

## International Transport Forum 2010 Transport and Innovation: Unleashing the Potential

### CASE STUDY - SWEDEN

The following information is based on a response to a survey carried out by the International Transport Forum on innovative policy initiatives within member countries, and countries' efforts to promote innovation.

1. Briefly describe innovative policy initiatives that your government has succeeded in implementing in the transport sector in recent years. Please take the widest possible definition of innovation, including innovative technologies (e.g. ITS), policies, practices (e.g. new pricing mechanisms), etc.

#### VINNOVA

*Congestion tax in Stockholm - see question 2.*

#### *Green car premium*

Individuals who purchase a new car included in the criteria for car rebates (green car) can have a cash contribution of SEK 10 000. Premium took effect from 1 April 2007. [www.sweden.gov.se/sb/d/8202/a/79866](http://www.sweden.gov.se/sb/d/8202/a/79866).

#### *Reduced parking fee*

Residents in Gothenburg holding a residential parking permit and owners of a green vehicle can park in their area of residence free of charge.

[www.goteborg.se/wps/portal/!ut/p/c0/04\\_SB8K8xLLM9MSSzPy8xBz9CP0os3gjU-9AJyMvYwMDSycXA6MQFxNDPwtTlyMjA\\_2CbEdFAKbTUa4!/?WCM\\_PORTLET=PC\\_7\\_25KQB2J3009BD02TD41N852226\\_WCM&WCM\\_GLOBAL\\_CONTEXT=/wps/wcm/connect/goteborg.se/goteborg\\_se/invanare/resor\\_trafik/bil/parkering/lnkrubrik\\_n400\\_bil\\_parkering\\_parkeringstillstand/art\\_n400\\_rt\\_bi\\_pa\\_boendeparkering](http://www.goteborg.se/wps/portal/!ut/p/c0/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gjU-9AJyMvYwMDSycXA6MQFxNDPwtTlyMjA_2CbEdFAKbTUa4!/?WCM_PORTLET=PC_7_25KQB2J3009BD02TD41N852226_WCM&WCM_GLOBAL_CONTEXT=/wps/wcm/connect/goteborg.se/goteborg_se/invanare/resor_trafik/bil/parkering/lnkrubrik_n400_bil_parkering_parkeringstillstand/art_n400_rt_bi_pa_boendeparkering) (Swedish)

In Malmo, all residents with green cars are entitled to park for free for one hour in all public parking spaces. This does not include private parking spaces or garages.

#### *Green car preferential taxation*

Lower benefit levels (förmånsbeskattning) for green cars.

### *Ethanol Vehicles*

Benefit value for cars that can run on E85 ethanol may be reduced by 20% compared with the closest comparable gasoline model. The maximum allowed reduction is SEK 8,000 per year, and adjustment is required by the employer. Adjustments may be made to income year 2011.

### *Gas vehicles*

Benefit value for cars that can run on natural gas and biogas can be reduced by 40% compared with the closest comparable gasoline model. The maximum allowed reduction is SEK 16 000 per year, adjustment is required by the employer. Adjustments may be made to income year 2011.

### *Hybrid and electric cars*

Benefit value for cars that run on hybrid power or electricity may be reduced by 40% compared with the closest comparable gasoline model. The maximum allowed reduction is SEK 16 000 per year, and adjustment is required by the employer. Adjustments may be made to income year 2011.

### *Gas vehicles*

Benefit value for cars that can run on propane may be lowered down to the same level as the closely comparable gasoline model. Adjustment is required by the employer.

### *Alternative fuel taxes are subsidized*

The tax on fuel is composed of tax on carbon and on energy. VAT is levied on all fuels. In Sweden, the alternative fuels are tax-subsidised (except electricity when it is used as fuel). Compared with petrol, diesel is taxed at 70% (in terms of energy content), natural gas and approximately 20% while RME, biogas and ethanol are not taxed at all, except VAT.

It is currently being investigated whether this subsidisation should be replaced or supplemented with a quota obligation.

### ***The Swedish Rail administration***

Banverket (The Swedish Rail Administration) is a government authority responsible for the maintenance, development, and traffic control of the Swedish rail network. The goals set by the Government for Banverket are an accessible transport system, high transport quality, safe traffic, and an equal opportunities transport system. In addition to this, Banverket shall continuously work towards cost-efficient maintenance of existing and construction of new infrastructure. R&D is a tool to support these goals. Banverket work together with other industrial stakeholders and research providers to identify needs that can be researched in projects; such projects deliver results whose implementation benefit Banverket, the rail industry, public transport and freight services. The actual research is often carried out by universities and institutes. Banverket has a holistic perspective on the rail services, which means that the agency work with other agencies responsible for other types of transport infrastructure, notably the Swedish road agency, to facilitate door-to-door transports. Banverket makes use of a stepwise approach before committing scarce funds to new research. This means that Banverket prioritises joint research projects, both on a European and national level, with other stakeholders. The EU Framework Programme is an important enabler of such co-operations. Banverket has an innovation strategy with focus areas. Research that may result in technical and organisational innovations to facilitate seamless door-to-door passenger and freight transport, cost-efficient maintenance and construction of infrastructure and vehicles, and sustainability are prioritised. Banverket makes use of open calls for new projects. The

projects are evaluated and negotiated by experts. A scientific reference board is used to check scientific excellence of the proposed projects. Industrial participation is important. This is necessary in order to ensure a high likelihood of market uptake of the results. Banverket and the industry need research to change rules and regulations. This is important in order to get an interoperable harmonised European railway system. Common standards also enable standardised production in longer series of components and systems. It opens up the railway market to new suppliers and makes competition work better. Taken together, this will lead to cost reductions.

