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EUROPEAN ASSESSMENT OF GLOBAL PUBLICLY FUNDED AUTOMOTIVE RESEARCH

# Publicly funded automotive research in South Korea

## **Acknowledgements**

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This report is a deliverable from the Project EAGAR, “European Assessment of Global Publicly Funded Automotive Research, Targets and Approaches”, supported by the Seventh Framework Programme.

Project Number: 218529

Duration: September 2008 until October 2010.

EAGAR Partner Organisations:

- AVL LIST GmbH, AUSTRIA
- RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN, GERMANY
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Website: [www.eagar.eu](http://www.eagar.eu)

Paris, April 2010

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## **1 Introduction**

### **1.1 Background**

The FP7 project EAGAR benchmarks the current public automotive research activities at international level, in particular the European Union with Brazil, Canada, China, India, Japan, Malaysia, Russia, South Korea, the United States and 13 EU Member States.

EAGAR identifies the national road transport visions and roadmaps, research priorities, supported key topics, technology pathway, as well as the level of investment. This enables a direct comparison of national automotive R&D policies relating to the environment, safety and congestion.

The EAGAR study provides a key perspective on global investments designed to improve automotive vehicle technologies for a greener, safer and smarter road transport system.

### **1.2 Objectives**

This deliverable report summarises the situation of the RTD funding system in South Korea with respect to published vision statements, research targets and roadmaps, the national funding programmes of the past 4 years and the governance of automotive RTD funding in South Korea.

The report is basis for the subsequent benchmarking analysis, which delivers the key results of EAGAR addressing the following issues:

- Overview of national road transport visions, research agendas and roadmaps
- Comparison of automotive research priorities and investments focused on vehicle technologies
- Characteristics of national automotive research funding systems and approaches
- Highlight areas of strength and weakness | European RTD compared to the analysed countries
- Potential international cooperation areas from a European perspective

This study benefits the competitiveness of Europe and enables the stakeholders to adjust its visions & plans for the future. Date of publication: September 2010. It is available from the EAGAR website [WWW.EAGAR.EU](http://WWW.EAGAR.EU) as deliverable D.5.1.

### **1.3 Methodologies**

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

The four main categories are:

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

#### **Disclaimer**

This document presents quantitative and qualitative data from various sources. Due to the complexity of the project and the large amount of sources of data, regularly changing during the duration of the project, it was not possible to thoroughly validate all details. The EAGAR project partners cannot guarantee that the data presented is either complete or correct. The value of some of these data is mainly explorative, as a first step in an indicators development process. In conclusion, the data provided here may be difficult to interpret, are not exhaustive and may need further development. Comments by stakeholders on the coverage, relevance and interpretation of the indicators pro-

vided, as well as observations on new indicators that could be employed to improve the analysis of publicly funded automotive research are welcomed by the EAGAR project consortium. Any quotation of the data in this document should make reference to the above disclaimer. The EAGAR project partners and EC accept no liability for any issues that arise from actions that may be taken as a result of reading this report.

## 2 Description of the main WP results

### 2.1 General Information and Automotive Data

South Korea, officially known as the Republic of Korea (ROK) and often simply referred to as Korea, is a country in East Asia, located on the southern half of the Korean Peninsula. It is neighbored by China to the west, Japan to the east, and North Korea to the north. Its capital is Seoul, the second largest metropolitan city in the world. Its territory covers a total area of 100,032 square kilometers and has a population of over 49 million in 2008, making South Korea one of the most densely populated countries in the world.



South Korea became a major player in Asia and in the World with its economical and industrial power during the 1970's when the country began to focus on exportation of products from electronics, automobiles, ships, machinery, petrochemicals and robotics. Its GDP now exceeds 632 billion € in 2008, ranking South Korea 14<sup>th</sup> in the world and 4<sup>th</sup> in Asia.

### The role and importance of road transport in South Korea and significance of domestic automotive industry

Like in all developed countries, the passenger car sales are quite high in South Korea, reaching 1 million units per year, making South Korea a country with a high level of automotive development with 331 passenger cars per thousand inhabitants. The motorised two-wheelers are very important too and are mainly used to take advantage of the traffic congestion in the urban areas of the country.

Table 1 :

Number of passenger cars per thousand inhabitants	331	units	2007
Passenger car sales or newly registered p.a.	1040000	units	2007
Commercial vehicle sales or newly registered p.a.	249000	units	2007

Sources: French Association of Carmakers (CCFA), World Bank

South Korea has an advanced transportation network consisting of high-speed railways, highways, bus routes, ferry services, and air routes that allow to easy travel through the country.

The Korean automotive industry represents one of the most important aspects of the industrial power of the country. The South Korean automobile industry is today the fifth largest in the world in terms of production volume and the sixth largest in terms of export volume. 50 years ago, South Korea was only a manufacturing country like China used to be 10 years ago with the assembly of parts from Japan and the United States. The Hyundai Kia Automotive Group which produces their cars in South Korea is today the second largest automaker in Asia, after Toyota (Japan). Other players in South Korea are GM Daewoo and SsangYong. All together, the automotive industry in

South Korea represents a turnover of 60 000 billion won (app. 37 billion euros) with 22 557 people employed (2006).

