

TECHNOPOLIS



**A Survey of State Funding for Vehicles R&D
In Selected Countries**

A Report to PFF

**Erik Arnold
John Wormald
Edward Kitching
Anne-Cécile Ollivier**

April 2007

Contents

1	Introduction	1
2	International Comparison	2
2.1	Results of the survey	2
2.2	Patterns and Trends	13
2.3	Policy Implications	14
3	Country Details	16
3.1	USA	16
3.2	United Kingdom	20
3.3	Japan	23
3.4	Canada	25
3.5	France	28
3.6	Germany	31
3.7	Australia	33
3.8	Norway	35
3.9	Italy	37
3.10	Israel	39
3.11	South Korea	40
3.12	Sweden	42
Appendix A	Government Support for the Automotive Industry	44
A.1	USA	50
A.2	United Kingdom	67
A.3	Japan	80
A.4	Canada	88
A.5	France	99
A.6	Germany	108
A.7	Australia	119
A.8	Norway	127
A.9	Italy	133
A.10	Israel	135
A.11	South Korea	138
Appendix B	Contacts	143
Appendix C	Overall Spend Breakdowns (2002-2008)	146
Appendix D	Technology Funding Breakdown	150
Appendix E	Indicator Tables	152

1 Introduction

This report summarises available information about international public funding of vehicles-related R&D in a small collection of countries: Australia, Canada, France, Germany, Israel, Italy, Japan, Korea, Norway, the UK and the USA. The purpose of the report is to permit some comparisons of subsidy spending in these countries with that in Sweden, so there are also some data about Sweden but less description of the instruments used. The report forms part of a larger evaluation of three vehicles research programmes in Sweden: the Vehicles Research Programme (FFP) and Green Car (Gröna Bilen) 1 and 2.

Our method in compiling this report was primarily to trawl the World Wide Web, including sources like the Trend Chart on Innovation and ERAWATCH that aim to provide databases describing research and innovation funding in various countries. We then compiled a draft of the report and invited research and innovation policymakers and other experts to review its accuracy and completeness. Earlier versions of this report have therefore extensively been reviewed, and we are grateful to both the officials and the people from the automotive industry who have looked at it for us. (A list of interviewees is provided at the Appendix. Naturally, the usual disclaimer applies...) Despite the collective effort, however, it is probable that this report is incomplete. Quite a lot of vehicles R&D is funded from general programmes targeted at subjects like materials, manufacturing and electronics and it has not always been possible to identify or estimate the vehicles component. It is also possible that we have simply missed some programmes – especially in the grey zones where, for example, research on stationary and mobile fuel cells shade into each other. We were, frankly, surprised at the start to discover that an exercise like this one had not already been done – or at least that there is not something like it not in the public domain. But we have found no trace of a similar exercise, not anything to suggest that the global vehicle manufacturers keep a centralised and systematic track of the R&D support programme from which they can benefit.

In the next Chapter, we discuss our findings at an aggregate level, showing the overall estimates we have made of spend and discussing international patterns. Chapter 3 offers a thumbnail sketch of each of the countries we studied. The Appendix contains more detail about the individual funding instruments used by each country and provides more detail on spend than is visible from the charts in Chapter 2.

2 International Comparison

This chapter summarises the policy-relevant findings of our survey. First, we summarise the information we gathered, so as to give an overview. Next, we discuss patterns and trends that are visible, and not visible, in this information. Finally, we draw out some tentative policy implications for Sweden.

2.1 Results of the survey

We were able to get quite good information for most of the countries surveyed. Israel turned out to have little activity, though it appears that General Motors is funding a small volume of research there. Italy certainly provides R&D support, but as far as we can tell entirely through general programmes and we could find no-one willing or able to disaggregate this support, even if we suspect that the level is considerably below that of France or Germany. Give the small amount of resources available, we were not able to get over the language barrier with Korea. A detailed investigation there would require a visit and a cooperative local host.

Exhibit 1 provides our impressionistic assessment of the relative weight countries surveyed assign to different types of technology R&D support. The main message is that most countries do most things. Sustainable emissions and environmental pollution are widely prioritised. The combination of fuel cells, batteries and hydrogen cycle needed to implement a hydrogen vehicle industry is most intensively explored by the USA and Japan. Interest in biofuels is more patchy – perhaps because a number of these are now proven in practice, to such an extent that the first scandals involving intensive biofuel production by Western interests in developing countries are appearing as rain forest is displaced and local food production disrupted. Similarly, we take it that the interest in Life Cycle Analysis (LCA) and recycling is limited by the fact that a lot of work was done in this area 10-20 years ago and that important aspects of recycling are now integrated into vehicles design and production, notably in Germany.

Exhibit 1 Government Automotive Activity by Technology Area

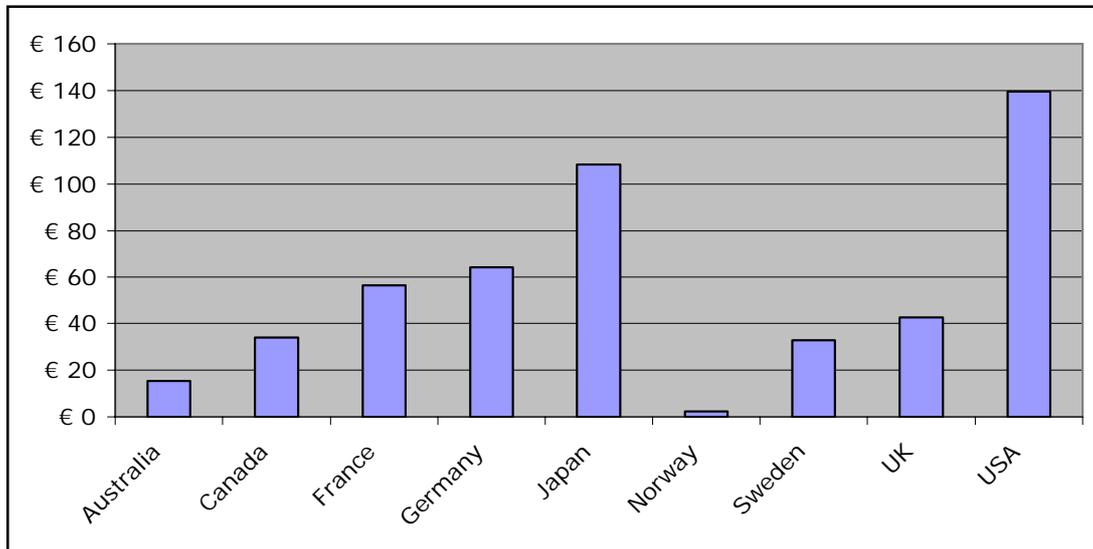
Technology Areas	Australia	Canada	France	Germany	Italy	Japan	Norway	UK	USA	Sweden
Powertrain - Fuel Cells	High	High	Medium	High	Low	High	High	Low	High	Low
Powertrain - Hybrid	High	High	High	Low	Medium	Medium	Medium	Medium	High	High
Batteries	Low	Medium	Low	Low	Low	High	Low	Low	High	Low
Hydrogen Infrastructure	High	Medium	Low	High	Low	High	High	Low	High	Low
Bio-Fuels	High	Medium	Medium	Medium	Low	High	Medium	Medium	High	High
Environmental Pollution	High	Low	High	High	High	High	High	Medium	High	High
Sustainable Emissions	High	High	High	High	High	High	High	High	High	High
Safety	Medium	Medium	High	High	Medium	High	High	High	High	High
Human/Vehicle Interaction	Low	Low	Medium	Medium	Medium	High	Low	High	High	Medium
Control Systems, Advanced Control	Medium	Medium	Medium	High	Medium	High	Low	Medium	High	Medium
Materials, Structures and Related Processes	High	High	Medium	High	Medium	High	High	Medium	High	Medium
Manufacturing	Medium	Medium	Low	Medium	Low	High	Medium	Low	High	Medium
LCA and Recycling	Low	Low	Low	Low	Low	High	Low	Medium	Medium	Low

Level of priority:



Exhibit 2 sums up all the financial information we were able to find and shows the mean annual spend per country on automotive-related R&D programmes over the period 2002-8. Not surprisingly the USA and Japan lead, followed by Germany and France. Sweden and Canada ‘punch above their weight’ but for rather different reasons. Canada’s major expenditure is on development and demonstration of fuel cells, while Sweden’s support is more closely tied to the medium term needs of its own automotive industry. In the absence of an industry that designs its own vehicles, the UK support is rather fragmented and a little more orientated towards its own supply industry than many others.

Exhibit 2 Mean Annual Government Funding for Automotive Sector R&D, 2002-2008 (€Million)



It is widely assumed that vehicles manufacturers receive more or less illegitimate subsidies as inducements to locate or maintain production in particular places. Exhibit 3 lists the examples of such state aids we were able to find. Of course, these things are more visible in some places than others, and where the state is an owner or part-owner there are other opportunities to provide benefits to the company. However, we were only able to identify one case – the Australian Automotive Competitiveness and Investment Scheme (ACIS) – where this was clearly being done through R&D subsidy. The benefits Australia-based VMs obtain from ACIS equal nearly half their total R&D expenditure, and given that only a small minority of any VM's R&D spend is actually for research, the research funding case for AIS is thin. Other visible state aids are usually given as grants or tax rebates.

Exhibit 3 State Aid given to the Automotive Industry (2002-2008)¹

Country	Year	Type of Aid	Value
UK	2002	General Aid to Vauxhall, Elsmere Port	€15 million
UK	2003	Peugeot Ryton - Direct Grant for Regional Development	€24 million
UK	2004	Training Aid to Ford	€15 million
UK	2004	Automotive Academy from DTI	
UK	2004	LDV Training Pilot	
UK	2005	Research and Development Aid (General)	€30 million
UK	2005	Rescue Aid to MGRover (loan)	€9.75 million
France	2003	Training Aid to Matra/Romorantin	€1.4 million
Germany	2002	BMW/Leipzig – Regional Development	€18 million (Refused)
Germany	2005	Training Aid to Rolls Royce Deutschland Ltd. & Co KG	
Germany	2006	Research and Development aid for Mobility and Ground Traffic Project	€80 million
Sweden	2004	Volvo - regional transport aid	€40.5 million
Sweden	2005	Environmental Aid to Volvo Truck Corporation	€13.9 million
Italy	2003	Training Aid to Fiat	€43 million
Italy	2003	De Tomaso Cutro – Regional Development	Originally €179 million reduced to €81 million by DG Competition
USA		State Development Aid given to Ford (Michigan) and Honda (Indiana)	€144.3 million
Australia	2002	Aid given to Mitsubishi from Australian and South Australian Government to create a new R&D facility	€50 million
Australia	2006	Aid given to Ford for new facilities and projects	€1 million
Australia	2006	Aid given to GM Holden from Australian, South Australian, and Victoria Government for R&D and Training	€7.9 million

Exhibit 4 reinforces the picture of the USA and Japan as dominant in fuel cell research. This research is also connected through to actions to create the needed infrastructure. The Japanese organisation responsible, NEDO, has a clear vision of 5 million hydrogen vehicles in use in Japan by 2020. Other countries' expectations seem more vague. Perhaps it is interesting to recall that, on the basis of common industry visions and planning, the Japanese consumer electronics manufacturers in the mid-1980s planned for CD player market that was ten times the size expected by the European producers. The Japanese companies sized their investments accordingly, moved rapidly down the learning curve ahead of the competition, and the rest is history.

Exhibit 5 shows spending on advanced materials and remind us of the synergies between vehicles production and manufacturing technologies more generally, with

¹ European Commission – DG Competition – “State aid decisions - by Sector/Activity - Manufacture of motor vehicles, trailers and semi-trailers” available at: http://ec.europa.eu/comm/competition/state_aid/register/ii/by_sector_dm34.html

Germany taking a prominent position. This is, however, an area where it is especially hard to separate out automotive materials activities from more general advanced materials research.

Exhibit 6 indicates that battery research is rather more concentrated than most of the other technologies considered here. Historically, this has never been a concern of the vehicles industry but it obviously becomes more important with the emergence of new power sources such as fuel cells and hybrids.

Exhibit 7 shows investment in the more medium-term power technologies. In Japan, the period of hybrid research seems to be past, with Toyota firmly established as the market leader in passenger cars. The US effort is still significant, even if it is not the major national priority. The French and Swedish positions appear defensive, compared with other vehicles-producing countries' thrust into fuel cells.

Exhibit 8 shows government spend on ITS, where Sweden is a not inconsiderable actor.

In Exhibit 9 to Exhibit 14, we have normalised national R&D spending by a range of indicators. Sweden stands out as spending much more than other countries per head of population and per unit of GDP, in response to the need to provide the kind of rich support that larger countries can more easily provide. Normalised for employment in the automotive industry, however, Sweden is within the normal range, so Sweden's apparently high investment in fact simply corresponds to its industrial specialisation in the automotive industry. However, the fact that the Swedish vehicle makers collectively produce a low volume of cars and trucks means that subsidy per unit produced is high. (Note, however, the very high value of the trucks produced.) Compared with vehicles R&D, Sweden's subsidy level is similar to that of the major vehicles-producing countries.

This implies a connection between the R&D and the subsidy. The logic of our discussions with VMs and of the way they select research projects and make location decisions suggests that

- The subsidy helps improve the quality and relevance of the knowledge infrastructure and of human capital production
- This is further enhanced by research relationships between the knowledge infrastructure and the VMs, who effectively focus attention on research problems relevant to their own needs
- As a result the position of VM research and production facilities is improved, whether as part of company-internal competition, competition in external markets, or both
- There is not a linear relationship, however, between R&D subsidy and some other variable. The amount of subsidy provided seems to depend on the logic of each country's situation. There is no evident marginal calculus that allows the 'right' amount of subsidy to be calculated

This combination of offensive and defensive roles for the knowledge infrastructure in supporting nationally based vehicles manufacturers makes it difficult to avoid funding vehicles-relevant research activities. This is not the only way to interpret the data, but it is certainly an interpretation that is consistent with what the companies themselves say.

Exhibit 4 Mean Annual Government Funding for Fuel Cell Research and Hydrogen Infrastructure 2002-2008 (€Million)

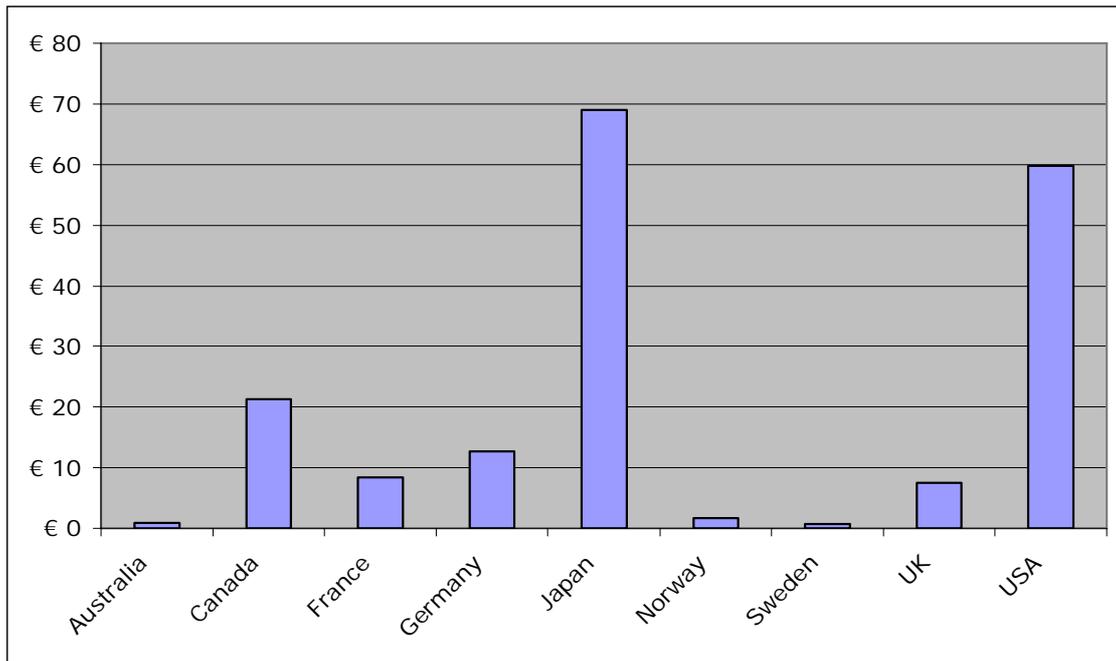
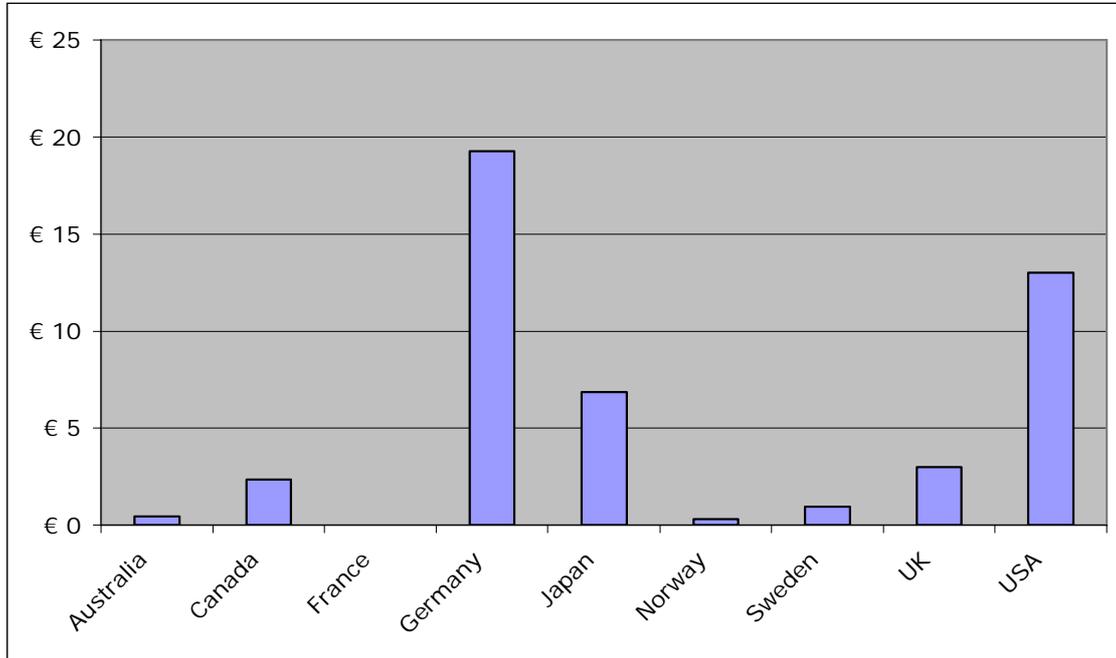
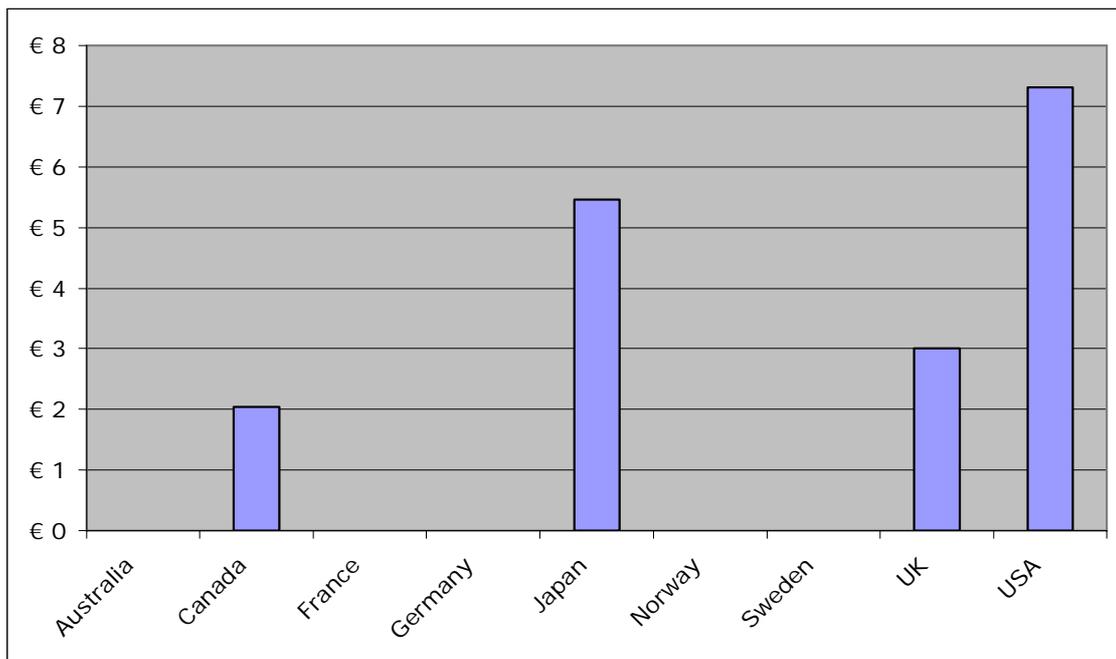


Exhibit 5 Mean Annual Government Funding for Research into Advanced Materials 2002-2008 (€Million)



No Data for France.

Exhibit 6 Mean Annual Government Funding for Research into Batteries 2002-2008 (€Million)



No Data for Australia, France, Germany, Norway, Sweden.

Exhibit 7 Mean Annual Government Funding for Research into Hybrid, Electric and Low Emissions Technologies 2002-2008 (€Million)

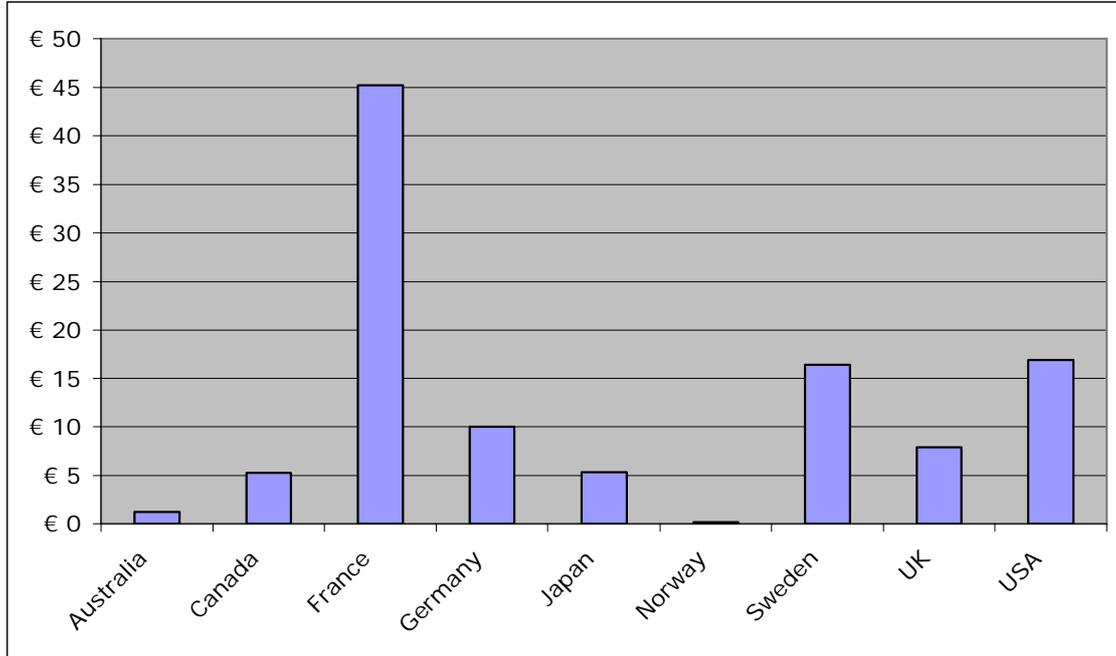
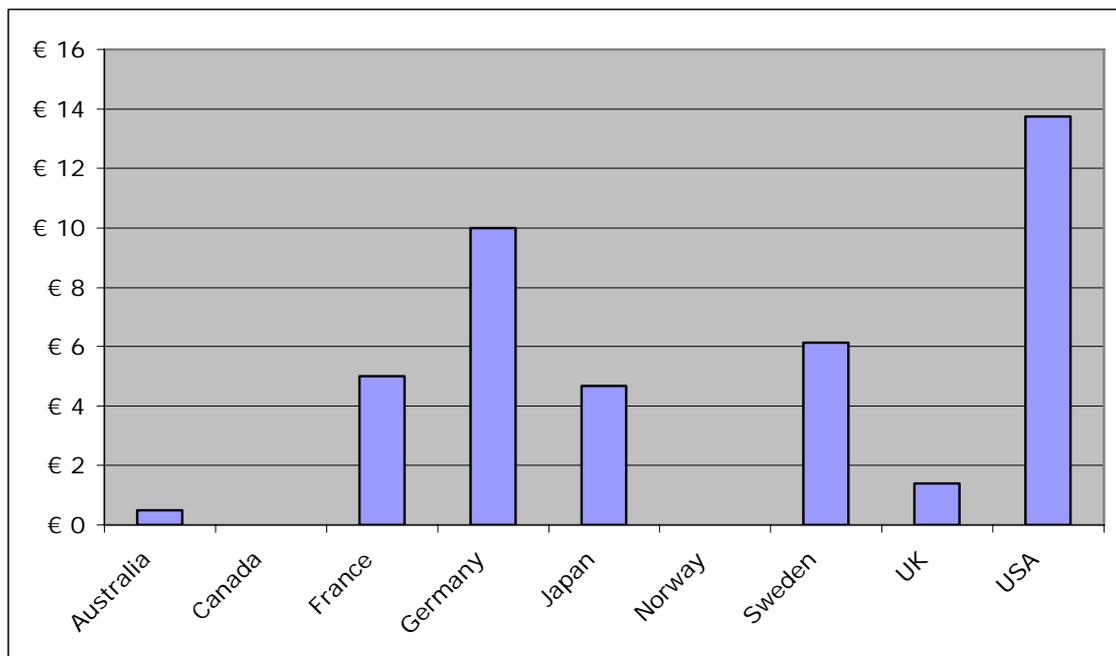


Exhibit 8 Mean Annual Government Funding for Research into Intelligent Transport Systems 2002-2008 (€Million)



No Data for Canada and Norway.

Exhibit 9 Mean Annual Government Funding for Automotive Sector R&D 2002-2008 Against Population

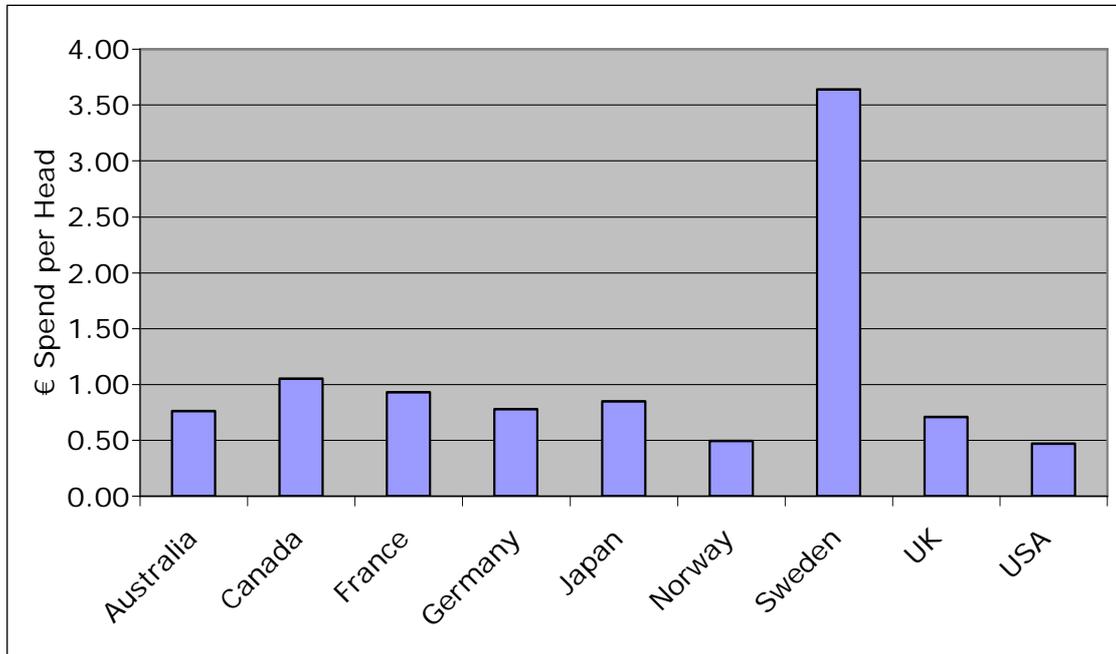


Exhibit 10 Mean Annual Government Funding for Automotive Sector R&D 2002-2008 Against GDP (€)

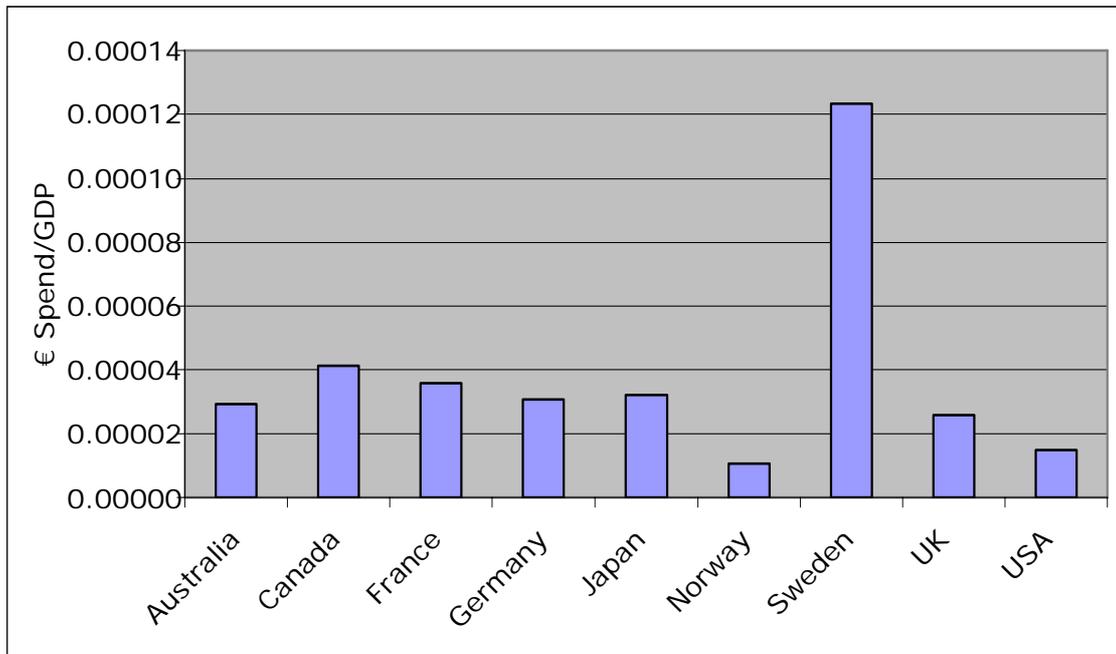


Exhibit 11 Mean Annual Government Funding for Automotive Sector R&D 2002-2008 Against GDP per Capita (€)

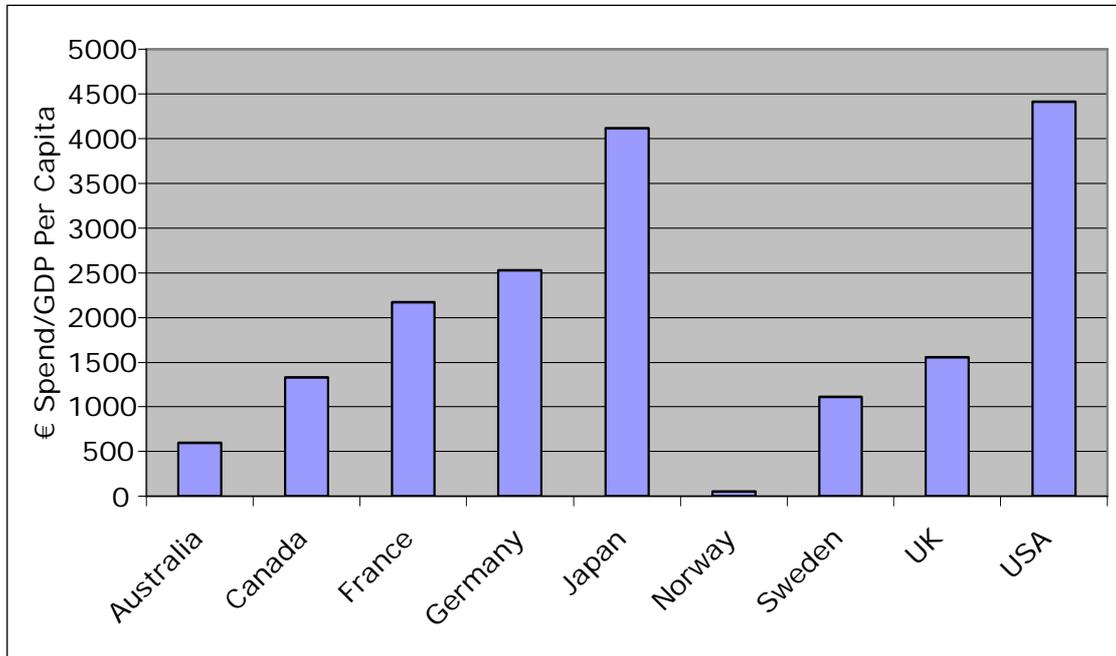
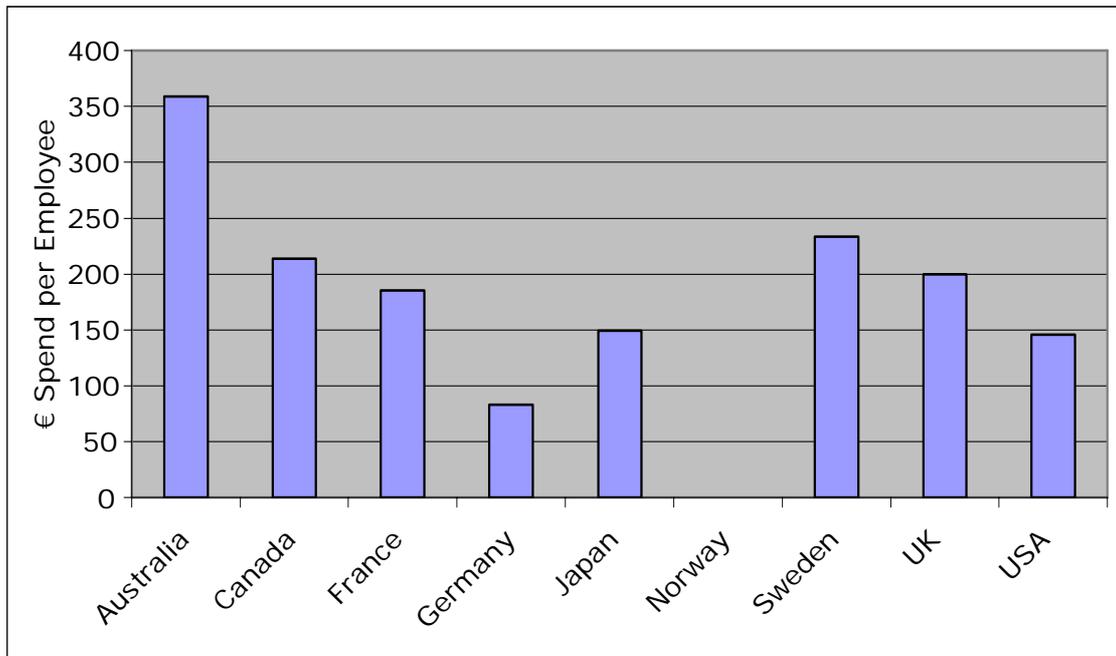
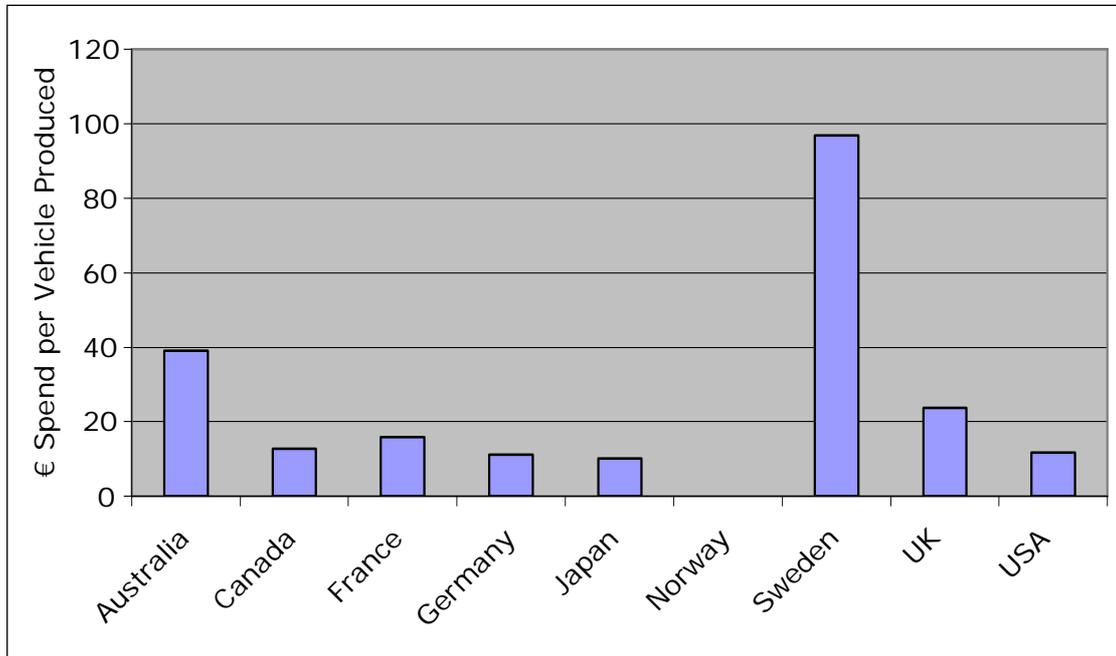


Exhibit 12 Mean Annual Government Funding for Automotive Sector R&D 2002-2008 Against Employment in the Vehicles Industry



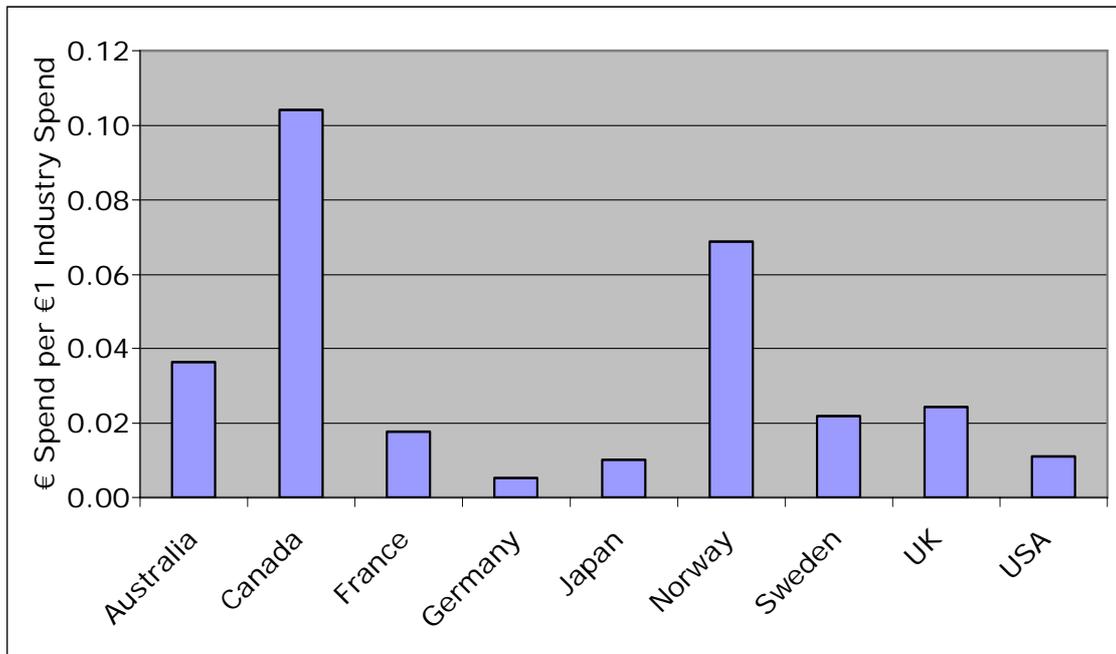
No Data for Norway.