Banverket has implemented projects that have produced good results, and that are in line with the goals and the innovation strategy of Banverket. Some of them are listed below:

#### *Sustainable bridges*

This European project has studied lifetime expansions of existing bridges, which is much less costly than to replace an old bridge with a new one. The project included a full scale test where a railway bridge was subjected to forces that eventually made it break down. The resulting evaluations of this test shows that bridges may have potential for longer service life, and that a premature replacement represents a destruction of capital that can be better used elsewhere. The project has produced handbooks for bridge inspection, monitoring methods, and suggestions of innovative ways for maintaining bridges in order to expand their service life.

#### *Monitoring of pantographs*

Catenary breakdowns caused by faulty pantographs are a source of disturbance. This European project has studied ways to monitor the pantographs and detect signs of malfunctioning, as well as engineering aspects of pantographs. The project results may also be used as an input to ongoing work with technical specifications for interoperability.

#### *Computer Assisted Train Operation - CATO*

CATO started as a project to develop methods for energy-efficient driving of the iron ore trains on the line between Luleå-Kiruna-Narvik in the north of Sweden. Much energy can be saved if trains can be run in a way that avoids stops - especially when it comes to loaded iron ore trains. This project is now on a prototype phase where one train set is equipped with the CATO system, enabling train drivers and traffic control staff to communicate (using wireless devices) and steer the train in an energy-optimal way. A small part of CATO has also been researched in the EU project Railenergy.

#### *Computer Assisted Train Dispatching*

Traffic control staff has to deal with huge and complex information flows on the actual state of train movements. Improvement in the work environment such as better monitors, electronic train graphs, computer-supported advice on train management and information exchanges with other traffic controls can improve the performance and punctuality of railways. The project has delivered results that are now being tested in a prototype at the traffic control in Norrköping.

#### *Green Train Programme*

New faster passenger trains that can run at higher speeds on existing lines, and at line speed (or near line speed) on dedicated high speed lines are the next step towards making rail for passenger services more competitive. Such trains should combine environmental performances (recyclable, low noise emissions and energy consumption) with economic requirements, and be

attractive for the customers. It should also produce low track forces and be able to run at high speed with a high level of comfort on existing tracks, which do not have the same quality as dedicated high speed lines. The Green Train programme is a joint undertaking between Banverket, Bombardier, The Swedish Train Operators Association and research providers such as KTH, Chalmers etc. It has produced a number of innovations - this has been tested using a modified Bombardier Regina Train as a base. A media high note was the setting of a new Swedish speed record on a conventional line section. The record now stands at 303 km/h.

### *Hybrid shunting locos*

A problem in freight is that the last mile is often not electrified. Train operating companies therefore have to make use of diesel locos for shunting and train set formation. A locomotive running on diesel on non-electrified lines, sidings and shunting yards, but capable of running on electricity during the main haul would produce big savings in rolling stock, train use and maintenance. Such locomotives exist in the USA, but they are not adapted to the conditions in Europe. A problem is that operators want suppliers to offer a proven product with all the normal service back-ups, spare parts etc that meet their requirements. Suppliers want an order from a buyer before they start to develop a hybrid train. This research project has studied the specifications that a hybrid trains needs to meet, such as traction power, work cycles, speed etc. A concept design has been made, and a demonstration of the added value of hybrids is currently under way, with a diesel generator supplying an electric locomotive with power.

### *DUO Tramways*

Tramways are making their way back into Swedish public transport. Stockholm is reintroducing tramways in its public transport system. Tramways that can run on city networks and on conventional lines facilitate seamless door-to-door travelling. Such systems exist for example in the German town Karlsruhe, but have been neither tested nor evaluated in Sweden. The DUO Tramways project was a joint initiative together with cities who are thinking about tramways and DUO concepts. The project was led by VTI. One part was an actual demonstration of an Alstom DUO tramway that connected the city of Norrköping with Linköping and some nearby villages. In Jönköping, a town situated at the southern tip of lake Vättern, discussions are underway concerning the possible introduction of DUO trains as a means of achieving a better integration of the city with its surrounding villages.

### *The Swedish Road administration*

The Swedish Road Administration has a Research & Innovation Strategy published as its publication 2008:46. This strategy is available on the following web site: [http://publikationswebbutik.vv.se/upload/4068/2008\\_46\\_the\\_way\\_ahead\\_towards\\_a\\_greener\\_safer\\_and\\_smarter\\_raod\\_transport\\_system.pdf](http://publikationswebbutik.vv.se/upload/4068/2008_46_the_way_ahead_towards_a_greener_safer_and_smarter_raod_transport_system.pdf).

The SRA is an authority with an overall responsibility for solving present and future problems, making it an important link, not only to the university and institute sector, but also to the business community. The SRA therefore occupies a central position in the innovation system. How it deals with the consequences of this, and how it has made the research and innovation process the focal point, is described in the SRA's Renewal Strategy from 2005. This is published as publication 2005:114E, available on the following web site: [http://publikationswebbutik.vv.se/upload/3019/2005\\_114\\_e\\_renewal\\_of\\_the\\_road\\_transport\\_sector\\_with\\_focus\\_on\\_the\\_knowledge\\_and\\_information\\_process\\_.pdf](http://publikationswebbutik.vv.se/upload/3019/2005_114_e_renewal_of_the_road_transport_sector_with_focus_on_the_knowledge_and_information_process_.pdf).

According to this strategy, individuals and the business sector are used as driving forces for attaining the desired renewal that must be carried out from a European and global perspective. In turn, desired renewal is expressed as focus areas in the overall Strategic Plan of the SRA. See the executive summary of this plan, which is published on the following web site: [http://publikationswebbutik.vv.se/upload/3704/89123\\_the\\_swedish\\_road\\_administrations\\_focus\\_2008\\_2017.pdf](http://publikationswebbutik.vv.se/upload/3704/89123_the_swedish_road_administrations_focus_2008_2017.pdf).

