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EUROPEAN ASSESSMENT OF GLOBAL PUBLICLY FUNDED AUTOMOTIVE RESEARCH

Publicly funded automotive research in Sweden

SEVENTH FRAMEWORK PROGRAMME

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1 Introduction

1.1 Background

The FP7 project EAGAR benchmarks the current public automotive vehicle research activities at international level, in particular the European Union with Brazil, Canada, China, India, Japan, Malaysia, Russia, South Korea, the United States and 13 EU Member States. EAGAR identifies the national road transport visions and roadmaps, research priorities, supported key topics, technology pathway, as well as the level of investment. This enables a direct comparison of national automotive R&D policies relating to the environment, safety and congestion. The EAGAR study provides a key perspective on global investments designed to improve automotive vehicle technologies for a greener, safer and smarter road transport system.

1.2 Objectives

This deliverable report summarises the situation of the RTD funding system in Sweden with respect to published vision statements, research targets and roadmaps, the national funding programmes of the past 4 years and the governance of automotive RTD funding in Sweden.
The report is basis for the subsequent benchmarking analysis, which delivers the key results of EAGAR addressing the following issues:

- Overview of national road transport visions, research agendas and roadmaps
- Comparison of automotive research priorities and investments focused on vehicle technologies, namely passenger cars, commercial vehicles and motorised two-wheelers.
- Characteristics of national automotive research funding systems and approaches
- Potential international cooperation areas from a European perspective

This study benefits the competitiveness of Europe and enables the stakeholders to adjust its visions & plans for the future. Date of publication: September 2010. It is available from the EAGAR website WWW.EAGAR.EU

1.3 Methodology

This country report is based on comprehensive investigations via desk research, information from the responsible programme managers and individual feedback from experienced project managers and researchers. The methodology used was developed in the first months of the project. It is consistent for all target countries. The data collection was mainly done from May to November 2009. The four main categories are:

- General and automotive data about the country
- Published challenges, visions, targets for automotive research
- Funding organisations and hierarchies for automotive research
- National public funding programmes with dedicated calls or permanently open between in the years 2006 to 2009.

1.4 Disclaimer:

This document presents quantitative and qualitative data from various sources. Due to the complexity of the project and the large amount of sources of data, regularly changing during the duration of the project, it was not possible to thoroughly validate all details. The EAGAR project partners cannot guarantee that the data presented is either complete or correct. The value of some of these data is mainly explorative, as a first step in an indicators development process. In conclusion, the data provided here may be difficult to interpret, are not exhaustive and may need further development. Comments by stakeholders on the coverage, relevance and interpretation of the indicators provided, as well as observations on new indicators that could be employed to improve the analysis of publicly funded automotive research are welcomed by the EAGAR project consortium. Any quotation of the data in this document should make reference to the above disclaimer. The EAGAR project partners and EC accept no liability for any issues that arise from actions that may be taken as a result of reading this report.

2 Description of the main WP results

2.1 General Information and Automotive Data

Sweden with its capitol Stockholm is a Nordic country in Northern Europe, which borders Finland to the northeast and Norway to the west. Sweden is the third largest country in Europe and covers a total area of 450,295 km². With a population of only 9.3 million[1] it has a very low population density.

Sweden has a highly developed economy, with a GDP in 2007 of SEK 3,070,000 million (which is about € 294,401 million)[2].

Figure 1: Flag of Sweden

The role and importance of road transport in Sweden and significance of domestic automotive industry

The automotive industry in Sweden is a very important economical branch. Despite the size of the population (9 million inhabitants), Sweden has four major automotive manufacturers, including research and development departments: Scania, AB Volvo, Volvo Cars, and Saab. The annual turnover of the automotive industry is about SEK 168,000 million (which equals € 16,110 million) representing 12 % of the total industry's refinement value and 14 % of all goods exported. The automotive sector exports the second largest amount of goods. When the whole supply chain is taken into consideration, the automotive industry is the largest business generating employment in Sweden, providing over 140,000 jobs (30,000 directly in the field of car manufactures).
More than 40 companies manufacture vehicles in Sweden – ranging from global volume car, van, truck and bus companies, to specialist niche producers. In addition to the two volume car manufacturers (Volvo, Saab), some large European automotive suppliers reside in Sweden, such as Plastal.