Exhibit 13 Mean Annual Government Funding for Automotive Sector R&D 2002-2008 Against Vehicles Produced



No Data for Norway.

Exhibit 14 Mean Annual Government Funding for Automotive Sector R&D 2002-2008 Against Automotive Industry Related R&D Spend (€)



2.2 Patterns and Trends

The overall pattern shows that significant state R&D investment is going into areas of long-term research, where the private return is uncertain and hard to appropriate, and to generate public goods such as safety and environment. These are the traditional roles of state research funding. Stricter government policy and regulation also affect the VMs on issues such as emissions targets.

Some of the medium-term work may be more defensive of national interests. Both France and Sweden may need to consider whether their national industries would benefit from an additional effort in longer-term research or whether, in practice, there is little prospect of national industry benefiting from this.

Major thrusts are

- Powertrains: fuel cells and hybrids
- ITS (including active safety)
- Materials

There has been a clear shift in government funding towards more environmentally friendly technologies such as hybrid systems, fuel cells, and lightweight materials. The funding philosophy has changed following the increasingly politically sensitive issue of climate change and the major advances in vehicle safety over the last decade, which has dramatically reduced vehicle fatalities. This is not to say that there is a shift away from vehicle safety, but it is considered less an issue as much of the technology has reached maturity and is widely available in the market place. Research is now more focused on the study of human factors in vehicle operation.

Active Safety Systems (ASS) have become a much more widely researched area both in industry and government strategies given the relatively mature stage that Passive Safety Systems (PSS) have reached coupled with the emergence of electronics and software in vehicle control systems. ASS have been tied in and form in many countries parts of larger government led Intelligent Transport Systems (ITS) programmes, which look at the overall infrastructure of the road networks and are routed more in the ICT domain². In these cases most of the government funding is on the civil engineering side of infrastructure with the VMs focusing more on the vehicle based systems and vehicle-to-vehicle communications.

Passive safety seems generally to be regarded as a problem that has been 'solved'. Safety in general is not a policy priority in the USA. Taken together, these factors suggest that further work on passive safety may indeed be an opportunity for a niche operator like Sweden.

Europe seems to have had more of a medium-term focus than the USA or Japan, though there are signs of increasing European efforts in the fuel cells area. Given the

² Richard Bishop, Bishop Consulting USA (2007)

prevailing conventional wisdom in the energy field that the future is likely to be multi-fuelled, it was surprising to see little evidence of this in the research efforts. It may simply not be visible. But the VMs may also be liable to monolithic thinking induced by their (reasonable) obsession with scale and uniformity.

The volume of the German effort is probably under-counted in this report (owing to efforts at the regional level). The new High-Tech strategy for Germany probably means that the volume of activity will increase even further, reinforcing Germany as **the** main vehicles R&D powerhouse in Europe.

In the detail of the Appendix, it is clear that there are some efforts to tackle technology development through procurement in the USA and to a lesser extent the UK. This may be an under-used instrument. More generally, the use of competence centres or centres of excellence, to bring together academic and industrial consortia, continues to spread.

Our industrial interviews suggested that companies formerly willing to ‘chase public funds’ for R&D are now increasingly clear that they want to set their own priorities in research and then to look for state and/or private partners to provide ‘leverage’. Correspondingly, it is increasingly important to have them involved in ‘arenas’ where policy and road maps can be discussed. USCAR and the Japanese road mapping exercises seem to be especially good mechanisms, and are associated with the state and industry together taking a particularly far-sighted approach to the research that needs to be done. In practice this seems to involve a genuine partnership, with the state’s social and regulatory needs being as well represented as the industrial concerns of the automotive companies.

US and Japanese approaches to hydrogen and fuel cells appear to be driven both by the long term needs of the automotive industry and of society. Countries like Canada and Norway that invest in hydrogen without having their own serious vehicles industry do so more to enable technology adoption.

Components industry R&D was surprisingly little visible as an object for R&D programmes. In part this will be because general and manufacturing/materials programmes cater for their interests. But this imbalance nonetheless fails to reflect component makers’ needs to increase their R&D capabilities – especially in Tier 1 – in addition to continuously improving efficiency and quality.

2.3 Policy Implications

There appears to be an internationally recognised need to provide fairly substantial R&D funding in countries such as Sweden where vehicles design is a significant activity. Unfortunately, there is no ‘golden formula’ that explains how much is enough.

Sweden has not taken a strong position in the longer-term technological opportunities or in hydrogen infrastructure. Rather, its R&D support is shorter term, reflecting the

more immediate interests of the automotive industry and possibly also the interest of other stakeholders in biofuels. This may be a result of the high degree of influence the industry has in defining the subjects of the national vehicles R&D funding programmes. If this is the case, there is an argument for using a mix of funding instruments – some of which are more responsive to medium-term industry needs; others of which are deliberately aimed at the longer term. (This is an argument for longer-term industrially relevant applied work, **not** for researcher-initiated, blue skies basic research.)

Much of the Swedish work relates to engines, reflecting both social needs and the strengths of the national industry and research community, which need to be reinforced. Sweden also has strength in safety. There appears to be every reason to continue to support these specialisations.

PFF represents an opportunity to maintain a high-level research and innovation policy arena for vehicles-related research, bringing together the power of industry and the state. The power of such platforms abroad implies that the role of PFF might usefully be strengthened to become a broader platform for discussing vehicles-related R&D policy with the state.

3 Country Details

3.1 USA

The overall strategy in the United States appears to be that of cooperation agreements within Industry and with the national and federal governments. There is a long-term push towards lowering the nation's dependency on oil imports by looking at alternative sources of energy, primarily hydrogen and bio-fuels. The Government has put forward large resources to the development of hydrogen fuel cells as well as the establishment of a hydrogen infrastructure. These new technologies are being explored by the government through the Department of Defence and the Department of Energy (DoE), with Industry collaborating to look at a range of technologies that will be of use in a hydrogen vehicle (materials, batteries, electrics). There is also an environmental angle to work with more short-term projects looking at cleaner technologies and processes to reduce emissions in both light and heavy goods vehicles (FreedomCAR). The DoE is looking at the whole hydrogen infrastructure from production to delivery and use, where as industry is mainly looking at the (effective) use aspects. The National Science Foundation also funds a large number of projects related to the automotive industry with most of this going into the university system. However some of this money does filter through to offer industry-university collaborative projects.

In the United States the major mechanisms for Government/Industry collaboration are through USCAR (collection of US car manufacturers) and the DoE through the Office of Energy, Efficiency & Renewable Energy (EERE). EERE leads the Federal government's research, development, and deployment efforts in energy efficiency. Its role is to invest in high-risk, high-value research and development that is critical to the Nation's energy future and would not be sufficiently conducted by the private sector acting on its own. Programme activities are conducted in partnership with the private sector, state and local government, DoE national laboratories, and universities. EERE also works with stakeholders to develop programs and policies to facilitate the deployment of advanced clean energy technologies and practices.³ EERE has recently outlined a major Bio-Fuels Initiative (BFI) to make it price competitive with gasoline by 2012, and to replace 30% of gasoline consumption with bio-fuels by 2030.

There is also a national focus on the development of Intelligent Transport Systems (ITS) through the Department of Transport (DoT). The programme looks at both intelligent infrastructure and intelligent vehicles and the integration between these two components. Safety is a focus here in the form of Active Safety Systems (ASS), but only as part of the wider ITS programme. Much of the work is performed by the universities (university transport centres) and the national labs, with industry pushing

³ Department of Energy (2007) "*Energy Efficiency*" available at: <http://www.energy.gov/energyefficiency/index.htm>

forward with human-vehicle interaction and ASS. It is then left to the DoT to evaluate the developed technologies⁴.

The research environment is formed of a number of CRADA's (Cooperative Research and Development Agreements) within industry. These CRADA's are formed and registered with the Department of Commerce to avoid anti-trust laws and the majority are brought together under the USCAR umbrella. The role of the CRADA's range from simple road-mapping and pre-competitive collaborative agreements to full industry/government procurement and cooperation carrying out R&D on a number of different vehicle and manufacturing technologies.

The country is at a stage where it can carry out state level demonstrations of hydrogen technologies (both stationary and mobile) as well as establish the beginnings of a hydrogen infrastructure (fuel stations, maintenance bays etc.). There is a much more developed bio-fuels infrastructure within the country that will serve as a medium term solution before fuel cells are a commercial reality. There are a number of tax agreements between industry and government, which appear to be handled by the individual states looking to retain or attract automotive manufactures. These can involve tax credits on infrastructure projects and may also include state help in training assistance.

⁴ Richard Bishop, Bishop Consulting (2007)

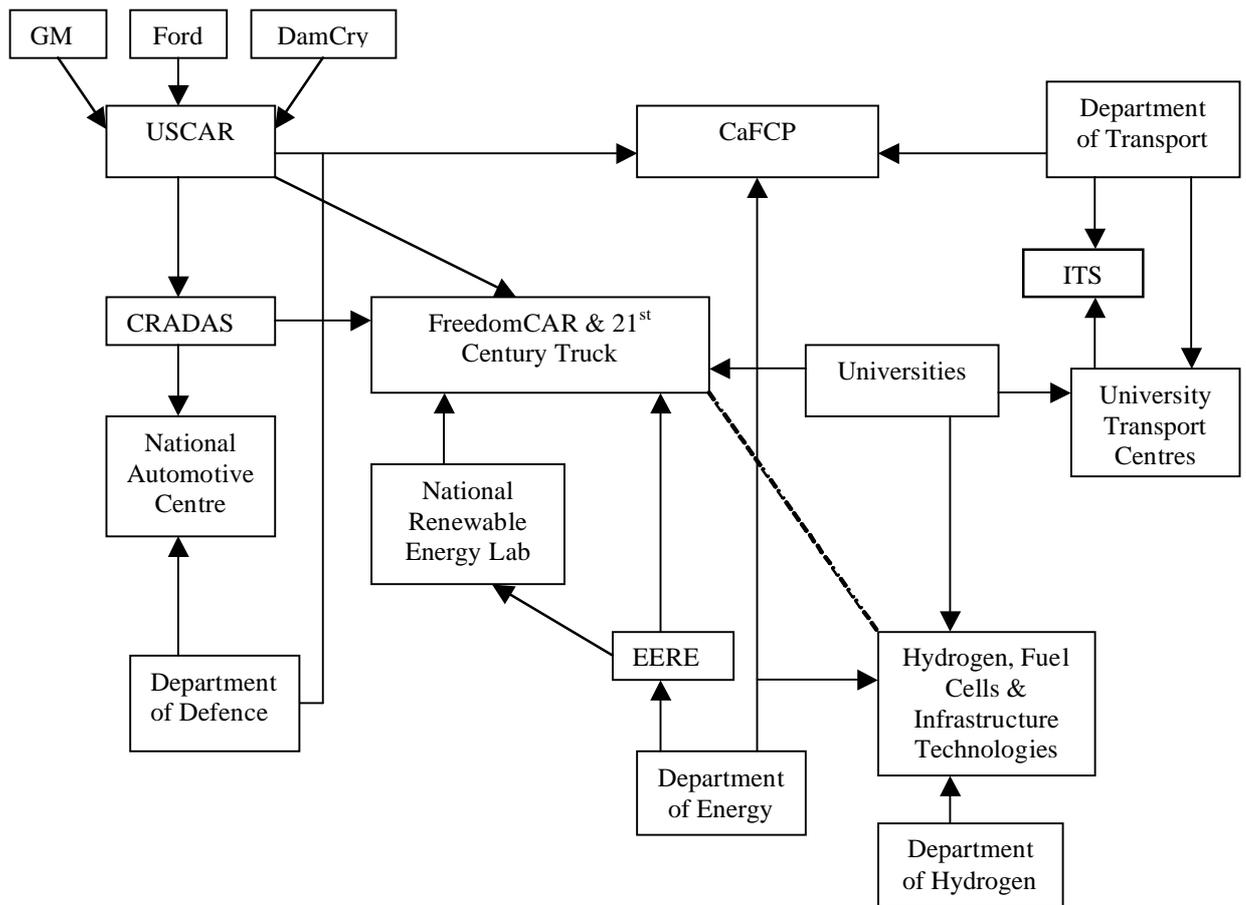


Exhibit 15 USA Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
United States Council for Automotive Research (USCAR)										
FreedomCAR & Vehicle Technologies Program										
Hydrogen, Fuel Cells & Infrastructure Technologies Program										
Casting Emissions Reduction Program (CERP)										
US Alliance for Technology and Engineering for Automotive Manufacturing (USATEAM)										
Low Emissions Partnership (LEP)										
Automotive Composites Consortium (ACC)										
Environmental Research										

Consortium (ERC)										
Electrical Wiring Component Application Partnership (EWCAP)										
US Advanced Battery Consortium (USABC)										
US Automotive Materials Partnership (USAMP)										
California Fuel Cell Partnership (CaFCP)										
National Automotive Centre (NAC)										
Tax Credits										
Automobile Tax Credits										
National Renewable Energy Lab (NREL)										
National Institute of Standards and Technology(NIST) – Advanced Technology Program (ATP)										
University of Michigan Transportation Research Institute (UMTRI)										
Department of Transport (DoT) – University Transport Centres (UTC)										
National Fuel Cell Research Centre (NFCRC)										
DoT - ITS										

Exhibit 16 Breakdown of Government Funding

USA - Breakdown	Total 02 - 08 (\$million)	Total (€million)
Fuel Cells	558	418.5
Materials	212	91.125
Batteries	68.25	51.1
Hybrid, Low Emissions, Electric Technologies	157.5	118.1
Advanced Combustion	146	109.5
Vehicle Systems	40	30
National Institutes/University Schemes	82.2	61.65
DoT Intelligent Transport Systems	128.3	96.2
State Tax Breaks (Indiana/Michigan) (Not Included in Exhibit 2)	(192.5)	(144.375)
Totals	\$1,301.8	€976.35

3.2 United Kingdom

It would appear that the UK is slightly less interested in the long-term establishment of a hydrogen infrastructure as yet and is focusing more on hybrid and lower emissions technologies. There is a push towards lowering carbon emissions with the Department of Trade and Industry (DTI) and the Energy Saving Trust offering grants to basic and pre-launch R&D on low carbon vehicle technologies. The DTI Technology Programme offers funds for clean-technology R&D and uses the Society of Motor Manufacturers and Traders (SMMT) run Foresight Vehicle Programme to direct interesting projects towards the DTI funding. Recently the DTI Technology Strategy Board outlined plans to channel multi-source funding (DTI, Department for Transport, for example) through Innovation Platforms, the first of which focuses on Intelligent Transport Systems (ITS). Several more Platforms will follow including one specifically concerned with the automotive sector.

The funding strategy has shifted over the years from safety (ie reducing the number of accidents/injuries by 40%) towards environmental and congestion-reduction policies. There has been a swing from sectoral, to cross-sectoral, back to sectoral funding (innovation platforms) of programmes. Some of the government policies are challenging to industry (such as emissions), as they cannot be met by simple incremental innovation, they require breakthroughs with has lead to industry being at odd with government. It is considered by some industry members that the government do not know the way forward however they do like environmentally friendly transport so industry is trying to ensure that government is not too prescriptive and allows scope for manoeuvre below the main policies.

In 2002 a report was published by the DTI outlining the future needs of the automotive industry including pilot projects, centres of excellence, and low carbon transport partnerships, which has refocused national efforts with industry towards environmentally friendly technologies and processes. Recently there has been an effort to consider hydrogen technologies by the government funding for this is yet to reach meaningful levels (£20 million over four years).

Much of the government funding within the automotive sector has been concerned with the start-up phase of mechanisms such as Foresight Vehicle Programme, CENEX, and innovITS with a view that they should then become self financed after a period of usually five years.

The International Automotive Research Centre and Premier Automotive Research & Development is seen as a very successful mechanism of getting industry members and higher education working together to enhance the manufacturing and design capabilities of West Midlands suppliers companies.

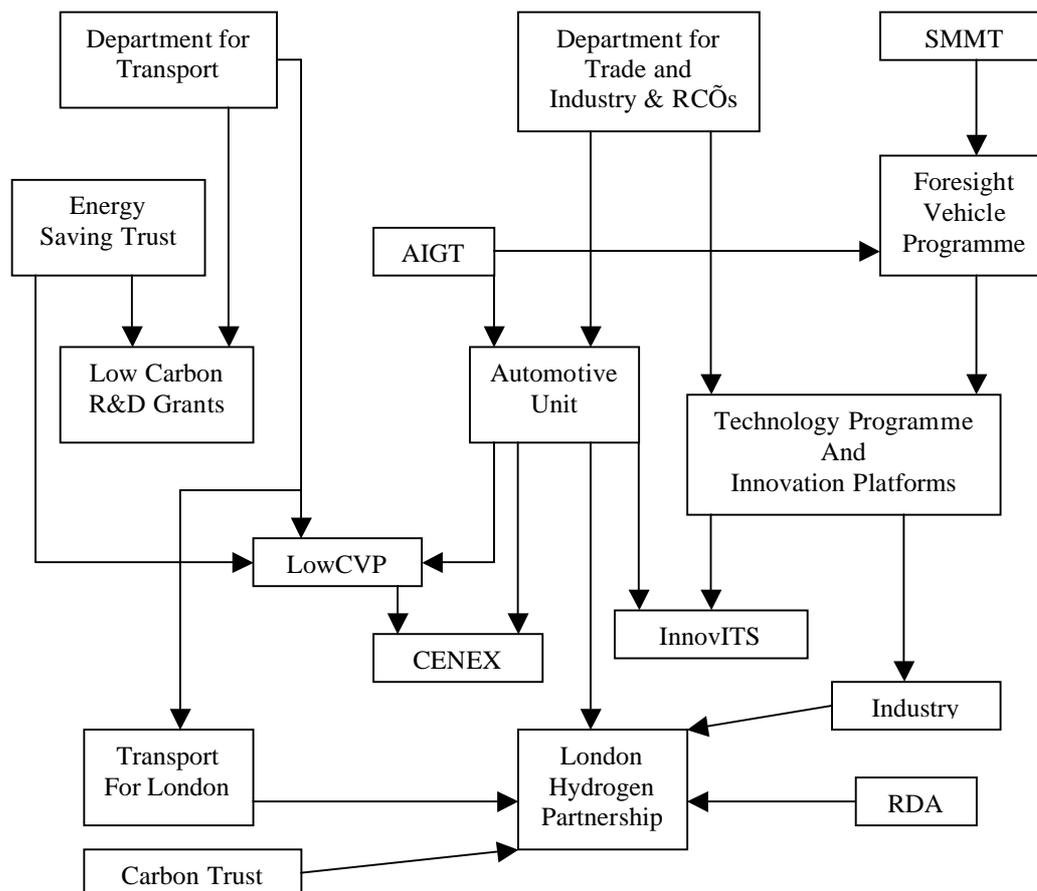


Exhibit 17 United Kingdom Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
R&D Tax Credits										
DTI Automotive Unit										
DTI AIGT										
DTI Innovation Platforms										
innovITS										
Low Carbon R&D Grant										
LowCVP										
CENEX										
Foresight Vehicle Programme										
IARC – PARD										
SMMT – Industry Forum										
DTI Technology Programme										
London Hydrogen Partnership										
Faraday Advance										
Low Carbon Grant Programme										

Exhibit 18 Breakdown of Government Funding

UK - Breakdown	Total 02 - 08 (£million)	Total (€million)
DTI - AIGT	45	67.5
Low Carbon R&D	20	30
CENEX – <i>included in AIGT Fund</i>	(6.5)	(9.75)
InnovITS – <i>included in AIGT Fund</i>	(6.5)	(9.75)
Foresight Vehicle Programme	50	75
IARC - PARD	24	36
Demonstration of Hydrogen/FC/other Projects	40	60
R&D State Aid	20	30
<i>State Rescue Aid/Training/General (Not included in Exhibit 2)</i>	<i>12.5</i>	<i>33.75</i>
Totals	£199	€298.5

3.3 Japan

The Ministry of Economy, Trade and Industry (METI) funds the majority of government R&D via the department for New Energy & Industrial Technology Development Organisation (NEDO). This is an agency of METI, a quasi-public organisation that controls the allocation of funding for R&D deemed critical to Japan's energy policy. NEDO runs a range of projects on fuel cell technology, batteries, lightweight materials, and low emissions technologies. There are government/industry collaborations for demonstration projects. Fuel cell projects within NEDO come under the Energy budget, with materials and emission projects carried out under the budget for environment.

Like the USA, Japan has established a long-term commitment and is well advanced in the development of a hydrogen infrastructure and fuel cell car. The first phase of this ceased in 2005 following several successful technology demonstrations (Advanced Clean Energy Vehicle ACE project and Japan Hydrogen & Fuel Cell Demonstration Project - JHFC). The second phase will see the introduction of 50,000 fuel cell vehicles and 500 hydrogen-refuelling stations by 2010. The final stage, termed "spread", hopes to see 5 million fuel cell vehicles on the road with 3500 fuel stations by the year 2020.

The Ministry of Land, Infrastructure and Transport (MLIT) is responsible for the Intelligent Transport Systems (ITS) programme in Japan and is well advanced in its development and deployment into the infrastructure. MLTI is also now in its fourth phase of the Advanced Safety Car (ASC) project which focused on intelligent vehicles and their interaction with the environment around them.

Japan appears to be very advanced in both Hydrogen and ITS development and deployment in terms of infrastructure and vehicle based systems. This is in part to initial programmes in each starting fairly early on in the technology life cycle of each project. Each of the programmes has a clear road map towards wide spread diffusion into society, which is backed by heavy government funding in each area.

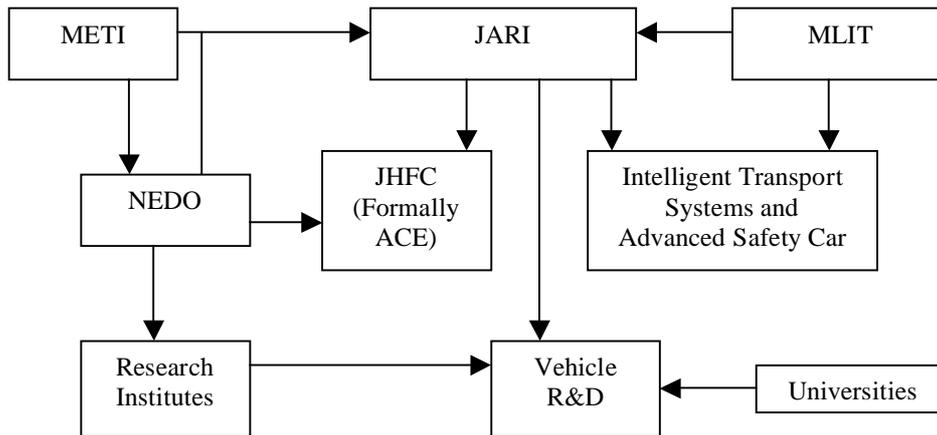


Exhibit 19 Japan Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
METI - NEDO - Fuel Cell Projects										
Materials Projects – Aluminium/Carbon-fibre/Carbon-nanofibre										
Low-Pollution Vehicle										
PEFC Technologies										
Lithium Battery Technology										
ACE										
JHFC										
R&D Tax Credits										
JARI										
FCDIC										
ITS										

Exhibit 20 Breakdown of Government Funding

Japan - Breakdown	Total 02 - 08 (¥million)	Total (€million)
Demonstration Projects	9,700	58.2
Hydrogen and Fuel Cell Vehicle Projects	80,500	483
Materials	7,980	47.9
Batteries	6,370	38.22
Low Carbon Vehicles	6,220	37.32
JARI	10,500	63
Intelligent Transport Systems	5,184	31.1
Totals	¥126,454,000,000	€758.7

3.4 Canada

Canada has been investing fairly heavily in fuel cell technology over the past few years (relative to population) and has committed its future to hydrogen with the establishment of demonstration/infrastructure projects and research institutes/partnerships. There is also a large amount of work looking at lightweight materials to help reduce vehicle emissions.

There are a number of research institutes within Canada looking at end use vehicle technologies including fuel cells and alternative fuels (mainly bio-diesel) funded under NRCan (Natural Resources Canada) with the National Research Council Canada (NRC) focusing on the higher level and supply chain aspects of hydrogen development. NRC runs several research institutes including the Institute for Fuel Cell Innovation (IFCI), Industrial Materials Institute (IMI), and the Institute for Chemical Process and Environmental Technology (ICPET). The Natural Sciences and Engineering Research Council (NSERC) is responsible for a large amount of funding aimed at collaborative R&D and Discovery Grants. They help fund networks of centres of excellence including Auto21, a major government, university and industry collaborative network.

The majority of this funding comes through the Office of Energy Research and Development and its associated R&D programs such as The Program on Energy R&D (PERD) and Technology and Innovation Research and Development (T&I R&D) Initiative.

The focus on safety in Canada has shifted to Intelligent Transport Systems (ITS) and there is much work being performed on the civil engineering side concerned with road monitoring and general road infrastructure programmes. There is little automotive industry participation on this side. The industry is more involved with the vehicle-to-vehicle aspects of ITS including communication, geomatics, GPS and WiFi. Much of this work is carried out in conjunction with the national labs and institutes. There are few national strategies and programmes specifically related to the automotive industry. Instead national strategies and funding are linked to the major issues including energy and greenhouse gasses, which then can be filtered down into covering many of the automotive related technologies (fuel cells, hybrids and materials). There are also societal and economic policies like safety and congestion (the negative affects of it on the economy) which will follow through to related technologies to do with wireless technology (human vehicle interaction), manufacturing (process efficiency), overall ITS (road congestion/charging) for example.

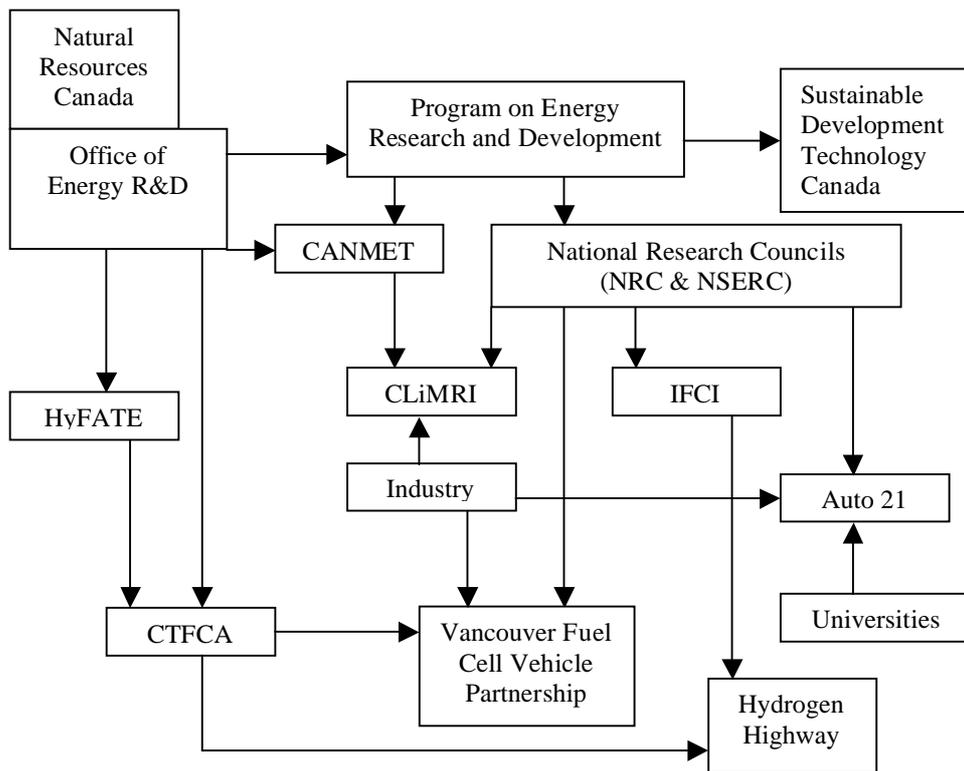


Exhibit 21 Canada Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hydrogen, Fuel Cell and Transportation Energy (HyFATE)										
Canadian Transportation Fuel Cell Alliance (CTFCA)										
Vancouver Fuel Cell Vehicle Program (VFCVP)										
National Research Council (NRC)										
NRC – IFCI										
Natural Sciences and Engineering Research Council (NSERC)										
Auto 21										
Canadian Lightweight Materials Research Initiative (CLiMRI)										
Technology Partnerships Canada – R&D										
SR&ED Tax Incentive Program										
Hydrogen Highway										
ARDC & Truck R&D										
Sustainable Development Technology Canada (SDTC)										
ITS Canada										

Exhibit 22 Breakdown of Government Funding

Canada - Breakdown	Total 02 - 08 (\$million)	Total (€million)
Hydrogen & Fuel Cells - R&D, Demonstration	228.2	148.3
Materials	25.4	16.5
Batteries	21.9	14.2
Electric/Hybrid/Low Emissions	56.7	36.9
Vehicle Systems	16	10.4
Safety	14	9.1
Sustainable Development Technology Canada – not covered above	4.2	2.7
Totals	\$366.5	€238.2

3.5 France

In 2005, with 3.55 million vehicles built on the territory, France was the world's sixth largest car producer behind the United States, Japan, Germany, China and South Korea.

About 20 manufacturers are present in France (e.g. PSA Peugeot Citroën, Renault, Renault Trucks, Toyota, Heuliez, Panhard, Alpine). In total, the vehicle industry employed 304,000 people in 2005.

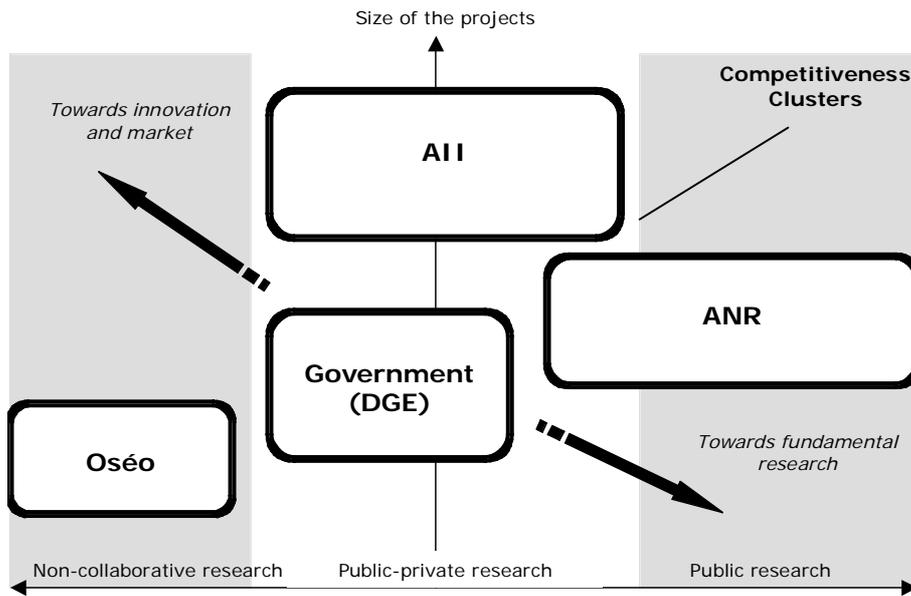
In France, about €4 billion is spent on automotive R&D every year. There are over 10,000 researchers, 75% of them working in private research centres.

The main programme of research in land transport is PREDIT, running since 1990 and funded by 4 Ministries and 3 public agencies (ADEME, Oséo, ANR). This programme supports research on energy, with the objective to produce clean and energy-saving vehicles, which implies research on sustainable emissions and new combustion technologies. Focus is also put on safety, through research on onboard intelligent systems and infrastructure intelligence. However, in the last few years, safety brought by car technologies has reached a high level and a great part of the research in safety now relates to public transport and human factors.

Although companies receive funding for carrying out research on hydrogen and fuel cells (through the calls for projects PAN-H launched by ANR), this field of research does not seem to be a priority yet.

Efforts are focused on producing energy-saving and environmentally-friendly vehicles. In order to contribute to this objective, the government (through the Agency for Industrial Innovation) has decided to support two important industrial projects: the first project, led by PSA, aims to develop electric-diesel hybrid vehicles, while the other, proposed by Valeo, aims to improve the performance of the petrol engine and to save energy, with the overall objective to reduce CO₂ emissions.

Another important feature of the French innovation system is the establishment in 2005 of 66 Competitiveness Clusters, with the aim to promote innovation through the support of industry's capacity to network with research institutes, universities and training centres. About 10 of these clusters relate to the automotive industry. They carry out research on materials, safety, onboard systems, hybrid vehicles and sustainable emissions.



Representation of the French research support system:

Source: Agence de l'Innovation Industrielle

Exhibit 23 France Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
PREDIT										
DEUFRACO										
CalFrance										
PACo										
PAN-H										
Competitiveness Clusters										
ANR										
Oséo										
AII										
Hybrid vehicle programme										
LOWCO ₂ MOTION										
RT3										
INRETS										

Exhibit 24 Breakdown of Government Funding

France - Breakdown	Total (€)
PREDIT	105,000,000
PACo/PAN-H	58,635,000
PNRB	1,935,000
Competitiveness Clusters	165,000,000
Hybrid vehicle programme	40,000,000
LOWCO ₂ MOTION	24,400,000
<i>Matra/Romorantin Training Aid from the State (Not included in Exhibit 2)</i>	<i>1,400,000</i>
Totals	€394,970,000

3.6 Germany

The automotive sector is one of the most important industry branches in Germany. 5.76 million cars were produced in the country in 2005. The same year, 766,350 people were employed directly by the automotive industry.

Five large global automotive manufacturing companies are situated in Germany: Volkswagen (VW, Audi, Seat, Skoda), DaimlerChrysler (Mercedes-Benz, Smart, Maybach, Chrysler, Jeep), Opel (belongs to GM), BMW (incl. Mini and Rolls-Royce) and Porsche. Important automotive supply companies are e.g. Conti, Bosch, Beru and Hella.

The German automotive industry invested 16 billion euros on research and development in 2005. As a result of its research intensity, the automotive sector in Germany accounted for 35% of applications worldwide.

The main organisation for applied-research is the Fraunhofer-Gesellschaft, which has set up the Fraunhofer Transport Alliance.

Support to R&D for the automotive industry is provided through large-scale schemes such as the Mobility and Transport Programme, the Framework Programme for Materials and the Microsystems Programme. Research on fuel cells and hydrogen is also supported through the National Hydrogen and Fuel Cell Technology Innovation Programme.

At a regional level, many networks of competence are directly related to the automotive industry, for example the Automotive Field of Competence around Wuppertal or Car e.V.- Competence Centre of the automotive region Aachen (both in North Rhine-Westphalia). All in all, there are dozens of competence networks in the areas of industrial manufacturing, materials science, mechatronics and microtechnologies, power engineering, and traffic and transport. There are also at least ten fuel cell and hydrogen networks in Germany, one of which is the Fuel Cell Research Alliance Baden-Württemberg. Generally, these networks act as platforms that promote (research) partnerships but they not themselves fund R&D.

Bavaria, which we selected as an example on the Länder level, has its own cluster policy, promoting the automotive industry with two automotive cluster initiatives (BAIKA and Cluster 'Automotive'). Bavaria also pursues its own research and technology policy, with, among others, three technology programmes in strategic fields: new materials, micro systems and ICT.

Exhibit 25 Germany Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mobility and Transport Programme										
AKTIV										
Intelligent Logistics										
FVV Automotive										
High-Tech Strategy										
National Hydrogen and Fuel Cell Technology Innovation Programme										
Clean Energy Partnership										
Framework Programme for Materials										
Microsystems Framework Programme										
Automotive Engineering Centre Bavaria										
BAIKA										
Alliance Bavaria Innovative, Cluster 'Automotive'										
Technology Programme 'Microsystems technology'										
Technology Programme 'New Materials'										

Exhibit 26 Breakdown of Government Funding

Germany - Breakdown	Total (€)
Mobility and Transport Programme	140,000,000
National Hydrogen and Fuel Cell Technology Innovation Programme	88,635,000
Framework Programme for Materials	135,000,000
Microsystems Framework Programme	86,665,000
Totals	€450,300,000

3.7 Australia

In 2005, about 395,000 motor vehicles were produced in Australia. The industry employed directly around 43,000 people.

The Australian passenger motor vehicle (PMV) industry consists of four car manufacturers (Ford, Holden, Mitsubishi and Toyota) and more than 200 component, tooling, design and engineering firms.

The Australian automotive industry is built on a strong research base, through established partnerships between Australian universities, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and a network of specialised Cooperative Research Centres in electronics, casting and manufacturing systems. In 2004/05 (financial year), Australia's automotive industry spent the equivalent of 425 million euros on R&D activity.

The automotive industry is supported by significant levels of investment by the Australian Government, primarily through the Automotive Competitiveness and Investment Scheme (ACIS). This scheme aims to encourage new investment and innovation in the automotive industry through the issue of import duty credit to the participants. State governments also support the industry through various investment schemes.

Demonstrations of hydrogen and research on biofuels and hybrid vehicles are carried out as part of the STEP Programme.

Exhibit 27 Australia Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
ACIS										
ACIS 2 (MVP R&D Scheme)										
Reduction in automotive tariffs										
CSIRO										
Auto CRC										
ITS Australia										
Automotive Centre of Excellence										
Ad-hoc assistance										
STEP										
Purchasing preferences										
R&D Tax Concession										
LPG Vehicle Scheme										

Exhibit 28 Breakdown of Government Funding

Australia - Breakdown	Total (€)
ACIS	1,680,640,000
AutoCRC	12,900,000
STEP	6,200,000
Ad-hoc assistance	88,900,000
Totals	€1,788,640,000

3.8 Norway

Except from a few niche products (specialized industrial vehicles and electricity driven cars) there is almost no automotive industry in Norway. In recent years, however, the supply industry to the international automotive industry has gained market shares and is now growing relatively strongly. Norway's automotive supply manufacturing industry is now an important activity for several of the large metal manufacturers (aluminum and other light metals, e.g. Raufoss, Hydro, Kongsberg Automotive).

These manufacturers have established common platforms, such as Arena Bil or AluPart, where they put their competence and resources together with the objective to invent and develop new technology and to increase their competitiveness.

Support for R&D in the automotive industry is also indirectly provided through hydrogen-related programmes. The Norwegian government aims to promote the development of a hydrogen economy through the implementation of several schemes, all coordinated since 2006 by the National hydrogen platform.

For the year 2007, the Research Council has earmarked NOK 60 million for projects related to hydrogen, of which approximately one third (2.4 million euros) can find an application in the automotive sector. These funds are provided by various ministries (agriculture, environment, energy, transport, and trade) and do not include private funding.

Automotive manufacturers can also participate in the Programme for user-driven research-based innovation (BIA), aimed at supporting R&D investment in Norwegian industry by funding large-scale projects.

Safety in transport is a priority in Norway, but focus is put more on studying the normative foundations of safety policy and studying risk in a social perspective than on developing new car technologies for safety.

Exhibit 29 Norway Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
Arena Automotive										
AluPart										
National hydrogen platform										
RENERGI										
NANOMAT										
HyNor										
RISIT										
Programme for user-driven research-based innovation (BIA)										
SkatteFUNN										
Ad-hoc assistance										

Exhibit 30 Breakdown of Government Funding

Norway - Breakdown	Total (€)
Arena Automotive	480,000
AluPart	2,070,000
Automotive-related hydrogen spending	12,000,000
Ad-hoc assistance	1,350,000
Totals	€15,900,000

3.9 Italy

The design and production of automobiles, commercial vehicles and buses, together with the different suppliers of components, sub-systems and services, represents one of Italy's most important industries. 1.04 million vehicles were produced in Italy in 2005.

The principal Italian vehicle marques (FIAT, Alfa Romeo, Lancia, Maserati, Ferrari and IVECO) belong to the FIAT Group. Correspondingly, many other important players in the global car industry, in particular component and sub-system suppliers, have production and distribution facilities within the country.

Focused research and development in recent years has enabled a position of technology leadership to be established in Italy specifically as concerns diesel and natural gas engines.

In Italy, no specific programme directly supports R&D in the automotive industry. However, the automotive industry can benefit from the two major funds (FAR and FIT).

The Government also provides subsidies to the FIAT Group, which received for example about €43 million in 2003 as "training aid".