2. What initiative(s) does your country have to promote innovation in the transport sector? Are these initiatives part of a larger effort to promote innovation across the economy? Please provide any additional material you have regarding these initiatives, including web sites, reports, etc.

## VINNOVA

VINNOVA's (The Swedish Governmental Agency for Innovation Systems) 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, amongst others, to:

- promote sustainable growth and higher employment rates by acting to increase competitiveness and the emergence and expansion of successful companies; and
- 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.

Listed below are the different measures used, together with references to websites wherever possible.

Source: Innovation for Sustainable growth, VINNOVA 2008.

### *Research initiatives/knowledge and skills-building (sectoral)*

- Industry Applications (e.g. Vehicles and Flight)
- R & D programme
- Competence centres

[www.VINNOVA.se/In-English/Activities/Transportation/](http://www.VINNOVA.se/In-English/Activities/Transportation/)

### *Knowledge of Innovation Systems*

- Innovation Systems Research on R&D and Growth
- Innovation System Analyses
- Technology Foresight
- Evaluations
- Analysis of effects

[www.VINNOVA.se/In-English/Activities/Knowledge-of-Innovation-Systems/Teknisk-framsyn/](http://www.VINNOVA.se/In-English/Activities/Knowledge-of-Innovation-Systems/Teknisk-framsyn/)

### *Strong research and innovation milieus*

[www.VINNOVA.se/In-English/Activities/Strong-research-and-innovation-environments/](http://www.VINNOVA.se/In-English/Activities/Strong-research-and-innovation-environments/)

Internationally strong research and innovation milieus (R&I milieus) are one of the most important competitive factors in the face of global competition. This is why all of VINNOVA's activities are guided by the ambition to develop and further develop strong research and innovation environments.

For small and internationally dependent countries like Sweden, the need to focus its efforts on a number of strong, internationally distinguished R&I milieus is a critical factor in the effort to promote growth. It is a question of creating a number of globally-recognised spearheads, so that Sweden can become an attractive partner for both companies and R&D investments.

In strong R&I milieus, cutting-edge research, development and innovation operations are conducted, and there is an effective interplay between these operations, called VINN Excellence Center. Four of them are listed below:

- Next Generation Innovative Logistics - NGIL. (University of Lund), a VINN Excellence Center in logistics. ([www.ngil.se](http://www.ngil.se)).
- SAMOT - Service and Market Oriented Transport Research Group (University of Karlstad), a VINN Excellence Center for public transports ([www.samot.kau.se](http://www.samot.kau.se)).
- Centre for ECO2 Vehicle Design (KTH), a VINN Excellence Center performing multidisciplinary research to support a sustainable vehicle design development. ([www.eco2vehicledesign.kth.se/](http://www.eco2vehicledesign.kth.se/)).
- SAFER - Fordons- och trafiksäkerhetscentrum (Chalmers), a VINN Excellence Center for design of future vehicle and traffic safety systems ([www.chalmers.se/safer/EN/](http://www.chalmers.se/safer/EN/)).

### *Commercialisation of R&D results*

[www.VINNOVA.se/In-English/Activities/Commercialisation-/](http://www.VINNOVA.se/In-English/Activities/Commercialisation-/)

When referring to the commercialisation of R&D, VINNOVA means the application and use of research results in a broad sense, both in existing companies and in start-up companies.

VINNOVA's activities with regard to the commercialisation of R&D results are conducted in collaboration with other players in order to achieve the greatest possible impact for the entire system. VINNOVA focuses its efforts on the closely research-related phases of the innovation and commercialisation process. The conditions that govern research and the context in which research takes place require tailored structures, skills, expertise, working methods and funding instruments. The market finds it very difficult to act in these early research phases as the conditions governing this stage of the process differ so widely from the market conditions that apply in the later phases.

VINNOVA's strategy is based on the unique characteristics of the Swedish innovation system and on the experience of successful commercialisation that exists in Sweden.

- The Key Actors Programme
- VINN-Verification
- Incubators
- VALOR

### *Research and Innovation in Small Companies*

[www.VINNOVA.se/In-English/Activities/Research-and-Innovation-in-Small-Companies/](http://www.VINNOVA.se/In-English/Activities/Research-and-Innovation-in-Small-Companies/)

Small and medium-sized companies (SMEs) play a decisive role in promoting national competitiveness and employment. Not only do they represent the overwhelming majority of companies, they also act as a source of renewal and a driving force for the development of new business areas. Moreover, a large number of SMEs want and need to become international in order to reach new markets and exploit new business opportunities.

R&D operations have become more complex and are also associated with major costs and risks. This means that it is more difficult for SMEs to conduct their own R&D operations than for large companies.

By investing in R&D programmes that focus on SMEs, VINNOVA aims to help these companies increase the knowledge content of their products and processes, and thus increase their competitiveness.

- Forska & väx
- VINN NU

### *R&D programmes at VINNOVA, with on-going projects*

VINNOVA runs a number of programmes, several in co-operation with other players, that aim to promote the development of strong R&I milieus in different ways.

[www.VINNOVA.se/In-English/Activities/Transportation/](http://www.VINNOVA.se/In-English/Activities/Transportation/)

#### *Innovative Vehicles for Different Transport Modes*

The focus of the Innovative Vehicles for Different Transport Modes programme is on technology for environment-friendly and safe vehicles. The aim of the programme is to develop technically advanced research and innovation environments in the field.

Advanced designs and functions for vehicles should enable an effective interplay between the various modes of transport and with the infrastructure. IT-based system solutions are being developed to further facilitate this interplay. The programme also strives to establish positive collaboration between manufacturers, researchers and society at large in order to find solutions to current transport problems.