Though the Swedish automotive industry has a high level of technology and highly educated employees, the industry's costs and the change of demands as well as the global recession of 2008 and 2009 and the financial problems affected the automotive industry in Sweden severely.
In 2008 the Swedish government has launched a package of measures worth € 2.7 billion to fight the aftermaths of the financial crisis[3]. In order to increase the investments in the automotive industry a new organisation, called Fouriertransform, has been founded to invest in the automotive industry. Also new programme calls within Vinnova have been launched. The two car manufacturers, Volvo Cars and Saab were sold to foreign investors.

National spending and funding for research and technological development

Automotive research funding has been approximately € 6 billion per year since the early 1990's. In 2007 Sweden spent in total € 11 billion on RTD and € 3.3 billion on automotive RTD.

[1] As in 2009
[2] Source: "Statistics Sweden"
[3] Eurofund online

2.2 National Funding Organisations and Hierarchies for Automotive Research

The Swedish government is the main organisation for funding automotive RTD. A number of organisations and ministries distribute the funds among the RTD performers.
Vinnova, the Swedish Road Administration, Swedish Energy Agency, Swedish Research Council, the region Vastra Gotaland, AP foundation number six, and Tillvaxtverket are all funding organisations under the influence of the Swedish Government.

The structure and governance of the national funding system

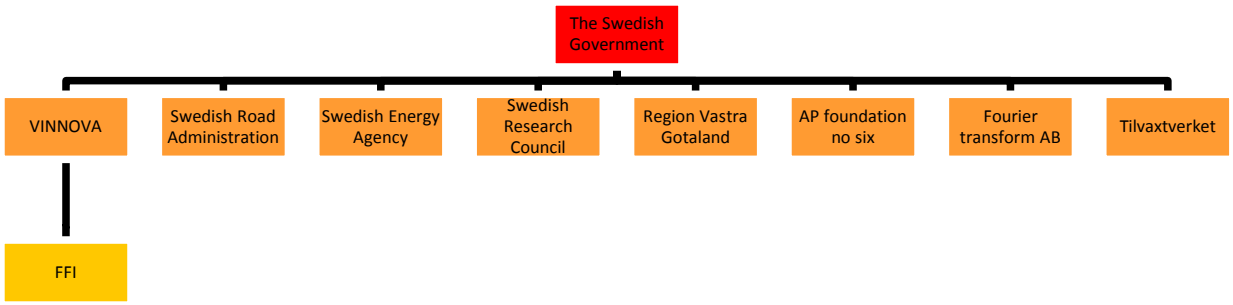

Figure 2: Structure of the Swedish funding system

Funding organisations and key players

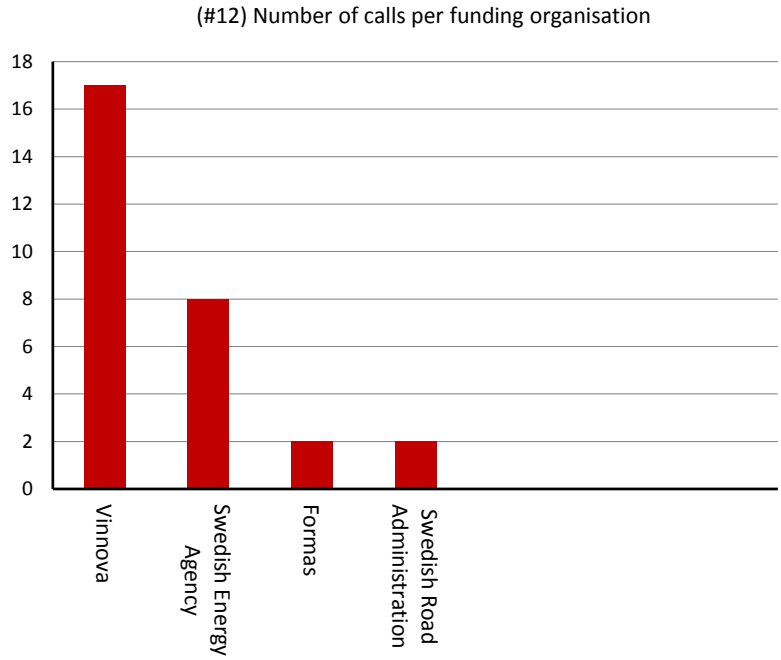

Figure 3: Number of calls per funding organisation

Vinnova funds the most programmes and calls, followed by the Swedish Engergy Agency. Formas and the Swedish Road Administration fund 2 calls each.

Vinnova
A State authority aiming at promoting growth and prosperity, with a specific focus on innovation linked to research and development, throughout Sweden. It aims at promoting research and development work in the areas of engineering, transport, and communications. Moreover, the Swedish participation in European and international R&D collaborations shall be stimulated.

Vagverket (The Swedish Road Administration)