In terms of public support for industry in Italy, the current period is a period of transition, between the old system of state intervention and the new framework, which has been set up by the very recent Financial Law 2007 (*Legge Finanziaria*). This law has defined five priority areas for the economic development and competitiveness of Italy

1. Energy efficiency
2. Sustainable mobility
3. New technologies in the area of Life sciences
4. New technologies for production in Italy
5. Innovative technologies for cultural goods and activities

The Financial Law 2007 establishes the Competitiveness Fund (*Fondo per la competitività*), which will fund innovative industrial projects and other support projects under the competence of the Ministry of economic development. €1.1 billion have been earmarked for this fund over the next three years (until 2010).

Until the Competitiveness Fund is activated, the FAR and FIT will be maintained and will participate in reaching the objectives defined under the PNR 2005-2007. The National Research Programme (*Programma Nazionale della Ricerca*) set up 12 strategic priorities, among which the promotion of low emissions and energy-saving in the automotive industry. The overall objectives of the PNR are: quality of life (health, safety, environment), competitiveness of the productive system and sustainable development.

In 1976 the Fiat Group founded the CRF (Fiat Research Centre), a centre providing R&D services to each of the different companies within the Fiat Group, and since 10 years, to other companies and organisations.

The 2004 activity report reveals that particular emphasis was given to major R&TD projects involving ecological engines, innovative vehicle architectures, electronically controlled chassis systems, telematic applications, integrated transport safety, environmental protection and advanced product methodologies.

Part of the projects carried out by the CRF are funded by the Government and by the European Commission. The presence of CRF in European programmes is very strong. The National Programmes are related to the PNR (National Research Programme). In 2005 some programmes were launched of indirect interest for vehicle industry: advanced manufacturing systems; development of the motor industry (including motorcycles): efficient and ecological powertrains, advanced transport and logistic - infomobility for people and goods, advanced materials (in particular ceramics) for structural applications, ICT and electronic components, energy saving and micro-power generation.

Exhibit 31 Italy Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
FAR										
FIT										

Exhibit 32 Breakdown of Government Funding

Italy - Breakdown	Total (€)
<i>Fiat Training Aid</i>	<i>43,000,000</i>
<i>De Tomaso Cutro – Regional Development Aid</i>	<i>81,000,000</i>
<i>Not included in exhibit 2</i>	
Totals	€124,000,000

3.10 Israel

Aside from a relatively small special vehicles production (such as vehicles for military or police use, fire-fighting units, off-road and riot-control vehicles), Israel does not have any domestic vehicle production.

Israel's automotive industry consists of suppliers and aftermarket manufacturers that supply to original equipment manufacturers (OEMs) such as GM, Ford, DaimlerChrysler, Volkswagen, Navistar, Freightliner, Volvo and Fiat. Some high-tech companies are focusing on telematics, driver safety systems and tracking technologies.

350 automotive related companies are located in Israel.

In 1984 was adopted the Law for Encouragement of Industrial Research and Development (amended in 2002). The objective of this law is to promote industrial research and development that would have substantial benefit for the Israeli market, and more specifically:

- to develop hi-tech industry by exploiting and expanding the science and technology infrastructure as well as the country's human resources
- to improve Israel's balance of payments through the production and export of locally developed hi-tech products
- to create jobs in industry and provide manpower with scientific and technological training.

There is no specific programme for the automotive or automotive component industry in Israel. Automotive manufacturers can participate in the various programmes established under the Law for Encouragement of Industrial Research and Development, even if these programmes are generally more focused on sectors such as high-tech and life sciences. Such programmes are funded by the Ministry of industry, trade and labour, the Office of the Chief Scientist and MATIMOP.

General Motors, through the GM Foundation Israel Program, supports research projects carried out by universities, research laboratories and companies. The Programme, launched in 1996, supports 7-8 projects and 1-2 conferences each year, with a budget of about \$ 200,000 a year. Projects cover research on areas such as materials, fuel cell and human/vehicle interaction.

3.11 South Korea

Unlike other countries, a higher than average proportion of R&D is carried out by industry, followed by the government supported research institutes and universities (in 2004 this was 76.7%, 13.4% and 9.9% respectively).

Government departments of interest;

- MOCIE – Ministry of Commerce, Industry & Energy
- MOST – Ministry of Science and Technology
- MOCT – Ministry of Construction and Transportation
- SMBA – Small and Medium Business Administration

These ministries, mainly MOST, then put money into a large number of Government Supported Research Institutes (GRIs) (the following are relevant to the study);

- KATECH – *Korea Automotive Technology Institute* – Previously ran the national project Next Generation Vehicle Technology Development Project (1992 – 2002) looking at low emissions, safety, and electric vehicle. The next project to launch is the Future Vehicle Technology Development Project (10 years duration) looking at hybrid vehicles, fuel cell vehicles, and smart vehicles.
- KITECH – *Korea Institute of Industrial Technology* – relevant projects in divisions; Advanced Materials, Manufacturing Systems, Environment and Energy, Production Technology, Manufacturing Process Technology.
- KIST – *Korea Institute of Science and Technology* – Environment & Process Technology Division.
- KIER – *Korea Institute of Energy Research* – several divisions of interest; High Efficiency Energy Technology, Energy Conversion Technology, Renewable Energy Technology, Advanced Energy Materials Technology, Energy Policy Research and Technology Transfer.

These GRIs have autonomy in operation, management, decision-making, and the organization of the Institutes.

Korea, like Japan, has established a clear roadmap towards a future of Hydrogen fuel cell cars and infrastructure (as an overall shift to a hydrogen economy). Through four stages with the aim by 2040 to have at least 50% of all vehicles in Korea run on fuel cells.

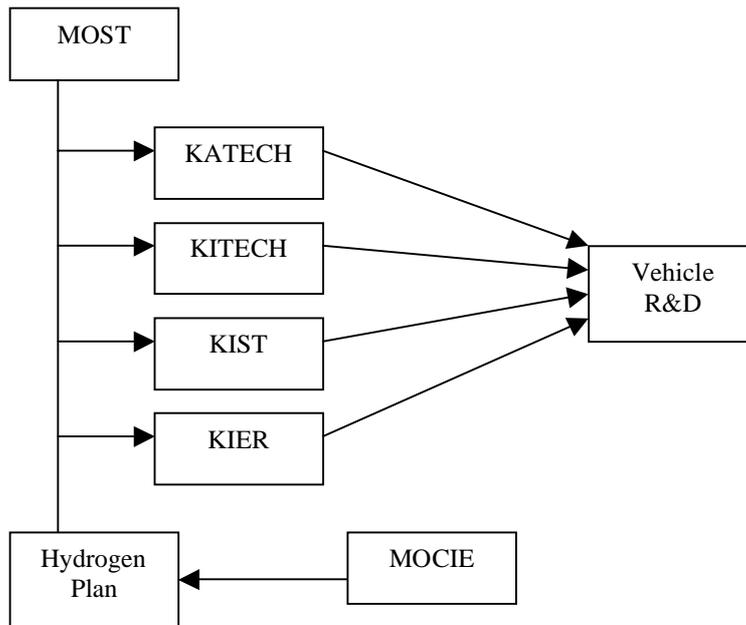


Exhibit 33 Korea Timeline

Scheme Name	Country	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
KATECH	Korea										
KITECH	Korea										
KIST	Korea										
KIER	Korea										
MOST - National R&D	Korea										
National RD&D Organisation for Hydrogen & Fuel Cell	Korea										

3.12 Sweden

Exhibit 34 Sweden Timeline

Scheme Name	Pre 2002	2002	2003	2004	2005	2006	2007	2008	2009	2010
CERC Combustion competence centre										
KCFP Combustion competence centre										
KCK Catalysis competence centre										
Hybrid technology centre										
CICERO Engine competence centre										
CECOST Combustion graduate school										
ECO2 Vehicle design competence centre										
SAFER vehicle safety competence centre										
PFF										
Green Car 1										
Green Car 2										
EMFO Emissions research										
IVS Intelligent Vehicle Systems										
V-ICT Vehicles IT and telematics										
MERA Production engineering programme										
Volvo DME - technology support										
Volvo hybrid loader										
Fuel cells in a sustainable society										
Energy waste gas treatment for combustion engines										
Energy systems in road vehicles										
Innovative vehicles, vessels and systems										
Light-weight materials and designs										

Exhibit 35 Breakdown of Government Funding

Sweden - Breakdown	Total (02 - 08) (MSEK)	Total (€Million)
El/Hybrid/Low	115	114.5
Fuel cells	212	5.04
ITS	212	42.84
Manufacturing	326	30.65
Materials	471	6.65
Safety	481	5.54
Vehicles general	417	23.99
Totals	2274	229.23

Appendix A Government Support for the Automotive Industry

Category →		R&D Tax Incentive	Road Map / Foresight	Vehicle R&D Programmes	General R&D Programmes	Institutions	Technology Procurement	Demonstrations, Pilots, Procurement of	Other Innovative Arrangements	Unofficial Subsidy Mechanisms
Scheme Name	Country									
USCAR	USA		X						X	
FreedomCAR & Vehicle Technologies Program	USA		X	X			X			
Hydrogen, Fuel Cells & Infrastructure Technologies Program	USA		X	X	X		X			
CERP	USA				X				X	
USATEAM	USA								X	
LEP	USA			X			X		X	
ACC	USA			X					X	
ERC	USA				X				X	
EWCAP	USA			X					X	
USABC	USA						X		X	
USAMP	USA			X					X	
California Fuel Cell Partnership	USA							X		
National Automotive Centre	USA			X					X	
Tax Credits	USA	X								
Automobile Tax Credits	USA	X								
NREL	USA					X				
NIST - ATP	USA			X	X					
UMTRI	USA					X				
DOT - UTC	USA					X				
NFCRC	USA					X				
DoT – Intelligent Transport System	USA			X	X					
Research and development tax credits	UK	X								

Category →		R&D Tax Incentive	Road Map / Foresight	Vehicle R&D Programmes	General R&D Programmes	Institutions	Technology Procurement	Demonstrations, Pilots, Procurement of Prototypes	Other Innovative Arrangements	Unofficial Subsidy Mechanisms
Scheme Name	Country									
DTI Automotive Unit	UK		X							
DTI AIGT	UK		X							
DTI Technology Strategy Board – Tech Platforms	UK								X	
InnovITS	UK					X				
Low Carbon R&D Grant	UK						X	X		
LowCVP	UK		X							
CENEX	UK					X		X		
Foresight Vehicle Program	UK		X							
IARC – PARD	UK			X		X				
SMMT – Industry Forum	UK								X	
DTI Technology Programme	UK				X					
London Hydrogen Partnership	UK		X					X		
Sustainable Hydrogen Energy Consortium	UK		X							
VIPER	UK								X	
Faraday Advance	UK					X				
Low Carbon Grant Programme	UK	X								
METI - NEDO	Japan		X	X	X		X	X		
Materials Projects – Aluminium/Carbon-fibre/Carbon-nanofibre	Japan			X						
Low-Pollution Vehicle	Japan			X						
PEFC Technologies	Japan			X						
Lithium Battery Technology	Japan			X						
ACE	Japan		X					X		
JHFC	Japan		X					X		
R&D Tax Credits	Japan	X								
JARI	Japan					X				

Category →		R&D Tax Incentive	Road Map / Foresight	Vehicle R&D Programmes	General R&D Programmes	Institutions	Technology Procurement	Demonstrations, Pilots, Procurement of Prototypes	Other Innovative Arrangements	Unofficial Subsidy Mechanisms
Scheme Name	Country									
FCDIC	Japan								X	
ITS	Japan				X					
HyFATE	Canada		X			X	X			
CTFCA	Canada		X					X		
VFCVP	Canada							X		
National Research Council	Canada			X	X	X				
NRC – IFCI	Canada					X				
NSERC	Canada					X			X	
Auto 21	Canada					X				
CLiMRI	Canada			X		X				
TPC – R&D	Canada									
SR&ED Tax Incentive Program	Canada	X								
Hydrogen Highway	Canada				X			X		
ARDC & Truck R&D	Canada			X						
STDC	Canada							X		
ITS Canada	Canada				X			X		
PREDIT	France		X							
DEUFRACO	France								X	
CalFrance	France								X	
PACo	France								X	
PAN-H	France								X	
Competitiveness Clusters	France								X	
ANR	France					X				
Oséo	France					X				
AII	France					X				
RT3	France								X	
INRETS	France					X				
Mobility and Transport Programme	Germany				X					
AKTIV	Germany			X						
Intelligent Logistics	Germany				X					
FVV Automotive	Germany					X				

Category →		R&D Tax Incentive	Road Map / Foresight	Vehicle R&D Programmes	General R&D Programmes	Institutions	Technology Procurement	Demonstrations, Pilots, Procurement of Prototypes	Other Innovative Arrangements	Unofficial Subsidy Mechanisms
Scheme Name	Country									
High-Tech Strategy	Germany				X					
National Hydrogen and Fuel Cell Technology Innovation Programme	Germany				X					
Clean Energy Partnership (CEP)	Germany							X		
Framework Programme Materials	Germany				X					
Microsystems Framework Programme	Germany				X					
Automotive Engineering Centre Bavaria	Germany					X				
BAIKA	Germany								X	
Alliance Bavaria Innovative	Germany								X	
Technology Programme 'Microsystems technology'	Germany				X					
Technology Programme 'New Materials'	Germany				X				X	
ACIS	Australia			X						
MVP R&D Scheme	Australia			X						
Reduction in automotive tariffs	Australia	X								
CSIRO	Australia					X				
Auto CRC	Australia					X				
ITS Australia	Australia								X	
ACE	Australia					X				
Ad-hoc assistance	Australia									X
STEP	Australia				X			X		
Purchasing preferences	Australia						X			
R&D tax concession	Australia	X								

Category →		R&D Tax Incentive	Road Map / Foresight	Vehicle R&D Programmes	General R&D Programmes	Institutions	Technology Procurement	Demonstrations, Pilots, Procurement of Prototypes	Other Innovative Arrangements	Unofficial Subsidy Mechanisms
Scheme Name	Country									
LPG Vehicle Scheme	Australia	X								
Arena Automotive	Norway								X	
AluPart	Norway								X	
National hydrogen platform	Norway				X					
RENERGI	Norway				X					
NANOMAT	Norway				X					
HyNor	Norway				X					
RISIT	Norway				X					
BIA	Norway				X					
SkatteFUNN	Norway	X								
Ad-hoc assistance	Norway									X
FAR	Italy				X					
FIT	Italy				X					
R&D Fund	Israel				X					
Magnet	Israel				X					
Generic R&D	Israel				X					
MATIMOP	Israel					X				
Bi-national Funds	Israel								X	
Bi-national R&D Support Agreements	Israel								X	
KATECH	Korea			X		X				
KITECH	Korea				X	X				
KIST	Korea				X	X				
KIER	Korea			X	X	X				
MOST – National R&D	Korea		X	X	X		X			
CERC Combustion competence centre	Sweden					X				
KCFP Combustion competence centre	Sweden					X				
KCK Catalysis competence centre	Sweden					X				
Hybrid technology centre	Sweden					X				

Category →		R&D Tax Incentive	Road Map / Foresight	Vehicle R&D Programmes	General R&D Programmes	Institutions	Technology Procurement	Demonstrations, Pilots, Procurement of Prototypes	Other Innovative Arrangements	Unofficial Subsidy Mechanisms
Scheme Name	Country									
CICERO Engine competence centre	Sweden					X				
CECOST Combustion graduate school	Sweden					X				
ECO2 Vehicle design competence centre	Sweden					X				
SAFER vehicle safety competence centre	Sweden					X				
PFF	Sweden					X				
Green Car 1	Sweden			X						
Green Car 2	Sweden			X						
EMFO Emissions research	Sweden			X						
IVS Intelligent Vehicle Systems	Sweden			X						
V-ICT Vehicles IT and telematics	Sweden			X						
MERA Production engineering programme	Sweden				X					
Volvo DME - technology support	Sweden				X					
Volvo hybrid loader	Sweden			X						
Fuel cells in a sustainable society	Sweden				X					
Energy waste gas treatment for combustion engines	Sweden			X						
Energy systems in road vehicles	Sweden			X						
Innovative vehicles, vessels and systems	Sweden				X					
Light-weight materials and designs	Sweden				X					

A.1 USA

Scheme Name	United States Council for Automotive Research (USCAR)
Country	USA
Category	Road Map/Foresight, Other Innovative Arrangements
Description	<p>USCAR was formed in 1992 with the key aim to strengthen the technology base in the US automotive industry through cooperative pre-competitive R&D. This was in reaction to the globalisation of the automotive industry and the fact that other overseas competitors were already collaborating in the same way. It is organised into specialised groups that look to focus on specific areas with an aim to; Accelerate technical development, provide a common voice to the supply base, increase the value of research investments, improve quality, and reduce the cost for non-competitive technologies and activities.⁵ It regularly forms partnerships with federal government and educational institutions to help reach these goals (some of which are outlined in the following sections).</p> <p>Under USCAR there are a number of sub-division/CRADA's and teams which look at a range of automotive areas through a series of collaborations (both industry and federal/educational partners);</p> <p><i>FreedomCAR & Fuel Cell Partnership</i> <i>Casting Emissions Partnership</i> <i>United States Alliance for Technology and Engineering for Automotive Manufacturing (USATEAM)</i> <i>Low Emissions Partnership (LEP)</i> <i>Automotive Composites Consortium (ACC)</i> <i>Environmental Research Consortium (ERC)</i> <i>Electrical Wiring Component Application Partnership (EWCAP)</i> <i>US Advanced Battery Consortium (USABC)</i> <i>US Automotive Materials Partnership (USAMP)</i> <i>Vehicle Recycling Partnership (VRP)</i></p>
Financial Details	In 2005, USCAR and the DoE signed co-operative research agreements to support continued R&D in the areas of lightweight materials and advanced battery technologies. The agreements include DoE funding and industry cost share represent a total investment potential of \$195 million over the next five years through USABC and USAMP to suppliers and research institutions. ⁶
Timing	Founded in 1992 and ongoing.
Governance and Management	USCAR is run by the three main manufacturers in the United States (Daimler Chrysler, Ford, General Motors) with top management of each company present on the USCAR board. At this level there does not appear to be any Government involvement with research directions and strategies.
Participants	Industry, Government, Research Institutes, Universities.
Evaluation and Impact	
Downloaded Documents	USCAR2005 Highlights of Technical Accomplishments.pdf

Scheme Name	FreedomCAR & Vehicles Technology Program (FCVT)
Country	USA
Category	Road Map/Foresight, Vehicle R&D Programmes

⁵ Key aims taken from the USCAR website (<http://www.uscar.org/guest/history.php>).

⁶ Automotive Engineer Plus (2005) "Big Three work together to lose weight" available at: <http://www.ae-plus.com/Technology%20News/tn-USCAR.htm>

Description	<p>The FreedomCAR and Vehicle Technologies (FCVT) Program is developing more energy efficient and environmentally friendly highway transportation technologies that will enable America to use less petroleum. The long-term aim is to develop "leap frog" technologies that will provide Americans with greater freedom of mobility and energy security, while lowering costs and reducing impacts on the environment.</p> <p><u>Freedom Car & Fuel Partnership</u> – In January 2002, USCAR and the U.S. Department of Energy teamed together to create the FreedomCAR Partnership. In September 2003, the FreedomCAR effort expanded to become the FreedomCAR and Fuel Partnership, adding five energy companies – BP America, Chevron Corporation, ConocoPhillips, Exxon Mobil Corporation and Shell Hydrogen LLC – to the USCAR/DOE partnership. It is supported by numerous suppliers, research institutions and universities.⁷ The goal of the FreedomCAR and Fuel Partnership is fundamental and dramatic — the development of emission- and petroleum-free cars and light trucks. The Partnership focuses on the high-risk research needed to develop the necessary technologies, such as fuel cells and advanced hybrid propulsion systems, to provide a full range of affordable cars and light trucks that are free of foreign oil and harmful emissions — and that do not sacrifice freedom of mobility and freedom of vehicle choice.</p> <p>Research areas covered; Hybrid & Vehicle Systems, Energy Storage, Power Electronics & Electrical Machines, Advanced Combustion Engines, Fuels & Lubricants, Materials Technologies.</p> <p>Also under the partnership is <u>21st Century Truck</u> - To address the research and development needs of commercial vehicles, the goal of the 21st Century Truck Partnership is for our nation's trucks and buses to safely and cost-effectively move larger volumes of freight and greater numbers of passengers while emitting little or no pollution, with dramatic reduction in dependence on imported oil.⁸</p>
Financial Details	<p><u>Vehicle Systems (\$000)</u> FY2003: \$13,485 FY2004: \$14,335 FY2005: \$13,004 FY2006: \$13,056 FY2007 request: \$13,315</p> <p><u>Hybrid and Electric Propulsion (\$000)</u> FY2003: \$41,996 FY2004: \$45,002 FY2005: \$44,066 FY2006: \$43,977 FY2007 request: \$50,841</p> <p><u>Advanced Combustion Engine R&D (\$000)</u> FY2003: \$55,267 FY2004: \$54,405 FY2005: \$48,480 FY2006: \$42,746 FY2007 request: \$46,706</p> <p><u>Materials Technologies (\$000)</u> FY2003: \$36,094 FY2004: \$39,744 FY2005: \$35,922</p>

⁷ USCAR (2007) "FreedomCAR and Fuel Cell Partnership" available at: http://www.uscar.org/guest/view_partnership.php?partnership_id=1

⁸ EERE (2007) "FCVT Overview" available at: <http://www1.eere.energy.gov/vehiclesandfuels/>

	<p>FY2006: \$35,269 FY2007 request: \$29,786 <u>Fuels Technologies (\$000)</u> FY2003: \$19,164 FY2004: \$16,494 FY2005: \$12,419 FY2006: \$13,709 FY2007 request: \$13,845 <u>Technology Introduction (\$000)</u> FY2003: \$4,570 FY2004: \$4,939 FY2005: \$4,944 FY2006: \$6,250 FY2007 request: \$11,031 <u>Technical/Program Management Support (\$000)</u> FY2003: \$2,005 FY2004: \$2,095 FY2005: \$1,877 FY2006: \$2,475 FY2007 request: \$0 <u>Vehicle Technology Total (\$000)</u> FY2003: \$174,171 FY2004: \$178,002 FY2005: \$161,236 FY2006: \$182,104 FY2007 request: \$166,024 (http://www1.eere.energy.gov/vehiclesandfuels/about/fcvt_budget.html)</p>
Timing	2002 – ongoing (Formally known as Partnership for a New Generation of Vehicles - PNGV)
Governance and Management	<p><i>FreedomCAR & Fuel Partnership</i> – DOE, energy companies — BP America, Chevron Corporation, ConocoPhillips, Exxon Mobil Corporation, and Shell Hydrogen (US), and the USCAR partners. The partners jointly carry out road mapping, suggest priorities, and monitor R&D. All the partners independently undertake their own research activities towards the overall FreedomCAR vision or through separate legal arrangements. USCAR partners jointly conduct pre-competitive R&D.</p> <p><i>21st Century Truck</i> - Industrial Partners; Allison Transmission, BAE Systems, Caterpillar, Cummins Engine, DaimlerChrysler, Detroit Diesel Corporation, Eaton, Freightliner, Honeywell International, International Truck and Engine, Mack Trucks, NovaBUS, Oshkosh Trucks, PACCAR, Volvo Trucks North America. Federal Government Partners; U.S. Department of Energy (DOE), U.S. Department of Defence (DOD), U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA).</p>
Participants	Industry, Government, Research Institutes, Universities.
Evaluation and Impact	
Downloaded Documents	<p>FreedomCAR Partnership Plan.pdf 21st Century Truck Roadmap.pdf FCVT - Hybrid.pdf FCVT - EnergyStorage R&D.pdf FCVT - Advanced Power.pdf FCVT - Advanced Engine.pdf FCVT - Fuels Technologies.pdf FCVT - Lightweight Materials.pdf</p>

Scheme Name	Hydrogen, Fuel Cells & Infrastructure Technologies Program
Country	USA

Category	Road Map/Foresight, Vehicle R&D, General R&D, Technology Procurement
Description	<p>This is a program run by the DoE looking at the overall hydrogen system from production and delivery, to storage and use within vehicles and stationary applications.</p> <p>Hydrogen Production and Delivery R&D - Research and develop advanced technologies for producing and delivering hydrogen. Feedstocks include natural gas, petroleum, and renewables; technology areas include processes and techniques such as reforming, separating, purifying, compressing, and delivering hydrogen.</p> <p>Hydrogen Storage R&D - Develop and demonstrate compressed hydrogen tanks for near-term storage of hydrogen, and advanced materials for long-term hydrogen storage systems (activities closely coordinated with FreedomCAR).</p> <p>Safety, Codes & Standards - Develop applicable codes and standards for hydrogen production and delivery processes, as well as hydrogen storage technologies for both transportation and stationary applications. Activities also include development of safety sensors and safety analysis.</p> <p>Systems Analysis - Systems analysis will assess cross-cutting and overall hydrogen system issues and support the development of production, delivery, storage, fuel cell and safety technologies.</p> <p>Transportation Fuel Cell Systems - Conduct R&D and analysis activities that address key barriers, including cost and reliability, to fuel cell systems for transportation applications. Activities support the development of individual component technology critical to systems integration, as well as systems-level modeling activities that guide R&D activities, benchmark systems progress, and explore alternate systems configurations on a cost-effective basis.</p> <p>Distributed Energy Fuel Cell Systems - Develop high-efficiency Polymer Electrolyte Membrane (PEM) fuel cell power systems as an alternative power source to grid-based electricity for buildings and other stationary applications. Activities focus on overcoming the barriers to stationary fuel cell systems, including cost, durability, heat utilization, startup time, and managing power transients and load-following requirements.</p> <p>Fuel Processor R&D - Develop onboard fuel processors as an alternative to the direct hydrogen approach for transportation and stationary applications.</p> <p>Fuel Cell Stack Components R&D In collaboration with partners, research and develop technologies to overcome the most critical technical hurdles for Polymer Electrolyte Membrane (PEM) fuel cell stack components for both stationary and transportation applications. Critical technical hurdles include cost, durability, efficiency and overall performance of components such as the polymer electrolyte membranes, oxygen reduction electrodes, advanced catalysts, bipolar plates, etc.</p> <p>Technology Validation - Validate component R&D in a systems-context under real-world operating conditions to quantify the performance and reliability, document any problem areas, and provide valuable information to researchers to help refine and direct future R&D activities related to fuel cell vehicles.</p> <p>Manufacturing R&D - Research and develop manufacturing processes to reduce the cost and enhance the reliability of critical components and systems, with a</p>

⁹ Department of Energy (2007) “About the Program” available at: http://www1.eere.energy.gov/hydrogenandfuelcells/presidents_initiative.html

	focus on distributed production and delivery, on-board vehicle storage, and polymer electrolyte membrane fuel cells. ⁹
Financial Details	<p>Thousands of Dollars (\$000)</p> <p>Hydrogen Production and Delivery R&D FY2005: \$13,303; FY2006: \$8,512; FY2007 Request: \$36,844; FY2008 Request: \$40,000</p> <p>Hydrogen Storage R&D FY2005: \$22,418; FY2006: \$26,600; FY2007 Request: \$34,620; FY2008 Request: \$43,900</p> <p>Safety, Codes & Standards FY2005: \$5,801; FY2006: \$4,727; FY2007 Request: \$13,848; FY2008 Request: \$16,000</p> <p>Systems Analysis FY2005: \$3,157; FY2006: \$4,925; FY2007 Request: \$9,892; FY2008 Request: \$11,500</p> <p>Transportation Fuel Cell Systems FY2005: \$7,300; FY2006: \$1,080; FY2007 Request: \$7,518; FY2008 Request: \$8,000</p> <p>Distributed Energy Fuel Cell Systems FY2005: \$6,753; FY2006: \$962; FY2007 Request: \$7,419; FY2008 Request: \$7,700</p> <p>Fuel Processor R&D FY2005: \$9,469; FY2006: \$617; FY2007 Request: \$4,056; FY2008 Request: \$3,000</p> <p>Fuel Cell Stack Components R&D FY2005: \$31,702; FY2006: \$31,595; FY2007 Request: \$38,082; FY2008 Request: \$44,000</p> <p>Technology Validation FY2005: \$26,098*; FY2006: \$33,594*; FY2007 Request: \$39,566*; FY2008 Request: \$30,000</p> <p>Manufacturing R&D FY2005: \$0; FY2006: \$0; FY2007 Request: \$1,978; FY2008 Request: \$5,000</p> <p>Hydrogen Technology Total: FY2005: \$166,772; FY2006: \$155,627; FY2007 Request: \$195,801; FY2008 Request: \$213,000</p>
Timing	2003 - ongoing
Governance and Management	Run by the Department of Energy – Energy Efficiency and Renewable Energy, and the Department of Hydrogen
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Casting Emissions Reduction Program (CERP)
Country	USA

Category	General R&D Programmes, Other Innovative Arrangements
Description	<p>Formed under a CRADA between the US government (US Air Force) and USCAR, CERP took its funding through the Department of Defence. The CERP facility is an independent applied research program that allows highly trained scientists and engineers to conduct air emissions testing in a real-world foundry environment. Technikon LLC operates the CERP under contract to the RDE (Research Development Engineering Command), ARDEC (Aviation & Missile Research, Development & Engineering Centre), and Environmental Technology Group. CERP's purpose is to help the American metal casting industry meet federal clean air standards by testing foundry products and process improvements in a real-world foundry environment, to advance emission measurement capabilities for stationary sources, and to perform research into leading edge energy technologies that could be used to support casting operations.¹⁰</p> <p>The primary areas of the CERP are:</p> <ul style="list-style-type: none"> Research and development of materials designed to reduce harmful emissions from metal casting operations and comparing them to established baseline values. Development of new technologies to reduce costs of lightweight castings. Develop and validate advanced environmental technologies for emissions measurement and analysis for testing of stationary and mobile emissions sources. Develop standards and protocols for emissions measurement instrumentation and methodology. Evaluate or develop improved processes and equipment for pollution prevention and worker safety. Transfer the technology and improvements developed to both the Department of Defence (DOD) and industry as appropriate.¹¹
Financial Details	CERP receives its funding from Department of Defence through contracts from RDE (Research Development Engineering Command), ARDEC (Aviation & Missile Research, Development & Engineering Centre), and Environmental Technology Group. It is not clear how much USCAR puts into the partnership.
Timing	1994 – Ongoing
Governance and Management	The steering committee and team chairs are made up of industry representatives from the members of USCAR and the Foundry Society. Technikon (who runs the facility) is managed by the US Army ARDEC however there is only one representative from the US Army in the committee.
Participants	Industry, Government Institutes, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	United States Alliance for Technology and Engineering for Automotive Manufacturing (USATEAM)
Country	USA
Category	Vehicle R&D Programmes, Other Innovative Arrangements

¹⁰ Taken from CERP (2007) “Overview” available at: <http://www.cerp-us.org/index.cfm?pageID=107>

¹¹ Technikon (2007) “Overview” available at: <http://www.technikonllc.com/index.cfm?pageID=122>

Description	The U.S. Alliance for Technology and Engineering for Automotive Manufacturing (U.S. A-TEAM) is a government-industry partnership formed to further strengthen the technology base of the domestic auto industry through cooperative, pre-competitive research directed at improving the manufacturing competitiveness of the U.S. automotive industry. The partnership is memorialized in a Memorandum of Agreement (MOA) between the United States Council for Automotive Research (USCAR)—representing DaimlerChrysler, Ford, and General Motors—and the U.S. Department of Commerce’s Technology Administration. Two of the Technology Administration’s agencies—the Office of Technology Policy (TA/OTP) and the National Institute of Standards and Technology (TA/NIST)—will participate in the partnership ¹² . The U.S. A-TEAM focuses its technical research efforts in three areas ¹³ : <i>Digital/virtual tools;</i> <i>Plant floor controllers, and</i> <i>Ergonomics.</i>
Financial Details	No indication
Timing	2004 – 2009
Governance and Management	The activities of the U.S. A-TEAM are be guided by a high-level government-industry steering group comprised of: Under Secretary of Commerce for Technology Assistant Secretary of Commerce for Technology Policy Assistant Secretary of Commerce for Manufacturing and Services Director of the National Institute of Standards and Technology Advanced Manufacturing Vice Presidents of Ford, GM and Daimler Chrysler
Participants	Industry, Government.
Evaluation and Impact	
Downloaded Documents	US A-TEAM.pdf

Scheme Name	US Advanced Battery Consortium (USABC)
Country	USA

¹² US A-TEAM (2004) “*The U.S. Alliance for Technology and Engineering for Automotive Manufacturing: The U.S. A-TEAM - A Pre-Competitive Research Partnership Focused on Manufacturing Technology*” available at: www.technology.gov/Events/2004/Auto/1209-Facts.pdf

¹³ National Institute of Standards and Technology (2007) “*Commerce, Big 3 U.S. Auto Makers Form New Partnership to Improve Manufacturing Competitiveness of U.S. Automotive Industry*” available at: http://www.nist.gov/public_affairs/releases/auto_mou.htm

Category	Vehicle R&D Programmes, Other Innovative Arrangements
Description	<p>It is the aim of USABC to develop electrochemical energy storage technologies that support commercialization of fuel cell, hybrid, and electric vehicles.</p> <p>Strategic Vision: The USABC seeks to promote long-term R&D within the domestic electrochemical energy storage (EES) industry and to maintain a consortium that engages automobile manufacturers, EES manufacturers, the National Laboratories, universities, and other key stakeholders.</p> <p>Objectives: For high-energy and high power energy storage technologies and models, the USABC shall continue its focus on understanding and addressing the following factors:</p> <p>Continue development of high-power battery technologies to reduce cost to \$20/kW and extend life to 15 years.</p> <p>Develop battery technology to support electric, hybrid and fuel cell vehicles.</p> <p>Develop ultracapacitor technology for hybrid electric vehicle applications.</p> <p>Conduct benchmarking activities for both high power and high-energy batteries and ultracapacitors to validate technologies.</p> <p>Publish technical goals and associated test procedures to guide the development of electrochemical energy storage systems.¹⁴</p>
Financial Details	<p>USCAR awards contracts to 3rd party system developers to which the Department of Energy will contribute up to 50% of the budget.¹⁵ USABC awarded a €15 million contract to A123 Systems to develop a Li-ion battery over three years.</p> <p>Compact Power Inc. was given €6.3 million over one and a half years to develop Li-ion technology for hybrid vehicle applications.</p>
Timing	1991 – ongoing
Governance and Management	Overall control of USABC appears to lay with USCAR with joint funding from the DoE under the FreedomCAR & Fuel Partnership.
Participants	Industry, Government
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Other USCAR CRADA's
Country	USA
Category	Vehicle R&D Programmes, Other Innovative Arrangements
Description	<p>Low Emissions Partnership (LEP)</p> <p>The purpose of this CRADA is to coordinate research and development efforts on emissions control technologies through exchange of technical information and licensing of promising technical breakthroughs.</p> <p>Its goals include:</p> <p>Identify and develop enabling emission technologies from existing research and development background knowledge of the U.S. automakers.</p> <p>Coordinate and focus the joint engineering capabilities to accelerate the development of these enabling technologies.</p> <p>Engage the resources of the National Laboratories where appropriate.</p> <p>Strengthen the domestic auto industry and intensify our dedication towards to a cleaner environment¹⁶</p> <p>Automotive Composites Consortium (ACC)</p>

¹⁴ USCAR (2007) “US Advanced Battery Consortium” available at: http://www.uscar.org/guest/view_team.php?teams_id=12

¹⁵ USCAR (2006) “USABC Awards \$15 Million Battery Technology Development Contract to A123Systems” available at: http://www.uscar.org/guest/article_view.php?articles_id=39

¹⁶ USCAR (2007) “Low Emissions Technologies R&D Partnership” available at: http://www.uscar.org/guest/view_team.php?teams_id=3

	<p>ACC conducts joint research programs on structural and semi-structural polymer composites in pre-competitive areas that leverage existing resources and enhance competitiveness. In 1996 it helped form (with The University of Dayton Research Institute, the Dayton Development Coalition, EMTEC, the Air Force Research Laboratory and the State of Ohio Department of Development) and continues to work with the National Composite Centre (NCC)¹⁷</p> <p>Environmental Research Consortium (ERC) The ERC aim is to facilitate technological developments to enable USCAR manufacturers to meet their global environmental goals, societal objectives & regulatory obligations and at the same time enhance their ability to compete effectively in the market place.</p> <p>Electrical Wiring Component Application Partnership (EWCAP) To permit and encourage cooperative research and development which includes the joint sharing of technologies and resources to develop common electrical connection systems. To develop common designs for electrical connectors to reduce costs and product complexity, while improving reliability, quality and serviceability. To establish common families of best-in-class connection systems. To establish a standard "footprint" for electrical components common to all partners. To develop industry-wide, test specifications and design guidelines for electrical components.¹⁸</p> <p>US Automotive Materials Partnership (USAMP) The primary aim of USAMP is to identify and conduct or direct non-competitive research and development in automotive related materials and material processes; Define new projects which comprehend non-competitive needs of the member companies Provide leadership and guidance to automotive material suppliers regarding research and development priorities Provide a single voice to government agencies that represents the technical needs for collaborative R&D in automotive materials Align its portfolio with the FreedomCAR needs of the OEMs¹⁹</p>
Financial Details	No indication of overall budgets, but there is a mix in funding between the USCAR members and the Department of Energy.
Timing	LEP – 1992 – ongoing ACC – 1988 – ongoing ERC – 1991 – ongoing EWCAP – 1994 – ongoing USAMP – 1993 – ongoing
Governance and Management	These partnerships appears to be an agreement wholly within USCAR, which then forms individual partnerships with industry/suppliers or government for specific projects.
Participants	Industry, Government Departments and Institutes, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	California Fuel Cell Partnership (CaFCP)
Country	USA

¹⁷ NIST (2007) "Automotive Composites Consortium" available at:
<http://statusreports.atp.nist.gov/reports/94-02-0027.htm>

¹⁸ USCAR (2007) "Electrical Wiring Component Applications Partnership" available at:
<http://ewcap.uscarteams.org/>

¹⁹ USCAR (2007) "US Automotive Materials Partnership" available at:
http://www.uscar.org/guest/view_team.php?teams_id=28

Category	Demonstrations, Pilots, Procurement of Prototypes
Description	<p>The California Fuel Cell Partnership is a collaboration of 31 member organizations, including auto manufacturers, energy providers, government agencies and fuel cell technology companies, that work together to promote the commercialization of hydrogen fuel cell vehicles.</p> <p>Automotive members provide fuel cell passenger vehicles that are placed in demonstration programs, where they are tested in real-world driving conditions. Energy members work to build hydrogen stations within an infrastructure that is safe, convenient and fits into the community. Fuel cell technology members provide fuel cells for passenger vehicles and transit buses. Government members lay the groundwork for demonstration programs by facilitating steps to creating a hydrogen-fuelling infrastructure. In addition, our members collaborate on activities that advance the technology, such as first responder training, community outreach and agreeing on protocols while standards are being developed.²⁰</p>
Financial Details	The participants in this network each contribute to the demonstration project through the operation of vehicle fleets and infrastructure. Each member holds a position on the steering committee. There is no indication of budget and proportions of finance from each partner.
Timing	1999 – 2012 (with a view to continue past this date)
Governance and Management	Made up of 20 full members; DaimlerChrysler, Ford, GM, Honda, Hyundai, Nissan, Toyota, Volkswagen, BP, Chevron, Shell Hydrogen, Ballard, UTC Power, National Automotive Centre, California Air Resources Board, South Coast Air Quality management District, California Energy Commission, US Department of Energy, US Environmental Protection Agency, US Department of Transportation.
Participants	Industry, Government
Evaluation and Impact	
Downloaded Documents	CaFCP - 2005AnnualReport.pdf

Scheme Name	National Automotive Centre
Country	USA
Category	Vehicle R&D Programmes, Other Innovative Arrangements
Description	<p>The National Automotive Centre (NAC), founded in 1992, is the DoD/Army focal point for collaborative ground vehicle research and development. The NAC, located at the Detroit Arsenal, is an integral part of the Army's Tank-Automotive Research, Development and Engineering Centre (TARDEC). The NAC serves as a catalyst linking industry, academia and government agencies in the development, exchange, and commercialization of automotive technologies. The NAC leverages government, commercial industry and academia benefit current and future military ground vehicle systems through: performance improvements, service life extensions, and reduction in ground vehicle design/manufacturing/production/operation/support costs.²¹</p> <p>Unique in the Army's research and development organizations, the NAC is able to leverage industry investments through a variety of programs including cooperative research and development agreements, Small Business Innovative Research, and cost share contracts while accelerating the full commercialization opportunities found in the private sector. The NAC's commitment to the Army is to promote the</p>