Demonstrators constitute an important tool in the effort to discover optimal solutions with regard to technology, regulatory systems and funding for the transport system of the future.

The programme has issued two calls (2003 and 2005). The second call is related to shipping and railways.

#### *Innovative Logistics and Freight Transport*

Logistics and freight transport is an extensive and varied field. Apart from research and development players, the field also covers all those who purchase, co-ordinate or conduct transport using different modes of transport.

VINNOVA focuses its activities in the field on knowledge development and the improvement of innovation environments. Our ambition is to develop knowledge that is generic for all modes of transport, and to initiate or improve the interdisciplinary innovation environments that relate to commercial and industrial supply networks, logistical structures and transport systems.

Three calls have been issued under the programme.

VINNOVA also promotes international R&D-cooperation within the framework of ERA-Net Transport.

### *Infrastructure and Efficient Transport Systems*

The vision for the programme Infrastructure and Efficient Transport Systems is to contribute to the development of the Swedish transport system so that it in turn supports sustainable growth. A central element in this is to help meet the objectives of Swedish transport policy.

The programme also addresses the importance of the transport system to regional growth and has links to the DYNAMO programme, which belongs to the Development of Working Life field. VINNOVA is collaborating within the programme with the National Rail Administration and the National Road Administration on a joint programme for public transport.

The programme issued calls in 2003 and 2005.

### *Maritime Safety*

The Maritime Safety programme focuses on research, development and demonstration in the maritime safety field. The programme aims to contribute to the dissemination, use and application of scientific and practical results in products, processes, services, the work organisation, the work environment, and regulatory frameworks in the field of maritime safety. It should also contribute to a more intensive exchange of knowledge, and the development of new networks between different fields of research, as well as between researchers and other players in the shipping sector.

Calls for applications for project funds are directed at universities, colleges, institutes, companies and organisations in the public sector, and relate to both the long-term development of knowledge on maritime safety and the more practical application of existing and new knowledge and experience.

Alongside the Maritime Safety programme, VINNOVA also has a special assignment in the field that concerns studies relating to the loss of the car and passenger ferry "Estonia" in 1994.

### *The Vehicle IT and Telematics Programme*

The Vehicle IT and Telematics Programme (V-ICT) was launched in the autumn of 2005, and will continue until further notice, although no later than to the end of 2008. The aim of the programme is to strengthen the international competitiveness of the Swedish automotive industry by means of a strategic concentration of efforts and resources in the field of vehicle IT, telematics and electronics.

The activities of the R&D programme should stimulate greater co-operation between the automotive industry and the telecom industry in order to enable the introduction of more advanced functions and services in the vehicles. The measures are designed to promote employment, growth and R&D, and also, in the short term, to improve the automotive industry's ability to conduct development and production in Sweden.

The programme has a total budget of approximately SEK 250 million.

Applications can only be submitted by the vehicle manufacturers that are contractual partners in the programme. The active support of one of the following manufacturers is thus required to start a project: Saab Automobil, Volvo Personvagnar, Volvo or Scania CV.

## *BISEK*

The Social and Economic Significance of the Automobile, BISEK. The aim of the BISEK programme is to provide society with knowledge which will make it possible to objectively describe the social and economic consequences of various measures in the road transport system for different categories of individuals and households.

BISEK is an R&D collaboration between VINNOVA, the Swedish Road Administration, BIL Sweden, the Co-operation Committee of the Swedish Motor Organisations (MOSK), Folksam (an insurance company) and the Norwegian Public Roads Administration.

### *Passenger Transport in the Future*

Passenger Transport in the Future is a programme that addresses public transport in a broad sense. The overall objective is to facilitate travel by promoting an efficient and sustainable public transport system.

The programme is based on collaboration between Banverket (the National Rail Administration), Vägverket (the National Road Administration) and VINNOVA on R&D work in the public transport field, and has a total budget of at least SEK 50 million. The programme begins in 2007 and will run for five years.

### *The Vehicle Research Programme*

The Vehicle Research Programme aims to increase the international competitiveness of the Swedish vehicle industry. This will be done by supporting vehicle engineering research in selected areas in order to create a competence and recruitment base in Sweden of the highest international level, and to produce high-class research results. The prioritised areas are safety, the environment and costs/quality.

The Vehicle Research Programme is run by the Programme Council for Vehicle Research which is made up of representatives of several authorities and companies, including VINNOVA.

### *"The Green Vehicle"*

A collaboration programme for environmentally sustainable automotive engineering. The aim of the collaboration programme The Green Vehicle is to conduct research and development in order to produce more environmentally sustainable automotive engineering solutions that can be incorporated into future products to improve their environmental properties, and thus increase their competitiveness. The development of vehicles and vehicle components with better environmental properties will accelerate the move towards road traffic with an environmental impact that is acceptable in the long term.

The programme is run by the Programme Council for Vehicle Research which is made up of representatives of several authorities and companies, including VINNOVA.

### *The national aviation research programme (NFFP 5 2009-2012)*

Flight technique is of great importance to society, both in the transport and defence. The aerospace industry is a high-tech industry with potential for great technology spread to other industries. The smooth operation of research and education are essential.

The purpose of NFFP is to further develop research resources nationally in the industry, at research institutes and universities, and to coordinate the use of these resources. NFFP shall as a part of the aeronautics research in the country contribute to the strengthening of the

Swedish industry's competitiveness. It will also strengthen its capacity to actively participate in and benefit from international research and technology cooperation. The programme covers aeronautics research of both civil and military importance. VINNOVA handles the administration duties.