The Swedish Road Administration is the national authority assigned the overall responsibility to the country's entire road transport system. The task is to cooperate with others to develop an efficient road transport system in the direction stipulated by the Swedish Government and Parliament. It was established to create a safe, environmentally sound and gender-equal road transport system which contributes to regional development and offers individuals and the business community easy accessibility and high transport quality.

Energimyndigheten (The Swedish Energy Agency)
The state authority wants to achieve a secure, environmentally-friendly and efficient energy system.

Västra Götalandsregionen (Region Vastra Gotaland)
Region Vastra Gotaland is a western Swedish region, with a large number of automotive industries, with a wide ranging self-government, responsible for health and medical care, regional development, including trade and industrial development, public transport, culture and environment.

Sjätte AP-fonden (AP foundation no six)
AP foundation number six contributes to developing the Swedish industry, through investments in small and medium sized enterprises.

Tillvaxtverket
Tillvaxtverket realizes on request of the Swedish government a development programme to support suppliers of the automotive industry during 2006-2010. The programme covers three main areas: technology, competence development, and strategic development support.

Fouriertransform AB
Fouriertransform, is a venture capital company, owned by the Swedish government, with the goal to invest in the automotive industry, however with a commercial focus. Its investments are expected to generate long-term market-based return.[4]

In Sweden many permanently open calls can be found. In comparison to other European countries this is a unique attribute of the Swedish funding system

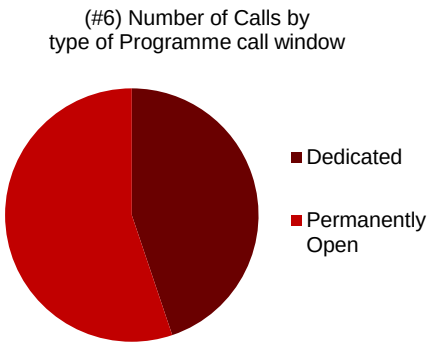

Figure 4: Number of calls by type of Programme call window

[4] http://www.fouriertransform.se/

2.3 Automotive Visions and Strategic Research Agendas

Significant challenges for the national road transport sector

Sweden faces two main challenges:

- The growing competition on the global automotive market
- The reduction of emissions and the reduction of the dependence on fossil fuels

Moreover, the challenge of improving the safety features of the Swedish cars is important to the automotive industry, since Swedish cars are internationally recognised for these qualities. Sweden wants to strengthen its leading position in the global market by responding to these challenges.

