2005-2008, 2006-2009)" outlines the framework of the organisation's research strategy. The focal points of the strategy are requirements of road users and other client groups, impacts of road management, asset management, working markets for procurement of road works and services, traffic management and management of traffic and road network information.

The Finnish Rail Administration's "Action and Economic Plan (2006 – 2009)" is based on the strategic directions of Finnish railway infrastructure development. It includes a list of infrastructure development priorities as well as an assessment of their costs and impacts. The focal points of the Finnish Rail Network Plan are:

The railway network will be maintained in a condition which allows competitive and efficient rail transport operations. This objective can be achieved e.g. through maintenance and replacement investments.

The requirements of regional and social equity will be implemented by increasing the speed level of passenger trains, constructing additional tracks for commuter trains and new station arrangements. Achieving of the objective also requires actions from the operators, such as decisions on rolling stock and improved supply of services in the railway sector.

The environmental objectives will be achieved through activities which reduce noise emissions, vibration, energy consumption and emissions of air pollutants. The safety objectives can be achieved through automated train protection systems, safety equipment, the renewal of radio system as well as removing and securing of level crossings.

The objectives of transport policy will be poorly achieved at a low level of investment. Early implementation of development projects is more profitable.

Research funded by the Finnish Maritime Administration is concentrated, according to administration's vision and strategy, on enhancement of waterborne traffic and waterway network, developing of safety and environmental issues and on use of information and communication technology. The Finnish Maritime Administration also engages in research aimed at improving maritime safety and information systems particularly within the Baltic Sea region, working closely with other Baltic states and with the Helsinki Commission (HELCOM).

## TRANSPORT RESEARCH AND INNOVATION SYSTEM

The national research, technology and innovation policy is formulated by the Science and Technology Policy Council, which works under the Prime Minister. The ministries that are responsible for the research policy are the Ministry of Education and the Ministry of Trade and Industry. The Ministry of Education is responsible for education and training, higher education and science policy as well as the Academy of Finland. The Ministry of Trade and Industry is responsible for industrial and

innovation policy, the Technical Research Centre of Finland (VTT) and the National Technology Agency (Tekes).

## MAPPING OF THE COUNTRY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM

Transport research in Finland is mainly generated and funded by the Ministry of Transport and Communications (MinTC). Besides transport research, the MinTC funds e.g. research related to communication networks, media policy, e-commerce, data security and the information society. Other main financiers are offices and agencies within the Ministry's administrative sector like the Finnish Road Administration (Finnra), the Finnish Maritime Administration, the Finnish Rail Administration and the Finnish Vehicle Administration.

In Finland the funding for transport research is mainly generated in the ministries or associated organisations to the ministry. Funding is allocated by call for tenders (95% of all public funding). The Ministry of Transport and Communications and the Finnish Road Administration (Finnra) hold the largest transport research funding budgets.

Tekes (Technology Development Agency of Finland) is the main public funding organisation in Finland and is as well an important funding organisation for Finnish transport research. Tekes funds industrial research as well as academic research. Tekes especially promotes innovative, risk-intensive research projects. Funding is mainly distributed to R&D projects run by companies and research organisations. Several funding organisations, e.g. the Ministry of Trade and Industry and industry itself, are pooling their funds - and Tekes is managing these funds. Tekes offers partners from abroad a gateway to the Finnish research and technology arena. The Academy of Finland is as well a large public funding organisation for research in Finland subordinate to the Ministry of Education concentrating on basic research.

## NATIONAL RTD PROGRAMMES FOR ROAD TRANSPORT FROM THE LAST FIVE YEARS

### Ministry of Transport and Communication's R&D Projects Supporting Transport Policy

(Liikenne- ja viestintäministeriön liikennepolitiikkaa tukevat tutkimushankkeet)

**DURATION:** Ongoing, continuous activity.

#### BACKGROUND

The R&D financed by the Ministry may be classified as short-term projects (quick state-of-the-art studies) and medium/long-term programmes. About half of the money is spent on long term programmes. The priority areas are logistics, transport telematics, scenarios and forecasts, interaction between land use and transport, e-commerce and information society.

In addition to the programmes, there are strategic subjects/themes of research going on. The content of these themes changes all the time when some short term projects end and new ones begin. Some of these themes have also larger projects, even programmes. The research themes include:

- Development Programmes for Public Transport
- Goods Transport and Logistics
- Transport of Dangerous Goods
- Traffic Safety
- Environment and Vehicle Technology
- Transport Infrastructure
- Transport Forecasts and Transport Economics
- Research Cooperation in Neighbouring Areas
- Pedestrian and Bicycle Traffic; Accessibility
- Intelligent Transport Systems and Services

**Objectives**

The R&D of Ministry of Transport and Communications is designed to achieve the goals of intelligent and sustainable transport system. An intelligent transport system is one in which technology is widely used in different transport functions, in personal mobility solutions and transport services, administration systems and individual activities. These technologies are increasingly using real-time data. Sustainability refers to a system that is economically, environmentally and socially sustainable. A sustainable system requires a more effective range of measures, full awareness of the impact of different measures, and careful targeting of the impacts for the equal benefit of different transport system users, the public at large and the business community.

In the Ministry of Transport and Communications, transport research and development is a tool to aid strategic planning, used to find a socio-economic optimum for the transport and communications system, and on the other hand an investment whose return is in the form of a more efficiently functioning system, with lower transportation costs, improved traffic safety and reduced environmental problems.

Within the Ministry's administrative sector, the transport and communications development work is generally shared. Each organisation has its own differentiated and specialised roles and responsibilities which are frequently reflected in the R&D work. The Ministry initiates cooperation and actively ensures the right conditions for successful cooperation at the programme and project set-up stage and in progress of the programme and projects.

## PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

The transport research and development is following the goals of Finnish transport policy of being a transport system in which personal mobility and transport services are intelligent and sustainable and have due regard for economic, environmental, social and cultural considerations.

In the programmes, a basic operating model is that the organisations within the administrative sector supervise the R&D programmes through e.g. management groups, while the practical project management is taken care of by full and part-time project leaders.

The development projects and other investigations commissioned separately or as part of various wider themes may use different operating models. The models feature joint funding, management groups, steering groups, coordinators or project secretaries as applicable.

## PROGRAMME STAKEHOLDERS

The funding comes from the Ministry of Transport and Communications and other project partners. Several parties are involved in the implementation of R&D, including Government departments and agencies within the ministry's remit, other ministries, municipalities, Provincial State Offices, regional administrations, different kinds of organisations, educational and research institutions and private companies.

### TOTAL NUMBER OF PROJECTS

Around 100. At any given time there are numerous small, medium or large scale projects ongoing continuously under all or most of the research themes.

**LEADING INSTITUTION** Ministry of Transport and Communications - Public organisation

**TYPE OF FUNDING:** Public (national)

### PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS

The total annual volume of projects is 4 million Euros. Joint funding solutions are applied within both projects and programmes in cooperation with various funding organisations and enterprises. On the average, the total funding volume in projects and programmes coordinated by Ministry of Transport and Communications is usually twice the amount MinTC itself is contributing.

### CONTACT INFORMATION

***Mr Martti Mäkelä***
*Ministry of Transport and Communications*
*Eteläesplanadi 16-18 P.O.Box 31*
*FIN-00023 Government, Finland*
*E-mail : martti.makela@mintc.fi*
*Tel : +358-9-160 28637, +358 40 551 8153*
*Fax : +358 9 160 28595*
*Website: www.mintc.fi*

# RESEARCH PROGRAMMES OF MINTC UNDER THE ABOVE STATED RESEARCH THEMES

## THEME: ROAD SAFETY

## Programme: Road Safety 2006 - 2010

Finnish road safety ranks amongst the best in the world. Finland's extensive history of road safety work has been characterized by setting challenging targets and implementing programmes which combine a variety of measures. Cooperation between the competent authorities and organizations on the one hand, and broad based political support on the other, has been key factors, and good results have been achieved. Whereas in the 1970s almost 1,200 people were killed and 16,000 injured annually in road traffic in Finland, in the 2000s the numbers of annual traffic fatalities and injuries have remained at under 400 and about 9,000, respectively, even though the volume of traffic has tripled in the meantime.

The current practice of preparing road safety programmes was instigated in 1993. They have formed the basis for a Government resolution on road safety, as a demonstration of political will. The Road Safety Programme for 2001–2005 contained a long-term road safety vision approved by the Government:

The road transport system must be designed so that nobody should die or be seriously injured on the roads.

This vision is grounded in the concept that defective road safety is an extensive public health problem that affects many areas of society. The vision provides a shared aspiration and an ethical basis for road safety work. It is based on the notion that human error is unavoidable and that people do not fare well in accidents. Traffic and transport-related services must therefore be developed according to the needs and means of people, minimizing the consequences of errors. This has been a guiding principle in air traffic, shipping, rail traffic and occupational safety for a long time now. The vision identifies human life and health as the primary values that should apply to road traffic too, even if the risk of accidents can never be completely eliminated in everyday life.

Achievement of the road safety vision will be pursued through a series of practical intermediate targets based on an overall timetable. In line with the vision, the target of Finland's transport policy is to improve safety continuously so as to achieve a level of no more than 100 annual traffic fatalities by 2025. This represents just one quarter of current annual fatalities and requires a considerable and rapid improvement in the sluggish trend of improvement in road safety seen over the past decade.

The Road Safety Programme for 2006–2010 presents measures for solving the problems observed in road traffic. Implementation of these measures would improve safety and help to reach the target in a manner consistent with the vision, and would be governed by the socio-economic principle that limited resources should be used in the most economical and productive way possible.

This Programme also emphasizes collective responsibility for road safety. The road traffic system is built up and regulated in interaction with road users. Many parties contribute to its creation and

regulation, and the users include a number of different groups that must all work together. Interaction in regulating the system can be improved, cooperation between the various actors involved in road safety can be enhanced, and cooperation in all aspects of traffic can be promoted.

The Programme has been conceived and prepared by a wide-ranging group of experts from the road traffic sector, from research institutions and from various administrative branches.The development and implementation of effective safety measures requires firm cooperation between the administrative sectors of central government, the rest of the public sector and the relevant organizations, including their commitment to the implementation of the safety measures proposed here. The Programme will be monitored through observation and analysis of road safety trends; results will be published in annual monitoring reports.

**CONTACT INFORMATION**

***Mr Leif Beilinson***
*Ministry of Transport and Communications*
*Tel. +358-9-1602 8572*
*E-mail: leif.beilinson@mintc.fi*

**COORDINATOR**

***Ms Annu Korhonen***
*Linea Consultants Ltd.*
*Tel: +358-9-7206 4264*
*Mobile: +358-40-725 3215*
*E-mail: annu.korhonen@linea.fi*
*Website: http://www.lintu.info/*

## THEME: INTELLIGENT TRANSPORT SYSTEMS AND SERVICES

## Programme: ÄLLI - Finnish R&D Programme on ITS 2007 - 2010

ÄLLI - Älykäs liikenne 2007 – 2010 kehittämisohjelma.

**DURATION:** 2007-2010

### Background

The research and development programme activities on ITS (Intelligent Transport Systems) of the Ministry of Transport and Communications in Finland continues in 2007-2010 in the form of ÄLLI.

ÄLLI is a nationwide development programme of ITS (Intelligent Transport System) shared by the administrative sector of the Ministry of Transport and Communications and the municipal sector in Finland. The four-year programme supports the general objectives of transport policy from the R&D perspective. The programme provides a framework, a know-how network across administrative boundaries, and international contacts in the field for the research, development and deployment of ITS solutions and services.

ÄLLI acts as a networker and catalyst for joint projects of various stakeholders between the public and the private sector. In this role, government and municipal administrations seed money and co-operation are the best way to ensure nationally uniform solutions with regard to both technology and functionality. In addition, through co-financed joint projects and a common procurement process, it is possible to achieve cost savings in the long run, and create vital – and hopefully also internationally-known and desired – services and know-how in Finland.

The ÄLLI procedure particularly emphasises the role of the public sector at the beginning of the service development chain, and, to some extent, also possibly at the end of the chain, as a client. Through close collaboration with various funding organisations, ÄLLI aims at improving transport sector visibility and role in other public funding instruments. ÄLLI's co-operation with Tivit Oy, the Strategic Centre for Science, Technology and Innovation in the Field of ICT, in particular, is close and systematic.

At the moment, ÄLLI's management group includes :

- Ministry of Transport and Communications
- Finnish Road Administration
- Finnish Maritime Administration
- Finnish Vehicle Administration (AKE)
- the Finnish Rail Administration (RHK)
- Helsinki Metropolitan Area Council (YTV)
- the cities of Helsinki, Tampere, Oulu and Turku
- ITS Finland
- the Finnish Funding Agency for Technology and Innovation (Tekes).

Climate change control, traffic safety, and the promotion of public transport, walking, bicycling, etc., constitute the core of the projects launched within the programme. Additionally, the objective is to promote the implementation of customer-oriented and internationally interesting traffic and transport services utilising information and communication technology.

The R&D activities will take place based on the needs and objectives of the following theme areas: Authority services and basic structures and Urban area services. For projects to be launched, a special effort is made to obtain a joint funding inside the themes, or to link them as a part of another national or international financing instrument, or European level research and development activities in the field of ITS.

The participating actors can also bring their own ITS projects under the ÄLLI umbrella, thus utilising the Help Desk services, communication and information channels provided by the programme. The objective of the programme's Help Desk service is to ensure the quality and further utilisation of the projects and the results, as well as the transparency of results and their nationwide applicability.

### THEME 1: AUTHORITY SERVICES AND BASIC STRUCTURES

The theme emphasises the development and harmonisation of public databases, services and systems built and maintained by the authorities. The development of public databases is toward an open and standardised information platform. The objective is to achieve a situation where public

information and data are easily available to all. The theme mainly focuses on joint projects between various public actors and cities.

## THEME 2: URBAN AREA SERVICES

The development of traffic and transport management in urban areas is characteristic of this theme where cities and public transport operators have a key role. The objective is to promote joint acquisitions and common deployment procedures, development of architectures and architecture recommendations etc. Pilots emphasise the utilisation of information and communication technology in service development and deployment. The solutions aim at interoperable, reliable and cost-effective implementations

In addition to the R&D activity in themes, ÄLLI's core goal is to promote the implementation of testing and development environments in Finland, which will support the growth of the Finnish ITS sector. The open development environments, built with the support of public funding agencies and authorities as well as private companies, are expected to increase new services and business in Finland, and also hopefully to open up a path to the international markets.

The development environments may, for example, provide application platforms, software components and data interfaces, serving both product development and various trials. By carrying out field experiments, which are adequately extensive, and their operating environment is uniform with the real world, the many-sided impacts of different ITS applications can be found out and evaluated in a reliable way. The development environments supported by the ÄLLI programme are:

- Traffic services in smartphones,
- Wireless broadband in public transportation,
- Open telematics platforms.

Top-notch Finnish ICT expertise, a natural, co-operation oriented operating culture, low boundaries between authorities, and a suitably-sized operating environment might provide a framework for building an ITS testing laboratory in Finland, which would even be attractive at the international level.

**TYPE OF FUNDING:** Public (national) and private

**CONTACT INFORMATION**

***Juuso Kummala***
*Finnish Road Administration*
*Opastinsilta 12 A P.O.Box 33*
*FIN-00521 Helsinki, Finland*
*E-mail: juuso.kummala@tiehallinto.fi*
*Tel: +358-40-7709905*
*Website: www.alliohjelma.info*

# RESEARCH PROGRAMMES OF THE FINNISH ROAD ADMINISTRATION

## Finnish Road Administration Road Research and Development: Current Themes

## Finnish Road Administration (FinnRA)

The Finnish Road Administration has key responsibility for research and development in the road transport sector. FinnRA uses approximately 2 % of basic road funding for development of the administration's processes, for informatics development and for road research and development. The main emphasis of road research is on the Road Administration’s areas of core competence.

The goal of road research and development is to develop new knowledge and skills to improve the performance, safety and competitiveness of road transport, as a part of the entire Finnish transport system, on a sustainable basis. This involves applied research that serves transport system development and road management as well as development and implementation of road management guidelines, performance specifications and methodology.

The Finnish Road Administration participates actively in the research programs of different ministries and cooperates with educational institutions, municipalities, businesses, interest groups and foreign expert bodies, particularly those in the Nordic countries. FinnRA commissions R&D projects from research institutes and consultants.

FinnRA's annual road R&D volume is €4 million. The research themes for 2006-2009 are:

- Client requirements
- Traffic management
- A safe and ecologically efficient transport system
- Asset management
- Cooperative programs
- Road management sector tasks

The Transport system economics theme will start in 2007, continuing the aspects taken up in the asset management theme. For 2008, the Transport system capacity theme will take up the traffic management focus as well as development of operations and maintenance. For 2009, the Transport system service level theme will develop the aspects of client requirements and service provision (see also the Finnra R&D guidelines 2006-2011 presentation appended).

### THEME: AN ECOLOGICALLY EFFECTIVE AND SAFE TRANSPORT SYSTEM

## Programme: EKOTULI

The objective of this research theme is to determine how ecological efficiency and safety in road management can be improved by means of road management methods, administrative cooperation, and stakeholder collaboration. Finnra focuses on ecological operating methods, a more comprehensive transport system viewpoint, and a more sustainable transport mode distribution.

The theme builds on the four-stage principle of road and transport planning. According to the principle, before major new investment, the priority should first be to manage mobility demand, curb greenhouse gas emissions, then support environmentally friendly modes of travel, and to improve the efficiency of use of the existing transport route network.

The scope of topics is characterized by wide cooperation and research that extends beyond the borders of administrative sectors. By means of this theme Finnra is funding Ministry of the Environment cluster projects, such as the Environmental Cluster Research Program, the Ministry of Agriculture and Forestry' Climate Change Adaptation Research Program projects, and research program projects administered by the Ministry of Transport and Communications Finland. By combining the research resources and utilizing the expertise of various stakeholders, coordination of this work has benefited from well-rounded expertise. By developing common tools for transport and land use planning it is possible to influence transport system development, support favorable development of environmental conditions, and road safety.

Finnra funding for the research theme is €2.16 million for 2006–2009.

- The research theme's topic areas were selected to support Finnra's 2006–2010 environmental policy, "Towards an ecoefficient transport system".
- Safe mobility and a healthy living environment
- A sustainable community and quality of life
- Reducing the environmental impacts of roads
- Sustainable use of natural resources and ecological efficiency
- Development of impact assessment methods

With its road safety research Finnra implements the tasks assigned to it in the national road safety plan. Particular attention is paid to the service level and safety for pedestrians, bicyclists and users of public transport, reducing driving speeds, and decreasing the number of serious head-on collisions. A major sector of Finnra funding for road safety research is the joint Long-term Research and Development Program for Road Safety (LINTU program).

Many road management actions affect environmental health. Under this theme Finnra examines how road management can be used to decrease particle pollution caused by pavement wear and noise pollution caused by road traffic.

The aims of the research in this sector are :

- to develop new tools for transport system action, supporting transport and regional development policies
- to improve the integration of land use planning and transport planning
- to develop methods and tools for protecting and maintaining culturally important sites.

Transport system planning is a collaborative strategic action, balancing and integrating stakeholder needs and resources. Development of new operating models and innovation has a central role. For transport system development Finnra is assessing the impact of mobility and traffic on a wider and more comprehensive basis than before. Finnra gathers data on key indicators of traffic and mobility.

In the year 2005, Finnra adopted a guideline on public roads in heritage sites. Management and maintenance methods are being developed to integrate road management measures with the values of the natural and built surroundings.

Preparing for climate change demands awareness of the significance of traffic emissions in the development of the greenhouse effect and of the impact of road management risks related to an advancing climate change. Adapting to climate change requires anticipation from the road authority and readiness to act in case of sudden changes in weather conditions. The goal is to improve Finnra's readiness to coordinate and initiate necessary anticipative and adaptive measures.

The goal in soil and water protection is to balance the environmental and safety objectives of road management. Under this theme Finnra is conducting follow-up studies on the effects of new de-icing chemicals.

The national biological diversity program for 2006–2016 obligates the Ministry of Transport and Communications and its agencies to promote preservation of diversity. Finnra participates in joint research programs and develops its own monitoring procedures, as required by the Road Act.

The intent is to include the principle of ecoefficiency in road management's procurement procedures and related documentation. When assessing bids, innovative solutions for preserving nature and the environment will be given priority. The possibility of developing a bonus system for environmentally adapted innovations is also being investigated.

Finnra participates in the Ministry of the Environment Development Program of Recycled, Residual and Alternative Materials for Infrastructure Engineering (UUMA program). The projects investigate more efficient utilization of construction materials: material approval, material reuse and recycling, use of poor-quality earth materials, and creating a materials' data bank for construction use.

Impact assessment requires transport system and program-level tools. To analyze the level of service of road and traffic conditions, Finnra is collecting road and impact information. By developing the procedure for monitoring the condition of the transport system, Finnra is assessing the system's service level from the standpoint of people's mobility and the transport demand of commerce and industry.

Under this theme Finnra continues the development of impact assessment methods started in the Research Program for Impact Management (VAHA) and the development of an impact map and indicators for monitoring purposes. New interaction methodology on different planning levels is also being studied.

**CONTACT INFORMATION**

*Theme coordinator*
***Raija Merivirta***
*Tel: +358 204 222 345*
*E-mail: raija.merivirta@tiehallinto.fi*

## THEME: ROAD MANAGEMENT SECTOR TASKS

## Programme: Finnra infra and transport sector research

This program comprises research and development of road management planning, road engineering and geotechnology, and bridge engineering. The program deals with transport engineering, traffic control, road equipment, pavements, super- and substructures, and bridges and tunnels to the extent that the results serve planning and procurement of construction and maintenance.

Many projects are implemented and funded in cooperation with other developers, the road administrations of other countries, or companies. The results serve the compilation of Finnra's and the sector's common quality standards, instructions and recommendations.

The program encompasses studies and investigations that are used to :

- carry out Finnra's responsibility for maintaining and developing transport route technology know-how and for compiling guidelines with respect to substance areas belonging to sector tasks
- develop quality standards and tools needed in procurement procedures that promote the use of new technology and companies' R&D
- examine the functionality of current practices and the need to improve them and search for and develop improvement proposals.

The program enhances connections to information produced in other research themes, especially related to client requirements, traffic management, eco-efficient and safe transport system, and asset management.

**CONTACT INFORMATION**

*Theme coordinator*
***Timo Tirkkonen***
*Tel: 0204 22 2486*
*E-mail: timo.tirkkonen@tiehallinto.fi*

## Programme: Economic efficiency of the transport system, TaTe

The research programme consists of thematic entities of road maintenance and transport economics, market monitoring and road management procurement. The economic efficiency is studied as a part of the entire transport in order to find out how the resources allocated into road maintenance can be used to boost the functioning of the entire transport system.

The purpose of the programme is to improve the control and guidance of road management costs and to develop road management productivity and impressiveness. The economic analysis concepts, procedures and methods of the different sectors of road management are also standardised.

The programme is divided into four themes:

- Economic analysis of road management and transport
- Road transport pricing
- Control of road management costs
- Road management acquisition

The research programme is scheduled for 2008-2010.

## I. Economic analysis of road management and transport

The methods of economic analysis vary for different levels of planning. The national and area economic models analyse macro level impacts whereas the efficiency of technical solutions is evaluated at the micro level. Regardless of the evaluation level the methods must be transparent, reproducible and compatible.

The theme has the following goals:

Evaluation of the usability of current national and area economic models in road maintenance planning and their compatibility with current traffic models. If the models are applicable they will be developed for road maintenance planning use.

Evaluation of how traffic models can be used more efficiently in road maintenance planning. The models and their exploitation methods are developed for road maintenance planning use.

Evaluation of the aspects of the extent of the road network considering economic efficiency and socio-political objectives. The result will be evaluation principles or a model for the evaluation of the extent of the road network.

Specification of economic profitability evaluation principles of different measures for the comparison of especially technical solutions and the application of the so-called four-step principle.

Definition of unit prices for travel time and noise and updating the Road transport unit costs 2005 publication.

## II. Road transport pricing

Even though Finland is one of the few countries in Europe that does not use road transport pricing it has been discussed a lot politically and in public. The Ministry of Transport and Communications has also studied the impacts of road tolls and their implementation.

Road Administration as the road keeper has the expert responsibility for road transport pricing. The maintaining and development of expertise requires studying of road transport pricing. The Road Administration also has to have the readiness to produce data required in the implementation of road transport pricing.

The theme has the following goals:

- Studying the most significant factors of road pricing acceptability in Finland how these can be managed during the setting of the pricing.
- Development of a transparent method for the allocation of the variable and fixed costs of road maintenance for different user groups.
- Creation of different pricing models (taxes and variable and fixed costs) and evaluation of the socio-economic impacts of the models.

### III. Control of road management costs

Tight budget frames mean that it is vital to optimally allocate the sparse road maintenance funds. This requires strategic operation methods for the specification and valuation of the desired service level of the route network. The route assets should also be controlled and maintained in a manner that holds the desired value and service level with as small costs as possible for the entire lifespan of the route. This means that the society must be conscious of the investments allocated for the keeping of routes.

The theme has the following goals:

- Improving and developing the dependability of infrastructure project cost estimates
- Improving the means of project cost control
- Developing principles and means for the valuation and management of road assets and route network service levels also from the socio-economic and business viewpoints.
- Knowing and controlling the behaviour of the road network and its impacts on the costs of road maintenance for the entire lifespan of the road.

The valuation of the service level and its impacts means that also the development of these immaterial outputs can be observed in the measurement of road maintenance productivity.

### IV. Road management acquisition

The data from the preparation of road management acquisitions is also extensively required in the planning and justification of road management. To ensure a wide perspective which looks at acquisitions as a fixed part of economic road keeping this theme includes a part about acquisitions. The theme includes studies and its projects will be in tight cooperation with the markets of road keeping theme.

The theme has the following goals:

- Trying to identify the impact of the market situation on the pricing of bids
- Cost development. Trying to find ways to manage and control markets.
- Creation of practises for risk and pricing management as a part of project preparation and cost evaluation.
- Recognition of the impacts of acquirement practises, payment mechanisms and project scale on the economics of road keeping and knowing how to choose the suitable practise for each situation.

**CONTACT INFORMATION**

*Project leader*
***Tuomas Toivonen***
*FinnRA*
*Tel: +358 204 22 2630*
*Mobile: +358 40 512 3329*
*E-mail: tuomas.toivonen@tiehallinto.fi*

*Project secretary*
***Ari Kähkönen***
*Pöyry Infra Oy*
*Tel: +358 10 3326418*
*Mobile: +358 50 511 6770*
*E-mail: ari.kahkonen@poyry.com*

## Other FinnRA research involvement

In addition to the above, FinnRA participates in several national and international cooperative programmes:

- Ministry of Transport and Communications programs:
- ÄLLI, - Finnish R&D Program on ITS 2007 - 2010
- DIGIROAD, national road and street information system
- LINTU, long-term road safety R&D program.

Ministry of the Environment programs:

- Eco-efficient community, environmental cluster program
- UUMA, new material technology for civil engineering
- Environmental cluster projects include LIIKEVÄ, traffic-induced vibration,
- MELUTTA, noise prevention in population centers and NIINI, effects of mowing on diversity.

Finnish Funding Agency for Technology and Innovation (TEKES) programs:

- SERVE, innovative services program
- MASI, modeling and simulation program
- DECOMB, planning and management of the built environment, is a TEKESfunded group project.

*Nordic cooperative programs:*

- GNA, Gemensam Nordisk Anläggningsmarknad is a program that develops the infra markets of Nordic road and rail administrations
- NordFoU veg&trafik, the Nordic road administrations' road and transport-related cooperative R&D program.

*Cooperative networks and programs in the transport engineering sector:*

- Traffic behavior and road planning
- NMF, road accessories and equipment
- NORTEK, traffic control and traffic sign development.

The umbrella organization of these groups is Vägregelgruppen, a cooperative network responsible for technical guidelines.

Finnra also participates in ERA-NET TRANSPORT, the MTC R&D cooperation program.

### CONTACT INFORMATION

*Planning manager*
***Mr Anders HH Jansson***
*Finnish Road Administration*
*P.O.Box 33*
*FIN-00521 Helsinki, Finland*
*E-mail: anders.jansson@tiehallinto.fi*
*Tel: +358 204 22 2348*
*Fax: +358 204 22 2312*
*Website: www.tiehallinto.fi*

## FINNISH ROAD ADMINISTRATION ROAD RESEARCH AND DEVELOPMENT GUIDELINES 2006-2011, FINNISH ROAD ADMINISTRATION (FINNRA) PUBLICATION, HELSINKI 2006

### BACKGROUND

When the Road Administration and the Road Enterprise were separated in 2001, the Road Administration Management Group decided on the mission and vision of the Administration. This also guided development of the Administration's R&D strategy, which was adopted on February 26, 2002. In 2005 the decision was made to revise this strategy in line with the new Operations Strategy for the Road Administration. The Road Research and Development Guidelines 2006-2011 are also based on projects that develop both cooperation between the administrations of the Ministry of Transport and Communications and international cooperation.

### OBJECTIVES AND TRANSPORT POLICY CONTEXT

The FinnRA's Operations Strategy states "the Finnish Road Administration has key responsibility for research and development in the road transport sector. FinnRA uses approximately 2 % of basic road funding for development of the administration's processes and for road research and development." These guidelines implement decisions on development methodology and the Finnish Road Administration's processes. Development programming will be closely linked to strategic planning

and the four-year finance and action plan. The goals of R&D have not changed, but the themes, cooperation methods and dissemination and implementation of results have been revised.

The goal of road research and development is to develop new knowledge and skills to improve the performance, safety and competitiveness of road transport, as a part of the entire Finnish transport system, on a sustainable basis. This involves applied research that serves transport system development and road management as well as development and implementation of road management guidelines, performance specifications and methodology. As the present research programs of the R&D themes end, the content and interfaces of the themes will be revised, aiming at a close linkage to the key tasks of the Road Administration. The 2011 theme structure focuses on the role of the road network, road management and road transport as a part of the whole transport system.

| **2006 THEMES** | **2011 STRUCTURE** |
|---|---|
| Client requirements | Transport system |
| Traffic management | - level of service |
| A safe and eco-efficient transport system | - capacity |
| Asset management - economy | - eco-efficiency and safety |
| Cooperative programs | Cooperative programs |
| Road management sector tasks | Road management sector tasks |

R&D is based on an assessment of the whole road management sector, made in collaboration with stakeholders.

### STAKEHOLDERS

The main stakeholders in R&D are the Ministry of Transport and Communications and its administrations, FinnRA's clients and their organizations, providers of R&D services and training, and the civil engineering sector's national and international partners.

### ORGANISATION AND PROJECTS

A 3 – 4-year research program is compiled for each theme. A steering group is assigned to the research program. The steering group supervises realization of goals and the plan of action, and if necessary, makes steering decisions concerning content. Depending on the length of the planning period, 1- 2 interim reports are compiled for review by FinnRA's Management Group. Management of program projects is specified in the operational system.

Projects related to research and development activity are implemented in the regional road districts

- as part of the road management R&D program
- as part of the regional development program of the districts and their cooperative partners
- as part of road management or road project responsibility, i.e. follow-up.

Projects linked to the road management R&D program are included under centralized programming, funding and reporting.

**LEADING INSTITUTION**

Finnish Road Administration - Public organisation

**TYPE OF FUNDING**

Public (national)

**PROGRAM FUNDING ARRANGEMENTS AND FUNDING CONDITIONS**

According to the funding objective, Finnra's investment in development should increase to 2% of basic road management, of which R&D's share is about one half. Another goal is that about half of the funding should be used for broader cluster and cooperation programs. The share of cooperative programs at Finnra will grow during this period, but their size will be determined by the projects included in the programs and how they support the implementation of Finnra's R&D objectives.

**CONTACT INFORMATION**

*Planning manager*
***Mr Anders HH Jansson***
*Finnish Road Administration*
*P.O.Box 33, FIN-00521 Helsinki, Finland*
*E-mail: anders.jansson@tiehallinto.fi*
*Tel: +358 204 22 2348*
*Fax: +358 204 22 2312*
*Website: www.tiehallinto.fi*

# OTHER ROAD RELATED RESEARCH IN FINLAND

## TEKES – Finnish Funding Agency for Technology and Innovation

Tekes, the Finnish Funding Agency for Technology and Innovation is the main government financing and expert organisation for research and technological development in Finland. Tekes finances industrial R&D projects as well as projects in universities and research institutes. Tekes especially promotes innovative, risk-intensive projects. Many of Tekes research programmes are in one way or another connected to Road or Traffic Research. Here is a brief description of those Tekes programmes that have this connectivity.

**PASTORI – NEW BUSINESS FROM INTELLIGENT TRANSPORT SERVICES**

Kicked off in the spring of 2009, the PASTORI project develops services and business models that exploit advanced technology. These new services are to be based on solid user needs and positioning. Successful future products will be based on open solutions, and interesting service packages will be put together for customers. The multi-actor modular concept to be developed in PASTORI will be something for the global marketplace.

The technology for services based on positioning is already here in our hands. It includes for example satellite positioning, digital map data and mobile devices. However, apart from navigation services, multiple prospective services are yet missing. The combination of advanced ICT and more precise positioning provided by the European satellite positioning system Galileo, will drive the development of service solutions that are based e.g. on real-time data and actual kilometres driven.

The greatest challenges facing developers of transport services are the lack of workable business models, the ambiguity of value networks, and current co-operation models. The market is looking for open implementation solutions based on true user needs. This is the foundation for profitable local and large-scale global business ventures.

The objective of PASTORI project is to meet the aforementioned challenges – or at least make a measurable step forward. The conventional objectives to improve traffic safety, reduce congestion and environmental problems, and increase the profitability of associated businesses is always present. The exploitation of positioning data in multiple services and applications forms the basis for all of this.

The findings of the project can be exploited e.g. in safety and emergency services (such as tracking of stolen vehicles, train approaching alerts, accident positioning), the development of insurances and taxation models based on actual kilometres driven, and the creation of services based on transport pricing. The project especially focuses on intelligent payment applications and the pan-European eCall and eCall+ systems, and will be completed in late 2010.

This R&D project forms part of the Finnish Funding Agency for Technology and Innovation's (Tekes) Safety and Security 2007–2013 programme. The project is co-ordinated by the VTT Technical Research Centre of Finland. Other participants include Destia, Elisa, IBM, Indagon, Logica, Semel, Tapiola, the Finnish Vehicle Administration (AKE) and the Finnish Ministry of Transport and Communications.

The PASTORI project consortium is interested in international co-operation and offers foreign partners the opportunity to participate in a Finnish implementation solution and to network with Finnish actors.

**CONTACT INFORMATION**

***Raine Hautala***
*VTT*
*Tel: +357 40 584 1114*
*E-mail: raine.hautala@vtt.fi*

## Ubicom - Embedded Systems 2007-2013

Tekes' Ubicom - Embedded ICT programme started in the beginning of 2007. The budgeted volume is approximately 300 million € for the duration of seven years, whereof Tekes' share is 120 million €. In Ubicom, technologies are developed and piloted for selected applications. Development of business know-how is of special importance.

The term ubicom stands for embedded systems and processors designed to make everyday life easy by functioning inconspicuously in the background. Ubicom enables, for example, new kind of leisure services and new housekeeping solutions. Entirely new business opportunities are unfolding for technology developers. The programme has been subject to great interest already in the preparatory phase.

The Tekes' Ubicom – Embedded ICT programme strengthens the research in ubiquitous computing, increases the resources available for the industry's commercial competitive offerings, enhances the international cooperation environment and spurs on cooperation between different branches of industry by creating new industry networks and industry standards.

The programme objectives are to strengthen the expert research base in ubicom-technologies to facilitate the expansion of networks internationally, via joint collaboration projects and to pilot and demonstrate new ubicom solutions and consolidate platforms for commercialisation of new ubiquitous systems, products and services. The goal is to create new markets and also to improve the productivity and conditions in existing industries.

Ubicom - Embedded ICT programme's strategy is to act as a platform connecting embedded computing and embedded communication. The key topics are sensors, computing compatibility, system architectures and middleware technologies. Existing distributed networks are used for early realisation in order to accelerate the implementation of entire systems, planning verification and the operation of tools.

**CONTACT INFORMATION**

*Programme Manager,* ***Mr. Kimmo Ahola***
*Tekes*
*Tel: + 358 1060 55756*
*E-mail: kimmo.ahola@tekes.fi*
*Programme Coordinator,* ***Mr. Jari Ikonen***
*Technology Centre Hermia Ltd.*
*Tel: +358 50 0456 636*
*E-mail: jari.ikonen@hermia.fi*
*Website: www.tekes.fi/eng/ubicom*

## VAMOS - Value Added Mobile Solutions 2005-2010

Mobile devices, networks, component technologies and development tools for mobile solutions have reached the standard required by demanding business solutions. The aim of Tekes' VAMOS technology programme is to ensure that the opportunities for mobile technology are efficiently utilised by Finnish companies. VAMOS funds enterprise projects with EUR 14 million and research projects with EUR 2.4 million annually.

VAMOS aims at improving the productivity of companies that utilise mobile solutions. The goal is to innovate, develop and widely implement mobile solutions that companies can use to revamp their own as well as their customer and cooperation processes.

The programme focuses on business areas where the profitability potential of mobile solutions is high. These sectors have many mobile employees who work outside the office and are disconnected from the company's data systems. Connecting mobile employees, partners and customers with company processes provides the opportunity to improve productivity. The selected business areas are:

- Logistics and transportation
- Construction and real estate
- The manufacturing industry
- Corporate services

The business areas were chosen based on preliminary studies, international assessments on the development of technology, and interviews with visionaries. An important factor in selecting the business areas was the views of various groups within the business areas concerning the potential of mobile technology. VAMOS can also include mobile business solutions for other sectors.

VAMOS supports the development of mobile solutions and related business, thus providing SMEs with new opportunities. The objective of the programme is to find internationally successful mobile solutions that enable their developers to expand their business viably and to create new high-standard jobs. The development of business models and services are key factors in gaining commercial success. As part of R&D projects, the programme also facilitates finding international pilot customers, market channels and partners. The programme includes the development of mobile technologies.

Recognising the potential of mobile solutions and supporting the development of commercially successful solutions that increase productivity VAMOS focuses on the market-driven utilisation of technologies, and the research projects are expected to generate commercially successful results. The programme finances research projects that support the development of the mobile solutions and related technology needed by companies in business areas that utilise mobile solutions.

VAMOS aims at assembling a cross-technological Mobile Enterprise cluster that will combine the expertise of the business areas utilising mobile solutions and the competence in mobile technologies. These mutually complementary value networks of actors will innovate, develop and commercialise solutions that produce significant value for customers in international markets. Solutions for different business areas use the same mobile technologies, standards, methods and tools. Best practices can be shared between different business areas. The benefits of mobile solutions are best achieved in a large cross-technological group of actors.

Budget of the programme is approximately 202 million Euros. Tekes' share is approximately 76 million Euros

**CONTACT INFORMATION**

*www.tekes.fi/vamos*
*Programme Manager*
***Pauli Berg**, Tekes*
*Tel: + 358 44 436 8053*
*E-mail: pauli.berg@tekes.fi*

## Safety and security 2007-2013

The Tekes Safety and Security Programme brings together enterprises, researchers and authorities to develop world-class safety and security systems and services. The programme helps you to find the best Finnish companies and research units in the field.

The programme will finance national R&D projects worth EUR 80 million in the period 2007-2013. Participating enterprises and research institutions will contribute another EUR 80 million. Networking Finnish and international partners is an essential part of the programme, and international cooperation is credited in funding decisions.

The program is based on three customer approaches:

National safety and security covers items in the defence, boarder guard, police, rescue and fire fighting as well as customs operations

Industrial safety and security deals with full agenda of corporate needs and respective solutions

Citizens safety focuses safety and security aspect in housing and leisure time

The first research call resulted in some ten projects. Well organised international cooperation is encouraged in Tekes funded research projects.

**CONTACT INFORMATION**

*Website: www.tekes.fi/turva*
*Programme Manager*
*Mikko Moisio*
*Tel: +358 10 60 25835*
*E-mail: mikko.moisio@tekes.fi*
*Programme Coordinator*
*Pekka Nykänen*
*Tel: +358 10 33 25 750*
*E-mail: pekka.nykanen@poyry.com*

## Sustainable community 2007-2012

Sustainable development is continuous and controlled social change that is taking place worldwide. Its ultimate objective is to secure the opportunities for a good life for present and future generations. The sustainable community programme will invest EUR 100 million into the development of sustainable and energy efficient areas and buildings.

The real estate and construction cluster plays a key role in promoting the objectives of sustainable development because its environmental impacts and significance to the national economy are of great importance. The proportion of energy consumption by buildings amounts to as much as 40 per cent in Finland. And where and how communities are built affects consumption and environmental loading.

Land use planning – the location of jobs, housing and services – has a major effect on the need for mobility and the environmental impacts of traffic. In turn, the standard of construction has a major impact on the use of energy during both the construction process and the lifetime of a building.

Sustainable community programme encourages Finnish research institutes, universities and companies to engage in international collaboration by exchanging information and networking companies and research groups. The programme provides opportunities for ambitious R&D projects and development of business expertise and international cooperation. It serves as a gateway to best researcher groups and innovative R&D companies in Finland.

**CONTACT INFORMATION**

*Programme Manager*
***Ms. Virpi Mikkonen***
*Tel: +458 10 60 55930*
*E-mail: virpi.mikkonen@tekes.fi*

*Programme coordinator*
***Mr. Mikko Nousiainen***
*Pöyry Building Services Oy*
*Tel: +358 10 332 4954*
*E-mail: mikko.nousiainen@poyry.com*
*Website: www.tekes.fi/yhdyskunta*

## Cooperative Traffic

Cooperative traffic system is making use of data led operations starting from data collection, transforming it to information and sharing the information at all levels of travel and transport decision making. The cooperative aspect is embedded in the capability of different actors either passively or actively to acquire data and share it with other parts and players of the traffic system.

The Cooperative Traffic Programme develops cutting-edge technology and service solutions for different levels of the traffic system by bringing together major players nationally and internationally and raising the Finnish traffic ICT sector competitiveness to a new level.

The programme overall objective is to develop technologies, services and functions for more efficient traffic system operation and functioning as well as raise Finnish ICT industry in transport sector applications to a high international level and in given areas to world elite.

The goal of the programme is to:

- Create an active collaboration network between companies and research organizations nationally and internationally.
- Address traffic system as structured whole consisting of different levels and identify the research and development needs on these levels.

- Develop services, functions and technologies needed to support sustainable traffic system on its different levels.
- Identify and build the needed research testing tools and sites for the services and functions validation.
- Study business models for the deployment of developed novel services and technologies.
- Create large-scale pilots for the cooperative traffic eco-system.
- Disseminate the project results effectively to all stakeholders concerned.

The projects under these themes work on and identify the application potential of the themes through pilots, thus being able to pinpoint the business potential of sensor and application technologies to fulfil the cooperative traffic objectives for Sensor, Vehicle, System, and User levels. The envisaged pilots and test sites act as the factual testing grounds for the programme participants' in-house technology, application and service development.