### *Environmental Innovation*

VINNOVA announced a call in the Environmental Innovations aimed at universities, colleges, research institutes, businesses and public activities 2009-06-24. The goal is to find new knowledge and successful products, services and processes, leading to an increased competitiveness of Swedish business development and that this takes place within the framework of relevant national environmental and transport policy objectives. Projects on call may involve research and development of new knowledge and technology, demonstration, testing, system studies and development of new business models. There are four main areas dedicated to players in the transportation, logistics and infrastructure:

- *Sustainable use of natural resources*
- *IT Environment*
- *Sustainable urban development*
- *Energy efficiency*

The call spans over five years and has a total budget of up to SEK 150 million. Projects can receive grants from 100 to 5 000 thousand per year. A co-financing of 50% is expected, but there are some possibilities for a higher funding level.

### *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 overarching 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.

### *New programmes not yet launched*

VINNOVA will launch new programmes during 2010. More information will be available later this fall.

### ***The Swedish Rail Administration***

Banverket promotes innovation through research projects conducted together with industry and academia, but the activities are limited to the rail business with its interfaces to other modes. Banverket make use of centres of excellence to provide a stable arena for industry and academia to create research partnerships that produce innovations in technology, products and processes susceptible of making the business more productive and profitable. The main centres of excellence are Charmec in railway mechanics and materials, KTH Railway Group in vehicles and transport planning and the Railway Centre at Luleå Technical University who specialises in maintenance.

### *The Swedish Road administration*

In the Research & Innovation Strategy of the SRA, publication 2008:46 (see question 1 above) there are two strategic initiatives introduced to promote innovation:

- Commercialisation of R&D results;
- Appropriate handling of IPR.

The SRA supports initiatives for developing new solutions in trade and industry, provided they contribute towards the advancement of the road transport system in the desired direction. This support is given in various ways. In order to give impetus to this aim, the SRA signed a collaborative agreement in December 2006 with Innovationsbron AB, which has risk capital at its disposal. See [www.industrifonden.se/in\\_english/investments/innovationsbron.asp](http://www.industrifonden.se/in_english/investments/innovationsbron.asp)

A prerequisite for the SRA being able to collaborate with the commercial sector in a favourable and trustworthy way is the consistent and well-considered handling of intellectual property rights (IPR). A number of approaches for dealing with intellectual property rights were established in October 2007. These include recommendations that serve as guidelines and which can be applied to the various situations the SRA might encounter.

These approaches are as follows:

1. Search for the solutions of others (via patent databases, etc.).
2. Map the existence of intellectual property rights before reaching a decision on any initial research and development projects, and take this knowledge into consideration.
3. Secure general access to the use of a defined solution by ensuring that the SRA owns or obtains intellectual property rights, if there is reason for doing so.
4. Pay attention to the existence of intellectual property rights so as not to unduly favour any particular organization, where tender wording favours monopolies.
5. Deal with employees' ideas that are worth patenting in a consistent and well-considered way.
6. The basic principle that goes hand-in-hand with these recommendations is to first define the intellectual property rights before making a decision.

### *The Swedish Energy Agency*

The Swedish Energy Agency's long term research and development objectives include the production of motor fuels from renewable sources and more efficient vehicle systems running on fossil (conventional), renewable fuels and electricity.

#### *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 bio-based 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 a 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 of 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 per day.

#### *Värnamo - gasification of biomass*

A demonstration plant for the gasification of biomass, having a fuel input power of 18 MW, was built and operated by Sydkraft in Värnamo during the 1990s, with the object of producing electricity via an Integrated Gasification Combined Cycle (IGCC). The gasifier and gasification technology are still of interest for the production of synthesis gas to make bio-based motor fuels. The plant was partly restarted in the EU Chrisgas project. Both the gasification process, which is now in operational condition again, and the gas cleaning process are vital for successful production of a second-generation bio-based motor fuel, primarily Fischer-Tropsch diesel fuel.

#### *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 optimisation of the processes so as to reduce 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*

1.2 TWh of biogas were produced in 2006 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 Strategic Vehicle Research and Innovation Initiative (FFI)
- 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 centres*

#### *CECOST*

*Vision.* In order to achieve a more complete understanding of combustion and its effects, knowledge in a wide range of different disciplines, such as the 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 of applied engineering sciences connected to the real combustion apparatus, are also required.

*Mission.* To guarantee a major impact of the research, it is important to create a research organisation where these disciplines are coordinated, not only within the academia but also with the outer world, i.e. related industries and society.

*Strategy.* 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 the fundamental understanding of, and viable systems for: optimising 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 *mission* can be summarised as follows:

- To establish a forum in which industrialists and academics can meet to perform high quality research;
- To acquire fundamental knowledge about the physical processes involved in high pressure spray combustion by experiments and modelling;
- To define and investigate new technologies and combustion concepts leading to cleaner and more efficient engines;
- To promote transfer of knowledge to industry;
- To educate engineers and scientists who will be able to secure rapid technological development of the engine industry.

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 atomisation and evaporation, fuel-air mixing, combustion, emissions formation, and alternative energy converters.

## CICERO

The long-term vision for research within CICERO 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.

In summary, the scientific and educational mission of KTH CICERO is to:

- Develop a world-recognised position within the gas-management area for internal combustion engines, using the competence from several fundamental and applied disciplines;
- Work in close cooperation with the Swedish IC engine industry and also with international companies;
- Work mainly with long-term projects, but also supplementary industry-specific projects;
- Increase the recruitment to the field, both at graduate (master) and post-graduate levels;
- Increase the number of research-educated people who can be employed by industry or universities (both Doctorate and Bachelors Degree-level), and especially encourage more female students to work in this field;

- Take an active part in developing and giving advanced courses in the gas-management area, valuable for both doctoral students and company employees;
- Play an important role in knowledge and technology transfer within its competence area by ensuring that research outputs are fully disseminated to its industrial partners.

The CICERO *strategy* for the first four years, which can be seen as a ramp-up phase, is both an internal strategy for organising 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.