Visions & focused targets for road transport

Sweden's visions and targets for the automotive sector correspond in their goals with the challenges. The main visions address the reduction of the CO_2 and tail pipe emissions, and the reduction of noises. By 2010 greenhouse gas emissions shall be lowered by 4 % compared to 1990 (Vision: "Limited influence on Climate") and the dependence on fossil fuels should be no longer existent by 2030 (Vision: "Fossil Fuels"). Furthermore, the "Vision Zero" aims at a no-fatality car. With this vision the parliament wants to lower the serious injuries in road accidents massively. The vision aims at reducing the fatalities to zero, which is not realistic, however, a corresponding target substantiates this vision with more achievable goals.
The targets underline the issued visions with a more concrete and focussed view on the problems. Specific numbers and perspectives are given for the visions and challenges. For example a 50 % decrease of road deaths by 2010 and a 25 % decrease of serious injuries from road accidents by 2010 shall be reached. The visions targeting the environment and the reduction of pollution as well as noises are underlined by a specific number as well.
A summary of the visions and targets is provided in the tables below:

Visions:

Vision	Corresponding challenge	Description	Year
Vision Zero	Safety & Security	The Swedish parliament has passed a bolt "Vision zero" resolution, aiming at ending all road deaths and serious injuries.	
Limited influence on climate	Fuel efficiency & greenhouse gas emissions	The pollution of greenhouse gases shall be at least 4 % lower in 2008-2010, than in 1990.	
Fossil Fuel	Pollution & noise	No dependence on fossil fuel 2030	

Targets:

Target	Description including addressed research themes, technologies
Environment	A massive decrease of the pollution due to exhaust emissions
Safety & Health	Decrease of the number of road deaths by 50 % by 2010
Environment	Nitrogen dioxide: A maximum of an average of 60 microgram/m³ per hour and an average of 20 microgram/m³ per year in 2010[5]
Environment	Ozone: Maximum of 120 microgram/m³ as an eight hour average in 2010.
Environment	Emission of Non methane volatile organic compounds shall be reduced to 241,000 tons in 2010

The Swedish government invests mainly in the fields of competitiveness and environmental issues (see chart #3). This meets the issued targets and visions. The high number of calls addressing the competitiveness category can be lead back to the effort of the Swedish government to improve the competitiveness of the Swedish automotive industry in the global market.
It should be noted that a programme call could be applicable to more than one Challenge Category.

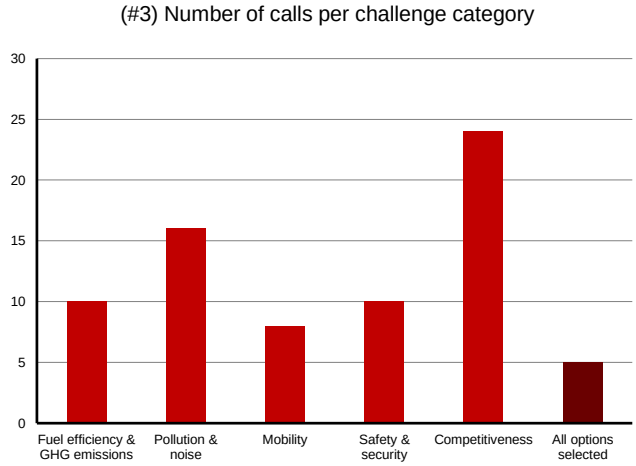

Figure 5: Number of calls per challenge category

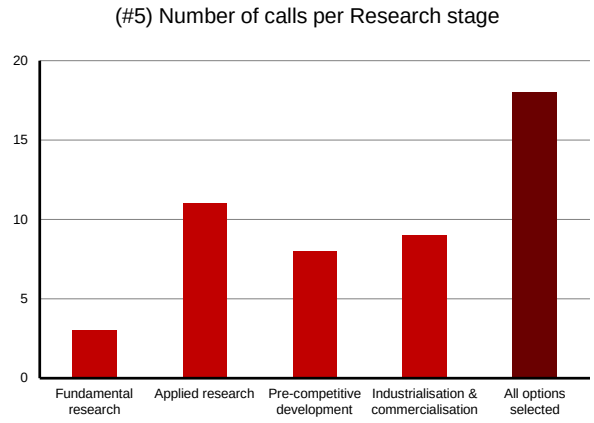

Figure 6: Number of calls per Reserch stage

Chart #5 shows, that most programmes target all research stages. However, in the field of fundamental research the least calls were issued. In comparison with the distribution of the calls per challenge category noticeable, that despite the high interest in the challenge category "competiveness" the number of calls in the stage of "pre-competitive development" is rather low.