## PROGRAMME PROJECTS:

Sensor Data Fusion and Applications
Environment Sensing Technologies
Parking Guidance and Information
Real Traffic Info
Demand Responsive Public Transport
Economic Driving of Trucks/Buses
Applied communication pre-study on R&D Possibilities
Tampere Region Test Site
100k pilot
Panda
Pilot environment for cooperative traffic solutions - PROCT

**CONTACT INFORMATION**

*Programme Director*
***Juha Hulkkonen***
*IBM*
*Mobile: +358 400 489228*
*E-mail: juha.hulkkonen@fi.ibm.com*

*Programme Administrator*
***Jukka Laitinen***
*VTT*
*Mobile: +358 40 518 1098*
*E-mail: jukka.laitinen@vtt.fi*

*Tekes*
*P.O.Box 69*
*FIN-00101 Helsinki*
*Finland.*
*E-mail : tekes@tekes.fi*
*Tel: +358 10 191 480.*
*Fax: +358 9 694 9196.*
*Website: www.tekes.fi*

## VTT Technical Research Centre of Finland

VTT Technical Research Centre of Finland is the biggest multitechnological applied research organisation in Northern Europe. VTT provides high-end technology solutions and innovation services.

From its wide knowledge base, VTT can combine different technologies, create new innovations and a substantial range of world class technologies and applied research services thus improving its clients' competitiveness and competence.

Through its international scientific and technology network, VTT can produce information, upgrade technology knowledge, and create business intelligence and value added to its stakeholders.

VTT is a part of the Finnish innovation system under the domain of the Ministry of Employment and the Economy. VTT is a non-profit-making research organisation. VTT has ISO9001:2000 certificate.

### TRAFFIC SAFETY 2025 – Research ProgramME

At the beginning of 2008, VTT Technical Research Centre of Finland launched a research programme in traffic safety (http://www.vtt.fi/proj/tl2025/index.jsp?lang=en). The overall objective of the programme is to support decision making for national traffic safety goals. Specifically, the annual number of road fatalities should be less than 250 in 2010 and 100 in 2025. In rail traffic, the goal is to maintain a safety level involving no fatalities or serious environmental damage.

The research programme involves multidisciplinary traffic safety research in the areas of road traffic and rail traffic, with a main focus on technical countermeasures and applications. However, other types of countermeasures are not excluded. In the programme, applied and customer-oriented research is conducted that will contribute to the advancement of overall traffic safety goals and the participating organizations and companies.

The consortium consists of public organizations and private companies whose activities deal with traffic safety. The following organizations and companies have committed to the programme: A-Katsastus Group, the Finnish Rail Administration, the Finnish Rail Agency, the Finnish Road Administration, Michelin Nordic AB, the Ministry of Transport and Communications Finland, Neste Oil Corporation, and VR-Group.

The members annually provide current and challenging traffic safety issues that need scientific research to be solved. The members are expected to present new and innovative ideas to achieve

the challenging traffic safety goals. In addition to the overall objective, the programme aims at providing members with specific results whose nature and content are expected to vary in line with the objectives and activities of members.

VTT is responsible for implementation of the programme and preparation of the annual action plan based on the proposals with the help of members, if needed. The specific projects included in the programme are conducted by VTT research scientists, and by domestic and international experts if needed. All the research activities are managed by VTT.

In 2008 and 2009, the program focused on the following topics:

- Approaches to road safety work
- Advanced illustration of accident data
- Tire defects in fatal road accidents
- Development of road safety tests for drivers, bicyclists, and pedestrians
- Traffic safety in land use planning
- Measures and technologies for detecting uninspected vehicles
- Feasibility study for testing Intelligent Speed Adaptation
- How drivers understand safe behaviour and perceive risks at passive railway-road grade crossings
- Traffic control during railway work
- Evaluation of costs of railway accidents

**CONTACT INFORMATION**

***Juha Luoma***
*VTT*
*Tel: +358 40 581 9053*
*E-mail: juha.luoma@vtt.fi*

## TRANSECO research programme on energy efficiency & alternative energies in road transport

The programme serves as a platform for integrated evaluation and development of energy and emission control solutions for the road transport sector. The programme will further strengthen VTT's position in research, development and deployment of new energy solutions for the transport sector. In this work VTT actively cooperates with both domestic and international research organisations.

From VTT's viewpoint the programme functions on four levels. On the upper level, the programme provides the public sector with tools for strategic decision making. On the system level, the programme strengthens VTT's position as one of the key players in research on, e.g., renewable energy and transport systems. As for interface technologies, the programme combines, among other things, knowledge in information technology as well as materials sciences with energy savings in transport. On the technology and component level the programme develops information technology for the transport sector, biofuels optimised for Finnish conditions and technology for reducing fuel

consumption of vehicles. Development of heavy-duty hybrid vehicles is one example of vehicle technology related activities. The focus of the research programme is on applied research and demonstrations.

The programme provides a tool for adapting the Finnish road transport system in a cost-effective way to national and EU-level climate and energy targets. The data generated within the programme will be used as input in the process of drafting and implementing EU directives, for the selection and implementation of the energy pathways most suitable for Finland and for supporting technology exportation. On the technical level the key targets are energy savings in transport, implementation of CO2 neutral energy and increasing self-sufficiency in transport energy supply. The programme is extensively supported by the public sector (ministries and agencies) as well as by industry.

**FRAMEWORK**

- Climate and energy strategies for 2020 in the European Union and national level
- reduction of greenhouse gas emissions (-20 %)
- reduction of energy use (-20 %)
- increased shares of renewable energy; mandatory target 10 % for the transport sector (biofuels and renewable electricity in total)

**TARGETS FOR FINLAND**

- increasing the share of renewable energy from 28 to 38 %
- 16 % reduction of greenhouse gas emissions in sectors outside emission trading (includes the transport sector)
- New Directives decided upon in 2009:
- promotion of the use of energy from renewable sources
- fuel quality directive
- limits on CO2 emissions from passenger cars
- Euro VI emission limits for heavy-duty vehicles

**TRANSECO TARGETS AND MISSION**

Create a set of measures to cost-effectively adapt Finnish road transport to EU & national level climate gas reduction and energy efficiency targets.

Give input for the preparations of EU Directives to reach solutions that are most suitable for Finland and facilitate high-technology export.

Increase energy efficiency and use of renewable (low-carbon) energies in road transport.

Develop systematic processes and tools for the assessment of potential & performance of energy savings measures and their impacts.

**STRUCTURE**

A broad multi-client research integrate with support from various ministries, agencies, companies and vehicle operators

Congruence with the ERA-Net Transport model:

- First pillar: policy research
- Second pillar: technological research
- Third pillar: demonstration projects
- A governing board to make decisions on content and funding
- VTT Technical Research Centre of Finland will serve as coordinator

### TIMETABLE AND FUNDING

- Planned timeframe 1.1.2009 to 31.12.2013
- Planned volume for R&D: 15 - 20 M€, (3 - 4 M€/annum)
- 50 % funding from Tekes and other public sources, the rest from private sector and VTT
- 2009 volume 3 M€, ~35 sponsors
- Planned volume for Demos: 20 – 40 M€ (total in five years)

### CONTACT INFORMATION

**Nils-Olof Nylund**
VTT
Tel: +358 400 703 715
E-mail: nils-olof.nylund@vtt.fi
Website: www.transeco.fi

# FRANCE

(Source: ERA-NET TRANSPORT, Overview of research programming and cooperation mechanism, Jan 2005 and PREDIT 4 Work Programme, May 2009)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

France is one of the largest countries in Europe by size and inhabitants with a population of about 59,9 million people. The size of the country is around 543.965 sq km, excluding the French overseas departments and territories located in North America, the Caribbean, South America, the western and southern Indian Ocean, and the northern and southern Pacific Ocean. The average population density is around 110 people per sq km. Most people live in the area around the capital city Paris (9 million). Other large cities and metropolitan areas are Marseille (1,2 Mio), Lyon (1,2 Mio) and Bordeaux (680.000).[16]

France has a large variety of landscapes. Nearly two thirds of the country in total is covered by plains and coastal plains, the other parts are hilly and include the mountain ranges of the Alps in the Southeast, with Europe's highest Mountain the Mont Blanc (4,807 metres), the Pyrenees in the South and other mountainous areas like the Massif Central, the Ardennes the Jura and the Vosges.

The climatic conditions in France are dominated by three types, namely the Oceanic climate in the West, the Mediterranean in the South, and the Continental in central and eastern France.

France extends from the Mediterranean Sea to the North Sea and from the River Rhine to the Atlantic Ocean with a total coastline of 5.500 kilometres. It is bordered by the United Kingdom (sea side border), Belgium, Luxembourg, Germany, Switzerland, Italy, Monaco, Andorra, and Spain (land side borders). Overseas land side borders are e.g. shared with Brazil and Suriname.

The French road transport network is one of the largest in Europe with about 950.000 km roads, including around 11.000 km of motorways. The road network is well-maintained and fully interconnected with the main countries of Western Europe.

France has a huge railway-network with about 31.385 km in total, which is operated by French National Railways (SNCF). Nearly the half of the routes (14.464 km) are electrified and over one third (12.132 km) of the routes are double- or multiple-track based. France has the longest rail-network in Europe explicitly constructed for high-speed-trains (TGV) with a length of around 1.540 kilometres.[17]

France has several main rivers like the Loire River, the Rhone River, the Garonne and the Seine. It has the longest waterway network in Europe apart from Russia, with a total of 14.932 km of navigable

[16] INSEE, France in figures, 2003.
[17] Ministry for Infrastructure, Transport, Housing, Tourism and the Sea, 2004.

rivers and canals, whereof 6.969 kilometres are used more heavily. About 16 important sea ports and harbours exist, like Bordeaux, La Rochelle, Le Havre or Marseille.

France has in total 474 airports and airfields. The most important airports are Charles De Gaulle International Airport and Orly Airport in or near Paris.

### TRANSPORT INDUSTRY

France has a large transport industry, especially automotive sector, railway sector and aviation and aerospace industry. Furthermore France has a strong focus on information technology industries and with that a strong sector for intelligent transport systems (ITS). Research and Development in the automotive industry is well organized and coordinated, although it avails almost no public funding. Adverse, R&D in aviation and aerospace industry as well as railway- and public transport is highly public funded.[18]

### TRANSPORT POLICY RELATED GENERAL GOALS

The Ministry of Construction, Housing and Transport is accountable for transport policy visions and policy goals as well as for transport infrastructure investments. French Transport Policy had to cope with a huge intersection in 2003, when the national assembly cut heavily down investments in transport infrastructure (source: Oudin 2003). The two most prevailing policy goals within the French transport policy are at the moment:

- Road safety and road security - reduce the number of traffic accidents,
- Enhancement (double) the overall proportion of railway freight transport till 2010.

One of the largest projects in French transport policy in the last decades was the TGV. France has today worldwide a high technology prominence in high speed train technologies. But with that, the extension of railway freight transport was delayed and a very poor intermodality factor is one of the hardest transport problems in France today.[19]

Focusing sustainability criteria French municipalities with more than 100.000 inhabitants are obliged to operationalize mobility plans (PDU - plans de deplacements urbains). The municipalities are committed to reduce automotive transport, to promote low-emission vehicles as well as to develop and implement concepts for user friendly public transport and parking site regulations.

In France the great majority of transport research programmes are conducted at the national and ministry level. The Ministry of infrastructure, transport, housing, tourism and sea (MELTLM) plays the lead role in funding transport research in France.

Apart from MELTLM several other ministries are involved in funding transport research. Actual national transport research priorities are e.g. road safety, energy, environment and freight transport. France has not only a research focus on technology and infrastructure, but also a strong focus on socio-economic issues in transport research.

[18] Potthast J., Dienel H., 2003.
[19] Oudin J., 2003.

**MAPPING OF THE COUNTRY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM**

The FNS (national science fund) is in charge -of funding new and strategic relevant research topics and mobilize cooperation between academic research institutions and interdisciplinary research. Several FNS domains are relevant for transport research, like e.g. space and territories, nano-science, road safety and road security and environment and health. The FRT (national technology research fund) is in charge -of funding applied- and technology research as well as innovation and network activities. The PREDIT programme is funded within the budget of the FRT.

PREDIT is the largest transport research programme in France. It is in general one of sixteen French national research and innovation network programmes (RRIT). In 1990 the inter-ministerial land transport research and innovation programme PREDIT started. PREDIT 2 (1996-2000) covered already around 1300 transport research projects, with more than 180 strategic transport research projects. PREDIT 3 started in 2002 and and ended in 2006 (more details see below).

DEUFRAKO was initiated in 1978. At the beginning the programme was a bilateral agreement between INRETS and the German ministry of research with a focus on railway research. After a few years the above mentioned partners were ready to develop joint projects. In 1998 the French ministry of infrastructure, transport and housing joined the programme and with that the opportunity of funding trans-national projects. In 2003 a first call for proposals for a joint French-German transport research programme was launched.

CALFRANCE the French-Californian research cooperation framework started in 1998. Till 2002 the programme was focused mainly on the exchange of researchers and joint publications between INRETS and the University of California. In 2002 it was decided to fund joint research projects with partners particularly from industry.

RGC&U (urban and civil engineering research network) and PUCA (town planning, construction and architecture) are research programmes governed by the ministry of infrastructure, transport, housing, tourism and sea. The RGC&U initiative is a research network for urban development and civil engineering. The PUCA initiative hosts six thematic programmes and platforms to promote research on urban development, some of them related to transport research in urban areas.

## PROGRAMMES FOR TRANSPORT FROM THE LAST 5 YEARS[20]

### PREDIT 3 : 3rd Inter-ministerial Land Transport Research and Innovation Programme (3ème Programme National de Recherche et d'Innovation dans les Transports Terrestres)

**DURATION:** 5 years (2002-2006)

[20] source: EXTR@WEB, http://europa.eu.int/comm/transport/extra/web/index.cfm

### BACKGROUND

Predit is a national programme to encourage innovation and coordinate research. This programme aims at encouraging the creation of transportation systems that are economically and socially more effective, safer, more energy-efficient and more environmentally friendly. The third Predit programme was launched in 2002. It is marked by a specific effort put on goods transportation, energy and environmental issues, including the greenhouse effect, as well as diversified research on safety.

### OBJECTIVES

Predit 3 has three general objectives:

- to ensure the sustainability of passenger and goods transport
- to improve the safety of transportation systems
- to reduce environmental impacts and contribute to the fight against the greenhouse effects.

## PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

Predit 3 is based on 11 fields of research, known as operational groups (Groupes Opérationnels: GO):

- GO 1. Mobility, territories and sustainable development: Knowledge of movement practices; use of work and leisure time; criteria for sustainable development; car dependency; evolution of actors' roles; social issues.
- GO 2. Mobility services: Services and technologies for neighbourhood mobility; inter-mobility in urban areas; inter-city transport.
- GO 3. New knowledge for safety: Conditions involved when taking safety into account in terms of issues, data and knowledge production; behaviour faced with risks; health and safety.
- GO 4. Technologies for safety: Control-command of controlled transport; driving aids and support for infrastructure operation; technologies for safer behaviour and for a better perception of the environment and risks.
- GO 5. Logistics and transport of goods: Public policies and logistics organisations; goods in cities; reverse logistics; social issues in freight transportation.
- GO 6. Technologies for goods transportation: Service quality of non road-transport; flow optimisation and management; intermodality; security of people and goods.
- GO 7. Energy and environmental impact: Air pollution at a local and regional scale, the Greenhouse effect; noise; impacts on ecosystems; assessment and management of externalities.
- GO 8. Clean and energy-saving vehicles: Environmental performance of thermal engines; alternative energies; electric and hybrid vehicles.
- GO 9. Integration of information and communication systems: Integration and implementation of remote and localisation systems; evaluation surveys for projects concerning security; mobility management.
- GO 10. Vehicles and infrastructure: Integration and assembling of existing technologies, traffic in constrained areas; intelligent vehicles and infrastructure; vehicles of the future.

- GO 11. Transportation policies: Tools to assess policies; prospective, economics and sociology of innovation.

In addition to the above, a 'common actions' group covers Franco-German co-operation, in particular the DEUFRAKO programme, which is both within the French Predit programme and the German 'Mobilität und Verkehr' (Mobility and Transport) programme.

The GOs (operational groups) draw up calls for tender and value and label proposals. The project founders (ministries and agencies) decide on projects and the operational groups follow the projects and disseminate results. Each of the 11 GOs, plus DEUFRAKO, are treated as sub-programmes on this Knowledge Centre site, hence further information on each theme is contained in separate sub-programme profiles.

## PROGRAMME STAKEHOLDERS

Predit 3 is led by six public bodies ; 4 ministries (responsible for transport, the environment, research and industry), and two governmental agencies (ADEME and ANVAR):

- Ministère de l'Equipement, des Transports, de l'Aménagement du Territoire, du Tourisme et de la Mer (Ministry of Public Works, Transport, Spatial Planning, Tourism and the Sea)
- Ministère de l'Ecologie et du Développement Durable (Ministry of the Environment and Sustainable Development)
- Ministère de la Jeunesse, de l'Education et de la Recherche (Ministry of Youth, Education and Research)
- MINEFI: Ministère de l'Economie, des Finances et de l'Industrie (Ministry of the Economy, Finance and Industry)
- ADEME: Agence de l'Environement et de la Maîtrise de l'Energie (Environment and Energy Management Agency)
- ANVAR: Agence Nationale de la Valorisation de la Recherche (Research Valorisation Agency).

Each GO (operational group) has 2 or 3 secretaries from the above bodies, as well as a chairman from the industrial, business or academic sector. A range of public and private companies (industry, operators, etc), universities, research institutes, public authorities, etc are represented on the orientation committees of each GO as appropriate.

Projects are carried out by a wide variety of institutes, universities and private/commercial organisations.

**TOTAL NUMBER OF PROJECTS:** 540 (ongoing in 2002-2003)

**PROJECTS COVERED:** See sub-programme forms for examples within each operational group.

**TYPE OF FUNDING:** Public (national)

## PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS

The six main funding organisations are the four ministries involved in the programme and the two governmental agencies. Their contribution distribution is the following:

- Ministry responsible for transport: EUR 69m
- Ministry responsible for industry: EUR 68.6m
- Ministry responsible for research: EUR 54.1m
- Ministry responsible for the environment: EUR 11m
- ADEME: EUR 61m
- ANVAR: EUR 41m.

The public budget is about EUR 305 million. Co-funding of projects by industry, local authorities, other ministries and from European institutions is in addition to this.

Projects are awarded through calls for proposals, spontaneous proposals, direct single orders and through federative actions. Predit funding of projects is between 20% and 80%, depending on the nature of the action and the status of the funding beneficiary.

**CONTACT INFORMATION**

*Secrétariat permanent du Predit*
*Ministère de l'Equipement, des Transports, de l'Aménagement du Territoire, du Tourisme et de la Mer*
*DRAST (Research Directorate)*
*Tour Pascal B*
*F-92055 La Défense cedex, France*
*E-mail : predit@equipement.gouv.fr*
*Tel: +33 1 40 81 14 17*
*Fax: +33 1 40 81 15 22*

## PREDIT 4 Work Programme 2008 - 201221

Launched in May 2008, Predit 4 was the subject of an agreement protocol signed in August 2008 to coordinate 400 million euros of incentives.

**DURATION:** 5 years (2008 – 2012)

Background & Objectives

Most of the topics chosen as priorities for Predit 4 concern both industrial issues and transport policy issues – two types of issue often bound up with one another by regulations. Predit is expected to forge links between these issues and therefore any progress made with technology, services, knowledge and tools for public policies, through research, experimentation and innovation.

This collective initiative is also expected to produce "roadmaps" supported by a consensus, which connect the short and long term and give some perspective to the orientations of the research. For these reasons, Predit 4 is organised around six research programming priorities, each the

[21] Source: PREDIT 4 Work Programme, May 2009

responsibility of an Operational Group (Groupe Opérationnel - GO), which will handle the technological and service dimensions and the public policy knowledge and tools dimension. This organisation into topics is also designed to make interaction with FP7 easier.

#### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

There are six operational groups for the six priority topics. They are run by a board consisting of a chairman, two vice-chairmen and secretaries representing the investors. A lead secretary is appointed from among these secretaries.

#### ENERGY AND THE ENVIRONMENT (GO 1)

Dealing with the challenges of greenhouse gas emissions and the quality of the environment are the major objectives of Predit 4, regarding freight transport and passenger transport alike.

#### QUALITY AND SAFETY OF TRANSPORTATION SYSTEMS (GO 2)

For reasons related to user demand and public policy, the quality and safety of transportation systems is now a research priority.

#### MOBILITY IN URBAN AREAS (GO 3)

The programme will focus on the design of transport systems and services adapted to such areas and to contemporary lifestyles, with a view to dealing with three types of sustainable development issue: the environment, funding and social cohesion.

#### LOGISTICS AND FREIGHT TRANSPORT (GO 4)

Research is structured around the topics of quality of service, tracking goods in transit, safety, optimising the use of infrastructures, the efficiency of breakbulking operations in intermodal transport systems, interfacing with sea or air transport and innovation in the area of road transport. Research on logistics systems should specify the developments required and possible guidelines for public policy.

#### COMPETITIVENESS IN THE TRANSPORT INDUSTRY (GO 5)

Competitive industry, transport operators and regions are crucial for the future of France and this will be reflected in all the research pursued under Predit 4.

#### TRANSPORT POLICY (GO 6)

Considering the long-term aspects of current challenges, especially as related to climate change, implies a need to put greater emphasis on forward-planning and on a review of many of the forecasting and assessment tools that we use, and, subsequently, our regulatory tools and methods (especially funding and pricing tools). Particular attention will be given to the issues of equity and acceptability.

Predit 4 covers the period 2008-2012, with a public investment target in the region of 400 million euros to support research and innovation (Predit 3 achieved 360 million euros over 6 years), to go to companies and academic bodies engaged in research. The diversity of investors and instruments involved guarantees that the concerns of all the different types of contributors to the innovation process will be taken into account.

### PROGRAMME STAKEHOLDERS

Programme governance is provided by a Steering Committee, a Strategic Advisory Council, six groups of experts (known as operational groups) and a permanent secretariat. Jean-Louis Léonard, Member of the French Parliament for Charente-Maritime has been appointed chairman of Predit 4.

Five investors are involved in providing funding for projects and coordinating the operational groups:

- MEEDDM: Ministère de l'écologie, de l'énergie, du développement durable et de l'aménagement du territoire - French Ministry of Ecology, Energy, Sustainable Development and the Sea
- ADEME: Agence de l'Environnement et de la Maîtrise de l'Énergie - French Environment and Energy Management Agency
- MinEIE: Ministère de l'économie, de l'industrie et de l'emploi – French Ministry for the Economy, Industry and Employment
- ANR: Agence nationale de la recherche – French National Research Agency
- OSEO

### PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS

Predit 4 does not have its own overall budget; the public funds for the term of the programme (target: 400 million euros over five years) rely on the consolidation of incentives provided by the five investors in this collective planning platform. Funding is agreed and allocated by the two ministries and three agencies on the basis of expertise and project labelling by the operational groups.

### CONTACT INFORMATION

*Secrétariat permanent du Predit*
*Ministère de l'Equipement, des Transports, de l'Aménagement du Territoire, du Tourisme et de la Mer*
*DRAST (Research Directorate)*
*Tour Pascal B*
*F-92055 La Défense cedex, France*
*E-mail: predit@equipement.gouv.fr*
*Tel: +33 1 40 81 14 17*
*Fax: +33 1 40 81 15 22*

## DEUFRAKO German-French cooperation for land transport research

(Deutsch-Französische Kooperation auf dem Gebiet der Verkehrsforschung / Coopération franco-allemande dans le domaine des transports terrestres)

**MASTER PROGRAMME :** PREDIT 3 and PREDIT 4

**DURATION:** Since 1978

### BACKGROUND

DEUFRAKO is a bilateral Franco-German scientific and technical research programme, set up in 1978 as a consequence of the EU deregulation initiative. The intention was primarily to advance the planning and implementation of modern guided surface transport systems and more particularly high-speed rail. Both Germany and France are obligatory points of passage for north-south and east-west traffic, are served by very active and extensive networks. Their railway industries are among the most dynamic in the world and they are pioneers in the development of innovative rail technology. If the two systems are to be compatible, certain research activities need to be pursued together. Such co-operation is all the more necessary nowadays to develop a high-speed network throughout Europe.

### OBJECTIVES

Initially, the main objective of DEUFRAKO was to reinforce German-French co-operation in modern rail transport to conquer new markets, to increase the performance and simultaneously reduce the resources used in order to ensure environmentally compatible mobility, to shift traffic to more favourable transport systems, and to enhance the interoperability between the national transport systems to develop a performant European network. The main partners were SNCF, DB, and INRETS.

The programme has been extended from 1998 onwards to solve problems in urban transport and freight and to use the great potential of telematics applications. Other stakeholders were included in order to broaden the scope of the activities.

After the French-German forum on research cooperation which was held in 2002, the DeuFraKo programme was further extended to deal with four specific issues: green freight corridors, noise research, security and safety, and smart travelling. New tools for cooperation were proposed for use, such as joint calls for proposals and joint status seminars.

### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

On the French side, the programme operation is undertaken by the ministry of transport and the INRETS institute, with support from other financing bodies in the PREDIT programme. On the German side, the leading institution is the ministry in charge of research and education, with support from the TÜV Rheinland. A DEUFRAKO steering committee meets every year in order to set cooperation objectives and select projects.

Five main areas were targeted to achieve co-operation in the development of innovative transport systems:

- rail transport
- freight
- urban transport
- telematics
- noise in transport.

These areas are open for bottom-up proposals, which are examined by the DeuFraKo committee, with the support of external experts when needed.

Other specific topics may be dealt with through joint calls for proposals. A first joint call was opened in December 2002 on green freight transport corridors.

**PROGRAMME STAKEHOLDERS**

- Ministère de l'Equipement, des Transports, de l'Aménagement du Territoire, du Tourisme et de la Mer (French Ministry of Transport)
- Ministère de la jeunesse, de l'éducation nationale et de la recherche (French Ministry of Research)
- BMBF - Bundesministerium für Bildung und Forschung (German Federal Ministry of Education and Research)
- INRETS (French National Research Institute for Transport and Safety).
- SNCF (French Railways)
- DB (German Railways)
- TÜV-Akademie Rheinland GmbH
- (wider coverage with the new themes)

**TOTAL NUMBER OF PROJECTS :** 25

**ONGOING PROJECTS :** 4

**COMPLETED PROJECTS :** 18 (From 1998 onwards: lack of information)

**PREDICTED PROJECTS :** 4

**PROJECTS COVERED**

A number of key projects are presented below:

ARTEMIS, rail control-command system for a railway prototype equipment, enables interoperability of European networks.

High-speed freight transport: research on the use of high-speed railways for freight transport

Use of satellite for localisation and communication for freight transport: research activities to define the needs of freight transport relative to localisation and communication and structure of costs regarding use of satellites.

Solutions to reduce noise emissions: modelling, identification of noise sources, solutions to reduce noise. Use of this research to develop new types of trains.

RODI (Rail Oriented Urban Development Intermodality): analyses relations between urban development and rail infrastructure in French and German cities.

**RECENT PROJECTS ARE:**

Side wind behaviour of high speed rail: innovative lightweight structures and distributed propulsion design leads to increased wind sensitivity. A systematic investigation should support safety features.

IVHW Inter-Vehicle Hazard Warning: investigation concerning a European standard car system for hazard and collision warning.

**LEADING INSTITUTION**

Ministère de l'équipement, des transports, du logement, du tourisme et de la mer (French Ministry of Transport)

BMBF - Bundesministerium für Bildung und Forschung (German Federal Ministry of Education and Research) - Public institution

**TYPE OF FUNDING:** Public (multinational)

**PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS**

Joint funding is the standard rule: French public bodies (mainly the ministry of transport) fund the French partners, and the German ministry of research funds the German partners.

Specific conditions are set in calls for proposals.

**CONTACT INFORMATION**

***Mr Mathieu Goetzke***
*Ministère de l'Equipement, des Transports, de l'Aménagement du Territoire, du Tourisme et de la Mer*
*Direction de la recherche et des affaires scientifiques et techniques*
*Tour Pascal B*
*F-92055 La Défense Cedex, France*
*E-mail: mathieu.goetzke@equipement.gouv.fr*
*Tel: +33 1 40 81 63 36*
*Fax: +33 1 40 81 63 03*
*Programme website: www.deufrako.org*

*Website: www.inrets.fr/infos/Deufrako/deufrako.html*

# GERMANY

(Source: Mobility and Transport Technologies, the Third Transport Research Programme of the German Federal Government, 2010 & 2012).

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Germany has a population of 82.3 million people (2009 figure), making it the 14th most populous country in the world. The country has a total area of 357,021 (sq km), and 349,223 sq. km. of land area. Germany has nine boardering countries, these are Austria 784 km, Belgium 167 km, Czech Republic 646 km, Denmark 68 km, France 451 km, Luxembourg 138 km, Netherlands 577 km, Poland 456 km, Switzerland 334 km. It further has 2,389 km of coastline.[22]

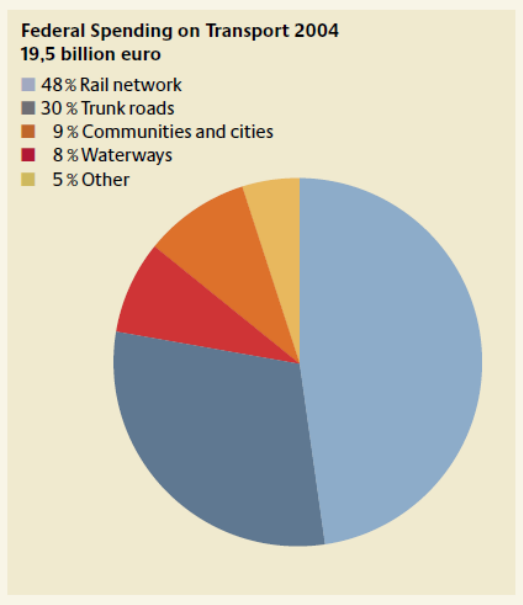
Located in central Europe, Germany is made up of the North German Plain, the Central German Uplands (Mittelgebirge), and the Southern German Highlands. The Bavarian plateau in the southwest averages 1,600 ft (488 m) above sea level, but it reaches 9,721 ft (2,962 m) in the Zugspitze Mountains, the highest point in the country. Germany's major rivers are the Danube, the Elbe, the Oder, the Weser, and the Rhine.

Germany has a densely developed transport network with approximately:

-231,400 km of inter-urban road (including approximately 12,530 km of motorway)

-413,000 km of local authority road

- 41,300 km of railway, and
- 7,300 km of federal waterway




[22] Country Reports, http://www.countryreports.org/geography/overview.aspx?countryid=91

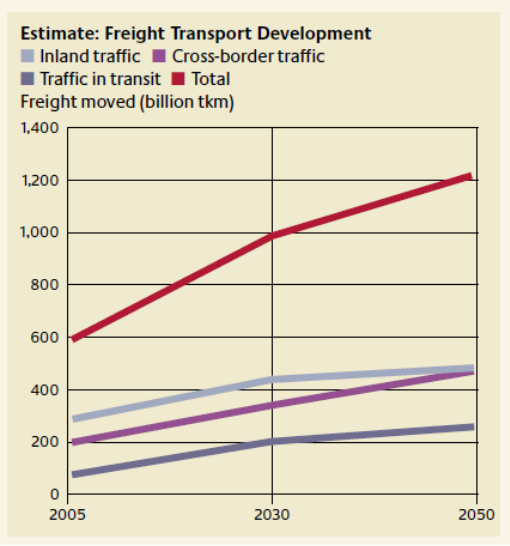
Due to the scope and the age of the transport infrastructure, most of the funds available are spent on maintenance rather than new development and expansion. Of the 150 billion euros allocated by the government for investment in the transport infrastructure between 2001 and 2015 under the Federal Transport Infrastructure Plan 2003, no less than 83 billion will be spent on maintaining the existing infrastructure.

Germany is running an increasing risk of no longer being able to cover maintenance costs through public funding alone. Congestion, roads in a poor state of repair, road works and accidents all lead to tailbacks and traffic disruption. According to "Keep Europe Moving"[23], the mid-term review of the EU Commission's White Paper on transport, European countries spend, on average, approximately 1 % of gross domestic product (GDP) covering costs incurred by traffic congestion. With this very dense infrastructure, this would correspond to more than 20 billion euros each year. In the future, the expansion of existing infrastructures for private and public transport with intelligent systems based on communications technology will be one way to reduce the extent and duration of tailbacks and to make public transport more attractive and more efficient.

### TRANSPORT INDUSTRY

Transport is of huge economic and social importance to Germany. Modern transport systems are a hallmark of highly developed industrial nations. The ability to meet a range of business and recreational mobility requirements is an essential prerequisite for economic growth and prosperity, and for removing any barriers to participation in all areas of social life.

Due to the increased exchange of goods within the enlarged European Union and growing global trade, freight transport is expected to increase on a massive scale in the coming years. According to the latest forecasts and estimations, the amount of freight moved (i. e. tonnes carried multiplied by the distance travelled in tone-kilometres) will increase by 69 % between 2005 and 2030, and by 110% by 2050. Traffic in transit is expected to see an increase of 130 % by 2030, and 214 % by 2050. The market share of the various modes of transport (modal split) will not exhibit a sustained change in the forecast period. Approximately 70 % of freight will be transported by HGV, and 27 % by rail and inland waterway. It is therefore essential that we employ intelligent solutions to make efficient use of the available capacities and reserves of all modes of transport, with a view to enabling the free-flowing, reliable transport of people and goods.




Estimation of the long-term development of freight transport in Germany to 2050. Source: progtrans report commissioned by the BMVBS, 2007

[23] "Keep Europe moving – Sustainable mobility for our continent", Mid-term review of the European Commission's 2001 transport White Paper, Luxemburg, 2006

### TRANSPORT POLICY RELATED GENERAL GOALS

The Federal Government organises transport research as follows:

The *BMWi* is responsible for technology-based and system-oriented project funding of transport research, including institutional funding for the DLR.

As part of its departmental research, the *BMVBS* primarily funds research projects that seek to facilitate and underpin transport policy decisions. In future, research funding will also become a more far-reaching funding instrument of the BMVBS.

The *BMBF* funds the research and development of basic technologies, some of which may ultimately be applied in the area of transport.

The *BMU's* transport-specific research fosters innovations that are primarily directed at improving the environmental soundness of transport solutions.

The BMVBS (Federal Ministry of Transport, Building and Urban Affairs) has the overall responsibility for transport policy, covering the area of intelligent infrastructure, as well as being responsible for the necessary legal structures.

As part of its departmental research, the BMVBS primarily funds research projects that seek to facilitate and underpin transport policy decisions. In the future, research funding will also become a more far-reaching funding instrument of the BMVBS.

Modern transport policy, as an integrated transport policy, encompasses all modes of transport, namely road, rail, waterway and air transport. On the basis of a modern, high-capacity and efficient transport infrastructure, the modes of transport must be able to guarantee mobility today and in the future. Ensuring mobility as the foundation of Germany's economic success is therefore one of the central objectives of the Federal Government's transport policy. Mobility is also essential to facilitating participation in society, as well as being an expression of economic prosperity.

However, mobility must not lead to over-exploitation at the expense of humanity and of nature. The underlying concept of a modern transport policy is therefore that of an integrated transport, urban development and regional planning policy. This also includes easy access to destinations, short distances and a safe and environmentally compatible handling of traffic.

Germany's transport policy pursues the principle of sustainability. The aim is to ensure mobility, while at the same time overcoming and limiting its negative effects. This includes reducing resource consumption and pollutant emissions. This is achieved by optimizing both the overall transport system and the innovation potential of the mobility industry itself. New transport telematics applications and traffic guidance systems can make traffic flow more smoothly, find the best routes and logistically track freight. Linking the various modes of transport is to facilitate transfers and combined usage.

The Federal Government's aim is for all modes of transport to form an efficient and modern overall transport system, thus providing relief to regions of high traffic density while at the same time creating development opportunities for structurally weak areas. Through innovative system

solutions, such an overall transport system will also ensure greater safety – in road, rail, waterborne and air transport.

Therefore, to optimise the entire system, the Federal Government is focused on an integrated transport policy and, thus also a comprehensive policy approach. In addition to developing the conventional policy areas such as regulatory policy and investment policy (for example, in the construction and maintenance of transport infrastructure), other areas such as transport process optimisation, demographic change, urban development and settlement development, new technologies, energy supply, environment, climate change, financing systems and security are indispensable elements of an integrative, holistic policy approach that must be able to also cope with future issues. The research conducted by the BMVBS, also known as departmental research, serves to support this policy approach. It is essentially an innovation policy because transport policy must rely on the development of new future-oriented innovative solutions in order to handle issues associated with the sustainable protection of mobility.

Depending on the budgetary and technical orientation of individual programmes, different individual projects are defined for the individual target fields. The main "transport policy" lines of development determine the lines of research to be followed, whereby the difference between research funding and departmental research also becomes apparent. The main horizontal lines of research for the BMVBS are as follows:

- Future-proof, energy-saving, low-CO2 and low-emission transport,
- Support for innovative technologies on their way into practical use,
- Low-noise transport,
- Protection of the transport system against climate change,
- Demographic change in transport, urban and regional development,
- Urban development at the interface of mobility and transport,
- Freight transport and logistics for enhancing
- German competitiveness in the global economy,
- Transport telematics for a more efficient use of infrastructure,
- Sustainability in future transport infrastructure financing,
- Safe transport.

Both the concept of integrated and intermodal transport and the concept of a European city provide direction for these main horizontal lines of research. Due to the various aspects involved in the aforementioned research lines, some of them are handled by several departments. The programme of innovation for "Hydrogen and Fuel Cell Technology" is an example of a cross-departmental project funded jointly by the BMVBS, the BMBF and the BMWi within the framework of the 6 billion euro R&D innovation programme and the Federal Government's High-Tech Strategy. The integrated overall research programme of the BMVBS comprises two main pillars, namely general BMVBS departmental research and research within the Federal Government's R&D innovation programme.

### MAPPING OF THE COUNTRY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM

The current research programme is part of the Federal Government's High-Tech Strategy. This strategy is an overall concept that unites the Federal Government's various core objectives for

research and technology. Transport research is listed as one of the priorities in the High-Tech Strategy.

The Federal Ministries involved in this research programme, are namely:

- Economics and Technology (BMWi)
- Transport, Building and Urban Affairs (BMVBS)
- Education and Research (BMBF)
- Environment, Nature Conservation and Nuclear Safety (BMU), and
- Food, Agriculture and Consumer Protection (BMELV)

These Federal Ministries plan to take a wide-ranging approach to driving and accelerating the required innovations in the area of mobility and transport by funding research and technological development. The following funding instruments will be used:

Funding of **departmental or contract research** that aims to find solutions to current policy issues and meets the (usually short-term) requirements of the individual department for scientifically substantiated results. Some of this research is carried out by agencies of the departments, such as the Federal Highway Research Institute (BASt), the Federal Maritime and Hydrographic Agency (BSH) or the Federal Environment Agency (UBA). These agencies form an essential component of the Federal Government's scientific and technical infrastructure.

**Grant-based project funding:** This refers to the funding of short-term research projects with welldefined aims, based on a broad research programme in private enterprises, research institutes and universities or partnerships between these, which are application-oriented and market-focused, and, where possible, whose results can be demonstrated. In most cases, public funding covers only part of the total project costs and spending. The remaining investment is to be covered by the grant recipients themselves.

**Institutional research funding:** This refers to the funding of research that is not based on specific targets. Instead, funding is regarded as an investment in the institutions themselves, and serves to enhance the expertise of research institutes and underpin their long-term strategic approach to transport research. This type of research tends to be based on underlying principles, and typically addresses issues that, due to their magnitude, complexity and individual requirements, require the specific research tools that are usually only available in larger research centres. Institutional funding is currently provided for the transport research being carried out at the German Aerospace Center (DLR) in the Helmholtz Gemeinschaft.

The instruments specified above complement one another, and can be used in combination if necessary. A parallel approach incorporating project funding and institutional funding, as well as the requisite coordination processes, has proven effective in practice.

## National RTD programmes for road transport from the last 5 years

The current, third transport research programme has been christened "Mobility and Transport Technologies". This distinguishes it from earlier programmes and places its focus squarely on the fostering of technology. Currently pressing issues and emerging challenges relating to land-based transport are tackled with a view to seeking a solution through the concerted efforts of industry and science. The programme forms part of the Federal Government's High-Tech Strategy, and implements its underlying principles in the area of transport. It incorporates all of the general conditions necessary for innovation, and provides particular support for strategic partnerships between industry and science to develop new technologies.

This programme and the associated funding structure have been defined by various government departments, under the auspices of the Federal Ministry of Economics and Technology. As such, it constitutes an official programme of the Federal Government.

The technology component of the programme is based on the following three pillars:

**A)** Intelligent logistics

**B)** Mobility of people in the 21st century

**C)** Intelligent infrastructure

Research and technological innovation in these areas have particular potential to provide solutions for a more efficient use of the various modes of transport, the reduction of dependency on fossil fuels, the adaptation of transport systems in preparation for demographic change, and the further tightening of road safety with assistance systems to provide technical information.

The programme will be funded by the federal budget. The funds allocated will be used both for project funding and to finance contract/departmental research. Public funding will also be allocated to the institutional transport research carried out by the German Aerospace Center (DLR) under this program. The German transport research programme is coordinated with Community research funding within the European Union. National and European Community funding complement one another, with the EU funding programmes focussing mainly on specifically European objectives. In accordance with the subsidiarity principle, European funding is intended to build on and enhance national programmes.

In addition to national research activities and participation in European framework programmes, bilateral and multilateral collaboration between individual countries plays a key role in transport research. This is because many of the challenges faced in the transport area are similar for most countries.

For example, Deufrako[24], a bilateral Franco-German collaborative research programme in the area of transport research established in 1978, has stood the test of time and provided important momentum for European developments. The period from 2004 to the present day has seen an increase in multilateral research collaboration as part of the ERA-net TRANSPORT[25] and ERA-net Road

[24] http://www.deufrako.org
[25] http://www.tranport-era.net

networks, which each comprise more than 10 European Member States. Germany has played no small part in this collaboration, which has led to the establishment of the European Research Area (ERA).

Collaboration on EUREKA projects represents another important platform for cooperation at an application-oriented level. EUREKA LOGCHAIN[26], which the Federal Government helped to initiate, is a project dedicated to one of the key issues in transport research. It largely involves cross-border collaboration towards traffic avoidance and modal shifts in transport chains. In contrast to Community-funded EU research programmes, these bilateral and multilateral programmes are publicly financed by the nations involved, and are subject to national conditions of funding.

