

NEW WAYS OF EXPERIENCING MOBILITY

through Research, Technology and Innovation



INTRODUCTION

Social, economic and technological developments are placing increasingly more complex demands on the transport system and its capacity. New technologies and innovations can significantly contribute to shaping sustainable mobility. They play an indispensable part in facing the major societal challenges such as climate change, scarcity of resources and demographic change and open up new economic opportunities for the transport sector, one of the most important economic branches in Austria.

Imprint

1st edition 2011

Media Owner and Issuer

Austrian Federal Ministry for Transport, Innovation and Technology (bmvit),
A-1010 Vienna, Renngasse 5

Content

Unit III/I4 – Mobility and Transport Technologies

Head of Unit: Evelinde Grassegger

Deputy Head of Unit: Andreas Dorda

Editor

Sarah Krautsack

Illustration, Layout and Design

ASTNEBEL KG

A-1070 Vienna, Zieglergasse 84/10

Printed by

REMAprint, Druck- und Verlagsgesellschaft m.b.H, Wien

A-1160 Vienna, Neulerchenfelder Straße 35

Translation

CREATIVE TRANSLATION

A-1090 Vienna, Alserbachstraße 15/1

Photos

page 12: Luis Fernández García L. Fdez / 2005-10-25

bmvit Project Partners:

page 12: Filmarchiv Austria,

page 14: FH OÖ Forschungs- und Entwicklungs GmbH, Gebrüder Weiss,

page 15: Montan Speditions GmbH, Rail Cargo Austria,

page 20: Diamond Aircraft Industries

Utilising research and new technologies in order to contribute to finding a solution to transport problems has a long-standing tradition in Austria and is based on the fact that the competence areas "transport and infrastructure" and "technology and innovation" are combined in one single ministry. The resulting positive synergies are reflected in a cross-policy approach to research promotion. Thus, over the last 13 years, significant impetus has been generated for the modernisation and greening of the Austrian transport system thanks to transport-related research and development (R&D) programmes totalling around € 180 mil. At the same time, this also enabled Austria to consolidate its technological competence and market leadership, thus substantially contributing to increasing the country's overall competitiveness as a business location.

Released in 2011, the White Paper of the European Commission for a competitive and sustainable transport system reflects the Austrian approach. This publication sets great store by the problem-solving potential of research, technology and innovation (RTI) in dealing with the challenges of the coming decades. Due to its geographic location in the heart of Europe as a hub for international flows of people and goods, Austria is faced with particular challenges. However, it also has the opportunity to contribute innovative approaches to pan-European transport solutions. Interoperability, intermodality and rapid breakthroughs of transport innovations (key words: electromobility, telematics) are central issues which need to be dealt with by a combination of transport and technology policy.

For its part, bmvit introduced the concept of "Strategic Topic Management" as an answer to the increasingly more complex questions arising in the innovation system. Insofar as this concerns the topic of "mobility", every available opportunity for intervention is taken advantage of in a comprehensive and targeted manner throughout the entire innovation path. In addition to promoting RTI directly, other instruments such as platforms, international networking, regulations, public procurement and training measures are advanced. Alongside RTI strategies and technological roadmaps, this aims to put research findings into practice more quickly and systematically in the future.

At bmvit, mobility is dealt with as a priority technology topic by Unit I4 – Mobility and Transport Technologies in the innovation division of the section for Innovation and Telecommunication. In an integrated view of infrastructure-vehicle-users and transport-energy-ICT, innovations are supported in the areas of "alternative propulsion systems and energy carriers", "transport telematics", "intelligent infrastructure" as well as barrier-free and socially affordable mobility and environmentally-friendly and efficient transport of goods.

TABLE OF CONTENTS

7	A Roadmap for Europe
10	A Driving Force for Austria's Economy
11	Into the Future of Mobility with Innovations
12	Alternative Propulsion Systems for Clean Vehicles
13	Electromobility reduces noise and pollutants
14	New Flows of Goods in Europe
15	Trendsetter in Combined Transport
16	Innovations for the Transport Infrastructure
17	Smarter on the Way
18	Personal Mobility: breaking the mould
19	Push for Young Talent
20	Aeronautical Technologies on the Rise
21	Inspirations from Nature: Bionics
22	Fit for Europe
24	Overcoming Borders through Cooperation
25	Dissemination
26	Partner Organisations and Platforms
27	Your Team at a Glance

A ROADMAP FOR EUROPE

In its new “White Paper on Transport”, the European Commission presents a roadmap to the future for a competitive and sustainable transport system.

The underlying tone of this visionary strategy paper is that transport, as one of the most important foundations of our economy and society, will have to face new challenges in the future. Whilst the transport system in the European Union has definitely improved in the last decade in terms of efficiency, safety and security, no structural changes have taken place. This has led to rising CO₂ emissions in transport, continued dependence on the fossil energy source petroleum and increased nuisance exposure of citizens due to transport. Unless we change our way of thinking, by 2050, the percentage of CO₂ emissions will increase from its current level of 19 % (see Figure 1) to 50 % of total emissions, barely affordable oil products will continue to supply 90 % of the needs of transport sector and traffic congestion will place an increasing burden on our society.

For these reasons, the White Paper proposes the following joint course of action for sustainable reshaping of the EU transport system by 2050:

Reduction of CO₂ Emissions

Despite transport growth and increasing mobility, transport-related CO₂ emissions should be decreased by 60 % compared to the level of 1990.

Until 2006, the transport sector in the EU was the only sector which not only failed to reduce emissions but, on the contrary, actually even increased emissions (see Figure 4 on page 9). The greatest amount of emissions continues to be produced by road traffic (see Figure 2 on page 8).

Reduction of the Rate of Oil Dependency

Whilst transport has become more efficient, in the European Union, the sector still relies on oil and oil products for almost 97 % of its energy needs (see Figure 3 on page 8). The increasing scarcity of this fossil fuel and the associated rise in prices drastically impact the mobility of citizens and economic development.

Reduction of Traffic Congestion

Transport has become more environmentally-friendly, but increasing traffic volumes result in economic costs, noise, air pollution and are a burden on the population.

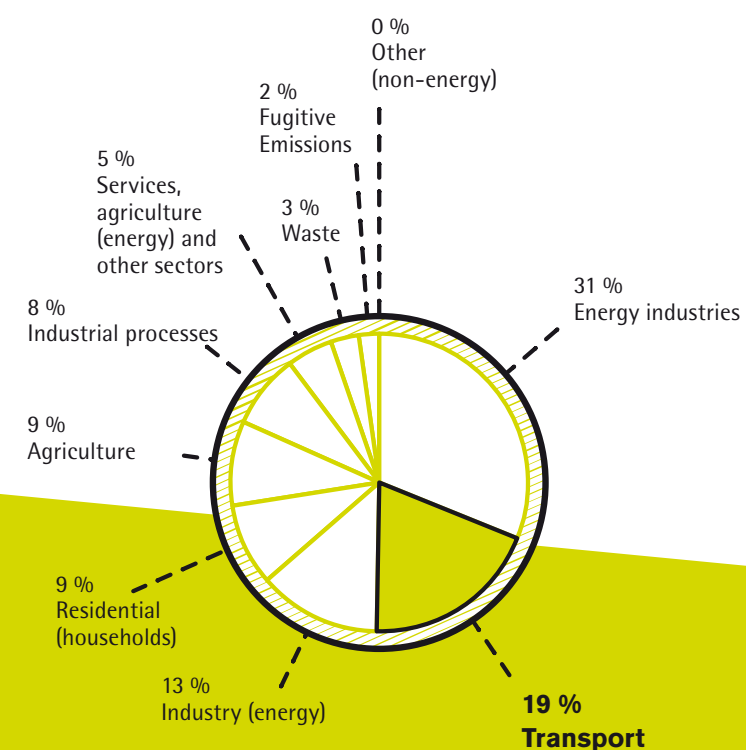


Figure 1: Distribution of total greenhouse gas emissions, EU-27, 2006
(Source: Eurostat (Environment))



Achieving these objectives and shaping a sustainable mobility system requires a systematic approach: on the one hand, innovations have to find their way into the transport system more quickly and, on the other hand a suitable transport infrastructure with an intelligent price structure and financing has to be developed.

This roadmap also deals with the most important technological innovations which should ensure a quicker and more economical transition to a more efficient and more sustainable European transport system. We are confronted with the following three requirements:

Increase in vehicle efficiency using new motors, new components and new construction methods

Increased utilisation of environmentally-friendly energy with optimised power trains and alternative fuels

Better use of infrastructure networks through intelligent information and communication systems

In order to spur on new technologies for these innovations, in analogy to the European Commission's Strategic Energy Technology (SET) Plan, a Strategic Transport Technology Plan (STTP) is being developed which aims to provide the long-term framework for future transport research and technology and implementation thereof. This plan should provide not only a list of promising transport technologies but also policy, budgetary and organisational instruments designed to contribute to increased penetration of the transport sector by innovations by the year 2050.