[5] Swedish Environmental Objectives – Interim Targets and Action Strategies; http://www.regeringen.se/content/1/c4/11/97/2aa978ad.pdf

2.4 Funding Programmes

The main funding programmes of the Swedish government aim at: intelligent safety systems, crash safety (passive and active), and other relevant areas with a potential to strengthen the international competitiveness of the Swedish automotive industry. The long term goal is the development of a zero fatality vehicle i.e. vehicles with an optimal combination of active and passive safety systems, to reduce the number of accidents and the injuries caused by road accidents massively.
Besides the large importance of the safety systems in Swedish vehicles the development of new state-of-the-art electronic parts is promoted. Moreover, along with the global aim of reducing GHG emissions the Swedish funding furthers the goal to minimize the pollution on Swedish roads. To promote this field many R&D funds are invested by Vinnova to develop new processes as well as components, like powertrains to reach the goal of reducing the CO_2 emissions.

Another goal of the sustainable Swedish funding is the creation and maintenance of a R&D system, in which the industry, governmental authorities, institutes, and academy can create new collaborations to strengthen the Swedish funding landscape (Vinnova).

“Sustainable Innovation AB” will, in cooperation with Goteborg Energy and Fortum, establish 500 electrical charging places in Stockholm and Goteborg. Moreover, 250 electrical vehicles will be launched to obtain more experience and a well-defined method to collect, process, and publish data in 2010. In order to promote the commercialization of second generation fuels, the “Vehicle energy systems programme” will coordinate the Energy Agency's research projects regarding traditional vehicles with combustion engines, electrical and electrical hybrid vehicles and fuel cell technologies.

“Environmental technology” is a programme to develop new engines and new powertrain technologies. New fuel technologies and systems for the public transportation shall be promoted with this programme as well. New methods and systems for a more efficient and coordinated transport system, also between different kinds of vehicles and applications, will be brought forward with this initiative (Formas).

The link between visions & targets and funding allocation

In general the visions and targets match the funding allocation.

Funding programmes and states of RTD as well as different types of instruments

All calls are applicable to all types of organisation.

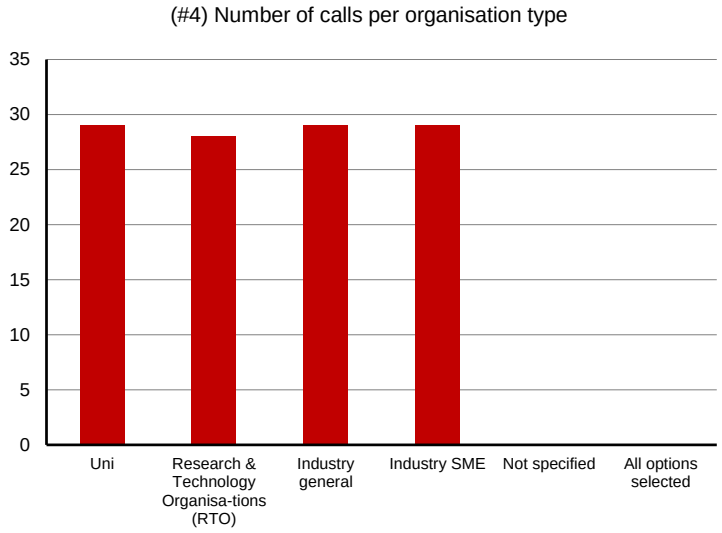

Figure 7: Number of calls per organsiation type

In addition to the permanently open calls, which were issued in 2006, new dedicated calls were launched in 2008 and 2009. Almost 8 projects were released per call in average. The high number of permanently open calls can be lead back to the annual commitment of Vinnova.
A collaborative partnership is always targeted in the Swedish RTD programmes.