## Second transport research programme "Mobility and Transport"

**DURATION:** 2000 to 2007

**BUDGET:** 380 million Euros

**Developed technologies and services with implementation in practice**

The funds allowed new networks comprising enterprises and research institutes to develop new technologies and services, which have since found their way onto the market. Examples include:

- the **INVENT** Initiative[27] with the German automotive industry and its component suppliers, which led to developments for innovative driver assistance systems in the areas of road safety, traffic flow and navigation.
- the **"clean HGV diesel engine"** with "ADD blue technology", which complies with the EURO IV standard[28].
- **fire control systems** for tunnels, which will be used in future in Madrid's underground rail system and on the Brenner motorway in Austria.
- the **"European Rail Freight Transport 2010"** ideas competition (SGV 2010), which encouraged enterprises to identify new ways to improve the quality and economic viability of freight transport by developing innovative solutions for technology, operations and organisation[29].
- the **"Mobility in Conurbations"** flagship project (Intermobil Dresden, Mobilist Stuttgart, Stadtinfo Cologne, WAYflow Frankfurt/Main, MOBINET Munich, CashCar Berlin), in which extensive mobility and transport concepts were designed, and which led to the establishment of large cross-regional transport management and control centres[30].
- **e ticketing** – the development of a standard, which will, in future, enable the implementation of an integrated, electronic ticketing system for public transport (core application[31]) throughout Germany.

[26] http://longchain.eureka.be/background.do
[27] http://www.invent-online.de/
[28] www.tuvpt.de/abgeschlossene-projekte/minimalemission.html
[29] www.schiene2010.de/web/
[30] www.tuvpt.de/abgeschlossene-projekte/mobilitaet-in-ballungsraeumen.html
[31] www.eticket-deutschland.de

- the research project **"Regional Public Transport"**, in which ideas for efficient and high-quality local public transport in rural areas and in small and medium-sized towns were developed and tested[32].
- the **"Quiet Traffic"**[33] research network, which significantly advanced scientific knowledge of the effects of traffic noise pollution, and developed and tested technological solutions for noise reduction.

## Analyses of the results

Quantitative analyses of the success of the research programmes and individual projects were also performed to the greatest extent possible. These showed, for example, that approximately 150 million HGV-km per year were saved through "intelligent logistics" as part of the "Flexible Transport Chains" programme (the anticipated result was 100 million HGV-km per year).

The results of evaluations performed so far have been incorporated into the overall concept and objectives of the third transport research programme.

## Third transport research programme "Mobility and Transport Technologies"

**DURATION:** 2008 to 2014

**BUDGET:** 420 million Euros.

### AIMS OF THE 3RD TRANSPORT RESEARCH PROGRAMME

The current, third transport research programme has been christened "Mobility and Transport Technologies". This distinguishes it from earlier programmes and places its focus squarely on the fostering of technology. Currently pressing issues and emerging challenges relating to land-based transport are tackled with a view to seeking a solution through the concerted efforts of industry and science.

The current transport research programme is part of the Federal Government's High-Tech Strategy[34] and implements its underlying principles in the area of transport. This strategy is an overall concept that unites the Federal Government's various core objectives for research and technology. One of the key aims of the High-Tech Strategy is to enhance the interface between science and industry to reduce the time it takes to implement the results of research. The transport research programme ties in neatly with this and is listed as one of the priorities in the High-Tech Strategy.

[32] www.tuvpt.de/abgeschlossene-projekte/pnvregion.html
[33] www.fv-leiserverkehr.de
[34] www.high-tech-strategy.de

## Funding of Research and Technology by the Federal Ministry of Economics and Technology (BMWi)

The programme has been funded by the federal budget. The funds allocated are used both for project funding and to finance contract/departmental research. Public funding is also allocated to the institutional transport research carried out by the German Aerospace Center (DLR) under this program. The German transport research programme is coordinated with Community research funding within the European Union. National and European Community funding complement one another, with the EU funding programmes focusing mainly on specifically European objectives. In accordance with the subsidiary principle, European funding is intended to build on and enhance national programmes.

The 3rd Transport Research Programme and the associated funding structure have been defined by cross-departmental collaboration, which translates into the involvement of the Federal Ministry of Economics and Technology (BMWi), Federal Ministry of Education and Research (BMBF), Federal Ministry of Transport, Building and Urban Affairs (BMVBS), Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) and the Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU), all under the auspices of the Federal Ministry of Economics and Technology. As such, it constitutes an official programme of the Federal Government.

For example, the innovative “Safe, Intelligent Mobility” project is a partnership between the BMWi, BMBF and BMVBS. Meanwhile, the “Hydrogen and Fuel Cells Technology” national programme for innovation unites the activities of the BMVBS, BMWi and BMBF.

## Programme Organisation

The technology component of the programme is based on the following three pillars:

- Intelligent logistics,
- Mobility of people in the 21st century,
- Intelligent infrastructure.

Research and technological innovation in these areas have particular potential to provide solutions for a more efficient use of the various modes of transport, the reduction of dependency on fossil fuels, the adaptation of transport systems in preparation for demographic change, and the further tightening of road safety with assistance systems to provide technical information.

**Intelligent Logistics**

The Federal Ministry of Economics and Technology (BMWi) has taken up the challenge of strong growth in external trade and Germany’s central position in the new Europe that will produce a rapid increase in the exchange of goods and in freight traffic in the coming years. The funding initiatives “Intelligent Logistics” and its successor “Sustainable Logistics Networks” aims to develop and prepare the rollout of technical innovations for the logistics and transport sectors.

The following political fields have been identified to help finding solutions for the increase of freight traffic:

- Increasing efficiency and environmental protection for transport by rail, road and waterway,
- Reducing bottlenecks at logistical hubs,
- Transport optimization through cooperation and integration,
- Maintaining affordable logistical safety.

In this way, the **Freight Transport and Logistics Action plan** initiated by the Ministry of Transport, Building and Urban Develoment (BMVBS) is implemented. Current developments and trends are examined, as there are quality standards in transport, economics and logistics, for the purpose of detecting where action is required and formulating appropriate responses. The objective is to strengthen Germany's position as a centre for both manufacturing and logistics, with a view to boosting competition, growth and employment. It comprises 30 Actions in the area of efficiency of all modes of transport, interlinking transport infrastructure, promote compatibility of transport growth with environmental protection and climate change, support good conditions of working and training in the freight transport industry.

**Mobility of people in the 21st century**

Highly developed transport systems have become an essential component of modern societies. The ability to meet a range of commercial, professional and recreational mobility requirements is key to ensuring economic growth and prosperity, and for removing any barriers to participation in all areas of social life. Mobility is therefore an important prerequisite for independence, flexibility and autonomy in terms of both time and space.

Challenges related to this theme are the predicted future climate change, the increasing fuel prices and the dramatic demographic change in Germany within the next decades.

The BMWi's research funding programme therefore targets research projects that focus on the following challenges:

- Development of sustainable mobility solutions including new integrated "door to door" solutions
- the use of new technologies to improve access to public passenger transport
- the improvement of personal navigation systems to strengthen mobility on foot.

*Programmes included/overlapping:*

**German National Cycling Plan** (BMVBS): increase of bicycle use in relation to the overall volume of traffic in Germany by 2012.

**Mobility 21**[35] (BMVBS): competition for innovative transport solutions to identify and pursue sound existing solutions and approaches that could not be developed further for various different reasons.

**e ticketing**[36] (BMVBS): development of a standard, which will, in future, enable the implementation of an integrated, electronic ticketing system for public transport (core application) throughout Germany.

[35] http://www.m.21-portal.de

**Urban Transport** [37] (BMVBS): Improvement of the communal traffic transport conditions.

Budget: around 4 million Euros per annum.

**Local Public Transport**[38] (BMVBS): Improvement of the communal traffic transport conditions.

Budget: around 4 million Euros per annum.

Safe travel with focus on driver assistance, innovative safety systems for rail transport and the enhancement of perceived safety.

Environmental protection and noise control comprising the themes alternative drive technologies and fuels, new materials and processes in automotive and engine technology and reducing traffic noise.

*Programmes included/overlapping:*

**"Safe, intelligent mobility – testing ground Germany (SIM TD)"**[39] (BMWi, BMBF, BMVBS): reduction of $CO_2$ emissions from cars with innovation alliance. This programme is part of the German high tech strategy for climate protection.

**National Hydrogen and Fuel Cells Technology Programme (NIP)**[40] (BMVBS, BMWi, BMBF): budget: 500 million Euros, Runtime 2008 – 2018.

**Mobility 21**[41] (BMVBS): competition for innovative transport solutions to identify and pursue sound existing solutions and approaches that could not be developed further for various different reasons.

**Electric Mobility in Pilot Regions**[42] (BMVBS): financial assistance of 115 million Euros to eight cities and regions with the objective to be one million electric vehicles and a further 500,000 fuel cell powered vehicles operating on Germany's roads by 2020.

**Intelligent Infrastructure**

A well developed, efficient transport infrastructure is a core prerequisite for demand-oriented mobility of people and goods. It is an important factor in attracting new business and investment, and has a significant influence on economic development. It is therefore important to improve the efficiency of the existing transport infrastructures and adapt them to meet new challenges. The possibilities for expanding these or developing new infrastructures are limited. Instead, the focus should be on employing intelligent technologies and organizational forms to make better use of existing infrastructures.

[36] http://www.eticket-deutschland.de/

[37] http://www.bmvbs.de/dokumente/-,302.21588/Artikel/dokument.htm

[38] http://www.bmvbs.de/dokumente/-,302.21588/Artikel/dokument.htm

[39] http://www.bmbf.de/pub/the_high-tech_strategy_for_climate_protection.pdf

[40] http://www.bmvbs.de/en/dokumente/-,1872.960602/Artikel/dokument.htm

[41] http://www.m21-portal.de

[42] http://www.bmvbs.de/en/dokumente/-,1872.1129174/Artikel/dokument.htm

The following challenges are integrated in this programme:

- Creating free flow with intelligent transport systems by the collection and compilation of high-quality traffic information,
- the collaboration and communication on the roads,
- the development of technologies for collaborative traffic management.

*Programme included/overlapping:*

**Travel Information Meta-Platform Initiative**[43] (BMVBS), budget: 4 million Euros.

Efficient and effective rail transport by increasing the effective and efficient operational control.

Development of the potential for higher volumes of rail traffic by the development of optimized train length and axle loads.

*Programme included/overlapping:*

**Master Plan for Freight Transport and Logistics**[44] (BMVBS).

Building and maintaining routes for the future and reaching this aim by LCC-oriented maintenance of road and rail, intelligent road works management and increase of the safety of transport infrastructures.

**Other Programmes for Road Transport Research Activities**

**Materials research**[45] (BMBF): new materials technologies including their manufacturing and coating processes for transport technologies.

**ICT 2020 research programme**[46] (BMBF and BMWi): join forces of science and industry in devising the future of ICT research. The ICT 2020 includes a funding of 80 million Euros for **microsystems technology** in 2010 alone.

**Research for Civil Security**[47] (BMBF): increase of civil security by not only technological innovation but also inclusion of innovative organizational concepts and strategies for action.

**Plant Biotechnoloy**[48] (BMBF): Molecular Plant Research and systems biology for optimizing biofuels for Future Drive Concepts to develop new types of, or specialized, high performance plants which produce "tailor-made" enzymes, polymers or amino acids.

**National Biofuel Action Plan**[49] (BMELV): Provision of an holistic concept to significantly increase the bioenergy share in Germany's energy supply while adhering to sustainability criteria.

[43] http://www.bmvbs.de/en/dokumente/-,1872.1063485/Artikel/dokument.htm
[44] http://www.bmvbs.de/Anlage/original_1059250/Masterplan-Freight-Transport-and-Logistics.pdf
[45] http://www.bmbf.de/pub/bufi_2008.pdf
[46] http://www.bmbf.de/pub/ict_2020.pdf
[47] http://www.bmbf.de/en/6293.php
[48] Development of new types of, or specialized, high performance plants which produce "tailor-made" enzymes, polymers or amino acids.
[49] http://www.bmelv.de/cln_173/cae/servlet/contentblob/750066/publicationFile/41950/BiomassActionPlan.pdf

**Contact Information**

***Dipl.-Ing. Alexander Spieshöfer***
*Internationales Forschungsmanagement*
*Projektträger Mobilität und Verkehrstechnologien (PT MVt)*
*Am Grauen Stein 33, 51105 Köln*
*Alexander.Spieshoefer@de.tuv.com*
*T +49 221 806-4153*
*F +49 221 806-3496*

# GREECE

(National representative of Greece in ERTRAC, Hellenic Institute of Transport (HIT)-Centre for Research and Technology Hellas (CERTH), Update October 2009, by prof. G.A.Giannopoulos).

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Greece has a population of 10.964.020[50] million people (2001) with estimation for the 1st of January 2009 about 11.260.000 million people. Its total surface is 131.957 sq km. The average population density is 82,9 inhabitants/sq km (2001). Nearly 60% of the population lives in urban areas, 13% in suburban and 28% in rural areas.

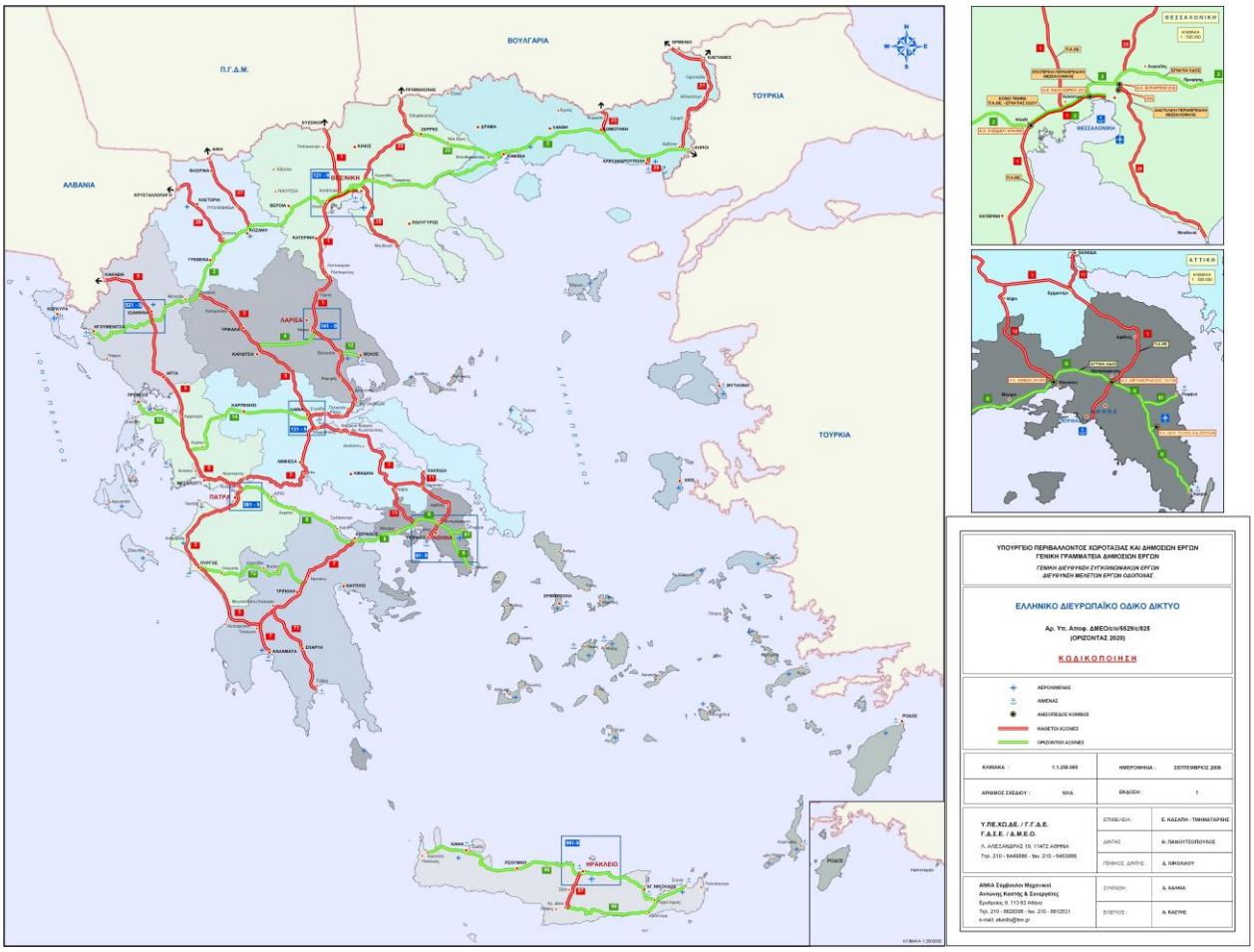
Greece lies in Southeastern Europe on the Mediterranean and has borders by land with Albania, Turkey, Bulgaria and FYROM. The capital city is Athens with a population of 3.192.606 inhabitants (2001). The mainland consists of the following administrative regions:

- Central Greece,
- Peloponnese,
- Thessaly (east/central),
- Epirus (west),
- Central Macedonia
- West Macedonia and
- Thrace (northeast).

The islands account for one-fifth of the country's land area. The majority are thickly clustered in the Aegean between the Greek and Turkish coasts.

Greece has a designated National road network with a total length of 10.000 kms (of which approximately 2000 kms is, or will soon be, of motorway standard) and about 30.000 km of county road network. Major highways include: Attiki Odos (in Athens), Egnatia Highway, The PATHE (Patra - Athens - Thessaloniki – Evzoni) motorway and the Ionian Motorway (under construction). The following Figure 1 shows the National (TransEuropean) road network as foreseen for 2020 (approximately 50% of it already constructed).

[50] Ministry of Economic Affaires and Communications, Reference Framework for the Cohesion Fund 2004-2006 – Transport Sector, 2003.




The railway network in Greece is approximately 2,500 km long, covering mainly the Eastern side of the country and linking the country with central Europe and Turkey.

Greece also has 110 commercial ports and 38 commercial airports.

## Transport Industries

The geographical location of Greece at the southern tip of Europe surrounded by sea, has made it one of the major hubs of shipping and transportation in the world, acting as a bridge between Europe, Africa and Asia. As a result, Greece is home to many highly-professional freight shipping, trucking and moving companies that offer a good selection of logistics services, including air cargo, maritime transport, vehicle and container shipping, packaging and moving.

The role of the secondary sector in the economy of Greece has played a crucial role in critical periods of the country's economic history, helping to absorb employment pressures during the transitional period from a traditional, agricultural economy to one with more complex and modern structures. The country's economy has gradually transformed itself from an agricultural one (in the sixties and fifties) to one of services, with a brief interval of industrialization (in the seventies). The decline of industry and the rise of service activities, is overstated to some extent because of the shift, in the last

decade, towards outsourcing by industrial enterprises of service activities that were previously carried out internally and were thus recorded as value added by industry. Even more important, a large part of value added in the service sector is goods-related and consists of trade, transport and business services purchased by industry.

Transport and research policy in Greece

Since March 2008 a law regarding the *legal framework for research and technology in Greece* was applied. In this, the scope and contents of a *National Programme for Research and Tecnology* are described as to:

- Promote research with main criterion scientific excellence according to international standards
- Nominate research as a main lever for the transition to the community of knowleage
- Utilize all Greek human research manpower (domestic and abroad)
- Simplify procedures in assignment and funding research programs
- Promote research cooperation between “industry” and academia.
- Support basic research mainly by national funding.

The new research law of 2008 had foreseen a number of new Authorities and procedures whose operation and establishmnet would require the issuance of a number of Presidential and Ministerial Decrees. Since these Decrees have not been issued at the time of writing this text, this law remains largerly inactive.

In October 2009 a new government was elected in Greece who changed considerably the organizational structure for supervising research in general and Transport (and Transport related) research in particular. The *General Secretariat of Research and Technological Development (GSRT),* which up to now was under the auspices of the Ministry of Development is now under the *Ministry of Education.* The previous Ministries *of Transport* and for *Planning, Public Works, and the Environment* have now been merged into a new Ministry (the *Ministry of Infrastructure, Transport and Networks),* while the previous Ministry of Merchant Marine has been dissolved and included into the new *Ministry of Economy, Competitiveness and Marine.*

The very recent re-organisation described above follows a long history of change in the Greek research establishment which started with the establishment of the Ministry of Development Research and Technology in 1982 (Law 1266/82) while the legal framework under which research was (and still is) conducted in the country was instituted in 1985 with law 1514 /85. The same year with law 1558/85 the *General Secretariat of Research and Technological Development* - GSRT was established. In the same year the first research and development programmes were introduced. These were the Industrial Research and Development Programme (abbreviated in Greek as *PAVE*), evolving to the Research Workforce Enforcement programme (known as *PENED*). In 1990 the first operational program for research and technology (known as EPET I) was approved and financed under the framework of the 1st Community Support Framework. Similar objectives with EPET I were addressed by another programme, STRIDE HELLAS, in 1992. In 1994, the realization of the second operational programme for research and technology, EPET II, was initiated, covering the technological evolution in the country for the period from 1994 to 2000.

## Main research programmes (supply and demand of research)

As regards the "**demand**" for transport research, and exploiting the experience stemming from the above, the GSRT is currently financing the new Programme «Competitiveness and Entrepreneurship» (EPAN II) for the Period 2007 – 2013, which continues and expands the successful actions from the first Operational Programme "Competitiveness" 2000 – 2006. This Programme aims at the acceleration of the transition to the knowledge-based economy, the development of healthy, sustainable and extrovert entrepreneurship and the goal of making Greece a more attractive place for developing business activities, with respect to the environment. EPAN II is funding the Programme called "SYNERGASIA" with total budget 76.100.000€. This programme aims at increasing the competetiveness through the collaboration of enterprises, research centers, universities and other public authorities. Priority sectors relevant to transport are "Green road and sea transport" with budget 4 million Euros and "Development and Utilization of Intelligent Transport Systems" with budget 4,5 million Euros.

Currently (October 2009), the programme "THALIS" with a total budget of 120 million € is running in which proposals and projects in transport research are included.

In all these programmes of the GSRT, transport subjects are directly or indirectly involved. So far, in the last decade, only one call was specifically dedicated to Transport (within the EPET II research programme).

The General Secretariat of Research and Technology (GSRT), announces and finances research projects, which are undertaken in the country by consortia comprising of universities, research centers, industries or individual researchers, as well as research activities within the framework of international agreements with other countries. The financing of these programmes comes from many sources, both Greek and the EU. The principal source of funding from the EU is the Commission Support Framework (through the Ministry of Economics but with the GSRT as the beneficiary of the CSF).

As regards the "**supply**" of research in the field of Transport in Greece, traditionally the two major Universities of the country (the National Technical University of Athens, and the Aristotle University of Thessaloniki) provided most of the research capacity in this field for the country.

In the decade of the 90's many consulting firms as well as some private firms and transport operators, were also involved in Transport research through their participation in the various research framework Programmes of the EU.

In the year 2000, through Presidential Decree no. 77/2000, the ***National Center for Research and Technology (CERTH)*** and, within it, the ***Hellenic Institute of Transport (HIT)***, was created. The Hellenic Institute of Transport is today the only National Organisation dedicated to Transport research in Greece. In the 8 years of its existence it has managed to develop a strategic research infrastructure that makes it the only center of excellence in the field of Transport research in Greece and a major one in the area of South Eastern Europe. It has also been involved in a great number of research projects in Greece and Europe, which makes it the major research organisation in Greece in the field of Transport (more info in: www.hit.certh.gr).

Transport Policy concerning freight and public transport (by land and air) is the responsibility of the (former) Ministry of Transport (new Ministry of Infrastructure, Transport and Networks). Maritime transport policy was the responsibility of the (former) Ministry of Merchant Marine. The construction of the road network as well as the management and control of road traffic is the responsibility of the (former) Ministry of Environment, Planning, and Public Works (new *Ministry of Infrastructure, Transport and Networks*). These Ministries have a number of Organisations (public or privately owned) under their jurisdiction that are involved in the operation and, to a large extent, planning of the various modes and parts of the transport system.

It is therefore of no surprise that for Greece the question of setting and implementing a coherent overall Transport Policy has been a difficult one for many years. All Greek governments of the last 20 years have almost unanimously followed the policies of the EU (implementing them invariably with a time delay of several years) in the various fields.

In the context of the so called *National Strategic Reference Framework* – NSRF for 2007–2013, a *"Plan for the Development of Transport for 2007-2013"* and a *"twenty-year plan*" was formed. The objectives and the directions of this National Plan include:

- Completion of missing links in infrastructure and services
- Reduction of travel time and cost (persons and goods)
- Elimination of congestion points
- Improvement of level of service across the board
- Ensuring interoperability and intermodality
- Improvement of road safety
- Reduction of environmental impacts
- Saving energy and natural resources.

Regarding the policy for Transport research, decisions to open and finance a Transport research programme come from the *General Secretariat for Research and Technology (GSRT*) as part of their overall research policies. In preparing the work plan for such a call, however, the GSRT invites representatives of the responsible Ministries or Organisations to participate in the relevant working groups. In principle the transport research programme (like all other similar ones, of the so-called "focused" programmes that fall within the general research framework for Competitiveness – EPAN) aims at supporting the promotion of transport policies and the application of innovation in the Transport sector.

# MAPPING OF THE SPECIFIC RESEARCH FUNDING SYSTEM IN GREECE[51]

## BODIES

*R&D Policy developers*

The main entity engaged in drawing up and implementing R&D policies in Greece is the *General Secretariat for Research and Technology (GSRT),* which comes under the *Ministry of Education*, (formerly under the Ministry of Development). The GSRT coordinates research projects funded by National as well as structural funds from the European Union. As regards developing policies, the GSRT is backed by the National Council for Research and Technology and other "industrial" representative bodies (chambers of commerce, Federation of Greek Industries, etc.).

The GSRT also coordinates research initiatives and R&D projects that are funded by pure National funds and supervises the research centres.

The Ministry of Education is also responsible for research that takes place within the Universities. Moreover, R&D issues in the agricultural sector and the defence sector are monitored by the Ministry of Agriculture (e.g. the National Foundation for Agricultural Research (NAGREF) and the Ministry of National Defence (Research and Technology Centre for National Defence), respectively.

## R&D PERFORMERS

The specific research centres, the higher education institutions and some businesses of the private sector are the bodies which implement R&D projects in Greece.

The majority of government research centres are monitored by the General Secretariat for Research and Technology, of the Ministry of Education, while the rest come under other Ministries. The GSRT supervises 13 research Centers, with a total of 52 Institutes, and 8 so called Technological Institutes.

All higher education institutions such as Universities, Technological Educational Establishments (TEI), and University research institutes come under the Ministry of Education and account for the greater part of research activity with the majority of researchers working within them.

Some (rather modest) research activity is also being performed in various businesses, industries, etc., especially in the information technology and communications sectors. It should be noted, however, that private funding of R&D is extremely scarce.

## FUNDING

## SOURCES OF R&D FUNDING

The main sources of funding for research in Greece are:

[51] Largerly based on a periodical publication by GSRT, ***R&D and Innovation in Greece***.

a) Public, which includes budget appropriations, programmes cofunded by structural funds, programmes of the EU Framework Programme for R&D,

b) Private funding

Budget appropriations refer to amounts coming from the state budget on a regular annual basis and to a lesser extend from the programme of public investments and mainly involve financing the running costs of universities and government research centres.

Structural funds come under the various *Community Support Frameworks* and they are managed by the Ministry of Economy. The General Secretariat for Research and Technology (GSRT), as a beneficiary of the CSFs, announces programmes and funds research projects, which are carried out in Greece as joint ventures by universities, research centres, businesses or individual researchers, as well as research activities within the framework of inter-governmental agreements with other countries.

Greek research teams also take part in European R&D programmes (mainly the various Framework Programmes of the European Commission) in collaboration with equivalent bodies and businesses from other countries in the European Union.

### GOVERNMENT FUNDING ON R&D

Government Budget Appropriations or Outlays for R&D (GBAORD) relates to amounts coming from the state budget and the programme of public investments (including EU funds for R&D), available to fund R&D activities. Table 1 shows a steady increase in GBAORD in the period 1995-2003.

Table 1
Government Budget Appropriations or Outlays for R&D Fund (GBAORD)

| Year | GBAORD Amount (million euros) | Current prices rates (% variation) | Fixed prices rates (% variation) | GBAORD/ GDP (% rate) |
|---|---|---|---|---|
| 1995 | 229.88 | | | 0.30 |
| 1996 | 262.68 | 14.27 | 5.02 | 0.30 |
| 1997 | 293.91 | 11.89 | 4.77 | 0.30 |
| 1998 | 302.93 | 3.07 | -1.84 | 0.29 |
| 1999 | 349.42 | 15.35 | 11.88 | 0.31 |
| 2000 | 420.12 | 20.23 | 16.3 | 0.35 |
| 2001 | 416.40 | -0.89 | -4.25 | 0.32 |
| 2002 | 406.89 | -2.28 | -5.88 | 0.29 |
| 2003 | 456.37 | 12.16 | 8.54 | 0.30 |

Source: GSRT

## GROSS DOMESTIC EXPENDITURE ON R&D

The percentage of Gross Domestic Expenditure on R&D (GERD), which measures the extent of research activity within an economy, has increased most notably in recent years. Though the progress achieved in the last ten years is also quite significant, with GERD rising from 0.38% of GDP in 1989 to 0.65% in 2001. However, this percentage is the lowest in the European Union where the corresponding EU average is 1.93%. This is mainly due to the limited contribution of the private sector (0.21%), compared to the public sector contribution (0.43%). Table 2 shows the R&D Intensity (%) by Sector of Performance (the expenditure for each research sector includes the total amounts, irrespective of the source of the funding, spent on R&D activities).

| Table<br>R&D Intensity (%) of GDP by Sector of Performance (2001) | 2 |
|---|---|
| GERD (Gross Domestic Expenditure on R&D)/GDP | 0,65 |
| BERD (Expenditure on R&D in the Business Sector) /GDP | 0,21 |
| GOVERD (Government Intramural Expenditure on R&D)/GDP | 0,14 |
| HERD (Expenditure on R&D in the Higher Education Sector) /GDP | 0,29 |

Source: GSRT

## ALLOCATION OF GERD BY SOURCE OF FUNDS

The small contribution made by businesses to the Greek R&D system can also be seen from the statistics on sources of funding for R&D (2001 statistics) (table 3).

| table<br>Total R&D Expenditure (GERD) (%) by Source of Funds (2001) | 3 |
|---|---|
| Government | 48.2 |
| Industry | 33.0 |
| Abroad | 18.4<br>(17.21: CSF/EU) |
| Other | 2.39 |

Source: GSRT

*Implementation of GERD*

As regards the performance of R&D (table 4), the universities and the government agencies make the greatest contribution in percentage terms, with businesses following behind. By contrast, in the EU, businesses make the greatest contribution to the implementation of the GERD.

| table 4<br>Total R&D Expenditure (GERD) by Sector of Performance (%) (2001) | |
|---|---|
| Government Research Organisations | 22.1 |
| Businesses | 32.7 |
| Higher Education Institutions | 44.9 |
| Private Non Profit Institutions | 0.35 |

Source: GSRT

## PROGRAMMES FROM THE LAST FIVE YEARS

Below we give a presentation of the existing operational programmes in the field of Transport which although they are not « research programmes » they provide some amounts for research. Pure research programmes in the field of Transport are rather scarce and (as already said) in the last 9 years there have been only two.

**THE NATIONAL STRATEGIC REFERENCE FRAMEWORK – NSRF, 2007–2013** constitutes the reference document for the programming of European Union Funds at national level for the 2007–2013 period. It was elaborated within the framework of the new strategic approach to the Cohesion Policy of the European Union, according to which NSRF *"…ensures that the assistance from the Funds is consistent with the Community strategic guidelines on cohesion and identifies the link between Community priorities, on the one hand, and the national reform programme, on the other."*

During the elaboration of the 2007-2013 NSRF as a programming document, a significant number of proposals submitted to the Ministry of Economy and Finance, guidelines – political choices at a national and European level, quantitative data and studies were used as input.

The Decisions of the European Council of December 2005, earmarking European Cohesion Policy funds for Greece until 2013, the new Regulations for EU Funds, as well as Cohesion Policy Strategic Guidelines have constituted the framework on which, among others, national authorities were based in order to approach the main parameters of development programming and to draw up the NSRF.

Furthermore, the main EU documents pertaining to the revised Lisbon Strategy and the National Reform Programme for Development and Employment 2005-2008, were taken into account in developing the main strategic choices-priorities, as they constitute central long-term choices for the European Union, to which the development policy of the new NSRF is called upon to contribute.

Based on the above, the NSRF targeting was structured over 4 levels:

- the NSRF strategic objectives level,
- the thematic (5) and spatial (3) priorities level, as required by the General Regulation of the Funds,
- the level of the General Objectives, in which each thematic priority is subdivided,
- the level of special targets and of main means of achievement.

At the same time, the development strategy took into account the national policies laid down in strategic documents, such as the National Report on Social Protection and Social Inclusion Strategy 2006-2008, the Digital Strategy 2006-2013, the "Plan for the Development of Transports for 2007-2013 and twenty-year plan", the National Port Policy, the National Strategic Rural Development Plan for Greece 2007-2013, etc.

The financing framework is structured on the basis of the decisions of the European Council of 16th December 2005 and of the specifications – limitations provided for in the new Regulations, and also according to the sectoral and regional development needs for the next period, also taking into account the needs for completion of ongoing projects carried forth from the previous programming period and the requirements for actions serving the objectives of the Lisbon Strategy. A fundamental choice is the optimum utilisation of the resources of the new programming period to the benefit of the country's balanced regional development.

The basic principles governing the management, monitoring and control framework of the 2007-2013 Operational Programmes are the object of a broad consultation process and were recorded in the position papers of stakeholders. These are complemented by the conclusions of a systematic analysis of the new E.U. Regulations requirements (NSRF Task Force, MOU S.A., CSF Managing Authority/Special Coordinating Service) and of a relevant study that was carried out on behalf of the Ministry of Economy and Finance entitled "*Improving the management and control systems of OP of CSF 2000–2006, Community Initiatives, the Cohesion Fund, and their adjustment for the 2007–2013 period".*

The architecture of the NSRF 2007-2013 Operational Programmes (OPs) is formulated in such a way as to implement the country's strategic choices in the best possible manner, whilst also taking into account new data for the programming period 2007–2013 (63% of the country's population in a state of transitional support). The new scheme is characterised by a smaller number of Operational Programmes in relation to the previous 2000–2006 period, leading to a more flexible management scheme: the country's strategic planning for the 2007 - 2013 period will be implemented through eight (8) Sectoral OPs, five (5) Regional OPs and twelve (12) European Territorial Cooperation OPs. Thus, during the 2007–2013 period, all accessibility infrastructure projects will be implemented through a single OP, while there will no longer be a distinct OP for the sectors of health and culture and the relevant actions will be carried out through Regional and Sectoral OPs.

## Other "developmental" operational programmes include:

**THE OPERATIONAL PROGRAMME "ROAD AXES, PORTS AND URBAN DEVELOPMENT"** (OP-RAPUD) of the General Secretariat for Public Works of (new) *Ministry of Infrastructure, Transport and Networks* is one of the 11 Sectorial Operational Programmes of the Third Community Support Framework (3d CSF) 2000-2006 (with an extention up to the end of 2009). It is a national programme implemented in the entire territory of the country.

**THE OPERATIONAL PROGRAMME 'RAILWAYS, AIRPORTS, PUBLIC TRANSPORT', (RAPT),** (short name in Greek: SAAS) one of the 11 sectoral and 13 regional programmes that make up the Third Community

Support Framework, comprises interventions in the sectors of rail, air and public transport as well as road safety.

**THE PROGRAMME OBJECTIVES INCLUDE:**

- the expansion and improvement of transport services provided in Greece
- the development of the country's international and domestic interconnections, in order to strengthen regional development and economic cohesion
- the improvement of urban public transport
- the upgrading of the interconnectivity of transport networks
- the enhancement of safety conditions
- the reduction of adverse impacts on the environment and the saving of energy

The Operational Programme 'RAPT', with a revised total budget of € 2,410 million for the period 2000-2008, is 53% financed by the European Regional Development Fund (ERDF) and apportioned among the various interventions as follows: railways € 1,500 million (62%), airports € 207 million (9%), public transport and road safety € 680 million (28%) and technical assistance € 22 million (1%). Supplementary to the above actions of the OP RAPT, the Cohesion Fund is co-financing (50%) a total of 8 railway projects on the Patras-Athens-Thessaloniki rail route, which fall under the Trans-European Transport Networks (TEN-T), with a total budget of € 1,310 million.

**CONTACT INFORMATION**

***Mr. George Giannopoulos***
*CERTH - National Center for Research and Development of Greece*
*ggian@certh.gr*
*www.hit.certh.gr*

# HUNGARY

(By Dr. László Ruppert, managing director, KTI Institute for Transport Sciences Nonprofit Ltd.) Update October 2009

## COUNTRY PRESENTATION AND ROAD TRANSPORT INFRASTRUCTURE

Hungary has a population of 10 million and covers an area of 93,000 sqkm. The largest city is Budapest with 1.7 million inhabitants and about 3.5 million with the suburban areas. Hungary is situated at the focus point of the Helsinki Corridors (IV., V., V/A., V/C., VII., X/A). The country has 7 942 km length of railway lines. The railway line-density of Hungary is 85.4 m/km$^2$ which is nearly two times higher than the EU15 average (46.6). The length of total public road network is 190 000 km, and that of national public road network is 31 370 km. The motorway network is increasing continuously. It was 267 km in the year 1990, 448 km in 2000, and it reached 911 km in 2009. The modal split in Hungary is much more railway- and public transport-oriented than the EU27, but based on the development of motorization, the road transport performances are increasing continuously.

Modal split of the freight transport for inland modes – 2007 tonne-km in %

| | Road | Rail | Inland waterways | Pipelines | Total |
|---|---|---|---|---|---|
| EU 27 | 72,7 | 17,1 | 5,3 | 4,9 | 100,0 |
| HU | **46,5** | **35,3** | **7,7** | **10,5** | **100,0** |

Source: Eurostat

Modal split of the passenger transport – 2007 passenger-km in %

| | Cars | Bus&Coach | Rail | Tram&Metro | Total |
|---|---|---|---|---|---|
| EU 27 | 82,2 | 9,4 | 6,9 | 1,5 | 100,0 |
| EU 15 | 83,1 | 8,6 | 7,0 | 1,3 | 100,0 |
| HU | **59,5** | **24,6** | **12,6** | **3,3** | **100,0** |

Source: Eurostat

Hungary has several huge capacity intermodal logistics centres and 51 airports, of which 7 have concrete runways.

## TRANSPORT INDUSTRIES

During the transition period between 1990 and 2000 the automotive industry was reconstructed. The Hungarian Ikarus bus manufacture was one of the largest in the world with 14 000 buses-coaches/year before the transition, nowadays it produces 300-600 buses/year. The truck manufactures declined dramatically as well. On the opposite side, Hungary has reached a good position in car industry as a builder (Suzuki), assembler (Audi), engine producer (GM, Audi) and spare parts producer for several large multinational companies. Hungary had long traditions on the railway sector, as engine and wagon producer. The companies were privatized in the 90's and they are under reconstruction led by their multinational owners.

## TRANSPORT POLICY

The new Hungarian Transport Policy was declared by the Parliament of the Hungarian Republic in 2004. The duration of transport policy is 2015 and the EU "White book – It's time to decide" was taken into consideration.

In relations with the EU Cohesion funds Hungary prepared a Unified Strategic Plan for Transport (2008-2020) – EKFS Egységes Közlekedésfejlesztési Stratégia. The Hungarian Operative Programme of the Transport (2007-2013) is based on the EKFS.

The construction of lacking infrastructure is a top priority of the transport policy. The strategic goals of the policy are to:

- improve the quality of life, preserve health, reduce regional differences, increase transport safety, and protect the natural and man-made environment;
- promote successful integration with the European Union;
- improve and broaden relations with neighbouring countries;
- assist with regional development;
- enable efficient operation and maintenance through regulated competition.

As roads are concerned, the priorities are to:

- Construct the freeway/expressway system according to the timetable set by Act CXXVIII of 2003, as part of Hungary's Europe Plan and in harmony with the National Plan for Regional Development.
- Complete freeway ring bypassing the capital, with a bridge over the Danube north of the city, and another one at Dunaújváros, in order to relieve stress on Budapest and improve regional connections. Build bridges on the Tisza River as required by the National Plan for Regional Development and the New Hungary Development Plan.
- Increase the length of trunk and regional roads having a load capacity of 115 kN/axle up to 7000 km by reinforcing them, in conformity with EU norms.
- Develop river ferry services to compensate for the inadequate number of bridges and improve access.

- Assist transport safety, environment friendly local transport, and tourism by developing the bicycle road network adopted in the National Plan for Regional Development, and supporting similar local activities, including the Regional Operative Programmes.
- Complete paving of all public local roads in built-up areas – one third of which are still unpaved at present – by 2012 in Budapest and major cities around the country, and by 2015 in all other settlements.

According to the new road policy, the road network will be standardized in the future for three types: trunk roads (motorways, expressways, main roads), regional roads and local roads.

## TRANSPORT RESEARCH AND INNOVATION SYSTEM

In Hungary the national innovation policy is directed by the National Research and Technology Office (Nemzeti Kutatási és Technológiai Hivatal – NKTH).

The NKTH is within the budget of the Ministry of Transport, Telecommunication and Energy (KHEM). The strategic decision about the aim of the national innovation and research policy of NKTH is made by the Council of Research and Technical Innovation (Kutatási és Technológiai Innovációs Tanács – KTIT). Members of the KTIT are the delegates from the Hungarian Academy of Science, several ministries and larger research associations.

The transport research is also directed by the Ministry of Transport, Telecommunication and Energy. There is one national research institute, Institute for Transport Sciences – KTI Közlekedéstudományi Intézet Nonprofit Kft. in Hungary, owned by the Ministry. The Hungarian State Railway has a Developing and Experimental Institute (MÁV FKI). There are several large transport planning organizations like Road and Railway Planning Company Ltd. – UVATERV, Capital City Planning Company Ltd. – FŐMTERV, that do forecasts, data collection, network planning, and modelling as well.

There are about 10-15-university faculties, which are involved in transport research, and about 40 small or medium size private domestic and international companies working in the fields of transport research.

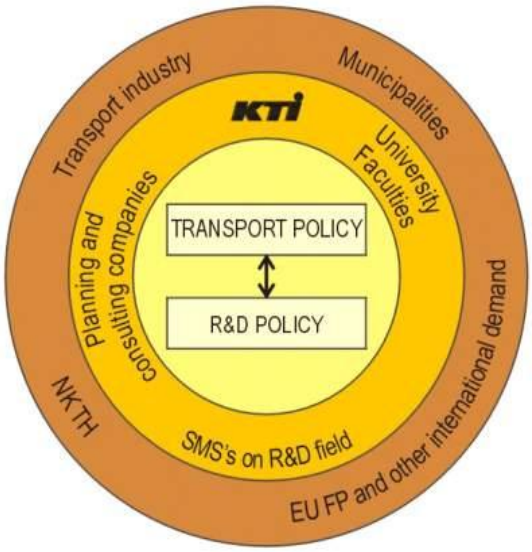
The percentage of general research funding of the GDP was 0,95 % in the year 2005 in Hungary. It means a total of 831 million € and the rate of the state budget within this amount was about 55 %. The rate of the **transport research** within the total research expenditure is 2,8 %.