## *EKC<sup>2</sup>*

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 energy 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.

*Mission:* The power industry clearly faces a series of challenges that must be addressed by development of knowledge, methods, and products.

At the outset of EKC<sup>2</sup>, the partners of EKC<sup>2</sup> formulated a set of seven strategic goals that need to be addressed on a societal level, with EKC<sup>2</sup> playing its role as a research centre, to successfully meet these challenges. These goals are:

- Integration of new power sources;
- Affordable Reliability;
- Energy efficiency;
- Market development;
- EKC<sup>2</sup> shall provide a meeting point and platform for implementation of new technologies, thereby creating an independent body where new technologies can be implemented, evaluated and developed;
- EKC<sup>2</sup> shall act as a forum for development dissemination of knowledge through seminars, academic as well as industrial training courses and a nationwide PhD student program in Electric Power Engineering;
- EKC<sup>2</sup> shall stimulate economic growth. This will be done by building an environment that stimulates the creation of new technologies, methods and prototypes that can be commercialised, either by partners, or by start-up companies.

## 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 biofuels can give benefits, but the major effort must be on increased fuel efficiency.

*Mission.* The main goal of this centre is to better understand the combustion process in internal combustion engines. Of particular interest are the combustion processes with low enough temperature to suppress formation of NO<sub>x</sub> and particulates, PM, often called Low Temperature Combustion, LTC or Homogeneous Charge Compression Ignition, HCCI.

The strategy of the centre is to attack the two main problems of the IC engine at the root. Both local emissions (NO<sub>x</sub>, HC CO and PM) and global emissions (CO<sub>2</sub>) come from imperfect combustion. Local emissions are the result of incomplete combustion, and in the case of NO<sub>x</sub>, also of high temperature during and just after combustion. Global emissions (CO<sub>2</sub>) are higher than necessary due to the requirements and constraints the combustion process set on the thermodynamic cycle, and hence on thermodynamic efficiency. To improve 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.

*Mission.* KCK shall be an internationally-recognised research organisation both within academia and industry, and one of the leading centres in the world for research, education and technical development within catalytic emission control and catalysis for sustainable energy systems.

*Strategy.* 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 budget for the first period, 2007 to 2010, is approximately USD 11 million.

## **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

### *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 a long-term (approx. 10 years) research collaboration between regional actors.

Research and Innovation in small companies

**3. What are the specific objectives of these initiatives? (e.g. Do they focus on certain challenges, such as climate change or safety, or on certain modes? Do they take a wider approach focusing on all of the challenges faced by transport?)**

#### *VINNOVA*

All programmes issued by VINNOVA promote sustainable growth. The different programmes are described in more detail in question 2.

#### *The Swedish Rail administration*

The main objectives are described in “Banverket innovation strategy” which is mentioned in question 2.

#### *The Swedish Road administration*

The challenges, on which Research & Innovation Strategy of the SRA is based, are as follows:

1. An efficient and accessible transport system;
2. Improved mobility for commuters and freight transport;
3. Attractive built-up areas and cities with better transport options;

4. Sensible use of the transport system;
5. A sound and vigorous transport industry;
6. Safe and energy-efficient vehicles with sustainable fuels;
7. Simpler and clearer for the client;
8. Efficient asset management;
9. An attractive and capable SRA as part of an attractive transport sector.

In addition, the SRA has a further important challenge to live up to when carrying out its operations, namely to aspire to be:

10. A modern and efficient road administration in a changing world.

Each of these 10 strategic challenges is more comprehensively described in publications presented in question 1 above. They are all foreseen to support the SRA Vision “to make the good journey possible”. This presupposes that one aims to achieve all of the transport policy subsidiary goals, since each concerns the quality of the journey in different respects. However, making “the good journey” an option also assumes that there is collaboration and dialogue with the “clients”, i.e., citizens and the business community. By collaborating with representatives who act for citizens and the business community, the SRA has established the requirements that need to be met by the road transport system. This basis has then been revised and weighed up in the light of transport policy goals.

#### 4. Please describe the funding arrangements associated with your efforts to promote innovation in transport:

VINNOVA’s budget for all research and development was approximately 2.05 billion SEK in 2008; the budget for 2009 is around 2.1 billion SEK. The budget for innovations in transport was 285 million SEK in 2007.

There are different funding arrangements in different programmes. VINNOVA strives to make the industry contribute the same amount as VINNOVA, but this does not always happen.

##### *Financiers for Innovations in transport - budget*

In total, about 1 billion SEK was invested in transport-related innovations (2007). This represents an increase of 215 million SEK compared to 2005. There are approximately 10 governmental agencies and other financiers which are funding innovations in transport. The four major financiers are the Swedish Road Administration, the Swedish Rail Administration, VINNOVA and the Swedish Energy Agency.

Financier	2007 (mnkr)
The Swedish Road Administration	291
VINNOVA	285
The Swedish Rail Administration	97
The Swedish Energy Agency	291
Other	55

Source: Inventering av pågående forskning inom transportområdet 2008, Sveriges Riksdag 2008/09:RFR5.

## 5. What is the lead ministry or agency for your efforts to promote innovation in transport?

Ministry of Enterprise, Energy and Communications and VINNOVA ([www.vinnova.se](http://www.vinnova.se)).