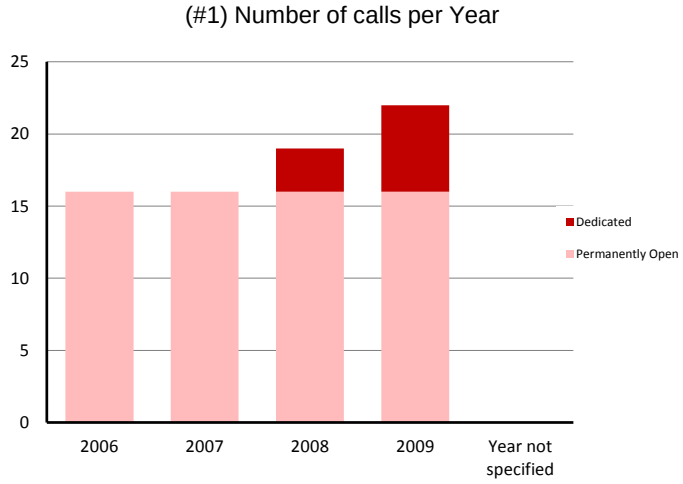

Figure 8: Number of calls per Year

Overview of technology specific programmes for automotive RTD

There is a big difference in popularity of technology categories, as illustrated in the chart above.

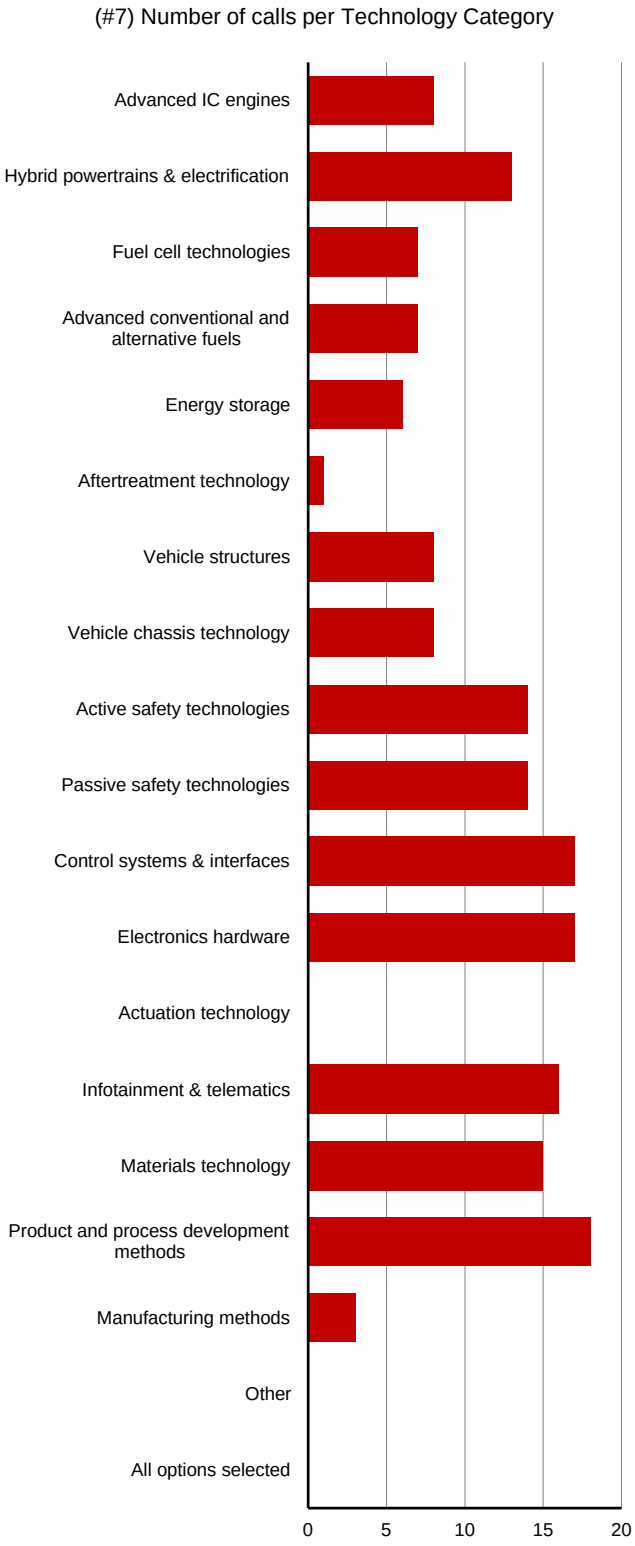

Figure 9: Number of calls per Technology Category

2.5 The efficiency, flexibility, and experienced bureaucracy of the funding process

The flexibility to release new calls in response to changing situations

The Swedish funding organisations are influenced by the industrial situation in Sweden as well as by the European situation and the available EU calls. The Swedish organisations are an addition to the European and the local companies' funding programmes.