## STRATEGY PROGRAMME OF THE HUNGARIAN TRANSPORT RESEARCH (2005-2015)

The Ministry of Transport, Telecommunication and Energy started to prepare a new transport research policy and programme in the year 2004. The programme is based on the EU White Book (COM(2001)370), the new Hungarian Transport Policy (19/2004.(III.26.)OGY hat.), the aim of the decree of the European Council of Lisbon (2000) and Barcelona (2002), taking into consideration the OECD/ECMT JTRC working programme and the ERTRAC vision until 2020.

The main pillars of the strategic research programme are:

- Transport Mobility
- Transport Economics
- Infrastructure
- Energy and Environment
- Traffic Safety and Security
- Intelligent Transport Systems




The programme contains the term of implementation of the efficient research work and the detailed research areas/topics. The figure on the left shows the general organization and structure of transport research and the institutions in Hungary.

As the strategy transport research programme hasn't been accepted yet there is no valid transport or road research programme in Hungary. Some research topics are requested by the state administration, some of them are made forthe domestic and international market or within international cooperation (EU-FP, COST, EUREKA, JTRC etc.).

## OTHER INFORMATIONS

The main transport research institute in Hungary is the state owned non profit KTI – Institute for Transport Sciences Nonprofit Ltd. The first predecessor of KTI was established in 1938.

## MAIN ACTIVITIES OF KTI

***Road matters, road management, bridges:*** development of road building and maintenance technologies, measurements and inspections, concrete and asphalt technologies, road and bridge management systems.

***Vehicle operation and maintenance:*** elaboration of the procedures for the operation of energy-saving vehicles, preparation of new tools for diagnostics and technical regulations, EU harmonisation.

***Environmental protection:*** efficiency analyses of environmental protection, alternative fuels, new procedures for the reduction of air and noise pollution, evaluation of environmental protection models.

***Transport safety, traffic engineering:*** development of transport projects, research into causes of accidents, preparation of the legal rules and regulations regarding transport safety.

***Network planning:*** traffic censuses and analyses, elaboration of alternative plans and prospective conceptions for the development of national, regional and municipal transport networks, development of methods for the improvement and evaluation of network.

***Transport by water and air:*** study of transportation performances, analysis and prognosis of port and airport traffic, foundation of strategies for the development of sub-sectors.

***Public transport, transport in cities:*** passenger transport censuses, mid- and long-term development plans, development of concession systems, urban public transport systems.

***Logistics-goods transportation:*** development of transportation and distribution networks, planning of national logistics centres, combined transport, city logistics, databases of goods traffic.

***Transport economics:*** the relationship between transport and society, modal split within transport, tariffing policy, regulation, market analyses, transport policy, strategies of different transport modes.

***Organisation of research:*** assistance and co-ordination of co-operation in domestic and international research, preparation of tenders.

With the support of the National Office for Research and Development (NKTH) KTI is operating the ERTRAC-Hungary National Technology Platform of Road Transport Research, which reaches all participants of road transport: the service providers, infrastructure, energy and environment, economy, safety and protection, and the vehicles themselves (www.ertarc.hu).

## INTERNATIONAL RELATIONS

KTI has developed a wide range of international relations, and is member of the European Conference of Transport Research Institutes (ECTRI), the Forum of European National Highway Research Laboratories (FEHRL) and the forum of European Road Safety Research Institutes (FERSI).

Our researchers participate as national experts in various bodies, including the European Conference of Ministers of Transport (ECMT), the Technical Commission of the European Commission, the UN ECE WP.1, WP.5, WP.29 working groups, and the European Road Transport Research Advisory Council (ERTRAC).

KTI is an active member – as a national expert delegate – of the Bureau and the Plenary Meeting of the Joint OECD/ECMT Transport Research Centre.

The institute operates the Hungarian transport office on EU research, carries out the co-ordination of the realisation of the intelligent transport passenger information system (RDS-TMC) in Central and Eastern Europe, and runs the Technical Co-ordination Centre for EU & UN-ECE Activities on Road Vehicles. The institute is a member of the World Road Association (AIPCR-PIARC), as a member provides data for the international Transport Research Documentation (ITRD), and is a member of the International Road Traffic and Accident Database (IRTAD) of the OECD countries.

The institute has carried out numerous international tasks commissioned by various companies, and has realised many successful projects under the COST, EUREKA, EU framework. KTI took and also takes part in significant projects within the sphere of the EU IV-VII framework programmes.

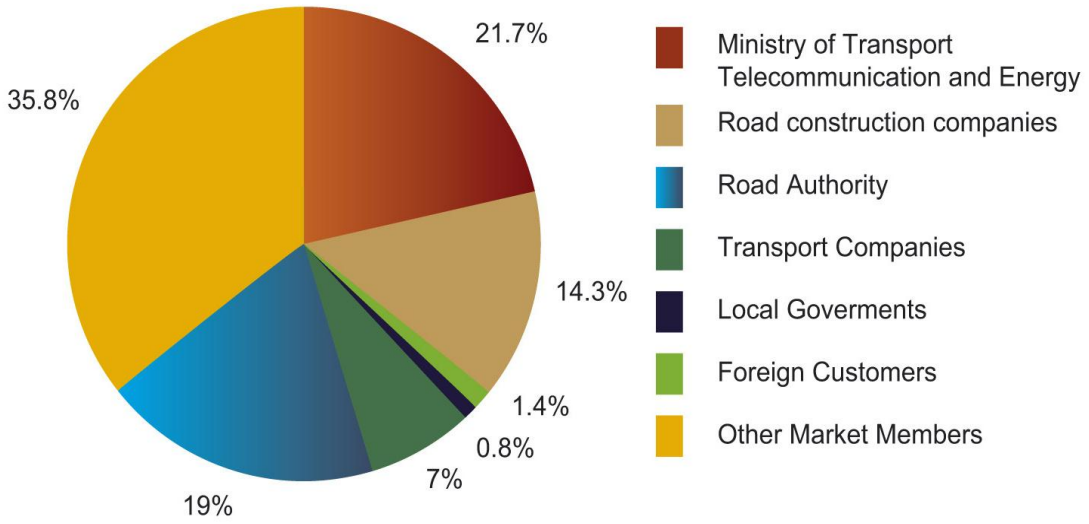
## RESOURCES

KTI has at its disposal an experienced and highly trained team of researchers, with a 170 full-time staff.

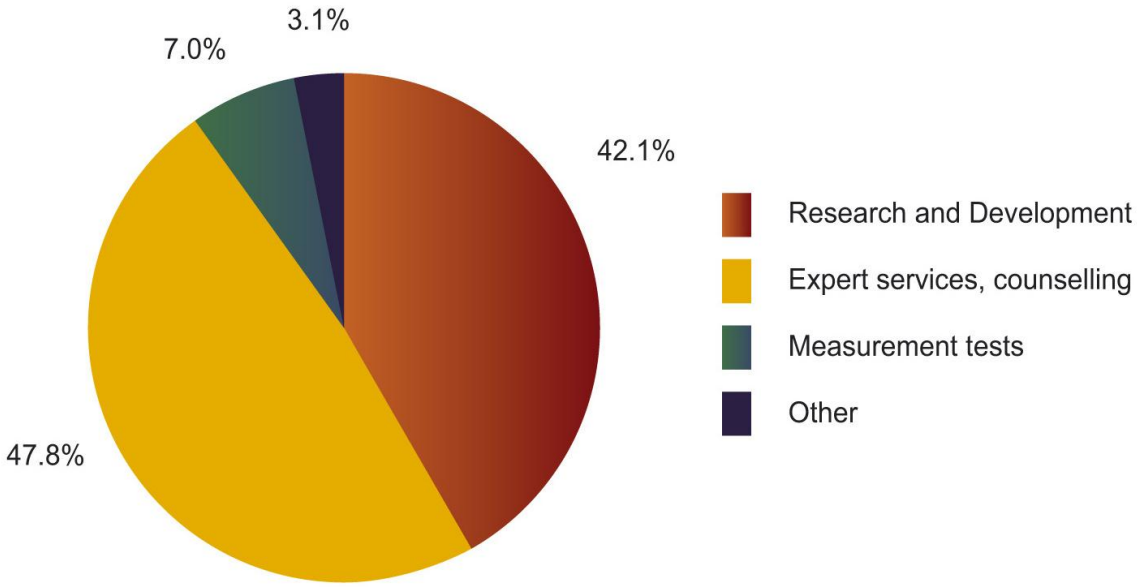
The institute is qualified to provide scientific training in the fields of transport science and transport construction. KTI satisfies the demands of a wide range of local and foreign commissioners and suppliers with its scientific and professional activities. The average annual net turnover amounts to 3 billion Hungarian forints.

The KTI's specialised national public library offers to the professionals some 60 000 books in the transportation field in Hungarian and in foreign languages, as well as a huge number of professional documents and journals on both the theories and practicalities of transport.

KTI has six accredited laboratories and since 1999 has continuously renewed its ISO 9001 quality and ISO 14001 environmental control systems.



***Revenue from basic activity by main customers in 2008***




**CONTACT INFORMATION**

*KTI - Marketing and Tendering Bureau*
*Than K. u. 3-5*
*Budapest, 1119 – Hungary*
*Tel: 371-5992*
*Fax: 371-5993*
*E-mail: garda.zsolt@kti.hu*

# ICELAND

(by Hreinn Haraldsson, Director, Development Division, Icelandic Road Administration, Reykjavík, update October 2009)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Iceland has a population of around 0,3 million people (2006) and the size of 103.000 sq km. Iceland is the largest island in Europe and only has an average population density of around 3 people per sq km, which is far the least in Europe.

The population is spread out quite unevenly. The Reykjavík capital area has around 195.000 inhabitants. Iceland´s residence in a whole is to a large degree concentrated along the lowland near the shore which is characterized by numerous fjords, while the interior is mainly inhabitable mountainous highland. Open plains are primarily found in the south. Almost 10% of Iceland´s surface is covered by glaciers. Lava fields cover large areas in some regions, and a volcanic eruption occurs on average every 5 years.

The northern and the western parts of Iceland are characterized by mountains and lakes. To the south and east, there are central lowlands and south of them fertile areas of forests and plains. Iceland has a coastline of 4.970 km; sand and gravel plains in the south but mainly rocky in other areas.

Iceland has no railway system. The total road network is 13.000 km long, whereof paved roads account for 4.900 km, and gravel roads for 8.100 km. Iceland has 70 airports of different sizes, but 3/4 of them are small airports with runways less than 1.000 m, often with gravel surface. The main international airport is in Keflavík, around 40 km from Reykjavík, where the domestic airport is located.

## TRANSPORT INDUSTRIES

Taking into account that fisheries have for long been the main industry, that Iceland is an island in the middle of the Atlantic Ocean, and that it is a highly developed society greatly dependant on import, the maritime sector is very significant. As railways do not exist, the freight transport industry is to-day mainly concentrated on the road network and the domestic maritime freight transport has now almost gone out of practice.

## TRANSPORT POLICY RELATED GENERAL GOALS

The Parliament of Iceland agreed upon a new transport plan in the year 2002, covering the period 2003-2014. The total budget amounts to around 3 billion Euros or 250 million per year. The transport policy is seen as an important step to achieve important societal goals, and an effective transport as one of the fundamental prerequisite for a strong economy and dynamic national life. The fast growth in transports also results in negative effect on the quality of life and the environment and undermines the benefits of good transport, if nothing is done to counter it.

It is stated that one of the most important tasks in the new millennium is to counteract the negative effects of transports so that they fall within the limits of sustainable development without losing the benefits of good transport. This task calls for global solidarity and the technological part of the world is showing increased understanding for it. This is taken into account in the transport policy.

The Icelandic national transport policy stresses four principal objectives:

- Objectives for mobility in the transport system.
- Objectives for cost-effective operations and transport development.
- Environmental objectives for a sustainable transport system.
- Objectives for a safe transport system.

Construction and paving will still be the main task within the road sector during the next decades, as only 35% of the total road network has asphalt pavement. However, about 95% of the total traffic in Iceland is on paved roads. By formulating the policy in the field of transport presented in the national transport plan, and with the financial resources intended to implement the policy, it should be possible to attain good milestones en route to the principal objectives of the transport policy. This has to do with mobility and efficiency in operations and the development of transport and also in respect of environmental objectives for a sustainable and safe transport system.

## TRANSPORT RESEARCH ORGANISATION

The principal authorities in the field of transport research in Iceland are the Ministry of Transport and Communication, the Icelandic Road Administration, the Civil Aviation Administration and the Icelandic Maritime Administration. Consultative bodies include the Icelandic Research Council, the University of Iceland, the Innovation Center Iceland and the Public Works department of the Municipality of Reykjavik. No private transport research institute exists, but many transport specialists are found within private consultant firms. These mainly take part in research through contracts with the transport authorities.

## MAPPING OF THE COUNTRY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM

No transport research institute exists in the Iceland. Instead, the authorities have established R&D departments within their organisations as described below.

It is difficult to estimate the number of researchers as many are involved in transport research on a part time basis, but on an annual basis the number of 30-35 is estimated. They are divided between sectors in similar proportions as indicated for the financial resources.

The transport research in Iceland has been characterised by a “bottom up” structure and the initiatives come often from employees of agencies and institutes and even the users of the transport systems. The initiatives of co-operation and larger programmes come from the transport authorities and will be empahsised more in the future. The transport research community is very small, and information is mostly spread by personal communication and in smaller meetings and seminars. The main advantage from the descriptions above is perhaps that the very small transport research environment gives a good overview of all possibilities and activities, which makes all communication easy and the decision making quick and effective. The same is valid for most activities of the Icelandic society and that differs a lot from larger societies. The fact that few researchers are experts in the transport field and financial resources are limited, makes it difficult to carry out and take part in many projects, especially internationally. Instead, the emphasis is on dissemination of results of projects carried out by other nations and import of knowledge of special interest, but also to keep an eye on the possibilities to participate in international projects, and Icelandic transport researchers are encouraged to work with international research groups which are working on projects benifical for Icelandic conditions.

Total resources are of the order of EUR 2 million per year with almost all from public resources. As stated in the Road Act, 1,5% of ICERA's earmarked sources of income goes directly into research and development. The distribution between field of research and the main research demanders is as follows:

- Roads - Icelandic Road Administration 65%
- Aviation - Civil Aviation Administration 15%
- Sea - Maritime Administration 10%
- General - Ministry of Transport & Research Council 5%
- EU 5%

Some 75% goes to research laboratories and individual research, about 20% to the University and 5% to industry. It is estimated that about 60% of the money is provided as projects, 30% as programmes and 10% as grants. Research funds are provided for both short-term tasks and long-term programmes.

Medium and long-term research programmes and projects are commonly defined jointly by different organisations. Priorities are directed towards the long term goals that have been put forward by the

Government, the Ministry of Transport and Communications, and the transport agencies. Emphasis has been put on the following areas:

- Intermodal / Multimodal transport
- Strategic research
- Maritime transport
- Transport in sparsely populated areas
- Traffic in cold climates
- Air traffic management.

The research focus in Iceland is somewhat different from other countries one would usually compare with, but the priorities are in general agreement with the European priorities. Iceland´s harsh climate, natural hazards such as volcanic eruptions, floods and avalanches, as well as the fact that the road system in many regions is still not highly developed, have influenced the research tasks selected. Being a sparsely populated island, Iceland´s priorities are less directed towards inter-state networks, congestion, urban traffic and large-scale environmental problems. There is, however, an interest in increasing European co-operation throughout the transport sector.

# PROGRAMMES FROM THE LAST 5 YEARS

## ICERA´s Research and development programme

**DURATION:** Ongoing (present programme 2005 – 2010).

### BACKGROUND

The Icelandic Road Administration is the central administrative agency commissioned with the overall responsibility (sectorial responsibility) for the entire road transportation system. Within the framework of its sectoral responsibility, the Road Administration is to assume a leading role in promoting and supporting the work of the other players involved in the road sector, including the research and development activities.

### OBJECTIVES

The overall aims and objectives of the road research programme are to take active part in the administration's approach to certain prioritised areas in policy documents. At present these areas are mobility in the transport system, cost-effective operations and transport development, environmental objectives for sustainable transport system and safe transport system.

### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

ICERA´s Development Division is responsible for presenting and implementing a road research policy, based on the general policy of the agency and the ministry. The research policy documents are approved by the Board of Directors and each year´s project funding is approved by the Director-General.

Dissemination of knowledge from the programme is through a number of lectures, seminars and conferences held throughout the programme. There is a report on each of the projects, that are published on ICERA´s homepage.

**PROGRAMME STAKEHOLDER:** The Icelandic Road Administration (Vegagerðin)

**TOTAL NUMBER OF PROJECTS:** Around 100 (each year)

**PROJECTS COVERED:**

- Infrastructure (innovation, durability, pavements, aggregates)
- Traffic and Transport research - Road safety
- Environmental research
- Society and Transport

**LEADING INSTITUTION:** The Icelandic Road Administration - Public institution

**TYPE OF FUNDING:** Public (national)

**PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS:**
The Icelandic Road Administration's research and development programme has a budget of approximately ISK 110 million (approx. EUR 1,2 million) per year, mainly earmarked resources.

**CONTACT INFORMATION**

***Thorir Ingason***
*Borgartún 7*
*IS-105 Reykjavik, Iceland*
*Email: thi@vegagerdin.is*
*Tel: +354 522 1000*
*Fax: +354 522 1009*
*Programme website: http://www.vegagerdin.is/um-vegagerdina/rannsoknir-og-throun/*

# IRELAND

(Overview provided by Albert Daly, National Roads Authority, 2009)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Ireland, the third largest island in Europe (after Great Britain and Iceland), lies to the northwest of continental Europe and is surrounded by hundreds of islands and islets. To the east of Ireland, separated by the Irish Sea, is the island of Great Britain. Politically, the island of Ireland is divided into the Republic of Ireland (also known as *Ireland*) covering five sixths of the island, and Northern Ireland, part of the United Kingdom, covering the remaining part. According to the Irish constitution (adopted in 1937), the official name of the country is *Eire*, or Ireland in the English language.

The population of the island is slightly over six million (2007), with 4.34 million in the Republic of Ireland and 1.75 million in Northern Ireland. This is a significant increase from a modern historical low in the 1960s, but still much lower than the peak population of over 8 million in the early 19th century, prior to the Great Famine. The land area of the Republic of Ireland is 70,273 $km^2$ (27,133 square miles) giving a population density 62 per $km^2$ (compared to the UK's 243 per $km^2$).

The island of Ireland consists of a ring of coastal mountains surrounding low central plains. The highest peak is Carrauntoohil in Co Kerry, which is 1,038 m (3,406 ft). The River Shannon, at 386 km (240 miles) is the longest river in Ireland. The island's lush vegetation is a result of its mild temperate climate modified by the North Atlantic Current and the frequent but soft rainfall. The island's area is 84,412 $km^2$ (32,591 square miles). Ireland's least arable land lies in the south-western and western counties. These areas are largely mountainous and rocky, with dramatic green vistas which has resulted in the nickname the "Emerald" Isle.

The five largest cities in Ireland are situated around the coast with populations (including surrounding urban areas) as follows:

- East coast: Greater Dublin: 1,661,000
- South coast: Greater Cork: 380,000
- Mid-west coast: Limerick: 91,000
- West coast: Galway: 73,000
- South-east coast: Waterford: 49,000

The two biggest cities in Northern Ireland (2001 census) are:

- North coast: Derry: 91,000
- North-east coast: Belfast: 580,000

Summer temperatures exceed 30°C (86°F) usually once every decade, though commonly reach 29°C (84°F) most summers, and freezes occur only occasionally in winter, with temperatures below -6 °C (21 °F) being uncommon. Precipitation is very common, with some parts of the country getting up to 275 days with rain annually.

Ireland is among the richest, most developed and peaceful countries of the world. It has a modern, trade-dependent economy. Ireland is a member of the EU and joined the EURO currency zone in January 2002 in along with 11 other countries. It is also a member of the OECD and the UN. The nation's policy of neutrality means it is not a member of NATO. Ireland's population is the fastest growing in Europe, with an annual growth rate of 2.5%.

Agriculture was once the most important sector but this is now dwarfed by industry and services. GDP growth averaged 6% in the period 1995-2007 fuelled largely by construction along with strong consumer spending and business investment. However, economic activity dropped sharply in 2008 and Ireland entered into a recession for the first time in more than a decade with the onset of the world financial crisis and subsequent severe slowdown in the property and construction markets. In spite of this, Ireland still had the 11th highest Gross Domestic Product per capita in the world in 2008.

The export sector remains a key component of the Irish economy. Industry includes steel, lead, zinc, silver, aluminium, barite, and gypsum mining processing; food products, brewing, textiles, clothing; chemicals, pharmaceuticals; machinery, rail transportation equipment; glass and crystal; software and tourism.

## TRANSPORT INFRASTRUCTURE

In Ireland, the road network is the main form of transport, accounting for 89% of freight and 96% of passenger transport. The National Road Network consists of (as of end 2008):

- National Primary 2,747km
- National Secondary 2,687km
- TOTAL 5,434km

The 5,434km of National roads includes 424km of motorway and 362km of dual carriageway. In addition, there are approximately 90,000kms of regional roads.

The national network carries 46% of Irish traffic.

The total number of bridges in Ireland is about 20,000: this includes 2,345 on the National Road system. Of this total, some 16,000 are arch bridges.

Ireland has 1,947km of standard gauge (1.6m) railway of which 37km is electrified and 485km is double track (1998 figures). It has 753km of inland waterways used exclusively by pleasure craft.

There are 36 airports in the island of Ireland of which 16 have paved runways. The main airports are Dublin, Shannon, Cork and Belfast. The longest runway in Dublin Airport is 2,637m: there are plans to construct a new runway with a length of 3,660m.

Ireland country depends to a large extent on sea trade, with 99% of external trade passing through a number of well-developed seaports, the largest of which are Dublin, Cork and Shannon Foynes.

## TRANSPORT INDUSTRIES

The main industries in Ireland relate to mining, food processing clothing, pharmaceuticals, IT services and tourism. Until recently there was a very active construction industry but this has slowed dramatically as the country entered recession. All of these industries rely on road transport. There are about 5,000 licensed haulage companies in the country.

Ireland has very well-developed road, rail, shipping and aviation systems. There are over 160 companies involved in the aerospace industry in Ireland encompassing mainly maintenance, repair and overhaul. There is no significant automotive or aeronautic sector.

Transport policy related general goals

Department of Transport

The Department of Transport is responsible for implementing an integrated transport policy for the country. The mission of the Department is to deliver a quality transport system, which underpins our sustainable development. The Programme for Government commits the Department to:

- Reducing travelling times
- Improving safety
- Delivering real commuting choices to people
- Reducing congestion
- Protecting the environment.

## NATIONAL ROADS AUTHORITY

The National Roads Authority (NRA) is a non-commercial semi-state agency with overall responsibility for the development and maintenance of the National Road network in Ireland. It was formally established as an independent statutory body under the Roads Act, 1993. The Authority's primary function is “to secure the provision of a safe and efficient network of national roads”. For this purpose, it has overall responsibility for planning and supervision of construction and maintenance works on these roads. The Irish National Road network consists of 5,434km of roads and 2,345 bridges. The current National Development Plan provides for the completion of an additional 850km of new road by 2010.

The total length of the Irish road network (including county roads) is approximately 95,000km, containing about 20,000 bridges. The non-national roads were, until recently, managed by the

numerous Local Authorities across the country. In September 2009, the remit of the NRA was extended to cover the management of regional and local roads. Organisational details for this new responsibility are currently being formalised.

In 2007 the NRA began developing a formal research strategy to provide a framework for taking forward its research activities. Its broad policy themes aimed at better efficiency, sustainability and safety are:

- Materials
- Standards and specifications
- Environment/sustainable construction
- Safety
- Value for money
- Transportation and land use
- Heritage

Research covers the general areas of expertise of the NRA including planning, construction, maintenance and operations, and is targeted on short-term goals driven by current business plan targets, but includes an element of longer term fundamental research. A list of current projects and their value is published on the NRA website www.nra.ie.

## ROAD SAFETY AUTHORITY

The Road Safety Authority (RSA) was established in September 2006 and is tasked with improving safety on Irish roads in order to reduce death and injury resulting from road collisions. One objective of the RSA is to bring Ireland's road safety record into line with best practice countries throughout the World. The achievement of this objective will involve cooperation with many stakeholders working in the area of road safety, including the Gardai, education sector, health sector, local authorities, the National Roads Authority, the media and of course the general public. The RSA website is www.rsa.ie.

### Iarnrod Eireann (Irish Rail)

Iarnrod Eireann, or Irish Rail, the national rail operator of Ireland, is a statutory body wholly owned by the Government of Ireland and reporting to the Minister for Transport. It is a subsidiary of Córas Iompair Éireann (CIE), itself a statutory corporation responsible for most public transport in Ireland. The principal activities of Iarnród Éireann are the provision of intercity and commuter rail passenger services, freight services and the management of Rosslare Europort. In 2007, the company carried 45.5 million passengers, an increase from 43.1 million in 2006. See website www.irishrail.ie for more details.

### National Development Plan

The National Development Plan 2007-2013 entitled *Transforming Ireland – A better quality of life for all*, sets out the roadmap to Ireland's future. The €184 billion Plan represents a major milestone in

building a prosperous Ireland for all the people, characterised by sustainable economic growth, greater social inclusion and balanced regional development. The Plan is the largest and most ambitious investment programme ever proposed for Ireland. It builds on, and consolidates, the achievements of the previous Plan (2000-2006) and provides €54.6 billion for investment in economic infrastructure; €49.6 billion for social inclusion measures (children, people with disabilities, etc); €33.6 billion for social infrastructure (housing, health, justice, etc.); €25.8 billion for human capital (schools, training, higher education, etc.), and €20 billion for enterprise, science and innovation. Full details of the NDP 2007-2013 are available on webite www.ndp.ie.

### TRANSPORT 21

Transport 21 is a capital investment framework developed from the National Development Plan through which the transport system in Ireland is being developed over the period 2006 to 2015. This framework addresses the twin challenges of past investment backlogs and continuing growth in transport demand. The projects and programmes that make up Transport 21 aim to:

- increase accessibility – making it easier for everybody to get to and from work, school, college, shopping and business.
- ensure sustainability – recognising that a modern transport system must be sustainable from an economic and environmental perspective.
- expand capacity – addressing existing deficiencies and providing for future growth.
- increase use - managing the transport network and seeking to increase the use of public transport
- enhance quality – improving safety, accessibility, integration, reliability, speed and comfort.

Transport 21 outlines a €34.4 billion national transport investment programme to be implemented over the 10-year period 2006-15. This programme is intended to be an integrated solution to Ireland's current and evolving road and public transport needs. Transport 21 was itself devised from the National Spatial Strategy (GoI 2002) and successive National Development Plans.

Full details of Transport 21 are available on the webite www.transport21.ie.

## MAPPING OF THE COUNTRY SPECIFIC RESEARCH FUNDING SYSTEM

Source: TRKC: http://www.transport-research.info)

In Ireland, the major public funding source for research into transport is provided by the National Development Plan (NDP), which aims to lay the foundation for Ireland's further economic and social development. The planned improvements to the national road network and public transport services are key investment areas for the NDP.

Ireland's peripheral island location makes it all the more important for it to have high quality internal and international transport arrangements.

The overarching priorities in the transport sector are to improve the inter-urban road network and public transport services, as part of an integrated approach to meeting transport needs.

There is no national programme that purely addresses transport-related topics. Various governmental ministries and agencies run NDP-funded transport research projects and programmes in line with their policies and agendas. As is most evident in the case of the aeronautics industry in Ireland, much of Ireland's research is carried out as part of European consortia under EC framework programmes.

The main university research provider is the Centre for Transportation Research and Innovation for People (TRIP) at Trinity College Dublin.

## PROGRAMMES

The Transport Research Knowledge Centre (TRKC: see website http://www.transport-research.info) lists the following research programmes:

- RSRP - Road Safety Research Programme (1998-2005)
- PRTLI - Programme for Research in Third Level Institutions (1999-2006)
- PTRP - Pilot Transport Research Programme (2002-2006)
- PFC - Platform for Change Transportation Strategy (2000-2016)
- ERTDI - Environmental Research Technological Development and Innovation Programme (2000-2006)
- NDP 2002-2006 - The National Development Plan 2002-2006
- TRIP - Centre for Transportation Research and Innovation (2002-2007)
- North South Programme for Collaborative Research (2002-2005)
- NRA Research Fellowship Programme (ongoing)

Details of these programmes can be found on the TRKC website.

In addition to these programmes, various other research initiatives are being undertaken by various government agencies:

NRA Research Programme: various projects relating to NRA strategic goals including the following ERA NET ROAD Joint Research Programmes (jointly funded by NRA):

- Road owners getting to grips with Climate Change
- Safety at the heart of road design
- Effective asset management meeting future challenges
- RSA Research Programme: various projects and initiatives relating to road safety

# NORWAY

(Source: ERA-NET TRANSPORT, Overview of research programming and cooperation mechanism, Jan 2005, updated by Jon Krokeborg, Research coordinator, Norwegian Public Roads Administration, Department of Technology, on behalf of Mrs. Marit Brandtsegg, Nov. 2009)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Norway has a population of around 4.7 million people unequally distributed over 324,220 sq. km, giving an average population density of around 14 people per sq. km. The population is concentrated around a limited number of cities with Oslo as by far the largest (580,000 inhabitants). Other large cities are Bergen (240,000), Trondheim (160,000) and Stavanger (115,000).

The landscape of Norway is characterised by its great variety. A large part of the country consists of high mountains broken by valleys. Open plains are primarily found in the south. There is a very long coastline totalling 25,148 km, deeply indented by fjords and surrounded by high mountain cliffs, making it one of the most rugged coastlines in the world. Paved roads account for approx 75,000 km, however, 18,000 km of unpaved roads form a fairly large part of the road network. Norway has 66 airports with paved runways, almost half of them being small airports with runways less than 1,000 metres. The main airports are in Oslo, Bergen, Trondheim and Stavanger. The total length of the railway network is 4 114 km.

## TRANSPORT INDUSTRIES

Due to Norway's position at the north of Europe and its long coastline, the maritime sector is very influential. The large oil industry also has an influence on the areas of transport research undertaken. Norway has no significant automotive or railway industry.

Transport Policy-related General Goals

In spring 2009 the Government of Norway presented the National Transport plan 2010-2019. Around 37 billion Euros (3,7 billion Euros per annum) will be spent from the national budget on investment in transport infrastructure - infrastructure development and infrastructure maintenance. In addition, sizeable grants (amount not specified) originating from road pricing and charges related to coastal sea traffic, are allocated for transport infrastructure investments.

The main goals of transport policy are:

- To improve standards in the infrastructure
- To reduce the number of fatalities and serious injuries in road accidents.
- To develop a public transport system that is suitable for all users
- To improve accessibility and reliability

- To reduce climate and environmental impact
- To reduce the risk of ice and rock slides on large part of the road and rail network
- To improve safety and navigability for shipping in Norwegian waters
- To improve efficiency in ports

The key words in relation to transport research in Norwegian transport policy are:

- Strong emphasis on safety and security
- Strong emphasis on intermodality and ITS applications
- Rail transport enhancement
- Improving decision-making tools for transport policy.

## TRANSPORT RESEARCH AND INNOVATION SYSTEM

The main players in transport research policy in Norway are the Ministry of Transport and Communications, the Norwegian Public Roads Administration, the Ministry of Trade and Industry, the Ministry of Fisheries and the Norwegian Research Council. In relation to the general transport policy goals, the departmental role is very important in Norway. Each department of public administration takes responsibility for organizing and funding research. In the area of international cooperation the role is shared. The overall responsibility for policy for international research cooperation lies with the Ministry of Education and Research, while several departments of the above-mentioned ministries are in charge of the practical application of international policy cooperation. Since 1 January 2004, the responsibility for the coordination of Norwegian participation in the EU framework programme has lain directly with the Ministry of Education and Research. However, the Research Council of Norway is also responsible for promoting participation in the EU framework programmes.

## MAPPING OF THE COUNTRY SPECIFIC RESEARCH FUNDING SYSTEM

There are five major public bodies involved in transport research funding in Norway. These are the Ministry of Transport and Communications, the Norwegian Public Roads Administration, the Ministry of Trade and Industry, the Ministry of Fisheries and the Research Council of Norway. The Ministry of Education and Research has the overall responsibility for financing higher education and research at universities and regional university colleges. The Norwegian Public Roads Administration has a particular responsibility for skills upgrading and recruiting sufficient ability in the area of road network development.

The Research Council of Norway is the largest research funding organization in Norway and administrates approximately two thirds of transport research funding. Funding budgets from the ministries are largely transferred to the Research Council and earmarked for transport research. The rationale behind that is twofold: transport research often loses out in competition with other research areas, as the Ministries are still in charge of specifying programme objectives and selecting research topics. Research programmes managed by the Ministries and the Norwegian Public Roads Administration can be characterized as sectoral programmes for specific purposes, whereas the

transport research programmes administered by the Research Council of Norway are larger and much broader in scope.

# PROGRAMMES

## Intelligent Freight Transport (SMARTRANS)

**DURATION**: 2007-2013

### BACKGROUND

The SMARTRANS programme was established in response to the Ministry of Transport and Communications' strategy for telecommunications and transport research and in accordance with the objective set out in the National Transport Plan to promote a safe, efficient and environmentally sustainable transport system.

### OBJECTIVES

The primary objective of this programme is to:

- Support the development of more efficient and sustainable transport solutions

The programme's secondary objectives are to:

- Reduce distance and time costs.
- Increase the use of sea and rail transport and multimodal transport.
- Encourage the use of smarter transport solutions that promote safe, environment-friendly and efficient transport. Project activities under the programme should seek to:
- Significantly expand the knowledge base on goods transportation,
- Increase awareness of alternative transport modes
- Draw attention to environmental impacts and place priority on solutions that offer both improved efficiency and environmental gains.

Research conducted under the programme should be relevant to the target groups (transport providers, transport users, authorities, research and educational institutions) and should generate verifiable results.

### PROGRAMME ORGANISATION

One of several research and innovation programmes in Innovation division of the Research Council of Norway. The programme is run by a programme manager and a small administrative staff taking care of operational aspects. The programme board (programme committee), consisting of 7 external members from the transport industry and academia, is responsible for the programme strategy and the allocation of funding to projects.

### TRANSPORT POLICY CONTEXT

See background above: Ministry of Transport and Communications' strategy for telecommunications and transport research and in accordance with the objective set out in the National Transport Plan

### PROGRAMME STAKEHOLDERS

Ministries (funding):

- Ministry of Transport and Communications
- Ministry of Fisheries and Coastal Affairs
- Ministry of Trade and Industry

### ELIGIBLE FUNDING STAKEHOLDERS:

Businesses, trade and industry, public institutions and organisations that provide transport products and/or services, have responsibility for transport-related infrastructure, are users of transport products and/or services, or have expertise in areas relevant to the programme.

### TOTAL NUMBER OF PROJECTS: 29

### ONGOING PROJECTS: 21

### COMPLETED PROJECTS: 8

### LEADING INSTITUTION:

Research Council of Norway

### TYPE OF FUNDING

Normally 35% of a project total cost for projects headed by an industrial partner (User-driven innovation projects)

Up to 80% of a project total cost for projects headed by an academic partner (Knowledge-building project with user involvement)

### PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS

Programme budget: approx. 3 mill Euro per year (public money). 1-2 calls per year.

### CONTACT INFORMATION

***Mr Øystein Strandli***
*Research Council of Norway*
*P.O.Box 2700 St.Hanshaugen*
*0131 Oslo, Norway*
*E-mail: ost@rcn.no*
*Tel: +47 90051144*
*Programme website: www.forskningsradet.no/SMARTRANS*

## RISIT - Risk and safety in transport

(Risiko og sikkerhet i transportsektoren)

**DURATION:** 2002 - 2009

**BACKGROUND**

Based on the fact that travel and transport represent high risks and that society is faced with major changes with respect to reducing such risks, the Ministry of Transport and Communications wanted further research to focus on transport risk, primarily in the form of an applied research programme under the auspices of the Research Council of Norway.

**OBJECTIVES**

The main objective of the 'Risk and safety in transport' programme is to provide the population, business, organisations and the authorities with a better understanding of transport risk, increasing knowledge regarding risk perception and evaluation and creating the best possible knowledge base for good risk-management within the transport sector.

The main academic objective is related to the intended application of the knowledge, which the programme will produce. The idea is that the value of such knowledge depends to a significant extent on how it can be applied. It is natural to assume that the interests of business, organisations and regulatory authorities are related to opportunities for more successful risk-management.

The programme has three sub-objectives which further develop the main objective. Firstly, the programme should contribute to making visions and ideals for transport safety more operational, as well as obtaining increased insight into ethical, economic, political and other types of normative foundations of transport safety policy.

Secondly, the programme is intended to improve knowledge and understanding of transport risks. This objective also includes studying risks in transport in a social perspective, by which transport risk is seen in relation to other forms of risk.

The third objective is to develop a better understanding of the implications of different ways of organising risk management, specifically how the responsibility for safety is formulated and shared.

Programme organisation and transport policy context

One of the programme's most important policy instruments is direct support for projects. The majority of projects should be longer than one year in length and involve a number of co-workers. It is desirable that both established and newly qualified researchers participate in the same project, and that there is room for both post-doctoral and doctoral students and network co-operation within the projects.

The research field consists of contributions from several research traditions within social sciences, the humanities and technology. Many of the problems will be of a cross-disciplinary or multi-disciplinary nature. The programme should present a new, broader approach to research within transport safety and risk, where perspectives from the humanities are also included. On the basis of

this, the programme committee will encourage co-operation between the established research institutions in the field and new institutions which may bring new impetus to research.

Projects may well take a critical perspective, but it is desirable that research projects examine opportunities as well as limitations, and consider developments in transport safety within an international, comparative perspective.

High scientific standards are required for the projects and it is assumed that the results will be of sufficient quality to be published in high level international scientific journals.

The main research topics have been defined: 'Visions for transport safety', Understanding transport risk and putting it into a social perspective' and 'Organising risk management'.

**PROGRAMME STAKEHOLDERS**

The stakeholders of the programme are the Research Council of Norway, the Ministry of Transport and Communications, the Norwegian Directorate of Public roads, the Ministry of Trade and Industry and the Norwegian Maritime Directorate, the Railways Authority, the Ministry of Fisheries and the Costal Authority, the Directorate for Civil Protection and Emergency Planning and the Aviation Authority.

**TOTAL NUMBER OF PROJECTS:** 17

**ONGOING PROJECTS:** 4

**COMPLETED PROJECTS:** 11

**PREDICTED PROJECTS:** 0

**PROJECTS COVERED**

- Human error, information processing, barriers and accident risk in transport (TOI)
- Security effects and systems for driver support (SINTEF)
- Risk judgement, risk tolerance and demand for risk mitigation in transport (NTNU)
- Disasters in transport: frequency of occurrence and prospects for learning and prevention (TOI)
- Foundations of normative approaches to transport safety policy: a comparative analysis (TOI)
- Responsibility and safety consequences of accidents (SINTEF)
- Deregulation and transport safety within road, rail, air and sea (SINTEF)
- Safety culture in the transport field: descriptions, comparisons, changes (The arts and science research foundation in Trondheim and NTNU)
- Risk analysis, risk acceptance and risk management (University of Stavanger)
- Safety, security and efficiency: The limits of personal privacy (TOI)
- Risk levels and the role of actors in transportation of dangerous goods (SINTEF)
- ”Every little bit helps?” Risk challenges and parallel change processes within the Norwegian transportation sector. (University of Stavanger)
- Perception of safety and security for different travel modes, choice of travel mode and behaviour during the journey (TOI)

- Perceptions of risks in transportation viewed in a dynamic societal perspective (The arts and science research foundation in Trondheim and NTNU)
- Risk levels and actors relating to transport of dangerous goods (University of Stavanger)
- Drugs and accidents in the transport sector (National institute of public health)
- Survey of risk perception among the public (TOI)

**LEADING INSTITUTION**

The Research Council of Norway - Research agency

**TYPE OF FUNDING:** Public (national)

**PROGRAMME FUNDING ARRANGEMENTS AND FUNDING CONDITIONS**

The programme will be financed by the Ministry of Transport and Communications, the Norwegian Directorate of Public roads, the Ministry of Trade and Industry, the Railways Authority, the Ministry of Fisheries and the Aviation Authority with a total budget of approximately NOK 70 million (EUR 9 million) over the years from 2002 till 2009.

**CONTACT INFORMATION**

***Mrs Synnøve M Konglevoll***
*The Research Council of Norway*
*Norges forskningsråd Postboks 2700 St. Hanshaugen*
*N-0131 Oslo, Norway*
*Email: smak@forskningsradet.no*
*Tel: +47 22 03 74 16*
*Fax: +47 22 03 74 09*
*Programme website: www.forskningsradet.no/risit/*

## TRANSNOVA

**DURATION:** 2009 - 2011

**BACKGROUND**

The intention of Transnova is to give financial benefit to good environmental projects which will speed up the increased use of alternative fuels such as second generation bio fuel, electricity and hydrogen. Transnova will advance better solutions to the environmental problems within the transport sector.

**OBJECTIVES**

The objective of Transnova is to develop policy instruments and measures to reduce greenhouse gases and other environmental pollution caused by the transport sector.

**PROGRAMME ORGANISATION**

The Ministry tasked the Norwegian Public Roads Administration to lead the programme. The management work is performed by Vegdirektoratet's technology department in Trondheim. The goal is that the project will become a permanent arrangement when the three-year trial period is over.

**PROGRAMME STAKEHOLDERS**

Municipalities, government actors, state actors, co-operatives, appartment blocks and commercial operators will be able to apply for funds from the scheme.

**LEADING INSTITUTION**

Norwegian Public Roads Administration

**TYPE OF FUNDING**

Public (national)

**CONTACT INFORMATION**

***Ms Eva Solvi***
*Norwegian Public Roads Administration*
*P.O.Box 8142 Dep.*
*N-0033 Oslo, Norway*
*E-mail: eva.solvi@vegvesen.no*
*Tel: +47 73 95 46 59*
*Programme website: www.transnova.no*

## Data Protection and Privacy Implication in Road Safety

**DURATION:** 2007-2010

**BACKGROUND**

Modern electronics provide great opportunities for society to reduce the number of accidents and the severity of injuries in road traffic.

The development of technology based systems for control, surveillance and operation of road transport and vehicles may, however, infringe on privacy. When implementing new technological systems in the sector, certain rules of action should be followed to ascertain that data is protected, and that the privacy we all desire is taken into consideration. Who should set these boundaries, and should technological development be halted because of privacy questions?

**OBJECTIVES**

This project will focus on different aspects of privacy in road safety work and try to establish acceptable boundaries.