²⁰ CaFCP (2007) "About us" available at: <http://www.fuelcellpartnership.org/aboutus.html>

²¹ Fuel Cell Partnership (2007) "Government Members" available at: http://www.fuelcellpartnership.org/about_member_govt.html

²² CaFCP (2004) "California Fuel Cell Partnership Welcomes the U.S. Army's National Automotive Centre as New Member" available at: http://www.cafcp.org/news_releases-04/2004_10_19_NAC.htm

	demonstration of advanced technologies and obtain the lowest commercial price when the products are subsequently bought for military customers. With the initiation of its 21 st Century Base Energy Infrastructure program in 2004, the NAC is evaluating the technical, economic, environmental and military issues associated with a transition to hydrogen as a transportation fuel. ²²
Financial Details	No indication, but will <i>probably</i> be financed fully by the DoD/Army.
Timing	1992 – Ongoing
Governance and Management	Run by the Department of Defence
Participants	Government, Industry, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Tax Credits
Country	USA
Category	R&D/Operation Tax Credits
Description	<p>The Research and Experimentation Tax Credit (Internal Revenue Code, Section 41) was created in 1981, and it has been extended by Congress 11 times since enactment. As originally enacted, the credit was equal to 25 percent (in 1986 reduced to 20%) of a company’s incremental “qualified R&D expenditures” (QREs), in excess of a base equal to the average qualified expenditures for the previous three years. By limiting the credit to incremental increases in R&D expenditures, Congress sought to provide an incentive for increased R&D expenditures, rather than a subsidy for expenditures that might have taken place in the absence of the credit.²³ The Credit scheme is in a continual state of renewal requiring extension from Congress every few years. Recently (2006) there were doubts over its extension until the latter part of the year where an extension was granted and backdated to the beginning of the year. This had an effect on industry, as it can be difficult to plan ahead in terms of R&D if the Tax Credit system is not confirmed.²⁴</p> <p>Individual states offer tax credits to the automotive industry to ensure they locate, or remain within their state. There does not appear to be a central mechanism to implement this, instead it is handled by each state. Tax agreements include: Ford and the state of Michigan – tax credits worth up to \$151 million. Honda and the state of Indiana – EDGE tax credits, training assistance, property and tax abatements totalling \$41.5 million.</p>
Financial Details	National Government State government – ranging value
Timing	Ongoing
Governance and Management	Government and State
Participants	Government and Industry.
Evaluation and Impact	See description for recent problems with the tax credit extension.
Downloaded	

²³ IEEE-USA (2005) “*R&D Tax Credit Background*” available at: <http://www.ieeeusa.org/policy/positions/researchcredit.html>

²⁴ Business Software Alliance (2006) “*Immediate Congressional Action Needed on R&D Tax Credit*” available at: <http://www.bsa.org/usa/press/newsreleases/R-D-tax-credit.cfm>

Documents	
-----------	--

Scheme Name	Automobile Tax Credits
Country	USA
Category	Tax Credit – to the consumer
Description	<p>Although this is not a direct tax credit to the automotive industry it is relevant as it will help the sale and spread of new technology vehicles through the US.</p> <p>“Individuals and businesses who buy or lease a new hybrid gas-electric car or truck are eligible for, and can receive, an income tax credit of \$250-\$3,400 – depending on the fuel economy and the weight of the vehicle. Hybrid vehicles that use less gasoline than the average vehicle of similar weight and that meet an emissions standard qualify for the credit. “Lean-burn” diesel vehicles could also qualify, but currently available diesel vehicles do not meet the emissions standard. There is a similar credit for alternative-fuel vehicles and for fuel-cell vehicles.”²⁵</p> <p>Individual states also run similar schemes, such as Colorado, who will offer a tax incentive equal to the extra cost of a hybrid vehicle over that of a traditional fuel powered vehicle in the same range. They will also double the credit if, as a result of the new car, an old car (over 10 years) is no longer used on the states roads.</p>
Financial Details	Income tax credit of \$250-\$3,400
Timing	2006 for the first 60,000 hybrid vehicles sold after which the credit will be reduced
Governance and Management	Department of Energy
Participants	Government, Consumers
Evaluation and Impact	<p>R&D Tax Credits – still looking for a full evaluation....</p> <p>State Tax Incentives – Some sceptics say industry would invest/locate anyway despite any additional incentives (tracking credible sources....)</p>
Downloaded Documents	

Scheme Name	National Renewable Energy Laboratory (NREL) – Advanced Vehicles and Fuels Research
Country	USA
Category	Institutions
Description	<p>At NREL, the Centre for Transportation Technologies and Systems (CTTS) works toward developing advanced vehicle and fuel technologies and moving them from research and development to the marketplace. Their mission is to reduce the nation's dependence on foreign oil supplies, while improving air quality, by developing and demonstrating innovative technologies that allow alternative fuels and advanced vehicle systems to supply a significant portion of the nation's transportation needs. Project groups cover;</p> <p>Advanced Vehicle Systems Group Technology Integration & Utilisation Group Fuels Performance Group²⁶</p> <p>The centre covers much of the work under the FreedomCAR & Vehicle Technologies initiative as well as the EERE's Hydrogen, Fuel Cells & Infrastructure Technologies.</p>
Financial	Funded by the Department of Energy on average \$215 million each year;

²⁵ US DoE (2005) “*The Energy Policy Act of 2005*” available at: <http://www.energy.gov/taxbreaks.htm>

²⁶ NREL (2007) “*Overview*” available at: <http://www.nrel.gov/overview/>

Details	FY02 \$216 m FY03 \$230 m FY04 \$212 m FY05 \$202 m FY 06 \$207 m
Timing	1991 - ongoing
Governance and Management	Managed by Department of Energy, Midwest Research Institute and Battelle.
Participants	Government, Industry, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	National Institute of Standards and Technology – Advanced Technology Program
Country	USA
Category	Vehicle R&D Programmes, General R&D Programmes
Description	<p>ATP helps industry invest in longer-term, high-risk research with payoffs far beyond private profit. By sharing the cost with companies, ATP accelerates the development of early-stage, innovative technologies, helping industry raise its competitive potential while providing Americans with a higher standard of living.</p> <ul style="list-style-type: none"> - ATP Fosters National Benefit: ATP spurs its partners to invest in research and development that have payoffs far beyond private profit, bringing to Americans higher paying jobs, better consumer products, improved health, greater energy efficiency, and a cleaner environment; - ATP Funds High-Risk Research: ATP accelerates the development of new-to-the-world technologies by sharing the cost and the risk with companies when research risks are too high for the private sector to bear alone. - ATP Conducts Rigorous Peer Review: ATP’s merit-based, rigorous selection process ensures high quality, objectiveness, and fairness. - ATP Builds Partnerships: ATP catalyzes companies, universities, research organizations, and state and local entities to partner creatively to develop innovative technologies; - ATP Encourages Diffusion of Knowledge: ATP encourages companies to publish and share their results and to pursue patents and licensing to give others a chance to benefit from new knowledge created in ATP projects.²⁷ <p>Projects related to the automotive sector include;</p> <ul style="list-style-type: none"> - Lighting technologies (Philips) - Ceramic Components (Alliedsignal, INC) - Quality Problems in Automotive Body Manufacture (Auto Body Consortium) - Boring with Optimal Accuracy Boring with Optimal Accuracy (UNOVA Industrial Automation Systems) - Casting Process Innovations to Lower Cost of Aluminium Automotive Parts (Bosch Corporation) - Developing Structural Composites for Large Automotive Parts (ACC) - Laser Ultrasonics to Improve Automotive Painting Process (Perceptron) - Magnetic Pulse Welding Process To Decrease Vehicle Weight and Increase Fuel Efficiency (Dana Corporation)
Financial Details	NIST, through ATP, offers funding for high risk R&D through cost sharing.
Timing	Inception 1990 – 1993, Operation 1994 - Ongoing

²⁷ NIST (2005) “Overview of ATP” available at: <http://www.atp.nist.gov/repcong/repcong.htm>

Governance and Management	<p>The ATP is run by the National Institute of Standards and Technology.</p> <p>Project selection process; At the beginning of each ATP competition, a Source Evaluation Board (SEB) is formed to rank the proposals. A typical general competition SEB consists of senior-level federal scientists, engineers, and managers with broad experience and a variety of different technical backgrounds, e.g., electrical engineers, chemists, chemical engineers, biotechnologists, materials scientists, manufacturing engineers, and computer scientists, as well as specialists with backgrounds in business and economics. A typical focused program competition SEB is smaller, with more specialized experts in the subject area of the competition.</p> <p>The ATP supplements the SEB with outside technical reviews, generally federal government experts in the specific technology of the proposal. Independent business experts also are hired on a consulting basis. These business experts include high-tech venture capitalists, people who teach strategic business planning, retired corporate executives from large and small high-tech businesses, economists, and business-development specialists.</p>
Participants	Industry, Government, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	University of Michigan Transportation Research Institute (UMTRI)
Country	USA
Category	Institutions
Description	<p>The Transportation Research Institute at The University of Michigan is committed to interdisciplinary research that will ultimately increase driving safety and further transportation systems knowledge. UMTRI is currently operating a \$14.5 million per year research program, with funds received from federal and state government agencies, motor vehicle manufacturers and suppliers, and other organizations.</p> <p>985 short- and long-term research projects have been carried out in broad areas involving accident data collection and traffic safety analysis, bioengineering, human factors, mechanical engineering, psychology, economics, and public policy. In addition, numerous multidisciplinary research programs are currently being conducted with other units of the University involving specialized areas of engineering, business, medicine, and public health.</p> <p>Research Divisions; Automotive Analysis, Biosciences, Engineering, Human Factors, Social & Behavioural Analysis, Transportation Safety Analysis.²⁸</p>
Financial Details	Funds (\$14.5million pa) from federal and state government, Vehicle Manufacturers, Suppliers.
Timing	1965 - ongoing
Governance and Management	
Participants	University, Government, Industry
Evaluation and Impact	
Downloaded Documents	

²⁸ UMTRI (2007) "About UMTRI" available at: <http://www.umtri.umich.edu/about.php>

Scheme Name	Department of Transport – University Transport Centres (UTC)
Country	USA
Category	Institutions
Description	<p>The University Transportation Centres (UTC) program, initiated in 1987 under the Surface Transportation and Uniform Relocation Assistance Act, authorized the establishment and operation of transportation centres in each of the 10 standard federal regions. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) reauthorized the UTCs for an additional six years and added four national centres and six University Research institutes (URI). The mission of the 14 UTCs was to advance U.S. expertise and technology transfer. The six URIs each had a specific transportation research and development mandate.</p> <p>In 1998 the Transportation Equity Act for the 21st Century (TEA-21) reauthorized the UTC Program for an additional six years and increased the total number of Centres to 33. In addition to the ten regional Centres, which were to be selected competitively, TEA-21 created 23 other Centres at institutions named in the Act. TEA-21 established education as one of the primary objectives of a University Transportation Centre and institutionalized the use of strategic planning in university grant management.</p> <p>Mission; To advance U.S. technology and expertise in the many disciplines comprising transportation through the mechanisms of education, research and technology transfer at university-based centres of excellence.</p> <p>Although many of the centres deal with projects looking at overall transportation issues and technologies there are a number of areas that can be related specifically to the automotive sector such as safety, materials, non-destructive testing, technology transfer, sustainability, Heavy Vehicle Safety, Efficiency, and Security.²⁹</p>
Financial Details	<p>The Department of Transport (DoT) funds a large number of centres (currently 60) on a tier system;</p> <ul style="list-style-type: none"> - National University Transport Centres – Ten (\$2 - \$3.5 million per year) - Regional University Transport Centres – Twelve (\$1 - \$2.25 million per year) - Tier I University Transport Centres – Fifteen (\$1 million per year) - Tier II University Transport Centres – Twenty Two (\$500,000 per year) - Tier III University Transport Centres – Eight (Funding amounts Vary)
Timing	1987 – ongoing (Current authorisation from FY2005-FY2009)
Governance and Management	
Participants	Universities, Government, (Industry through the university projects)
Evaluation and Impact	
Downloaded Documents	

Scheme Name	University of California – National Fuel Cell Research Centre (NFCRC)
Country	USA
Category	Institutions
Description	The National Fuel Cell Research Centre was originally established in 1992 at Southern California Edison's Highgrove Generating Station in Riverside County, Calif. Its purpose was to demonstrate and evaluate fuel cell technologies. Edison and UCI officials recognized that this could best be done in a research university

²⁹ DoT University Transport Centres (2007) “About UTC” available at: <http://utc.dot.gov/current.html>

	environment, and, in March 1997, Edison transferred to UCI, all rights and obligations to the NFCRC. The agreement included the relocation of the Siemens Westinghouse 25-kilowatt solid oxide fuel cell operating at Edison's Highgrove station to UCI. ³⁰
Financial Details	Funded by the university but given an initial grant by the California Energy Commission for \$305,733. Receives funding from the Department of Energy through the freedom car project.
Timing	1992 – ongoing.
Governance and Management	Run and managed by the university of California and partners in Industry.
Participants	University, Industry, Government
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Department of Transport – Intelligent Transport Systems (ITS)
Country	USA
Category	Vehicle R&D Programmes, General R&D Programmes
Description	<p>The U.S. Department of Transportation's (USDOT) ITS program focuses on intelligent vehicles, intelligent infrastructure and the creation of an intelligent transportation system through integration with and between these two components. The Federal program supports the overall advancement of ITS through investments in major initiatives, exploratory studies and a deployment support program. Federal investments are directed at targets of opportunity – major initiatives – that have the potential for significant payoff in improving safety and mobility and enhancing global connectivity by means of ITS-enabled productivity improvements. These targets of opportunity will both infrastructure and vehicles and focus on the integration between vehicles and infrastructure, between modes of transportation and between jurisdictions. USDOT uses exploratory studies to examine other as yet unexamined or unsolved opportunities for applying ITS technologies to significant transportation problems. USDOT support a deployment support program – architecture, standards, professional capacity building, evaluation, technical assistance, etc. – that fosters the widespread deployment of ITS. There are nine major initiatives or varying relevance to the automotive industry including:</p> <ul style="list-style-type: none"> - Vehicle Infrastructure Integration (VII) - This initiative will build on the availability of advanced vehicle safety systems developed under the Intelligent Vehicle Initiative (IVI) and on the results of related research and operational tests. It is also supported by radio spectrum at 5.9 GHz specifically allocated for DSRC. The fundamental building blocks of the VII concept are coordinated deployments of communication technologies: In all vehicles by the automotive industry, and; On all major U.S. roadways by the transportation public sector. - Cooperative Intersection Collision Avoidance System (CICAS) - Intersection collision avoidance systems use both vehicle-based and infrastructure-based technologies to help drivers approaching an intersection understand the state of activities within that intersection. CICAS have the potential to warn drivers about likely violations of traffic control devices and to help them manoeuvre through cross traffic. Eventually, CICAS may also inform other drivers (i.e., potential victims) about impending violations as well as identify pedestrians and cyclists within an intersection. - Integrated Vehicle Based Safety Systems (IVBSS) - This initiative, in partnership with the automotive industry, builds on completed and ongoing Intelligent Vehicle Initiative (IVI) field operational tests as well as results from

³⁰ National Fuel Cell Research Centre (2007) “About Us” available at: <http://www.nfrcr.uci.edu/>

	naturalistic driving studies. It will involve projects and studies that include private passenger vehicles and freight-carrying trucks. The IVBSS initiative will: Develop information on how best to communicate warnings from an integrated system covering multiple hazards to the driver; Develop objective tests and criteria for performances of systems that simultaneously address rear-end, road departure, and lane change crashes; Develop and field-test integrated vehicle-based safety systems on the road with real drivers to understand the safety benefits of integrated systems and driver behaviour and acceptance ³¹ .
Financial Details	ISTEA originally authorized \$659 million for fiscal years 1992-1997 with additional funds appropriated for a total of approximately \$1.2 billion. The Transportation Efficiency Act for the 21st Century (TEA-21) authorized a similar amount (\$1.3 billion) through fiscal year 2003. In 2005, the Congress enacted the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which ended the ITS Deployment Program at the close of fiscal year 2005, but continued ITS research at \$110 million annually through fiscal year 2009. In addition to authorized ITS funding, ITS projects are eligible for regular Federal-aid highway funding.
Timing	1991 – ongoing.
Governance and Management	Programmes run by the Department of Transport and actively seek to involve industry in its projects. Work is also performed by the DoT university transport research centres.
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	

³¹ DoT (2007) “Intelligent Transport Systems” available at: <http://www.its.dot.gov/faqs.htm>

A.2 United Kingdom

Scheme Name	Research and development tax credits
Country	UK
Category	R&D Tax Incentive
Description	<p>The aim of the tax credits is to encourage greater R&D spending in order to promote investment in innovation. By early 2006 about 22,000 claims had been made, just over 19,000 of which were made under the SME scheme and just under 3,000 of which were made under the large scheme, amounting to almost £1.8 billion of support claimed through both schemes.</p> <p>The R&D tax credit works by allowing companies to deduct up to 150% (125% for large companies) of qualifying expenditure on R&D activities when calculating their profit for tax purposes. SMEs can, in certain circumstances, surrender this tax relief to claim payable tax credits in cash from the HM Revenue & Customs. There does not appear to be a cap on the maximum that can be claimed under the scheme.³²</p>
Financial Details	£1.8 Billion by 2006 through 22,000 claims.
Timing	Ongoing.
Governance and Management	Government – HM Revenue & Customs
Participants	Industry
Evaluation and Impact	
Downloaded Documents	UKR&DTaxcredit.pdf

Scheme Name	DTI – Automotive Unit
Country	UK
Category	Road Map/Foresight
Description	<p>The DTI aims to work in partnership with industry to improve competitiveness and exploit the opportunities for the UK industry in Europe and globally. Within the DTI, the Automotive Unit has responsibility for all aspects of the automotive sector from vehicle and component manufacturing to car distribution, retailing and the aftermarket. The Automotive Unit was created following a review of DTI, with advice from the Automotive Innovation and Growth Team. Similar units within the DTI's Business Group serve the aerospace, construction, chemicals, materials and engineering sector. The Unit is working to build close relationships with key companies to ensure that it has as full a picture as possible of the key issues affecting their competitiveness. The Unit also works in partnership with the lead trade associations - the SMMT and the RMIF - to deliver a wide range of initiatives and programmes to promote the industry and enable it to become even more successful.</p> <p>Its key aim is to help the automotive industry in the UK succeed by:</p> <ul style="list-style-type: none"> - Supporting the adoption of world class manufacturing performance and undertaking initiatives to raise competitiveness - Promoting the development, demonstration and adoption of new technology and the spread of best practice in design and development

³² HM Revenue & Customs (2006) "Research and development tax credits" available at: <http://www.hmrc.gov.uk/randd/>

	<ul style="list-style-type: none"> - Assisting firms to develop the knowledge and skills of their workforce - Promoting inward investment (including further investment by existing investors) and collaboration with partners overseas - Influencing the development of regulatory and tax policies so that they reflect the interests of automotive companies in the UK - Providing Ministers with prompt and comprehensive advice based on close working relationships with companies and analysts in the sector. <p>To achieve these aims they work with other Government Departments, Regional Development Agencies, Government Offices in the Regions and other interested parties to ensure a comprehensive service to business.³³</p>
Financial Details	Paid for by the DTI
Timing	Pre 1998 - ongoing
Governance and Management	Part of the DTI
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	DTI – Automotive Innovation and Growth Team (AIGT)
Country	UK

³³ DTI Auto Industry (2007) “*Automotive Unit*” available at:
http://www.autoindustry.co.uk/automotive_unit/automotiveUnit

Category	Road Map/Foresight
Description	<p>The Automotive Innovation and Growth Team brought together major stakeholders from the automotive sector to identify the issues most likely to have the greatest impact on the long-term profitability and productivity of the sector. The Team was headed by Sir Ian Gibson, former Chief Executive of Nissan Motor Manufacturing (UK) and its findings were published on 16 May 2002. The Team made seven recommendations, which were welcomed by the Prime Minister. The Department of Trade and Industry has committed £45 million towards implementation of the recommendations.</p> <p>The Automotive Innovation and Growth Team made seven recommendations; <u>Automotive Academy</u> - a national centre to help raise skills and productivity in the industry; <u>Supply Chain Groups</u> - to address process improvement issues in the sector; Refocusing of <u>Foresight Vehicle</u> - towards greater commercial exploitation; <u>Centres of Automotive Excellence</u> - two centres will take forward work on Low Carbon and Fuel Cell Technologies and Transport Telematics and Technologies for Sustainable Mobility; <u>Low Carbon Transport Partnership</u> – a non-Governmental Group to lead the transition to a low-carbon future for the automotive sector; <u>Pilot Mobility Projects</u> – to explore alternatives to vehicle ownership and accelerate the adoption of low-emission vehicles; <u>Consumer Working Group</u> – to provide a forum in which stakeholders in the retail sector can discuss regulatory and other issues affecting the sector³⁴</p> <p>All seven of the recommendations have now been implemented, however the Pilot Mobility Projects recommendation was not considered to be viable and similar functions are now carried out by CENEX.</p>
Financial Details	£45 million from the DTI to help meet the recommendations, carried out but the DTI automotive unit.
Timing	2002 Report
Governance and Management	Unit run by the DTI with members from industry.
Participants	Government, Industry
Evaluation and Impact	
Downloaded Documents	AIGT ExecSummary.pdf

Scheme Name	DTI – Technology Strategy Board – Innovation Platforms - ITS
Country	UK
Category	Other Innovative Arrangements
Description	<p>An Integral part of The Government's Technology Strategy, the Technology Strategy Board (TSB) was established at the end of 2004 to ensure the technology and innovation priorities for the UK reflected business needs and had a clear market focus leading to wealth creation.</p> <p>To support this approach, the TSB introduced the concept of Innovation Platforms. Innovation Platforms (IP's) are a new way of working for Government and business and are seen as an opportunity to position business and government closer together to generate more innovative solutions to major policy challenges. They were introduced in the Technology Strategy Board's first Annual Report in</p>

³⁴ DTI Auto Industry (2002) "Summary" available at:
http://www.autoindustry.co.uk/automotive_unit/aigt/initialReport/summary/index.xml

	<p>November 2005 and are designed to:</p> <ul style="list-style-type: none"> - Address a major policy and societal challenge, - Bring together Government stakeholders and funders, and - Engage with business and the research community to identify appropriate action. <p>The Technology Strategy Board has been sufficiently encouraged by the enthusiastic response of other partners, to proceed in the two pilot areas: Network Security and Intelligent Transport Systems and Services and has earmarked an initial £10 million to each Platform to kick-start activities.</p> <p>Several further platforms will be introduced including one specifically looking at the automotive sector.</p> <p><u>Intelligent Transport Systems and Services:</u> The Intelligent Transport Systems and Services Innovation Platform provides a framework to bring together Government policy makers, business representatives, academia and a range of other organisations to better understand the challenge, the future direction of Government and the solutions that business may be able to provide or should be working towards. By making future public procurement opportunities more visible to business, it provides a greater incentive to business to invest in R&D with the knowledge and confidence of future market opportunities. DTI and Department for Transport (DfT) Permanent Secretaries have formally agreed to support the initiative and the Platform steering Group has met three times since early June. DfT is an active member as the primary "owner of the policy challenge". Initial membership also includes EPSRC and SEEDA. All fundholding members of the steering group have committed to coordinate their funding streams via the Innovation Platform. The DTI is also committing funding to the business led network InnovITS to help identify the business challenges (see below).³⁵</p>
Financial Details	Initial £10m start-up fund for each platform. The Secretary of State for Transport launched the Transport Innovation fund in July 2005 to support the development of transport schemes that feature demand management. Funding of £290m will be available in 2008/9, increasing to £2.5bn by 2014/15.
Timing	2004 - Ongoing
Governance and Management	Run by the DTI
Participants	Government, Industry, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	InnovITS
Country	UK
Category	Institutions
Description	In response to recommendations from the Automotive Innovation & Growth Team (AIGT), a centre of excellence called innovITS was been established. The ITS Centre of Excellence will seek out inventive telematics technology to integrate on a realistic scale and validate that it delivers value to road users and transport operators. As a result, it will act as a catalyst for subsequent deployment and commercial exploitation. ³⁶

³⁵ DTI (2007) "Technology Platforms" available at: http://www.dti.gov.uk/innovation/technologystrategy/innovation_platforms/index.html

³⁶ InnovITS (2007) "About Us" available at: <http://www.innovits.com/index.asp>

	InnovITS runs the ITS Knowledge Transfer Network set up by the Government, Industry and Academia.
Financial Details	Given £6.5 million over the next five years by the DTI
Timing	2005 - Ongoing
Governance and Management	Acts as a central point for ITS in the UK and directs research through to the Technology programme and the Technology Platforms from the DTI.
Participants	Industry, Government
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Low Carbon Research and Development Grants – Department for Transport and Energy Saving Trust
Country	UK
Category	Technology Procurement/ Demonstrations, Pilots, Procurement of Prototypes
Description	<p>The aim of this scheme is to support - through grant funding - the development of new low carbon vehicle technologies that are typically:</p> <ul style="list-style-type: none"> - 3-4 years from launch (pre-competitive stage) - 5-7 years from market launch (industrial research stage) <p>The scheme will be used to fund approximately 10-20 diverse low carbon technology projects per year. It aims to encourage collaborations between central government, technology developers, research centres, operators and private investors. It is also hoped that the scheme will help to meet the need to produce more low carbon vehicles, thus making them more readily available to consumers and businesses in the UK.</p> <p>Grants from low carbon research and development are available to support projects at two different stages of Research and Development. These stages are:</p> <ul style="list-style-type: none"> - Industrial research stage - Pre-competitive development stage <p>There is no bias towards the development of any particular type of technology. Rather, new projects will be supported according to the vehicle type and carbon reductions required. Grants are available to all sizes of businesses - from small and medium sized enterprises (SMEs) to large firms - operating in the motor vehicle sector.</p> <p>The grants cover:</p> <ul style="list-style-type: none"> - Personnel costs of staff employed solely for the project activity, excluding travel and expenses. - Costs of durable assets (i.e. equipment and instrumentation) used solely and on a continual basis for the research activity. - Costs of land and premises used solely for the industry and on a continual basis (except where transferred commercially). - Costs of external consulting and contractors solely employed for the project activity. - Additional overheads incurred directly as a result of the research activity.

	<ul style="list-style-type: none"> - Costs for components and hardware for the project. - Other operating expenses (costs of materials, supplies and similar products incurred directly as a result of the research activity).³⁷ <p>An example of this can be found in the “ultra low carbon car challenge” where the Department for Transport and Energy Saving Trust put forward £10 million to encourage the development and demonstration of low carbon passenger cars. The first of three projects was a collaborative project between Ricardo UK, PSA Peugeot Citroen and QinetiQ to produce and demonstrate a diesel hybrid car. Government contributed a grant for just under 50% of the project. The EST and DfT also funded the development and demonstration diesel hybrid taxis and a hybrid bus.</p>
Financial Details	Grants offered by the DfT and EST for research and development. Overall this will amount to £20 million.
Timing	2005 - 2008
Governance and Management	This scheme is run by the Department for Transport (DfT) and the Energy Saving Trust (EST)
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	<p>Ultra Low Carbon Car Challenge Case Study.pdf</p> <p>LTI Azure hybrid taxi case study.pdf</p> <p>Dennis Enviro200H hybrid bus case study.pdf</p>

Scheme Name	Low Carbon Vehicle Partnership (LowCVP)
Country	UK
Category	Road Map/Foresight
Description	<p>The Low Carbon Vehicle Partnership is an action and advisory group, established in 2003 to take a lead in accelerating the shift to low carbon vehicles and fuels in the UK and to help ensure that UK business can benefit from that shift.</p> <p>The LowCVP is a partnership of nearly 250 organisations from the automotive and fuel industries, the environmental sector, government, academia, road user groups and other organisations with a stake in the low carbon vehicles and fuels agenda.</p> <p>The LowCVP aims to:</p> <ul style="list-style-type: none"> - Develop initiatives to promote sales and supply of low carbon vehicles and fuels - Provide input and advice on Government policy - Provide a forum for stakeholders to share knowledge and information - Ensure that UK motor, fuel and related businesses are best placed to capitalise on the opportunities in the low carbon markets of the future - Contribute to the achievement of UK Government targets for road transport carbon reduction <p>The Low Carbon Vehicle Partnership plays a key role in helping Government to deliver on the UK's Powering Future Vehicles Strategy (2002). The objective of the Strategy is to ensure that the UK takes a leading role in the global shift towards low carbon transport.</p> <p>There are five working groups that focus on the following: Bus, Passenger Car, Commercial Vehicle, Fuels and Innovation.³⁸</p>
Financial Details	There appears to be equal funding through the partnership (DfT and the DTI) for the action and advisory group. The money, however, remains within the

³⁷ Energy Saving Trust (2007) “*Low Carbon Research and Development Grant*” available at: <http://www.est.org.uk/fleet/Informationcentre/FundingandGrants/LowCarbonresearchanddevelopmentgrant/>

³⁸ LowCVP (2007) “*About LowCVP*” available at: <http://www.lowcyp.org.uk/about-lowcyp/index.asp>

	partnership and there is not a disbursement of funds to industry. Finance goes towards a secretariat and the management of contracts.
Timing	2003 – ongoing
Governance and Management	<p>There is equal/proportional sectoral membership across the board/steering committee comprised from the following;</p> <p><u>Chairs of Working Groups:</u> Azure Dynamics (Commercial Vehicle WG), Sciotech (Bus WG), Society of Motor Manufacturers and Traders (Passenger Cars WG), TEC Ltd (Innovation WG), UKPIA (Fuels WG), Toyota Motor Europe (Board Chair's representative)</p> <p><u>Motor Industry stakeholders:</u> BMW, Daimler Chrysler UK, Ford Motor Company, PSA Peugeot Citroen</p> <p><u>Fuel suppliers:</u> BP, Environmental Industries Commission, Renewable Energy Association, Shell International</p> <p><u>Other stakeholders:</u> Carbon Trust, Energy Saving Trust, IEEP</p> <p><u>Non-governmental environment group:</u> Royal Society for the Protection of Birds</p> <p><u>Government stakeholders:</u> Department for Transport, Department of Trade & Industry</p> <p><u>Technology providers:</u> Millbrook, Ricardo</p> <p><u>Fleet sector:</u> Freight Transport Association, Lex Momentum</p>
Participants	Industry, Government, Universities
Evaluation and Impact	
Downloaded Documents	LowCVP Memo of Understanding.pdf

Scheme Name	Centre of Excellence for Low Carbon and Fuel Cell Technologies (CENEX)
Country	UK
Category	Institutions
Description	<p>Cenex is a UK government initiative supported by the Department of Trade and Industry (DTI).</p> <p>It is managed by a small team of full-time staff, supported by secondees for industry. The Cenex management team reports into a Board of Directors consisting of representatives from a core group of member organisations. These members cover the broad cross-section of UK industry interested in low carbon and fuel cell technologies and have played an active role in defining the structure, aims, objectives and priorities for the centre.</p> <p>The concept of a Centre of Excellence for low carbon and fuel cell technologies arose from the recommendations in the Automotive Innovation and Growth Team (AIGT) report of November 2002. The AIGT brought together leading figures from the UK automotive sector to identify the issues likely to have the greatest impact on the long-term profitability and productivity of the sector. Members identified the need for the UK automotive sector to respond competitively to the challenges posed by the transition to low carbon and fuel cell technologies that is already underway.</p> <p>The AIGT recognised that the UK is host to many organisations demonstrating excellence in specialist fields related to low carbon and fuel cell technologies. However, both knowledge and know-how are fragmented and in need of better integration if the UK's capabilities are to be fully realised. The AIGT foresaw the creation of a Centre of Excellence as the ideal means by which to catalyse innovation to enhance UK industries' overall capabilities using strategies focused on knowledge transfer and technology demonstration. Following the recommendation from the AIGT, the Low Carbon Vehicle Partnership (LowCVP) was tasked with establishing the business case for the centre. Cenex was formally established in April 2005.³⁹</p>

³⁹ CENEX (2007) "Overview" available at: <http://www.cenex.co.uk/aboutcenex.asp>

	The Centre has also established a Knowledge Transfer Network (KTN) to promote communication and knowledge transfer between the many organisations with an interest in low carbon and fuel cell technologies. It provides these organisations with access to accurate and up-to-date information on technological and market developments, disseminated through a single web-based portal. In order to maximise the effectiveness of the KTN, Cenex works with partners from the relevant communities active in the UK including SMMT Foresight Vehicle, for the communities developing low carbon automotive technologies; and Fuel Cells Today and Fuel Cells UK for the fuel cells sector.
Financial Details	CENEX is a public-private equal partnership. Given £6.5 million in 2005 by the DTI over the next five years as a start up fund ⁴⁰
Timing	2005 – ongoing (DTI has committed funding over five years (perhaps less now).
Governance and Management	Supported by the DTI and run by the member organisations (industry and government – central and RDAs)
Participants	Government, Industry, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Foresight Vehicle Program
Country	UK
Category	Road Map/Foresight
Description	<p>The Foresight Vehicle Initiative, now administered by The Society of Motor Manufacturers and Traders Limited (SMMT), is the UK's prime knowledge transfer network for the automotive industry, and is the UK's response to the worldwide crisis in transport. The Foresight Vehicle Steering Group was set up by the Transport Panel and the DTI to define the detailed objectives of a programme designed to develop, demonstrate and exploit technology "... to stimulate the UK automotive supplier base to develop products and systems which satisfy increasingly stringent environmental requirements while meeting mass expectations for safety, performance, cost and desirability".</p> <p>It consists of representatives of vehicle builders and their suppliers, independent research consultancies and university departments, government departments and user representatives such as motoring organisations.</p> <p>Research Projects are bought through five thematic groups;</p> <ul style="list-style-type: none"> - Engine Power-Train (EPT) - Hybrid, Electric, Alternatively Fuelled Vehicles (HAEFV) - Software, Sensors, Electronics and Telematics (ASSET) - Advanced Structures and Materials (FASMAT) - Design and Manufacturing Process (DMAP) <p>The programme includes Research Networks that are focused on a specific transport issue, technology or sector. They bring together a network of organisations with the right expertise and the right sectoral profile. This profile may cover geographical location, industry sector and company size as well as technology. The network members collectively identify the research opportunities, and present proposals to meet the objectives of the Foresight Vehicle Programme.⁴¹</p>
Financial Details	Over 100 collaborative projects worth over £100 million. There is an equal share between industry and government.