The application process

New topics are accommodated well whilst the project is running. The application process is rated good to very good, which underlines the average opinion that the application process is regarded as very well.
The proposal assessment process takes normally between 1-3 months, which is much less than the European average. Like in the European comparison, all applications are reviewed by an independent review panel.

Experienced success rates

The proposal success rate is slightly above the European average with about 75 % (the proposal success rate provides the rate of successful applications). The time between the notification of a successful application and the actual start lies between 1 and 3 months, which is a much quicker time, than the European process normally takes. With the transfer of funds to the beneficiaries the Swedish applicants are very satisfied.

Funding process - exploitation

Exploitation plans are required in most cases.

Funding process – feedback

There is no working feedback system for every project a. However, most organisations provide such a system for their applicants.

Transparency & openness

Information about the existence of funding and programmes are always available publicly. In the most cases a final report has to be published.

Foreign collaboration

All Swedish organisations allow a foreign collaboration.

3 Discussion and Conclusion

The Swedish automotive industry is a very important economical branch. The four automotive manufacturers along with the various automotive suppliers achieve an annual turnover of approximately € 16,110 million. Moreover, the automotive sector is the largest employer in Sweden providing over 140,000 jobs. In the last years however, the automotive industry has suffered severely. The two major car manufacturers Saab and Volvo have been sold to foreign investors and many jobs were reduced.

In 2008 the Swedish government already launched a huge aid programme to absorb on the one side the aftermaths of the financial crisis and on the other hand to boost the troubled automotive industry. With the help of a € 2.7 billion package many new calls were launched and the Swedish government founded Fouriertransform AB, a new approach in promoting the automotive industry.

The Swedish funding structure, which distributes the funds among the beneficiaries, is structured rather unbureaucratic with two layers. The most calls are issued and administered by Vinnova a governmental authority. Noticeable is the high number of open calls compared to the dedicated calls.

The main challenges of the automotive industry these days aim at improving the Swedish competition and the reduction of GHG emissions. These challenges are matched with more specific targets, given more explicit numbers and figures. This is displayed in the high number of calls targeting the competitiveness category.

The most calls were issued in 2009 in addition to the permanently open calls which were launched in 2006. The high number of open calls, which is unique in Europe, can be traced back to the annual commitment of Vinnova.

The application process is very good and unbureaucratic. The latency until a proposal is assessed is very short compared to the European average. It takes only 1-3 months to evaluate and approve a proposal. The same time is required until the project can actually start. Moreover, a great transparency of the calls as well as a good collaboration between the applicants and the government can be observed. Information on the calls can be easily found on the internet.

4 References

- Statistics Sweden, Swedish government, http://www.scb.se
- Fordon Komponent Gruppen, Automotive Sweden 2008, http://www.automotivesweden.se/download/18.162b64ed119f10c5dac80003464/Sven%C3%85ke+Berglie+.2008.pdf 2008
- Swedish government, 2009 http://www.sweden.gov.se/content/1/c6/12/25/68/c18a0ad0.pdf
- www.fouriertransform.se
- Swedish government, Swedish Environmental Objectives – Interim Targets and Action Strategies; http://www.regeringen.se/content/1/c4/11/97/2aa978ad.pdf