**PROGRAMME STAKEHOLDERS**
The programme's main stakeholder is the Norwegian Public Roads Administration

**LEADING INSTITUTION**
Norwegian Public Roads Administration

**TYPE OF FUNDING**
Public (national)

**CONTACT INFORMATION**
***Mr Finn H Amundsen***
*Norwegian Public Roads Administration*
*Postboks 8142 Dep*
*N-0033 Oslo, Norway*
*E-mail: finn.amundsen@vegvesen.no*
*Tel: +47 22 07 34 65*

## Development of Expertise within Road Maintenance

**DURATION: 2007 – 2010**

**BACKGROUND**
The background for the project is the concern about loss of maintenance expertise in the Norwegian Public Roads Administration (NPRA) and in the business sector, for which several causes can be identified:

NPRA lost both expertise and experience when the Production Department was separated from NPRA in 2003 and became a commercial company

Introduction of competitive tendering has caused a sector-wide shift of focus from maintenance practices to competitive bidding, contracts, terms of settlement, etc.

Over the next few years many employees will reach retirement age, and important experience may disappear.

In addition, experience has shown that contractors are unwilling to spend their resources on long-term research. The Roads Authority must therefore actively stimulate innovation in the sector.

**OBJECTIVES**
The main objective is to increase maintenance expertise, not only for NPRA, but for the whole road maintenance sector in Norway.

An additional aim of the project is to establish systems, routines and procedures that help develop expertise in the future.

Focus areas

The project will focus on five different areas:

- Making road maintenance more visible to politicians and the general public
  . increase status and recruitment
- Training and education
  . improve knowledge of road maintenance at all levels within the sector
- Specialisation
  . encourage more PhD studies and other forms of specialisation in the field of road maintenance
- Research
  . develop and implement new technologies and knowledge
- Exchange of experience
  . collect, systematise and disseminate maintenance experience

**PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT**

The project will be carried out in cooperation with other road authorities, municipalities, maintenance contractors, equipment suppliers, consultant companies, research institutes, education institutes and the Norwegian University of Science and Technology.

**PROGRAMME STAKEHOLDERS**

The programme's main stakeholder is the Norwegian Public Roads Administration.

**TOTAL NUMBER OF PROJECTS:** 1

**ONGOING PROJECTS:** 1

**COMPLETED PROJECTS:** 0

**LEADING INSTITUTION**
Norwegian Public Roads Administration

**TYPE OF FUNDING:**
Public (national)

**CONTACT INFORMATION**
***Mr. Øystein Larsen***
*Norwegian Public Roads Administration*
*P.O.Box 8142 Dep*
*N-0033 Oslo, Norway*
*E-mail: oystein.larsen@vegvesen.no*
*Tel: +47 73 95 46 41*
*Fax: +47 73954631*
*Programme website: www.vegvesen.no/kdv*

## Environmentally Friendly Pavements

**DURATION:** 2004 – 2008

### BACKGROUND

Road traffic is the pre-dominant source of noise affliction in Norway. Construction of noise barriers and facade insulation of buildings are the most commonly used measures for traffic noise reduction but were found to be insufficient to meet the national target. It therefore became necessary to look for ways of reducing noise at source.

The high concentration of suspended matter (dust) due to the use of studded tyres is a significant problem in several Norwegian cities, particularly on dry winter days, and the poor air quality represents a threat to public health. As a result, standards have been set for the maximum acceptable dust concentration, and these are expected to be strengthened in 2010. Thus it has become necessary to develop environmentally friendly pavements which will help in alleviating noise and dust pollution.

### OBJECTIVES

The project will focus on optimising the environmental properties of road surfaces in order to reduce the environmental impact on surroundings, and thereby contribute to achieving the environmental targets set for levels of dust in suspension and noise.

### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

The project is implemented in close cooperation with research institutes and the road industry.

### PROGRAMME STAKEHOLDERS

The programme's main stakeholder is the Norwegian Public Roads Administration

### LEADING INSTITUTION

Norwegian Public Roads Administration

**TYPE OF FUNDING:** Public (national)

### CONTACT INFORMATION

***Mr Jostein Aksnes***
*Norwegian Public Roads Administration*
*P.O. Box 8142 Dep.*
*N-0033 Oslo, Norway*
*E-mail: jostein.aksnes@vegvesen.no*
*Tel: +47 73 95 46 51*
*Programme website: www.vegvesen.no/miljovegdekke*
*Telephone: +47 73 95 46 51*
*E-mail: jostak@vegvesen.no*

# High Risk Groups in Road Traffic

**DURATION:** 2007 - 2010

### BACKGROUND

The road death risk is relatively low in Norway. One reason for this is that most road users behave well in traffic. Most drivers use seat belts, few are intoxicated and most drivers respect speed limits, or break them only marginally.

On the other hand, when we study severe road accidents, there is an over-representation of drivers who drive too fast, do not use seat belts, or who drive under the influence of alcohol or other drugs. Many accidents are also linked to the health situation of the road users.

The Norwegian Public Roads Administration has a vision zero, meaning a vision of no deaths and no serious injuries caused by road traffic accidents.

In the light of vision zero we shall of course continue to work for better safety on the roads. In addition to the efforts to improve both roads and vehicles, we must continue to influence road users to act more safely. The challenge is to reach those population groups who are at highest risk: those who drive too fast, who do not use seat belts, who drive under the influence of drugs, and all those who generally behave unsafely in traffic.

The most significant questions then are: Do we know enough about these groups? Do we know who they are and how to reach them?

### OBJECTIVES

This project is an attempt to learn more about a number of such high risk groups and to identify countermeasures to improve their safety. In that respect we have identified a number of groups that will be the subject of further studies. These are:

- Young drivers, especially men
- Old drivers
- Motor cyclists
- Intoxicated drivers
- Immigrants

### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

The project runs for four years. During the first two years (2007-2008) we identified five tasks. These were:

- Identification of sub-groups at particularly high risk
- Exposure and risk for high risk groups
- Risk development for young drivers
- Accident risk of immigrants
- Accident involvement of the elderly

During the following two years (2009-2010) we have identified another five tasks. The main objective of these tasks is to identify possible countermeasures. These tasks are:

- Traffic safety for motor cycle riders
- Traffic safety for elderly drivers
- Traffic safety related to single vehicle accidents
- Traffic safety for non western immigrants
- Active and passive safety, especially related to young and elderly drivers

**PROGRAMME STAKEHOLDERS**
Norwegian Public Roads Administration

**LEADING INSTITUTION**
Norwegian Public Roads Administration

**CONTACT INFORMATION**
***Mr. Richard Muskaug***
*Norwegian Public Roads Administration*
*Postboks 8142 Dep*
*N-0033 Oslo, Norway*
*E-mail: richard.muskaug@vegvesen.no*
*Tel: +47 22 07 34 66*

## ITS towards 2020

**DURATION:** 2007-2010

**BACKGROUND**
The Norwegian Public Roads Administration has a vision called Vision Zero. Vision Zero is an image of a time in the future when nobody will be killed or seriously injured in road accidents.
We need to use "new" technology to achieve further progress in our work towards Vision Zero.

**OBJECTIVES**
Measures and solutions to achieve better road safety, the environment, and more effective use of the road network will be in focus. Measures that address the entire traffic system, including the road, the vehicle and the road user will be used.

Increasing knowledge about the use of new technology and its effects on the traffic system is of general interest, with particular emphasis on the HMI-interface (Human – Machine interface).

The project's main target is to establish a test site for new technology and ITS in the city of Trondheim. The test site will be based on the main road network in the city, and encompass both

streets in the city centre, local roads and thoroughfares. The test site will continue as a permanent activity at the end of the project.

**PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT**

Pilot study in 2006:

- Demonstration vehicles.
- ISA/Speed Alert based on the "National Road Databank".
- CALM communication.
- Tests in a driving simulator.

**PROGRAMME STAKEHOLDERS**

The programme's main stakeholder is the Norwegian Public Roads Administration

**LEADING INSTITUTION**

Norwegian Public Roads Administration

**TYPE OF FUNDING:** Public (national)

**CONTACT INFORMATION**

***Mr Anders Godal Holt***
*Norwegian Public Roads Administration*
*P.O. Box 8142 Dep.*
*N-0033 Oslo, Norway*
*E-mail: anders-godal.holt@vegvesen.no*
*Tel: +47 73 95 46 53 Fax: +47 73 95 46 31*

## Modern Road Tunnels

**DURATION:** 2008 - 2011

**BACKGROUND**

The project will focus on NPRA's strategy for tunnels and follow up issues described in two reports. These reports were written as a consequence of rockfalls in Norwegian road tunnels and reveal the need for improved tunnel maintenance and geological documentation systems. Major issues, such as increasing professional expertise, tunnel profile design, life cycle costs, new tunnel linings, operation and maintenance and the harmonization of regulations will also make up key parts of the project.

**OBJECTIVES**

The main objectives are:

- To provide the Norwegian Public Roads Administration with a clear policy on tunnel planning, construction and maintenance.

- To ensure that the life cycle of tunnels and their equipment is in accordance with the adopted strategy
- To organize the documentation of technical solutions in our tunnels into a standard system
- To optimize tunnel design
- To further develop fireproof solutions for water and frost protection
- To clarify and continue the NPRA's tunnel expertise and contribute to increasing cooperation within the industry.

**Sub-projects :**

- Road tunnel strategy
- Tunnels - a planning element in road systems and local communities
- Tunnel school
- Adequate standards and safety in road tunnels
- Tunnel linings
- Fire safety and material requirements
- Tunnel documentation
- Tunnel design
- Operation, maintenance and upgrading

**PROGRAMME STAKEHOLDERS**

The programme's main stakeholder is the Norwegian Public Roads Administration

**LEADING INSTITUTION**

Norwegian Public Roads Administration

**TYPE OF FUNDING:** Public (national)

**CONTACT INFORMATION**

***Mr Harald Buvik***
*Norwegian Public Roads Administration*
*P.O. Box 8142 Dep.*
*N-0033 Oslo, Norway*
*E-mail: harald.buvik@vegvesen.no*
*Tel: +47 71 27 42 05*
*Programme website: www.vegvesen.no/tunnelutvikling*

## Salt SMART

**DURATION:** 2007-2011

**BACKGROUND**

In response to changing regulations and increasing environmental concerns related to salt application on roads, the Norwegian Public Road Administration (NPRA) initiated a four year research and development project, entitled: ”Salt SMART”.

The motivation for the project is the increasing focus on the negative environmental effects related to the use of salt (sodium chloride) on roads during wintertime.. Excessive salt concentrations have been measured in different Norwegian groundwater sources and the insufficient oxygen levels measured in the bottom water layer of different Norwegian lakes have been directly related to elevated salt concentrations. Meanwhile, the amount of salt applied annually on Norwegian roads has increased significantly in the past few years. Added to these concerns, EU Water Framework Directive is implemented in Norwegian water management regulations. These regulations place pressure on the NPRA to control its discharges of salt (sodium chloride) into both groundwater and surface water.

Salt application is an important measure to maintain road accessibility and traffic safety during wintertime. It prevents and removes ice deposition, hinders the compaction of snow and reduces the adhesion of snow on the road surface. The project has adopted the principle that road accessibility and traffic safety is to be ensured without negative impact on the environment. This principle serves as a reference throughout the project.

**OBJECTIVES**

The project’s primary objective is to promote a justifiable (responsible) use of salt for winter maintenance purposes.

**PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT**

The following tasks of the project are defined below:

- Provide a knowledge base for a justifiable use of salt in winter maintenance by collecting, systemising, and developing general knowledge and practices.
- Identify vulnerable areas within Norway.
- Investigate and develop alternative winter maintenance practices that ensure road accessibility and traffic safety in vulnerable areas.
- Develop maintenance strategies to promote justifiable salt use for less vulnerable areas.

**PROGRAMME STAKEHOLDERS**

The programme’s main stakeholder is the Norwegian Public Roads Administration

**LEADING INSTITUTION**

Norwegian Public Roads Administration

**TYPE OF FUNDING:** Public (national)

**CONTACT INFORMATION**
***Mr Åge Sivertsen***
*Norwegian Public Roads Administration*
*P.O. Box 8142 Dep.*
*N-0033 Oslo, Norway*
*E-mail: age.sivertsen@vegvesen.no*
*Tel: +47 73 95 46 61*

## Freight Transport and Logistics

**DURATION:** 2007 – 2010

### BACKGROUND

The transport research carried out by NPRA and other Norwegian R&D funds has mainly been spent on passenger transport. The research on freight transport has so far been insufficient. The growth in freight transport on the roads has been considerable for several decades, but from 1995 there was a shift towards an even higher growth rate in all transport modes including road, and this is due to rapid changes in logistics. There are also increasing complaints from shippers and drivers about poor loading facilities and congestion in city centres, leading to ineffective goods distribution. New knowledge and demand for better environment and safety standards also support the need for research on freight transport and logistics.

### OBJECTIVES

More efficient logistics and reduced environmental impact from freight transport are long- term goals. The objective of the project *Freight Transport and Logistics* is to increase knowledge and expertise about freight transport in the public road administration and local authorities.

### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

To achieve the objectives, knowledge has to be distributed to stakeholders, industry and authorities. Dissemination is therefore prioritised in the programme. Seminars, conferences, study tours, internet pages and other activities to increase expertise are included. The objective to increase knowledge and expertise includes distribution of lessons learned, not only from the programme itself, but also from related research.

The programme is organised thematically:

- Improve freight databases, models and other planning tools
- Trends in logistics and how changes in logistics can reduce the number of vehicle km on road, better capacity utilization and shift to railway and sea
- Distribution of goods in cities, efficiency and environment

### PROGRAMME STAKEHOLDERS

The stakeholders are the Norwegian Public Roads Administration, local authorities, planners and consultants, transport industry and transport users.

**THE SINGLE PROJECTS**

In total there are 29 projects. The projects are generated applications from researchers responding on announcement for the program, (11) projects). The program financially contributes through partnership in larger projects mainly financed by the Norwegian Research Council or EU (11 projects).

The projects are defined by the programme's project group. (7 procjects)

**ONGOING PROJECTS:** 18

**COMPLETED PROJECTS:** 9

**PREDICTED PROJECTS:** 1

**LEADING INSTITUTION**

Norwegian Public Roads Administration

**TYPE OF FUNDING:** Public (national)

**CONTACT INFORMATION**

***Ms Toril Presttun***
*Norwegian Public Roads Administration*
*P.O. Box 8142 Dep.*
*N-0033 Oslo, Norway*
*E-mail: toril.presttun@vegvesen.no*
*Tel: +47 22 07 35 58*
*Fax: +47 22 06 36 73*
*Programme website: www.vegvesen.no/godstransport*

## Climate and Transportation

**BACKGROUND**

The road network is influenced by climate conditions. The climate scenarios for Norway in this century show that one should expect higher precipitation - more frequent *and* more intense rainfall, milder winters, warmer summers, a possible increase in wind speed and storm frequency.

This will affect the road network in several ways. Higher groundwater levels will yield higher probability of floods and erosion. More rain will give a higher risk of slides, occurring at new locations and new types, such as slush avalanches, debris slides and mud flows. Our premise for the choice of structural solutions and dimensioning of physical protection may be inadequate and existing slide protection may not be sufficient. Areas exposed to stable winter conditions may experience higher exposure to freezing and thawing. One should also count on reduced accessibility and regularity. All this requires improved emergency plans.

**OBJECTIVES**

Evaluate the effect of climate change on the road network and recommend remedial action concerning planning, design, construction operation and maintenance of the road network. Evaluate

and recommend measures necessary for maintaining both safety and accessibility in a changed climate.

**PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT**

The programme is planned in close cooperation with the Norwegian National Rail Administration, and will be carried out with the help of a large number of cooperating partners (also members of the programme board): Norwegian Meteorological Institute (met.no), Norwegian Water Resources and Energy Directorate (NVE), Norwegian Geotechnical Institute (NGI), Norwegian Geological Survey (NGU), Norwegian University of Science and Technology (NTNU), Centre for International Climate and Environmental Research (CICERO), Directorate for Civil Protection and Emergency Planning (DSB), and Norwegian Institute for Agricultural and Environmental Research (Bioforsk).

The programme group consists of managers of each of the seven projects and a programme secretary (all employees of the NPRA).

**PROGRAMME STAKEHOLDERS**

The aims of the programme are mainly formulated based on the need of NPRA. However, the results are expected to be used by all cooperation partners in the programme and also by Norwegian municipalities.

**TOTAL NUMBER OF PROJECTS:** 7

**ONGOING PROJECTS:** 7

**COMPLETED PROJECTS:** 0

**PREDICTED PROJECTS:** 0

**PROJECTS COVERED**

1. Literature Survey - Climate Change and its Effect on Road Transportation
2. Data: Collection, Processing and Storage
3. Flood and Erosion Prevention
4. Avalanches: Snow-, Soil-, Flood Slides, Rock fall
5. Bearing Capacity of Roads
6. Consequences for Winter Operation
7. Emergency Plans and Susceptibility

**LEADING INSTITUTION**

Norwegian Public Roads Administration

**TYPE OF FUNDING**

Public (national) – NPRA research funds

**CONTACT INFORMATION**

***Ms Gordana Petkovic***
*Norwegian Public Roads Administration*
*P.O. Box 8142 Dep*
*N-0033 Oslo, Norway*
*E-mail: gordana.petkovic@vegvesen.no*
*Tel: +47 22 07 32 15*
*Fax: +47 22 07 38 66*
*Programme website: www.vegvesen.no/klimaogtransport*

## SUSTAINABLE URBAN TRANSPORT

**DURATION:** 2007-2010

### BACKGROUND

More sustainable urban transport with reduction in use of cars is one of the main objectives in the National Transport Plan for 2006-2015. Demand forecasts predict that the increase in transport in the future will primarily manifest itself as growth in car use if we do not control the use of cars and improve alternative transportation modes. Therefore the National Transport Plan emphasises the importance of introducing restrictions on car use in urban areas and improving the conditions for pedestrians, cyclists and users of public transport.

### OBJECTIVES

The objective of this programme is to increase the knowledge and expertise on sustainable urban transport within the Norwegian Public Roads Administration and in society as a whole. The intention is to do this by adapting and developing knowledge that can contribute to:

- Achieving a more sustainable, effective and available transport system for both industry and commerce, and the populations of urban areas.
- Increasing walking, bicycling and the use of public transport in urban areas, especially on work and leisure trips.
- Reducing the growth of car use in urban areas
- Implementing comprehensive solutions and obtaining synergy effects by relating different measurements together.

### PROGRAMME ORGANISATION AND TRANSPORT POLICY CONTEXT

The project is managed by the Road Development Department and will be carried out in cooperation with other departments and regions within the Norwegian Public Roads Administration. Other road

authorities, municipalities, consultant companies, research institutes, and education institutes will be involved in the work. The objective of the programme is based on The National Transport Plan.

### PROGRAMME STAKEHOLDERS

The programme's main stakeholder is the Norwegian Public Roads Administration

Predicted projects:

- Develop a database of best practices containing a toolbox for implementing measurement of sustainable urban transport
- Evaluations of various measurements to obtain sustainable urban transport
- Define indicators of sustainable urban transport and develop a system of benchmarking between Norwegian urban areas
- Develop a method of urban street planning for sustainable urban transport
- Various general research projects related to sustainable urban transport

### LEADING INSTITUTION

Norwegian Public Roads Administration

### TYPE OF FUNDING

Public (national)

### CONTACT INFORMATION

***Guro Berge***
*Norwegian Public Roads Administration*
*Postboks 8142 Dep*
*N-0033 Oslo, Norway*
*E-mail: guro.berge@vegvesen.no*
*Tel: +47 22 07 36 27*
*Programme website: www.bytransport.no*

# POLAND

(Source: ERA-NET TRANSPORT, Overview of research programming and cooperation mechanism, Jan 2005. Updated in March 2010 by ERTRAC Poland Representative Andrzej Urbanik and Monika Kowalska-Sudyka, IBDiM)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Poland is one of the largest countries in Europe with a population of around 38.3 million people (2002) on a territory of 322,577 sq. km. The capital city of Warsaw is the country's largest city with 1.7 million inhabitants. Smaller cities are Lodz (789,318), Krakow (758,544), Wroclaw (640,367) and Poznan (578,886). The average population density is around 119 people per sq. km. Poland is divided into a number of distinct parallel regions that spread from east to west. The northern zone is a vast region of plains and low hills, divided into the Central Polish Lowlands, the Baltic Heights, and the Coastal Plain. The Central Lowlands are traversed from east to west by a series of large, shallow valleys. In the north of the Central Lowlands the Baltic Heights region is situated, dotted with hills and lakes. The Coastal Plain consists of narrow lowland. The coastline (491 km) is remarkably smooth and regular, with a few natural harbours like Gdansk or Gdynia.

The southern part of Poland consists of upland areas of various kinds and adjacent or intervening lowlands. The Carpathian Mountains, located on Poland's south-eastern border, include the Tatry and Beskid range. The Sudety, another major mountain range, are located on Poland's south-western border. Mount Rysy in the High Tatry Mountains in the south is the highest peak (2,499 m). Poland is bordered in the north by the Baltic Sea and Russia (the Kaliningrad Region); in the east by Lithuania, Belarus and Ukraine, in the south by the Czech Republic and Slovakia and in the west by Germany. The maximum distance from east to west is around 680 km and the maximum distance from north to south is around 790 km. Poland's borders are marked by the Sudety Mountains (Sudetes) in the southwest, the Carpathian Mountains (Karpaty) in the southeast, the Odra and Neisse (Nysa) rivers in the west, and the Bug River in the east. There are around 9,300 lakes concentrated in the Baltic Heights and Coastal Plain regions of the north. Two rivers cross the country from the south to the north, namely the Odra and Wisla.

Poland has a relatively dense rail network that links most main cities and towns. The railway network consists of 22.560 km of railway lines. Many of Poland's paved roads are in poor condition - this is a result of more than 40 years of centrally planned economy. Poland has nearly 4,000 km of navigable rivers and inland waterways. The country's main rivers are connected by 1,215 km of inland waterways; major ports are Gliwice, Wroclaw and Warsaw. Poland has several important sea ports at the coast of Baltic Sea.

There are five international airports situated in Poland: Warsaw, Krakow, Poznan, Gdansk and Katowice. The country's main airport "Fryderyk Chopin" in Warsaw is a major transit airport for Central and Eastern Europe.

## TRANSPORT INDUSTRY

Since 1989 Poland has experienced widespread political, social and economical changes. The transition from a centrally planned system to a market economy, meant substantial alterations and restructuring for the national economy. With over 37,000 employees, Polish shipping and maritime technology industry plays an important role for the national economy. This industry sector claims a share of about 5 percent of the country's total export share. As one of the most important shipbuilding countries of the world, Poland competes against Asian countries. Holding 5.7% of the world orders in the year 2000, Poland is the fourth largest ship manufacturer behind South Korea, Japan and China. There are two main centres of manufacturing of sea-going vessels determined by two major companies: the Szczecin Shipyard and the Gdynia Shipyard.

Poland has no national automotive industry, but numerous global automotive companies run car manufacturing sites in Poland. The largest investor is the Italian Fiat Group followed by General Motors, Volkswagen, Scania, Man, Volvo and Solaris (buses). The automotive supply industry (Delphi, Toyota, Isuzu, Michelin, Firestone, Continental, Faurecia, Bridgestone, NGK) is one of the fastest growing industry sectors in Poland.

Manufacturing of railway rolling stock is regarded as a priority due to the strategic importance of the railway sector in Poland. Rolling stock is manufactured on a mass scale. On the other hand, the production of railway engines is insignificant today. The whole railway industry sector covers around 140 manufacturing sites for railway equipment (around 22,600 employees).

Due to close cooperation with international aerospace industry, aircraft manufacturers in Poland have expanded in the recent years. 55 aerospace companies are manufacturing small sports and passenger aeroplanes, helicopters, aircraft parts and equipment. (Around 16,000 employees)

The Ministry of Infrastructure developed the following documents within the National Development Plan 2004-2006:

"Strategy for Utilisation of the Cohesion Fund 2004-2006", and

"Sectoral Operational Programme – Transport for the years 2004-2006". SOPT was approved by the European Commission on 29 June 2004, and thereby the utilisation of the ERDF funds allocated to this programme was enabled. On 28 July 2004 the Minister of Infrastructure signed the Regulation on adopting SOPT (Journal of Laws no. 177, pos. 1828).

On 10 September 2004 the SOPT Monitoring Committee approved the „Supplement to the SOP – Transport", which came into effect by the virtue of the Regulation of the Minister of Infrastructure of 8 October 2004 on adopting the Supplement to the Sectoral Operational Programme – Transport for the years 2004 - 2006 (Journal of Laws no. 235 pos. 2350).

Within these two programmes, which are managed by the Ministry of Infrastructure, the total amount of about 3,250 million Euro from the European Funds will be utilised by the transport sector.

The Operational Programme on Transport is one of seven operational programmes in Poland. This document is considered as the Polish strategy paper for the Cohesion Fund and sets general provisions applicable to the structural funds. The strategy document defines policy goals and funding request for the development of transport infrastructure in Poland.

For the next programming period, covering the years 2007-2013, the Ministry of Infrastructure has developed two planning documents that will serve as a basis for developing operational programmes for the transport sector.

These are:

"National Transport Policy for the period of 2006-2025". This document was approved by the Council of Ministers on 29 June 2005.

"Strategy for Transport Development 2007-2013". This document is foreseen to be approved by the Council of the Minister at the end of August 2005.

The adopted National Transport Policy is the third Polish planning document of this kind. Previous documents dedicated to transport policy were developed in 1995 and 2001. Considerable improvement of the quality of transport system and its development following the principles of sustainable development are the main objectives of transport policy. This objective will be achieved by focusing on achieving the following six goals:

- improvement of transport accessibility and transport quality as a factor of improving conditions of living and removing barriers of economic development;
- supporting competitiveness of the Polish economy as the key instrument of economic development;
- improvement of efficiency of transport system functioning;
- integration of transport system – in sectoral and territorial aspects;
- increase in safety that will lead to radical reduction in the number of accidents and their consequences (the killed, the injured) and – in social understanding – to the improvement of personal safety of transport users;
- reduction of the negative impact of transport on the environment and conditions of living.

These goals will be achieved through several tasks and actions. For the period of 2007-2013, tasks for executing transport policy are specified in the previously mentioned „Strategy for Transport Development". The strategy takes into consideration common European transport policy included in the White Paper. It has also been adopted that transport development should be more sustainable.

While investing in transport development, both the execution of the objectives resulting from Polish transport policy and those implemented by the Strategy will be taken into account. This will ensue by:

- progress of construction works of the motorway and expressway networks and the strengthening of the main national road network up to 115 kN axle load;

- progress of modernisation of the railway network, including the adaptation of 700 km of railway lines to the speed of 200 km/h;
- improvement of port infrastructure and accessibility to maritime ports, both from land and sea;
- an increase in the share of intermodal transport in freight transport, integration of public transport services in towns and cities;
- improvement of the road transport safety;
- introduction of intelligent transport systems.

Consequently, gradual improvement of transport accessibility and improvement of transport service in individual voivodeships will take place..

It is foreseen that in order to implement the „Strategy for Transport Development 2007-2013" a considerable part of the future Union's assistance within the National Development Plan will be directed to the transport sector. This sector can be a beneficiary of significant Union's support through transport projects that are included in the operational programmes.

The Ministry of Infrastructure has started to develop preliminary projects of operational programmes for the transport sector for the period of 2007 - 2013.

## MAPPING OF THE COUNTRY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM

The Ministry of Science and Information Society Technologies (currently Ministry of Science and Higher Education - MNiSW) is mainly responsible for research funding in Poland, as well as for international research cooperation. Some research funding initiatives are coordinated between MNiSW and other ministries, such as the Ministry of Infrastructure, the Ministry of Economy, Ministry of Labour and Social Policy and the Ministry of Environment. MNiSW supervises around 40 public institutions, including 5 institutions which are involved in transport research (e.g. Road and Bridge Research Institute, the Railway Scientific and Technical Centre in Warsaw, the Maritime Institute in Gdansk, the Motor Transport Institute in Warsaw, etc.)

Within 1991-2003 the State Committee for Scientific Research (KBN) was responsible for Polish research policy and was the main funding organization. The State Committee accepted for funding (for a period of up to 3 years, exceptionally up to 5 years) about 200-300 submitted goal-oriented projects and sets up about 30-40 ordered goal-oriented projects per year. Those projects are carried out mostly by R&D institutions.

In recent years, such units secured some 70 per cent of the KBN's expenditure on goal-oriented projects. This activity is currently lead by MniSW.

### Examples of projects financed by KBN and later by MNiSW and carried out in recent years:

- safety systems for air transport and passengers on land-side of airports
- airport infrastructure for small aircrafts

- high-speed railway project in Poland in the framework of the TEN
- wheels and rails as safety elements of railway transport
- suspension of railway vehicles in the context of high speeds and safety aspects
- air rescue systems in the context of multi-modal transport
- modular systems for low noise aircrafts
- environmental risks of railway transport in Poland
- geometric parameters for high-speed railway tracks
- experimental analysis of situations of road accidents
- methods of analysis and forecast of urban transport systems
- bearing capacity of safety barriers for road traffic
- dynamics of vehicles with ABS/ASR/ESP systems
- model of an information system supporting road transport inspections, in accordance with the EU requirements.
- tools supporting development of the policy of restructuring of the vehicle fleet
- optimalisation of features of vehicle parts through formation of the modern composite material structure
- new generation of diesel engine pistons as a result of optimalisation of their features through formation of the modern composite material structure
- metalographic quantitative criteria of selected functional features of brake discs made of composite materials
- measurement of pollutants emission from low-emission diesel vehicle engines in practical operating conditions
- training of young drivers and their behaviour under circumstances of a road accident
- relationships of economy and motor industry – methods, evaluations and forecasts
- theoretical basics and technical concept of an innovative system of complex vehicle lighting diagnostics system
- system of integrated haulage of unit cargo in the east-west direction
- elaboration of a complex technology of production of composite castings
- launch of production of brake discs of composite castings for the needs of transport means
- competitiveness of Polish road transport operators on the European transport markets
- possibilities of implementation of simulation methods in homologation and control tests of the vehicles equipped with board diagnostics systems EOBD/OBD II.

## FINANCING OF RESEARCH AND DEVELOPMENT

The new act on financing provides for the financing of the following research projects:

- ordered, on the subject matter determined in the national framework programme or long-term programme;
- own, including postdoctoral projects, on the subject matter determined by the applicant;
- developmental, the purpose of which is to carry out the research task establishing the basis for the practical use;
- promotional projects aimed at preparation of the doctoral thesis;

- special projects constituting a part of international programmes, not subject to co-financing from foreign sources.

The above mentioned national framework programme determining priority directions of scientific research and development works is settled by the Minister of Science on the basis of proposals from other ministers, voivodes, organs of voivodeship self-government, the President of the Polish Academy of Science, universities, research units and organisations of national business community. The national framework programme is published in the official journal of the Minister. Research projects are selected for financing on the basis of the tender of the submitted proposals or offers for the execution of the ordered projects.

The long-term programme, which was mentioned in point 1, is settled according to the regulations on public finances. The Minister of Science gives his opinion to the part of the project of the long-term programme which includes scientific research and development works. Next, the appropriate minister submits the project of the programme to be settled.

Apart from the above mentioned research projects, also target projects will be financed, including:

l) target projects related to the implementation of sectoral operational programmes or regional development programmes that are submitted by the proper ministers and organs of voivodeship self-government;

2) target projects on the subject matters determined by the applicant and submitted by the entities which are able to put directly the results of the project into practice.

Financing of the target project involves a part of expenditures on development research determined by the Minister. Target projects are qualified to financing on the basis of the evaluation of the submitted proposals.

Currently, executive regulations related to the Act on principles for the financing of science are developed, such as the Regulation of the Minister of Science and Information Society Technologies on criteria and methods of granting and accounting for the funds for science. At the same time, while preparing the guidelines of scientific research to be included in the national framework programme, the Ministry of Infrastructure developed the priority directions of scientific research and development studies in the areas appropriate for the Minister of Infrastructure. These are:

## I. Sustainable transport development

- Shaping of transport demand and mobility management.
- Forecasting of transport flows development.
- Revitalisation of railways and inland navigation.
- Influence of transport investments on regional and local development.
- Intermodal transport and logistics services in transport.
- Integration of transport service in cities and metropolitan areas.
- Processes of transport globalisation.
- Standardisation in transport.

## II. New technologies and innovations in transport

- Intelligent transport systems.
- Systems of satellite navigation.
- Systems of transport management and information.
- Modern technologies of road pavement.
- Expert systems in transport.

## III. Transport safety

- Behaviour of users of transport systems.
- Psychophysical fitness of operators of transport means.
- Passive safety of transport means and transport infrastructure.
- Identification and model description of the influence of infrastructure and traffic on road transport safety.
- Efficiency of methods of improvement of road transport safety.
- Consequences of accidents in the aspect of deterioration of the victims health and life.
- Tools for the system of road transport safety management.

## IV. Environment protection in transport

- Reduction of negative influence of transport on the environment in urbanised areas.
- Conditions for transport infrastructure development in the areas of particular environmental sensitivity, including Nature 2000 areas.
- Renewable fuels on the market of motor fuels.

## V. Transport economics (costs and financing)

Function of charges for transport infrastructure (airport taxes, road taxes, railway, cordon and port charges) and models of setting these charges.

Possibility of internalisation of external costs within present and future transport financial mechanisms.

Systems of organisation of the funding of transport infrastructure development and public transport services.

While implementing the guidelines of the Lisbon Strategy, the Polish government planned in the „Guidelines for National Development Plan 2007-2013" that the postulated level of expenditures for science amounting to 3% of GDP will be reached by 2013 at the latest.

The expenditures for science in 2004 amounted to about 3 billion PLN (approx. 650 million EUR) which makes up some 0.34% share of GDP and 1.4% share of the state budget expenditure.

The objective determined in the Lisbon Strategy is planned to be achieved in three stages.

In the first stage (2004-2006) it is assumed that the expenditures for science will reach 1.5% of GDP in 2006, out of which the budgetary expenditures should amount to 0.6%. However, it is possible that the increase in expenditures for science up to 0.6% of GDP will not create the planned increase in science funding from non-budgetary sources in this period; it is supposed that the motivational instruments and institutional support for entrepreneurs can bring measurable effects only after a few years. Furthermore, budgetary funding at the level of 0.6% (or less) of GDP may not be sufficient to release the sharp growth in non-budgetary financing. According to this variant, the expenditures for science would amount to 1.5% in 2006.

The second stage (2006-2010) constitutes the so-called "following of the Lisbon Strategy". The first development variant here provides that the objectives of the Lisbon Strategy will be achieved by 2010, which means that the expenditures for science will reach 3% of GDP (including 1% from the public sources). The second development variant provides that in 2010 the level of expenditures for science will exceed the present average level of such expenditures among the EU-15 countries, i.e. it will reach the level of 2.2% of GDP (including 0.8% of GDP from the public sources). Thus, this variant takes into consideration the lower increase in funding than it is planned.

The third stage (2010-2013) is the continuation of the objectives set by the Lisbon Strategy. The precise priorities for this period will be determined in the National Development Plan 2007-2013. There is a possibility that the budgetary situation will not allow to achieve the objectives of the Lisbon Strategy until 2010. In this case they should be reached by 2013. It is expected that in this year the expenditures for science will reach 3% of GDP, including 1% from budgetary sources and 2% from non-budgetary sources. As there is a necessity to increase the level of budget funding for research and development works and, at the same time, a necessity to increase the share of non-budgetary expenditures in science financing at least up to the average level of such funding in the EU, the latter should increase almost seven times by 2010, i.e. from the present level of 0.3% of GDP up to the level of 2% of GDP.

**CONTACT INFORMATION**

*Ministry of Infrstructure*
*ul. Chałubińskiego 4/6*
*PL 00-928 Warszawa*
*Programme website: www.mi.gov.pl*

# SLOVENIA

(Source : Rok Podobnik - Hidria d.d., January 2012)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

Slovenia is a small country and covers an area of only 20.273 square kilometres. It borders Italy to the west, Austria to the north, Hungary on the east and Croatia on the south.

Slovenia's geography is very diverse, posing a challenge also to transport routes and communication infrastructure. Slovenian topography is very diverse and includes Alps and pre-Alpine landscape, Dinarides, Pannonian plain and a strip of Mediterranean coast. Slovenia's average height above the sea level is 557 metres with some higher mountains located especially in the north and north-west (the highest mountain Triglav has a height of 2.864 m). Slovenia's landscape is shaped by many rivers (the longest being Sava, Drava and Soča). Slovenia is also one of the most forested countries in Europe with forests covering more than 58% of the country.

The population of Slovenia numbers just little over 2 million inhabitants. The biggest city and the capital of the country is Ljubljana (about 270.000 citizens), other major cities include Maribor (110.000), Celje (38.000) and Kranj (37.000). The density of inhabitants is 101 inhabitants/cq. Km, and this puts Slovenia among the ranks of more sparsely populated European countries.

The transport network in Slovenia has undergone massive changes in the past 50 years. Extensive motorway construction efforts, which began already in the times of the former Yugoslavia, have given Slovenia in total 603 km of highways (533 km of dual carriageways and 73 km of expressways).

Opposed to highways that are very modern in their design, the railway network (1229 km in total) severely lacks behind since there are still many sections dating back to the period of Austria-Hungary and since more than 50% are only one-gauge railways, the railway system itself is very inefficient.

Transport in Slovenia is mostly carried out with private means of transportation. After independence, when personal vehicles became more affordable, the use of public transport has taken a plunge. Today the percentage of Slovenians using bus or train is on very low levels.

Another big problem is freight transport in Slovenia. It is mostly done by trucks that tend to damage the highway network. Railway capacities are to small and the state of railway system in Slovenia is too old in order to enable efficient transport of goods.

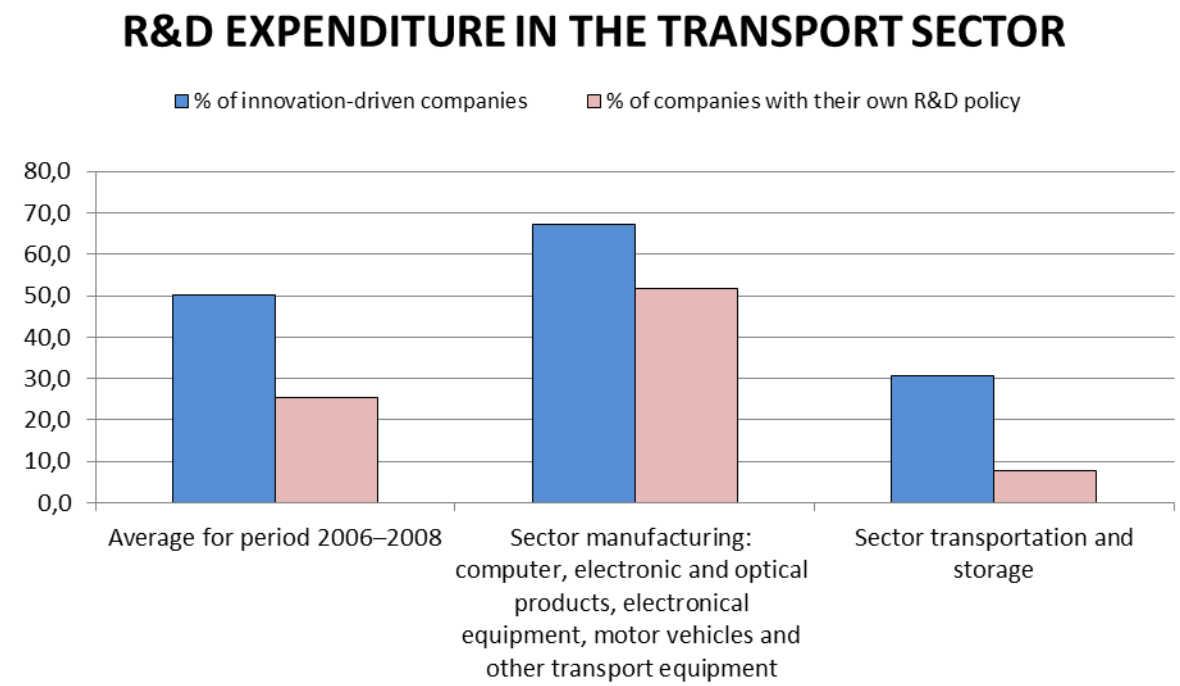
# TRANSPORT INDUSTRY

Slovenia is a developed economy with a wide range of industries. The only vehicle manufacturer in Slovenia is the Renault-owned Revoz from Novo Mesto. The Novo Mesto plant is an important part of the Renault global manufacturing scheme, since it is exclusively specialised for production of Renault's successful models (Clio, Twingo and most recently Wind). There is another factory in Maribor, TVM – Tovarna Vozil Maribor that produces coaches and buses, but its current operating and ownership status is unknown.

Slovenian industry is especially strong in the field of automotive components. According to the data obtained by the Automotive Cluster of Slovenia (ACS), main groups of products manufactured in Slovenia include exterior body equipment (sheet metal panels, supports, wings, hoods), engine parts (engine components, exhaust), components for driving and auxiliary systems (steering, brakes, windshield wiping system, cooling system), interior parts (including seating), plastic components (interior and exterior).

Industrial technologies most widely used by Slovenian automotive suppliers include a wide array of casting technologies (die casting, high pressure casting), welding and CNC machining processes, plastics casting and machining processes etc. Slovenian companies mostly supply Tier-2 products with some companies also specialising in Tier-1 products.

The problems of Slovenian transport industry are related mostly to the lack of advanced industrial knowledge regarding vehicle parts assembly (such as drive train assembly, engine assembly) or industrial knowledge in final assembly processes and also core research knowledge on new green propulsion technologies although the companies are beginning to heavily invest in these areas to reach the level of their west European counterparts.




*Source: Statistical Office of the Republic of Slovenia*

# TRANSPORT POLICY RELATED TO THE GENERAL GOALS

Transport policy in Slovenia is prepared and implemented by various institutions that each has their own field of competence and responsibility. In 2006 the Ministry of Transport passed the Resolution on transport policy in Slovenia.

The resolution defines the key actors of implementation of transport policy in Slovenia: The Ministry of Transport (the main actor for application of transport policies), the Ministry of Environment (landscape architecture and protection policies), the National Assembly (national legislative foundations for transport policies), municipalities and local communities.

The Resolution based its policy on the SWOT analysis that established following advantages and disadvantages of the current state of Slovenian transport: 1) strengths: geographic position of the country, connection of primary routes with the par-European road and (to a lesser extent) rail network, maritime port at Koper with access to international waters, tradition 2) weaknesses: absence of duality and intermodality of transport infrastructure, dispersed population, poorly developed public transport, unfinished and obsolete railway network system 3) opportunities: future inevitable systematization and harmonisation of transport systems in the country, development of new transport technologies, future development of high-speed railway routes on European corridors running through Slovenia 4) threats: repositioning of key transport routes on alternative transport corridors (via Austria), non-compliance with demands of Kyoto treaty.