⁴⁰ UKInvest (2006) "Automotive Opportunities in the UK" available at: <http://ukinvest.gov.uk>

⁴¹ Foresight Vehicle (2007) "About the Vehicle Foresight Program" available at: http://www.foresightvehicle.org.uk/about_us.asp

Timing	1995 – ongoing (Government funding has morphed into the Technology Programme)
Governance and Management	Originally set up by the DTI, the SMMT took over management of the program. The government still controls the contracts as the programme acts as a “middle man” between industry and the Technology Programme
Participants	Industry, Government Agencies/Research Councils, Universities.
Evaluation and Impact	
Downloaded Documents	ForesightVehicleProgram.pdf

Scheme Name	International Automotive Research Centre – Premium Automotive Research & Development (IARC – PARD)
Country	UK
Category	Vehicle R&D Programmes, Institutions
Description	<p>The University of Warwick’s Warwick Manufacturing Group set up the £70 million "International Automotive Research Centre" which will focus on supporting the manufacture of premium/luxury products - the key sector for the future of UK engineering.</p> <p>The Premium Automotive Research and Development (PARD) programme was set up to support the luxury automotive vehicle sector (50,000 jobs in the West Midlands). It consists of a portfolio of research and development projects, aimed at enhancing the manufacturing and design capabilities of West Midlands supplier companies.</p> <p>The programme is supported by the Regional Development Agency, Advantage West Midlands, together with numerous partner companies targeted at being over 160 by the end of the programme. Among these companies are the vehicle manufacturers Land Rover and Jaguar, who form part of the Premier Automotive Group in the Ford motor company.⁴²</p>
Financial Details	£70 million between Ford PAG (Premier Automotive Group), RDA Advantage West Midlands (AWM), University of Warwick.
Timing	2003 – 2007 (AWM has put forward £33 million to continue the project – pending extension)
Governance and Management	Ownership between the three parties, with emphasis on University of Warwick and AWM.
Participants	Government, Industry, University
Evaluation and Impact	
Downloaded Documents	

Scheme Name	SMMT Industry Forum
Country	UK
Category	Other Innovative Arrangements
Description	<p>The SMMT Industry Forum was established in 1996 with the aim of achieving sustainable world leading competitiveness in the UK based vehicle and components industry. It is a unique collaboration between the UK Government and the automotive industry and was established “by the industry for the industry”.⁴³</p> <p>The Industry Forum has created a number of programmes based around a</p>

⁴² Warwick Manufacturing Group (2003) “New £70 Million Research Centre Secures 50,000 Jobs Linked to Luxury Car Market” available at: <http://www.wmg.warwick.ac.uk/iarc/>

⁴³ SMMT Industry Forum (2007) “About SMMT Industry Forum” available at: <http://www.industryforum.co.uk/industryforum/about.shtml>

	<p>Common Approach Toolkit to enable any company in any part of the supply chain to make real, measurable improvements in quality, cost and delivery, while at the same time improving partnerships with their customers. The Industry Forum programmes are practical, shop floor based process improvement activities implemented with a “hands-on” approach by a team of high calibre Industry Forum engineers. They work with a company’s employees to bring about tangible, sustainable bottom-line results. In effect, they are the industry’s own dedicated resource for process improvement.</p> <p>Since 1996 the SMMT Industry Forum has worked with over 450 car and components manufacturers to improve their performance and has also trained engineers from a number of other sectors in the tools and techniques of manufacturing process improvement.</p>
Financial Details	No indication of budget or financial mix. Does not appear to be much government involvement other than funding the formation of the forum.
Timing	1996 – onwards
Governance and Management	<p>Ford, Mobil, Denso, GKN Automotive, Corus, Honda, Jaguar, Perking, LDV, Vauxhall, Lotus, CAT, Unipart, Bentley, Nissan, DTI, Toyota, Leyland, Peugeot, One North East.</p> <p>The board appears to be comprised mainly of automotive industry members and SMMT organisational members.</p>
Participants	Government, Industry
Evaluation and Impact	
Downloaded Documents	

Scheme Name	DTI Technology Programme
Country	UK
Category	General R&D Programmes/Grants
Description	<p>The Technology Programme is the combination of business support products and information that the DTI are offering business in response to the Technology Strategy. The Technology Strategy Board, comprising mainly experienced business leaders, will identify the new and emerging technologies critical to the growth of the UK economy into which government funding and activities can be directed.</p> <p>The Government's ten-year Science and Innovation Investment Framework, published in July 2004, reaffirmed the commitment to support businesses investing in new and emerging technologies. Over the period 2005-2008, £320 million is available to businesses in the form of grants to support research and development in the technology areas identified by the Technology Strategy Board.</p> <p>In the Spring and Autumn each year, businesses will have the opportunity to compete for funding using two DTI business support products: Collaborative Research and Development and Knowledge Transfer Networks.</p> <p>The funding covers Knowledge Transfer Networks (KTN) and Collaborative R&D⁴⁴;</p> <p>Basic Research, Applied Research, and Experimental Development.</p>
Financial Details	DTI Funding under the Technology Strategy, decided upon by the Technology Strategy Board.
Timing	2005 - 2008
Governance and Management	The Technology Strategy Board, formed mainly of senior business representatives, has responsibility for overseeing the development of the Technology Strategy and identifying technology priorities critical to the growth of the UK economy. Now

⁴⁴ DTI (2005) “*Succeeding through innovation: Overview of the technology programme*” available at: <http://www.dti.gov.uk/innovation/technologystrategy/technologyprogramme/>

	the programme is moving out from the DTI as an “arms length” delivery unit, with the DTI now acting as a post box between the Treasury and the Technology Programme.
Participants	Government, Industry and Universities.
Evaluation and Impact	It has allocated £320m funding to over 450 projects in the competitions since its launch
Downloaded Documents	DTI Technology Programme.pdf

Scheme Name	London Hydrogen Partnership
Country	UK
Category	Road Map/Foresight, Demonstrations, Pilots, Procurement of Prototypes
Description	<p>The key aims of this partnership are to;</p> <ul style="list-style-type: none"> - Make London's infrastructure hydrogen-friendly, for example by providing refuelling points - Develop research and assembly skills in hydrogen applications, which could bring jobs to London and build our green economy - Encourage business and government to look seriously at the potential of hydrogen vehicles - Set targets for the number of hydrogen vehicles that should be on London streets, and units to power our homes and offices <p>Task Groups;</p> <p>The Steering Group co-ordinates a number of Task Groups which work to identify and enable projects under the Action Plan, and define how the Partnership can enable its members to deliver further work towards the goals of the Partnership.</p> <p><u>Transportation Applications</u> Identifying priority transport projects including hydrogen-natural gas vehicle conversions and fuel cells for water transport, linking to the London Fuel Cell Bus Project.</p> <p><u>Stationary Applications</u> Identifying priority projects in portable, and small to large-scale stationary applications such as combined heat and power (CHP).</p> <p><u>Infrastructure & Renewables</u> Integrated with Imperial College's London Hydrogen Infrastructure study. Advisory group for other Task Groups.</p> <p><u>Safety & Regulation</u> Advisory group for other Task Groups, managing the safety and regulatory issues of Partnership projects and advising on safety aspects of communications work.</p> <p><u>Skills, Training & Communications</u> Facilitating new skills and training to support the hydrogen economy. Producing and managing Partnership Communication Strategy.⁴⁵</p>
Financial Details	No indication
Timing	2002 – ongoing
Governance and Management	The Partnership is co-ordinated by a Steering Group chaired by a representative of the Mayor of London, and including Air Products, Association of London, Government, Baxi Technologies, BP, BMW, BOC, Carbon Trust, DTI, Energy Saving Trust, Fuel Cell Europe, Greater London Authority, Health and Safety Executive, Imperial College, Intelligent Energy, Johnson Matthey, London Development Agency, London First, Rolls-Royce, Thames Water and Transport for London.
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded	

⁴⁵ London Hydrogen Partnership (2007) “Partnership” available at: http://www.lhp.org.uk/article_flat.fcm?subsite=1676&articleid=170

Documents	
-----------	--

Scheme Name	Faraday Advance
Country	UK
Category	Institutions
Description	<p>The Faraday Advance is the transport node of the Materials Knowledge Transfer Network (MatKTN). Over the last 5 years, over £8.7M of third party funds have been secured by Faraday Advance for industrially-related RTD, of which £2.2M was provided by EPSRC through its Research Grants. These funds have employed approximately 35 research students, university researchers or industrial technologists, including 13 EPSRC Industrial CASE awards at companies including Airbus, Alcoa, Arborescent, Aztex, Bowman Power, ESI, Jaguar, Merck, Permabond, Renault F1, Rolls Royce, and Sandvik-Osprey.⁴⁶</p> <p>Projects look at future materials for low pollution, high efficiency, cost effective transport:</p> <p>Increasing the impact of science on business, Building teams to meet industry needs, Promoting young engineers and scientists, Technology road-mapping, A spectrum of services from idea to profit, Integration and support, Engaging industry in science and engineering</p>
Financial Details	<p>Over the last 5 years, over £8.7M of third party funds have been secured by Faraday Advance for industrially-related RTD, of which £2.2M was provided by EPSRC through its Research Grants.</p> <p>Sponsors include; DTI, EPSRC, SEEDA, UK MOD, Rolls-Royce, Goodrich, Smiths, Boeing, Bombardier, BAE Systems, Qinetiq, Airbus.</p>
Timing	Pre 2002 - Ongoing
Governance and Management	Core Partners; Oxford University (lead), Cranfield University, Oxford Brookes University, MIRA Ltd, Business Link Solutions, The Oxford Trust
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	FaradayAdvance – AnnualReport2006.pdf

Scheme Name	Sustainable Hydrogen Energy Consortium
Country	UK
Category	
Description	<p>The UK Sustainable Hydrogen Energy Consortium (SHEC) was established on 1 April 2003 by the EPSRC (in collaboration with the BBSRC, ESRC and NERC) as part of the SUPERGEN Initiative.</p> <p>SHEC will target many of the forefront fundamental, multidisciplinary research challenges in the production, storage, distribution and utilization of hydrogen. In addition, we will study the feasibility and acceptability of sustainable hydrogen as an energy carrier through a range of socio-economic projects, ranging from the public awareness and acceptability of hydrogen, impact analyses and regulatory issues.⁴⁷</p>
Financial Details	The Government has injected £15 million over four years for the <u>demonstration of hydrogen and fuel cell projects</u> , on top of a £4 million a year spend on hydrogen research across the public sector - £2.5 million from the EPSRC (Sustainable

⁴⁶ Faraday Advance (2006) "Annual Report" available at: <http://www.faraday-advance.net/home.php>

⁴⁷ Sustainable Hydrogen Energy Consortium (2007) "About Us" available at: <http://www.uk-shec.org/>

	Hydrogen Energy Consortium)
Timing	2003 - ongoing
Governance and Management	Universities and Government
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	VIPER
Country	UK
Category	
Description	<u>VIPER</u> - The Vehicle Industry Policy and European Regulation (VIPER) Group is a Whitehall and UK industry stakeholder network of experts, focused on the automotive sector, that provides a joined up approach to the Government's policy and regulation formulation in the UK and the EU; VIPER is a one stop policy shop that gives industry greater opportunities to inform and influence policy and regulatory outcomes.
Financial Details	
Timing	
Governance and Management	
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Low Carbon Grant Programme
Country	UK
Category	?
Description	Energy Saving Trust would like to offer grants to individuals/organisations that operate reduced emissions vehicles.
Financial Details	Up to £21 million over 3 years
Timing	2005 – 2008
Governance and Management	Energy Saving Trust
Participants	Government, Operators
Evaluation and Impact	
Downloaded Documents	Low Carbon Grant Programme.pdf

A.3 Japan

Scheme Name	NEDO - Global Warming Prevention Technologies – Materials (Environment Field)
Country	Japan
Category	Vehicle R&D Programmes
Description	<p><u>Aluminium Production & Fabrication Technology Development Useful for Automobile Light-Weighting</u> - An ultra light, high-strength aluminium material with excellent impact strength is being developed for possible use in automobiles in an attempt to reduce their weight. The realization of this technology will help not only establish medium- and long-term basic energy technology in the transportation sector, but also control greenhouse gas emissions that result from energy consumption.</p> <p><u>R&D of Carbon Fibre-Reinforced Composite Materials to Reduce Automobile Weight</u> - Using carbon fibre and other continuous fibre-reinforced composite materials that are stronger and much lighter than high tensile steel, the technology for designing, forming, and recycling composite materials can be developed and then used commercially. More specifically, structural materials for automobiles will be developed that could reduce the weight of conventional steel automobile chassis by 50% and yet still provide excellent safety (energy absorption 1.5 times that of steel). Another goal is to develop the manufacturing technology to reduce the moulding cycle to ten minutes or less.</p> <p><u>Carbon Nanofibre-Metal Composite Material Project</u> - As part of the New Global Warming Prevention Technology program, the “Carbon Nanofibre-Metal Composite Material Technology Project,” which aims to reduce the weight of automobiles, has been implemented under the banner of “innovative technology development” for the purpose of easing carbon dioxide emissions in the transportation sector. In particular, technology will be developed to combine an aluminium or magnesium alloy with carbon nanofibre, and then to form and mold the resulting material. The aim is to create lighter-weight automobile parts with excellent rigidity, thermal conductivity, and workability, leading to lighter automobiles and better fuel economy.⁴⁸</p>
Financial Details	<p>Aluminium – 2004 ¥720 million, 2005 ¥570 million, 2006 ¥290 million</p> <p>Carbon Fibre – 2004 ¥310 million, 2005 ¥360 million, 2006 ¥570 million</p> <p>Nanofibre – 2004 ¥350 million, 2005 ¥290 million</p>
Timing	<p>Aluminium – 2002 – 2006</p> <p>Carbon Fibre – 2003 – 2007</p> <p>Nanofibre – 2003 – 2005</p>
Governance and Management	Projects are run by NEDO (New Energy & Industrial Technology Development Organisation) – a satellite of METI (Ministry of Economy, Trade & Industry) that controls the allocation of funding for R&D deemed critical to Japan's energy policy. NEDO provides grants to Universities and subsidies to private organisations, as well as R&D management to Universities, Industry and Public Research Labs
Participants	Government, Universities, Industry
Evaluation and Impact	
Downloaded Documents	NEDO 2005 – 2006.pdf

⁴⁸ NEDO (2006) “Outline of NEDO 2005-2006” available at: <http://www.nedo.go.jp/english/activities/index.html>

Scheme Name	NEDO - Next-Generation Low-Pollution Vehicle (LPV) Technology Development Program
Country	Japan
Category	Vehicle R&D Programmes
Description	Under new, long-term regulations, a diesel engine's emissions will have to become as clean as that of a gasoline engine. In this development project, NEDO is undertaking: 1. R&D of a new combustion method (e.g. homogeneous charge compression ignition (HCCI)) and optimization of fuel, 2. Development of engine technology capable of using natural gas-based GTL (gas-to-liquid), 3. R&D of innovative diesel after-treatment systems, and 4. Comprehensive assessment technology development for next-generation automobiles. NEDO is also developing revolutionary technology to clean up exhaust gases while maintaining the high thermal efficiency of diesel engines. ⁴⁹
Financial Details	2004 ¥860 million, 2005 ¥850 million, 2006 ¥930million
Timing	2004 – 2008
Governance and Management	Run by NEDO. Mix of partnerships for each area; 1. Isuzu & National Institute of Advanced Industrial Science and Technology (NIAIST). Mazda & Hiroshima University. 2. Toyota, Hino, Shell. 3. Daihatsu, Research Institute of Innovative Technology for the Earth. Mazda, Asahi Kasei, Noguchi Institute, Toda Kogyo, Oita University. Ritsumeikan University, Horiba. Hino Motors, Nissan, Waseda university. 4. Japan Automobile Research Institute (JARI) & NIAIST
Participants	Government, University, Industry
Evaluation and Impact	
Downloaded Documents	NEDO 2005 – 2006.pdf

Scheme Name	NEDO - Polymer Electrolyte Fuel Cell (PEFC) Technology Utilizing Hydrogen Energy
Country	Japan
Category	Vehicle R&D Programmes/General R&D Programmes
Description	<u>Overall</u> – This section of the NEDO project portfolio is heavily involved with the automotive sector and includes a range of studies looking at: <ul style="list-style-type: none"> - Strategic Development of PEFC Technologies for Practical Application - Development of Solid Oxide Fuel Cell (SOFC) System Technology - Development for Safe Utilization and Infrastructure of Hydrogen - Development of Fuel Cell System with Liquefied Petroleum Gas (LPG) - Development of Lithium Battery Technology for Use by Fuel Cell Vehicles - Development of Fuel Cell Technology for Portable Information Devices - Establishment of Codes & Standards for Hydrogen Economy Society - Demonstration of Residential PEFC Systems for Market Creation It is part of a long range strategy to increase the use of fuel cell vehicles within Japan that is broken up into three stages: Pre 2005 – Infrastructure organisation and technology demonstration, 2005 to 2010 – Introduction with at least 50,000

⁴⁹ ibid

	<p>FCVs, 2010 onwards – dissemination stage with 5 million FCVs by 2020 along with 4000 hydrogen fuelling stations⁵⁰.</p> <p><u>Strategic Development of PEFC Technologies for Practical Application</u> – (previously Development of Elemental Technology for Polymer Electrolyte Fuel Cells)</p> <p>This program promotes the development of technology for the practical application at the initial introduction stage, development of elemental technology at the full introduction stage and development of next-generation technology at the full dissemination stage to comprehensively develop highly-efficient, highly-reliable and low-cost polymer electrolyte fuel cells (PEFC).</p> <ul style="list-style-type: none"> - Development of Technology on Basic and Common Issues - Development of Elemental Technology - Development of Basic Production Technology - Development of Technology for Next-generation Fuel Cells <p><u>Development of Lithium Battery Technology for Use by Fuel Cell Vehicles</u> –</p> <p>NEDO is engaged in developing technology for lithium batteries in order to bring about the commercial use of high-efficiency lithium batteries for use in automobiles, which will result in further energy efficiency and load response improvements for FCVs. Among these technologies for using lithium batteries in automobiles, NEDO is promoting the development of light, compact, low-cost, high-power, long-life lithium batteries. The development program for high-efficiency lithium battery element technology will include trial production and development for the further improvement of the performance of lithium batteries and the achievement of high-performance lithium batteries that can be used safely under a wide variety of conditions.⁵¹</p>
Financial Details	<p><u>Overall</u> – 2001 ¥11.9 billion, 2002 ¥22 billion, 2003 ¥30.7 billion, 2004 no data, 2005 ¥20.8 billion, 2006 ¥20.4 billion</p> <p><u>PEFC</u> – 2005 ¥5.17 billion, 2006 ¥5.6 billion</p> <p><u>Lithium Battery</u> – 2004 ¥860 million, 2005 ¥1.07 billion, 2006 ¥930 million</p>
Timing	<p><u>Overall</u> – 2002 – 2030</p> <p><u>PEFC</u> – 2005 – 2009 (previous project 2000 – 2004)</p> <p><u>Lithium Battery</u> – 2002 – 2006</p>
Governance and Management	NEDO
Participants	Government, University, Industry.
Evaluation and Impact	
Downloaded Documents	NEDO 2005 – 2006.pdf OECD Fuel Cell Japan.pdf

Scheme Name	Advanced Clean Energy Vehicle (ACE)
Country	Japan
Category	Demonstrations, Pilots, Procurement of Prototypes
Description	NEDO ran the ACE Project. The ACE Project’s objective was to develop vehicles utilizing alternative or “clean” fuels that achieve twice the energy efficiency of conventional models rated as ultra-low emission vehicles (ULEVs). The Japan Automotive Research Institute (JARI) managed the ACE Project for NEDO.

⁵⁰ Maeda, A. (2003) “*Innovation in Fuel Cell Technologies in Japan: Development and Commercialisation of Polymer Electrolyte Fuel Cells*”, OECD/CSTP/TIP Energy Focus Group Report.

⁵¹ NEDO (2006) “*Outline of NEDO 2005-2006*” available at: <http://www.nedo.go.jp/english/activities/index.html>

	NEDO provided 20 percent of the funding (approximately US\$5million per year), and the participating companies provided the other 80 percent. Over the life of the program, funding totalled about US\$175 million. The ACE Project supported the development of six hybrid vehicles; ⁵² <ul style="list-style-type: none"> - Two passenger cars - Two Cargo Trucks - Two City Busses
Financial Details	NEDO – 20% Participating Companies – 80% Total over the program – US\$175 million
Timing	1997 – 2003
Governance and Management	NEDO, JARI, Nissan, Toyota, Honda, Isuzu, Mitsubishi, Hino.
Participants	Industry, Government
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Japan Hydrogen & Fuel Cell Demonstration Project (JHFC)
Country	Japan
Category	Demonstrations, Pilots, Procurement of Prototypes
Description	<p>The Hydrogen & Fuel Cell Demonstration Project consists of the fuel cell demonstration program run by Japan Automobile Research Institute - JARI (included in the support project for "empirical and other research on solid high-polymer fuel cell systems" under the auspices of the Ministry of Economy, Trade and Industry) and the Demonstration Study of Hydrogen Fuelling Facilities for Fuel Cell Vehicles run by the Engineering Advancement Association of Japan - ENAA. Equivalent to the CaFCP and VFCVP.</p> <p>Aims;</p> <ol style="list-style-type: none"> 1. Determination of energy saving effects (CO2 emissions reduction and efficiency) achieved by FCVs and hydrogen stations 2. Determination of environmental (non-CO2) load reduction effects achieved by FCVs and hydrogen stations 3. Data acquisition for preparing specifications, regulations and standards concerning the safety of FCVs and hydrogen stations 4. Activities for familiarizing the general public with FCVs and hydrogen station 5. Solving of problems involved in the dissemination of FCVs and hydrogen stations 6. Efficient recovery of hydrogen from by-product gas (COG:Coke Oven Gas), and development and verification of an efficient liquefaction technique <p><i>Japan's first extensive research with actual running of fuel cell vehicles (FCVs) for demonstration purposes.</i></p> <p>In 2003 FCVs from eight car manufacturers and fuel cell buses for commercial routes participated in trial runs on highways. Highway run data and hydrogen station usage data such as driveability, reliability, environmental characteristics, fuel consumption, etc., were obtained for evaluation.</p> <p><i>World's first parallel operation of hydrogen stations based on different fueling and manufacturing systems.</i></p>

⁵² Office of Technology Policy (2003) "Fuel Cell Vehicles: Race to a new Automotive Future", U.S. Department of Commerce.

	Nine hydrogen stations were organized for desulfurized gasoline reforming, naphtha reforming, LPG reforming, liquid-hydrogen storage, methanol reforming, high-pressure hydrogen storage, lye electrolysis, petroleum reforming, and city gas reforming. These stations will be operated and evaluated by using them for the FCVs that participate in this project. Facilities for producing liquid hydrogen were designed in 2002. ⁵³
Financial Details	Subsidies; 2002 - ¥2 billion 2003 - ¥2.5 billion 2004 - ¥2 billion 2005 - ¥1.8 billion
Timing	2002 – 2005
Governance and Management	The program is administered by METI and run by JARI and the ENAA. Partners include: Toyota, Nissan, Honda, DaimlerChrysler, GM, Hino, Suzuki, Mazda, Shell, Japan Air Gasses, Tokyo Gas, Nippon Oil (and more)
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	JHFC Overview 2006.pdf JHFP.pdf

Scheme Name	Ministry of Finance – R&D Tax Credits
Country	Japan
Category	R&D Tax Incentives
Description	<p>Special Credit for conducting research and development</p> <p>1. Tax deduction system for total research expenses: This system allows a tax deduction equivalent to 8% to 10% of the total test and research expenses depending on their rates (the upper limit is the amount equivalent to 20% of the corporation tax for the relevant period). The rate of test and research expenses means the rate of test and research expenses against the total amount of sales. (The average sales of four years including the relevant period).</p> <p>2. Tax deduction for joint and entrusted researches etc. Based on industry-academic-government cooperation: This system together with (1) allows a tax deduction equivalent to 12% of the total test and research expenses for joint and entrusted testing and research with universities and public research institutes (The upper limit is the amount equivalent to 20% of the corporation tax for the relevant period.)</p> <p>3. Tax system to strengthen the technical base of small and medium-sized corporations: Tax credit of the amount equivalent to 12% is allowed for testing and research expenses instead of applying the above (1) to (2). (The upper limit is the amount equivalent to 20% of the corporation tax for the relevant period.)⁵⁴</p> <p>Another way Japanese automotive companies accrue tax advantages is through participation in a government-sponsored cooperative R&D program. Any investment made or paid for by Japanese companies as part of cooperative R&D programs sponsored by the government or an independent administrative agency can be depreciated by 100 percent in the year in which the investment is made. This provision also applies to investments made within the company to support the project (e.g., equipment purchases). It also governs investments made in connection with joint projects run by certain nonprofits formally affiliated with a</p>

⁵³ Japan Hydrogen & Fuel Cell Demonstration Project (2007) “What is JHFC” available at: <http://www.jhfc.jp/e/project/jhfc.html>

⁵⁴ Ministry of Finance Japan (2006) “Comprehensive Handbook of Japanese Taxes 2006” available at: <http://www.mof.go.jp/english/tax/taxes2006e.htm>

⁵⁵ Office of Technology Policy (2003) “Fuel Cell Vehicles: Race to a new Automotive Future”, U.S. Department of Commerce

	government agency. ⁵⁵
Financial Details	As above
Timing	Ongoing
Governance and Management	Ministry of Finance
Participants	Government, Industry
Evaluation and Impact	
Downloaded Documents	Japan Tax.pdf

Scheme Name	Japan Automobile Research Institute (JARI)
Country	Japan
Category	Institutions
Description	<p>The Japan Automobile Research Institute (JARI) was established through the reorganization of the former Automobile High-Speed Proving Ground Foundation in April 1969 to engage in general research on automobiles. It started as a public-service corporation of a test-research organization intended to contribute to healthy development of the automotive society. It has since progressed with the development of automobiles in Japan. In 2003 the institute incorporated the Japan Electric Vehicle Association (JEVA) and the Association of Electronic Technology for Automobile Traffic and Driving (JSK).</p> <p>Carries out activities in the following areas; Environment/Energy Fuel Cell/Electric Vehicle – heavily involved in JHFC, and previously ACE Vehicle Intelligent Transport Systems Active Safety Crash Safety Economic Analysis/International Cooperation</p>
Financial Details	Overall 2005 - ¥8.8 billion, METI - ¥0.44 billion, NEDO- ¥1.1 billion
Timing	1969 - ongoing
Governance and Management	JARI receives funds from METI and NEDO for automotive technology R&D, JARI manages several automotive projects from METI and NEDO ranging from basic R&D to demonstration projects.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Fuel Cell Development Information Centre (FCDIC)
Country	Japan

Category	Other Innovative Arrangement
Description	Fuel Cell Development Information Centre was established in July 1986 to exchange information among its members on fuel cell research, development and deployment aiming at the introduction and penetration of fuel cells into the market. Currently, FCDIC consists of more than 200 organizations, including major Japanese private companies and national organisations working on fuel cell development, 65 academic individuals, and 10 foreign members. ⁵⁶
Financial Details	
Timing	1986 - ongoing
Governance and Management	National Institute of Advanced Industrial Science and Technology, Patent Office, NEDO, a large number of Industry and University members.
Participants	Industry, Government, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Intelligent Transport Systems
Country	Japan
Category	General R&D Programmes
Description	The Intelligent Transport System (ITS) Programme in Japan focuses on nine areas; <ul style="list-style-type: none"> - Advances in navigation systems - Electronic toll collection systems - Assistance for safe driving - Optimization of traffic management - Increasing efficiency in road management - Support for public transport - Increasing efficiency in commercial vehicle operations - Support for pedestrians - Support for emergency vehicle operations <p>Of which two, possibly three will be of direct interest to the automotive industry in Japan.</p> <p>It is organised into a four-stage programme initially looking at research and development moving towards deployment in the latter stages from 2005 onwards.</p> <p>Work is carried out by a number of ministries including Ministry of Land, Infrastructure and Transport (MLTI) Road Bureau, METI as well as the regional governments across Japan. Much of the spending (¥71 billion in 2002) is on the deployment of systems across the road network, but around 10% of the budget each year is spent on research and development. The R&D proportion will reduce as time goes on and the focus of the programme shifts to deployment and implementation of the systems.⁵⁷</p>
Financial Details	As above. However, much of this will go on the civil engineering side of the system and integration into the infrastructure.
Timing	1995 – ongoing (roadmap to 2025)
Governance and Management	The ITS programme is run by the Ministry of Land, Infrastructure and Transport (MLTI) Road Bureau. The national labs/research institutes (like JARI) carry much of the work out but there are opportunities to collaborate with industry.

⁵⁶ Fuel Cell Development Information Centre (2007) “Activities” available at: <http://www.fcdic.com/eng/index.html>

⁵⁷ Ministry of Land, Infrastructure and Transport (2007) “What is ITS” available at: <http://www.mlit.go.jp/road/ITS/>

Participants	Government, Universities, Industry.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	The Lithium Battery Energy Storage Research Association (LIBES)
Country	Japan
Category	General R&D Programmes
Description	The Lithium Battery Energy Storage Research Association (LIBES) is similar to the U.S. Advanced Battery Consortium (USABC) in that both seek to promote advanced battery research. Both groups work on the standardization of test methods, particularly on abuse testing methods of advanced batteries. There are differences in approach, however. No Japanese vehicle companies participate in LIBES (only battery companies), while the U.S. vehicle companies are all active in USABC. LIBES is researching advanced batteries for both stationary utility and electric propulsion applications. USABC is involved much more heavily in advanced power applications. In 1998 LIBES formed an agreement of cooperation with USABC. ⁵⁸
Financial Details	
Timing	1992 – ongoing?
Governance and Management	Japanese battery companies, and MITI (Now known as METI)
Participants	Government, Industry
Evaluation and Impact	
Downloaded Documents	

⁵⁸ Office of Technology Policy (2003) “*Fuel Cell Vehicles: Race to a new Automotive Future*”, U.S. Department of Commerce

A.4 Canada

Scheme Name	The Hydrogen, Fuel Cell and Transportation Energy (HyFATE)
Country	Canada
Category	Institution, Road Map/Foresight, Institutions, Technology Procurement
Description	<p>The Hydrogen, Fuel Cell and Transportation Energy (HyFATE) group partners with industry and government organizations to develop and deploy leading-edge hydrogen, fuel cell and transportation energy technologies that minimize environmental impacts, increase the potential for job and economic growth and extend the lifespan of Canada's energy resource base. HyFATE also manages the Canadian Transportation Fuel Cell Alliance (CTFCA) program.</p> <p>HyFATE's work is concentrated in two main areas: Hydrogen and Fuel Cells; and Transportation Energy R&D</p> <p>HyFATE supports R&D studies, workshops and demonstration projects, usually through cost-sharing arrangements. The group works in cooperation with a number of stakeholders in the domestic and international transportation industries, including original equipment manufacturers, industry associations, fleet managers, transit authorities, utilities, provincial governments, research organizations, universities, other federal departments, as well as the U.S. Department of Energy and the International Energy Agency.</p> <p>Program activities include: R&D toward the development of technologies with short-to-medium term commercial and market potential; Technology assessments conducted in the lab and through technical demonstration projects and field trials to provide data on factors such as fuel economy, reliability, safety, environmental impacts and cost benefits; Development of technical and safety standards; Technology transfer through sponsorship of workshops and seminars, publication of technical reports, and information exchanges with public and private sector organizations.⁵⁹</p> <p>It is run by The CANMET Energy Technology Centre (CETC), Canada's leading federal government S&T organization with a mandate to develop and demonstrate energy efficient, alternative and renewable energy technologies and processes. CETC has facilities in Devon, Alberta; Varennes, Quebec; and Ottawa, Ontario.</p>
Financial Details	Cost-sharing between government and industry – no indication of proportions. HyFate receives about \$15 million from Natural Resources Canada, a figure that has been increasing in recent years. The majority of this budget goes on (end user) hydrogen technology as well as alternative fuels such as bio diesel.
Timing	Late 1980s – Ongoing
Governance and Management	Run by CANMET Energy Technology Centre.
Participants	Government, Industry and Universities.
Evaluation and Impact	
Downloaded Documents	HyFATE Overview.pdf

⁵⁹ HyFATE (2006) “Hydrogen, Fuels Cells and Transportation Energy” available at: http://www.nrcan.gc.ca/es/etb/cetc/cetc01/htmldocs/Groups/hyfate_e.htm

Scheme Name	The Canadian Transportation Fuel Cell Alliance (CTFCA)
Country	Canada
Category	Road Map / Foresight, Demonstrations, Pilots, Procurement of Prototypes
Description	<p>The Canadian Transportation Fuel Cell Alliance is a \$33 million federal government initiative that will demonstrate and evaluate fuelling options for fuel cell vehicles in Canada. Different combinations of fuels and fuelling systems will be demonstrated by 2008 - for light, medium and heavy-duty vehicles. The initiative will also develop standards and training and testing procedures as related to fuel cell and hydrogen technologies.</p> <p>Funding for the initiative comes from Action Plan 2000, a package of activities to reduce greenhouse gas (GHG) emissions in Canada - it is a \$500 million commitment on the part of the federal government. These measures are expected to take Canada one third of the way to achieving the GHG reduction target established in the Kyoto Protocol, which is to reduce GHG emissions by 2012 to 1990 levels.⁶⁰</p> <p>Projects include; Hydrogen Village Vancouver Fuel Cell Vehicle Programme Hydrogen Highway</p>
Financial Details	\$33 million CAN from federal government. The program will provide approximately 30 to 50% of total project costs with the remainder coming from partners.
Timing	2001 – ongoing
Governance and Management	The Alliance is made up of Government departments, Industry members (both VMs and Suppliers), and Universities. Members include; Ford, BMW, Toyota, Finance Canada, Regional Governments, National Research Council, and University of Toronto. It is run as a scheme under Natural Resources Canada.
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	CTFCA Progress Report.pdf

Scheme Name	Vancouver Fuel Cell Vehicle Program (VFCVP)
Country	Canada
Category	Demonstrations, Pilots, Procurement of Prototypes
Description	The VFCVP is a four-year, \$7.5-million demonstration initiative to test fuel cell vehicles in the lower mainland of British Columbia. The project will determine what improvements need to be made before bringing fuel-cell vehicles to market, examine fuelling issues and solutions, assess reduction levels of GHG emissions, determine and encourage public acceptance, and provide feedback for encouraging commercial adoption. ⁶¹
Financial Details	Overall, \$7.5 million. CTFCA contribution: \$2 million.
Timing	2005 – ongoing
Governance and Management	CTFCA, Ford Motor Company, the Government of Canada's Technology Early Action Measures program, the Government of British Columbia, the National Research Council and Fuel Cells Canada.
Participants	Government, Industry, Universities.
Evaluation and	

⁶⁰ CTFCA (2007) "Introduction" available at: http://www.nrcan.gc.ca/es/etb/ctfca/index_e.html

⁶¹ VFCVP (2007) "Overview" available at: http://www.vfcvp.gc.ca/faqs_e/index.html

Impact	
Downloaded Documents	

Scheme Name	National Research Council Canada
Country	Canada
Category	Institutions
Description	<p>The National Research Council (NRC) is composed of over 20 institutes and national programmes spanning a wide array of disciplines. The following are of relevance to the automotive sector:</p> <ul style="list-style-type: none"> - Centre for Surface Transportation Technology (NRC-CSTT) - is a financially self-supporting business division of the National Research Council of Canada. NRC-CSTT does proprietary research, technology development, engineering, and testing of civilian and military vehicles and vehicle systems under contract to the rail and road transport industries, defence departments, and a wide range of vehicle and equipment manufacturers. - Industrial Materials Institute (NRC-IMI) - promotes the growth and competitiveness of Canadian industry through research and development activities related to materials processing technologies. The Institute works in a number of sectors, including metal, polymer, aerospace and automotive sectors, as well as in virtual fabrication, advanced instrumentation and materials, environmental technologies, nanomaterials and biomedical materials. - Institute for Chemical Process and Environmental Technology (ICPET) - With its partners, NRC-ICPET contributes to increasing the competitiveness of Canada's chemistry intensive industries through research into innovative processes and technologies that enable sustainable development. Chemistry intensive industries are those where chemistry is a central component of the value-added transformation of materials. Performs much of the work involved with fuel cells. - Institute for Fuel Cell Innovation (IFCI) - The National Research Council of Canada Institute for Fuel Cell Innovation (NRC-IFCI) is Canada's premier applied research organization dedicated to supporting Canada's fuel cell and hydrogen industry through excellence in relevant research, innovation, partnerships and cluster building. - Institute for Information Technology (IIT) - creates and commercializes software and systems technology to help Canada prosper in the knowledge economy. Through its research, the dissemination of its findings and innovative business services, including licensing opportunities, R&D support, business mentoring and strategic partnerships, NRC-IIT provides a competitive advantage to myriad industry sectors, from health care and manufacturing, to transportation and entertainment. - Integrated Manufacturing Technologies Institute (IMTI) - focuses on the research and development of integrated technologies for the manufacture of products and equipment. It carries out focused, innovative and strategic research in collaboration with industrial, university and government partners in virtual manufacturing and precision freeform fabrication.⁶²
Financial Details	Industry usually contracts work out to these institutes with 100% funding to ensure full control of the IP. However, 50/50 funding is used for collaborative research between industry and government where the IP of the project is shared between the institute and industry.
Timing	Pre-1991 – ongoing
Governance	

⁶² National Research Council Canada (2007) “NRC Institutes, Programs, Initiatives and Technology Centres” available at: http://www.nrc-cnrc.gc.ca/institutes/index_e.html

and Management	
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	National Research Council Canada – Institute for Fuel Cell Innovation (IFCI)
Country	Canada
Category	Institutions
Description	<p>Targeting manufacturing companies and end users who need technical solutions for commercialization of products and services, NRC’s Fuel Cell and Hydrogen Program facilitates R&D at a national level, and draws from NRC’s 4,000 staff and specialized facilities. The program provides a broad, extensive and multi-disciplinary network of expertise for platform R&D, testing and evaluation, and technology demonstration in fuel cell and hydrogen technologies. Principal NRC institutes contributing to the program are the Institute for Fuel Cell Innovation (Vancouver), Institute for Chemical Process and Environmental Technology (Ottawa), Steacie Institute for Molecular Science (Ottawa), Integrated Manufacturing Technologies Institute (London), and Industrial Materials Institute (Boucherville).</p> <p>The research program focuses on three strategic areas: Polymer Electrolyte Membrane Fuel Cell; Solid Oxide Fuel Cells; and Hydrogen Generation and Infrastructure. Each participating Institute works closely with regional R&D providers, universities, government agencies and local industry to support the development of regional fuel cell clusters.⁶³</p>
Financial Details	Federal Government gives \$10 million a year to this institute, who then gain additional funds through collaborative agreements with industry and universities.
Timing	2002 – ongoing
Governance and Management	Run by the National Research Council Canada under the Hydrogen and Fuel Cell Program. The main advisory board is made up of government and regional/university representatives with little representation from industry.
Participants	Government, Industry and Universities.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Natural Sciences and Engineering Research Council (NSERC)
Country	Canada
Category	Institutions, Other Innovative Arrangements
Description	<p>NSERC’s role is to make investments in people, discovery and innovation for the benefit of all Canadians. We invest in people by supporting some 23,000 university students and postdoctoral fellows in their advanced studies. They promote discovery by funding more than 11,000 university professors every year. They also help make innovation happen by encouraging about 1,300 Canadian companies to invest in university research and training. Over the last ten years, NSERC has invested more than \$6 billion in basic research, university-industry projects, and the training of Canada’s next generation of scientists and engineers.</p> <p>NSERC is the national instrument for making strategic investments in Canada's capability in science and technology. NSERC supports both basic university</p>

⁶³ IFCI (2007) “About IFCI” available at: http://ifci-iipc.nrc-cnrc.gc.ca/main_e.html

	<p>research through discovery grants and project research through partnerships among universities, governments and the private sector, as well as the advanced training of highly qualified people. NSERC is a separate employer of the Government of Canada, reporting to Parliament through the Minister of Industry.</p> <p>Partnership programmes include; (average contribution per year per award)</p> <ul style="list-style-type: none"> - Collaborative Research and Development Grants (\$50,000) - Idea to Innovation Programme (Replaced the Technology Partnerships Canada Programme) (\$90,000) - Research Partnership Agreements - Strategic Network Grants (\$850,000) - Strategic Project Grants (\$130,000) - Industrial Research Chairs (\$170,000) <p>General Motors of Canada is currently the most actively participating company (by total cash contribution) in NSERC Research Partnership Programmes.⁶⁴</p> <p>Discovery Grants are also used to fund basic research in Universities, for which roughly \$5 million a year goes on Transportation Systems and Services.</p> <p>The NSERC, along with three other federal agencies fund a network of centres of excellence across Canada with funding of around \$77m a year. Networks of interest include;</p> <ul style="list-style-type: none"> - Auto 21 Network of Centres of Excellence (2000-2008) - Intelligent Sensing of innovative Structures – ISIS Canada (1995-2009) - Geomatics for Informed Decision Making
Financial Details	Overall budget of almost \$900 million a year. The large majority of this goes towards discovery grants (\$390m), with a smaller proportion going on Innovation (\$172m) and People (\$300m). Innovation covers the Strategic Projects (\$46m) and Collaborative R&D Partnerships (\$38m) and also covers the Networks of Centres of Excellence (\$40m) – See Auto21 below.
Timing	1978 - Ongoing
Governance and Management	
Participants	Government, Industry and University/Researchers
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Auto 21
Country	Canada
Category	Institutions
Description	<p>The AUTO21 Network of Centres of Excellence was created to address the many issues surrounding the automobile in the 21st century, and to help advance Canada as a leader in automotive-related research and development. The Network brings together more than 230 top Canadian researchers in 37 universities and partners them with more than 110 industry and government partners. An annual research budget of approximately \$12 million in federal and industry support fund projects within six key research themes:</p> <ul style="list-style-type: none"> - Health, Safety and Injury Prevention - Societal Issues and the Future Automobile - Materials and Manufacturing - Powertrains, Fuels and Emissions - Design Processes

⁶⁴ NSERC (2007) “Industry” available at: http://www.nserc.gc.ca/partners/indust/indust_e.asp

	<p>- Intelligent Systems and Sensors</p> <p>Currently, AUTO21 supports 42 research projects exploring issues that range from consumer education in the use of safety devices, to new or improved processes for design, materials and manufacturing, to advanced fuel research.</p> <p>Fostering powerful partnerships between university researchers, government and industry, the networks are designed to help develop Canada's economy and improve the quality of life for Canadians.⁶⁵</p>
Financial Details	Annual research budget of around \$12 million from government and industry, 50/50 mix.
Timing	2000 - 2008
Governance and Management	The management board and research committee is a mix of government, industry and university representatives. However, the theme coordinators of the programme are all from Canadian universities.
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	Auto21 AnnReport.pdf

Scheme Name	The Canadian Lightweight Materials Research Initiative (CLiMRI)
Country	Canada
Category	
Description	<p>The Canadian Lightweight Materials Research Initiative (CLiMRI) coordinates research and development of materials and processes for weight reduction in transportation applications. Its main goals are to:</p> <ul style="list-style-type: none"> - Reduce greenhouse gas emissions through improved vehicle efficiency, - Improve the competitive position of Canadian operations involved in the vehicle manufacturing chain. <p>The technical focus of CLiMRI is on mass reduction, while addressing barriers that include:</p> <ul style="list-style-type: none"> - Manufacturability - Affordability - Environmental impact - Economic impact for Canada - Total life cycle energy use <p>About 75% of the research activity is focused on the automotive sector with the remaining 25% looking more at mass-transit applications.</p> <p>CLiMRI came into being when the CANMET Materials Technology Laboratory (CANMET-MTL) was tasked to bring forward a research program on advanced transportation materials as part of the Program on Energy Research and Development (PERD). Technical review of research proposals to CLiMRI is provided by an arm's length Technical Advisory Committee comprised of members of industry, academia and government.⁶⁶</p>
Financial Details	Roughly \$3.5 million per year. A mix of funding from government (33%), industry (33%), and academia (33%)
Timing	1999 - Ongoing
Governance and Management	The Canadian Lightweight Materials Research Initiative (CLiMRI) is a partnership between industry and the federal government. Industry guidance is provided by the Industry Steering Committee, whereas the interests of the federal government, and coordination functions, are provided by a federal secretariat.