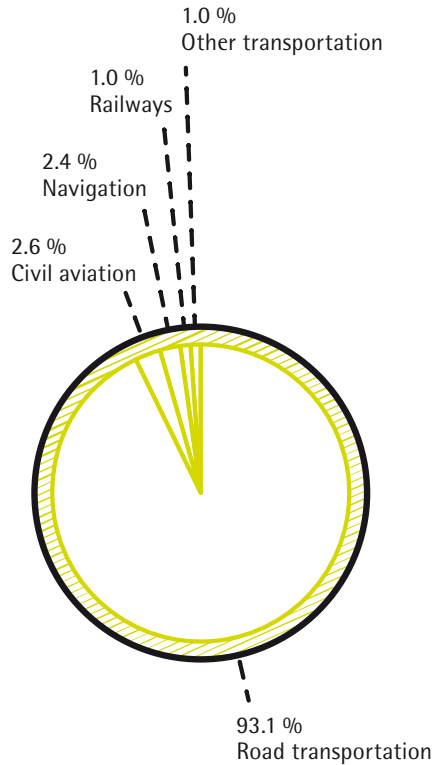


Figure 2:
Transport: Greenhouse gas emissions, by transport mode (% CO₂ equivalent)
(Source: Eurostat (Environment))

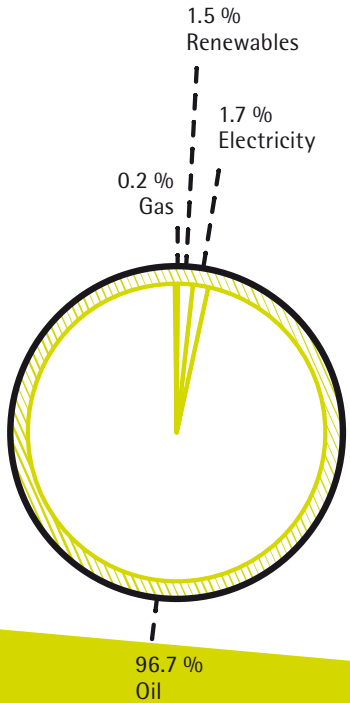


Figure 3: Energy consumption in transport, by fuel type, EU-27, 2006 (%)
(Source: Eurostat (Environment))

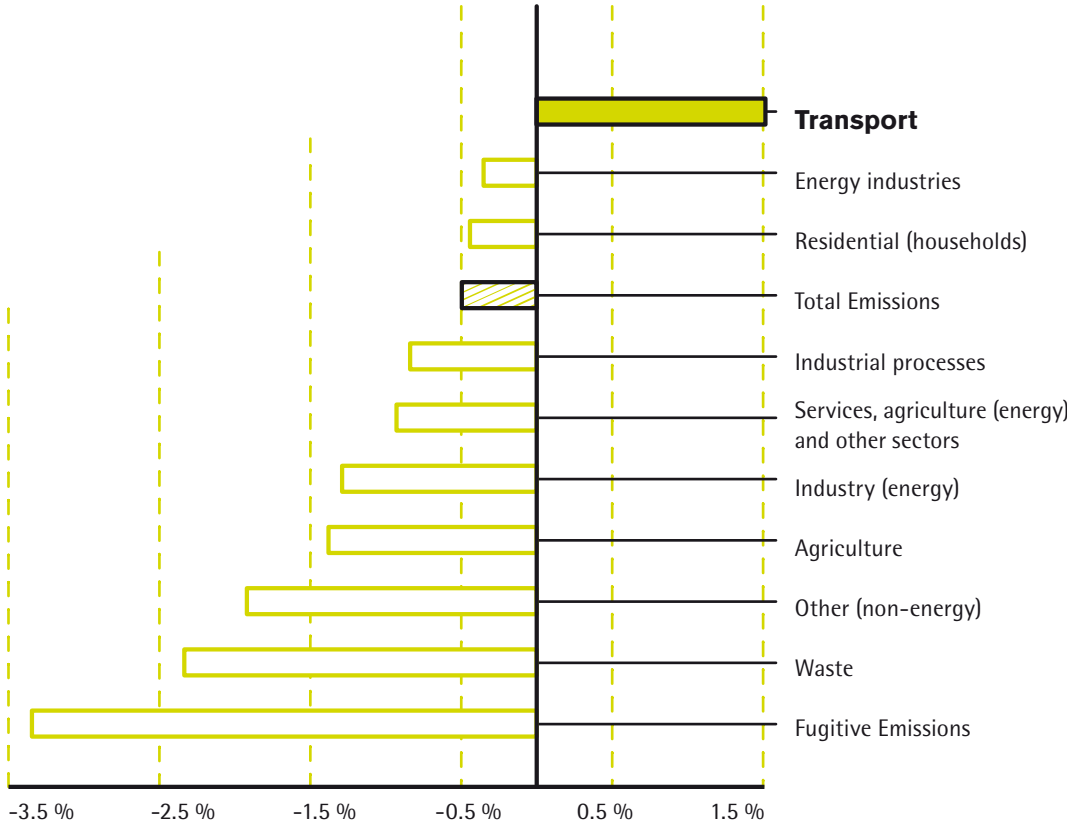


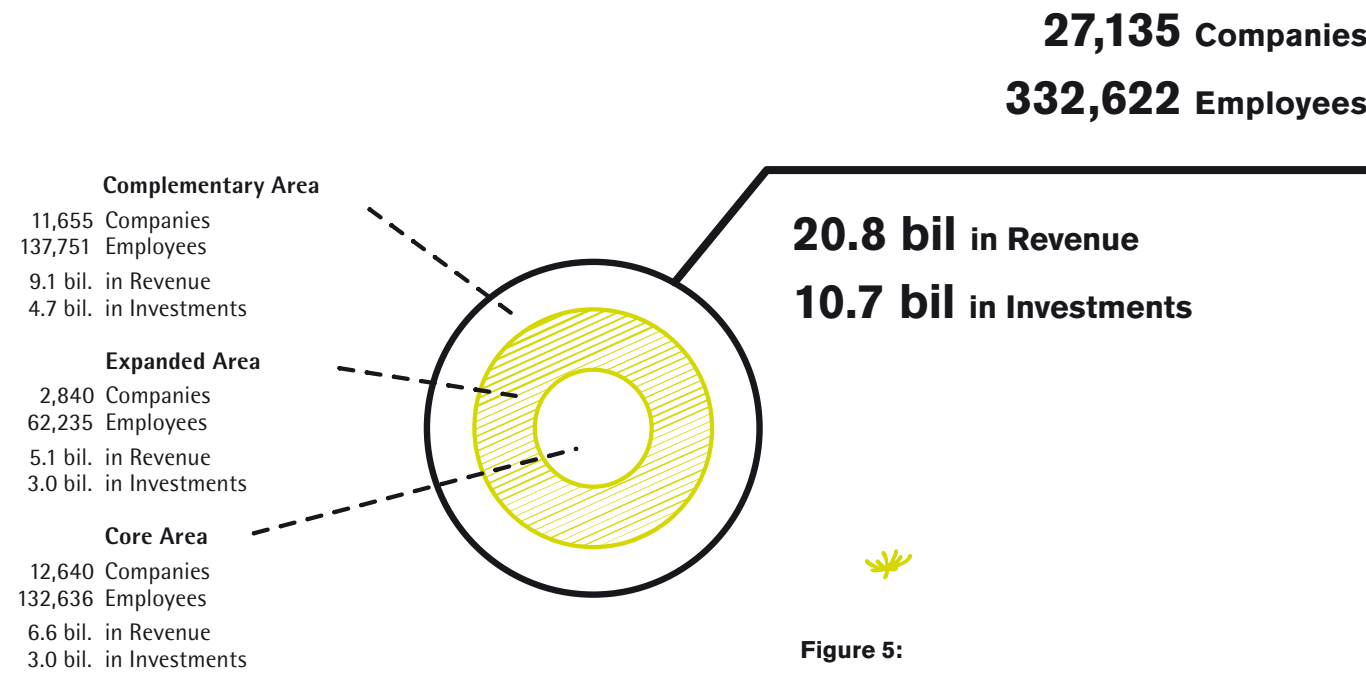
Figure 4: Total greenhouse gas emissions, 1990 to 2006 (%)
(Source: Eurostat (Environment))

A DRIVING FORCE FOR AUSTRIA'S ECONOMY

With € 630 bil. in revenue and 12 mil. employees (as of 2005), the branches of the transport sector represent a significant economic factor in the European Union. In the same year, the transport sector in Austria generated € 15 bil. and employed 241,000 employees. Consequently, this sectors represents a significant economic factor not only at the European level but also at the national level.

The study commissioned by bmvit entitled "The Economic Significance of the Transport Sector in Austria" provides in-depth insights into this important sector. The study divides the transport sector into three sub-areas: the core area, the expanded area and the complementary area. The core area includes the actual transport services, i.e. transport services on land, on water and in the air. The expanded area encompasses auxiliary services for the internal transport sector e.g. supporting and ancillary activities for transport, travel agencies, shipping companies, freight and storage. The third, complementary area includes products and services such as vehicle manufacturing, rental and trade.

The findings of the study show that in 2007, the Austrian transport sector included 27,135 companies in all three areas with a total of 332,622 employees, generating € 20.8 bil. (for the breakdown into the three areas see Figure 5). Measured against the non-agricultural private sector, the national transport sector accounted for 9.2 % of companies, 12.7 of employees, 12.8 % of revenue and thus represents a share of 7.7 % in the GDP. If we compare the 2007 figures with those from 1995, we find a 40 % increase in the number of companies, a 21 % in the number of employees and almost a doubling of revenue by 91 % over the 12 year period.