After the completion of the national highway system, the transport policy in Slovenia has 3 main priorities that have been politically put forward of the documentation: 1) modernisation of the railway network 2) completion of the so-called ''modern regional transport axes'' for the deprived and hampered regions and 3) pushing forward the public transport electrification measures. Regarding the latter, in 2010 the Government announced it is preparing a funding scheme to support sales of electric and hybrid vehicles. Plans are also under way to create national programme to develop a national electric grid to support electrification of traffic. Until now due to economic standstill and political crisis in the country, all initiatives regarding the establishment of a electric vehicle power grid (powering stations) have been run independently on a local municipal level. It is currently unclear how the measures will take place post 2011.

# MAPPING OF THE COUNTY SPECIFIC TRANSPORT RESEARCH FUNDING SYSTEM

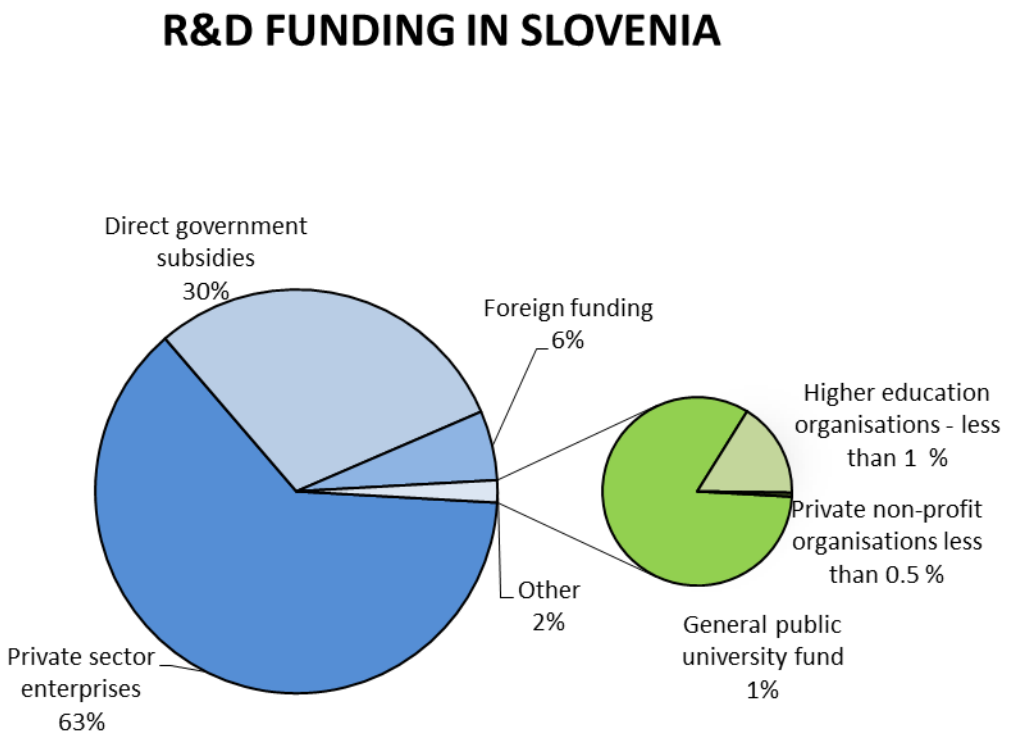
According to the last available data from EAGAR (European Assessment of Global Publicly Funded Automotive Research), Slovenian automotive sector devoted about 662 million € to research in 2007. We assume that in the following years before the world economic crisis the numbers were a little bit higher and that with the beginning of crisis funding dropped significantly.

According to data acquired by EAGAR, the automotive R&D funding in 2007 was split between: 36% public funds, 58% private sector and 6% foreign funding. Funding regulations concerning public funds

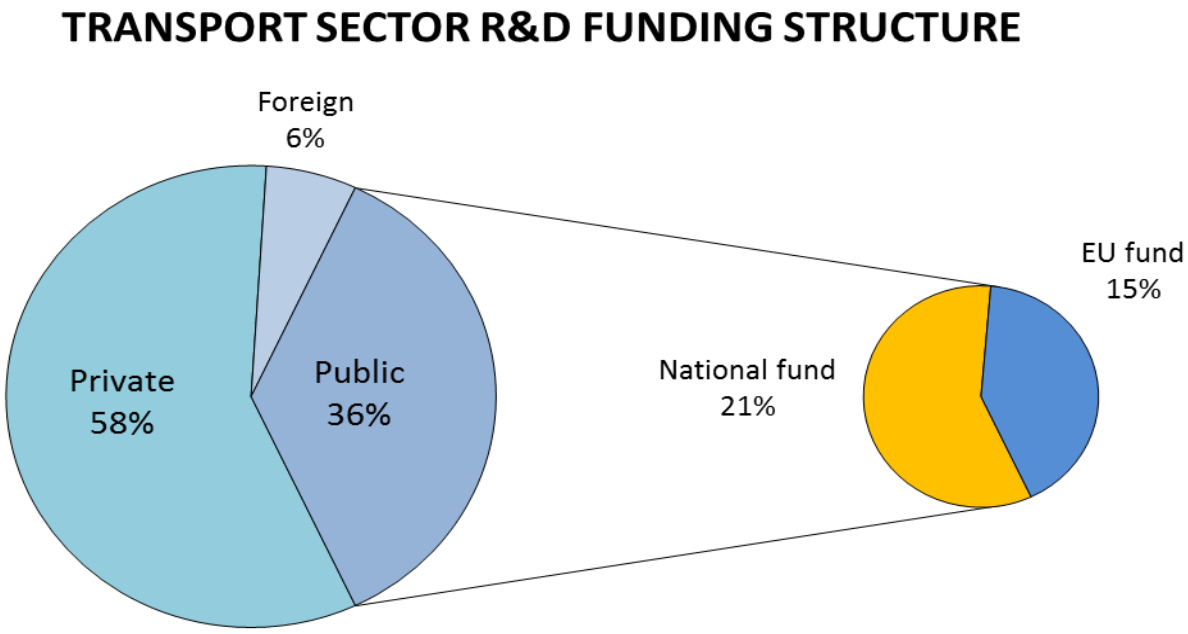
are based on European State-Aid regulations. Automotive R&D funding in Slovenia accounted for 15% of the total national R&D funding (which is a little over the EU average).

EAGAR also measured the intensity funding ratio – total GERD/GDP. The higher the percentage the more intensive R&D funding and thus the country's production is more technologically advanced. Countries producing more technologically demanding products tend to have a higher GERD/GDP ratio. In 2007 the average ratio in the EU was 1.8%, with the most technology advanced countries having more than 3&. Slovenia had a GERD/GDP ratio of 1.4%.

As it is visible from the data available from the national Statistical Office, public funding (government subsidies, public funds) plays a great role in R&D funding. Private funds account only for about one half of total funds; other sources are more-or-less funds provided-for by the government (whether it is by direct allocation of funds – subsidies, or university fund).




*Source: Statistical Office of the Republic of Slovenia*




*Source: EAGAR*

## SLOVENIAN RESEARCH AGENCY

One possible source of funds in the coming years for transport sector is the funding provided by the Slovenian Research Agency (ARRS).
The last tender for funding in the year 2012 was published this July, the results are to be published in November 2012.
Funding for projects, which are due to start in December 2012 are planned to be allocated as follows:

| Scientific area of funding | Share (in %) | Size of funds available |
|---|---|---|
| natural science and mathematics | 21.5 | 236,500,000 |
| technical sciences | 29.7 | 326,700,000 |
| medicine | 12.5 | 137,500,000 |
| biotechnical science | 10.2 | 112,200,000 |
| social sciences | 9.9 | 108,900,000 |
| humanism | 16.2 | 178,200,000 |
| TOTAL | 100.0 | 11.000,000 |

**Transport – related R&D projects included**

*Source: Slovenian Research Agency (ARRS)*

5% of funding in each category goes to interdisciplinary projects. Of specific importance will be interdisciplinary applicative projects that have the largest share of private funds related to the public funds provided by the agency. Transport-related R&D is mentioned as being one of the main fields that will be targeted for funding[52]. Final allocation of funds is still unknown, allocation of funding to the transport R&D area is also difficult to define from previous tenders since the funds for R&D transport often get allocated to interdisciplinary fields (environment, mathematics, etc.).

## SiEVA Public-Private Partnership (PPP)

Slovenia traditionally used to have very sporadically organised automotive R&D projects. Even today Government and public institutions (such as Universities) usually work only on specific separate projects involving normally one or more companies from the private sector. However, in 2010 the Government decided to give substantial funding to the SiEVA Development Centre. SiEVA is one of the 17 so-called Development centres of the Slovenian economy. These are public-private partnerships (PPP) that include the Ministry of the Economy of the Republic of Slovenia as the public actor and various private stakeholders. The programme is one of the first of its kind in the country, very elaborate and the Government hopes it will bring further innovative breakthroughs in the Slovenian automotive industry. In addition in the same year the Government also announced its intentions to prepare a funding scheme to support sales of electric and hybrid vehicles. Plans are also under way to create national programme to develop a national electric grid to support electrification of traffic. Until now all initiatives regarding the establishment of a electric vehicle power grid (powering stations) have been run independently on a local municipal level.

The SiEVA Development Centre (SiEVA stands for Sinergijski ekološki varen avtomobil – Synergetic ecologic safe vehicle) is one of 17 so-called Development Centres of the Slovenian economy (Razvojni centri slovenskega gospodarstva). SiEVA Centre is a PPP Government sponsored programme and includes 9 Slovenian companies (including Hidria) that currently employ over 15.000 people, have almost 900 engineers and scientists and create more than 1,5 billion € annual income. It is also useful to stress that SiEVA was also established as a body governed by public law. The key parts of SiEVA's development program include development, analysis and tracking of global trends together with other support activities in following fields: construction of electric motors for EVs and HVs, drive train architecture and other mechatronic solutions for EVs and HVs, electronic converters typology, electric drive train algorithms, auxiliary electro-mechanic vehicle systems, safety and comfort in the passenger cabin, safety of pedestrians and cyclists, safety- and comfort-enabling mechatronic systems, development of new materials, information- and energy-transfer systems, new materials for electric machines, EV and HV electric energy sources, business impact of new technologies, and environmental influences of new technologies.

The partners in the SiEVA Development Centre have already established good relations with the leading car manufacturers (BMW, Audi, Volkswagen, Opel, PSA, Renault) that enable them to

[52] The R&D fields that are seen as having the biggest private sector stakeholder share related to the public share include: **transport**, geology, mining, construction, geotechnology, computing science, cybernetic systems, telecommunications, architecture and design.

successfully and rapidly transport new development achievements directly to market. The SiEVA Development Centre is a project that was launched with an aim of offering development services on scientific and research fields and will work as a development core for the Slovenian automotive industry.

The partners in the SiEVA Development Centre include:

| Name of the partner | Area of competence |
|---|---|
| Cimos d.d. | Pedal boxes, gearbox mechanisms, engine- and pump- mountings |
| Kolektor Group d.d. | Plastic mould components |
| Iskra Avtoelektrika d.d. | Starter motors, alternators, DC motors |
| Hidria d.d. | Diesel glow plugs, diesel heater components, solenoid switches, flywheel magnetos, laminations, fine blanked parts, die-cast rotors, die-cast parts, fans |
| Iskra Mehanizmi d.d. | Actuators, solenoid switches, magnets |
| MLM d.d. | Aluminium die-cast parts |
| Polycom d.d. | Plastic mould components |
| TPV d.d. | Seat parts, wire parts, stanping parts |

*Source: SiEVA presentation catalogue*

The SiEVA PPP has a budget of 45 mio. € that is more or less evenly split between public funds and private stakeholder funding.

| Programme Call Name | Budget |
|---|---|
| SiEVA | Total: 45 mio. €<br>Government funding: 20 mio €<br>Private stakeholder funding: 25 mio. € |

*Source: SiEVA presentation catalogue*

## NATIONAL R&D PROGRAMMES FOR ROAD TRANSPORT FROM THE LAST 5 YEARS

As it was already mentioned, the SiEVA Development Centre is the only institutionally organised effort in the field of automotive and transport R&D in Slovenia in the past years. It is in a way a pilot project that will establish the trends for similar projects in the future,that may include even more partners from private and public sector.

## References

[1] Automotive Cluster of Slovenia, Presentation Catalogue, internal source, 2009

[2] DARS, Motorway Company in the Republic of Slovenia, www.dars.si, 2011

[3] Holleis et al, EAGAR Benchmarking Analysis Report, FP7 project EAGAR, www.eagar.eu, 2011

[4] Holleis et al, EAGAR European Assessment of Global Publicly Funded Automotive Research, FP7 project EAGAR, www.eagar.eu, 2011

[5] Holleis et al, EAGAR Publicly Funded Automotive Research in the EU, FP7 project EAGAR, www.eagar.eu, 2011

[6] Government of the Republic of Slovenia – Ministry of the Economy, www.mg.gov.si, 2011

[7] Government of the Republic of Slovenia – Ministry of Environment, www.mop.gov.si, 2011

[8] Government of the Republic of Slovenia – Ministry of Transport, www.mzp.gov.si, 2011

[9] Government of the Republic of Slovenia – Slovenian Research Agency (ARRS), http://www.arrs.gov.si, 2011

[10] SiEVA, Presentation Catalogue, internal source, 2011

[11] Government of the Republic of Slovenia Statistical Office of the Republic of Slovenia, http://www.stat.si/, 2011

[12] SŽ, Slovenian Railways, http://www.slo-zeleznice.si/, 2011

[13] Wikipedia, Slovenia, http://en.wikipedia.org/wiki/Slovenia, 2011

***CONTACT INFORMATION***

*Mr Rok Podobnik*
*Hidria d.d.*
*Slovenska cesta 29, 5281 Spondnja Idrija, Slovenia*
*Rok.Podobnik@hidria.com*

# SPAIN

(Source: ERA-NET TRANSPORT, Overview of research programming and cooperation mechanism, Jan 2005. Updated in April 2012 by ERTRAC Spain Representative, María Luisa Soria, SERNAUTO-M2F; Pedro Prado, MINECO - SG Public Private Partnership; Alejandro Ruiz, CDTI)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE

The Kingdom of Spain is the second largest country in Western Europe after France, with a territory of 504,800 km² located on the Iberian Peninsula. It is made up of 17 autonomous regions. The capital city is Madrid, and the territory includes the Balearic Islands in the Mediterranean Sea, the Canary Islands in the Atlantic Ocean and two autonomous cities in the North of Africa, Ceuta and Melilla, that border Morocco, as well as, a number of uninhabited small islands (Chafarine, Alborán, etc).

Its population in 2011 reached 47 million people, with an average population density of 93 inhabitants/km² (lower than most Western Europe countries), unequally distributed through the different regions of the country. With the exception of Madrid and its periphery, the inland regions are almost empty and the most populated areas lie around the coast. The capital, Madrid is the largest city with about 5 million people, followed by Barcelona and Valencia.

Spain has a large variety of landscapes consequence of a complicate orography result of the mountains ranges present in the northern (Cantabric and Pyrenees ranges), centre (Central range) and southern (Beticas and Penibeticas ranges) of the territory. The wide areas located between mountain ranges are occupied by plateaus (Mesetas Norte y Central) which dominate most part of the inland territory. The country has over 1,800 rivers and streams of which the Duero, Tajo, Guadiana, Ebro, Guadalquivir, Miño, Segura and the Jucar are the principal ones.

The particular geographical situation and orographic conditions of Spain, define a climate environment extremely diverse: A continental climate in the inland part of the country, a Mediterranean climate that extends from Andalusian region along the southern and eastern coasts up to the Pyrenees, on the seaward side of the mountain ranges that run near the coast; a temperate oceanic climate in the North regions with temperatures and rainfall decreasing inland and a subtropical climate in the Canary Islands. Average annual precipitation in the north and northwest is 890 mm or more and the Meseta receives between 305 mm to 635 mm annually.

Agriculture is the most important sector from the point of view of land use: extended cereal agriculture in the two plateaus that progressively moves to the South and East areas where the typical Mediterranean crops are produced: citrus fruits, tomatoes and other vegetables, olive and grapes. The land use of the whole territory can be divided into agricultural-cultivated land use (39%), pastures (21%), forest and woodland (32%) and other (8%) (1993).

On the other hand, Spain is a major tourist destination, to which the country's transport system has contributed decisively. Tourists represented 68.5% of all travellers from overseas in 1995, rising to 70.4% in 2003. During that time, the number of passengers entering Spain rose on an annual average of 4.4%. In order, the categories used were air (79% in 2011) and road (18%, mostly in private vehicles).

With EU membership (October, 1984), the country has experienced significant social and economic changes. The investments performed during the last decades in different sectors of the economy and, in particular, in the infrastructures like roads, railways, airports and communications in general, in concert with UE Cohesion Founds have transformed the country and their inhabitants' quality of life. At present, Spain has good manufacturing and servicing sectors with a growth in the economic development with a per capita income increased, recently stopped by the world wide crisis with particularities in the economy of the country.

The total length of the road network in Spain reaches 165,152 km. It comprises the 24,797 km of the State Highway Network, of which 8,700 km (35%) are dual carriageways (6,698 km) and toll motorways (1,951 km). It must also be remembered that this structuring mainland network also includes about another 2,500 km of the Autonomous Communities' system of dual carriageways and motorways. Goods transport by road in 2007 was of 2,408,762 (million ton.km) and the motorisation rate (cars per 1,000 inhabitants) was of 454 in 2004. The total length of railway lines is 12,839 km (2005); Rail transport of passengers (million passenger-km) 21,980 and goods transport by rail 24,605 (million ton.km). In 2007, sea transport of goods was 426,648 (1,000 tons); Air transport of passengers 163,523,010 and the air transport of goods 510,597 (1,000 tons).

## TRANSPORT INDUSTRY

***Road Transport***

The automotive sector in Spain represents the 2nd largest vehicle producer in Europe and the 8th in the world (2010). The biggest manufacturers are in Spain (Ford, Opel, PSA, Renault, Seat, VW, etc.), however they do not have decision centres and only scarce RTD activity in Spain. It is the largest producer of industrial vehicles in Europe and the sector is characterised by a strong equipment and components manufacturers' industry.

With around 1,000 companies, vehicle manufacturing sector in Spain represents 6% of GDP and employs directly and indirectly over 350,000 people. In 2011, 90% of the vehicles manufactured in Spain were exported, mainly to the European market, being France and Germany responsible for the 50%.

The Spanish production of motor vehicles in 2010 accounted for 38.466 Meuros that corresponds to 2,387,900 units distributed as follows (ANFAC source): 1,913.513 units of passenger cars and 474,387 units of commercial and industrial vehicles. Spain exported 87% of its production (2,079,782 vehicles).

***Railway***

Spain is carrying out an integral modernization of the public railway system, without precedents in recent history of public investments (see the PEIT figures later in this document). With a network of 13,463 km, 1,606 km of high speed lines, the structural reform that is being made, has confirmed high speed trains as a future important challenge. Currently there are more than 2,200 km of high speed railway lines under construction. Moreover, it has been made an important investment in rolling stock, which permits to Spain railway system with the most modern train fleet in Europe. This international leadership of the Spanish railway industry has been favoured by railway operators, railway managers, manufactures, builders, suppliers and consultants. The passenger market share is situated around 5% in passenger, and 4% in freight transport. The sector companies have been reinforced their efforts in RTD during the last years, in order to overcome the lack of strategic planning, the exterior technological dependency of the sector and the resistance to the change.

***Maritime***

The particular geographic situation of the Iberian Peninsula provides an important logistics platform for major maritime traffic routes worldwide. Spanish ports have 292,000 m of harbours and 58 million m2 of storage areas. Shipbuilding sector is important both in terms of turnover and employment, and quality is widely known in the international market.

***Aerospace***

Aerospace sector in Spain is one of the most developed in Europe. After 100 years working in aeronautics and 60 years in space, the sector keeps a 5th place in Europe. Spanish aerospace industry is marked by participation in major European projects and an increasing prominence of Spanish companies in the international context.

***Logistics and Freight Transport***

It represents in Spain between 9.5 and 11.5% of the GDP and employs nearly 865,000 people in 223,328 enterprises. Logistics is a transversal sector and it has been estimated that logistics costs represent 12% of the final cost in manufacturing sectors and over 20% in retail. The development of logistics activities in Spain is high, as shown by the fact that there are more than 60 Logistics Platforms and Areas in Spain. 21 of them participate in the European Association of Logistics Platforms and Freight Villages Europlatforms, which means the highest representation of a Member State at the European level. Thus the national transport and logistics network gives Spain a key position as platform for international transit.

## TRANSPORT POLICY-RELATED GENERAL GOALS

The Ministry of Public Works (Ministerio de Fomento) is responsible for transport policy visions and policy goals as well as for transport infrastructure investments. Besides this ministry, other ministries are involved in transport research policy such as the Ministry of Industry, Energy and Tourism – Ministerio de Industria, Energía y Turismo (former Ministry of Industry, Tourism and Trade – Ministerio de Industria, Turismo y Comercio), the Ministry of Agriculture, Supply and Environment – Ministerio de Agricultura, Alimentación y Medioambiente (former Ministry of Environment and Rural

and Marine Affairs – Ministerio de Medioambiente, Medio Rural y Marino) and the State Secretariat of Research, Development and Innovation (Secretaría de Estado de Investigación, Desarrollo e Innovación) of the Ministry of Economy and Competitiveness - Ministerio de Economía y Competitividad - (former Ministry of Science and Innovation – Ministerio de Ciencia e Innovación) and the Spanish Road Traffic Directorate (Dirección General de Tráfico) of the Ministry of Internal Affairs (Ministerio del Interior). Some of the strategic research funding programmes of these ministries are open for transport and mobility research projects, that finance or cofinance public or semi-public research organisations, private companies, technology centres, etc. Additionally, and with a more local dimension the Autonomous Regions (CCAA) have their own funding programmes where transport and mobility projects can be submitted.

The Ministry of Public Works is in charge of the proposal and execution of government policies in the matters of infrastructure and land, air and maritime transport in state competence, except on competencies from the Ministry of Environment, Rural and Marine Areas. The Spanish transport sector policy is recorded in the document: "Strategic Infrastructures and Transport Plan (PEIT) 17" (2005-2020) approved on July 15th 2005 by Resolution of the Council of Ministers. This document, includes a diagnostic of the present transport system, defines the objectives of the Plan, proposes some scenarios, sets criteria and guidelines, fixes short- and medium-term priorities for action and creates the economic-financial framework for its implementation.

The aim of the PEIT is to create a rational and efficient framework for the transport system and it is structured into four fields:

- system efficiency,
- social and territorial cohesion,
- environmental compatibility, and
- economic development.

Rail and sea transport systems are priority sectors within the PEIT. With a total budget of 248,892 Meuros, the implementation of the PEIT was structured into a set of sectorial, intermodal or territorial coordination plans with 4 to 8 year horizons.

## TRANSPORT RESEARCH AND INNOVATION SYSTEM

As mentioned above, in Spain the main actor responsible of the transport policy and associated infrastructures, is the **Ministry of Public Works** (www.fomento.es). Other institutions and ministries participate in different ways in this policy and they take responsibility for organizing and funding research. In the international cooperation the role is shared.

The **Ministry of Public Works**, published calls for proposals of RTD pluriannual projects, between 2002 and 2006, as part of the Spanish National Research Plans. Until 2006, the calls were addressed to non-profit bodies (such as Universities, Research Centres, Associations and Foundations), while companies could join the projects, without any funding by the Ministry. This resulted in a very low participation of industry.

With the creation of the **Ministry of Science and Innovation** in 2008, all RTD funds were transferred to this Ministry, which is presently responsible for the management of the available resources for RTD, including those focused on transport and associated infrastructures till 2011.

The former **Ministry of the Environment and Rural and Marine Affairs** had a Directorate General for the Environmental Quality and Assessment, within the commitments of the Secretary for Climate Change, which has developed a draft with the "Spanish Strategy for sustainable mobility". The document includes a number of different recommendations and proposals to be adopted by the administration, private companies, institutions and the public in general, aiming to improve and raise a more efficient and sustainable mobility model, that respect the environment and, in the end, enhancing the quality of life of citizens.

The **Ministry of Industry, Energy and Tourism** (www.minetur.es) is responsible for proposing and carrying out government policy in the areas of industrial development and innovation, small and medium sized enterprises, energy and mining, tourism, telecommunications, audio visual media and the development of the Information Society. Related to transport and mobility there are two initiatives to be highlighted: the Competitiveness Programme for the Automotive Sector and the MOVELE Project, which will be presented later.

The **Spanish General Directorate of Traffic (DGT)** (www.dgt.es) of the **Ministry of Internal Affairs** is the competent body for the development of plans and programs on road safety, the promotion of road safety policies and the analysis of the associated data and statistics. With this aim, the DGT established in 2004, the National Observatory for Road Safety with the purpose of generating information and knowledge on aspects linked to road safety. This Observatory operates in collaboration with different Institutes and Research Centres to carry on research projects in the lines of work established:

- Assessment measures, that intend to assess the impact of road safety actions implemented as well as the behaviour of road users
- Indicators building
- Opinion polls
- In-depth study of traffic accidents, risk factors and vulnerable groups
- Development of databases and information systems.

The **State Secretariat of Research, Development and Innovation** of the **Ministry of Economy and Competitiveness** (www.mineco.gob.es/stfls/mineco/investigacion.html; www.mineco.es) manages the **National Scientific Research, Development and Technological Innovation Plan** (National R&D&I Plan), which is the programming tool of the Spanish Science, Technology and Enterprise system for accomplishing Spain's medium-term technological research, development and innovation policy objectives and priorities, as defined in the Science Act and in the National Science and Technology Strategy (ENCYT). The Work Program for the 2008-2011 National R&D&I Plan is the short-term planning and scheduling tool for science and technology policy in Spain, through four Areas of activity and six Instrumental Lines of Action developed by 13 National Programs. This National RTD Program is implemented by means of annual calls. The aims of the National RTD Plan are:

- to encourage the cooperation between scientific and technological country agents,
- to promote the industry technological capacity,

- to favour research on target of interest,
- to optimise resources and investment in RTD,
- to respond to strategic needs,
- to guarantee the results of RTD;
- to promote the development of the own technology, and
- to contribute to the structuring of the territory

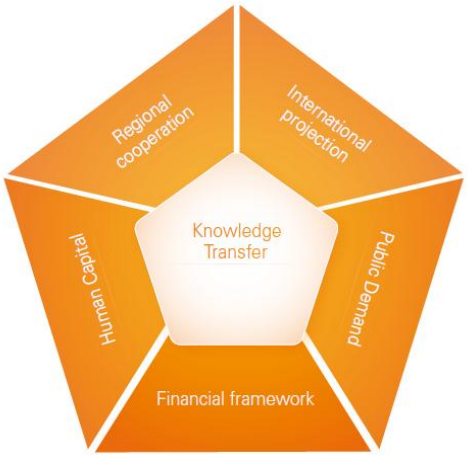
On 19 May 2010 the Bill for the new Science, Technology and Innovation Law was presented for parliamentary approval. If this new law is passed it will replace the currently prevailing Scientific and Technological Research Law of 1986. Throughout the different stages of its drafting, the Science, Technology and Innovation Bill of Law has benefitted from the contributions of the different Autonomous Communities, universities, social players, experts, researchers and citizens, through the different methods made available for this purpose. The bill of law aims to establish a general framework for promoting and coordinating scientific and technical research in order to contribute to sustainable economic development and social welfare by generating and disseminating knowledge and innovation. The challenges it aims to achieve include:

- To design an attractive professional career path for researchers.
- To establish a stable, flexible and efficient R&D&I system.
- To contribute to the development of a knowledge-based society.

The Spanish **State Innovation Strategy** (*Estrategia Estatal de Innovación* E2I), launched in 2010, constitutes the framework of action for Government policy on innovation in order to contribute to changing the production model in Spain by promoting and creating structures that facilitate a better use of scientific knowledge and technological development. It is based on diagnosing the current status of innovation in Spain and determines and quantifies the medium and long-term goals that will improve the innovative capacity of our economy.

The main goals proposed in the State Innovation Strategy are directly related with increasing a series of parameters to above the current European average and getting closer to the leading countries in innovation. In quantitative terms, this calls for doubling the economy of innovation in Spain, in other words achieving the following:

- Private investment in R&D will have to be 6,000 million euros more in 2015 than in 2009.
- Between 2010 and 2015 the number of companies engaged in innovation will have to double, incorporating 40,000 more companies.
- The number of jobs in medium and high technology will have to grow by half a million between 2010 and 2015.




The State Innovation Strategy stems from the need to reach these goals within a five-year period based on the starting point and takes into account the current economic context, enabling each

stage of the process to build on the growing foundations for the following development. It has five mainstays: generating a climate that fosters innovation, promoting innovation through public demand, international projection, strengthening territorial cooperation and human capital. These mainstays are graphically represented in a pentagonal space, at the centre of which lies knowledge transference.

The new ministerial organization is studying the strategy redefinition, according with the results of the two last years' programmes and the current situation.

The **Centre for Industrial Technological Development** (*Centro para el Desarrollo Tecnológico Industrial* – CDTI; www.cdti.es) is a Business Public Entity, depending on the Ministry of Economy and Competitiveness, which fosters the technological development and innovation of Spanish companies. It is the entity that channels the funding and support applications for national and international R&D&I projects of Spanish companies. The CDTI thus seeks to contribute to improving the technological level of the Spanish companies by means of implementing the following activities:

- Financial and economic-technical assessment of R&D projects implemented by companies.
- Managing and fostering Spanish participation in international technological cooperation programmes.
- Fostering international business technology transfer and support services for technological innovation.
- Supporting the setting up and consolidating technological companies.

During the last years all RTD funding competences were under the responsibility of the **Ministry of Science and Innovation.** These competences have been assumed in 2012 by the **Ministry of Economy and Competitiveness** of the new government**,** through its **State Secretariat of Research, Development and Innovation.** However, over the former years, each ministry organised its funds to promote RTD programs in line with its commitments and objectives. In this framework, the most important RTD Programs in the field of road transport and mobility in Spain, were included in one of the following programs or calls:

The **Ministry of Public Works**, with the PEIT (mentioned above). The Centro de Estudios y Experimentación de Obras Públicas (CEDEX), Public Body belonging to the Ministry of Infrastructures, published in 2006 and 2007, two public calls for RTD in the Transport field directly connected to the Spanish PEIT document (Spanish Infrastructure and Transport Strategic Plan 2005-20) within the National Scientific RTD Plan 2004-2007. These calls were addressed to both public and private entities, including both non-profit and profit organisations, with an interest in research and development activities. Both calls deepened into research needs highlighted by the PEIT document Plan. As a new scheme of the reasons to consider and assess projects proposals, these calls mainly funded Coordinated Projects carried on by big public-private research consortia.

The former **Ministry of Industry, Tourism and Trade**, with two main initiatives: the Competitiveness Programme for the Automotive Sector and the MOVELE Project focused on the green/electric car:

The objective of the Competitiveness Programme for the Automotive Sector is to promote investments to reorient production towards higher value-added vehicles, more sustainable, more efficient and safer. In 2009, 12 projects were funded (5 on BEVs and 7 on HEVs) with 70 Meuros (4.5

Meuros grants + 65.5 Meuros soft loans), out of which 4 involved OEMs and 8 suppliers. In 2010, 16 projects (on BEVs and HEVs) were funded with 50.5 Meuros soft loans; 5 involved OEMs and 11 suppliers.

The Institute for Diversification and Saving of Energy (IDAE) is a state-owned business entity that reports to the Ministry of Industry, Tourism and Trade through the General Secretariat for Energy. One of the Areas of activity of IDAE in transport is known as the MOVELE Project (Electric Mobility Pilot Project), defined in the framework of the Action Plan for Energy Efficiency and Savings (2008-2011). MOVELE is an electromobility pilot project focused on the development of electric vehicles aiming at demonstrating the technical and economic feasibility of EVs and promoting public and private collaboration in this field and the deployment of the associated infrastructure. Its budget was 10 Meuros: 8 Meuros for acquisition and use of EVs and 2 Meuros for recharge public infrastructure and project management.

The National Strategy for the Electric Vehicle is a comprehensive strategy (2010-2014) with four axes, structured in programmes, to be detailed in the action plans:

- Demand promotion
- Production of vehicles and RTD and Innovation
- Deployment of charging infrastructure and management of electricity demand
- Cross-cutting actions (communication and marketing, regulation and standardization, education and training, …)

The **Ministry of Internal Affairs**, with the initiatives promoted by the General Directorate of Traffic (DGT).

The **Ministry of Science and Innovation,** with the "National RTD Plan" (2008-2011) where the main funding programs supporting research can be grouped in the following Subprograms:

- Subp. for Singular Strategic Projects (PSE) (large integrated projects, precompetitive research)
- Subp. for Technology Platforms (PTE)
- Applied Research National Program (CIT and PPT Projects)
- Subp. for Strategic National Technical Research Consortiums (CENIT) (large integrated projects with industrial leadership and stronger market orientation)
- INNOVACCION Plan (2010-2011 calls)

A short description of the projects carried out during the last years, in the field of transport and mobility, by the Ministry of Science and Innovation is presented below.

## PROGRAMME FOR SINGULAR STRATEGIC PROJECTS (PSE)

These projects were promoted and financed by the Science and Innovation Ministry in the National R&D&I Plan (2008-2011) framework. Shared cost funding between public and private cooperation agreements. Funding is provided for Universities, Agencies and Public Research and Development Centres (OPIs), Institutes, Industry clusters and associations. Different financing rates are applied

depending on the annual resources available, type of institution considered and type of financing subject. The yearly calls allowed for the renewal of the Project both in terms of the finances and participants involved and also to adjust partial budgets of participants in the different sub-projects according to evolution of the PSE. In 2010, projects running under this programme evolved to INNPACTO projects, within the INNOVACCION Plan (See below).

### Enhancing competitiveness of the business through logistics as a strategic factor in a global environment (GLOBALOG)

**Duration:** 2006 – 2010

Today, in the highly competitive and global environment, Spanish industry finds it difficult to compete with other countries in production costs. The increase of competitiveness of Spanish companies through logistics and integration of supply chain is the main goal of GLOBALOG. The project's aim is the creation of new knowledge, methodologies and practices in the logistic area by using information and communication technologies to get more efficiency in the supply chains in a global marketplace. The first step of the project is to analyse the strengths and weaknesses of Spanish logistic and future trends.

It is an integrated project, as far as it considers research on basic techniques and methods to improve the efficiency of the supply chains and the transportation networks. It also includes the coordinated development of various sub-projects to address global optimization of all the mechanisms involved in the management of logistics processes of different types of supply chain:

All sectors where logistic is present, especially, Manufacturers, Distributors, Logistic operators, Transport companies, etc.

**Leading institution: ITENE**

**Project Total Budget: 8.3 M€**

**Contact:***http://www.pse-globalog.com/*

### Intelligent Cabine (CABINTEC)

**Duration**: 2007 – 2011

This project intends to use smart technologies advantages to enhance the interactions between vehicle cabin and driver addressing safety. The purpose of this project is two-fold: to design a vehicle cabin fitted with intelligent technologies, enabling us to study the driver's behaviour (by revealing good habits as opposed to hazardous behaviour in the context of safe driving), and to analyse the parameters characterizing both the vehicle and the driver during the moments prior to an accident.

**Leading institution:** CEIT

**Project total budget:** 8.9 M€

**Contact:** *http://www.cabintec.net/*

### LIGHTCARBONCARS

**DURATION:** 2007 – 2011

Automotive industry is one of the most innovative manufacturing sectors. One of the objectives of this industry is weight reduction in order to reduce energy consumption and $CO_2$ production. The use of carbon composite materials would help designers to solve both problems. The Project aims to reduce the environmental impact of cars by structural lighten based on low cost carbon fibber without compromising safety and comfort

Programme stakeholders: The automotive sector in general and the components and supplies in particular. Also, railways, naval, wind power and civil engineering industries.

**Leading institution:** Polytechnic School of Mondragon University

**Contact:** *http://www.mondragon.edu/eps*

### INTEGRAUTO

**Duration:** 2008 – 2011

The automotive sector is moving forward incorporating new lighter materials in the novel car models, safer and with new capacities and advanced properties. These new materials need innovative processing routes tailored to the function. The objective of the project is to integrate new technologies being developed in universities and technological centres of the consortium to create products with a higher added value together with automotive market companies.

For the definition of the specific objectives of the project, it has been chosen as a demonstrator or Cockpit (or supported Module), manufactured by a company which is part of the project, integrating different functional parts. At present, manufacture of this module requires many tasks with a lot of hand work associated: on a metal bracket obtained by deformation and many welds are subjected, usually by screws, modules (mostly plastic), such as the vents, the covers of air bags, etc. Thus, there is much room for improvement in design and weight reduction using new materials and technologies.

**Leading institution: Mondragon Goi Eskola Politeknikoa – University of Mondragon**

**Contact: *http://www.mondragon.edu/integrAuto***

## CITYELEC

**Duration:** 2009 – 2010

CityElec project is focused on the key elements both in vehicle and infrastructure for new concepts of electrified mobility in urban environment, and the objectives are the following:

- Search solutions for the introduction of new mobility systems in urban environment.
- Research on electric powertrain systems and the dedicated infrastructure associated with the electric vehicles.
- Demonstrate the impact of the research with a field test in two Spanish cities (involving electric vehicles and the related infrastructure).
- Generate knowledge and industrial property in the field of the vehicle electrification.

**Leading institution:** ROBOTIKER TECNALIA
**CONTACT / ADDITIONAL INFORMATION:** *www.cityelec.es*

## TECMUSA Technologies for Sustainable and Accessible Urban Mobility (TECMUSA)

**DURATION: 2009 – 2010**

The challenge facing urban areas in the context of sustainable development is immense: that of reconciling the economic development of towns and cities and accessibility with improving the quality of life and with environmental protection, on the other. In order to address these issues, which have many and varied implications, a joint effort will make it possible to encourage the search for innovative and ambitious urban transport solutions with a view to arriving at a situation where towns and cities are less polluted and more accessible and where traffic within them flows more freely.

**THE OBJECTIVE OF THE PROJECT IS TO develop, test and integrate into platforms of electric and hybrid vehicles**

- A set of technologies associated with these vehicles,
- Next-generation fuels,
- Electricity,
- Fleet management and information and communication systems,
- To achieve urban transport of people and goods effective, energy efficiently, environmentally friendly and accessible to all users.
- To achieve urban transport of people and goods effective, energy efficiently, environmentally friendly and accessible to all users.

**Leading institution:** University Institute for Automobile Research. INSIA-UPM. UNIVERSIDAD POLITECNICA DE MADRID (UPM)
**CONTACT / ADDITIONAL INFORMATION:** *www.tecmusa.es*

# SUBPROGRAMME FOR TECHNOLOGY PLATFORMS SUPPORT (PTE)

**Programme arrangements and general funding conditions:** One of the involved institutions acts as Platform Secretariat. Its activities are supported by the Ministry, like communications between participants, organization of meetings, etc. Yearly calls allow the PTE to adapt the agenda, modify the working groups and include new topics of interest, according to the sector evolution. Shared cost funding through public and private cooperation agreements.

## Spanish Automotive and Mobility Technology Platform – Move2Future

**Duration:** 2005 -…

Spain is the second largest vehicle manufacturer in Europe and the 9th in the world and therefore the sector of component manufacturers and suppliers to the automotive industry plays an important role in the economy and the employment of the country.

The aim of the Spanish Technological Platform for the automotive industry and the mobility sector, is to be the instrument for the development and monitoring of initiatives among the different actors involved in the innovation of this sector in Spain, in order to create an innovation culture and a common line of work, aiming to enhance the competitiveness of companies in the automotive sector in Spain to the new challenges that emerge, through research, development and innovation of products and processes.
The main areas of concern are:

- Vehicle electrification, energy and resources
- Safety
- Materials, Design and Production Systems
- Efficient Mobility in Urban (and Interurban) Areas
- RTD Promotion

Plenary: more than 100 members participating actively in the working groups:

- Suppliers of the automotive sector (from SMEs to large industrial groups)
- Suppliers of ICT for transport and infrastructures
- Universities and Research Centres
- Technological Centres
- Engineering companies
- Related Spanish TPs

**Leading institution:** SERNAUTO – Spanish Association of Automotive Equipment and Components Manufacturers

**Contact Information**
*Cecilia Medina*
*Castelló, 120 – 1º, 28006 Madrid,*
*Tel: +34 915 623 431*
*E-mail: cecilia.medina@move2future.es*
*Website: www.move2future.es*

## Integral Logistics, Intermodality and Mobility Technology Platform

**Duration:** 2006 -...

Logistic is a key factor in the competitiveness of almost every company. Intermodality, comodality and sustainability concepts are promoted and addressed in world leading supply chains. Moreover, mobility of goods and people impact in the lifestyle and wellbeing of citizens. Future society will need close collaboration between companies, universities, research organizations and public bodies to deploy leading innovation and knowledge in the field to develop the sustainable, safe and fast movement of goods and people and optimizing supply chains performance.

This Technology Platform was born with the aim of increasing Spanish industry's competitiveness through the promotion of the R&D, as well as, the cooperation between the different agents involved in the Integral Logistics, Mobility and Intermobility sector in Spain. Close cooperation between public and the private sectors is expected, improving the coordination of the regional, national and European investment in R&D according to industrial and society needs in the field. This raises the objective of the definition of a Vision-2020 document and a Strategic Research Agenda (SRA) adapted to the needs and capabilities of Spanish industry and to create and coordinate critical mass to implement this SRA. Join effort of different actors to generate and transfer knowledge will provide the leadership in the field.

It includes the following areas of interest:

- Supply Chain Management.
- Supply Logistics.
- Production Planning and Control.
- Storage, Packaging and Handling.
- Transport and Mobility management.
- Distribution logistics.
- Reverse logistics.

The Strategic Research Agenda (SRA) includes the following fields applied to logistics and mobility:

- Sustainability and Social Corporate Responsibility
- Development of Safety and Reliability
- Encouragement of Collaboration
- Co-modality / Intermodality
- Technology
- Training and Knowledge
- Promotion of R&D&I

**Stakeholders**: Companies, leading the initiative, and also technology centres, universities and other R&D Centres.

**Contact Information**

*Fernando Liesa*
*Centro Nacional de Competencia en Logística Integral*
*Avda. Gómez Laguna, 25-1º.50009, Zaragoza.*
*Tel: +34 976077600*
*E-mail: info@logistop.org, fliesa@cnc.logistica.org*
*Website: www.logistop.org*

## Spanish Hydrogen & Fuel Cell Technology Platform

**Duration:** 2005 → ...

The Spanish Hydrogen & Fuel Cell Technological Platform (PTE-HPC) is an initiative developed by the Spanish Hydrogen Association (www.aeh2.org), hosted by the Science and Innovation Ministry.