## 6. What other public entities are involved and what are their roles?

The Swedish Road Administration ([www.vv.se](http://www.vv.se)),

The Swedish Rail Administration ([www.banverket.se](http://www.banverket.se)),

The Swedish Energy Agency ([www.energimyndigheten.se](http://www.energimyndigheten.se)),

Growth Analysis- agency for growth policy evaluations and analyses ([www.tillvaxtanalys.se/en/index.html](http://www.tillvaxtanalys.se/en/index.html)),

Swedish Agency for Economic and Regional Growth - Tillväxtverket ([www.tillvaxtverket.se/sidhuvud/englishpages.4.21099e4211fdb8c87b800017332.html](http://www.tillvaxtverket.se/sidhuvud/englishpages.4.21099e4211fdb8c87b800017332.html))

## 7. What other partners are involved (e.g. the private sector, universities, states/provinces, etc.)?

*Generally:* Private sector, universities and research institutes, VTI (Swedish National Road and Transport Research Institute) [www.vti.se](http://www.vti.se) and SP (SP Technical Research Institute of Sweden) [www.sp.se](http://www.sp.se) - both public and private enterprises participate.

*Rail:* Major industrial partners are Balfour Beatty, Voest Alpine, Bombardier, Alstom. Research providers include Chalmers/Charmec, Railway group at the KTH, Railway Centre at Luleå, VTI and private companies such as Interfleet.

## 8. What international partnerships are involved in this?

*Generally:* Era-Net Transport, FP 7

*Rail.* ERRAC and the UIC.

*Road:* In the cross-border research collaboration governed by NordFoU or ERA-NET ROAD, other national road administrations participate, i.e. the CEDR members. See question 11.

## 9. Please provide a summary of any results or outcomes already achieved as a result of your efforts to promote innovation in transport?

VINNOVA

### *Automotive research*

At the start of the 1990s, the government, in close collaboration with the automotive industry, invested in a vehicle research programme called FFP. Both sides invested SEK 30 million per year in the initial years. Its most important impact was helping to strengthen the research expertise of the automotive industry and its interest in and capacity to absorb research results into its own development activity. Amongst other things, this was because the industry could employ research-trained people. It also helped strengthen the collaboration with universities and research institutes and bolstered the internal competitiveness of passenger car manufacturers within foreign-owned groups. Aided by FFP, both Volvo PV and Saab were able to establish internal Excellence Centres within important technological fields.

Accordingly, the Vehicle Research Programme has made a significant contribution to maintaining the Swedish automotive industry's competitiveness through strengthened research expertise and absorption capacity, strengthened collaborative relationships with universities, strengthened internal competitiveness for passenger car manufacturers within foreign-owned groups and vital research results applicable in product development.

*Literature: SUMMARY IMPACT OF GOVERNMENT SUPPORT TO AUTOMOTIVE RESEARCH - Implications of research and renewal for the competitiveness of the Swedish automotive industry.*

[www.VINNOVA.se/upload/EPiStorePDF/va-09-12.pdf](http://www.VINNOVA.se/upload/EPiStorePDF/va-09-12.pdf)

### ***The GSM Story Effects of Research on Swedish Mobile Telephone Developments***

Ericsson's development of mobile telephony is one of Sweden's outstanding industrial successes of recent years in terms of turnover, employment and exports. This impact study focuses on the role of Swedish government research funding in the development of technology for mobile telephony, especially GSM, and subsequent Swedish success.

The study shows that a number of factors were important. These included the dialogue between the supplier Ericsson and the customer Swedish Telecom and their mutual support in the international standardisation process. Another factor was the technological capabilities and market strength already built up under the Nordic cooperation that created the NMT system.

[www.VINNOVA.se/upload/EPiStorePDF/va-09-12.pdf](http://www.VINNOVA.se/upload/EPiStorePDF/va-09-12.pdf)

### ***Impacts of the Framework Programme in Sweden***

VINNOVA, together with the Swedish Research Council, the Swedish Energy Agency, the Swedish Council for Working Life and Social Research, and the Swedish Research Council Formas, was instructed in 2007 by the Swedish government to conduct an impact analysis of EU framework programmes for research and development at the level of industrial sectors and universities in the period 1990 to date.

A steering group with representatives from these research councils and agencies agreed on the foundation for the analysis. VINNOVA coordinated the work in the steering group.

The impact analysis was conducted by Technopolis Ltd.

The study will hopefully inspire new policy action in the field of research and innovation on the national and the supranational level in Europe. The Swedish agencies will be inspired by the report.

[www.VINNOVA.se/upload/EPiStorePDF/va-08-11.pdf](http://www.VINNOVA.se/upload/EPiStorePDF/va-08-11.pdf)

### ***Effects of Swedish traffic safety research 1971-2004***

Traffic accidents are a major social problem. Costs for killed and injured persons in 2005 have been estimated to exceed 29 billion Swedish crowns. To this number should be added considerable human pain.

However, the ongoing development as regards traffic safety is positive. During the period 1970 - 2004, the number of killed persons per year was dropped by two thirds, from 1307 to 440 per year, despite the fact that the amount of traffic more than doubled in this period. This positive development includes unprotected road-users as well as drivers and passengers in vehicles. Furthermore, there are no signs that this positive development should not continue.

The present impact analysis demonstrates that research on traffic safety has had been of great importance for the increase of traffic safety. At the same time, it has formed the basis for considerable commercial success within the automotive industry.

From 1970 to 2005, the number of fatalities in Swedish traffic dropped by about 67% (from 1307 to 440), and the number of seriously injured persons by about 45%. Given that road traffic during the same period increased by over 100% (from 37 to 77 billion vehicle-kilometres), the risk of persons being killed or injured in traffic in Sweden reduced by over 80% and 50%, respectively. In other words, every road user now travels more safely than before.

Research and research-based safety measures have contributed significantly to the large reduction of the numbers of persons killed in traffic accidents in Sweden. Measures which, to a large extent, are based on traffic safety research, may have reduced the numbers of persons killed by 96 persons per year. Measures where research has provided a significant contribution may have reduced the numbers of persons killed by 385. Factors not influenced by research are estimated to have contributed to an annual reduction in road deaths of 70 persons.