Research and Development in the Sector
The survey on research and experimental development showed that, in 2007, there were 4,301 people employed (full-time equivalent) in research and development (R&D) in the various branches of the transport sector. This corresponds to 12 % of all R&D employees in the Austrian economy with motor vehicle construction alone accounting for 8 %. This shows that the research intensity here is especially high. R&D expenditures mirror these figures. The branches of the transport sectors represent 12 % of macroeconomic R&D expenditures with motor vehicle construction alone making up 8 % here too.

Figure 5:
Companies, Employees, Revenue and Investments in the Transport Sector, in € bil, 2007
(Source: IWI, Austrian National Statistical Office, Own Calculations)

INTO THE FUTURE OF MOBILITY WITH INNOVATIONS

The Austrian Federal Government's strategy "Realising potential, increasing dynamics, Creating the Future: Becoming an Innovation Leader" aims to make Austria one of the most innovative countries in the EU by the year 2020. The strategy calls for utilising the potential of science, research, technology and innovation in order to deal with the three major societal and economic challenges of the future.

Climate Change
The development and use of novel technologies in energy use such as alternative power trains and electromobility should make a substantial contribution to reducing CO₂ emissions.

Resources
The global scarcity of energy and natural resources such as oil requires efficiency measures such as switching to new and renewable resources using technological solutions.

Quality of Life and Demographic Change
In order to guarantee a high quality of life, the societal needs arising out of demographic change must be coupled with social and product-related innovations.

Research, technology and innovation policy will contribute to solving these challenges. Because there is a very strong interplay between transport and all three major challenges, since transport both impacts and is strongly impacted by their development, transport-specific research, technology and innovation must continue to be actively promoted in order to deal with these societal challenges.

Important impetus has been created over the last 13 years in this regard. With the thematic R&D programmes MOVE (Mobility and Transport Technology; 1998–2001), IV2S (Intelligent Transport Technologies and Services; 2002–2006), its successor IV2Splus (2007–2011), the innovation promotion programme IKV and its predecessors (Combined Goods Transport; 1998–2014) as well as the aeronautics R&D programme TAKE OFF (2002–2012) totalling around € 180 mil., significant impetus has been generated for modernising and greening the Austrian transport system. This also made it possible to consolidate technological competence and market leadership in what represents a key industry in Austria.

As an answer to the increasingly more complex issues in the innovation system, "Strategic Topic Management" at bmvit actively encourages the development of strategies, roadmaps and action plans for the technology focus on "mobility". These include the RTI Aeronautics Strategy (2007), the RTI Automotive Strategy (2009) and the Electromobility Implementation Plan (2010–2011). These were developed together with stakeholders from research and industry building on Austrian strengths and innovation potential. Based on these strategies, the different financial and non-financial promotion instruments are employed in a goal-oriented manner throughout the innovation path to a greater extent. Better matching transport-specific thematic programmes with the other programmes in the Austrian Research Promotion Agency, the subsidies from the Climate and Energy Fund and the AWS is designed to pool the funding commitment and make it more customer-oriented and efficient. "Strategic Topic Management" however also includes additional strategic activities such as defining specific call topics, international networking and implementation of research results and new technologies. To this end, bmvit has also set up corresponding support instruments such as the A3PS as a strategic platform in the field of alternative propulsion systems and fuels and AustriaTech as a telematics agency. Active participation in creating innovation-oriented framework conditions, support for innovation-oriented public procurement, promotion of training and research dissemination are additional tasks undertaken to ensure fast and successful practical implementation of research. The Unit for Mobility and Transport Technologies' new mission, to mobilise the problem-solving potential for the major societal and economic challenges, is based on this holistic approach.

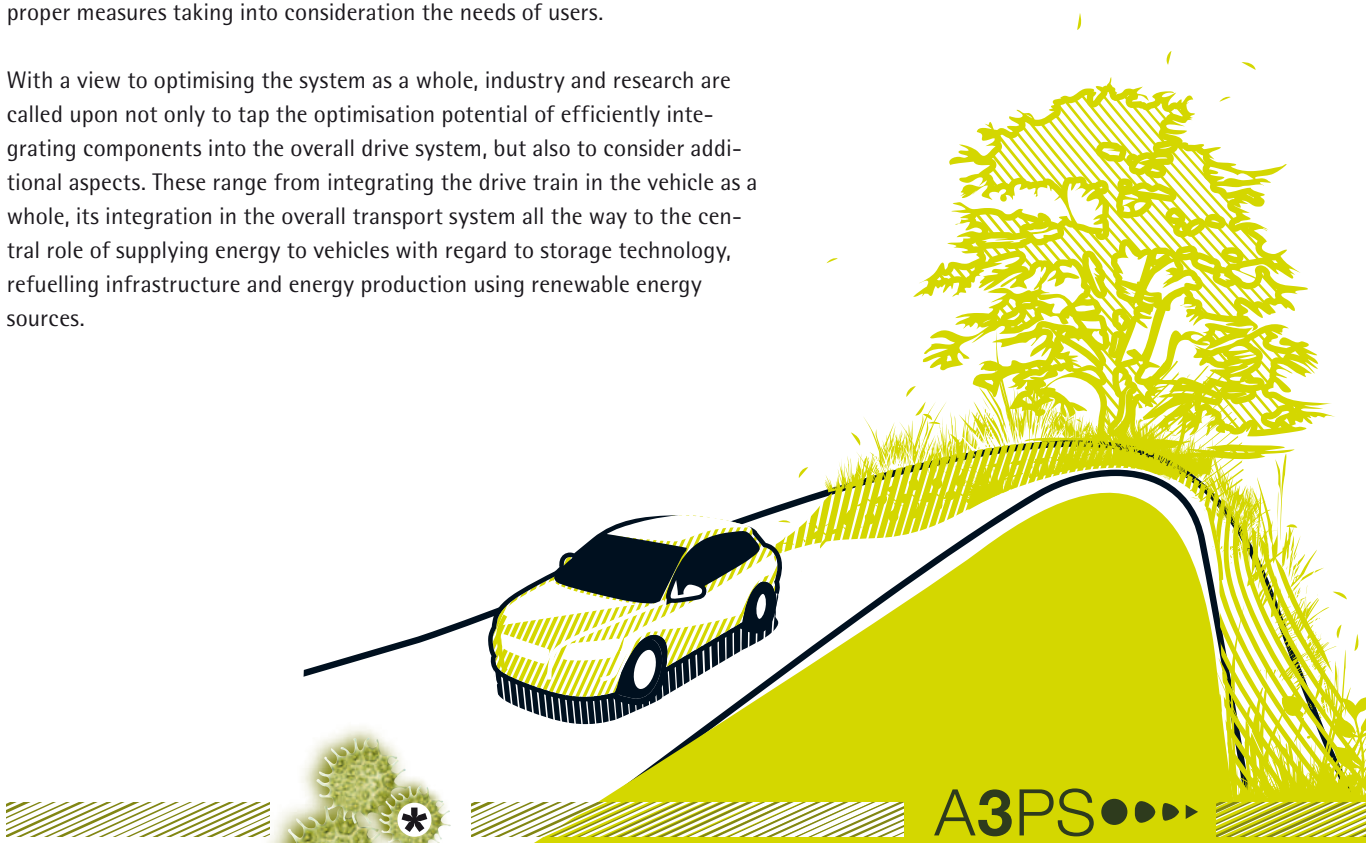
ALTERNATIVE PROPULSION SYSTEMS FOR CLEAN VEHICLES

Environmental, energy and transport policy guidelines for increasing energy efficiency and reducing emissions have triggered an urgent demand for innovation in energy and transport technology. The development of alternative propulsion systems and fuels is a crucial factor here.

As an automotive supplier country, Austria plays a leading role in comparison with other countries. Especially in terms of internal combustion engines, there is a great deal of know-how existing in Austria associated with high revenues. For some time now, the technological trend has been moving away from classic vehicle drive trains with internal combustion engines and towards electrification of power trains. In order to consolidate and further expand the pioneering role of the Austrian automobile industry and research and value creation, it is necessary to recognise developments early on and derive the proper measures taking into consideration the needs of users.

With a view to optimising the system as a whole, industry and research are called upon not only to tap the optimisation potential of efficiently integrating components into the overall drive system, but also to consider additional aspects. These range from integrating the drive train in the vehicle as a whole, its integration in the overall transport system all the way to the central role of supplying energy to vehicles with regard to storage technology, refuelling infrastructure and energy production using renewable energy sources.

Moreover, achieving the policy vision of climate neutral, pollutant free, entirely fossil fuel independent transport by 2050, one which goes beyond the medium-term goals of the EU for 2020, also calls for completely new mobility concepts. Therefore the public sector has to advance the innovation process towards sustainable mobility by means of suitable instruments and support framework conditions coordinated with industry partners.



A3plus Project “Hydrogen from Algae”

The aim of this project is to biogenically produce hydrogen from algae. For this purpose, selected hydrogen-producing strains of algae are cultivated and a photo bioreactor system is constructed for continuous hydrogen production. Here the photolysis of algae is used to produce a hydrogen mixture and a membrane separation process is employed to generate ultra-pure hydrogen.