⁶⁵ Auto 21 (2007) "About Us" available at: http://www.auto21.ca/aboutus_e.html

⁶⁶ CANMET (2007) "CLiMRI" available at: http://climri.nrcan.gc.ca/default_e.htm

	<p>Federal laboratory participants; CANMET Materials Technology Laboratory, in Ottawa (casting, forming, corrosion, alloy development, MMCs materials characterization), NRC Industrial Materials Institute (NRC-IMI) in Boucherville (semi-solid casting, continuous casting, computer modelling), NRC Integrated Manufacturing Technologies Institute (NRC-IMTI) in Vancouver (tribology, coatings evaluation)</p> <p>University researchers; Windsor University (Ford Light Metals Chair), University of Waterloo, McGill University, University of British Columbia</p> <p>Industry participants; Alcan International, Noranda, Long Manufacturing, Norax, JME Incorporated, Grenville Castings, Timminco Metals, Powercast Manufacturing Inc., The Industrial Research and Development Institute in Midland, Ontario, is also a participant and, through its consortium project on steel hydroforming, involves many more industrial players</p>
Participants	Government, Industry, Universities
Evaluation and Impact	Evaluation at: http://www2cm.nrcan.gc.ca/nrcan/index_e.aspx?ArticleID=86 , to be summarised
Downloaded Documents	

Scheme Name	Technology Partnerships Canada – Research and Development Programme
Country	Canada
Category	
Description	Technology Partnerships Canada (TPC) is a special operating agency of Industry Canada with a mandate to provide funding support for strategic research and development, and demonstration projects that will produce economic, social and environmental benefits to Canadians. Since 1996, TPC's activity has been rooted in helping Canadian companies perform R&D that takes new technologies closer to the marketplace. These R&D projects have the potential to improve the efficiency of production processes in traditional sectors as well as support innovation in emerging technologies ⁶⁷ . Over the past several years, TPC has provided approximately \$60 million of financial support to Canadian fuel cell and hydrogen businesses to develop innovative products and processes.
Financial Details	The TPC program funds 33% of project costs relating to industrial research (to develop or improve products, processes or services); pre-competitive development (translation of industrial research findings into pre-production activities); and studies pertaining to industrial research or pre-competitive development projects.
Timing	1996 – Closed end of 2006 (Projects before this time will still be funded)
Governance and Management	Run by the Government through Industry Canada
Participants	Government, Industry
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Scientific Research and Experimental Development (SR&ED) Tax Incentive Program
-------------	--

⁶⁷ Technology Partnerships Canada (2007) "About TPC" available at: http://tpc-ptc.ic.gc.ca/epic/site/tpc-ptc.nsf/en/h_hb00001e.html

Country	Canada
Category	R&D Tax Incentive
Description	<p>The Scientific Research and Experimental Development (SR&ED) program is a federal tax incentive program to encourage Canadian businesses of all sizes and in all sectors to conduct research and development (R&D) in Canada that will lead to new, improved, or technologically advanced products or processes. The SR&ED program is the largest single source of federal government support for industrial research and development.</p> <p>Claimants can apply for SR&ED investment tax credits for expenditures such as wages, materials, machinery, equipment, some overhead, and SR&ED contracts. Work that qualifies for SR&ED tax credits includes:</p> <p>Experimental development to achieve technological advancement to create new materials, devices, products, or processes, or improve existing ones;</p> <p>Applied research to advance scientific knowledge with a specific practical application in view;</p> <p>Basic research to advance scientific knowledge without a specific practical application in view; and</p> <p>Support work in engineering, design, operations research, mathematical analysis, computer programming, data collection, testing, or psychological research, but only if the work is commensurate with, and directly supports, the eligible experimental development, or applied or basic research.⁶⁸</p>
Financial Details	A Canadian-controlled private corporation (CCPC) can earn an investment tax credit (ITC) of 35% up to the first \$2 million of qualified expenditures for SR&ED carried out in Canada, and 20% on any excess amount. Other Canadian corporations, proprietorships, partnerships, and trusts can earn an ITC of 20% of qualified expenditures for SR&ED carried out in Canada. The ITC earned by a Canadian corporation that is not a CCPC is non-refundable, but may be used to reduce any taxes payable. The ITC earned by a proprietorship or certain trusts may be partially refunded after applying these tax credits against taxes payable.
Timing	Ongoing
Governance and Management	Government through Canada Revenue Agency
Participants	Government and Industry
Evaluation and Impact	<p>Survey carried out in 2005 for companies that received the incentive between 2002-2004. Most respondents were satisfied with the following services provided by the SR&ED program. The majority (82%) of respondents were satisfied with the outcome of their most recently reviewed claim. Most survey respondents (88%) indicated that they plan to make future SR&ED tax credit claims.</p> <p>Generally, respondents were satisfied with the overall administration of the program (71%). Respondents were less satisfied with the length of time it took to process their claim. The survey confirms that the SR&ED program needs to continue with its current focus on clarifying and harmonizing its forms and publications, and on strengthening its timeliness.⁶⁹</p>
Downloaded Documents	

Scheme Name	The Hydrogen Highway
Country	Canada
Category	Demonstrations, Pilots, Procurement of Prototypes

⁶⁸ Canada Revenue Agency (2007) "About Our Programme" available at: <http://www.cra-arc.gc.ca/taxcredit/sred/aboutus-e.html>

⁶⁹ Canada Revenue Agency (2005) "2005 SR&ED Claimant Survey" available at: <http://www.cra-arc.gc.ca/taxcredit/sred/survey/2005/fs2005-e.html>

Description	<p>The Hydrogen Highway is a co-ordinated demonstration, deployment and market development program that enables participants to evaluate, improve and refine the performance of hydrogen and fuel cell technologies.</p> <p>The Hydrogen Highway is a showcase for the best in hydrogen fuel cell research applications and market deployment. The goal is to establish Canada as a destination for investment, research and implementation in hydrogen fuel cell technologies. By communicating Canada's successes to industry and the public, the Hydrogen Highway will help to move the global hydrogen economy from a compelling idea to a commercially viable reality.⁷⁰</p>
Financial Details	No indication of overall budget. Formed from the finance from the main hydrogen projects in Canada (outlined above). \$10 million given by British Columbia provincial government to the scheme.
Timing	2004 - ongoing
Governance and Management	Large number of Government participants mainly through their overall hydrogen projects; CTFCA, VFCVP, NRC – IFCI, Ministry of Energy, TPC. Universities and industry is also involved, however in this specific project no vehicle manufacturers are involved. Instead the providers of the infrastructure and vehicle technologies participate here. Vehicle manufactures are involved in the associate project – Vancouver Fuel Cell Vehicle Project.
Participants	Government, Industry, Universities.
Evaluation and Impact	
Downloaded Documents	Hydrogen Highway.pdf

Scheme Name	University of Windsor - Automotive Research and Development Centre (ARDC) & Truck R&D Centres
Country	Canada
Category	Vehicle R&D Programme
Description	<p>The Automotive Research and Development Centre (ARDC) is a joint undertaking between DaimlerChrysler Canada and the University of Windsor. In September 2000, DaimlerChrysler Canada announced a \$500 million investment in operating capital over a five-year period. The aim of the ARDC is to help DaimlerChrysler improve product quality and vehicle safety, reduce cost and improve the environment in the various communities served by DaimlerChrysler.</p> <p>The ARDC is comprised of a number of facilities, including: Automotive Safety Research; Automotive Coatings Research; Automotive Lighting; Automotive Life Cycle; and Road-Test Simulators.</p> <p>Since 1996 the University of Windsor/DaimlerChrysler Canada ARDC partnership has grown from 100 to the current level of over 200 Research and Development positions and co-op students. Since its inception, this industry/academia partnership has continued to support the pursuit of automotive excellence.⁷¹</p> <p>Truck Research and development centres for advanced truck manufacturing and clean diesel technologies. A collaboration between the university, the International Truck and Engine Corporation (ITEC), and the federal and provincial</p>

⁷⁰ Hydrogen Highway (2007) “Purpose” available at:
<http://www.hydrogenhighway.ca/code/navigate.asp?Id=212>

⁷¹ DaimlerChrysler Canada (2006) “Automotive Research Centre” available at:
http://www.daimlerchrysler.ca/CA/03/EN/CORPORATE/1,,CA-03-EN-CORPORATE-SOCIALRESPONSIBILITY-4_AUTOMOTIVERD,,html

⁷² University of Windsor (2005) “University of Windsor named site of R&D facility for advanced truck manufacturing and clean diesel engine technology” available at:
<http://www.uwindsor.ca/units/pac/newsrel.nsf/f8e26b1a592c9edb8525676a0048614a/f30f876a5f1e32268525700300540f4e!OpenDocument>

	governments. ⁷²
Financial Details	ARDC – Over \$500 million since 1996 Truck R&D – ITEC is contributing about \$65 million, Ottawa \$33 million and the Ontario government \$32 million.
Timing	ARDC – 1996 – ongoing Truck R&D – 2005 – ongoing
Governance and Management	ARDC – Partnership between University of Windsor and DaimlerChrysler Truck R&D – collaboration between the university, the International Truck and Engine Corporation (ITEC), and the federal and provincial governments.
Participants	Industry and University/Regional Government
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Sustainable Development Technology Canada (SDTC)
Country	Canada
Category	Technology Procurement / Demonstrations, Pilots, Procurement of Prototypes
Description	<p>Sustainable Development Technology Canada is an initiative created by the Government of Canada that operates a \$550-million fund to finance and support the development and demonstration of clean technologies— solutions that address issues of clean air, climate change, clean water and clean soil to deliver economic, environmental and health benefits to Canadians.</p> <p>An arm’s length, not-for-profit corporation, SDTC bridges the gap in the innovation chain between research and commercialization, helping clean technology developers move their solutions through the development and demonstration phases in preparation for commercialization.</p> <p>SDTC funds groundbreaking technologies and fast-tracks their progress by helping entrepreneurs connect with partners, formalize business plans and qualify for venture-capital financing.</p> <p>Projects in the transportation sector range from fuel cell and battery technologies to tyre and materials development. Technology area breakdown (2002 – 2006 overall funding);</p> <ul style="list-style-type: none"> - Fuel Cells - \$3.2 million - Batteries - \$4.4 million - Materials - \$4.4 million - Hybrid Systems - \$3.2 million - Low Emissions - \$6.5 million - Intelligent Systems – \$2.1 million - Natural Gas - \$2.1 million
Financial Details	\$550 million fund, of which \$241 million has been allocated to date to 109 clean technology projects. The fund works on a 30/70 split with industry so overall SDTC has levied \$617 million from industry to bring the total investment to \$858 million. 15% (\$35 million) of this has gone on the transportation sector through 16 projects, 12 of which are relevant to the automotive industry. This brings the total investment in automotive sector technologies from the fund to circa \$26 million since 2002.
Timing	2001 (Calls for projects began in 2002) – ongoing (until the fund runs out?)
Governance and Management	Projects are brought through a three-stage process (statement of interest, proposal, and contract). The funding committee that selects a proposal is made up of government, industry and university representatives. Funds are received from NRCan through the Office of Energy Research and Development.

Participants	Industry, Government
Evaluation and Impact	\$26 million put forward by the fund + circa \$61 million put forward by industry (30/70) for automotive sector projects between 2002 and 2006.
Downloaded Documents	

Scheme Name	Intelligent Transport Systems
Country	Canada
Category	
Description	<p>Canada's ITS Vision is to create an environment that will stimulate the collaborative development and deployment of ITS across urban and rural Canada to improve safety and maximize the use and efficiency of the existing multimodal transportation system; and to make the Canadian ITS industry a leader in ITS technologies by positioning it to meet future Canadian needs and to compete in the growing global marketplace. This initiative continues today under the Strategic Highway Infrastructure Program (SHIP). The framework has four objectives:</p> <ul style="list-style-type: none"> - To promote transportation safety - which will always be the top priority; - To support trade and tourism through more productive and "smarter" transportation systems; - To improve our quality of life by promoting more sustainable transportation systems; - To sustain strategic investment in transportation. <p>Federal funding will be provided under the Strategic Highway Infrastructure Program, a \$600 million program to improve highway infrastructure across Canada. Part of this funding – \$100 million – is for initiatives that better integrate the country's transportation system. One of these is the Intelligent Transportation Systems Initiative (\$30 million), which includes applications such as advanced systems for traveller information, traffic management, public transport, commercial vehicle operations, emergency response management and vehicle safety.</p>
Financial Details	As above.
Timing	2003 - ongoing
Governance and Management	Non-Profit professional society supported by Transport Canada. Much of the work is carried out on a civil engineering level with industry focusing more on the vehicle-based systems and vehicle-to-vehicle communications.
Participants	Government (Federal and Regional), Industry, Universities
Evaluation and Impact	
Downloaded Documents	

A.5 France

Scheme Name	PREDIT – Land Transport Research Programme
Country	France
Category	Road Map/ Foresight
Description	<p>PREDIT is a programme of research, experimentation and innovation in land transport, started and implemented by the Ministries in charge of research, transport, environment and industry, the ADEME (French Environment and Energy Management Agency) and the ANVAR (now Oséo, a small business support agency). By stimulating cooperation between public and private sector, this programme aims at encouraging the creation of transportation systems that would be economically and socially more effective, safer, more energy-saving, and finally more respectful of Man and environmentally-friendly.</p> <p>The first 3 stages of the programme were:</p> <ul style="list-style-type: none"> - PREDIT 1, which was mainly devoted to technological innovations in vehicles - PREDIT 2, which included wider subjects (involvement of Man and Society sciences, Life sciences, etc.) - PREDIT 3, which focused on goods transportation and energy and environment issues, greenhouse effect in particular, as well as a diversified research on safety. <p>Two calls for proposals were launched in 2007:</p> <ul style="list-style-type: none"> - “Clean and energy-saving vehicles” concerning sustainable emissions, diminution of energy consumption and reduction of environmental pollution (noise). - “Technologies for safety”, concerning safety, accessibility and onboard systems. <p>This call for proposals, in line with the programmes launched by PREDIT since 2002, aims to fund research in the following fields:</p> <ol style="list-style-type: none"> 1. Safety: the actions will notably focus on the improvement of vehicle/infrastructure interaction via research on onboard intelligent systems – ARCOS and infrastructure intelligence – SARI) 2. Adaptability: projects will also focus on themes such as accessibility, ergonomics, human/vehicle interaction, onboard and nomad systems.
Financial Details	<p>The overall budget was approximately 1 billion Euros over the three programmes:</p> <ul style="list-style-type: none"> - PREDIT 1: 396.4 million Euros - PREDIT 2: over 300 million Euros - PREDIT 3: about 305 million Euros. <p>Projects are awarded through calls for proposals, spontaneous proposals, direct single orders and through federative actions. PREDIT funding of projects is between 20% (of full expenses) and 80% (of marginal expenses), depending on the nature of the action and the status of the funding beneficiary (the lowest to industry, the highest to academy).</p>
Timing	<p>The programme was launched in 1990.</p> <ul style="list-style-type: none"> - PREDIT 1 (1990-1994) - PREDIT 2 (1996-2000) - PREDIT 3 (2002-2006, effectively ending in 2007) <p>The fourth stage of the programme should normally be launched in March 2008.</p>
Governance and management	<ul style="list-style-type: none"> - The steering committee is composed of 15 representatives of the funding organisations (the 4 Ministries and 3 governmental agencies: ADEME, Oséo, ANR). It decides which projects will be funded. - The committee of orientation meets twice a year to help the steering committee in taking its decisions. It is composed of the presidents of the operational groups and representatives of various organisations (research institutes, industrials, etc.). - The permanent secretary (6 persons) coordinates the whole programme.

	- 11 operational groups are in charge of the implementation of the programme. They are formed of individuals representing Ministries, semi-public agencies, private companies, research institutes and universities. These groups draw up calls for tender and value and label proposals. Once the steering committee has selected the proposals, they follow the projects and disseminate results. The main criteria are scientific excellence, quality of the partnership and complementarity of the partners involved.
Participants	Projects are carried out by a wide variety of industrials (e.g. PSA, Renault), public service suppliers (e.g. SNCF, RATP), public research institutes (e.g. CNRS, INRETS), universities and other various organisations.
Evaluation and Impact	An evaluation of PREDIT 1 and 2 was carried out by an independent consultancy, Technopolis France. An assessment report of PREDIT 3 at mid-term was published in 2005 and the evaluation of this programme is currently undertaken.
Downloaded Documents	Assessment report 2005 (French): www.predit.prd.fr/predit3/menu.fo?cmd=bilan

Scheme Name	DEUFRAKO – German-French cooperation for land transport research
Country	France
Category	Other innovative arrangement
Description	<p>DEUFRAKO is a scientific and technological cooperation in the field of land transport between <i>Mobilität und Verkehr</i>, research programme of the German federal Ministry of economics and technology and PREDIT.</p> <p>It was implemented in 1978 to cooperate in the field of research on high-speed train.</p> <p>The first thematic widening occurred in 1998 with an opening on telematics, urban transport and freight transport.</p> <p>In 2002, it was agreed that DEUFRAKO should widen its research sphere of action to freight corridors, noise reduction and road safety.</p> <p>The second Franco-German research Forum in July 2005 pointed out additional issues concerning hybrid vehicles on one hand, the organization of road transport of goods on the other hand.</p> <p>DEUFRAKO projects are mainly inter-disciplinary and bring together partners from the industry, research institutes and higher education establishments. Both countries support them jointly, each partner being financed by its own country.</p>
Financial Details	There is no budget for DEUFRAKO. All French partners must be funded under the PREDIT, while German partners are funded under the <i>Mobilität und Verkehr</i> programme. 50 to 60 projects are thus funded under PREDIT every year. However, very few projects involve automotive manufacturers.
Timing	Since 1978
Governance and management	<ul style="list-style-type: none"> - The steering committee. This committee brings together the funding partners of the Ministries and agencies of PREDIT and the German programme <i>Mobilität und Verkehr</i>, involved in DEUFRAKO. It meets once year in a restricted group, and a second time in a plenary session, with the chairmen of the existing thematic working groups and an additional panel of experts from both countries. - The panel of experts from public and private research sectors assists the steering committee on the research strategy and future priorities, particularly to clearly identify the added value of bilateral projects compared to national and European activities. - The thematic working groups. They bring together specialists from both countries to discuss project proposals or other activities and their realisation. They work on the basis of a mandate, developed with the steering committee, that sets the group's objectives, its duration, etc.
Participants	The projects bring together partners from the industry, research institutes and higher education establishments.
Evaluation and	

Impact	
Downloaded Documents	Activity report 2002-2005 (English): www.deufrako.org/pdf/deufrakobericht_en.pdf

Scheme Name	CalFrance
Country	France
Category	Other innovative arrangement
Description	<p>CalFrance is a collaboration in the field of intelligent transport between the California Department of Transportation (Caltrans), PATH (California Partners for Advances Transit and Highways), INRETS (French National Institute for Transport and Safety Research and DRAST (French Administration of Research and Scientific and Technical Affairs – Ministry of transport).</p> <p>Until 2002 the programme was focused mainly on the exchanges of researchers and joint publications between INRETS and the University of California. In 2002 it was decided to fund research projects with partners particularly from the industry.</p> <p>A new administrative agreement between Caltrans and DRAST will be signed in April 2007. The partners will launch a call for proposals for collaborative projects between Californian and French organisations, with a broader scope: collective transport, heavy transport, etc.</p>
Financial Details	<p>CalFrance will fund the value of the project which was added by the collaboration between California and France.</p> <p>\$200,000 (€150,000) has been budgeted by each country for 2007.</p> <p>This amount will be revised the following years according to the number of applications received in 2007.</p>
Timing	Since 1998
Governance and management	<p>The programme is managed by Caltrans and DRAST.</p> <p>A committee will be set to assess the proposals.</p>
Participants	The proposals can be submitted by public organisations, or by consortia including private companies.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	PACo – Fuel Cells Network
Country	France
Category	Other innovative arrangement
Description	The PACo network was one of the networks for research and innovation, created in 1999. It aimed to support the development of a French industry of fuel cells by encouraging the collaboration between public and private research.
Financial Details	<p>Over the period 1999-2003, approximately 10M€ subsidies were allocated annually by the Ministry responsible for research (46%), the Ministry responsible for industry (25%), ADEME (23%) and the Ministry in charge of transport (6%). 57% of this funding benefited to the private sector.</p> <p>For each project, the funding was between 30% and 50% of the amount of the project and took the form of subsidies or refundable loans.</p>
Timing	1999-2004
Governance and management	<ul style="list-style-type: none"> - The committee of orientation proposes the research topics it wishes to see particularly supported and organises the evaluation of research projects. It is composed of approximately 20 members, representing the various actors implied. - The network office is composed of the representatives of the committee of orientation as well as representatives of the financiers of the program. The

	representatives of the animation and coordination cell also attend the meetings of the office. - The animation and coordination cell is in charge of the scientific and technical animation of the network. It is composed of a representative of ADEME (Agency for Environment and Energy Management) and a representative of CEA (Atomic Energy Commission).
Participants	The consortia which presented a project proposal had to include at least an industrial and a research institute.
Evaluation and Impact	
Downloaded Documents	Presentation of the network (1999-2003): www.reseaupaco.org/onglet1_reseau/documents/reseau_PA-Co_en_quelques_chiffres.ppt

Scheme Name	PAN-H - National action plan on hydrogen and fuel cells
Country	France
Category	Other innovative arrangement
Description	PAN-H is an innovation and research programme, setting up private/public partnerships. It aims at developing an industrial sector of hydrogen and fuel cells compatible with the constraints of the automobile use on the long term. It will also support the deployment of these technologies in markets considered as less demanding in the shorter term, which will allow, by creating industrial sectors having their own dynamics, to prepare the automobile market. PAN-H replaced PACo in 2004.
Financial Details	The objective of the ANR (National Agency for Research) is that the majority of the projects receive a financing of an amount ranging between 1 and 2 M€ However the ANR does not exclude to finance projects of a lower amount or superior. In addition the ANR will not allot assistance of an amount lower than 20 k€ to a partner of a project. For industrial research, the maximum rate of assistance of the ANR will be 50% of the eligible expenditure net of tax. In 2005, 29,634,376 euros were allocated for the projects, 35% of which to private companies.
Timing	Since 2004
Governance and management	The management of the call for projects PAN-H is carried out by the CEA (Atomic Energy Commission). The process of selection of the projects includes the following stages: - examination and classification of the projects by an evaluation committee according to a scientific and technical quality criterion, with the help of two external experts, possibly belonging to the public sphere and the private sphere; - examination and selection of the projects by a strategic committee which establishes a classification of the eligible projects; - decision of financing by ANR. The evaluation committee is only made up of scientists. The strategic committee is composed of representatives of the actors of public research (e.g. ECA, CNRS, IFP, INRETS, ADEME), of socio-economic world (industrials, civil company, etc.) and of the ministries concerned.
Participants	The projects are primarily public-private partnerships. They bring into play several partners: industrials, public research institutes, higher educational establishments, universities or associations.
Evaluation and Impact	
Downloaded Documents	Call for proposals 2007 (French): http://www.agence-nationale-recherche.fr/documents/aap/2007/aap-panh-2007.pdf

Scheme Name	Competitiveness clusters
Country	France
Category	Other innovative arrangement
Description	<p>In 2005, 66 Competitiveness Clusters (<i>Pôles de compétitivité</i>) were established over the French territory with the aim to promote innovation through the support of industry's capacity to network with research institutes, universities and training centres.</p> <p>11 clusters are related to land transport, with the following thematic areas:</p> <ul style="list-style-type: none"> - Advanced transportation (MTA): Heat engines/ Fuel/ Sustainable emissions; Mobility, Hybrid vehicles; Materials - Mov'Eo: Heat engines/ Fuel/ Sustainable emissions; Safety; Mobility; Hybrid vehicles; Materials - Cars for the future (PVF): Heat engines/ Fuel/ Sustainable emissions; Safety; Onboard systems; Mobility; Hybrid vehicles; Materials - High grade cars (PAHDG): Safety; Onboard systems; Mobility; Materials <p>These first four clusters are directly related to the automotive sector.</p> <ul style="list-style-type: none"> - Lyon Urban Truck&Bus 2015 (LUTB): Heat engines/ Fuel/ Sustainable emissions; Safety; Mobility; Hybrid vehicles; Materials; - i-trans: Safety; Mobility; Materials - System@tic: Onboard systems; - Urban sustainable mobility (VMD): Safety; Mobility - EMC2: Materials - Aerospace Valley: Onboard systems - Agro-industries (IAR): Heat engines/ Fuel/ Sustainable emissions
Financial Details	<p>The French government will bring 500 million euros annually, from 2006 to 2008. The overall budget on this period is divided as follows:</p> <ul style="list-style-type: none"> - Government (DGE- <i>Direction Générale des Entreprises</i>): €330 m - Agencies (ANR, Oséo) and CDC: €20 m - Tax incentives: €160 m. <p>The budget is shared out between clusters according to the number of successful projects they will present over the year.</p> <p>The clusters also receive funding from regional and local organisations.</p>
Timing	Since 2005
Governance and management	The initiative will be managed by a committee (<i>Groupe de Travail Interministériel</i>) representing the funding organisations.
Participants	Research centres, training organisations, private companies
Evaluation and Impact	
Downloaded Documents	Presentation: http://www.competitivite.gouv.fr/IMG/pdf/poles_plaquette_en.pdf

Scheme Name	ANR
Country	France
Category	Institution
Description	<p>The National Agency of Research (ANR) has been created on 1 January 2007 to fund research projects.</p> <p>The calls for projects are organised in 6 research areas:</p> <ul style="list-style-type: none"> - Biology and health - Ecosystems and sustainable development - Sustainable energy and environment - Engineering, process and safety - Matter and information - Social sciences

	<p>- Non-thematic programmes.</p> <p>The automotive industries mainly benefit from 3 programmes within the “Sustainable energy and environment” area: PREDIT, PAN-H and PNRB, which funds research on biofuels.</p> <p>If the selected projects are supported by one of the competitiveness clusters, they benefit from additional funding.</p>
Financial Details	<p>For the year 2007, the ANR has a capacity of engagement of 825 million euros for research projects with a maximum duration of four years.</p> <p>In 2005, the following incentives were allocated by ANR:</p> <ul style="list-style-type: none"> - PREDIT: 17,095,881 euros (of which €5,455,000 to companies) - PAN-H: 29,634,376 euros (of which €10,384,000 to companies) - PNRB: 8,490,366 euros (of which €1,935,000 to companies)
Timing	Since 2007 under its current form
Governance and management	<p>The ANR is administered by a governing board and managed by a Director.</p> <p>The evaluation committee, composed of between 10 and 25 members, selects the projects according to criteria which were defined in adequacy with the objective set up for the call for projects.</p>
Participants	Public research institutes and private companies
Evaluation and Impact	
Downloaded Documents	Activity report 2005 (French): http://www.agence-nationale-recherche.fr/documents/uploaded/2006/rapport-2005-1-principal.php

Scheme Name	Oséo
Country	France
Category	Institution
Description	<p>Oséo was born in 2005, by bringing together ANVAR (French innovation agency) and BDPME (SME development bank), around a mission of general interest supporting the regional and national policies. Its mission is to provide assistance and financial support to French SMEs.</p> <p>Activities of Oséo include innovation support and funding.</p>
Financial Details	<p>In 2005, the aid for technological innovation amounted to €24 million, generating €60 million of innovative programmes. The aid takes the form of advances repayable in the event of success or subsidies.</p> <p>43% of the businesses in receipt of aid employed fewer than 10 people.</p> <p>In 2004, as part of the PREDIT Oséo distributed €11.8 million euros, of which 85% to the automotive sector. The projects funded covered the following areas:</p> <ul style="list-style-type: none"> - vehicle and infrastructure; - information and communication systems; - clean and energy-saving vehicles; - safety technologies; - mobility
Timing	Since 2005
Governance and management	Oséo is under the supervision of the Ministry of economy and industry.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	AII
Country	France

Category	Institution
Description	<p>The Agency for Industrial Innovation (AII) is a public and autonomous establishment created by the French government to promote and support large-scale, cutting-edge projects driving industrial innovation.</p> <p>AII has approved so far support to the following programmes:</p> <ul style="list-style-type: none"> - Hybrid vehicle programme, presented by PSA, which aims to develop electric-diesel hybrid vehicles, whose CO₂ emissions will be reduced approximately 30% compared to the diesel version. - LO_wCO₂MOTION, proposed by Valeo, which aims to improve the performance of the petrol engine and to save energy, with the overall objective to reduce CO₂ emissions. <p>This programmes should generate two new products:</p> <ul style="list-style-type: none"> - the system “Camless”, for control of the valves of the thermal engine using electromagnetic actuators, replaces the camshaft and optimises combustion in all the operations of the petrol engine like, in a later version, diesel engine. <p>The partnership of the system “Camless” gathers the Laboratory of Electrical engineering of Grenoble (LEG), the French Petroleum Institute (IFP), automobile equipment supplier German TRW automotive and the German company of automobile engineering IAV GMBH.</p> <ul style="list-style-type: none"> - the system of “soft hybridisation”, conceived on the basis of alterno-starter, makes it possible to manage the energy used by the vehicle and is applicable to any type of motorisation and fuel. <p>The partnership of soft hybridisation gathers PCA (group PSA Peugeot Citroen), Batscap (Bolloré group) for the storage of electricity by supercapacities and TNO, company of council and engineering.</p>
Financial Details	<ul style="list-style-type: none"> - Hybrid vehicle programme: the cost of this programme, running over four years, is €471m, of which €80m is funded by AII - LO_wCO₂MOTION: €211.6m will be invested over the period 2007-2011, of which €61m will be funded by AII.
Timing	AII was created in 2005.
Governance and management	The Agency’s Supervisory Board is made up of government representatives (Ministry of economy and industry) and qualified personalities, including four members of Parliament and three members of trade unions. It sets the Agency’s overall guidelines and approves the Mobilizing Programmes for Industrial Innovation (PMII) that were selected and submitted by the Agency’s Management Board.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	RT3
Country	France
Category	Other innovative arrangement
Description	<p>The Inter-regional Network for Technological Research in Land Transport aimed to:</p> <ul style="list-style-type: none"> - constitute a network of competences by improving collaboration between laboratories, members of Regional Councils and Regional Delegations for Research and Technology and industrials; - set up inter-regional projects. <p>The main working areas were:</p> <ul style="list-style-type: none"> - hybrid vehicles and fuel cells; - mobility; - new materials for vehicles;

	<ul style="list-style-type: none"> - on-board electronic systems; - security; - environmental pollution. <p>The network gathered scientific and technological centres of 7 French regions: Nord-Pas-de-Calais, Poitou-Charentes, Haute-Normandie, Alsace Franche-Comté, Midi-Pyrénées, Rhône-Alpes, Picardie.</p> <p>The network stopped its activity in 2006 but its “members” are still active.</p> <p>For example, the Nord-Pas-de-Calais region has structured its research activity on land transport around the Regional Group For Research In Transport (GRRT) since 1983. GRRT offers information, advice, networking opportunities and laboratory facilities, and implement a regional strategy for research and development in the field of transports.</p>
Financial Details	
Timing	2001-2006
Governance and management	Universities, scientific centres, research institutes, industrials, semi-public organisations, Ministries and local authorities
Participants	Universities, scientific centres, research institutes, industrials, semi-public organisations, Ministries and local authorities
Evaluation and Impact	
Downloaded Documents	Presentation of the network (French): www.grrt.fr/pdf/rt3/presentation_rt3.pdf

Scheme Name	INRETS
Country	France
Category	Institution
Description	<p>The French National Institute for Transport and Safety Research has been created by interministerial decree on 18 September 1985. INRETS is a state-financed scientific and technological body under the administrative supervision of the Ministries in charge of research and transport.</p> <p>The scientific programme of INRETS for the period 2006-2009 is structured in 3 main axes:</p> <ul style="list-style-type: none"> - Improve human safety - Optimise the use of transport networks and reduce the oil-dependence - Increase the sustainability of transport systems, optimise their energy-consumption and reduce their impact on environment.
Financial Details	<p>The annual budget of INRETS is about 39 million euros:</p> <ul style="list-style-type: none"> - €38,076m in 2003 - €38,879m in 2004 - €40,213m in 2005.
Timing	Since 1985
Governance and management	<p>INRETS is administered by a board of directors composed of nine representatives of the transport professions (manufacturers and operators), eight representatives of the ministries concerned, and four representatives of INRETS personnel.</p> <p>The Director General is assisted by the board of directors, the Secretary General and official representatives, who are responsible for the orientation, co-ordination and diffusion of the research programmes, and who act as advisors to the Institute research units.</p>
Participants	
Evaluation and	

Impact	
Downloaded Documents	Activity report (French): http://www.inrets.fr/services/quadriennal/Rapport-activite2005.pdf

A.6 Germany

Scheme Name	Mobility and Transport Programme
Country	Germany
Category	General R&D programme
Description	<p>The 'Mobility and Transport' Programme contributes to achieving the following goals:</p> <ul style="list-style-type: none"> - sustainable management of mobility from an ecological, economic and social standpoint; - improving performance, efficiency and safety of the transport system; - achieving a higher level of international competitiveness; safeguarding and creating future-oriented jobs in the transportation industry. <p>The programme is focused on the following priorities:</p> <ol style="list-style-type: none"> 1. Intelligent Traffic Networks 2. Against the Trend: More Freight on Rail and Ship 3. Faster and More Comfortable with Railway and Bus 4. Improving the Quality of Life for Future Generations 5. Safety as a Continuous Task 6. Better Understanding of Mobility 7. Interdisciplinary Tasks <p>Some initiatives directly involve the automotive industry.</p>
Financial Details	<p>The yearly budget has been between 45-50 million euros since 2000. An estimated 40% of the yearly budget goes to the automotive industry (research departments of automotive producers and suppliers, public/university research institutes).</p> <p>The projects aided fall under the R&D stages of fundamental research, industrial research and pre-competitive development. Aid is given in the form of grants and according to EU regulations. Aid intensity is up to 100% of the eligible costs for fundamental research, up to 50% for industrial research and up to 25% for pre-competitive development, including demonstration projects. Feasibility studies preparatory to industrial research can be aided with up to 75% of eligible costs, whilst those preparatory to pre-competitive development can be aided with up to 50% of eligible costs.</p> <p>The following bonuses are applicable: 10% for SMEs; 10% for genuine cooperation between firms and public research establishments or by way of joint research by companies and public research establishments, or accompanied by a wide dissemination and publication of the results.</p>
Timing	<p>The programme started in 2000. EU notification will end in 2007. A new programme is being prepared by the Ministry of Economic Affairs and Technology (BMWt), which will be published in 2007. It will replace 'Mobility and Traffic'.</p>
Governance and management	<p>The Ministry of Education and Research (BMBWF) initiated the programme in 2000. In 2006, the programme was transferred to the Ministry of Economic Affairs and Technology (BMWt). Hence, the programme is managed and funded by the (BMWt), with the assistance of the project management firm TÜV Rheinland/PT MVBW (Projekträger Mobilität und Verkehr, Bauen und Wohnen).</p>
Participants	Companies, public research institutions
Evaluation and Impact	
Downloaded Documents	http://www.tuvpt.de/foerderung/mobilitaet-verkehr.html (in German)

Scheme Name	AKTIV
Country	Germany
Category	Vehicle R&D programme

Description	<p>This programme is part of the umbrella programme 'Mobility and Transport'. AKTIV stands for "Adaptive and Cooperative Technologies for the Intelligent Traffic". This German research initiative brings together 28 partners - automobile manufacturers and suppliers, electronic, telecommunication and software companies as well as research institutions.</p> <p>With the goal of improving both traffic safety and traffic flow in the future, the partners are working together to design, develop, and evaluate novel driver assistance systems, knowledge and information technologies, solutions for efficient traffic management and "car-to-car" and "car-to-infrastructure" communication for future cooperative vehicle applications.</p> <p>The initiative AKTIV consists of the three projects:</p> <ul style="list-style-type: none"> • Active Safety (developing novel driver assistance systems in order to provide a higher standard of traffic safety) • Traffic Management (coordinating innovative traffic management technologies in order to improve the efficiency of the road transportation network) • Cooperative Cars (to optimize targeted transmission of traffic data via mobile communication networks)
Financial Details	<ul style="list-style-type: none"> • Active Safety - project cost: €37.5m, of which €15m is funded by the Ministry of Economic Affairs and Technology (BMW i) • Traffic Management - project cost: €18m, of which €10m is funded by BMW i • Cooperative Cars - project cost: €4.2m, of which €2.1m is funded by the Ministry of Education and Research (BMBF)
Timing	To 2010
Governance and management	
Participants	28 partners cooperate in the three projects of the initiative AKTIV - automobile manufacturers and suppliers, electronic, telecommunication, and software companies as well as research institutes. Numerous university and research institutes as well as small to medium-sized companies are also contributing to the projects as subcontractors.
Evaluation and Impact	
Downloaded Documents	Presentation of the programme: http://www.aktiv-online.org/englisch/img/AKTIV-Factsheet-E.pdf

Scheme Name	'Intelligent Logistics'
Country	Germany
Category	Transport R&D programme
Description	<p>This programme is part of the umbrella programme 'Mobility and Transport'. It focuses on organisational process optimisation in logistics, which are intended to counteract the trend of ever increasing freight traffic on roads. At least one of the following objectives are to be attained with this programme:</p> <ul style="list-style-type: none"> - Avoiding traffic (by at least 10%) - More freight on rail and ship (by at least 10%) - Decreasing mileage through more efficient use of vehicle capacity (by at least 10%). <p>Moreover, the programme is to contribute to</p> <ul style="list-style-type: none"> - safeguarding and creating jobs - improving competitiveness of logistics firms, especially SMEs - opening up markets and maintaining market shares in existing markets - introducing product and process innovations and logistical services
Financial Details	Up to 15 million euros

Timing	2006-2010
Governance and management	The Federal Ministry of Economic Affairs and Technology is in charge of the initiative. It is managed by the programme management firm TÜV Rheinland Consulting/PT MVBW (Projektträger Mobilität und Verkehr, Bauen und Wohnen).
Participants	Firms, universities, research institutes, engineering firms. The programme addresses primarily firms from the transport sector (e.g. forwarding firms) as well as industrial development partners from the automotive and railway sector.
Evaluation and Impact	
Downloaded Documents	http://www.bmwi.de/BMWi/Navigation/Presse/pressemitteilungen.did=157636.html (in German)

Scheme Name	FVV Automotive
Country	Germany
Category	Institution
Description	<p>The Fraunhofer-Gesellschaft is the largest institution for applied science in Europe.</p> <p>As part of the institution, the Fraunhofer Transport Alliance was formed in March 2003, and currently represents the combined traffic-engineering expertise of nineteen Fraunhofer Institutes. It offers technical and conceptual products and services for public as well as industrial clients and accompanies their transfer into practical application.</p> <p>FVV-Automotive is an initiative of the Fraunhofer Transport Alliance FVV. Its main competences cover the following areas:</p> <ul style="list-style-type: none"> - Safety, reliability, durability and testing - Production and process planning and optimisation - Inspection and quality assurance - Modelling and simulation - Processing, manufacturing and assembling - Materials and structures - Development tools and organisation - Comfort, new functions and services - Logistic, product and material circles. <p>FVV-Automotive works as a virtual research institute, which gathers the competences of 19 Fraunhofer institutes in the field of automobile technology and gives the opportunity to find contact persons. Each institute decides on which projects it will carry out, and FVV-Automotive does not seem to determine any overall strategy or priority areas.</p>
Financial Details	FVV-Automotive has no proper budget, and it appears to be difficult to separate the budget that the 19 institutes dedicate to research on automotive from the budget allocated to other types of research.
Timing	Since 2003
Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	http://www-fvv.Impl.fhg.de/website/index.php?page=331

Scheme Name	High-Tech Strategy
-------------	--------------------

Country	Germany
Category	General R&D programme
Description	<p>With this new strategy, implemented at the end of 2006, the German government aims “to turn Germany into the most research-friendly nation in the world by the year 2020”, and sets the goal to raise research expenditure to 3% of gross domestic product by 2010.</p> <p>As part of this strategy, the National Hydrogen and Fuel Cell Technology Innovation Programme, launched in May 2006 with the objective to boost hydrogen and fuel cell research in Germany, will continue the work done to date. A new research programme for automotive and transport technologies will also be developed. This programme will be aimed at ensuring and expanding Germany's standing as Europe's logistics hub, ensuring individual mobility and modernising Germany's infrastructure with the help of IC technologies.</p>
Financial Details	The German government plans to invest some €14.6 billion in its High-Tech Strategy in the years 2006 through 2009. Some €2 billion of this amount will be earmarked for research in energy technologies (including hydrogen and fuel cells), while €770 million will be earmarked for automotive and traffic technologies.
Timing	2006-2009
Governance and management	Brought into being by Federal Minister of Education and Research Dr Annette Schavan and composed of representatives from the industrial and science sectors, the Industry-Science Research Alliance on the Technology Prospects of Markets of the Future will provide flanking support for the implementation and continued development of the High-Tech Strategy. This will entail advising on the strategic elaboration of the concrete cross-cutting measures as well as drafting recommendations for individual fields for innovation work with the help of the relevant ministries. This will be done in close co-operation with high-ranking specialist bodies (such as the Energy Summit and the IT Summit).
Participants	
Evaluation and Impact	The implementation of the High-Tech Strategy will be reviewed on a regular basis. The German government will conduct an initial review and report on progress achieved to date in September 2007. Starting in 2008, the Federal Government Report on Research and Innovation will document the progress being made.
Downloaded Documents	Presentation of the strategy: http://www.bmbf.de/pub/bmbf_hts_lang_eng.pdf