[www.VINNOVA.se/upload/EPiStorePDF/va-07-09.pdf](http://www.VINNOVA.se/upload/EPiStorePDF/va-07-09.pdf)

### *The Swedish Rail administration*

The results are evaluated based on indicators of market uptake of knowledge in products, services and processes. The method is described in an ERRAC working paper. Major academic centres of excellence are periodically evaluated in peer reviews, both with regards to relevance and to scientific quality.

### *The Swedish Road administration*

R&D activities are seen to be parts of a tool kit for reaching different policy goals. Thus, the outcome is described in the annual general reports to the Swedish Government. The last ones of these reports (publications 2009:32 and 2009:34) are available on the following web sites:

- [http://publikationswebbutik.vv.se/upload/4782/2009\\_32\\_annual\\_report\\_2008.pdf](http://publikationswebbutik.vv.se/upload/4782/2009_32_annual_report_2008.pdf)
- [http://publikationswebbutik.vv.se/upload/4784/2009\\_34\\_the\\_road\\_transport\\_sector\\_sectoral\\_report\\_2008.pdf](http://publikationswebbutik.vv.se/upload/4784/2009_34_the_road_transport_sector_sectoral_report_2008.pdf)

10. Please describe the performance indicators or measurements that you use to evaluate the outcomes of your efforts to promote innovation. Please attach more detailed documents on this issue, if they are available.

See answer to previous question.

## 11. What are the principal means by which your agency keeps track of new innovations and trends in transport?

### VINNOVA

VINNOVA use different network to keep track of new innovations and trends in transport: for example Transam ([www.VINNOVA.se/In-English/Activities/Transportation/TRANSAM/](http://www.VINNOVA.se/In-English/Activities/Transportation/TRANSAM/)), different technical platforms, the EU-group, a national reference group with researcher and different users in the transport sector.

VINNOVA also participate in ERA-net Transport and FP7.

### *The Swedish Rail Administration*

Banverket is working together with other transport agencies and research founders such as the Road Agency and VINNOVA, where information is shared about innovations and trends. On the international level, Banverket is a member of both the UIC and ERRAC.

### *The Swedish Road Administration*

One important conclusion stated in publication 2006:159E of the Swedish Road Administration ([http://publikationswebbutik.vv.se/upload/3076/European\\_Way\\_ahead\\_for\\_the\\_Renewal\\_of\\_Roads\\_and\\_Road\\_Transport.pdf](http://publikationswebbutik.vv.se/upload/3076/European_Way_ahead_for_the_Renewal_of_Roads_and_Road_Transport.pdf)) is the following:

As the problems and challenges are not unique to Sweden, neither are the solutions.

On this background the five-step approach for research and innovation was introduced in the strategy of the SRA, publication 2008:46 (see question 1 above). This approach implies the following steps:

1. If a solution for the current challenge or problem already exists in the surrounding world, the SRA will use it in the Swedish road transport system (or within the SRA itself).
2. If a solution for a current challenge or problem is produced at the expense of the EU (by being part of a framework programme), the SRA will attempt to steer the result and contribute towards it being used appropriately. This can, however, require co-financing from either the SRA or another Swedish R&D funder. In this case, participation in the activities of ERTRAC is crucial, see [www.ertrac.org](http://www.ertrac.org).
3. If it is likely that the current problem has already been identified in Europe, the SRA will pool expenses in order to find a joint solution through collaboration with, for example, ERA-NET ROAD (CEDR TG Research). See [www.eranetroad.org](http://www.eranetroad.org) and [www.cedr.fr](http://www.cedr.fr).
4. The NordFoU collaboration will be used if a particular problem or question has a connection to typically Nordic climatic or traffic conditions. See [www.nordfou.org](http://www.nordfou.org).

The SRA finances and orders R&D activities first when the SRA itself is responsible for the problem and when no solution is available abroad or can be found in another way, for example, through collaboration with the business sector or other public bodies. See [www.vv.se](http://www.vv.se).

This will allow the realisation of potential efficiency and quality profits through European collaboration, i.e. to utilise the “European Research Area”.

This approach is moreover in line with the initiative by the European Commission to promote joint research programming. This was expressed in the report COM (2008) 468 “Towards Joint Funding in Research”.

The basic premise for being able to carry out R&D in collaboration with the commercial sector must be the synergy that exists between transport and business policy goals and company economic policy goals. This collaboration is indeed feasible, as is shown by the positive experience the SRA has derived from a number of joint industrial R&D programmes.

## 12. Is there any additional information that you would like to provide?

In October 2008, the Swedish Ministry of Enterprise, Energy and Communication presented a Government Bill concerning the future transport infrastructure. Among its new initiatives, it is stated that the Swedish Road and Railway Administrations, together with the Swedish Construction Industry, are expected to launch a joint public-private research programme on more energy efficient road and railway infrastructure management.

The Swedish Road Administration, together with the Swedish Agency for Innovation Systems and the Swedish Energy Agency, have earlier accomplished a number of successful public-private joint research programmes, such as the Emission Research Programme (EMFO) and the IVSS programme on Intelligent Vehicle Safety Systems. Private partners were Swedish car, bus and truck manufacturers as well as their sub-contractors. According to a decision by the Swedish Government on 10th of October, 2008, the next generation of this type of public-private joint research programming was endorsed on 1st of January 2009. This automotive research programme amounts to 90 million Euros annually for the period 2009 to 2013. It is stated by the Swedish Government that 2/3 is dedicated to the climate change challenge, while 1/3 is dedicated to increased road safety.

Furthermore, on 3<sup>rd</sup> of September, 2009, the Government decided to appoint an administrator, who shall prepare for and establish a new authority for the development of the overall transport system. This new agency will include (and replace) both the Swedish Road administration and the Swedish Rail administration. The agency will start on 1 April 2010.