RTI Automotive Strategy

In 2009, bmvit developed the RTI automotive strategy with the automobile industry. This strategy focuses on drive trains, electronics, constructive vehicle design and manufacturing technology. Counter-cyclical investments were made during the financial crisis and in 2009–2010, the R&D research funding increased from € 40 to 60 mil. which ensured the sustained operation of research capacities.

A3PS – Austrian Agency for Alternative Propulsion Systems

In this strategic partnership, bmvit cooperates with the Austrian industry and research and supports these alongside R&D promotion by preparing information, marketing member competence and (inter)national networking for R&D cooperation.

ELECTROMOBILITY REDUCES NOISE AND POLLUTANTS

As a sought-after international R&D partner, Austrian industry and research is developing cutting edge technologies for the high-efficiency and clean mobility of the future. The hybrid, battery and fuel cell vehicles best suited to different vehicle categories and areas of application represent key components in a sustainable transport system interlinked with public transport.

Electric power trains offer many benefits

- Local emission-free mobility in highly polluted urban centres
- Utilisation of renewable energy sources in road transport, which at present still relies almost exclusively on oil
- Nearly three times higher energy efficiency, longer life spans and lower maintenance costs for the electric engine compared with the internal combustion engine.

The limited range of electric vehicles due to the lower energy density of the batteries and high costs due to the lack of large-scale production require both technological and organisational innovations. These can only be achieved through simultaneous optimisation of the entire vehicle–infrastructure–users system.

Due to its multiple responsibilities for transport, infrastructure and technology policy, bmvit therefore strives towards the goal of

- clean road transport,
- fuelled by renewable energy sources,
- embedded in an optimised transport system linked with public transport,
- to demonstrate Austrian technology competence and guarantee the competitiveness of the Austrian industry.

Electromobility includes not only battery electric vehicles but also fuel cells and hybrid vehicles as a combination of an internal combustion engine with a battery which together overcome range limitations. The trend is heading from the merely re-fuelable hybrid already available on the market to the rechargeable hybrid up to battery electric or fuel cell vehicles. Concepts for switching drained with charged batteries and quick-charging using high voltages are also being pursued. However, these present technical disadvantages in terms of lifespan and problems with acceptance by manufacturers.

Particularly promising user groups and areas of application for electromobility include:

- Commuters
- Taxis
- Public Sector and Company Fleet Vehicles
- Recreational Traffic
- Teenagers and Elderly Users of Single-Occupant Electric Vehicles
- Implementation Regions



E-Mobility Implementation Plan

Based on its competence in transport, infrastructure and technology policy, bmvit developed this implementation plan and cooperates with the Federal Ministry of Economy, Family and Youth and the Federal Ministry of Agriculture, Forestry, Environment and Water Management to concentrate the national instruments in the inter-ministerial process “Electromobility in and from Austria.”

Technological Lighthouse Projects of E-Mobility

Large pilot projects are designed to make the competence of Austrian industry and research in optimisation of the complete vehicle–infrastructure–users system widely visible, prepare the population for technological changes and spur on the market launch of electromobility. € 25 mil. were spent from 2009 to 2011 on these projects.

A3plus “Solarbus” Project

This battery-electric city bus with a solar roof is a purely Austrian innovation. Thanks to lightweight construction, an innovative electric motor and transmission and sophisticated power electronics, the first Austrian low-floor electric bus accommodates 35 passengers and has a 100 km range per battery pack (swap system).

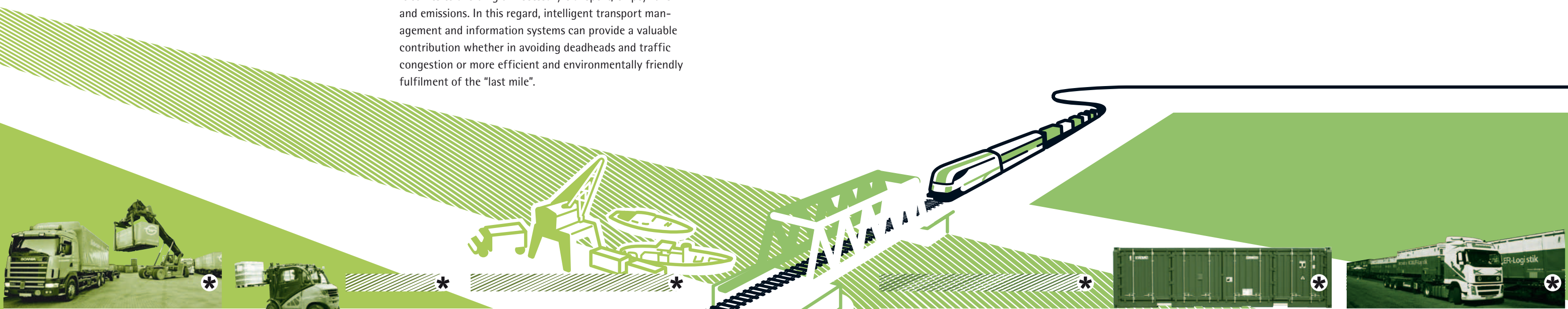
NEW FLOWS OF GOODS IN EUROPE

Increasing flows of goods, primarily via roads and the associated environmental and traffic problems and growing trends toward flexibilisation pose sizeable challenges for the transport system and the logistics sector. Alongside a modern and efficient infrastructure, the use of new technologies and innovative concepts will help to surmount these challenges and keep companies competitive.

With the aim of resource-saving handling of flows of goods, multimodal supply chains are gaining more and more ground. Terminals as intermodal transport nodes are becoming more and more important. More efficient processing and increasing automation in these intermodal hubs not only contribute to optimisation along the entire supply chain but also makes it easier to include environmentally friendly modes of transport. Terminals, as intermodal transport nodes, are important interfaces within the European transport corridor network. In this context, intelligent distribution of goods, from sea and inland ports and airports to the domestic market, between terminals and distribution centres and dispersion at the regional and urban level, plays an important role.

The growing competitive pressure and quality demands on logistics providers and shipping companies require increasingly precise knowledge regarding the transport of particular goods. Therefore real time information exchange between the actors of the (multimodal) supply chain is relevant input used for planning and monitoring systems. These systems support the optimisation of supply chains in terms of efficiency, transport handling costs and emissions (as well as other environmental affects). Furthermore, advanced cargo handling technologies and innovative transport units enable companies to keep up with increasing turnover and restrictive time requirements.

Especially in urban and congested areas, the logistics sector is faced with sizeable challenges, particularly when it comes to avoiding unnecessary transport, empty runs and emissions. In this regard, intelligent transport management and information systems can provide a valuable contribution whether in avoiding deadheads and traffic congestion or more efficient and environmentally friendly fulfilment of the "last mile".



I2V “Trans-Austria” Project

Intermodal logistics models are being developed following the example of Eastern European automotive suppliers and their Western European customers. Intelligent transport pooling models lead to a reduction in road transit through Austria, fewer emissions and lower logistics costs.

I2V “PalletFlow” Project

The focus of the project is an innovative rail-road transport systems based on pallets/unit loads, supported with identification, communication and planning technologies. The feasibility and commercial exploitation of this system were demonstrated in the scope of the project and the possibility for implementing shuttle transport was identified.

I2V “Combined Transport Monitoring Services” Project

“CTMS” developed a sensor-assisted monitoring and locating system which is installed on a container and provides status information such as position, acceleration, temperature, etc. upon request. Currently a “low cost version” of the box is being developed which is also equipped with an RFID transponder for automatic identification.

TRENDSETTER IN COMBINED TRANSPORT

Combined transport (CT) offers a more environmentally friendly solution for goods transport. This refers to goods transport in a single loading unit, primarily by rail and/or ship with short pre- and post-transport on roads. Promotion of CT not only results in a shift of a large portion of road transport of goods onto rails or ships but also strongly contributes to reducing CO₂ emissions. Austria is a pioneer here in Europe.

Combined road-rail-ship transport offers an environmentally friendly alternative to monomodal road transport of goods. Cooperation amongst the various carriers makes it possible to make optimal and efficient use of the advantages of the individual carriers and thus contributes to creating an environment friendly transport chain. Whereas the share of combined goods transport in long-distance road transport of goods in Europe is 5 %, in Austria this figure is already 12 %, putting Austria at the forefront in Europe.

Due to the increased handling costs, the special equipment requirements (e.g. containers) and the not yet realised cost transparency, CT presents a considerable competitive disadvantage over road transport. As such, there is an increased need for new technologies and systems in order to make combined goods transport more competitive and appealing compared with monomodal road transport of goods. This can be achieved by reducing costs by raising efficiency and improving the quality of the transport offer.

Innovative systems in this area range from multifunction containers suited to both bulk and pallet goods to cross-company shipment tracking systems and handling technologies such as rotary unloading systems for containers and “Mobiler” lorries all the way to booking platforms for block trains. Use of intelligent transport systems and services will play a key role in the continued promotion of combined goods transport in the next few years. This should allow for expedient shifting of road transport of goods in the future to combined transport in order, on the one hand, to reduce emissions and traffic congestion and, on the other hand, to make combined transport more economically efficient.

IKV “WoodLogistic” Project by Innofreight

Harmonised equipment and the development of new unloading and handling technologies made it possible to set a new standard in transport logistics for the wood sector. All modes of transport (carriages and lorries) and products of the wood sector (round timber, lumber, wood chips, bark, wood shavings) were integrated in this new logistics concept.