5 Annex

Overall Programme name	*Programme call name*	*Call description*	*Funding organisation*	*Call End date*	*Reference*
Automotive R&D	Safety & security	Intelligent safety systems	Vinnova		http://www.vinnova.se/Verksamhet/Transporter/FFI/Program-1/
		Human cognition and tolerance			
		Crash safety (Passive and active)			
		Field studies e.g. real- life-safety			
		Unprotected road users			
		Security (e.g. personal safety/integrity)			
		Other relevant areas with a potential to strengthen the international competitiveness of the Swedish automotive industry			
Automotive R&D	Vehicle development	Vehicle Electronics	Vinnova		http://www.vinnova.se/Verksamhet/Transporter/FFI/Program-5/
		Embedded systems and software			
		Hydraulics			
		Development methods			
		Materials technology for more efficient vehicles			
		Vehicle concepts			
		Other relevant areas with a potential to strengthen the international competitiveness of the Swedish automotive industry			
Automotive R&D	Sustainable processes	FoI regarding process, powertrain and components	Vinnova		http://www.vinnova.se/Verksamhet/Transporter/FFI/Program-4/
Automotive R&D	Transport efficiency	Create and sustain a transport arena where the industry, authorities, institutes and academy can form new forms of collaboration	Vinnova		http://www.vinnova.se/Verksamhet/Transporter/FFI/Program-3/
Automotive R&D	Energy and environmental	Increased energy efficiency	The Swedish Energy Agency	06.04.2009	http://www.energimyndigheten.se/sv/Forskning/Transportforskning/Fordonsstrategisk-Forskning-och-Innovation---FFI/
		Transition to renewable fuels		06.04.2009	
		Decreased local/regional environmental influence		06.04.2009	

		Other relevant areas with a potential to strengthen the international competitiveness of the Swedish automotive industry		06.04.2009	
	Vehicle Electronics	Sustainable Innovation AB will, in cooperation with Goteborg Energy and Fortum, establish 500 electrical charging places in Stockholm and Goteborg, 250 electrical vehicles will contribute to more experience and a well-defined method to collect, process and publish (web) data shall be ready in 2010.	The Swedish Energy Agency		http://www.energimyndigheten.se/sv/Forskning/Transportforskning/
Transport research	Second generation fuels	Demonstration and commercialization of second generation fuels	The Swedish Energy Agency	03.05.2009	
Transport research	Vehicle energy systems	The programme will be cordinate the Energy Agency's research projects regarding traditional vehicles with combustion engines, electrical and electrical hybrid vehicles and fuel cell vehicles.	The Swedish Energy Agency		http://www.energimyndigheten.se/sv/Forskning/Transportforskning/Energisystem-i-vagfordon/
Transport research	Development of hybrid vehicles	Development of better batteries needed to be able to develop hybrid cars.	The Swedish Energy Agency		
Transports	Infrastructure and efficient tranportations	To support the transport system development in order to achieve a sustainable growth (e.g. by supporting the transport goals set by the government)	Vinnova/Banverket/The Swedish Road Administration	01.04.2009	http://www.vinnova.se/Verksamhet/Transporter/Infrastruktur-och-effektiva-transportsystem/
Transports	Passanger travel in the future	To enable easy mobility by supporting a long term sustainable public transportation.	Vinnova/Banverket/The Swedish Road Administration	June 2009	http://www.vinnova.se/Verksamhet/Transporter/Framtidens-personresor/
Transports	Sustainable freights	To support the transformation of a sustainable freight system and improve cooperation of freight FoI and increase the international freight FoI.	Vinnova	May 2008	http://www.vinnova.se/upload/dokument/Verksamhet/Transporter/Logistik%20och%20godstransporter/Utlysningen%20Hållbara%20godstransporter%20071127%20rev%20080404Final.pdf
Fundamental and applied research	Environmental technology	New engines and new powertrain technology. New fuel, technology and systems for the public transportation. New methods and systems for more efficient and coordinated transports, also between different kinds of vehicles.	Formas	01.12.2008	http://www.formas.se/formas_templates/Page.aspx?id=4320

		Applications where weight is critical because of energy and/or fuel consumption. Also more efficient processes.		15.12.2008	http://www.vinnova.se/Verksamhet/Transporter/FFI/Program-1/