Many Spanish entities, with activities somehow related to the Hydrogen and Fuel Cell Technology, participate in this platform. These entities contribute with their experiences, knowledge and opinions in the document elaboration stage, making possible the establishment of the scientific, industrial and technologic guidelines which should be adopted to make easier the incorporation of these technologies in a way they not only give energetic solutions but also empower a brand new industrial and technological services sector.

The main aim of the PTE-HPC is to make easier and accelerate the development and use of energy systems based in hydrogen and fuel cells in their different aspects. This development is thought to be applied to the transport, stationary and portable sectors. It also considers all the Reset & Development & Technological Innovation (R&D&IT) chain.

The Platform organizes the collaborative entities in Working Groups. Amongst this Working Groups, the Planning and Strategic Development Group has the main objective of developing the strategy which must be adopted in Spain in order to reach the optimum levels in all the fields concerning Hydrogen and Fuel Cells. The analysis is made both from the point of view of the application uses (transport, stationary, portable) and from the point of view of the involved technologies (fuel cells, hydrogen storage systems).

Main areas of concern:

- Centralized and distributed hydrogen production from fossil fuels.
- Hydrogen production from other energy sources (renewable and nuclear energies).
- Hydrogen storage, transport and distribution.
- Use of hydrogen in combustion processes.
- Use of hydrogen in electricity production.
- Use of hydrogen in fuel cells.
- Use of fuel cells in centralized and distributed electricity generation.
- Use of fuel cells in applications of transport, mobile and auxiliary power systems.
- Use of hydrogen in industrial processes and facilities.
- Codes, standards and safety

The PTE HPC has more than 140 members, of which 42 % are companies, 24 % private technological centres, 14% Universities, 13 % public administration, and 7% other associations related to the sector.

**Contact Information**

*Rebeca Guerra*
*ARIEMA*
*Sector Embarcaciones, 24 – Local 5*
*28760 - Tres Cantos - Madrid*
*Tel: +34.91.804.53.72*
*Fax: +34.91.771.08.54*
*E-mail: rebeca.guerra@ariema.com*
*Website: www.ptehpc.org*

## PTC, the Spanish Road Technology Platform

**Duration**: 2009 → ...

The Spanish Road Technology Platform, is a discussion forum for all Science-Technology-Enterprise stakeholders with a significant role in the promotion of employment, competitiveness and growth of Spanish road infrastructures.

The Platform´s main objectives are to:

- Define a strategic vision for technological activities in the Spanish road sector.
- Stimulate stakeholder cooperation by optimizing existing R&D investments and promoting new R&D projects.
- Build R&D guidelines and long-term priorities, in cooperation with national and international bodies.
- Encourage knowledge transfer and good-practice exchange between the aforementioned stakeholders.

Today the Spanish road sector faces important technological challenges which will influence the future road system, in particular in connection to:

- Road safety conditions,
- The environmental impact of road construction & operation,
- The efficient management of roads at the service of the citizenship, and
- Road financing and taxing.

In order to respond to these challenges and cover all areas, the Platform undertakes the following activities:

- Management of a Technical Secretariat, which is responsible for the implementation of the Platform´s work plan.

- Regular organisation of Technical Conferences.
- Management of 6 thematic Working Groups, in charge of exchanging information and identifying R&D priorities.
- Elaboration and dissemination of R&D recommendations both in Spain and in EU institutions and fora.
- Promotion of R&D initiatives and inter-company cooperation within the Platform.

**Contact Information:**

*Plataforma Tecnológica Española de la Carretera*
*General Pardiñas, 15 – 1º; 28001 Madrid*
*Tel.: +34 914448239; E-mail: info@ptcarretera.es; Website: www.ptcarretera.es*

## PESI, the Spanish Technology Platform on Industrial Safety

**Duration**: 2005 → ...

The Spanish Technology Platform on Industrial Safety promotes Industrial Safety issues, integrating all the agents interested on research and technological developments. At the same time, it also contributes to define its own necessities and ideas to improve the Strategic Research Agenda.

The main objective is to develop a general view about Industrial Safety to promote and boost research activities, technological development and innovation to improve safety in industrial activities. The deployment areas are:

- Product & Installation Safety
- Occupational Safety & Health
- Environmental Safety
- Enterprise Security

**Contact Information:**

***Fundación TECNALIA RESEARCH & INNOVATION***
*Parque Tecnológico de Álava; Leonardo Da Vinci, 11; 01510 Miñano (Álava)*
*Tel.: +34 902760000;*
*E-mail: secretaria@pesi-seguridadindustrial.org*
*Website: www.pesi-seguridadindustrial.org*

## FUTURED Spanish Electrical Grid Technology Platform

I )05 → ...

The Spanish Technological Platform of Electrical Grids FUTURED was created for the purpose of integrating all of the agents involved in the electricity sector to define and promote strategies at the national level to allow the consolidation of a much more advanced network capable of responding to the challenges of the future. It is a meeting point and a common forum for dialogue to allow greater

mutual understanding among its member organizations and bodies, identify potential opportunities for collaboration, define a shared vision, and if necessary, defend a common position in relation with their target audiences (society, national and European administrations, etc.).

The main objective is to foster the technological evolution of Spanish electricity transmission and distribution systems in order to promote the technological leadership, the sustainable development and an increased competitiveness. FUTURED tries to develop the main objectives of the Spanish energy policy, increasing the independence from foreign energy and consistently reducing the environmental impact caused by electrical system infrastructures. The primary strategies to achieve these objectives consist of saving and using energy rationally, via the most effective electrical systems, and taking greater advantage of domestic resources

The FUTURED Platform is a tool to promote R&D in Spain applied to Spanish electricity transport and distribution grids. This involves the definition of a series of specific strategic goals that can be objectively verified, with clearly defined operational calendar milestones that can be translated into concrete “deliverables” in terms of content and deadline.

The challenges to which FUTURED hopes to respond are being determined and respond directly to the interests of the Spanish electricity sector, and include achieving the following objectives:

- Collaborate with companies in the Spanish electricity sector to develop new products and services based on technology and innovation for the new electrical supply scenario.
- Cooperate with the pertinent organizations in the development of Spain’s electrical regulatory framework, which promotes and facilitates the harmonious development of the electrical system.
- Strengthen cooperation in R&D among electric companies and their service and equipment suppliers, especially SMEs, Research centers, and universities.
- Collaborate with social agents and institutions on training plans and the spreading of good practices for rational and sustainable use of electrical power.

**Contact Information:**

*Enrique Morgades; Mariano Esquillor Gómez, 15; 50018 Zaragoza*
*Tel.: +34 976762957*
*E-mail: secretaria@futured.es*
*Website: www.futured.es*

## eMOV, Spanish Wireless Communications Technology Platform

**Duration:** 2005 → ...

The Spanish Wireless Communications Technology Platform was created as initiative of the Spanish sector and is linked to the European Technology Platform eMOBILITY.

eMOV objectives are:

- Update the strategic research agenda.

- Advise the national RTD funding agents (Ministries, CDTI, CCAA) in the definition of R&D&I programmes, their set up, evaluation and dissemination of results.
- Create and promote projects
- Collaborate with public administrations en prospective and technological surveillance
- Promote the Spanish participation in the VII FP
- Traction enterprises
- Distribute information
- Look for a market approach
- Coordinate and manage the mechanism to deliver a quality label
- Establish links with other national and European platforms

**Contact Information:**

*AMETIC*
*Príncipe de Vergara, 74; 28006 Madrid*
*Tel.: +34 915902302*
*E-mail: emov@aetic.es*
*Website: www.idi.aetic.es/emov*

### PTEC, the Spanish Construction Technology Platform

**Contact Information:**

*Website: www.construccion2030.org*

## APPLIED RESEARCH NATIONAL PROGRAM. FRAMEWORK OF THE NATIONAL R&D PLANS

**Objective**

The aim of this Programme was to promote activities addressed at acquiring new knowledge, exploring the possible application of new technologies in the generation of new products, processes or services, or the substantial improvement of existing ones.

The Applied Collaborative Research Subprogramme intended to promote activities designed at acquiring new knowledge through the collaboration of the different elements of the science and technology concerned. They are addressed to the public and private cooperation.

**Funding**

Multiannual funding by the Ministry of Science and Innovation through the General Directorate of Programs and Knowledge Transfer. Applied collaborative research projects to be financed had minimum total budget of 60,000 euros to award a grant or 175,000 euros in the case of a loan.

The programme covered two kinds of projects:

***1. Applied Collaborative Research (CIT)***

It requires the participation of a public or private R&D centre, at least, in collaboration with a technological centre or a private company, with an involvement for participant no less that 20%.

***Stakeholders:*** Public R&D Organisms; Public R&D Centres, Companies, Technology Centres, Groups or Associations, Other private non-profits, Private R&D Centres non-profit and non-university, Private R&D from university.

Support provided in the field of Transport and Infrastructure during the period 2005-2008:

R&D&I National Plan 2004–07: As result of two calls in 2005 and 2007, a total of 56 projects were financed by different ministries, for a total budget of 61,397,315 euros by way of grants and loans with a value of 16,098,584 euros.

R&D&I National Plan (2008–11). In the action priority area for transport and Infrastructure four projects were financed in 2008 call, with a total budget of 3,516,028 euros, which were financed in the form of loans and grants (414,535 euros)

***2. Projects carried out in Science and Technology Parks (PPT)***

PPTs are critical sites for cooperation and technology transfer between companies and research centres and universities. They consist in projects or activities undertaken by entities located in science and technology Parks.

***Stakeholders:*** All categories mentioned above for CITs, with the only conditions of verification that they are installed or being installed in the park, and that they have had a relationship with public R&D.

Support provided in the field of Transport and Infrastructure during the period 2005-2008 for PPTs. Three projects with a total budget of euros 9,285,454 were financed as loans repaid by a total of euros 3,772,914.

## CENIT PROJECTS

With the reactivation of the European Union's commitment to the Lisbon Strategy, which defines a series of measures for promoting growth and employment, the year 2010 was proposed as the deadline for bringing Spain into line with the more developed countries of the European Union in terms of Research and Development. In a future full of challenges, R&D&I is the key to sustaining and boosting growth, productivity and our society's wellbeing. With this purpose, whilst keeping up all the existing efforts in the area of R&D&I, the Government drew up the INGENIO 2010 Programme.

The CENIT Programme (National Strategic Consortiums for Technological Research), managed by the CDTI, was aimed at stimulating R&D&I collaboration between companies, universities, public research organisations and centres, science and technology parks and technology centres. It managed financing for large integrated projects in industrial research with strategic character, great dimension and high scientific-technical baggage.

## Revelacion - R&D of Technology for a New GENERATION of Coatings for Automotive

**Duration:** 2006 - 2009

This project intends to get a new generation of coatings and trimmed for interior of vehicles. The joint work of two industrial sectors: textile and automotive components, is required. With this aim, the project is focused on materials technology, technology manufacturing processes and the quality perceived by the senses, safety, ergonomics and comfort.

**Budget** 26.5 Million €

**Leading Institution:** Grupo Antolin-Ingenieria

## Forma 0 – New Confirming Processes and Development of Advanced Materials for the Transformation of High Strength Steels

**Duration:** 2006 - 2009

Forma0 aims to explore new processes and new materials that allow the fabrication of industrial components with high resistance steels. The automotive and transport sectors are the potential market. Applicability of these steels is very broad, and could be spread to other sectors. For that, the scope of the project is focused on research of new processes for AHSS steels and advanced manufacturing research matrices, and on research of new materials.

***Budget*:** 24.9 Million €

**Leading Institution:** SEAT

## MARTA – Mobility and Automotive with Advanced Transport Network

**Duration**: 2007 -→ 2010

The main aim of this project is to establish the scientific and technological basis for the future mobility, letting Spanish ITS sector to answer challenges of safety, efficiency and sustainability.

Budget**:** 35 Million €

**Leading Institution:** FICOSA INTERNATIONAL, S.A.

## TIMI - Smart Intermodal Transportation of Goods

**Duration:** 2007 - 2010

During the last years a considerable increase in the transport of goods, mostly performed by road in Europe, has been observed. In this context and for a sustainable development, the European

Commission and various national and regional governments have imposed as a necessity and priority to encourage the use of intermodal transport.

The biggest problem of intermodality is the need for a more effective organization among the different modes of transport. Besides the standardization and unification in legislation in the different states, technological innovation can help and benefit the intermodal transport offering tools to facilitate and promote their use.

Aspects such as the integration of means of transport, monitoring and tracking of vehicles and goods, the potential of services that the new satellite navigation system Galileo will offer, the identification and tracking system of vessels LRIT great distance, or the European system of traffic management ERTMS rail, emerge as relevant topics for this sector.

This proposal brings together the major players in the Spanish transport (including rail and sea) with technology service providers, associations and other relevant logistics and transport with the aim of developing methodologies, technologies and knowledge for building new specific generation of intelligent systems for intermodal transport of goods that meet the needs and medium term scenarios, taking into account the needs of sustainable development.

The project aligns well with the thematic priority "Sustainable Mobility" in the CENIT Program, with the objectives set out in the Seventh Framework Program, and the different R&D national and regional plans aiming to enhance research in the areas of CIT, Transport and Intermodality.

**Budget:** 23.8 Million €

**Leading Institution:** ATOS ORIGIN SOCIEDAD ANONIMA ESPAÑOLA

### FENIX – Research for New Concepts to be Applied in more Safer and Sustainable Roads

**Duration:** 2007 - 2010

Roads are the main means of transport in Spain and therefore road is the most important transport infrastructure in Spain. FENIX project members are on the road an active platform for the development of communications, cultural and social changes for present and future. The road as a platform for modern guidance systems for vehicles communication to the road as an active element in reducing accidents by developing early warning systems from the pavement situations or extreme weather risk. The road as a recycling system of their own products or even more, products from other industrial sectors, employed in the development of materials and the structure of the firm, all with a strong commitment to sustainability, developing technologies friendly to the environment.

The FENIX project brings together companies in the consortium that represents 45% of the national road sector that carry out 85% of the R&D being conducted in this field, thus ensuring scientific and technical excellence of the project and the probability of technical success of the tasks undertaken.

**Budget:** 31.1 Million €

**Leading Institution:** AGRUPACION DE INVESTIGACION ESTRATEGICA PROYECTO FENIX

## I+DEA – Ethanol Research & Development for Transportation

**Duration:** 2007 - 2010

The objective of this project is to position the Spanish industry as a leader in the fields of technology, production and use of bioethanol as a biofuel. As a result, the introduction of bioethanol into the Spanish fuel market will be promoted, which represents an important step in meeting the objectives set by the European Commission in its Directive 2003/30/EC of 8 May 2003 and later in the directive on renewable energy promotion.

**Budget**: 28.2 Meuros

**Leading Institution:** Abengoa Bioenergía Nuevas Tecnologías

## MAGNO - Magnesium NewTechnological Opportunities

**Duration:** 2008 - 2011

The processing industry of Magnesium in Spain it is not too important, although the demand and its potential applications are very high. The reasons of this situation lie in the handling difficulties with this kind of material in its different states and the inadequacy of the technologies based on current knowledge and experience with other lightweight alloys. An analysis of the state of the art in Europe concludes that the situation is not so different.

Therefore, there are important opportunities around the field of Magnesium, demanding important changes to the industry and a major innovation effort in order to lead the sector in Europe.

The MAGNO project will be implemented by an industry consortium, supported by research groups and Technological Centres in the field of light alloy and magnesium, and seeks to give impetus to the sector of Magnesium in Spain through a program of high-technology investments, seeking to place Spain at the top of a future market trend upward, and additionally to consolidate the Spanish consortium through competitiveness based on technology and knowledge in accordance with the European R&D FP VII.

**Budget:** 30.7 Million €

**Leading Institution:** GRUPO ANTOLIN-INGENIERIA

## ADAPTA – Intelligent and Adaptive Automotive Side Protection Functions Technologies

**Duration:** 2008 - 2011

The overall objective of the project is to meet challenges outstanding research technology field of the lateral advanced safety vehicle.

**Budget:** 26.7 Million €

**Leading Institution:** DALPHI METAL ESPAÑA

## OASIS - Safe, Intelligent and Sustainable Highways Operations

**Duration**: 2008 - 2011

The main target of OASIS project (Safe, Intelligent and Sustainable highways operation) is the definition of the highway of the future, that is, the one able to operate at clearly improved levels of security, service for the user and sustainability. This project will tackle the highway conception from a global perspective, in such a way that all the stages of its lifecycle are taken into account, paying special attention to the exploitation phase due to its greater relevance.

**Budget:** 30.5 Million €

**Leading Institution:** PROYECTO CENIT-OASIS, A.I.E.

## VERDE – Technologies for the Production and Commercialisation of Electric Vehicles

**Duration:** 2009 - 2012

The aim of the project VERDE is to research and develop technologies which allow the production and commercialisation of electric vehicles in Spain. VERDE is an applied research project to develop new technologies, organised with a solid leadership, but also cooperative and based on the mutual trust between partners, which are convinced of being part of a common project.

VERDE must be the driving force of future individual and cooperative projects to introduce the new developed technologies in the next generations of vehicles. The accomplishment of these objectives would allow Spain to reduce its energy dependency from the oil, to reduce the CO2 emissions in the transport sector and to favour the penetration of renewable energy as established in the UE energy policy for 2020, and, last but not least, to guarantee the future of the industrial sector and the automotive R&D in the country.

**Budget:** 34.15 Million €

**Leading Institution:** Centro Técnico de SEAT S.A.

## ECOTRANS – Environmental Technologies for Urban Transport

**Duration:** 2008 → 2011

The Project's overall objective address the challenges of urban public transport through the R&D of technologies needed for making public transport more attractive for passengers as well as energy more efficient. These new technologies will allow public transport emits less $CO_2$ and also improve the market share respect private vehicles, through an upper comfort and reliability of service guaranteed.

**Budget:** 23.8 Million €

**Leading Institution:** CONSTRUCCIONES Y AUXILIARES DE FERROCARRILES, S.A.

# INNOVACCION PLAN

The **INNOVACCION Plan** is the instrument to develop the State Innovation Strategy and comprised the following calls in 2010 and 2011 (6 competitive bidding, 4 financed actions and 3 structural actions):

**INNCIDE** to stimulate the activity of the offices for transferring research results (Oficinas de Transferencia de Resultados de Investigación - OTRI) of universities, public research centres and non-profit private institutions.

**INNCORPORA** combines loans to hire R&D&I personnel and funding to train them in innovation management.

**INNFLUYE** supports the set up and consolidation of Technology Platforms, with the aim to foster the partnership between public and private agents in a specific sector, promote knowledge exchange and dissemination and identify and prioritize the sector research, technology and innovation needs in the mid- and long term.

**INNOEUROPA** supports Spanish technology centres to stimulate and increase their participation in the 7th FP of the EU.

**INNPACTO** stimulates the collaboration between research centres and enterprises to develop R&D&I projects focused on an identified market and demand, and help promoting Innovation, private investment, employment and improve the technology balance.

**INNPLANTA** for the implantation or improvement of scientific and technological infrastructures in the Scientific and Technology Parks.

**INNOCASH** to mobilize private investment to develop and commercially exploit the R&D results generated in research centres.

**INNTEGRA** to coordinate the State Innovation Strategy with the Innovation policies or the Autonomous Regions.

**INNVENTA** to promote the setup of R&D reference centres.

**INNVIERTE** is a venture capital fund for innovative enterprises.

**Reasoned reports** to qualify the activities of economic agents as R&D or Innovation for fiscal purposes.

**INNPLICA** to promote the innovative public procurement.

**INNPULSO** to foster innovation promoted by local administrations.

In the **INNPACTO 2010 call,** 9 projects related to road transport, mobility and vehicle technologies were approved, with a total budget of 21.27 Meuros.

***Innovative Technologies for the Development of Electric Buses (INNELBUS)***

**Duration:** 2010 – 2012
**Leading Institution:** CARROCERA CASTROSUA SA

***Research and EGR Technology Development Adapted to the New Architectures and Cooling Requirements for Automotive Supercharged Diesel Engines (HIREFIRE)***
**Duration:** 2011 - 2013
**Leading Institution:** VALEO TÉRMICO, SA

***Development of New Brake Set Corner in Aluminium Alloys Reinforced***
**Duration:** 2011 - 2013
**Leading Institution:** FAGOR EDERLAN S COOP

***Development of In-wheel Motor Minicorner for Urban Electric Vehicle (WHENEVER)***
**Duration:** 2011 - 2012
**Leading Institution:** GRUPO COMPONENTES VILANOVA

***Energy Storage Systems Based on High Capacity Batteries with Preferred Use for Electric Vehicles***
**Duration:** 2011 - 2013
**Leading Institution:** JOFEMAR, SA

***CITYCHARGE: Infrastructures for Electric Vehicle Charging in an Urban Environment***
**Duration:** 2011 - 2012
**Leading Institution:** Z I V MEDIDA, SL

***Rehabilitation of Roads and Highways: REHABCAR***
**Duration:** 2011 - 2013
**Leading Institution:** DRAGADOS, SA

***Modelling and Dynamic Treatment of Road Firm Auscultation Tests (DYNASPHALT)***
**Duration:** 2011 - 2012
**Leading Institution:** GEOTECNIA Y CIMIENTOS, SA

***VI@LIBRE. Advanced System for the Coordination of Emergency Operations with Priority Vehicles***
**Duration:** 2011 - 2012
**Leading Institution:** ALKIME CONSULTORES, SL

In the **INNPACTO 2011 call** 23 projects related to road transport, mobility and vehicle technologies were approved, with a total budget of 38.18 Meuros.

***Increase in road safety through road inventory and itineraries guided by RFID***
**Duration:** 2011 - 2014
**Leading Institution:** AZVI, S.A.

***INNOTRANSMER. Simulation platform for the development of innovative solutions in the transport of goods by large capacity roads***
**Duration:** 2011 - 2013
**Leading Institution:** CONCEPTUAL KNOWLEDGE LOGISTICS AND TECHNOLOGY SL

***METRA. Traffic Efficient Measurement in advanced networks***
**Duration:** 2011 - 2013
**Leading Institution:** TECSIDEL, S.A

***SAFEBUS. Advanced system to bus safety***
**Duration:** 2011 - 2013
**Leading Institution:** COGNITIVE ROBOTS SL

***New systems of smart collective protection in dynamic environments for Linear Infrastructure***
**Duration:** 2011 - 2013
**Leading Institution:** CORSÁN-CORVIAM CONSTRUCCIÓN

***INMOBIKE. Intermodal Planning Platform for public transport with bike***
**Duration:** 2011 - 2013
**Leading Institution:** INDRA SISTEMAS SA

***PREMISE. Post mobile for smart recharge of electric cars (PREMISE)***
**Duration:** 2011 - 2013
**Leading Institution:** ZIGOR CORPORACION SA

***New pavement safer in extreme temperature conditions***
**Duration:** 2011 - 2014
**Leading Institution:** GRUPO CAMPEZO OBRAS Y SERVICIOS, S.L.

***Development of automotive lightweight structural components in composite materials***
**Duration:** 2011 - 2013
**Leading Institution:** FPK LIGHTWEIGHT TECHNOLOGIES, SDAD. COOP.

***SOFIA. Multidimensional information management system for intelligent infrastructures***
**Duration:** 2011 - 2013
**Leading Institution:** FERROVIAL AGROMAN SA

***DYNACAR. Techniques for the dynamic design of roads infrastructures***
**Duration:** 2011 - 2013
**Leading Institution:** SA DE OBRAS Y SERVICIOS COPASA

***FERROLINERA 3.0. Development of an advanced electric vehicle charging system from the rail power grid.***
**Duration:** 2011 - 2013
**Leading Institution:** ADMINISTRADOR DE INFRAESTRUCTURAS FERROVIARIAS

***MULTITRANS. Framework of tools, applications and services for next generation of control centres aiming a more sustainable, efficient and safe transport of passengers and goods***
**Duration:** 2011 - 2014
**Leading Institution:** ANGEL IGLESIAS, S.A.

***CUADRINWHEEL. Minicorner with wheel motor for urban electric quadricycle.***
**Duration:** 2011 - 2013
**Leading Institution:** INFRANOR SPAIN SL

***ATENEA +.Advanced receiver prototype multisensor GNSS-INS-LiDAR-Camera for urban mapping.***
**Duration:** 2011 - 2013
**Leading Institution:** DEIMOS SPACE SLU

***PTR MIRAMON. Rapid Transit System with automatic guided vehicle for the Park of Miramon***
**Duration:** 2011 - 2014
**Leading Institution:** IDEA INFORMATICA SA

***HECATE. Tool for real-time control of dangerous goods transport***
**Duration:** 2011 - 2014
**Leading Institution:** INVENTIAPLUS S.L.

***SILO. Geolocated and contextualized Information System for Public Transport.***
**Duration:** 2011 - 2013
**Leading Institution:** IBER WIFI EXCHANGE SL

***INNVENXTRAN. Innovative technologies for development of a plug electric light vehicle with range extension.***
**Duration:** 2011 - 2014
**Leading Institution:** INYECCIONES PLASTICAS MECACONTROL S.L

***Development of thermal management advanced solutions for the battery packs-GTA-BATT***
**Duration:** 2011 - 2013
**Leading Institution:** FICO-TRIAD, SA

***MITEC. Miniaturization, Integration, Testing and Evaluation of a Commercial Head Up Display for use in terrestrial and space vehicles***
**Duration:** 2011 - 2014
**Leading Institution:** AD TELECOM, S.L.

***MEDUSA. Efficient micro-platforms for sustainable urban distribution of goods***
**Duration:** 2011 - 2013
**Leading Institution:** DHL EXEL SUPPLY CHAIN (SPAIN) SL

***Development of new designs and elastomeric formulations for elastic joints of the vehicle suspension with increased resistance to fatigue***
**Duration:** 2011 - 2013
**Leading Institution:** CAUCHO METAL PRODUCTOS II SL

## CDTI ACTIVITIES TO SUPPORT R&D&I

**R&D&I projects financing**: At national level, the CDTI has different instruments to fund R&D&I projects and to create and consolidate technology start-ups. Apart from the funding, the CDTI is entrusted with issuing the Reasoned Report to claim for a tax rebate on R&D&I activities.

**Research and Development Projects (PID)**: Applied business projects that seek to create and significantly improve a process, product or service, which may include experimental development and industrial research activities.

**INNPRONTA:** Funding for big integrated projects of industrial research, strategic dimension and high budget.

**INNODEMANDA**: Financing instrument for supporting technological offers to the innovative public purchase process

**Technology Fund**: Special European Union ERDF fund heading for promoting business R&D&I in Spain. The specific methods included are: Integrated Projects and SME Technological Partnership Projects

**FEDER (ERDF) INNTERCONECTA:** Grants for integrated projects of experimental development. Co-funded by the Technology Fund

**NEOTEC initiative**: Ministerial initiative to support the creation and consolidation of technology start-ups in Spain

**NEOTEC Venture Capital**: Spanish Venture Capital investment programme

**CDTI-BANKING Line**: Technological innovation funding line in conjunction with banks

**R&D&I internationalisation:**

Within the international area there are also different funding programs for projects and initiatives of cooperation.

**CDTI Financial aids: INNTERNACIONALIZA:** Funding for activities of the Spanish SMEs that wish to exploit new technologies abroad.

**CDTI financial aids: INNVOLUCRA:** Encourages the Spanish entities participation in international technology cooperation programmes, specially the VII R&D Framework Programme of the European Union, as well as the offers to large scientific-technological facilities.

**CDTI-Eurostars ("Interempresas Internacional" Subprogramme):** Support of Spanish companies participation on international R&D programmes.

Moreover, CDTI manages Spanish participation in different European and international R&D programmes, such as:

**EU Framework Programme,** main initiative to the R&D promotion and support in the European Union.

**Competitiveness and Innovation Framework Programme:** European aids to boost productivity, innovation capacities and sustainable growth.

**EUREKA**: Intergovernmental European initiative for R&D&I support, to boost competitiveness of European companies.

**EUROSTARS:** Joint initiative European Union-Eureka to support SMEs that are very active in R&D.

**IBEROEKA**: Support instrument for technological cooperation in Latin America, Portugal and Spain.

**CANADEKA**: Bilateral Technological Cooperation Programme signed by CDTI and NRC-CNRC (Canada).

**CHINEKA**: Bilateral Spanish - Chinese Technological Cooperation programme to promote international cooperation between Spain and China.

**ISIP**: Bilateral Technological Cooperation programme to promote international cooperation between Spain and India.

**KSI**: Bilateral Technological Cooperation programme to promote international cooperation between Spain and Korea.

**JSIP**: Bilateral Technological Cooperation programme to promote international cooperation between Spain and Japan.

**SASI:** Bilateral Technological Cooperation programme to promote international cooperation between Spain and South Africa.

**e+: International Technological Cooperation Projects:** International R&D projects close to the market.

**Science Industry/Large facilities:** The Spanish Delegations of two of the most important International Scientific Large Facilities, CERN and ESRF, are in CDTI.

**Industrial Returns Programmes:** CDTI manages the industrial and technological aspects of the spatial programs with Spanish participation.

**Space:** CDTI represents Spain in the European Space Agency, the organization created to engage in spatial programs of high complexity and dimension with pacific purposes (ESA-UE) and has signed agreements of bilateral cooperation with spatial agencies of other countries.

**Aeronautics:** CDTI represents Spain in aeronautical international forums.

***Contact information***

***Dr. Pedro Prado***
*Head of Unit Sustainability*
*Sub-Directorate General Public Private Partnership*
***Ministry of Economy and Competitiveness (MINECO)***
*Albacete, 5*
*28071 Madrid – Spain*
*Tel.: +34 916 038 331  Fax: +34 916 037 085*
*e-mail: pedro.prado@mineco.es  Website: www.mineco.es*

# SWEDEN

(Original source  uUpdated by Christina Kvarnström, VINNOVA, May 2012)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE SWEDEN

At 450,295 square kilometres (173,860 sq mi), Sweden is the third largest country in the European Union by area, with a total population of about 9.4 million. Sweden has a low population density of 21 inhabitants per square kilometre (54 /sq mi) with the population mostly concentrated to the southern half of the country. About 85% of the population lives in urban areas. Sweden's capital is Stockholm, which is also the largest city with a population of 1.4 million. Other large cities are Gothenburg (549.000 inhabitants) and Malmo (280.000 inhabitants). The northern and the western parts of Sweden are characterized by mountains and lakes. To the south and east, there are central lowlands and south of them fertile areas of forests and plains. Sweden has a long rocky coastline of 3.218 km, split up by bays and many islands.

## ROAD TRANSPORT INDUSTRY

AB Volvo, Volvo Car Corporation and Scania are internationally very strong brands, established with the expertise and technology for a long period of time. From an international perspective, it is unique to a country like Sweden - with about nine million people - two of the world's leading manufacturers of heavy vehicles and on big producer of passenger cars (until the end of 2011 two big producer of passenger cars, SAAB). The automotive industry is very important for employment, export income, investment, research and development and knowledge sharing in Sweden.

In the companies operating in the automotive industry is working a total of about 100 000 people in companies with more than 20 employees. An estimated working another five to ten thousand people in smaller companies. Many companies engaged in addition to the vehicle-related activities are also active in other areas. About 90 000 people are employed with direct vehicle-related activities in companies with more than 20 employees. Of these, are approximately 60 000 people working in the vehicle manufacturer supplying complete vehicles, light vehicles, heavy vehicles or work vehicles.

The suppliers and engineering consultants are approximately 36 000 people. In the automotive industry works a total of 19 000-20 000 people with some form of R & D activities.

# THE ROAD NETWORK

The Swedish road network comprises approximately 139.000 km of public roads, of which 98.400 are state roads and 46.500 are municipal roads. There are approximately 285.000 km of private roads, most of which are access roads for forest trucks. Approximately 76.000 km of private roads are financially supported by the state. The state road network includes 15.700 bridges, approx. 20 tunnels and 37 ferry crossings. Sweden has 11.481 km of railway tracks and 145 airports of different sizes with paved runways.

# POLICY AND OBJECTIVES IN VIEW OF ROAD TRANSPORT

## Transport Goals

The objective of transport policy is to ensure the economically efficient and sustainable provision of transport services for people and businesses throughout the country. The objective of the transport policy was presented in a Government Bill in March 2009. The Swedish Parliament decided on the Bill in June 2009. The main objective contains of two subsidiary objectives, functional and impact objective.

## Functional objective

**ACCESSIBILITY**

The design, function and use of the transport system will contribute to provide everyone with basic accessibility of good quality and functionality and to development capacity throughout the country. The transport system will be gender equal, meeting the transport needs of both women and men equally.

To achieve the functional objective the following is proposed:

- Travel for people will be improved through increased reliability, security and convenience.
- Transport quality for the business sector will be improved and will strengthen international competitiveness.
- Accessibility will be improved inside and between regions as well as between Sweden and other countries.
- The working methods, implementation and outcomes of transport policy will contribute to a gender-equal society.
- The transport system will be designed to be accessible for people with disabilities.
- Opportunities for children to travel independently and safely using the transport system, and be present in traffic environments, will be enhanced.
- Public transport, pedestrian and cycling options will be easier to choose.

## Impact objective

**HEALTH, SAFETY AND ENVIRONMENT**

The design, function and use of the transport system will be adapted to eliminate fatal and serious accidents. It will also contribute to the achievement of the environmental quality objectives and better health conditions.

To achieve the impact objective the following is proposed:

- The number of road fatalities will be halved and the number of serious injuries will be reduced by a quarter between 2007 and 2020.
- The number of commercial shipping and pleasure boat fatalities will be reduced continuously and the number of serious injuries will be halved between 2007 and 2020.
- The number of rail and air fatalities and serious injuries will be reduced continuously.
- The transport sector will contribute to the achievement of the environmental quality objective, reduced climate impact, by gradually increasing energy efficiency in the transport system and decoupling from dependence on fossil fuels. By 2030, Sweden should have a vehicle fleet that is independent of fossil fuels.
- The transport sector will contribute to the achievement of other environmental quality objectives and lower levels of ill health. Priority is given to the targets of environment policy where the development of the transport system plays an important role in the achievement of the set objectives.

## Industry Policy Objectives

The Government's overall objective is to break the cycle of exclusion by creating more jobs in more and growing businesses. An efficient transport system is important for Sweden's future prospects.

This is essential for people's mobility and the competitiveness of the business sector. An entire trip or transport route that functions smoothly can help make labour markets throughout the country more efficient and create conditions for continued growth**.**

## Efforts to Find Policy Synergies

According to a decision by the Swedish Government, national authorities are to work towards joint programmes for research, technical development, demonstration activities and the introduction of new solutions that contribute to achieving transport policy objectives, as well taking into consideration trade and industry policy objectives.

## National Road Transport Research Strategies

The major governmental research funding organisations in Sweden are; the Swedish Agency for Innovation Systems (VINNOVA), the Swedish Road Administration (SRA), the Swedish Energy Agency (STEM), the Foundation for Strategic Environmental Research (MISTRA), the construction industry's organization for research and development (SBUF) and Swedish Rescue Services Agency (SRSA).The total volume of funding of road transport R&D amounted to 780 – 1 000 million SEK per year.

## A national strategy for R&D related to the transport system

The Swedish Agency for Innovation Systems (VINOVA) has developed a national strategy for transport related RDD – Research, Development, Demonstration – together with other relevant government authorities. The strategy emphasizes that Swedish RDD providers must be given the opportunity to successfully compete for European Commission funding. This strategy will be revised during 2012-2013.

## The market providers of R&D

In recent years the operators of R&D in Sweden have steadily moved from the traditional university environment financed by the government, into a more diversified and horizontal context with financing from various stakeholders. The traditional university world has been complemented by regional universities with an increasing inter-face towards industry and innovation. As a result of this, the sources for financing as well as the demand for new knowledge and innovation has changed and has become more varied compared to the former Swedish R&D system.

# R&D PROGRAMMES

## VINNOVA

**Background**

VINNOVA (The Swedish Governmental Agency for Innovation Systems) is an agency that aims to promote growth and prosperity throughout Sweden. The particular area of responsibility comprises innovations linked to research and development. VINNOVA's tasks are to fund the needs-driven research required by a competitive business and industrial sector and a flourishing society, and to strengthen the networks that are such a necessary part of this work.

The Government has assigned VINNOVA to:

- Contribute to making Sweden a leading research nation in which research of high scientific quality is conducted.
- Promote sustainable growth and increased employment by acting to increase competitiveness and the emergence and expansion of successful companies.
- Support research and development work of the highest quality in areas such as engineering, transport, communications and working life in order to promote renewal and sustainable growth.
- Stimulate Swedish participation in European and international R&D collaboration and in the exchange of experience in the field of innovation.

VINNOVA's vision is that**: "VINNOVA makes a clear contribution to Sweden's development as a leading growth country."**

## Innovative vehicles, vessels and systems

Swedish manufacturers of vehicles and vessels export most of their production to the global market which has great future growth potential. Generally important factors are access to competence and R&D environments as well as long-term investments and networks. One of VINNOVA's goals is therefore that those active businesses in the country choose to invest in central R&D functions in Sweden in an interaction with Swedish innovation environments.

## Innovative logistics systems and freight transports

Well-developed cost-efficient transport and logistics systems are fundamental conditions for Sweden's welfare and industrial development. Logistics competence on an international front should provide Swedish-based companies with the opportunity to form efficient and client-related supply networks to support effective business models for a global market, in spite of the handicap of distance.

## Infrastructure and efficient transport systems

A functioning infrastructure and transport systems are central for growth within many sectors of society and a necessary prerequisite for all innovative systems within all sectors. In countries such as Sweden with relatively large distances, both from the large markets and within the country, a good infrastructure and efficient transport systems are especially important. Deficiencies in the transport system can be detrimental to locating new companies. The quality of the transport is, for example, crucial when it comes to opportunities for work trips to and from and within a region. In this connection public transport also contributes to a great degree to the possibilities of travelling in a viable way.

## Important Research and Innovation Environments

### COMPETENCE CENTRE/VINN EXCELLENCE CENTRE

Central to the notion that Sweden should be able to continue competing successfully in the knowledge-based economy is the fact that Swedish research must maintain a world-class standard and that there is well-functioning coordination between universities, colleges, institutes and industry. World-leading competence, a stable and long-term activity, an undertaking that is made known internationally as well as an expressed support from departmental officials are all needed in order to be chosen as an executor of R&D in global competition.

A competence centre is long-term (approx. 10 years) research collaboration between the private and public sectors, universities and colleges, research institutes and other organizations that conduct research.

VINNOVA finance the following seven competence centres within the transport sector;

- Next Generation Innovative Logistics (NGIL) at Lund University focusing on smart logistics solutions
- Service and Market Oriented Transport Research (SAMOT) at Karlstad University concentrating on service and market oriented transport research within public transport

- Centre for ECO2 Vehicle Design at KTH, the Royal Institute of Technology in Stockholm, with its focus on future vehicle solutions.
- The Vehicle and Traffic Safety Centre at Chalmers (SAFER) is a joint research unit where academy, industry and authorities cooperate in the design of future vehicle and traffic safety systems.
- Virtual Prototyping and Assessment by Simulation (ViP) at VTI unify the extended but distributed Swedish competence in the field of transport related real-time simulation with special focus on HMI applications.
- Lighthouse at Chalmers is a multidisciplinary maritime competence and research centre.
- The Centre for Transport Studies (CTS) at KTH includes cost-benefit analysis, sustainable transport systems, transport modelling, simulation, financing and organization, interactions between the transport system and the regional economy, and travellers' behaviour and valuations.

# SECTOR PROGRAMMES

## Vehicle Research and Innovation (FFI)

In order to facilitate cooperation between the automotive industry and the relevant authorities Sweden has – since 1994 - Vehicle industry research programmes. The FFI's overall aims are:

- responsibility for the implementation of the programme within the field of automotive technology
- to facilitate coordination of the R&D work done by contributing authorities within the field of automotive technology
- to be a forum for the discussion and analysis of current questions in the automotive sector.

The work carried out within the FFI is based on a collaboration agreement between Scandinavian automotive suppliers, car manufacturers and the Swedish government.

FFI currently has responsibility for five research programmes:

- Sustainable Production Technology
- Vehicle development
- Transport Efficiency
- Vehicle and Traffic Safety
- Environment & Energy

## BISEK

The Social and Economic Significance of the Automobile, Bisek. A first phase of the Bisek program was completed by the end of 2010, and the research reports are available on www.bisek.se. Now a second phase (2011-2016) has been started. The program aims to shed more light on the scope of personal mobility by the private car in a transport policy environment that is committed to a

significant reduction of the transport sector's dependency on fossil fuels as well as to pursuing other objectives for transport emissions and safety in a socio-economic perspective. The main focus of the program is on the consequences for households and individuals of transport policy measures related to these policy objectives. The role of new transport technology and revised regulatory regimes for personal mobility will be studied. Bisek will also initiate research that elucidates the role of inadequate personal capabilities e.g. due to age, handicap etc to restrict personal mobility, and what could be done to mitigate such transport accessibility problems. Bisek puts particular emphasis on practical applicability and implementation of research results.

BISEK is an R&D co-operative effort between VINNOVA, the Swedish Transport Administration, the Norwegian Public Roads Administration, the Co-operation Committee of the Swedish Car user Organizations (MOSK), NAF, the major Norwegian car user organization, the Swedish Transport Agency and Transport Analysis (a Swedish Government Agency). Bisek aims to successively expand its research resources as well as its competence base by inviting also other stake holders.

# REGIONAL RESEARCH AND INNOVATION

## VINNVÄXT

By developing dynamic innovation systems, based on the best competence, regions in Sweden can become internationally competitive within specific growth areas. The programme is intended for all companies, research organizations, public activities or networks that see a possibility in developing efficient and internationally competitive regional innovation systems. A VINNVÄXT initiative is long-term (approx. 10 years) research collaboration between regional actors.

## Research and Innovation in small companies

### FORSKA&VÄX (RESEARCH AND GROW)

VINNOVA has been commissioned by the government to conduct a programme to strengthen and stimulate R&D in small and medium-sized companies (SME). The overreaching aim for Forska&Väx is to strengthen companies' possibilities to compete on a global market and thus contribute to economic growth and new jobs in Sweden. The Forska&Väx programme is designed for SME within all branches that need to have access to R&D and/or develop their own R&D.

### TOTAL FUNDING

The total funding through VINNOVA programs amounted to approx. 285 million SEK, excluding FFI.

### CONTACT INFORMATION

*VINNOVA*
*SE-101 58 Stockholm, Sweden*
*E-mail: vinnova@VINNOVA.se*

# THE SWEDISH ENERGY AGENCY

## BACKGROUND

The Swedish Energy Agency supports research and development of new knowledge associated with the supply, conversion, distribution and use of energy to develop a sustainable society. Grants are also given for pilot and demonstration installations for testing new technology. In addition, the Agency is involved in international research work, such as for greater use of renewable energy sources and the development of new energy supply technologies and systems.