IKV “Innovative Container Technology” by Montan Spedition

For the first time ever, a container makes it possible to open the entire side panel using folding doors. This allows for optimisation of loading and unloading of pallets and long products. In addition, the novel closing mechanism for the folding doors improves the stability of the entire container structure.

IKV “MOBILER” Project by Rail Cargo Austria

The MOBILER lorry ideally combines the mass transport capacity of the train with the flexibility of the lorry. The train gets to the customer no matter if there is a rail connection or not. The MOBILER lorry collects the goods and transports them to the nearest loading site by rail. Thanks to the MOBILER, goods transport can be shifted to the rails in a cost-effective manner.

* Since 2007, 93 projects have been promoted as part of the I2V technology programme line with a total of € 21.2 mil. in funding on the topic of “Intermodality and Interoperability of Transport Systems”.

* Each year, investment subsidies of 3 mil. are awarded to the Austrian transport industry through the IKV innovation promotion programme for combined transport.

INNOVATIONS FOR THE TRANSPORT INFRASTRUCTURE

A key element of a country is the quality of its transport infrastructure. The constant increase in traffic volume gives rise to stricter requirements in terms of pollution and availability. Scarce public funds heighten the pressure to guarantee maintenance, environmental protection, energy consumption and expansion with cost-efficient solutions. Research and development are called upon to come up with answers.

bmvit's "Federal Transport Infrastructure Expansion Plan 2011–2016" views the Austrian transport system as a central component of a complete European system due to Austria's geographic location. An efficient and barrier-free transport system is not only a key factor for economic development and establishment of industry and thus the basis for the overall economic development of a country, but it is also necessary to ensuring people's mobility and maintaining their quality of life.

The plan advocates the use of research and development to deal with medium to long-term challenges in transport infrastructure. Particularly intensive research is needed in four central topics:

1. Construction materials and design, such as maintenance/repair issues, lifespan specifications, fire, climate and load requirements, recycling potential;
- 2 Maintenance and transport management, e.g. continuous status monitoring, optimised upkeep and renovation, improvement of infrastructure management, operation and transport information systems;
3. Protective measures for persons and the environment, e.g. noise control, energy consumption, transport safety;
4. Infrastructure planning, intensified consideration of long-term forecasts for investments & developments in transport and political, economic and social framework conditions.

New Research Focus "Transport Infrastructure"

In conjunction with Austrian Federal Railways (ÖBB) and ASFINAG, research grants are offered in topics such as construction materials and design, maintenance and transport management, protective measures for people and the environment and infrastructure planning.

"Reflex" Project

This project dealt with the reflective properties of noise barriers. AIT, ASFINAG, ÖBB, TAS SV-GmbH, the Austrian Federal States, bmvit and nine noise barrier manufacturers worked together on this cooperative project. The project illustrates the common interest of rail and road transport operators and research and industry in a solution through research and development.

Innovation-Oriented Procurement

Innovation-promoting public procurement aims to create an effective instrument for providing an integrated approach to procurement as part of innovation policy in the medium to long-term. By acting as technologically demanding first buyers, public procurers can drive innovation from the demand side.

SMARTER ON THE WAY

Transport telematics offers users the option to choose the mobility or logistical service best suited to them by means of personal and intermodal real time information. This tool thus contributes to reaching transport and environmental policy goals. As such, transport telematics is an integrative instrument which also makes an essential contribution toward a safe, efficient and environmentally friendly transport system in Europe.

Transport telematics (intelligent transport systems and services) has the potential for a sustainable change of the transport system, provided that telematics services are interoperable and intermodal. The prerequisite for this is uniform standards for data collection, provision and exchange and the creation of the necessary specifications. Corresponding activities are being carried out at both the European (see EU ITS Directive 2010/40/EU) and the national level where the Transport Telematics Act and an "ITS Action Plan" are being developed in close cooperation with the most important stakeholders. These measures will identify the priority fields of action for developing ITS infrastructure and services in the Austrian transport system and prepare for their implementation. Integration of all transport operators is a crucial transport-policy goal in this endeavour.

Back at the end of the 1990's, important steps were taken in Austria towards developing technology competence in the field of transport telematics early on. Supported by thematic R&D programmes, the establishment of AustriaTech as a transport telematics agency and measures in the areas of education and knowledge transfer, many innovative companies developed new solutions marketable products for the transport telematics sector. Since then, Austria has emerged as the global market leader in toll and traffic light systems, leading the charge in research topics such as cooperative systems. Most notably, AustriaTech and ASFINAG, by getting involved early on in European research and implementation projects, successfully managed to build up crucial know-how, integrate Austrian technology companies and research and test new ITS applications.

Implementation of already developed technical solutions, harmonisation of data, ensuring interoperability, appropriate business models and user-adapted information and services are current issues which can only be solved through concerted efforts by government, industrial, infrastructure and transport companies. Because Austria increasingly serves as a proving ground for nationally developed technologies, these efforts also support the innovativeness and competitiveness of Austrian companies.

Congress Navigator: ITS Vienna Smartguide

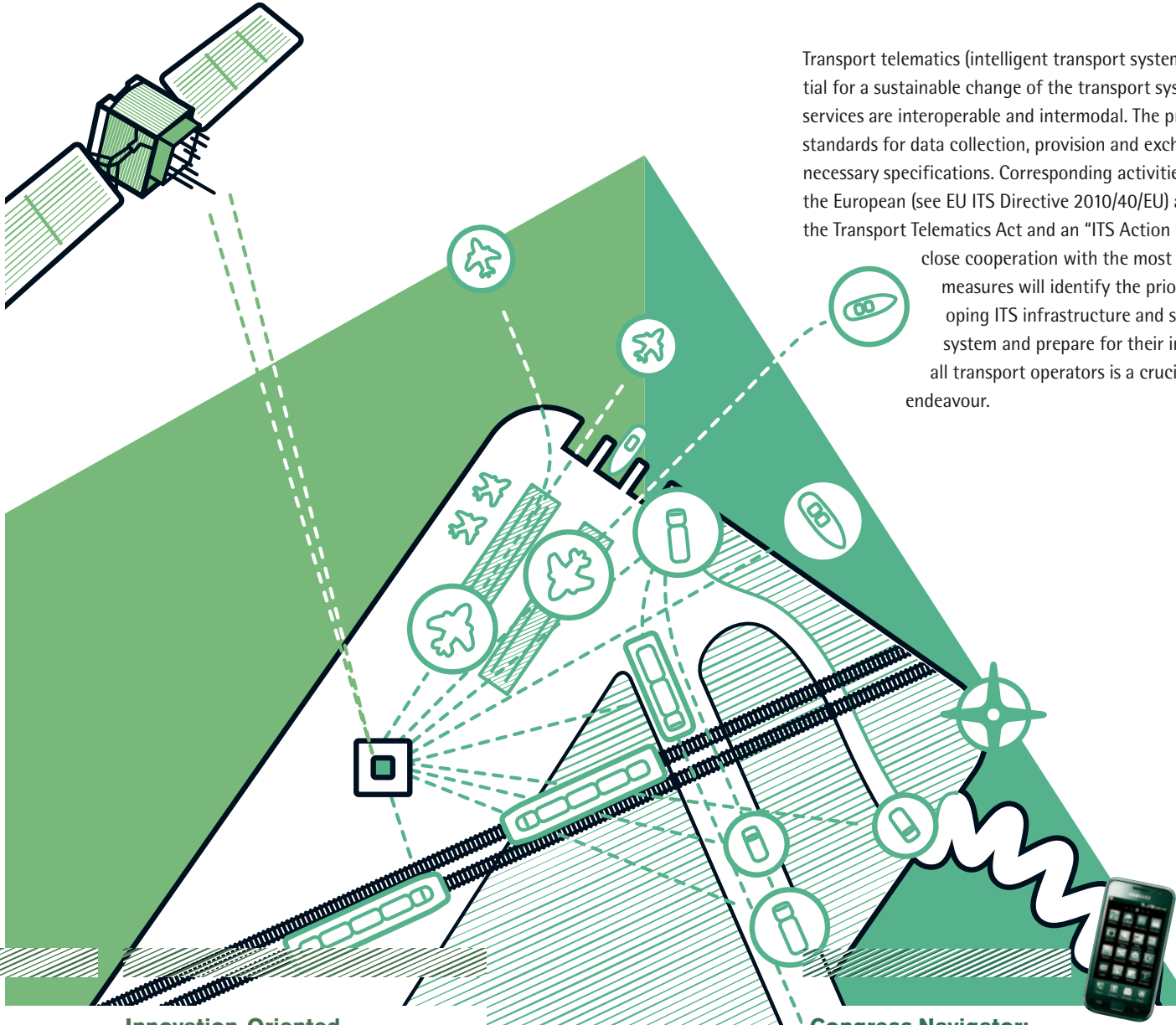
The ITS World Congress in Vienna will serve as a platform for field testing of a smartguide. Attendees will organise their own personal itineraries at and around the congress with a smartphone. This application will allow users to book a place and events and demonstrations, navigate at the event location and in the city and will include the most up to date conference programme.