Scheme Name	National Hydrogen and Fuel Cell Technology Innovation Programme
Country	Germany
Category	General R&D programme
Description	<p>The aim of the Innovation Programme is to significantly strengthen application-oriented research and development activities in the fields of hydrogen and fuel cell technology with a view to deploying these technologies in transport and in buildings including in large Public Private Partnership (PPP) demonstration projects such as the Clean Energy Partnership (CEP) project in Berlin.</p> <p>Specifically, the Ministry of Education and Research will coordinate basic research and portable fuel cell R&D, while the Ministry of Economic Affairs and Technology will be responsible for R&D and demonstration projects as well as commercialisation programmes for stationary hydrogen/fuel cell applications (in coordination with the Ministry of Transport if appropriate).</p>
Financial Details	The total budget will be 1 billion euros, half of which from the private sector. A large share of the budget (65%) will be used for demonstration projects designed to systematically prepare components and systems for full-scale commercialisation in terms of reliability and suitability for everyday use (with a focus on transport applications).
Timing	2006-2016
Governance and	The programme will be funded by the Ministry of Transport, Building and Urban Affairs (BMVBS), the Ministry of Education and Research (BMBF), the Ministry

management	of Economic Affairs and Technology (BMW), as well as the private sector. The Hydrogen and Fuel Cell Strategy Council, composed of government, industry and academia representatives, will draw up a detailed development plan for the next 10 years. A Programme Office will be set up to manage the programme, in cooperation with existing organisations such as the Jülich project management firm.
Participants	
Evaluation and Impact	
Downloaded Documents	Presentation of the programme: http://www.nkj-ptj.de/datapool/page/59/H2FCStrategyengIV8May2006.pdf National development plan: http://www.nkj-ptj.de/datapool/page/59/NatDevPlan1.1_EN.pdf

Scheme Name	Clean Energy Partnership (CEP)
Country	Germany
Category	Demonstrations, pilots and procurement of prototypes
Description	The Clean Energy Partnership was formed in June 2002, with the objective to “keep tomorrow’s society mobile with clean fuels without any greenhouse gas emissions”. More specifically, the partnerships aims to tap the technological potential of hydrogen as a source of energy, conducting tests with a view to suitability for routine use and system capability. A demonstration project was launched in November 2004 in Berlin. It consists of the hydrogen infrastructure of two hydrogen filling stations, a fleet of 17 hydrogen cars, a hydrogen information centre and a service station for hydrogen vehicles. It is Europe’s largest and technologically most advanced transport sector hydrogen demonstration project. The programme was integrated in the National Hydrogen and Fuel Cell Technology Innovation Programme in 2006.
Financial Details	CEP partner companies and the German Federal Government’s “Sustainable Energy Strategy for Germany” invested a total of 33 million euros, 5 million of which are public funds.
Timing	2002-2007
Governance and management	The programme is funded and managed by the Federal Government and private companies.
Participants	The CEP is an association of the following companies: Aral, BMW, Berliner Verkehrsbetriebe (BVG), DaimlerChrysler, Ford, GM/Opel, Hydro, Linde, TOTAL, Vattenfall Europe and Volkswagen AG.
Evaluation and Impact	
Downloaded Documents	http://www.cep-berlin.de/index_eng.html

Scheme Name	Framework Programme Materials Innovations for Industry and Society - WING
Country	Germany
Category	General R&D programme
Description	The framework programme is divided into 10 fields of action, which can be subsumed under three headings: - Visions through interdisciplinarity: 1. Nanotechnology material concepts 2. Computational materials science 3. Bionic materials - Life, health, and society: 4. Materials, chemistry and life sciences 5. Substances and reactions

	<p>6. Thin films and interfaces - Mobility, energy, and information: 7. Lightweight construction 8. Resource-efficient materials 9. Intelligent materials 10. Electromagnetic functional materials</p> <p>The ten fields of action address the most important materials-based industries in Germany. Lightweight construction, resource-efficient materials and intelligent materials are particularly relevant to the automotive industry.</p>
Financial Details	<p>Funding goes to collaborative research between industrial enterprises and research institutions. The assessment of the funding quota in industrial collaborative research is governed by national regulations and the Community framework for State aid for R&D, i.e. up to 50% for the R&D state 'industrial research' and up to 25% for the R&D state 'pre-competitive development'. For small and medium-sized enterprises the funding quota may be increased by up to 10%. University and comparable institutes can be funded up to 100% in industrial collaborative research.</p> <p>WING has a yearly budget of approximately 90 million euros.</p>
Timing	Since the beginning of 2004
Governance and management	The Federal Ministry of Research and Education (BMBWi) is in charge of the programme. The programme is managed by the project management firm Jülich.
Participants	Research institutes, companies.
Evaluation and Impact	
Downloaded Documents	<p>http://www.fz-juelich.de/wing/WING_Das_Rahmenprogramm/ (link to English publication) http://www.fz-juelich.de/ptj/wing/ (in German) http://www.bmbf.de/de/3780.php (in German)</p>

Scheme Name	Microsystems Framework Programme
Country	Germany
Category	General R&D programme
Description	<p>The Microsystems Framework Programme provides targeted funding for areas in which a leverage effect can be achieved in terms of growth and employment and in which German research and industry can be strengthened in international competition.</p> <p>The four areas of innovation are:</p> <ul style="list-style-type: none"> - Life sciences - Industrial production - Mobility - System Integration. <p>10 priority topics have been identified within these areas. Among them, Smart Labels, driver assistance systems, micro-fuel cells and microsystems with self-sufficient energy supply can find applications in the automotive industry.</p>
Financial Details	The overall budget of the programme is about €260 million.
Timing	2004-2009
Governance and management	The scheme is managed and funded by the Federal Ministry of Education and Research (BMBF).
Participants	
Evaluation and Impact	<p>The development of the programme is assessed and documented annually on the basis of interim project results and superior activities.</p> <p>Programme-integrated monitoring is complemented by an external assessment, which should start in 2006. The result of that assessment will decide if public</p>

	support is granted for another term extending to 2009.
Downloaded Documents	Presentation of the programme: http://www.bmbf.de/pub/microsystems.pdf

Scheme Name	5 th Energy Research Programme
Country	Germany
Category	General R&D programme
Description	<p>The 5th Energy Research Programme was launched in 2005. It was developed by the then Ministry of Economic Affairs and Labour, with the assistance of the Ministries of Environment (BMU), of Food, Agriculture and Consumer Protection (BMELV) and of Education and Research (BMBF). The programme will fund research and development for modern energy technologies, and aims to encourage research investment in industry.</p> <p>Research and development in the field of fuel cells and hydrogen are funded under the “efficient energy conversion” sub-programme. The government focuses its fuel cell R&D funding on those with the best chances of a quick market introduction, and encourages technologies for hydrogen storage. However, the programme has so far focused more on industrial fuel cells, home appliances and the development of components rather than on automotive applications.</p>
Financial Details	<p>The total budget of the 5th Energy Research Programme is 1.7 billion euros. Funds of about 455 million euros are earmarked for the project-oriented funding of research and development in the field of “efficient energy conversion”. These funds will be used for individual projects, collaborative projects and for enhancing links between basic research and application-oriented research and for the first demonstration projects.</p> <p>Funding will be provided in the form of grants. The rates for funding are subject to the standard upper limits of the guidelines for grants of the European Union. This means that in the case of application-oriented projects, as generally performed by industrial enterprises, up to 50 % of costs can be financed.</p>
Timing	2005-2008
Governance and management	<p>The Ministries responsible for the “efficient energy conversion” field, and thus R&D in the field of fuel cells and hydrogen, are the Ministry of Economic Affairs and Technology (BMWi) and the Ministry of Education and Research (BMBF). This part of the programme is managed by the project management firm Jülich GmbH.</p> <p>Whether the topic on which a project idea is based is eligible for funding can only be decided in the individual case by the ministries responsible and the project management organisations entrusted by the ministries with the implementation of the research programme. The project management organisations examine every project submitted with respect to its innovation content as well as the expertise and the credibility of the applicant. Moreover, they also assess the possible contribution that the project may make to the funding aims of the Energy Research Programme. If these criteria are satisfied, funding can be taken into consideration. The final funding decision is taken by the ministry responsible.</p>
Participants	Applications may be made by companies with production sites in Germany, in particular SMEs, universities as well as non-university research institutions based in Germany and other institutions or legal entities. The project must be implemented and exploited in Germany. Another basic condition for funding is that applicants should make a contribution of their own to the research project.
Evaluation and Impact	
Downloaded Documents	http://www.bmwi.de/BMWi/Navigation/Energie/energieforschung.html (with link to English publication)

Scheme Name	National Hydrogen and Fuel Cell Technology Innovation Programme
Country	Germany
Category	General R&D programme
Description	The aim of the Innovation Programme is to significantly strengthen the application-oriented research and development activities in the fields of hydrogen and fuel cell technology with a view to deploying these technologies in transport and in buildings including in large Public Private Partnership (PPP) demonstration projects such as the Clean Energy Partnership (CEP) project in Berlin. Specifically, the Ministry of education and research will coordinate basic research and portable fuel cell R&D, while the ministry of economics and technology will be responsible for R&D and demonstration projects as well as commercialisation programmes for stationary hydrogen/fuel cell applications (in coordination with the Ministry of transport if appropriate).
Financial Details	The total budget will be 1 billion euros, half of which from private sector. A large share of the budget (65%) will be used for demonstration projects designed to systematically prepare components and systems for full-scale commercialisation in terms of reliability and suitability for everyday use (with a focus on transport applications).
Timing	2006-2016
Governance and management	The programme will be funded by the Ministry of transport, building and urban affairs (BMVBS), the Ministry of education and research (BMBF), the Ministry of economics and technology (BMWt), as well as the private sector. The Hydrogen and Fuel Cell Strategy Council, composed of government, industry and academia representatives, will draw up a detailed development plan for the next 10 years. A Programme Office will be set up to manage the programme, in cooperation with existing organisations such as the Jülich project management agency.
Participants	
Evaluation and Impact	
Downloaded Documents	Presentation of the programme: http://www.nkj-ptj.de/datapool/page/59/H2FCStrategyenglV8May2006.pdf National development plan: http://www.nkj-ptj.de/datapool/page/59/NatDevPlan1.1_EN.pdf

Bavaria

There are a multitude of programmes, clusters, networks of competence, centres of competence, etc. on the Länder level. By way of an example, we have listed a selection of policy interventions in Bavaria, as Bavaria hosts important automobile producers and suppliers.

Scheme Name	Alliance Bavaria Innovative/Cluster 'Automotive'
Country	Germany, Bavaria
Category	Other innovative arrangement
Description	In the context of its innovation policy, Bavaria has set up the 'Alliance Bavaria Innovative' which rests on two pillars. The first pillar is a cluster policy: the Bavarian government has identified 19 clusters, one of which is an automotive cluster, which it has decided to support. The second second pillar of 'Alliance Bavaria Innovative' aims at boosting cross-sectoral regional networks. Missions of the automotive cluster include: - Identifying and prioritising themes in collaboration with representatives from academia and industry; - Identifying and accompanying projects involving firms and research institutes; - Designing and organising thematic conferences, partly in collaboration with BAIKA and other clusters; - Regional activities

Financial Details	The Alliance Bavaria Innovative receives 50 million euros from the Bavarian Ministry of Economic Affairs over a period of five years. The money comes from the privatisation of state-owned companies.
Timing	Since mid-2006. The policy is limited to 5 years.
Governance and management	The cluster 'Automotive' is governed by a board consisting of 15 persons from industry and academia.
Participants	The target group for the project is: <ul style="list-style-type: none"> - automotive component suppliers; - component, module and system suppliers, service providers; - firms in the areas of electrical and mechanical engineering, metal processing, plastic, ceramics, glass, logistics, computer technology, order development, etc. - firms with a minimum turnover of approx. 25% in the automotive component sector; - firms intending to take the next step towards co-operation, qualification and information acquisition
Evaluation and Impact	
Downloaded Documents	www.stmwivt.bayern.de/cluster/Bayerische_Clusterpolitik.pdf (in German) http://www.allianzbayerninnovativ.de/cluster/ (in German) http://www.invest-in-bavaria.com/BavariasClusters/index.html (in English)

Scheme Name	Network BAIKA - Bavarian Innovation and Cooperation Initiative for the Automobile Suppliers Industry
Country	Germany, Bavaria
Category	Other innovative arrangement
Description	<p>The Bavarian state government has set up the "Bavarian Innovation and Co-operation Initiative for the Automotive Components Industry". In co-operation with the car manufacturers and component suppliers, the government intends to concentrate resources and activate previously unused potential. The initiative has the following goals:</p> <ul style="list-style-type: none"> - maintenance and further expansion of international competitiveness - securing existing jobs and creating new jobs - improvement of co-operation between component suppliers and between component suppliers and car manufacturers. <p>BAIKA offers the following services:</p> <ul style="list-style-type: none"> - congresses with exhibition; - international "One-on-One" - co-operation forums; - Bavarian-wide cooperation forums and cluster; - technology working-circles and workshops; - joint booths on international fairs; - company competence profiles integrated as homepage in BAIKA-Online; - monthly Information-Service - BAIKA eLetter with automotive and BAIKA news; - participation in individual, confidential cooperation projects <p>The cluster does not fund R&D.</p>
Financial Details	5 million euros from the Bavarian Ministry of Economic Affairs.
Timing	Since 1997
Governance and management	<p>The project is co-ordinated by Bayern Innovativ GmbH, which is a publicly held company initiated by the Bavarian State Government.</p> <p>An advisory council is composed of car manufacturers, automotive component suppliers, employee representatives, chambers of commerce, associations, banks and experts.</p>
Participants	The target group for the project is:

	<ul style="list-style-type: none"> - automotive component suppliers; - component, module and system suppliers, service providers; - electrical and mechanical engineering, metal processing, plastic, ceramics, glass, logistics, computer technology, order development, etc. - minimum turnover of approx. 25% in the automotive component sector; - intention of taking the next step towards co-operation, qualification and information acquisition.
Evaluation and Impact	
Downloaded Documents	http://www.baika.de/portal/baika_index_en.html

Scheme Name	Technology programme 'Microsystems technology'
Country	Germany, Bavaria
Category	General R&D programme
Description	Microsystems technology allows to develop new products and to improve existing products in virtually all sectors relevant to the German and the Bavarian industry (particularly the automotive industry). The programme funds research partnerships between firms or between firms and research institutes. It is aimed at small and medium-sized firms.
Financial Details	The Bavarian government funds up to 50% of the total costs of a project. The project volume is approximately 5 million euros per annum, of which the Bavarian government funds 2 million euros. Approximately 1 million euros goes to automotive suppliers.
Timing	Since mid-1994
Governance and management	Projects are selected by the project management firm VDI-VDE-IT, which acts on behalf of the Bavarian Ministry of Economic Affairs.
Participants	Firms (especially SMEs) and research institutes.
Evaluation and Impact	It is estimated that the programme has lead to 1,300 highly qualified jobs. 75% of the participating firms are SMEs. For about half of the firms, the programme meant a first step in taking up microsystems technology.
Downloaded Documents	http://www.stmwivt.bayern.de/technologie/technologief.html (in German) http://www.mst-bayern.de/ (in German)

Scheme Name	Technology programme 'New materials'
Country	Germany, Bavaria
Category	General R&D programme
Description	The focus of the programme is on the following topics: metals; polymers; ceramics and glass; composite materials; general materials-related problems. The programme funds research partnerships between firms or between firms and research institutes. It is aimed at small and medium-sized firms.
Financial Details	The Bavarian government funds up to 50% of the total costs of a project. The Bavarian government spends approximately 4 million euros per annum, a part of which goes to automotive suppliers.
Timing	Since 1990. The current EU notification expires at the end of 2012.
Governance and management	The Bavarian Ministry of Economic Affairs is in charge of the programme. Programme management is carried out by the project management firm Jülich/Division NMT.
Participants	Firms (especially SMEs) and research institutes.
Evaluation and Impact	
Downloaded Documents	http://www.fz-juelich.de/ptj/werkstoffe-bayern/ (in German) http://www.mst-bayern.de/ (in German)

Scheme Name	Automotive Engineering Centre Bavaria (Automobiltechnikum Bayern in Hof)
Country	Germany, Bavaria
Category	Institution
Description	The Automotive Engineering Centre is a research and development organisation/competence centre that provides automotive suppliers with the possibility to test systems, components and innovations in terms of vehicle safety, operational durability and to conduct environmental simulations on-site. It is located adjacent to the Automotive Supplier's Park (Automobilzulieferpark Hof-Gattendorf), an 360 acres industrial development area for automotive suppliers in Upper Franconia. There is no legal relationship between the two. However, the idea is to make the industrial development site more attractive to automotive suppliers by its close proximity to the Automotive Engineering Centre.
Financial Details	The Engineering Automotive Centre received 10 million euros from the Land Bavaria.
Timing	Since January 2005
Governance and management	The Automotive Engineering Centre is a publicly held company ('GmbH') owned by the districts of Hof and Wunsiederl i.F., LfA Förderbank Bayern, Sparkasse Fichtelgebirge, Sparkasse Hof, city of Hof.
Participants	The districts of Hof and Wunsiederl i.F., LfA Förderbank Bayern, Sparkasse Fichtelgebirge, Sparkasse Hof, city of Hof, Bavarian Ministry of Economic Affairs.
Evaluation and Impact	
Downloaded Documents	http://www.gewerbepark-hochfranken.de/en_willkommen.html

A.7 Australia

Scheme Name	Automotive Competitiveness and Investment Scheme (ACIS)
Country	Australia
Category	Vehicle R&D programme
Description	<p>The Automotive Competitiveness and Investment Scheme (ACIS) has been introduced by the Australian Government to guide the development of the automotive industry post 2000. ACIS is directed towards encouraging new investment and innovation in the automotive industry in the context of a reduction in the automotive tariff on passenger motor vehicles and automotive components from 15% to 10% in 2005, and from 10% to 5% from 1 January 2010.</p> <p>The Scheme commenced on 1 January 2001 and will conclude on 31 December 2015. It consists of three stages:</p> <ul style="list-style-type: none"> - ACIS Stage 1 (2001-2005) - ACIS Stage 2 (2006-2010) - ACIS Stage 3 (2011-2015).
Financial Details	<p>ACIS rewards production, investment and research and development through the quarterly issue of import duty credits to registered participants. These credits can be used to discharge customs duty on eligible automotive imports. Duty credits can also be sold or otherwise transferred.</p> <ul style="list-style-type: none"> - ACIS Stage 1: €1.62 billion was delivered over 2001-2005. - ACIS Stage 2: Capped incentives will be limited to €1.18 billion; the programme will include the €88.5 million Motor Vehicle Producer Research and Development Scheme (MVP R&D Scheme). - ACIS Stage 3: Capped incentives will be limited to €590 million, with assistance declining progressively over the period. <p>A further €1.18 billion is uncapped funding for the period of the scheme (2001–2015).</p> <p>MVPs will be able to claim import duty credit equal to:</p> <ul style="list-style-type: none"> - 25% of the value of production of motor vehicles, engines and engine components, multiplied by the relevant tariff rate; and - 10% of the value of new investment in plant and equipment. <p>ACPs, AMTPs and ASPs will be able to claim import duty credit equal to:</p> <ul style="list-style-type: none"> - 25% of the value of new investment in plant and equipment; and - 45% of the value of investment in R&D.
Timing	Since 2001
Governance and management	<p>The scheme is administered by AusIndustry, the Australian Government's agency for industry, research and innovation, which is part of the Department of industry, tourism and resources.</p> <p>The programme is not competitively-based.</p>
Participants	<p>Eligible participants are:</p> <ul style="list-style-type: none"> - motor vehicle producers (MVPs) - automotive component producers (ACPs) - automotive machine tool and automotive tooling producers (AMTPs) - automotive service providers (ASPs).
Evaluation and Impact	<p>Deloitte Touche Tohmatsu carried out an impact study in May 2002. This study concluded that ACIS was:</p> <ul style="list-style-type: none"> - assisting Australian subsidiaries of automotive manufacturers to secure approval for new investments in plant and equipment and for the development of new products; - improving company and technical efficiency by supporting investments in new state-of-the-art capital equipment and encouraging manufacturing process improvements; - creating a pool of 'patient' capital to fund R&D activity;

	<p>- improving dynamic efficiency within the Australian automotive industry by assisting its capability to respond to global market opportunities, particularly through R&D and product innovation.</p> <p>The Standing Committee on Employment, Workplace Relations and Workforce Participation stated in a report (2006) that 64% of the assistance paid to automotive component suppliers under ACIS related to R&D, while 36% was for plant and equipment. The same committee acknowledges that there is a review due to occur in 2008, and notices that, while ACIS was initially established to support the structural readjustment necessary after the change to tariffs, the industry and the economy has since undergone significant changes. There is evidence to indicate that the emergence of China, India and Thailand are causing rapid changes within the Australian automotive industry. The committee thus concludes that there are strong drivers for ACIS to be restructured to focus on supporting the industry to grow and respond to these competitive pressures rather than maintaining its current form.</p>
Downloaded Documents	<p>Presentation of the scheme: www.ausindustry.gov.au/content/content.cfm?ObjectID=8ABD6529-FB8F-4DF4-A9F0FFCAC0506043&L2Parent=AEB901E5-7CB8-4143-A3BF33B2423F9DA6&L3Parent=75AFC6C0-A9D9-4953-8B4C50DE1EA042DB</p>

Scheme Name	ACIS 2 Motor Vehicle Producer Research & Development Scheme (MVP R&D Scheme)
Country	Australia
Category	Vehicle R&D programme
Description	<p>This component of the ACIS scheme Stage 2 will provide motor vehicle producers with access to R&D assistance within the MVPs' existing 55% share of the ACIS capped pool of funding.</p> <p>The MVP R&D Scheme is directed at encouraging Australian motor vehicle producers to invest in high-end R&D technologies.</p>
Financial Details	The scheme offers up to €88.5 million of assistance for R&D projects over the five-years from 2006 to 2010; is accessible to all MVPs registered under ACIS; rewards successful projects up to 45% of the total amount spent on eligible R&D; involves a minimum of two application rounds; and limits total credits over the life of the scheme for an individual MVP to €44.2 million.
Timing	2006-2010
Governance and management	<p>The scheme is administered by the Department of industry, tourism and resources. The secretary verifies that proposed projects are eligible R&D projects, and takes the final decision in determining which projects will receive credits under the scheme. In making this decision, the secretary considers factors including:</p> <ul style="list-style-type: none"> - the merit ranking provided by the assessment panel (made of the automotive committee of the Industry Research and Development Board or the Board itself); - available credits; - the amount of credits already issued to individual MVPs; - the objective of the scheme. <p>The assessment panel assesses each project against 4 merit criteria:</p> <ul style="list-style-type: none"> - the calibre of new R&D activity to be generated in Australia by proposed projects; - the technical merit of the proposed activities; - the level of benefit, including environmental benefit, to the wider Australian community of proposed projects; - the contribution of proposed projects to the sustainability of an internationally competitive automotive industry in Australia.
Participants	All motor vehicle producers registered under ACIS are eligible in the scheme.
Evaluation and Impact	
Downloaded Documents	<p>Presentation of the scheme: www.ausindustry.gov.au/content/content.cfm?ObjectID=2B34AE7A-2AF3-4678-</p>

	AD461EC4B21E0939&L2Parent=AEB901E5-7CB8-4143-A3BF33B2423F9DA6&L3Parent=75AFC6C0-A9D9-4953-8B4C50DE1EA042DB
--	--

Scheme Name	Reduction in automotive tariffs
Country	Australia
Category	R&D tax incentive
Description	In 2005, the automotive tariffs on passenger motor vehicles and automotive components were reduced from 15% to 10%. They will then fall to 5 per cent from 1 January 2010 until (at least) 2015.
Financial Details	See above
Timing	2005-2015
Governance and management	Australian Government
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Country	Australia
Category	Institution
Description	<p>CSIRO, Australia's national science agency, is accountable to the Minister for education, science and training and is part of the Education, Science and Training portfolio.</p> <p>It carries out several research projects in the field of automotive transport, across a wide range of areas such as achieving improved fuel economy and lower emissions through innovations in hybrid vehicle technology.</p> <p>Some specific activities involve:</p> <ul style="list-style-type: none"> - Development of innovative casting technologies. <p>CSIRO is a member of the CRC for Cast Metals Manufacturing (CAST), a collaborative initiative involving Australian government research agencies, universities, smelting companies, manufacturers and die-casting companies.</p> <ul style="list-style-type: none"> - Design and development of energy-efficient electric machines - Development of fuel cell powered cars.
Financial Details	
Timing	
Governance and management	The CSIRO Board (9 members) is responsible to the Government for the overall governance, strategy and performance of the organisation.
Participants	
Evaluation and Impact	
Downloaded Documents	CSIRO annual report 2005-06: http://www.csiro.au/files/files/pak9.pdf

Scheme Name	Auto CRC
Country	Australia
Category	Institution

Description	<p>The Cooperative Research Centre for Advanced Automotive Technology (AutoCRC) was created in December 2005, as part of a national strategy to secure Australia's position in the global automotive industry.</p> <p>AutoCRC aims to deliver outcomes that will directly enhance the viability and sustainability of the Australian automotive industry, its capability to export and its productivity through:</p> <ul style="list-style-type: none"> - Reduced concept-to-product cycle times - Improved manufacturing flexibility and efficiency - New material systems to meet the challenges of weight reduction, increased safety and enhanced functionality. - Improved air quality and reduced consumption of fossil fuels - Safer, crashworthy vehicles and intelligent products and systems for increased comfort and performance with minimum driver distraction. <p>AutoCRC has four broad research themes, with up to 25 projects commencing in the first year of operation:</p> <ul style="list-style-type: none"> - Materials and sustainable manufacturing - Powertrains, fuels and emissions - Safety and intelligent vehicle systems - Virtual design and manufacturing.
Financial Details	<p>Auto CRC will receive AUS \$ 68 million (€40.1m) over 7 years:</p> <ul style="list-style-type: none"> - Commonwealth Government: €22.7m - Industry: €10m - University and State Governments: €7.4m
Timing	Since December 2005
Governance and management	A small management team manages the day-to-day affairs of the company and communication with participants. It reports through the CEO to the Board of Directors (eight) which is ultimately responsible for the activities.
Participants	<p>The participants are eight leading vehicle and component manufacturers, two state governments and ten research institutions:</p> <ul style="list-style-type: none"> - Industry Participants: Australian Arrow Pty Ltd; Air International Thermal Pty Ltd; Futuris Automotive Interiors (Australia) Pty Ltd; GKN Aerospace Engineering Services Pty Ltd; GM Holden Ltd and GM Global Technology Operations Inc; Mitsubishi Motors Australia Ltd; Seeing Machines Ltd - Research Participants: The Australian National University; Commonwealth Scientific and Industrial Research Organisation; Deakin University; La Trobe University; Monash University; Queensland University of Technology; Royal Melbourne Institute of Technology; Swinburne University of Technology; The University of South Australia; Victorian Partnership for Advanced Computing Ltd - Supporting Participants: Dept of Innovation Industry and Regional Development (Victoria); Dept of Trade and Economic Development (South Australia); Intelligent Transport Systems Australia Inc.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	ITS Australia
Country	Australia
Category	Other innovative arrangement
Description	<p>Established in 1992, Intelligent Transport Systems Australia (ITS Australia) is an organisation focused on facilitating the development and deployment of advanced technologies across all modes of transport; air, sea, road and rail. ITS Australia is an incorporated, not-for-profit organisation representing members of the ITS Industry including government, consumer organisations and academia.</p>

	<p>IST Australia organises and participates in conferences, seminars and events, in order to promote development of ITS technology and develop collaborative opportunities.</p> <p>In 2005, ITS Australia inaugurated the Victoria Intelligent Transport Systems Centre (ITSVIC), which objectives include:</p> <ul style="list-style-type: none"> - coordinating R&D activities in ITS - demonstrating best of breed solutions to local and global buyers - recommending direction of research and government funding - developing access to sources of venture capital where needed - hosting workshops, conferences and training programmes.
Financial Details	Approximately 580,000 euros were spent in 2005.
Timing	Since 1992
Governance and management	ITS Australia is managed on behalf of the members by a Board of Directors and a small Executive team.
Participants	Over 90 organisations and companies involved in ITS, including infrastructure providers, hardware suppliers, content aggregators and suppliers, service providers, vehicle manufacturers and transport companies.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Automotive Centre of Excellence (ACE)
Country	Australia
Category	Institution
Description	<p>The ACE is being developed in Melbourne in partnership with the Victorian Government and Kangan Batman Institute of TAFE (Victoria's largest provider of automotive training).</p> <p>The ACE concept has been developed in consultation with the automotive industry which has identified the need for:</p> <ul style="list-style-type: none"> - increased innovation capabilities within the industry; - a better, more integrated approach to education and training, and research and development; - highly-skilled staff trained in the latest technology; - centralising of training to allow resource sharing and the ability to constantly update technology; - on-going professional development for existing staff, in particular in leadership training for management staff, bringing together the TAFE, university and corporate education and training systems. <p>The ACE is being constructed in four stages. Stage one brings together automotive training and R&D facilities, but has the capacity to become a centralised showcase for all automotive products and services. The ACE aspires to become the largest and most advanced automotive training facility in the Southern Hemisphere.</p>
Financial Details	Stage One was funded by the Office of Training and Tertiary Education (part of the Victorian Government). €11 million of funding was received, consisting of € 8 million for the building, with the remainder spent on equipment.
Timing	Since September 2006
Governance and management	ACE is managed by Kangan Batman TAFE, which is currently working to attract both public and private funding from appropriate organisations, to complete planning and design work for further stages of the ACE.
Participants	
Evaluation and Impact	

Downloaded Documents	
----------------------	--

Scheme Name	Ad-hoc assistance
Country	Australia
Category	Unofficial subsidy mechanism
Description	<p>Australian governments, State and Federal, have provided firm-specific and project-specific assistance to local automotive assemblers over recent years. Some examples since 2002 are:</p> <ul style="list-style-type: none"> - In 2002, Mitsubishi Motors was given €50 million of combined Australian and South Australian Government assistance for the creation of an R&D facility and 900 new jobs. - In 2006, Ford Australia was given a financial assistance package of €31 million for design, engineering and manufacturing projects, an R&D facility and the creation of 273 new jobs. - In 2006, GM Holden was given €7.9 million of combined Australian, South Australian and Victorian Government assistance for R&D and training aimed at safety, fuel management improvements and the reduction in greenhouse gas emissions in some models. <p>The assistance was given on condition that the local component sector was given 'every fair and reasonable opportunity to supply necessary components for these projects.'</p>
Financial Details	See above
Timing	No timeframe
Governance and management	Australian governments, State and Federal
Participants	Automotive manufacturers
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Sustainable Transport Energy Program (STEP)
Country	Australia
Category	General R&D programme/ Demonstrations, pilots, procurement of prototypes
Description	<p>STEP is a major programme of the Western Australian Government designed to increase the sustainability of its transport systems and activities.</p> <p>The programme includes research and field trials involving biofuels, hybrid vehicles, and fuel cell buses. Three DaimlerChrysler/EvoBus hydrogen fuel cell buses have been placed on normal service routes in Perth for two years from September 2004. The Western Australian Government has also committed to buy 20 hybrid cars as part of a trial of hybrid vehicles in collaboration with other Governments around Australia.</p> <p>The project hopes to determine the critical technical, environmental, economic, and social issues facing introduction of hydrogen fuel cell buses; the Government's role in supporting a hydrogen based energy system; and what opportunities there might be for Western Australian and Australian industries.</p>
Financial Details	Overall programme costs are estimated at €8.3 million over 5 years, including € 4.4 million for the buses. The Western Australia Government has committed €4.7 million, with BP and the Australian Commonwealth Government each committing €1.5 million.
Timing	2004-2006

Governance and management	The Western Australian Government, through the Department for Planning and Infrastructure, will own the buses. They will be operated as part of the Transperth public transport system by Path Transit. BP is supplying the hydrogen fuel for the trial, produced from its oil refinery at Kwinana.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Purchasing preferences
Country	Australia
Category	Technology procurement
Description	The automotive industry also benefits from Commonwealth vehicle fleet arrangements, which provide that vehicles purchased by government agencies must be made in Australia by vehicle producers which satisfy the criteria for registration under ACIS. Imported vehicles with an engine capacity of less than 2000cc can be purchased only if marketed by local vehicle producers. Similar preference arrangements have been adopted by State Governments and, to a lesser extent, local governments.
Financial Details	
Timing	
Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	R&D Tax Concession
Country	Australia
Category	R&D tax incentive
Description	In addition to the R&D assistance received under ACIS, vehicle and automotive component producers can access the R&D Tax Concession. This is a broad-based, market driven tax concession, which allows companies to deduct up to 125% of qualifying expenditure incurred on R&D activities when lodging their corporate tax return. A 175% Incremental (Premium) Tax Concession and R&D Tax Offset are also available in certain circumstances.
Financial Details	See above
Timing	Since 2001
Governance and management	Australian Government
Participants	
Evaluation and Impact	The Department of industry, tourism and resources' 2003 evaluation concluded that the 125 per cent R&D Tax Concession is an appropriate and effective policy measure. However, whereas R&D is becoming progressively more internationalised, there was evidence regarding inaccessibility of R&D tax concessions (both through ACIS and the R&D Tax Concession scheme) to foreign-owned multinational companies and their Australian based subsidiaries.
Downloaded Documents	

Documents	
-----------	--

Scheme Name	LPG Vehicle Scheme
Country	Australia
Category	Tax incentive
Description	The Australian Government has established the LPG Vehicle Scheme to assist private use motorists with the purchase of a new LPG vehicle or the conversion of a new or used petrol or diesel vehicle to LPG.
Financial Details	Two different grants are available: - A grant of €1,180 will be paid following the LPG conversion of a new or used petrol or diesel motor vehicle. - A grant of €90 will be paid following the purchase of a new motor vehicle with an LPG unit fitted at the time of manufacture of the vehicle.
Timing	Since 2006
Governance and management	The scheme is administered by AusIndustry, the Australian Government's agency for industry, research and innovation, which is part of the Department of industry, tourism and resources.
Participants	Private motorists
Evaluation and Impact	
Downloaded Documents	Statistics: http://www.ausindustry.gov.au/library/LPG_VEHICLE_STATISTICS_09020720070216114804.pdf

A.8 Norway

Scheme Name	Arena Automotive
Country	Norway
Category	Other innovative arrangement
Description	Arena Automotive (<i>Arena Bil</i>) is a project with the aim to establish a more solid R&D platform for Norwegian automotive suppliers and to promote their activity abroad. It is a cooperative scheme between about 20 industrial companies within the automotive sector. The goal is to use and increase common competence and resources to maintain their competition strength in the international market through innovation and technology.
Financial Details	The annual budget is 4.2 million NOK, of which NOK 2m (240,000 euros) from public funds.
Timing	From 2007 to 2009
Governance and management	The project has been launched by NORPART, which gathers about 20 member companies, and is hosted by SINTEF (research organisation) together with RTIM at Raufoss.
Participants	Automotive-related companies
Evaluation and Impact	
Downloaded Documents	

Scheme Name	AluPart
Country	Norway
Category	Other innovative arrangement
Description	The main objective of AluPart is to secure future production of aluminium based automotive components within Norway. AluPart has established a platform in order to invent, develop and industrialise new and radically improved manufacturing technology.
Financial Details	The project has a total budget of 78 million NOK, of which NOK 27.3m (€2.76m) is financed through the Norwegian Research Council during the 2006-2009 period.
Timing	Since 2006
Governance and management	AluPart is a joint project between Hydro Aluminium Structures Raufoss AS, Fundo Wheels AS, Raufoss Technology AS and Steertec Raufoss AS.
Participants	In addition to these companies, main R&D partners for the project are Raufoss Technology and Industrial Management AS (RTIM), SINTEF and NTNU. Moreover, international cooperation is planned through Fraunhofer, Michigan Tech. and RWTH Aachen.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	National hydrogen platform
Country	Norway
Category	General R&D programme
Description	As part of the Norwegian Hydrogen Strategy, which aims to promote hydrogen as an energy carrier in transport and stationary energy supply, the Ministry of petroleum and energy and the Ministry of transport and communications have established the National hydrogen platform.