## OBJECTIVES

The Swedish Energy Agency is the national authority for energy policy issues. The Agency's mission is to promote the development of Sweden's energy system so that it will become ecologically and economically sustainable. This means that energy must be available at competitive prices and that energy generation must make the least possible impact on people and the environment. In simple words a smarter use of energy. The Agency works to ensure that energy matters are automatically taken into account in relevant social sectors. The Agency supports the achievement of the national climate targets. The Agency promotes an energy system that is economical on resources and energy efficient, and that uses an increasing proportion of renewable energy sources. The Agency works to ensure that there is a safe and reliable energy supply. The Agency works for efficient energy markets in which customers have a strong position. The Agency is a modern and efficient public authority in all respects. The Agency is an attractive employer whose employees are given good development opportunities in a sound working environment.

## PROGRAMMES RELATED TO TRANSPORT

### Renewable motor fuels

The Swedish Energy Agency is financing several large research projects covering the entire chain from cultivation of raw materials for bio based motor fuels to the use of new fuels.

### Second generation biobased motor fuels

Energy efficient carbon dioxide neutral solutions are the targets of work on second generation bio based motor fuels. The concept includes conversion of forest raw materials and short-rotation crops: in addition, it involves the use of advanced new technology in efficient processes aimed at increasing the energy yield from the biomass. Gasification of biomass, for example, permits flexible choice of raw materials as well as of end products. Second generation motor fuels deliver a significantly better energy yield throughout the production chain than do traditionally produced bio based motor fuels. Sweden has three large development plants for the production of bio based motor fuels, which are partly supported by funding from the Agency. The purpose of these plants is to establish a foundation for what are known as bio energy combination plants, in which several processes operate together in order to provide maximum overall energy efficiency. In addition, research is being carried out at several universities directly linked to the plants. A recently revived interest in the production of bio based motor fuels means that more parties may become involved in research and development, as new stakeholders in Sweden discuss whether to join the sector. One working area that will probably be expanded is biogas.

### Black liquor gasification in Piteå

A development facility in Piteå for gasification of black liquor from the Smurfit Kappa Kraftliner pulp mill was commissioned in 2005. Its purpose is to develop gasification technology, and to investigate recovery or production of chemicals, electricity, heat and motor fuels from the process. The project was originally focused on the production of electricity and heat from synthesis gas. The Agency is a funding partner of a cooperative element of the work between the USA and Sweden. The main focus of development today is to produce DME (dimethylether), which can be used as a fuel in diesel engines. Crude synthesis gas produced in the existing gasifier will be used as a feedstock produce 4–5 tonnes of renewable DME per day. This part of the work is partly financed by the EU Seventh Framework Programme, and is intended to develop and demonstrate the entire production chain from biomass to end use of a renewably sourced bio fuel, which will involve field trials using goods vehicles developed by Volvo. The Piteå gasification plant has a capacity of 3 MW of fuel.

### GOTHENBURG –BIOMASS TO VEHICLE GAS BY GASIFICATION

A demonstration plant for the gasification of biomass and subsequent purification and methanisation to produce methane will be constructed in Gothenburg and be taken into operation in 2013. The project is called GoBiGas and is partially financed by the Swedish Energy Agency. The fuel input is approximately 30 MW and the methane will be injected into the natural gas grid to distribute the gas to filling stations.

### Örnsköldsvik – ethanol from cellulose

Ethanol can be manufactured from cellulose by first breaking the cellulose down to simple sugars, which can then be fermented. The main thrust of ethanol research is to find ways of reducing production costs, such as through the use of cheaper and more efficient enzymes, improved strains of yeast that can ferment all the sugars encountered in the cellulose feedstock, and optimization of the processes in such ways as reducing the amount of water and energy used. A pilot plant for investigating the entire process chain on a larger scale was started up in Örnsköldsvik in 2004. This plant is intended to be used for several years as a centre for development of the process technology and as a test bed for research results produced by university departments.

### Biogas

1.4 TWh of biogas were produced in 2008 from various sources such as sewage sludge, food industry waste, stable manure and food waste that had been sorted at source. Current research in the biogas sector, which is being carried out at a number of universities and institutes of technology, is concentrated on process optimisation. In addition, a number of development projects for the production of biogas are ongoing.

### Energy efficient Vehicles

Renewable motor fuels and more fuel efficient vehicles The Swedish Energy Agency supports research aimed at reducing motor fuel consumption as well as developing new technologies, such as, electric and hybrid vehicles. There are two national research programmes dealing with issues related to vehicle development, and seven national centres. The programmes and centres are closely linked in order to benefit from common working areas and overall synergy effects between them. They also

share a common business intelligence monitoring and analysis element. The following are brief details of the programmes:

The Vehicle Strategic Research and Innovation programme (FFI) started in 2009 as a cooperative effort between the Government and the Swedish automotive industry. The programme finances common research efforts, innovation, and development activities mostly in the overall theme areas Climate and Environment, and Safety, respectively. The project is managed by Vinnova (Swedish Agency for Innovation Systems), the Swedish Energy Agency, and the National Road Administration. It comprises five sub programmes: Sustainable production technology, Vehicle development, Transport efficiency, Vehicle and traffic safety, and Energy and environment. The venture includes R&D operations valued at approximately SEK 1 billion per year (approximately US$ 140 million per year), of which public funds amount to SEK 450 million per year (approximately US$ 65 million).

Energy Systems in Road Vehicles This academic research programme is devoted to batteries, fuel cells and other components for vehicles using electricity as a means of improving energy efficiency. The Swedish Energy Agency administers the programme. The programme, which runs until the end of 2010, has a budget of about USD 12 million. To date, several PhD students in the field of hybrid vehicles and fuel cells have been trained, and a number of patents have been granted for new types of hybrid drive lines. Seven national competence centres.

### CECOST

In order to achieve a more complete understanding of combustion and its effects, knowledge in a wide range of different disciplines such as fundamental aspect of physics, chemistry and mathematics as well as heat transfer, fluid mechanics, thermodynamics etc., are required. However, to successfully implement this multidisciplinary knowledge in combustion applications, a deep understanding in the applied engineering sciences connected to the real combustion apparatus, are also required. The ambition and objective for the Centre of Excellence in Combustion Science and Technology, CECOST, is to combine all necessary disciplines into a complete and coherent national programme.

### CERC

The CERC vision is to attain (and maintain) world-leading competitiveness in fundamental understanding of, and viable systems for optimizing and controlling: spray formation and combustion, alternative fuels and alternative engines for hybrids/plug-in hybrids. A key practical goal is to provide the member companies with knowledge and highly skilled, highly educated specialists to enable the Swedish automotive industry to preserve its world leading status. The CERC long-term *strategy* is to foster sufficiently high competence to adapt flexibly and continue to make substantial contributions following advances in theories, systems and strategies related to engine control, fuels (conventional and alternative), fuel atomization and evaporation, fuel-air mixing, combustion, emissions formation, and alternative energy converters.

### KCGeX

The long-term vision for research within KCGeX is to emulate the successful simulation-intensive routes taken by the aircraft industry by providing state-of-the-art tools and understanding to

contribute to the creation of the "virtual engine" that allows accurate design of engines with respect to performance, emissions and noise.

The KCGeX *strategy* for the first four years, which can be seen as a ramp-up phase, is both an internal strategy for organizing and developing the Centre within KTH, as well as an external strategy to develop the relations with its sister centres in Sweden (CERC and KCFP), its industrial partners and some selected international institutions.

### EKC²

The centre's *vision* a future society that is provided with sustainable, highly reliable and cost efficient energy in electric form for a majority of its residential, commercial, industrial, and transportation energy needs. This vision implies that the electricity is produced using renewable sources such as wind, solar and hydropower. It also implies that the transmission and distribution system is built with components that exhibit low losses and high reliability and that the system is designed to manage the uncontrollable aspects of these power sources using sophisticated control algorithm and Information and communication technologies.

The power industry clearly faces a series of challenges that must be addressed by development of knowledge, methods, and products.

### KCFP

The vision is that the combustion engines in the future must be able to run on the fuels available and acceptable in the future. This requires significant adaptability of the combustion process to new and different fuels in the future. Local emissions must be kept close to zero with advanced combustion concepts in close interaction with exhaust gas after treatment. The main challenge will be the emission of green house gases. Hydrogen rich fuels and bio fuels can give benefits but the major effort must be on increased fuel efficiency. The strategy of the centre is to attack the two main problems of the IC engine at the root. Both local emissions (NOX, HC CO and PM) and global (CO2) comes from imperfect combustion. The local emissions are the result of incomplete combustion and in the case of NOx too high temperature during and just after combustion. The global emissions (CO2) are higher than necessary due to the requirements and constraints the combustion process sets on the thermodynamic cycle and hence the thermodynamic efficiency. To improve the knowledge, advanced measurement systems as well as models will be applied.

### KCK

The long-term vision of KCK is to contribute to sustainable transport-, energy- and environmental systems with state-of-the-art catalytic techniques.

KCK aims at maintaining an excellent research environment, which performs high-quality research within these areas.

### Swedish Hybrid Vehicle Centre (SHC)

The aim of this project is to establish an internationally competitive centre of excellence for hybrid electrical vehicle technology, facilitating education and research to meet industrial and societal needs in the area, and to form a natural framework for cooperation between industry and academia.

Participating in the centre are: AB Volvo, Scania CV AB, Saab automobile AB/GM Powertrain AB, Volvo Car Corporation AB, Bae systems Hägglunds AB, Chalmers university of Technology, Lund university and the Royal institute of technology. The centre started in July 2006 and the annual budget for is approximately USD 5 million.

**CONTACT INFORMATION**

*www.energimyndigheten.se*

## MISTRA

The Foundation for Strategic Environmental Research, (MISTRA), supports strategic environmental research with a long-term perspective, aiming to solve major environmental problems. The main part of MISTRA's funding is focused on broad-based interdisciplinary programs. MISTRA is a foundation and as such must comply with the Swedish Foundations Act. The relevant paragraph from the statutes states that:

The aim of the foundation is to support research of strategic importance for a good living environment.

The foundation shall promote the development of robust research environments of the highest international class that will have a positive impact on Sweden's future competitiveness. The research shall play a significant role in solving major environmental problems and contribute to the development of a sustainable society. The potential for achieving industrial applications shall be realized as far as possible.

## Programs

There is only one relevant program funded today by MISTRA:  Energy efficient reduction of exhaust emissions from vehicles.

With growing evidence, global warming appears to be one of the largest environmental challenges presently facing us. The emission of anthropogenic CO2 is the largest factor contributing to global warming.

As a large fraction of the CO2 emissions originates from the transport sector measures have to be taken here. This can be in the form of sustainable (bio-) fuels and fuel cells using hydrogen produced from water and solar-cells. However, an important short-term contribution is to develop and stimulate the use of more fuel-efficient engines.

The objective of the Mistra program Energy Efficient Exhaust Emissions (E4) is to demonstrate very low emission levels (0.005 g PM/kWh and 0.1 g NOx/kWh) with an engine exhibiting low CO2 emissions. The program is a joint academic/industrial effort, involving seven subprojects.

**CONTACT INFORMATION**

*Dr. Chris Folkesson Welch*
*MISTRA, SE-11120 Stockholm, Sweden*
*Tel: + 46 8 791 1026 Fax: + 46 8 791 10 29*
*Website: www.mistra.org E-mail: chris.welch@mistra.org*

## SWEDISH CIVIL CONTINGENCIES AGENCY

The (Swedish Civil Contingencies Agency) MSB is an authority responsible for all work related to public safety, emergency management, and civil defence. The MSB replaced the Swedish Rescue Services Agency, the Swedish Emergency Management Agency, and the Swedish National Board of Psychological Defence all of which ceased operations and closed down on 31st December 2008.

MSB's research field is broad and includes research in several scientific disciplines. It is characterized by a diverse, needs-driven and long-term project whose priorities build on the research and Rescue Services Agency Emergency Management Agency previously owned.

**CONTACT INFORMATION**

www.msbmyndigheten.se

## THE CONSTRUCTION INDUSTRY'S ORGANIZATION FOR RESEARCH AND DEVELOPMENT

The Construction industry's organization for research and development (SBUF) is the Construction industry's organization for research and development with approximately 3.000 affiliated companies in Sweden.

SBUF aims to promote development in the building process to create more businesslike conditions for contractors enabling them to make use of research and conduct development work. Further aims are:

- To improve the effectiveness ranging from raw material to complete product and from idea to destruction by means of development and collaboration,
- to promote collaboration for development with specialized contractors in order to improve the effectiveness in the entire building sector,
- to stimulate and support research at the technical universities on questions vital to contractors and,
- to support development of methods and equipment making construction, service and maintenance more attractive and better adjusted to construction workers,
- to support research and development being the basis for performance-oriented public rules and standards.

SBUF takes part in several larger research programmes based on cooperation with companies and technical universities. In these programmes it is possible to recognize several R&D activities aimed at the Road Transport Sector.

**CONTACT INFORMATION**

www.sbuf.se

## THE SWEDISH ENVIRONMENTAL PROTECTION AGENCY

The Swedish EPA is the Swedish governmental agency that has an overview of conditions in the environment and progress in environmental policy. The Swedish EPA also has the task of coordinating, monitoring and evaluating efforts, involving many agencies, to meet Sweden's environmental objectives.

The Agency remit comprises:

- compiling knowledge and documentation to develop environmental efforts
- helping to develop environmental policy by providing the Government with a sound basis for decisions and by giving an impetus to EU and international efforts
- Joining in environmental policy implementation by acting in such a way as to ensure compliance with the Swedish Environmental Code and achievement of the national environmental objectives.

The mission as a funder of research is to encourage research that is relevant to Sweden's national environmental quality objectives, the Environmental Code, and international negotiations. Applications for research funds are only accepted during the currency of application call, with the exception of those relating to conferences and EU projects. The Swedish EPA's allocation for environmental research in 2012 is about SEK 100 million. Only a small portion of the research budget is used in the field of transport.

### Programmes related to transport

**Governing transitions towards Low-Carbon Energy and Transport Systems for 2050.**
**(LETS 2050)**
The Swedish EPA in conjunction with the Swedish Transport Administration, The Swedish Energy Agency (STEM) and The Swedish Governmental Agency for Innovation Systems (VINNOVA) are jointly investing SEK 36.9 million for the research in LETS 2050 during January 2009 to June 2013. Approximately 25 researchers from a number of institutions mainly at Lund University are involved.

The core mission of the LETS research program is to identify, explore and suggest ways that Sweden can implement low-carbon energy and transport systems for 2050, in order to reach the ambitious climate policy objectives suggested by the 2 °C target. The overarching research question is: *What societal transitions are implied by low-carbon futures and how can these transitions be governed and implemented to meet challenging climate policy objectives?*

The program consists of six research areas or work packages:

- Future Policy Scenarios and Alternative Pathways for LETS
- Governance: Developing Institutions and Policy for LETS
- Urban and regional planning and infrastructure for LETS
- Markets, industry and policy for bio energy
- Citizen-Consumers and Voluntary Instruments for LETS
- Logistics and Goods Transport

**CONTACT INFORMATION**

www.naturvardsverket.se

# THE SWEDISH TRANSPORT ADMINISTRATION

Trafikverket, the Swedish Transport Administration, mission is, based on an intermodal perspective, to make the long-term infrastructure planning for the road, rail, sea and air sectors and to construct, maintain and operation of state roads and railways. Trafikverket shall create the conditions for an economically efficient, internationally competitive and sustainable transport system. The transport policy objectives, the national transport plan and regional counterparts, are the most important starting points.

## Targets and objectives for Research and Innovation (R & I)

The main objectives for R & I are:

- Well-structured R & I portfolios with good potential for control and monitoring of R & I.
- Developed innovative capacity within Trafikverket by a professionalized R & handling.
- Increased utilization of R & I through more applicable R & D results.
- More effective collaboration with R & I providers.

Much of the ongoing R & I is about opportunities to reduce costs both for operation and maintenance of investments, while maintaining good quality of infrastructure, thereby supporting the challenge "More value for money". Another major area is novel solutions to achieve and support the challenge "Robust and reliable infrastructure." These efforts are important for achieving better punctuality on the railway and a good availability on the roads.

The efforts to support the challenge"An energy efficient transportation system" have come a long way. Future activities will focus on collaboration with other stakeholders to develop applicable solutions for an energy efficient transportation system. The planned R & I activities that support challenges "Efficient travel and transport in metropolitan areas," "Efficient transport links for business" and "A modern authority" is of comparatively limited extent, but are increasing.

The R & I is guided by the DG's directive:

- Research for new knowledge.
- Development and demonstration of products and services in road and rail system.

- The development of working methods, support systems and choice of materials.
- Development of the economic and physical planning processes.
- Preparations for the utilization of results through development of a basis for development and change of regulations and standards. "

For 2011, Trafikverket's total R & I activities sums up to 54 million euro.

## The administration; in seven portfolios

**An energy-efficient transport system**

The purpose of the R & I portfolio, "An energy-efficient transport system" is to use new and present knowledge to develop and demonstrate new solutions that contribute to eye up the transformation towards a more energy efficient transport system. Some main tasks are:

- Methods and key performance indicators to evaluate the overall energy efficiency of the transport
- Sustainability impact assessments for planning, implementation and follow-up of investment and improvement.
- Procurement and monitoring methods for energy-efficient construction, maintenance and operating of infrastructure facilities.
- Instruments for energy efficient and safe speeds on the road
- Development of energy and fossil-free machinery and vehicles.
- Pursue the development of energy efficient equipment and installations.
- A robust, proven and environmentally sound technology to develop the idea of electrification of heavy road transport.
- Exploring the potential of alternative energy sources connected to the infrastructure and the infrastructure as an energy source or storage.
- Solutions for the transfer of freight to rail and sea.
- Solutions for increased share of walking, cycling and public transport.
- Demonstrate climate, environment and security of supply aspects of the transport system.

**Well-functioning travel and transport in metropolitan areas**

The most important goals are:

- Contribute to an increase in the public transport share of passenger trips in urban areas
- Reduce the congestion in urban areas
- Increase the accessibility of destinations for the goods and service transport in cities
- Make the environment in big cities more attractive
- The portfolio is focusing on verification, demonstration and implementation of new knowledge and solutions contribute to the development of attractive, accessible and functional urban regions within:
- Traffic management
- Integrate transport issues in urban and regional development
- Develop services, pricing and capacity allocation that balances punctuality
- Reduce noise and emissions in urban areas

- Improved accessibility for bus and taxi
- Enhanced capacity and reliability of rail services
- Increased and safe bicycle and pedestrian traffic
- Development of a cohesive pedestrian and bicycle paths

**Efficient transport links for industry**

For industrial competitiveness requires well-functioning goods transport in a robust infrastructure with an associated regulatory framework that is harmonized and effectively. Freight transport is highly international, which means that well-functioning international linkages are particularly important. The tourism is rapidly growing and is dependent on the existence of good and sustainable travel opportunities to tourist destinations.

The purpose of the portfolio is to increase knowledge, development and demonstration to show the possibilities of improving transport conditions for long-distance freight transport, tourism and business travelers.

The availability and reliability for long distance freight transport in the strategic network

More attractive climate and smarter transport options for tourism

**Robust and reliable infrastructure**

The goal is to deliver quality of road and rail system and that citizens and businesses will find relevant information in case of interruption.

The results from the portfolio will contribute to the road and rail sector through better operation, maintenance and construction, and can;

- Reduce disturbances in traffic
- Improve and streamline the traffic - develop disruption information
- Improve safety on the road and rail
- Manage and prevent the consequences of climate change
- Reduce the total life cycle cost of infrastructure
- Ensure sustainable road and rail maintenance
- Design the systems for the interaction between vehicles, infrastructure and traffic control to improve road safety
- Prevent suicide, in particular on the railway

**More value for money**

The purpose of the portfolio is to create more value for money through effective planning processes. The development of the transport system will be done with innovative solutions related to social planning and interaction between stakeholders. Internal processes and procedures will be developed. Improvements in the basis for procurement will be made in a systematic and well planned manner. The planning has a strong focus on reducing maintenance costs.

This will lead to:

- More effective coordinated and intermodal planning
- More efficient internal operations
- Contribute to increased productivity in the construction industry

**Trafikverket, a modern administration**

The challenge is to develop working methods that will enable us to carry out the mission in an efficient and innovative way. This is especially important in the cooperation with the users and in the international work.

The main focus is through effective and innovative approaches to develop and deliver services based on customer needs, able to attract and retain skilled employees, strengthening the identity and image and ensure efficiency of work in the EU and the international work:

- Customers should be pleased with the Trafikverket deliverables and services
- Trafikverket R & I should give an increased yield
- Trafikverket is an active participant in international and EU affairs
- Trafikverket is an attractive employer
- Trafikverket has a well recognized brand

**Strategic Initiatives**

The purpose of the portfolio is to develop and manage strategic R & I collaborations, capturing key strategic development needs not covered by other challenges or that go beyond today´s horizon.

The problem-oriented challenges do not fully cover Trafikverket's overall development needs. E.g. the R & I agenda needs to be complemented with a needs analysis on a much broader business and requirements. It is especially important when taking into account the transport policy targets and balance development needs against the transport policy benefits. Such analyzes should be carried out in conjunction with other operational planning and will provide the basis for long-term programs, beyond the horizon we see today. There are also strategic R & I activities, applicable e.g. at the societal challenges.

## CONTACT INFORMATION

*www.trafikverket.se*

# UNITED KINGDOM

(Original source ERA-NET TRANSPORT. Updated by FEHRL, 2010)

## COUNTRY DESCRIPTION AND TRANSPORT INFRASTRUCTURE UK

The United Kingdom has a population of around 61.7 million people (2009) and with the size of around 244,820 sq km it is one of the bigger countries in the European Union. The average population density is around 243 people per sq km. Population (mid 2009) of the constituent countries of United Kingdom is estimated as follows53, England 51,810,000 (83,9 per cent of the total UK population), Scotland 5,194,000 (8,4 per cent), Wales 2,999,000 (4,9 per cent), Northern Ireland 1,789,000 (2,9 per cent). The majority of population lives in urban areas. London consists of 7,754,000 people alone.

The United Kingdom's geography and landscape is varied and diverse. In total it is estimated that the UK is based on over one thousand small islands.

Most of England consists of rolling lowland terrain, divided east from west by more hilly terrain: in the north of the Cumbrian Mountains and the Tees-Exe line, through the Pennines Highland moors, the limestone hills of the Peak District into the Cotswolds and Chiltons off southern England. The main rivers are the Thames, the Severn, and the Trent & Ouse. Major cities are London, Birmingham, Manchester, Sheffield, Liverpool, Leeds, Bristol and Newcastle upon Tyne.

Wales is mostly mountainous the highest peak is the Snowdon (1.085 m). North of the mainland is the island of Anglesey. The capital city is Cardiff, located in the south of Wales. Scotland's geography is varied, with central lowlands, where most of the population lives, and more mountainous terrain to the north and south. The highest mountain of the UK Ben Nevis (1.343 m) lies in the Grampians in the North of Scotland. There are many long and deep sea arms, firths, and lochs. A multitude of islands west and north of Scotland are also included, notably the Hebrides, Orkney Islands and Shetland Islands. Main cities are Edinburgh, Glasgow and Aberdeen.

Northern Ireland, making up the north-eastern part of Ireland, is mostly hilly. The main cities are Belfast and Londonderry.54

The United Kingdom has only one landside border. It is 360 km long across Ireland. The road transport network of the UK consists in total of about 391.700 km roads, of which 161.715 km are classified roads and about 3.477 km are motorways.55

[53] Office for National Statistics, UK population, 2009.
[54] Countryside Survey 2000 (CS2000)
[55] DFT, Public road length: by class of road and country: 2002.

The railway network has a total length of about 5.167 km electrified and about 11.485 km non-electrified tracks with 2.508 stations in total.56

The United Kingdom has several sea harbours like Aberdeen, Bristol, Harwich or the Humber ports. Besides that the UK has a dense inland waterway system with a total length of 2.127 km, of which 1.065 are in freight use. The Yorkshire and the Humber region have the largest waterway track, whereas the London region has the highest percentage (55%) of inland waterway transport.57

The United Kingdom has several larger and smaller civil airports. The most important with runways longer than 3.000 meter are London Heathrow, London Gatwick, London Stansted, Birmingham and Manchester Airport.

## ROAD TRANSPORT INDUSTRY

The United Kingdom has traditional steel- and ship building industry and a modern automotive, aviation and aerospace industry (the last for military and civil purpose).

Transport policy related to the general goals

The current British transport policy is still deeply affected by the political decisions during the 80ties and 90ties and the strong tendency at that time towards liberalism and deregulation – the major transport research institute (TRL) was privatized. In 1997 with their first legislative period the new Labour government aimed towards new regulations and coordination in transport and made problem solving in the transport sector to a central policy goal and a long term commitment (10 years plan).

A long term strategy for a modern, efficient and sustainable transport system backed up by sustained high levels of investment over the next 15 years was unveiled on the 20th July 2004 by Transport Secretary, Alistair Darling. The Future of Transport White Paper looks at the factors that will shape travel and transport over the next thirty years and sets out how the Government will respond to the increasing demand for travel, maximising the benefits.

The White Paper identifies a need for a transport network that can meet the challenges of a growing economy and the increasing demand for travel, but can also achieve our environmental objectives. This means coherent transport networks with:

- the road network providing a more reliable and freer-flowing service for both personal travel and freight, with people able to make informed choices about how and when they travel;
- the rail network providing a fast, reliable and efficient service, particularly for interurban journeys and commuting into large urban areas;
- bus services that are reliable, flexible, convenient and tailored to local needs;
- making walking and cycling a real alternative for local trips; and
- ports and airports providing improved international and domestic links.

[56] DFT, National railways: route and stations open for traffic at end of year: 2002.
[57] Waterborne freight benchmark report, 2003.

The strategy is built around three central themes:

First, sustained investment over the long term. The spending review settlement honours this Government's commitment to deliver sustained improvements to transport networks. Spending by the Department for Transport will rise by an annual average of 4.5 per cent in real terms between 2005-06 and 2007-08. This includes an additional £1.7 billion GBP (2.4 billion Euro) transport reform package for the railways, over and above 10 Year Plan provision. 10 Year Plan spending has also been increased by £0.5 billion GBP (0.71 billion Euro) each year from 2006-07. This higher level of spending will then grow in real terms (by 2.25 per cent each year) through to 2015. Meanwhile, the other reforms the government is putting in place will ensure that each pound of investment works harder for the British taxpayer.

Secondly, improvements in transport management. The Government is reorganising the rail industry to improve performance, drive down costs and get better value from public spending. To put our plans into effect, The Government's Department for Transport (DfT) will legislate to put in place a structure where Government sets the strategy and controls public expenditure. Better traffic management will ease congestion on our road network. Where it makes sense, economically and environmentally, DfT will add capacity to our road network. Where this is done, steps will be taken to ensure that the benefits are locked in, and that the design is sympathetic to the environment. Options include, for example, measures such as tolling on new roads and the introduction of carpooling (High Occupancy Vehicle) lanes, where these make sense. DfT is also encouraging local authorities to procure bus services through Quality Contracts, where this is linked to a wider strategy including bold measures to reduce congestion, or modification of rail services.

And thirdly, planning ahead. The long term trends in travel are evident to all. The UK cannot build our way out of the problems it faces on our road networks. And doing nothing is not an option. So Government will lead the debate on road pricing. DfT will work with stakeholders to establish how and when pricing might provide the reliability and standards road users want. And it will work to ensure that the choices faced, together with their full costs and benefits, are well understood. The Government is also committed to sharing decision-making with regional and local stakeholders, and to ensure that regional and local planning is based on a shared view of priorities, deliverability and affordability. And at all levels of Government - national, local or regional - it will be ensured that transport decisions are taken alongside decisions on liveability, sustainable communities and other policy areas.

Underlining these themes, and an important underlying objective of our strategy, is balancing the need to travel with the need to improve quality of life. This means seeking solutions that meet long term economic, social and environmental goals. Achieving this objective will clearly contribute to the objectives of the UK sustainable development strategy58. For example, DfT is working hard to deliver improvements in design and technology to improve air quality and reduce greenhouse gas emissions; and will ensure that the wider impacts of future developments are reflected in appropriate appraisal methodologies.

[58] Department for Transport, Webpage, http://www.dft.gov.uk/stellent/groups/dft_about/documents/page/dft_about_031269.hcsp#P35_7468#P35_7468

The White Paper, The Future of Air Transport, published on 16 December 2003, sets out a strategic framework for the development of airport capacity in the United Kingdom over the next 30 years, against the wider context of the air transport sector.

### Mapping of the country specific transport research funding system

In the UK there are mainly two different ways of requesting research funding: Invitation and Open Calls. Department for Transport (DfT) only funds transport research by invitation (exception: the small research programme New Horizons). Invitation means, that research interests are specified by DfT, and research contractors are invited to tender for the work. Normally, between 4 and 6 research organisations are invited to tender for a particular project.

The Office of Science and Technology (OST), located in the DTI, is responsible for the organisation of research funding in six Research Councils. The RCs are non-departmental public bodies. The actual six Councils are the Biotechnology and Biological Sciences Research Council (BBSRC), the Economic and Social Research Council (ESRC), the Engineering and Physical Sciences Research Council (EPSRC), the Medical Research Council (MRC), the Natural Environment Research Council (NERC) and the Particle Physics and Astronomy Research Council (PPARC).

The above mentioned research councils support research activities, in universities, through the provision of funding (institutional funding) with research programmes (programme/project funding) and individual grants (structural funding). The Research Councils use both Open calls and Directed programmes. 70% of EPSRC research funding is distributed by Open Calls. The overall coordination of the research councils is conducted by Federation of Research Councils UK (RCUK).

### National RTD programmes for road transport from the last 5 years

The two relevant initiatives are the Technology Strategy Board (TSB) "Innovation Platforms: Low Carbon Vehicles and Intelligent Transport Systems & Services (ITSS). Innovation platforms "focus on specific societal challenges where the UK Government is taking action through policy, regulation, procurement or fiscal measures to tackle the problem". These Platforms bring together support from the TSB, Department for Transport (DfT), the Engineering & Physical Sciences Research Council (EPSRC), as well as many of the Regional Development Agencies and Devolved Administrations [i.e. Scotland, Wales and Northern Ireland].

By way of information, the Technology Strategy Board is an executive non-departmental public body (NDPB), established by the Government in 2007 and sponsored by the Department for Business, Innovation and Skills (BIS). The activities of the Technology Strategy Board are jointly supported and funded by BIS and other government departments, the devolved administrations, regional development agencies and research councils.

### Low Carbon Vehicles Innovation Platform

The Low Carbon Vehicles Innovation Platform aims to maximise the benefit to UK-based businesses of the rapidly-developing low carbon vehicles market, and to help accelerate the adoption of low carbon vehicles in the UK.

The growing pressure from customers and regulators for more environmentally friendly vehicles is creating new business opportunities for both the established industry and innovative new entrants.

The Low Carbon Vehicles Innovation Platform invests jointly with the industry and other funders in interventions that promote UK-based R&D in low carbon vehicle technologies, and strengthen the relevant supply chains within the UK.

The Technology Strategy Board launched the Low Carbon Vehicles Innovation Platform in September 2007 and activity is expected to continue for 5-10 years.

### The priorities

To identify the innovation platform's priorities Technology Strategy Board reviewed published roadmaps and held a number of stakeholder consultations. These priorities continue to be guided by an industry-led steering group and are also informed by the Department for Business Innovation & Skills (BIS)-funded New Automotive Innovation & Growth Team Technology Roadmap and associated work, which has recently been released by the UK automotive industry.

### The Integrated Delivery Programme

The Integrated Delivery Programme is a £200m investment programme, jointly funded by Government and business that will help to speed up the introduction of new low carbon vehicles onto Britain's roads. The Programme will co-ordinate the UK's low carbon vehicle activity from initial strategic research through collaborative research and development, leading to the production of demonstration vehicles.

To date, the Department for Transport, the Engineering and Physical Sciences Research Council (EPSRC), Advantage West Midlands and One North East have agreed to invest in the programme, and will seek further support from other regional development agencies and the devolved administrations.

### The Integrated Delivery Programme will feature:

- A strategic programme of university-based research targeted towards future technologies for which there are good prospects of commercialisation in the long term
- Industry-led advisory panels that will help shape the technological direction and priorities for the programme. It will be composed of representatives of leading elements of the UK automotive industry and low carbon vehicle technology developers, as well as relevant academic experts
- Flexible rolling opportunities for industry to seek support for high quality collaborative research and development proposals which take technology through to system or vehicle concept readiness
- Funding to support trialling and demonstration of particularly innovative lower carbon vehicle options.
- The programme will initially run for 5 years and be managed by a Funder's Panel with an industry focussed Advisory Panel providing input into the areas of strategic research needed. There will be several separate competitions throughout the five years, with the subject of

these competitions based on strategic research and development needs as advised by the Advisory Panel.

- The competitions are being run under the usual collaborative R&D process.
- Integrated Delivery Programme – Competition 1
- Ultra-Efficient Systems for the Market Advancement of Electric and Hybrid Vehicles - now closed.

### Integrated Delivery Programme - Competition 2

Aligned to the New Automotive Innovation & Growth Team (NAIGT) roadmap and research agenda, the competition aims to accelerate research and development leading to the reduction of carbon emissions from mass market road vehicles - now closed for expressions of interest.

### Integrated Delivery Programme - Competition 3

Now closed for expressions of interest - This call invites outline proposals for small-scale, short term feasibility projects exploring future technologies that might contribute to the reduction of CO2 emissions from the UK vehicle market and so help support the uptake of low carbon vehicles. This call is being run in conjunction with the Technology Strategy Board's Integrated Delivery Programme (IDP) where it forms the strategic portfolio of that activity, supporting the flow of research ideas into the IDP from academia.

Submissions to this call will be initially assessed through project outlines. Those outlines that are successful will be invited to submit a full, more detailed proposal. Subject to the quality of the submissions received, up to £3 million is available for this call, which is expected to support projects of between 12 and 18 months in duration.

### The Ultra Low Carbon Vehicle Demonstrator

The ultra low carbon vehicle demonstration competition aims to see up to over 250 new innovative cars on the road in several locations around the UK by the end of 2009 and recognises the considerable value of demonstrating new and emerging low carbon vehicle technology in real world situations.

The demonstration competition make available funding of £20m or more (increased from original budget of £10m) and will provide some of the costs for business-led demonstration projects of vehicles with tailpipe emissions of 50g CO2/km or less and a significant zero tailpipe emission only range.

To ensure that this demonstration fully considers the attitudes of consumers, discussions will be held with drivers. The Department for Innovation, Universities and Skills (DIUS) will support this activity through the Sciencewise ERC, providing the networking across Government to ensure that the views of consumers are taken into account in the development of Government policy in this area.

### Competition scope

Over 250 passenger cars on the road by late 2009 (original target was 100 cars)

Vehicles to have less than 50g CO2/km tailpipe emissions and a significant zero tailpipe emission range

### Key outcomes

Real-world testing through in-vehicle data logging

Exposure to multiple drivers and drive cycles

Opportunity to understand customer perceptions and concerns

Identify challenges with infrastructure interface

Inform future demonstrator activity within the Low Carbon Vehicle Integrated Delivery Programme

### Timing

The competition is now closed for applications. Details of the successful projects will be published shortly.

### Transport Systems and Services (ITSS) Innovation Platform

The Intelligent Transport Systems and Services (ITSS) Innovation Platform helps UK businesses develop innovative products and services in response to new market opportunities that may result from government interventions in transport.

Traffic congestion is a specific challenge because of its impact on the economy, climate change and quality of life. We take a broad view of congestion, and are exploring the wider issues around the mobility of people and the transport of goods by asking: 'How can we move people and goods more intelligently?'

Through a series of strategic interventions, encouragement is given to private-sector R&D with the potential to improve efficiencies in the overall transport network and/or promote lower-carbon travel choices.

Two approaches are needed to achieve this. First, taking a user-led systems approach, there is a need to identify and address the gaps in the UK's current use of available technologies and services. Second, human behaviours and attitudes in this context should be analysed, and find how to influence people's decision-making by providing them with the appropriate tools and information.

The ITSS Innovation Platform was launched in November 2005. It invests jointly with industry and other funders in projects that promote UK-based R&D in this area and strengthen the relevant supply chains within the UK. Funds will be committed for new projects initially until about 2012, with activity on those projects continuing beyond that.

### Future priorities

The priority activities for the innovation platform were identified from consultations with other organisations, and these activities are aligned with the five goals contained in the DfT's strategy for a sustainable transport system.

Activities are being considered in the following areas over the next five years:

- Informed incident management
- Informed safety
- Informed vehicles and infrastructure
- Better-informed public transport.

Extensive consultations will be held before each of these interventions, including workshops with participants from industry, academia and the public sector. These workshops will guide in defining and working out the challenges to overcome in each area. The above list will be updated with the feedback received from other organizations and lessons learnt from existing projects.

### Future priorities: 'Informed incident management'

In 2010 emphasis will be on 'Informed incident management', focusing on how to provide integrated and tailored information services that will enable a more effective and better-coordinated response to incidents in a disrupted transport network. This activity will affect all those involved in responding to incidents, or managing the impacts resulting from an incident; for example, immediate incident management teams, police, emergency services and the public. It will also consider how to deploy reliable and credible information to manage traffic disruption as a result of the incident.

The aim is to address the issues and barriers that prevent integrated systems and services being deployed for effective recovery from incidents, and where possible to use tools such as synthetic environments and response modelling to see how human behaviour and system architecture technologies can be balanced to reduce the time of recovery and impacts to congestion after an incident. In this context 'incidents' are viewed as including organised events, accidents and natural weather incidents such as flooding.

# ANNEX

Transport Research Knowledge Centre EXTR@WEB - EXploitation of Transport Research Results via the WEB

Link: http://europa.eu.int/comm/transport/extra/web/index.cfm (obselete)

FP5 Project of DG TREN coordinated by GOPA-Cartermill International, Brussels (1.9.2002 - 31.8.2006).

EXTR@Web attempts to collect, structure, analyse and disseminate transport research results in the ERA, as well as selected global transport research programmes and projects. The aim is to support the research and policy-making by providing timely access to the latest results and their implications.

The key objectives of EXTR@Web are:

- To establish a comprehensive web-based Knowledge Centre, providing structured and timely access to both detailed and user-oriented summary information on transport research programmes and their results across Europe.
- To establish a common best practice scheme for the structure and content of the reporting of transport research results.
- To provide high-quality analytical outputs that are structured and tailored according to the type of stakeholder and medium.
- To raise awareness of the new service, the implications of emerging results, and the wider opportunities under national research programmes across Europe as a whole.

There is a database offering a detailed search for European programmes and projects (EC and national).

In December 2004 the report "TRANSPORT RESEARCH IN THE EUROPEAN RESEARCH AREA - A guide to European, international and national programmes and other research activities, revised version".

On 72 pages it provides an overview of European, international and national transport research programmes (focus on RTD, not so much implementation or deployment) of 30 countries.

**Listed countries (page in the EXTR@Web report):**

| | | |
|---|---|---|
| AUSTRIA | GREECE | NORWAY |
| BELGIUM | HUNGARY | POLAND |
| BULGARIA | ICELAND | PORTUGAL |
| CYPRUS | IRELAND | ROMANIA |
| CZECH REPUBLIC | ITALY | SLOVAKIA |
| DENMARK | LATVIA | SLOVENIA |
| ESTONIA | LITHUANIA | SPAIN |
| FINLAND | LUXEMBOURG | SWEDEN |
| FRANCE | MALTA | SWITZERLAND |
| GERMANY | NETHERLANDS | UNITED KINGDOM |

# ERA-NET TRANSPORT

http://www.transport-era.net

ERA-NET Transport is a FP6 initiative which promotes the cooperation between national transport research activities by creating tools and means for transnational research cooperation. The programme aims to develop a European vision for transport research. It aims to supply transport and research policy-makers with information about the future challenges and European research priorities. Hereby ERA-NET TRANSPORT contributes to improve the outcome of national transport research programmes in terms of quality, efficiency and effectiveness.

The **objectives** of the ERA-NET TRANSPORT are to:

- Develop model procedures and rule sets for trans-national research cooperation and co-ordination in order to establish a basis for sustainable European research framework.
- Map the national programmes or transport R&D activities analysing the objectives, main players and approaches.
- Develop a shared vision for European transport research and identify the research topics that are most fit for cooperation and integration.
- Test and implement the cooperation and co-ordination activities, the model rules and procedures on selected topics.
- Draw conclusions on the basis of monitoring and evaluating practical experiences in order to influence future national, regional and/or European transport research and policy planning.
- Increase the knowledge of trans-national research, its methods, best-practices and possibilities.

**Partners** are Federal Ministries of 12 EU countries, coordinator is TÜV-Akademie Rheinland GmbH. Some are also ERTRAC members (e.g. A. Dorda of Austria, M. White, UK)

**PUBLICATIONS:**

**Overview of research programming and cooperation mechanism,** Jan 2005, 101 pages.

For 12 countries (A, B, D, DK, EST, FI, FR, NL, NO, PO, SE, UK) on 5-10 pages per state an overview of the following is given:

Contextual patterns: Country description and Transport infrastructure, Transport Industries, Transport research policy related general goals

Transport research and innovation system: Mapping of the country specific transport research funding system, Mapping of relevant transport research organisations,

Policy process description along the policy circle: Policy formulation and policy determination, Policy implementation and policy dissemination, Policy evaluation and policy monitoring

Institutional barriers for cooperation in transport research: Policy and administrative barriers, Legal and budgetary barriers

**Trans-national Transport Research Road map**, Sept. 2004, 121 pages incl. annexes:

Lists 235 transport research programmes for air, road, rail and waterborne transport from 17 countries and analyses them according several general criteria like "addressing policy objectives", "addressing policy tools", transport sector (freight or passengers), different "fields of research". Plus short benchmarking with FP6, Joint Transport Research Committee of OECD, US and Japan.

# ERA-NET ROAD

http://www.eranetroad.org/

ERA-NET ROAD is a commitment by eleven National Road Administrations to work in partnership to develop joint research programmes financed through joint funds. They already manage between them research programmes with a combined annual budget of around € 150M. ERA-NET ROAD will also assist those National Road Administrations without research programmes to develop them and implement research in a manner that contributes to European integration. It brings about a joint vision and research programme, with joint targets, funds and calls for research. It will deliver results in a strict timeframe.

**The Objectives**

ERA-NET ROAD is a four-year programme running from June 2005 – May 2009 that focuses on initiation and coordination of research relating to the management and operation of the strategic road network. The primary objective is to have achieved by May 2009 trans-national programmes which are strategically planned, trans-nationally funded and will have led to the mutual opening of national research programmes.

There are a number of sub-objectives to be carried out. A systematic exchange of information and best practice between National Road Administrations has to be encouraged. Beyond that complementary research themes between the partner National Road Administrations have to be identified and analysed in order to implement joint activities through the identification of opportunities of current national research projects or programmes.

Furthermore common trans-national strategies and programmes incorporating common funding and calls for proposals must be developed and implemented as well as evaluation procedures and programme management to overcome any administrative or legal barriers that may hinder cooperation.

The progress and achievements of ERA-NET ROAD are disseminated ensuring access to all results to programme managers, research strategists and end users, especially to countries and regions in Europe not yet having research programmes in road management and operation.