AustriaTech

The Austrian Federal Agency for Technological Measures is a steering instrument of bmvit which serves to ensure the social usefulness of new ITS technologies in Austria. AustriaTech acts as coordinator, initiator and neutral contact point for the development and deployment of ITS solutions in the transport system.

19th ITS World Congress in Vienna, 2012

In 2012, Vienna will host the 19th ITS World Congress themed "smarter on the way". More than 8,000 visitors from around the world will attend this congress for conferences, exhibitions and demonstrations. "ITS Austria" will also serve as joint platform of the Austrian ITS community which will continue to endure in the future.



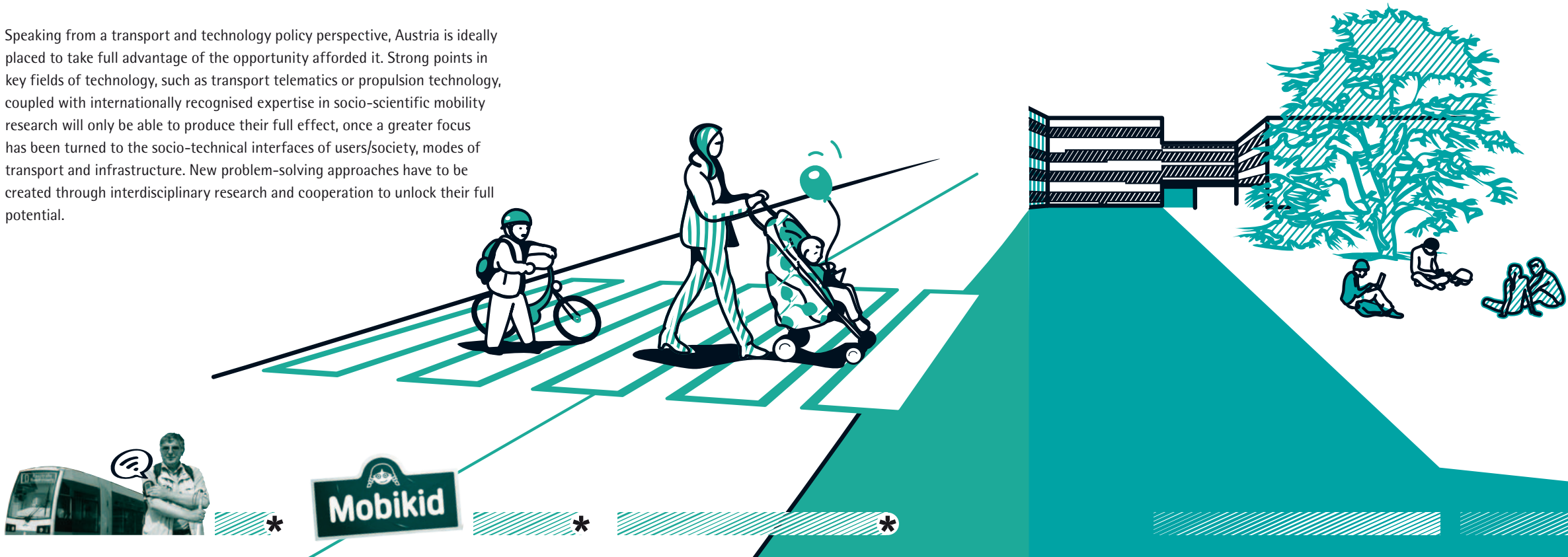
PERSONAL MOBILITY: BREAKING THE MOULD

New lifestyles, climate change and dwindling resources are confronting our society with increasingly greater challenges. Is our transport system prepared for future challenges at all and how will we (be able to) be mobile in the future? With these questions, there is simply no getting around innovations for sustainable and user-adapted mobility solutions!

The necessary shift in mindset in all spheres of life also calls for radical changes to be made in personal mobility. "Sustainable Mobility" is the only viable path we can take to prevent curtailing physical mobility options. Innovations offer the opportunity to shape a transport system which, in a "new generation", not only fulfils the ecological and economical, but also the social requirements. This system is geared towards the needs of all user groups and thus fosters equal opportunities in the community. It takes advantage of new technological applications in an expedient fashion and forms an effective complete system through integrated, inter-complementary elements and functions.

Speaking from a transport and technology policy perspective, Austria is ideally placed to take full advantage of the opportunity afforded it. Strong points in key fields of technology, such as transport telematics or propulsion technology, coupled with internationally recognised expertise in socio-scientific mobility research will only be able to produce their full effect, once a greater focus has been turned to the socio-technical interfaces of users/society, modes of transport and infrastructure. New problem-solving approaches have to be created through interdisciplinary research and cooperation to unlock their full potential.

The activities being carried out on the topic of "Personal Mobility" are thus aimed at promoting multifaceted innovations which will enable the pursuit of multimodal lifestyles and create barrier-free mobility options. New instruments and tools which materially contribute to a sustainable awareness of mobility are just as important in this regard as technology-based applications which support future-proof decision making for spatial developments in transport and spatial planning.



**ways2go
"ways4all complete" Project**
Innovative navigation solutions allow for barrier-free usability of the transport system without costly retrofitting. The needs of specific user groups (e.g. the blind) can help to point out new solution paths which subsequently represent improvements for all.

**ways2go
"mobikid" Project**
Awareness-raising measures and social learning can decisively contribute to achieving sustainable mobility patterns. Innovations open up new possibilities here. Innovative products enable children and adolescents to learn about desirable mobility in a fun way, thus making an important contribution to socialisation of mobility.

**ways2go
"KOMOD" Project**
With technology-based tools transport developments can be better anticipated, effective measures in transport and spatial planning can be taken and essential support for R&D activities can be provided. An innovative data collection concept is laying the groundwork for a new level of mobility data quality in Austria.

PUSH FOR YOUNG TALENT

Excellence in transport research and technology can only be achieved with highly qualified employees. Targeted promotion of young talent and interest aims to ensure that the pool of young talent will not dry up in the future.

Transport-relevant courses of study are primarily technology-oriented and the insufficient numbers of students and graduates are divided amongst many other technical and natural science fields. This is reflected on the labour market as follows: Although up to now there has been no general shortage of engineers and technicians on the labour market, problems with finding new recruits are already evident in the still male-dominated transport-relevant engineering fields such as mechanical engineering, electrical engineering, metallurgy and material sciences.

It is critical that interest be raised amongst children and adolescents in research, technology and innovation in the most diverse transport-related areas in order to win them over to these disciplines tomorrow as apprentices, students or skilled labour. Only by doing so can the shortage of skilled labour be remedied across all levels education.

"Developing talent, awakening passion" is one focus of the Austrian Government's strategy on the topic of "Research, Technology and Innovation". Under the heading, "Discovering Talent", bmvit offers a series of (funding) instruments for promoting young RTI talent. These funding instruments are thematically open but can be earmarked with specific focuses such as the topic of "Transport and Mobility".

New technological focuses in transport such as intelligent transport systems and electromobility also create new job descriptions which are often very strongly characterised by interdisciplinarity. Here knowledge from different fields needs to be synthesised into new knowledge. This gives rise to heterogeneous career fields such as transport telematics which is defined by the overlapping of subject matter from the fields of transport, information technology, telecommunication, infrastructure, planning and ecology. These new fields form the basis for innovations and their development must be supported to the greatest extent possible.

**Young Talent for
"Transport Telematics"**
Prior to and involving every aspect to the 19th ITS World Congress in Vienna 2012, a broad range of activities designed to promote young talent are planned. These activities aim to get school children and students enthused about the new career field with internships, competitions, company excursions and much more.

**Educational Concept:
"Electromobility"**
The system shift to electromobility brings with it new career prospects. bmvit commissioned a study to investigate the needs of companies and requirements in terms of various education levels and come up concrete measures and suggestions for education planning in "Electromobility".

**fti...remixed Contest about the
Mobility of the Future**
In cooperation with bmvit's instrument for promoting young RTI talent, the website www.fti-remixed.at, a contest was held in which 14 to 25 year olds were asked in a fun way to discuss what their own personal mobility habits will look like 20 years from now.

AERONAUTICAL TECHNOLOGIES ON THE RISE

The high-tech field "Aeronautical Technology", requires dynamic and flexible research activities by companies in order to gain access as suppliers to the new aircraft programmes of the major global manufacturers like Boeing and Airbus or to stay competitive on the market as their own manufacturers. Fuel reduction in particular and along with it the use of new light weight materials and aircraft engines play an important role here.

The Austrian aeronautical (supply) industry has strengths in the following eight market segments:

- Aircraft (complete)
- Aircraft Structures, Materials and Manufacturing Technologies
- Cabin Interiors and Furnishing
- Equipment and Aircraft Electronics/Avionics
- Ground Testing Equipment
- Air Traffic Infrastructure and Air Traffic Control Applications
- Systems
- Engines

The primary goal of the RTI Aeronautics Strategy published in 2008 is to consolidate the value chains in these competence areas through better inclusion of the aeronautics sector and its needs.

A survey about the market participants in the Austrian aeronautics (supply) industry was commissioned to achieve better transparency in the sector. The results of this survey are now available in the form of an Austrian aeronautics competence atlas. This shows that there around 240 companies operating in the aeronautics (supply) industry in Austria, most of them in highly specialised niches. Internationally, Austrian companies are appreciated especially due to their great dependability and flexibility.