	<p>The platform functions as a “virtual programme”, with the objective to coordinate all current schemes and measures related to hydrogen in Norway so that they work towards a common goal.</p> <p>Government subsidy schemes linked to research, development and demonstration of hydrogen-related technologies are:</p> <ul style="list-style-type: none"> - RENERGI for general hydrogen research and research on technologies in the transport sector involving no or very low emissions; - NANOMAT for hydrogen-related materials research; - CLIMIT for hydrogen-related gas scrubbing technologies; - Demonstration projects.
Financial Details	<p>The activities in the hydrogen platform are funded through the existing programmes and agencies, depending on the field of the project.</p> <p>In 2005, approximately 9.6 million euros was spent on hydrogen-related research, development and demonstration activities, as follows:</p> <ul style="list-style-type: none"> - €3 m for RENERGI (general hydrogen research) - €2.6 m for RENERGI (research on technologies in the transport sector involving no or very low emissions) - €2.3 m for NANOMAT - €1.7 m for CLIMIT
Timing	Established in autumn 2005, in operation since 1 January 2006.
Governance and management	<p>The platform is administered through close collaboration between the Research Council of Norway, Gassnova (Centre for Sustainable Gas Technologies), Enova (public enterprise contributing to environmentally sound and rational use and production of energy) and Innovation Norway. It will be anchored in the Research Council of Norway, who will be responsible for coordination and the secretariat.</p> <p>A Strategic Advisory Board has been appointed to give advice related to the activities of the Hydrogen Strategy.</p>
Participants	Consortia between private companies, research institutes and universities.
Evaluation and Impact	
Downloaded Documents	<p>Presentation of the programme:</p> <p>http://www.forskningsradet.no/servlet/Satellite?blobcol=urlvedleggfil&blobheader=application%2Fpdf&blobkey=id&blobtable=Vedlegg&blobwhere=1143099781813&ssbinary=true</p>

Scheme Name	RENERGI (Clean Energy System for the Future)
Country	Norway
Category	General R&D programme
Description	<p>RENERGI aims to develop knowledge and solutions as the basis for environment-friendly, efficient and effective management of the Norway's energy resources, security of supply and internationally competitive economic development related to the energy sector.</p> <p>Among other activities, it funds research on technologies in the transport sector involving no or very low emissions.</p>
Financial Details	<p>The overall budget of the RENERGI programme is approximately 20 million euros annually.</p> <p>About €3 million in average is awarded every year by the Ministry of transport and communication for the “Environmentally friendly transport technologies” pillar of RENERGI, which is dedicated to demonstrations of hydrogen technologies and biofuels for use in the transport sector.</p>
Timing	2004-2013
Governance and management	<p>The Research Council of Norway is responsible for the management of the RENERGI programme.</p> <p>A Programme Committee has been appointed and is responsible for following up the Work Programme, framing a plan of action, disseminating information, etc.</p> <p>The projects are evaluated against the following criteria:</p>

	<ul style="list-style-type: none"> - research merit - relevance and user-centrism - internationalisation - co-operation between technical and social science research - projects that fulfil several goals - sales and market shares for new products.
Participants	Consortia between private companies, research institutes and universities.
Evaluation and Impact	A mid-term evaluation is planned in 2008-2009.
Downloaded Documents	Work Programme: http://www.forskningsradet.no/servlet/Satellite?ssbinary=true&blobcol=urlvedleggfil&blobheader=application%2Fpdf&blobkey=id&blobtable=Vedlegg&blobwhere=1088882926632

Scheme Name	NANOMAT
Country	Norway
Category	General R&D programme
Description	The NANOMAT programme supports research in the fields of nanotechnology and new materials. One of its objectives is to pave the way for new knowledge-based, research-intensive industry and more value added, based on new products and new technology in fields such as: sensors and smart materials, micro- and nanotechnology, new energy technology, new environmental technology, new process technology.
Financial Details	<p>The programme is funded by grants from the Research Fund (Research Council). The Ministry of education and research and the Ministry of trade and industry also provide support.</p> <p>The overall budget for the period 2002-2006 was 46.9 million euros.</p> <ul style="list-style-type: none"> - 2002: €60,000 - 2003: €6.6 m - 2004: €8.88 m - 2005: €13.68 m - 2006: €16.8 m. <p>The budgets planned for 2007 and 2008 are respectively €17.4 m and €18 m.</p>
Timing	2002-2006
Governance and management	<p>The initiative is implemented by the Research Council. The Programme Committee consists of participants from research groups and industry as well as international experts.</p> <p>In the first phase, the projects were evaluated according to the following result indicators: number of doctorates; number of post-doc positions; number of refereed articles; number of visits abroad/visiting foreign researchers engaged in joint publication; percentage of projects involving international co-operation.</p> <p>As the programme period progressed, industrial research and innovation received higher priority. This was reflected in the result indicators being expanded also to include: number of registered patents, number of new/improved products and process concepts; percentage of projects in which R&D work is implemented along a value chain or in a cluster; percentage of the funding for KMB projects (knowledge-building projects with user involvement); number of research-based new business enterprises that participate in the projects.</p>
Participants	The programme is highly interdisciplinary and targets universities, research institutions, established industry and new spin offs from these communities.
Evaluation and Impact	
Downloaded Documents	Work Programme: http://www.forskningsradet.no/servlet/Satellite?blobcol=urlvedleggfil&blobheader=application%2Fpdf&blobkey=id&blobtable=Vedlegg&blobwhere=1143470629509&ssbinary=true

Scheme Name	HyNor
Country	Norway
Category	General R&D programme
Description	HyNor is a joint industry initiative to demonstrate real life implementation of hydrogen infrastructure along a route of 580 kilometres from Oslo to Stavanger during the years 2005 to 2008. The partnership connects major industrial and energy companies, transport companies, regional and national public authorities and R&D institutes. The project aims to demonstrate the commercial viability of hydrogen energy production and use in the transport sector.
Financial Details	A total NOK 30.2 million (about 3,600,000 euros) has been earmarked for the HyNor programme. Hynor is funded by the Research Council under the RENERGI programme and by private companies.
Timing	2005-2008
Governance and management	The scheme is managed by the Research Council.
Participants	Energy companies, public transportation companies, universities, environmental organisations, vehicle and vehicle components manufacturers, public institutions
Evaluation and Impact	
Downloaded Documents	Presentation of the programme: http://www.hynor.no/pdf/engelsk-hynor-presentation.pdf

Scheme Name	RISIT (Risk and Safety in Transport)
Country	Norway
Category	General R&D programme
Description	<p>The main objective of the programme is to provide a better understanding of transport risk. Important sub-goals are to contribute to realising Vision Zero for transport safety (which states that no one should be killed or permanently injured as a result of transport accidents), analysing normative foundations of safety policy in the transport sector, studying risk in a wider social perspective and analysing how different methods of organising risk-management may affect transport safety.</p> <p>One of the programme's most important policy instruments is direct support for projects. The majority of projects should be longer than one year in length and involve a number of co-workers.</p>
Financial Details	The programme is funded by the Ministry of transport and communications, the Norwegian directorate of public roads, the Ministry of trade and industry, the Railways Authority, the Ministry of fisheries and the Aviation Authority, with a budget of approximately NOK 9 million (€1.08 m) each year.
Timing	2003-2009
Governance and management	The programme is managed by a committee composed of representatives from central user groups and interested parties in relation to transport safety.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Programme for user-driven research-based innovation (BIA)
Country	Norway
Category	General R&D programme
Description	In 2005 the Process Industry Programme, which supported R&D for car components industry (especially through research on aluminium), merged into the BIA. The objective of this programme is to increase R&D investment in Norwegian trade

	and industry by providing funding for ambitious, large-scale projects.
Financial Details	The percentage of aid allowed can vary between 25% and 50% The overall budget for 2006 was NOK 250 million (€30 million).
Timing	Since 2005
Governance and management	Research Council of Norway
Participants	The programme's target group are R&D intensive companies and companies with significant investments in R&D for which public funding is crucial to achieve their aims. The projects will be implemented by a consortium of 2-7 participants.
Evaluation and Impact	
Downloaded Documents	Presentation of the programme: http://www.forskningsradet.no/servlet/Satellite?blobcol=urlvedleggfil&blobheader=application%2Fpdf&blobkey=id&blobtable=Vedlegg&blobwhere=1148232843203&ssbinary=true

Scheme Name	SkatteFUNN
Country	Norway
Category	R&D tax incentive
Description	SkatteFUNN is a system for tax deduction of R&D expenses, established in order to encourage innovation and increase the value of trade and industry in Norway.
Financial Details	For enterprises with more than 250 employees, 18% of the expenses related to an approved R&D project may be deducted in income tax, wealth tax and national insurance tax to the state. For companies with less than 250 employees, 20% deduction is possible if these criteria are met: - the annual turnover must not exceed €40 million or the annual balance sheet total must not exceed €27 million - the enterprise is owned by a large enterprise with less than 25%. In 2004, the estimated tax deduction for Norwegian enterprises was almost NOK 1.8 billion (€216 million).
Timing	Since 2002
Governance and management	The scheme is managed by the Research Council.
Participants	Private companies
Evaluation and Impact	In a survey, carried out for the Research Council in 2005, 80% of the companies stated that SkatteFUNN had set off R&D activity which otherwise may not have been implemented. 72% of the companies said SkatteFUNN projects were central to their growth strategies.
Downloaded Documents	

Scheme Name	Ad-hoc assistance
Country	Norway
Category	Unofficial subsidy mechanism
Description	As part of this initiative to promote the development of the hydrogen economy in Norway, the Research Council of Norway has awarded a grant of NOK 11 million (€1.35m) to the company Think Nordic. This grant will partly fund the development and construction of a prototype fuel cell/electric hybrid vehicle with partner Raufoss Fuel Systems.
Financial Details	See above

Timing	In 2005
Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	

A.9 Italy

Scheme Name	Research Support Fund (FAR)
Country	Italy
Category	General R&D programme
Description	This fund supports industrial research to create new products, processes or services which improve the existing ones. There are three types of interventions: - Evaluation procedure; - Negotiation (only for PNR); - Automatic procedure.
Financial Details	<p>- Evaluation procedure The percentage of aid allowed is 20% of incentive + 70% facilitated credit for industrial research (within the limit of 50% of costs), and 10% incentive + 70% facilitated credit for pre-competitive development (within the limit of 25% of costs). The credit is currently at a rate of 2%. In 2005, 406 million euros were distributed as part of this intervention (€739m in 2002; €150m in 2003; €624m in 2004)</p> <p>- Negotiation (only for PNR) With this instrument, the Ministry identifies specific thematic areas and invites participants to send proposals in these areas. In 2005, 32 million euros were distributed as part of this intervention.</p> <p>- Automatic procedure The aid takes the form of: 25,000 euros (20,000 in the form of tax credit and 5,000 in the form of incentive) for each assumption of qualified R&D research; 50% of the amount of research contracts in the form of tax credit, with a maximum of 200,000 euros per applicant per year; 60% of the amount of grants (for doctorate courses) in the form of tax credit. The aid will be granted according to the chronological order of reception of the requests, until resources are available. In 2005, 48 million euros were distributed as part of this intervention (€49m in 2004).</p>
Timing	Since 2000
Governance and management	The Ministry of Education, Universities and Research is in charge of the management of the Fund. For the evaluation procedure, the Ministry checks the validity of the proposal and passes it on to a scientific expert , which assesses the innovativeness and pertinence of the proposal. Then the proposal is transmitted to a bank (chosen by the applicant among a list of 10), which will assess the economic aspects of the project. The final decision comes to a technical committee , composed of 11 members, all designated by various ministries.
Participants	Private companies, research centres, universities, scientific parks, consortia. Projects can be presented jointly by industrials and public research institutes.
Evaluation and Impact	
Downloaded Documents	Description of the programme (Italian): www.miur.it/0003Ricerca/0139FAR_-_0159II_nuo/index_cf3.htm

Scheme Name	Technological Innovation Fund (FIT)
Country	Italy
Category	General R&D programme
Description	The FIT funds research programmes which mainly include activities of pre-competitive development.
Financial Details	The aid takes the form of facilitated credit (up to 60% of eligible costs) and incentive (equal to the difference between 25% of costs and the amount of

	facilitated credit). In 2004, 2.490 million euros were distributed (€1.324 m in 2002; €628 m in 2003) as part of this programme.
Timing	Since 1999
Governance and management	Ministry of Economic Development (former Productive Activities Ministry)
Participants	Private companies, research centres, consortia
Evaluation and Impact	
Downloaded Documents	Decree (Italian): http://www.phiap.org/legge-46-fondo-innovazione-tecnologica-fit-2.php

A.10 Israel

Scheme Name	R&D Fund
Country	Israel
Category	General R&D Programmes
Description	The scheme supports industrial R&D projects, which must last at least one year, and result in the development of a new product or a significant improvement to an existing product. The development may also lead to a new industrial process or a significant improvement in an existing industrial process.
Financial Details	Grants are between 20 and 50% of the total approved R&D expenditures, depending on the estimated potential of individual projects. The annual budget of €225 million is spent on about 1,000 projects being undertaken by 500 companies. When a government assisted R&D project results in a commercially successful product, the company is obligated to pay royalties, which is between 3 and 5% of the product sales.
Timing	
Governance and management	The programme has been launched by the Office of the Chief Scientist, which is part of the Israeli Ministry of industry, trade and labour. Proposals are approved by a Research Committee.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Magnet
Country	Israel
Category	General R&D Programmes
Description	This scheme supports the formation of a consortium made up of industrial companies and academic institutions, in order to jointly develop generic, pre competitive technologies.
Financial Details	The budget is approximately €67,5 million per year. Grants are up to 66% of the approved budget.
Timing	
Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Generic R&D
Country	Israel
Category	General R&D Programmes
Description	This scheme encourages companies investing heavily in R&D to invest a significant percentage of funds in long-term generic R&D.
Financial Details	Grants are up to 50% of approved budget.
Timing	

Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	MATIMOP
Country	Israel
Category	Institutions
Description	MATIMOP, the Israeli Centre for R&D, is a public non-profit organization, founded by the three major associations of manufacturers in Israel. Functioning as the interface between Israeli companies and their international counterparts, it aims to promote joint developments of advanced technologies and encourages participation in the international programs for bi-lateral and multilateral cooperation in industrial R&D, signed and funded by the Office of the Chief Scientist (OCS) of the Ministry of Industry and Trade.
Financial Details	
Timing	
Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Bi-national Funds
Country	Israel
Category	Other innovative arrangement
Description	<p>This programme enables Israeli companies to participate in a joint R&D program with a foreign counterpart. The amount of support is decided upon by the appropriate authorities in each country, in accordance to the regulations and standards that are in effect at the time.</p> <p>Funds are not subject to the Law for the Encouragement of Industrial R&D-1984. The bi-national funds, financing, and operational procedures are similar to the regular programmes that benefit from support of the Office of the Chief Scientist or its counterparts in participating countries.</p> <p>10 funds have been set up, with countries such as USA, UK, Canada, Korea, Singapore, Australia.</p>
Financial Details	Grants are up to 50% of R&D expenses of each company.
Timing	
Governance and management	A board of directors, appointed by the two governments, decides on the criteria and procedures. The funds are managed and grants payments administered by a non-profit organisation.
Participants	Private companies
Evaluation and Impact	
Downloaded Documents	

Documents	
-----------	--

Scheme Name	Bi-national R&D Support Agreements
Country	Israel
Category	Other innovative arrangement
Description	The Government of Israel through the Office of the Chief Scientist has signed agreements together with other governments to actively support and encourage industrial R&D cooperation between Israeli and overseas industries. This cooperation will include access to know-how and technologies that are not otherwise readily available to the participants as well as access to new markets.
Financial Details	The programmes enable access to sources of national funding: Israeli companies taking part in the program are entitled to receive R&D grants from the OCS.
Timing	
Governance and management	
Participants	
Evaluation and Impact	
Downloaded Documents	

A.11 South Korea

Scheme Name	Korea Automotive Technology Institute (KATECH)
Country	South Korea
Category	Institutions, Vehicle R&D Programmes
Description	<p>The main purpose of Korea Automotive Technology Institute (KATECH), established in 1990, is to effectively support Korean automotive component suppliers in their effort to enhance their technological levels, R&D engineers, equipment and test facilities. Since its establishment, KATECH has been actively developing various key automotive technologies in cooperation with the industry,</p> <p>Next Generation Vehicle Technology Development Project has been one of the most important R&D projects undertaken by KATECH. The project was a long term large scale national project over a period of ten years, from 1992 to 2002, and main effort was devoted to the development of technologies related to the areas of low emission, safety and electric vehicle.</p> <p>KATECH is preparing to launch another long-term large-scale national project (Future Vehicle Technology Development Project) that will continue for the next ten years. In carrying out the project, much R&D effort will be concentrated on hybrid vehicle, fuel cell vehicle and smart vehicle with telematics areas.</p> <p>Focuses on developments in the following areas; Power & IT, Environment, Thermal, Chassis, Electronic, Material, Structural, Processing, Metallurgic, Standards, Reliability.⁷³</p>
Financial Details	Contributions from government – not clear on budgets.
Timing	1990 – Ongoing
Governance and Management	Run as a separate entity bidding for contracts from Industry and Government. MOST funds the institute under a Project-Based System having changed from a lump-sum system in 1996.
Participants	Universities, Government, Industry
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Korea Institute of Industrial Technology (KITECH)
Country	South Korea
Category	Institution, General R&D Programmes
Description	<p>KITECH is made up of 11 R&D centres around Korea employing almost 1000 people. The institute covers a wide array of projects, with several divisions relevant to the automotive industry;</p> <ul style="list-style-type: none"> - Advanced Materials – new mold and light metals for engine components. - Manufacturing Systems – assembly systems - Environment and Energy – fuel cell and hydrogen technology - Production Technology – weald technology and heat treatment - Manufacturing Process Technology – IT and digital fusion⁷⁴
Financial	Total Budget 2005: US\$180 million (US\$200 million for 2006)

⁷³ Korean Automotive Technology Institute (2007) “*Presidents Message*” available at: <http://www.katech.re.kr/eng/int/intro.asp>

⁷⁴ Korea Institute of Industrial Technology (2007) “*Facts and Figures*” available at: <http://www.kitech.re.kr/>

Details	<p>- Income: 30% from Government, 70% self generated - Expense: 70% R&D, 12% Labour cost, 11% Business cost</p> <p>Total Research Contract Amount 2005: US\$210 million - From Grants: US\$35 million - From Competitive Biddings: US\$175 million</p> <p>R&D Sponsored by Government, Industry and KITECH.</p>
Timing	1989 – ongoing
Governance and Management	Run as a separate entity bidding for contracts from Industry and Government. MOST funds the institute under a Project-Based System having changed from a lump-sum system in 1996.
Participants	Government, Industry, Universities
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Korea Institute of Science and Technology (KIST)
Country	South Korea
Category	Institutions, General R&D Programmes
Description	<p>KIST carries out both Governmental and Institutional programs covering areas such as;</p> <ul style="list-style-type: none"> - Nano devices/microelectronics technology - Intelligent Human Computer Interaction (HCI) - Micro system - Bio-active lead compounds - Sustainable environment technology <p>The Institute is made up of five divisions, each with some relevance to the automotive sector, for example; The Environment & Process Technology Division contains several centres that have a direct impact on the automotive sector;</p> <ul style="list-style-type: none"> - Fuel Cell Centre - Battery Centre - Hydrogen Energy Research Centre <p>Materials Science and Technology Division;</p> <ul style="list-style-type: none"> - Centre for Facilitated Transport Membranes - Advanced Metals⁷⁵
Financial Details	No indication
Timing	No indication
Governance and Management	MOST funds the institute under a Project-Based System having changed from a lump-sum system in 1996.
Participants	Government, Industry, Universites
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Korea Institute of Energy Research (KIER)
Country	South Korea

⁷⁵ Korea Institute of Science and Technology (2007) “Welcome” available at: http://www.kist.re.kr/en/intro/Int_Index_en.asp?over_01=001

Category	Institutions, Vehicle R&D Programmes, General R&D Programmes
Description	<p>“For 28 years Korea Institute of Energy Research (KIER) has been committed to the research and the development of energy-efficient technologies, environmental technologies, and new & renewable energy technologies to meet the need of our nation to gain the international competitiveness.</p> <p>KIER, the sole institution dedicated to energy research in Korea, will make our utmost effort to fulfil the mission of resolving nation's energy-related problems by developing a variety of energy technologies and by supporting the formulation of national energy policies.”⁷⁶</p> <p>Major R&D areas include;</p> <ul style="list-style-type: none"> - High Efficiency Energy Technology - Energy Conversion Technology - Renewable Energy Technology - Advanced Energy Materials Technology - Energy Policy Research and Technology Transfer <p>Under the 21st Century Frontier Program the institute focuses its efforts on Hydrogen Technologies/production for mobile and stationary applications. Hydrogen/Hybrid Cars.</p>
Financial Details	<p>Budget 2006;</p> <p>Revenue from R&D Contracts – 65% (60,712 million Won)</p> <p>Government Contribution – 34% (31,092 million Won)</p> <p>Others – 1% (500 million Won)</p> <p>Total 92,304 million Won = £50/\$100 million (approx)</p>
Timing	1977 - ongoing
Governance and Management	MOST funds the institute under a Project-Based System having changed from a lump-sum system in 1996.
Participants	
Evaluation and Impact	
Downloaded Documents	

Scheme Name	Ministry of Science and Technology (MOST) – National R&D Programs
Country	South Korea
Category	Road Map/Foresight, General R&D Programmes
Description	<p>The National R&D Program was first initiated by the Ministry of Science and Technology in 1982. The program, which aims to strengthen technological capability and competitiveness, has made significant contributions to economic growth as well as the improvement of the quality of life. Now, national R&D efforts are geared toward meeting the challenges in a move to a knowledge-based economy with a view to placing the nation among the ranks of the advanced economies by the early 2010s.</p> <p>The current National R&D Programs include the 21st Century Frontier R&D Program, the Creative Research Initiative (CRI), the National Research Laboratory (NRL), the Biotechnology Development Program, the Nanotechnology Development Program, the Space and Aeronautics Program.</p> <p>21st Century Frontier R&D Program - was launched in 1999 to develop scientific and technological competitiveness in newly emerging areas. The government plans</p>

⁷⁶ Korea Institute of Energy Research (2007) “*Message from the President*” available at: http://www.kier.re.kr/eng/kier/01_greeting.jsp

	<p>to invest a total of US\$3.5 billion over a period of ten years in this program that would comprise twenty-three projects in new frontier areas, such as bioscience, nanotechnology, space technology, and so on. Many of the automotive R&D programs in the Institutes previously outlines are funded under the 21st Century Frontier R&D Program.</p> <p>National Research Lab (NRL) - launched in 1999, aims at exploring and fostering research centres of excellence, which will play a pivotal role in improving technological competitiveness. The government annually funds each individual project totalling approximately \$250,000 for five years. The government supports over 444 NRL's across the nation in which 278 are in academia, 114 in research institutes and 52 in industry.⁷⁷</p>
Financial Details	21 st Century Frontier R&D Program – US\$3.5 billion over 10 years NRL -
Timing	National R&D Program – 1982 – ongoing 21 st Century Frontier R&D Program – 1999 – ongoing NRL – 1999 - ongoing
Governance and Management	Under MOST - each project director is given full autonomy in managing the program. The project director is responsible for designing the details of the research projects, supervising sub-projects, and allocating the funds.
Participants	Government, Industry, Universities, Research Institutes.
Evaluation and Impact	
Downloaded Documents	

Scheme Name	National RD&D Organisation for Hydrogen & Fuel Cell
Country	South Korea
Category	Road Map/Foresight, Vehicle R&D, General R&D
Description	<p>The National RD&D Organization for Hydrogen & Fuel Cell is currently composed of seven subcommittees;</p> <ul style="list-style-type: none"> - Hydrogen Production/Storage/Distribution - Hydrogen Infrastructures - Fuel Cell for Industrial Power Plant - Fuel Cell for Vehicle Transportation - Fuel Cell for Commercial/Residential Power Generation - Fuel Cell for Portables (i.e. Laptops and Mobile Telecommunications) - Commercialization. <p>The organization has a vision to facilitate and lead the Hydrogen Economy as well as a mission to establish the technological foundation to commercialize Hydrogen and Fuel Cell, with objectives to; 1) develop hydrogen based new industry, 2) secure energy independence and 3) solve the ultimate environmental issues. Also, the organization includes two major functions; 1) plan all the Hydrogen Economy programs in the Republic of Korea 2) manage all the Hydrogen and Fuel Cell related projects in the Republic of Korea</p>
Financial Details	
Timing	2003 – ongoing (Roadmap to 2040)
Governance and Management	Run by the Ministry of Commerce, Industry and Energy
Participants	Government, Industry, Universities
Evaluation and	

⁷⁷ Ministry of Science and Technology (2007) “National R&D Program” available at: <http://www.most.go.kr/>

Impact	
Downloaded Documents	HydrogenR&D.pdf

Appendix B Contacts

Country	Name	Telephone	Email	Organisation	Type of contact
USA	Robert Farrington	(001) 303 275 4448	rob_farrington@nrel.gov	National Renewable Energy Laboratory	Telephone
USA	Dr. Phyllis Yoshida	(001) 202 586 8055	Phyllis.Yoshida2@hq.doe.gov	DOE – FreedomCAR	Email
USA	Walter McManus	(001) 734 936 2723	watsmcm@umich.edu	University of Michigan Transportation Research Institute	Telephone
USA	Jodie Crandell	(001) 916 929 8001		CERP	Telephone
USA	Catherine Dunwoody	(001) 916 771 2870		CaFCP	Telephone
USA	Richard Bishop	(001) 443 695 3717	richardbishop@mindspring.com	Bishop Consulting	Telephone
USA	William Pierce	(001) 586 986 4988	william.pierce@gm.com	GM USA, Director-Technology Collaboration	Telephone
UK	Ian Massey	(0)845 009 3838	ian@smttforesightvehicle.org.uk	SMMT Foresight Vehicle	Telephone
UK	Patt Selwood	(0)845 009 3838		SMMT Foresight Vehicle	Telephone
UK	Dr Rob Phaal	(0)1223 766 141	rp108@cam.ac.uk	Cambridge University	Email
UK	Andy Feest	(0)20 7215 1188	andy.feest@dti.gsi.gov.uk	DTI	Telephone
UK	Matthew White	(0)207 944 5038	matthew.white@dft.gsi.gov.uk	DFT	Telephone
UK	Chris Ward	(0)207 944 5930	Chris.Ward@dft.gsi.gov.uk	DFT	Telephone
UK	Tony Harper	(0)2476 204102	Aharper2@jaguar.com	Jaguar & Land Rover	Telephone
Japan	Yutaka Takada	(0081) 3 3359 8461	y-takada@levo.or.jp	LEVO	Email
Japan		(0081) 44 520 5260	inf-r6@nedo.go.jp	NEDO	Telephone
Japan	Ryuji Osuga	(0081) 298561112	Kenkyu@jari.or.jp	JARI	Email
Japan		(0081) 3 3296 0935		FCDIC	Telephone
Canada	Richard Fry	(001) 613 943-2258	rifry@nrcan.gc.ca	CTFCA	Telephone
Canada	Dr. Peter Frise	(001) (519) 253-3000	peter.frise@auto21.ca	Auto 21	Email
Canada	Nick Beck	(001) 613 996 6022	nick.beck@nrcan.gc.ca	HyFATE	Telephone
Canada	Bruce Rothwell	(001) 604 827 5747		VFCVP	Telephone

Canada	Ritinder Harry	(001) 604 221 3099		NRC - IFCI	Telephone
Canada	Anita Deganee	(001) 613 943 7591		Industry Canada	Telephone
Canada	Jack Smith	(001) 613 943 7589		Industry Canada - Office of National Science	Telephone
Canada	Jennifer Jackman	(001) 613 995 8248	jjackman@NRCan.gc.ca	CliMRI	Email
Canada	Carl Fuerst	(001) 586 986 0627	carl.fuerst@gm.com	GM Canada	Telephone
Canada	Marc Boismenu	(001) 905 644 5423	marc.boismenu@gm.com	GM Canada	Telephone
France	Bernard Favre	+33 47296 4584	bernard.favre@volvo.com	Volvo 3P-Renault Trucks	Email
France	Bernard Jullien	+33 61471 5393	bernard.jullien@u-bordeaux4.fr	GERPISA, Director	Telephone
France	Anne Charreyron-Perchet	+33 14081 6336	anne.charreyron-perchet@equipement.gouv.fr	Ministry of transport, Head of European and international affairs, Responsible for CalFrance	Telephone
France	Annie Duhayon		duhayon@terre.inrets.fr	GRRT	Email
France	Alexander Spieshöfer	+33 14081 6328	alexander.spieshoefer@i-carre.net	Ministry of transport (DEUFRAKO)	Telephone
France	Jean-Pierre Goedgeguer	+33 15759 3906	jeanpierre.goedgebuer@mpsa.com	PSA, Head of Research	Telephone
France	Bernard Sauvet-Goichon	+33 15759 4862	bernard.sauvetgoichon@mpsa.com	PSA	Telephone
France	Robert Csukai	+33 14179 8000	robert.csukai@oseo.fr	Oséo	Email
France	Jacques Magen	+33 15850 1600	jacques.magen@aii.fr	AII, International Affairs Director	Email
Germany	David Dörr	+49 221 806 4156	david.doerr@de.tuv.com	TüV Rheinland Consulting Group	Telephone
Germany	Oliver Althöf	+49 221 806 4141	oliver.althoff@de.tuv.com	TüV Rheinland Consulting GmbH, Coordinator of ERA-NET	Telephone
Germany	Peter Redlich	+49 241 942 1205	predlich@ford.com	Ford, Manager European R&A Technology and Strategy Office	Telephone
Germany	Michael Kuchenbecker	+49 231 974 3371	info@verkehr.fhg.de	Fraunhofer Gesellschaft (FVV Automotive)	Telephone
Germany	Peter Heinzmann	+49 1888 615 2192	peter.heinzmann@bmi.bund.de	Federal Ministry of Economic Affairs and Technology (BMWi)	Telephone
Germany	Klaus Beumler	+49 3031 007 8194	beumler@vdivde-it.de	VDI/VDE Innovation + Technik GmbH	Telephone
Germany	Dr. Weisshaupt	+49 892 162 2783		Bavarian Ministry of Economic Affairs	Telephone

Germany	Jochen Seier		j.seier@fz-juelich.de	Foschungszentrum Jülich	Email
Germany	Gillian Glaze		g.glaze@fz-juelich.de	Foschungszentrum Jülich	Email
Australia	Barrie Finnin	+613 9545 2951	barrie.finnin@csiro.au	CSIRO Manufacturing & Materials Technology	Telephone
Norway	Sidsel Arbo		sidsel.arbo@nhd.dep.no	Ministry of Trade and Industry, Senior adviser	Email
Norway	Hans Otto Haaland	+47 2203 7297	hoh@forskningsradet.no	Research Council, Responsible for RENERGI	Telephone
Norway	Line Amlund Hagen	+47 2203 7497	lah@rcn.no	Research Council, Responsible for RENERGI (hydrogen)	Telephone
Norway	Odd Myklebust	+47 9261 4449	Odd.Myklebust@sintef.no	RTIM, Project leader of Arena Bil	Telephone
Norway	Anne Brendemoen		anne.brendemoen@sd.dep.no	Ministry of Transport, Director of the section for environment and public transport	Email
Norway	Marika Kolbenstvedt	+47 2257 3819	mk@toi.no	Institut of Transport Economics, Oslo	Email
Italy	Dr Guido Rossignoli	+39 06542 21493	g.rossignoli.roma@anfia.it	ANFIA	Telephone
Italy	Dr Giulio Pepe	+39 06470 52448	giulio.pepe@attivaproduttive.gov.it	Ministry of Economic Development	Telephone
Italy	Giampaolo Vitali	+39 01168 24932	g.vitali@ceris.cnr.it	CERIS	Telephone
Italy	Giuseppe Rovera	+39 01190 83111	giuseppe.rovera@crf.it	FIAT Research Centre	Telephone
Italy	Maria Odina	+39 01190 83525	maria.onida@crf.it	FIAT Research Centre, Public funding	Telephone
Israel	Uri Pachter	+972 3514 2811	urip@export.gov.il	The Israel Export & International Cooperation Institute, Subcontracting and automotive	Telephone
Israel	Naftali Dratman	+972 3953 4453	naftali@umi.co.il	General Motors, R&D Director	Telephone
Israel	Melani Levit	+972 3953 4475	melanie@umi.co.il	GM Foundation Programme	Telephone
Korea	Mr Youngmo Goo	(0082) 41 559 3014		KATECH	Telephone
Korea	Kang Chang Seog	(0082) 62 6006 140		KITECH	Telephone

Appendix C Overall Spend Breakdowns (2002-2008)

USA - Breakdown	Total (\$)	Total (€)	Source of Funding/Figures
Fuel Cells	558,000,000	418,500,000	EERE - from 2005/08 Hydrogen, Fuel Cells & Infrastructure Technologies Program
Materials	121,500,000	91,125,000	50% EERE Freedom Car Budget
Batteries	68,250,000	51,187,500	50% EERE Freedom Car Budget + USABC Spending
Hybrid, Low Emissions, Electric Technologies	157,500,000	118,125,000	50% EERE Freedom Car Budget
Advanced Combustion	146,000,000	109,500,000	50% EERE Freedom Car Budget
Vehicle Systems	40,050,000	30,037,500	50% EERE Freedom Car Budget
National Institutes/University Schemes	82,200,000	61,650,000	UMTRI (30%) + UTC's (proportion 10%)
State Tax Breaks (Indiana/Michigan)	192,500,000	144,375,000	Government / News Articles
Intelligent Transport Systems	128,300,000	96,225,000	DoT – ITS Programme, 50% of 3 relevant areas
Total	\$1,494,300,000	€1,120,725,000	

UK - Breakdown	Total (£)	Total (€)	Source of Funding/Figures
DTI - AIGT	45,000,000	67500000	Automotive Innovation and Growth Team Recommendations Budget
Low Carbon R&D	20,000,000	30000000	Low Carbon R&D Grants
CENEX	6,500,000	9750000	<i>DTI Start-Up Fund within AIGT Fund</i>
InnovITS	6,500,000	9750000	<i>DTI Start-Up Fund within AIGT Fund</i>
Foresight Vehicle Programme	50,000,000	75000000	50% of Project funding under Foresight Vehicle
IARC - PARD	24,000,000	36000000	1/3 of PARD budget given by Advantage West Midlands (£33 M pending)
Demonstration of Hydrogen/FC/other Projects	40,000,000	60000000	Hydrogen Energy Consortium and Govt Hydrogen R&D Plan
<i>DTI Technology Programme</i>	<i>60,000,000</i>	<i>90000000</i>	<i>Technology Programme - £20m pa earmarked for clean technologies in Vehicle Foresight</i>
State Rescue Aid/Training/General	42,500,000	63750000	EC - DG Competition
State Aid for R&D	20,000,000	30,000,000	
Totals	£ 199,000,000	€298,500,000	

Japan - Breakdown	Total (¥)	Total (€)	Source of Funding/Figures
Demonstration Projects	14,400,000,000	86400000	ACE & JHFC - budgets (only final 2 years of ACE)
Hydrogen and Fuel Cell Vehicle Projects	80,500,000,000	483000000	50% NEDO Project Budgets
Materials	7,980,000,000	47880000	NEDO Project Budgets
Batteries	6,370,000,000	38220000	NEDO Project Budgets
Low Carbon Vehicles	6,220,000,000	37320000	NEDO Project Budgets
JARI	10,500,000,000	63000000	JARI Budget (Govt Contributions)
ITS	5,184,000,000	31,104,000	ITS R&D (=5% of budget to industry) or relevant areas
Totals	¥206,470,000,000	€1,238,820,000	

Canada - Breakdown	Total (\$)	Total (€)	Source of Funding/Figures
Hydrogen & Fuel Cells - R&D, Demonstration	228,200,000	148,330,000	HyFate + IFCI + TPC + Auto 21 (1/6) + CTFCA + SDTC
Materials	25,400,000	16,510,000	CLiMRI (1/3) + Auto 21 (1/6) + SDTC
Batteries	21,900,000	14,235,000	50% CANMET Budgets + SDTC
Electric/Hybrid/Low Emissions	56,700,000	36,855,000	Auto 21 (1/6) + Government Demonstrations (CTFCA) + New Projects + SDTC
Vehicle Systems	16,100,000	10,465,000	Auto 21 (1/6) + SDTC
Safety	14,000,000	9,100,000	Auto 21 (1/6)
SDTC not covered above	4,200,000	2,730,000	
Totals	\$366,500,000	€238,225,000	

France - Breakdown	Total (€)	Source of Funding/Figures
PREDIT	105,000,000	4 Ministries, ADEME, ANR, Oséo
PACo/PAN-H	58,635,000	ANR
PNRB	1,935,000	ANR
Competitiveness Clusters	165,000,000	French Government (DGE), ANR, Oséo, CDC
Hybrid vehicle programme	40,000,000	AII/PSA
LOWCO ₂ MOTION	24,400,000	AII
<i>Matra/Romorantin Training Aid from the State (Not included in Exhibit 2)</i>	<i>1,400,000</i>	
Totals	€394,970,000	

Germany - Breakdown	Total (€)	Source of Funding/Figures
Mobility and Transport Programme	140,000,000	Ministry of economics
National Hydrogen and Fuel Cell Technology Innovation Programme	88,635,000	3 Ministries
Framework Programme for Materials	135,000,000	Ministry of research
Microsystems Framework Programme	86,665,000	Ministry of research
Totals	€450,300,000	

Australia - Breakdown	Total (€)	Source of Funding/Figures
ACIS	1,680,640,000	Ministry of industry
Auto CRC	12,900,000	Auto CRC
STEP	6,200,000	Australian and Western Australian Governments
Ad-hoc assistance	88,900,000	Australian, South Australian and Victorian Governments
Totals	€1,788,640,000	

Norway - Breakdown	Total (€)	Source of Funding/Figures
Arena Automotive	480,000	RTIM
AluPart	2,070,000	RTIM
Automotive-related hydrogen spending	12,000,000	Research Council of Norway
Ad-hoc assistance	1,350,000	Research Council of Norway
Totals	€15,900,000	

Sweden - Breakdown	Total (€M)	Source of Funding/Figures
CERC Combustion competence centre	4.94	STEM
KCFP Combustion competence centre	4.94	STEM
KCK Catalysis competence centre	4.94	STEM
Hybrid technology centre	2.02	STEM
CICERO Engine competence centre	2.12	STEM
CECOST Combustion graduate school	3.63	STEM
ECO2 Vehicle design competence centre	2.82	VINNOVA
SAFER vehicle safety competence centre	3.02	VINNOVA
PFF	21.17	PFF
Green Car 1	38.71	PFF
Green Car 2	28.43	PFF
EMFO Emissions research	14.11	PFF
IVS Intelligent Vehicle Systems	27.8	PFF
V-ICT Vehicles IT and telematics	12.5	VINNOVA
MERA Production engineering programme	30.65	VINNOVA
Volvo DME - technology support	3.63	STEM
Volvo hybrid loader	0.91	STEM
Fuel cells in a sustainable society	5.04	MISTRA
Energy waste gas treatment for combustion engines	2.12	MISTRA
Energy systems in road vehicles	4.03	STEM
Innovative vehicles, vessels and systems	5.04	VINNOVA
Light-weight materials and designs	6.65	VINOVA
Totals	229.23	

Appendix D Technology Funding Breakdown

Following figures in thousand euros

Fuel Cells/ Hydrogen	Australia	Canada	France	Germany	Italy	Japan	Norway	Sweden	UK	USA
2002		24,440	10,000			66,000		1,000	7,500	45,000
2003		24,440	10,000			93,000		1,000	7,500	45,000
2004	2,067	24,440	10,000			81,000	9,600	1,000	7,500	55,125
2005	2,067	24,440	29,634			63,000	10,500	1,000	7,500	62,625
2006	2,067	26,520	29,634	29,545		60,000	10,500	1,000	7,500	58,125
2007		24,440	29,634	29,545		60,000	10,500	0	7,500	73,125
2008		24,440	29,634	29,545		60,000	10,500	0	7,500	79,875
Total	6,201	148,720	148,536	88,635	0	483,000	51,600	5,000	52,500	418,875

Advanced Materials	Australia	Canada	France	Germany	Italy	Japan	Norway	Sweden	UK	USA
2002		1,950				8,400	-	0	3,000	13,500
2003		1,950				8,400		1,109	3,000	13,500
2004		1,950		27,000		8,400		1,109	3,000	15,000
2005		1,950		27,000		7,200		1,109	3,000	13,500
2006	1,075	4,810		27,000		5,160	690	1,109	3,000	13,125
2007	1,075	1,950		27,000		5,160	690	1,109	3,000	11,250
2008	1,075	1,950		27,000		5,160	690	1,109	3,000	11,250
Total	3,225	16,510	0	135,000	0	47,880	2,070	6,653	21,000	91,125

Batteries	Australia	Canada	France	Germany	Italy	Japan	Norway	Sweden	UK	USA
2002		1,625				5,160			3,000	7,312.5
2003		1,625				5,160			3,000	7,312.5
2004		1,625				5,160			3,000	7,312.5
2005		1,625				6,000			3,000	7,312.5
2006		4,485				5,580			3,000	7,312.5
2007		1,625				5,580			3,000	7,312.5
2008		1,625				5,580			3,000	7,312.5
Total	0	14,235	0	0	0	38,220	0	0	21,000	51,187.5

Electric/ Hybrid/ Low Emissions	Australia	Canada	France	Germany	Italy	Japan	Norway	Sweden	UK	USA
2002		1,300	10,000	10,000		5,160		10,585	3,000	15,750
2003		1,300	10,000	10,000		5,160		10,585	6,000	15,750
2004		4,550	10,000	10,000		5,160		10,585	15,375	16,875
2005		4,550	11,935	10,000		5,100	1,350	10,585	15,375	16,500
2006	6,345	10,855	10,000	10,000		5,580		24,194	15,375	16,500
2007	1,075	4,550	132,200	10,000		5,580		27,218	15,375	19,125
2008	1,075	9,750	132,200	10,000		5,580		20,766	15,375	17,625
Total	8,495	36,855	316,335	70,000	0	37,320	1,350	114,500	85,875	118,125

ITS Safety	Australia	Canada	France	Germany	Italy	Japan	Norway	Sweden	UK	USA
2002			5,000	10,000		4,667				13,750
2003			5,000	10,000		4,667				13,750
2004			5,000	10,000		4,667				13,750
2005			5,000	10,000		4,667				13,750
2006	3,705		5,000	10,000		4,667				13,750
2007	1,075		5,000	10,000		4,667				13,750
2008	1,075		5,000	10,000		4,667				13,750
Total	5,855		35,000	70,000	0	32,667	0	42,840		96,250

Appendix E Indicator Tables

Total Spend Vs. Indicators

Country	Population	GDP	GDP per Capita	Employment in Vehicles Industry	Vehicles Produced	Auto Related R&D Spend
Australia	5.32	0.00021	4171.83	2511.63	273.62	0.25
Canada	7.38	0.00029	9326.87	1498.27	88.61	0.73
France	6.51	0.00025	15222.02	1299.24	111.29	0.12
Germany	5.46	0.00021	17690.36	582.37	78.21	0.04
Japan	5.93	0.00022	28775.31	1046.52	70.26	0.07
Norway	3.46	0.00007	343.50	No Data	No Data	0.48
Sweden	25.47	0.00086	7768.45	1637.39	677.05	0.15
UK	4.96	0.00018	10890.73	1401.41	165.55	0.17
USA	3.29	0.00010	30878.70	1023.20	81.49	0.08

Average Spend Vs. Indicators

Country	Population	GDP	GDP per Capita	Employment in Vehicles Industry	Vehicles Produced	Auto Related R&D Spend
Australia	0.76	0.00003	595.98	358.80	39.09	0.04
Canada	1.05	0.00004	1332.41	214.04	12.66	0.10
France	0.93	0.00004	2174.57	185.61	15.90	0.02
Germany	0.78	0.00003	2527.19	83.20	11.17	0.01
Japan	0.85	0.00003	4110.76	149.50	10.04	0.01
Norway	0.49	0.00001	49.07	No Data	No Data	0.07
Sweden	3.64	0.00012	1109.78	233.91	96.72	0.02
UK	0.71	0.00003	1555.82	200.20	23.65	0.02
USA	0.47	0.00001	4411.24	146.17	11.64	0.01

Source Data:

Population, GDP, GDP Per Capita – *World Bank 2005*

Employment, Vehicles Produced – *International Organisation of Motor Vehicle Manufacturers 2005*

Auto Related R&D Spend – *OECD ANBERD in 2003*