Austrian companies generate € 1.6 bil. each year in aeronautics turnover and ultimately export almost 100 %. Of this percentage, exports to Europe represent 50 %, to North America 25 % and 25 % goes to the remaining global market. This risk diversification also contributes to the industry's excellent growth and strong competitiveness.

In terms of support measures, bmvit promoted the national research and technology programme TAKE OFF with around 124 cooperative research projects, instituted the SESAR Forum, commissioned a study on the topic of "Cluster Creation" and "Education and Training" and established a working group to derive other implementation measures to support the sector.

The goal here, in addition to strengthening the leading companies, is first and foremost to achieve better networking between all stakeholders in this field of innovation. To this end, research institutions as well are better networked with companies and overall the research topics are handled in a more focused manner.

INSPIRATIONS FROM NATURE: BIONICS

"Learning from nature for technology" makes it possible for people to overcome the boundaries between the classic disciplines and tread new ground in research and development. Nature offers man the worlds' largest research laboratory. If we understand how things work in nature, we can use this knowledge to develop technical solutions.

The breadth of the spectrum of research topics which are dealt with in the framework of bionics is impressive and is divided into three major groups: construction or structural bionics, procedural bionics and informational bionics. Bionics' applications lie mainly in the fields of medicine, surface engineering, mechanical engineering, material development, architecture, communications technology and robotics. Many of these applications can also be harnessed for technology.

As a cross-sectional subject, bionics in Austria is integrated in the established organisational structures of research and industry but is often tucked away, as it were. The heterogeneous nature of the application areas for bionic developments often makes it difficult to see bionics as a complete discipline. For this reason, it is important that bionics as a complete discipline be made transparent and the resulting research findings be put into practice to a greater extent. To do this, bundling of thematic focuses, an increased focus on the needs of business and industry and the creation of interfaces for cooperation is necessary. Only through interdisciplinarity is added value created. Bionics can thus not only facilitate access to technical developments but also promote economic foundations.

Training in interdisciplinary research and development is another challenge which must be approached with teaching concepts and methods. Bionics thus creates new professions and new education and training opportunities. In addition, bionics can serve to spark interest in the natural sciences, especially amongst adolescents.



RTI Aeronautics Strategy

This strategy calls for the coordinated development and expansion, within their respective fields of competence, of the aeronautics sector, which includes the aeronautics (supply) industry with 241 companies, 8,675 aeronautics employees and €1,665 mil. in turnover and the air transport industry by means of targeted measures.

The Austrian Aeronautics Competence Atlas

www.aeronautics.at
An online database of the Austrian aeronautics (supply) industry provides information about the companies in the sector, their competences, products and services.

TAKE OFF "Future Small Aircraft" Project

The goal of this co-operative project of Austrian research institutes and companies is to develop a market-driven, modern, highly efficient two-engine aircraft in the general aviation class. Top efficiency, safety and comfort, drastically reduced operating costs and significantly lowered CO₂ and NO_x emissions are of paramount importance here.

Interdisciplinary Exchange

Various technical seminars serve to foster meetings between biologists and engineers. These also take place in their respective domains (e.g. in the Technical Museum or the Schönbrunn Zoo). Indeed, interdisciplinary communication and cooperation are the prerequisites for bionics.

Example: "Tyre Development"

The invention of the pneumatic tyre was the beginning of a 150 year long product improvement process. Nature does not offer any direct models for wheels. Tree frogs, crickets and polar bears for example do use adhesion mechanisms, however, which in depth fundamental research has shown to hold great potential for tyre development.

Bionics Landscape in Austria

With its brochure "BIONICS Innovation & Qualification" bmvit has opened up a platform for bionics in Austria. The brochure increases transparency and awareness of bionics, enhances people's understanding of bionics and facilitates access to the relevant stakeholders. Some 50 teams of researchers introduce themselves in the publication.



* Since 2002, 124 projects have been promoted with a total of € 49.5 mil. in funding as part of the TAKE OFF research and technology programme for aeronautics.

FIT FOR EUROPE

bmvit participates in strategically significant committees at the European level in the field of transport and aeronautics. On these committees, the Unit for Mobility and Transport Technologies represents the interests of Austria's national transport and aeronautics research community: The delegates actively champion the inclusion of national research focuses in the subject matter of calls for proposals at the European level, significantly contribute towards shaping European strategies and also ensure that European objectives and topics find their way into the subject matter of Austrian national research programmes. This not only ensures the compatibility of Austria's national R&D companies with their European counterparts, it also sustainably strengthens the competitiveness of domestic companies and research institutions.

European Technology Platforms (ETP)

The start of the 2000's saw the creation of technology platforms at the European level with the support of the European Commission. Their goal was to develop pan-European research agendas on strategically significant topics. This in turn was intended to achieve networking and coordination of all European research and development capacities. Ambitious goals were formulated with the participation of the relevant interest groups from industry, science, users, infrastructure operators, member countries and the European commission. The strategies developed are seen as guidelines for European, national and private research and development programmes and are revised and adapted to new technological developments at regular intervals. The Austrian delegates actively participate in the area transport and aeronautics in the scope of the following technology platforms:

ACARE
Advisory Council for Aeronautics Research in Europe
www.acare4europe.com

EIRAC
European Intermodal Research Advisory Council
www.eirac.eu

ERRAC
European Rail Research Advisory Council
www.errac.org

ERTRAC
European Road Transport Research Advisory Council
www.ertrac.org

ERTICO – ITS Europe
Europe's Intelligent Transportation System (ITS) Organization
www.ertico.com



EU Framework Programme for Research and Technological Development

In the current, 7th EU Framework Programme for Research and Technological Development (2007–2013), there is € 4,160 mil. available for research projects in the thematic focus, "Transport (incl. Aeronautics)" of the programme pillar "Cooperation". The calls held through 2011 include approved Austrian participation with a total of € 34.44 mil. in funding, representing a return indicator in the field of "Transport (incl. Aeronautics)" of 2.43 %*.

Preparations for the successor programme to begin in 2014 are already underway. Entitled "Horizon 2020 – The Framework Programme for Research and Innovation", this programme will coordinate and bundle the various funding instruments to a greater extent along the innovation path. This is intended to provide quicker practical implementation of research results.

Transport Programme Committee; TPC

bmvit designates the Austrian national delegation to the EU Transport Programme Committee which decides on the topics of the calls in the 7th EU Framework Programme for Research and Technological Development in the field of "Transport (incl. Aeronautics)".
cordis.europa.eu/fp7/home_en.html

Joint Technology Initiatives; JTI

This funding scheme in the 7th EU Research Framework Programme deals with public-private partnerships, a combination of European public funds and investments from the private sector. Lead by industry and including all relevant stakeholders from public and private fields, this funding scheme deals with selected research topics for which a major joint strategic European effort seems necessary and expedient in order to purposefully promote the development of important technological sectors in Europe. Joint technology initiatives which are relevant for transport are JTI Clean Sky and JTI Hydrogen and Fuel Cells.

JTI Clean Sky

The Joint Technology Initiative Clean Sky is a public-private partnership between the European Commission and the European aeronautical industry. This project, which will speed up the development, validation and demonstration of environmentally friendly aeronautical technologies for the quickest possible time to market, is organised by the aeronautical industry itself and receives funding from the European Commission. The project has a total budget of € 1.6 bil. bmvit is represented in the National States Representative Group which is an Advisory Group to the Clean Sky Joint Undertaking primarily interested in ensuring that the various relevant activities at European and National level are complementary to one another.
www.cleansky.eu

JTI Hydrogen and Fuel Cells

The JTI "Hydrogen and Fuel Cells" is the central European instrument in the development of hydrogen and fuel cell technologies with a budget of nearly one billion Euros. bmvit represents Austria not only with at National Delegates but also names one of the 9 experts on the Scientific Committee.
www.fch-ju.eu

* Percentage of funding requested from approved Austrian participation out of the total funding requested for approved projects in the field of Transport

OVERCOMING BORDERS THROUGH COOPERATION

The opportunity and importance of actively shaping the European Knowledge Area clearly follows from the RTI strategy of the Austrian Federal Government. Through transnational cooperation with other countries, important experiences can be exchanged, synergies utilised and, together, new funding strategies and tools developed. This provides the Austrian RTI community with better access to international research networks and allows the community to achieve critical masses and thus better opportunities in international competition.

ERA-NETs (European Research Area Networks) play a key role as a cooperation platform amongst the organisations in charge of promoting research in Europe. The goal of the ERA-NET is to strengthen cooperation amongst national and regional research promotion agencies, better harmonise the funding activities of the independent countries, thus contributing to creating a common European research area. In the transport sector, bmvit is actively involved in the ERA-NET TRANSPORT and the ERA-NET AirTN. In addition, bmvit has been involved with the International Energy Agency (IEA) for many years.



ERA-NET Transport (ENT)

www.transport-era.net

In the scope of ERA-NET TRANSPORT I and II, a powerful platform for transport research and innovation was created in which bmvit plays a leading role in crucial activities and calls for proposals. In this framework, cooperation procedures and tools were developed in order to better adapt national research promotion systems to transnational funding sources and open up new avenues of cooperation. These have already been tested in several transnational calls for proposals. In addition, the foundation pillars for a joint call for proposals by 13 countries and regions with a budget of € 30 mil. were established in the framework of the ERA-NET+ Schemes (Electromobility). € 10 mil. was provided by the European Commission for this purpose.



ERA-NET Air Transport Network (AirTN)

www.airtn.eu

Ministries and research promotion agencies sound out common transnational funding sources in the field of aeronautical technologies outside of the European Union's research framework programme. In this regard, over the last several years Austria has made several proactive attempts. Parallel calls were held with Germany, the United Kingdom and Hungary. The four joint-venture research projects represent a research volume of around € 40 mil. and, for the time being, are being carried out for the most part with German partners.



International Energy Agency (IEA)

www.iea.org

bmvit represents Austria in the Implementing Agreements "Hybrid and Electric Vehicles" (HEV) und "Advanced Motor Fuels" (AMF) of the International Energy Agency. The Austrian Agency for Alternative Propulsion Systems (A3PS), the Austrian Institute of Technology (AIT) and Joanneum Research are participating in these international research partnerships which offer Austria the opportunity to also collaborate with partners outside of Europe.

DISSEMINATION

Developing and disseminating knowledge and competence is a central concern of RTI policy. The aim here is not only to make existing knowledge accessible to all but also to support rapid practical implementation of research results. In addition to publishing studies, the current state of knowledge on funded research projects is made available to the public through brochures and presentations on online platforms. These activities are supported by regularly held events which actively promote networking of researchers amongst themselves but also with future users. Important dissemination measures are taken in the transport sector through the following activities:

"Mobility for All" Research Forum

www.forschungsforum-mobilitaet.at

Since 2005, this event has been held every year. Experts from research institutions in the mobility sector, transport and spatial planners, representatives of regional authorities, NGOs, etc. from all over Austria are invited to raise awareness and point out how innovative approaches in mobility can lead to a strengthening of sustainable Mobility for All. In this framework, the following topics have been discussed so far: New Paths towards Mobility for Young and Old, Sustainable Local Mobility, Mobility for All through Innovative Infrastructure and Mobility and Living.



Austrian National Awards for Transport and Mobility

www.bmvit.gv.at/ministerium/staatspreis

Since 2005, bmvit has awarded National Awards on a regular basis. With these National Awards, on the one hand, concepts and ideas and on the other hand projects realised on particular focuses in the transport sector are honoured. In the last few years the focus has been on Ecological Goods Transport, Efficiency for Climate Protection and Safe through Technology and Creativity. In 2011, the National Award call for E-Mobility was held.



INFO NETWORK on Research Projects from IV2Splus

www2.ffg.at/verkehr

This website offers a short description and contact persons for all R&D projects and studies which have been promoted since 2007 in the scope of the IV2Splus "Intelligent Transport Systems and Services plus" research and technology programme and also helps find partners.

TAKE OFF

Information on the Research Projects from TAKE OFF

www.verkehrstechnologien.at/take-off--aeronautikprogramm/_/prog12/umb5

This website offers a short description and contact persons for all R&D projects and studies which have been promoted since 2002 in the scope of the TAKE OFF research and technology programme for aeronautics.



ways2go Interim Innovation Report

www.bmvit.gv.at/service/publikationen/innovation/verkehrstechnologie/downloads/ways2go_innovationsbilanz_lang.pdf

This brochure discusses the problem-solving approaches of the projects funded in the IV2Splus programme line ways2go in the area of personal mobility in the context of different thematic areas. The innovation paths point out how user needs can be brought to the fore and how fundamental-research oriented findings from mobility research can be better integrated in the development of mobility-relevant and technology-based applications.

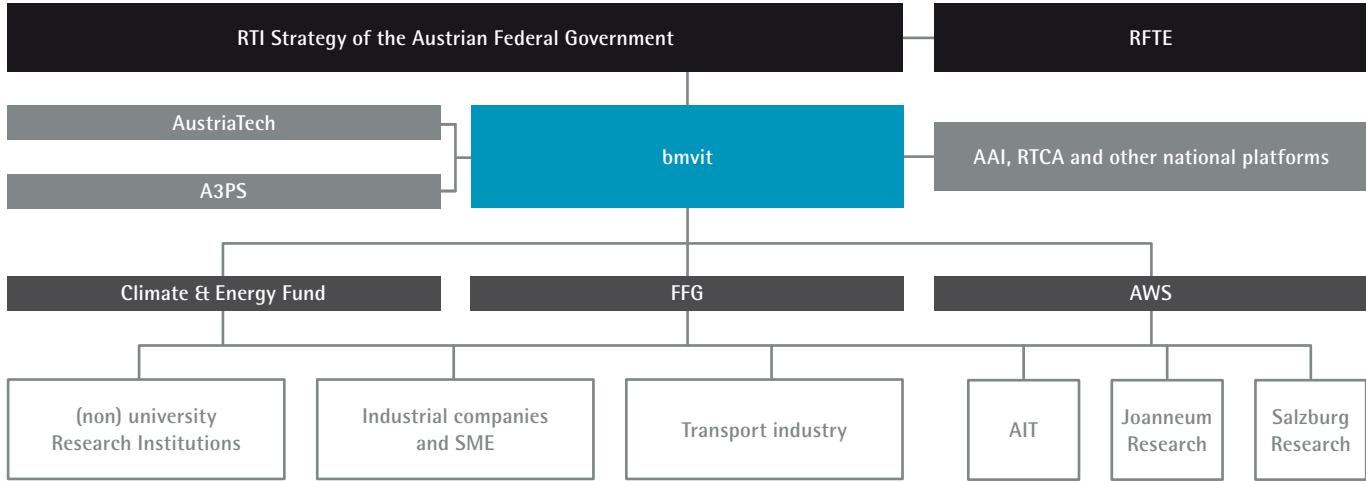
"Technology Competence in Transport in Austria" Publication Series

www.bmvit.gv.at/innovation/publikationen/verkehrstechnologie

With its publication series "Technology Competence: Transport in Austria", bmvit aims to provide an overview of the current state of developments in Austria on strategic transport-related topics. Four volumes have been published to date: "Hydrogen and Fuel Cells", "Fuels", "Selected Projects from the Intelligent Transport Systems and Services Programme" and "Hybrid and Electric Vehicles".

PARTNER ORGANISATIONS AND PLATFORMS

Based on transport policy requirements and taking into account European developments, bmvit develops the national technological fields of action in the form of strategies, roadmaps and subject matter for calls in conjunction with the Austrian mobility and transport community. Operational implementation is headed by bmvit and takes place together with partners from research promotion (FFG, AWS, Climate and Energy Fund), the relevant agencies and platforms (AustriaTech, A3PS, RTCA, AAI, etc.) and university and non-university research institutions & industry.




The most important partner organisations and platforms are:


AAI – Austrian Aeronautics Industries Group
www.aaign.at


AIT – Austrian Institute of Technology
www.ait.ac.at


AustriaTech – Austrian Federal Agency for Technological Measures
www.austriatech.org


AWS – Austria Wirtschaftsservice
www.awsg.at


A3PS – Austrian Agency for Alternative Propulsion Systems
www.a3ps.at


FFG – Austrian Research Promotion Agency
www.ffg.at


JOANNEUM RESEARCH
Forschungsgesellschaft mbH
www.joanneum.at


Climate and Energy Fund
www.klimafonds.gv.at


RFTE – Austrian Council for Research and Technology Development
www.rat-fte.at


RTCA – Rail Technology Cluster Austria
www.rtca.at


Salzburg Research
Forschungsgesellschaft mbH
www.salzburgresearch.at

YOUR TEAM AT A GLANCE

Your contact persons within the Unit for Mobility and Transport Technologies

Andreas Blust
andreas.blust@bmvit.gv.at
T: +43 1 711 62 – 65 34 13

Sarah Krautsack
sarah.krautsack@bmvit.gv.at
T: +43 1 711 62 – 65 32 11

Walter Wasner
walter.wasner@bmvit.gv.at
T: +43 1 711 62 – 65 21 20

Back Office

Marion Kainz
marion.kainz@bmvit.gv.at
T: +43 1 711 62 – 65 31 06

Head of Unit

Evelinde Grassegger
evelinde.grassegger@bmvit.gv.at
T: +43 1 711 62 – 65 31 05

Christian Drakulic
christian.drakulic@bmvit.gv.at
T: +43 1 711 62 – 65 32 12

Elisabeth Ossberger
elisabeth.ossberger@bmvit.gv.at
T: +43 1 711 62 – 65 31 02

Hildegard Weiss
hildegard.weiss@bmvit.gv.at
T: +43 1 711 62 – 65 29 03

Deputy Head of Unit

Andreas Dorda
andreas.dorda@bmvit.gv.at
T: +43 1 711 62 – 65 31 09

Ingrid Gnam
ingrid.gnam@bmvit.gv.at
T: +43 1 711 62 – 65 21 19

Kurt Schreitl
kurt.schreitl@bmvit.gv.at
T: +43 1 711 62 – 65 32 06



from left to right: Andreas Dorda, Kurt Schreitl, Christian Drakulic, Andreas Blust, Elisabeth Ossberger, Walter Wasner, Hildegard Weiss, Ingrid Gnam, Marion Kainz, Irene Sailer, Sarah Krautsack, Evelinde Grassegger

NEW WAYS OF EXPERIENCING MOBILITY

A