Table 2:

Automotive industry turnover	60000	billion won	2006
Automotive industry number employed	22557		2006

Source: Korea Automotive Manufacturer Association (KAMA)

### **National spending and funding for research and technological development (general vs automotive sector)**

South Korea shows a long heritage of R&D with a specialisation in R&D-intensive industries like electronics, robotics and automobiles. The Korean government, the public sector and the private sector spent 31 300 billion won (24.7 billion euros) into R&D which amounts to almost 3% of the GDP of the country<sup>1</sup> (2007). In terms of R&D intensity (R&D expenses over the total GDP of the country), Korea is among the leaders and the number of researchers is also above the OECD average.

As one can see, the public sector has a major role in the R&D spend with a rough quarter of the total R&D spend, which was 8 169 billion won in 2007 (app. 6.4 billion euros) but the exceptional strength of South Korea R&D is due to its private sector which is the main funder of research and development in the country.

Table 3:

<b>Total RTD spend</b>	31300	billion won	2007
Public total RTD spend	8169	billion won	2007
Private total RTD spend	23068	billion won	2007
Foreign total RTD spend	63	billion won	2007
Other total RTD spend	0	billion won	2007

Source: ERA Watch

In the future, the South Korean government aims at increasing its R&D intensity. The recent "Green New Deal", a global policy which aims at achieving the economical growth of the country in a sustainable way, event sets for 2012 as a national target to dedicate 5% of its GDP to R&D. When Korea reaches this goal, it will become the major R&D hub in the Asia Pacific region.

In the strong Korean automotive industry, it is no surprise that the Korean automotive RTD spend reaches 16% of the total RTD spend in the country. In 2002, more than 5 000 billion won (approx. 3.9 billion euros) have been invested into the automotive R&D. Without more recent data than of 2002, we can only conclude that the public sector plays a minor part in the automotive RTD with only 2% of the total spend.

Table 4:

<b>Total automotive RTD spend</b>	5008	billion won	2002
Public automotive RTD spend	115	billion won	2002

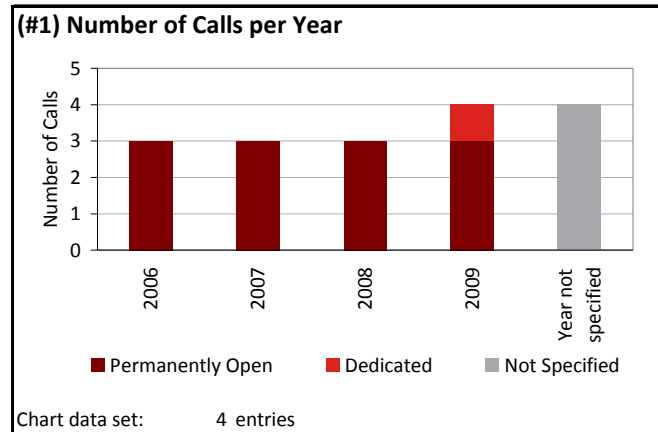
Source: Center for International Science and Technology Policy

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<sup>1</sup> Source: ERAWatch project

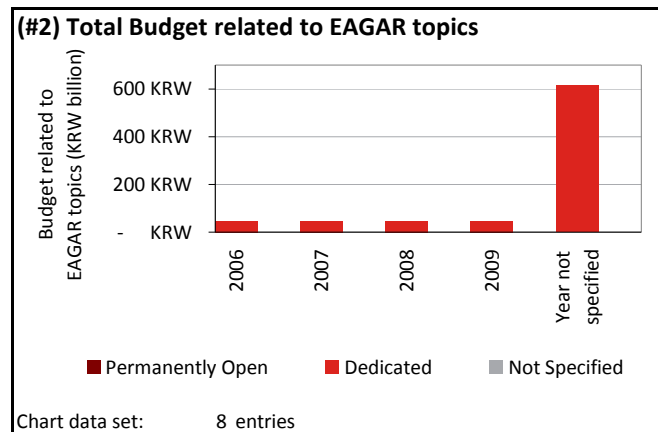
The main conclusion is that despite its strong support to R&D in general, South Korea offers little public support for the automotive R&D. This situation is beginning to change with new programmes being activated to achieve a sustainable economical growth by the development of green technologies for the use in vehicles. This resulted in a growing number of calls. In 2009, one more programme has been added to the permanently open calls which have been observed between 2006 and 2009. Four more calls exist but due to the lack of information no year could be linked to them.

Figure 1:



From resources which were available during the EAGAR project, it is very difficult to describe the trend in RTD spend over time in South Korea. When looking at the figure below, there is a lot of funds which cannot be linked to a specific year. Almost 700 billion won (554 million euros) has been found which is linked to calls with an unspecified year. In parallel, there is a constant amount of money which is linked to permanent programmes and which have been counted for all the years between 2006 and 2009.

Figure 2:



Source: EAGAR

## 2.2 National Funding Organisations and Hierarchies for Automotive Research

### The structure and governance of the national funding system



## EAGAR – Publicly funded automotive research in South Korea

The funding structure is centralized around the role of the state ministries. Directly linked to the President office, the ministries are in charge to lead the country's policy in a specific field. The most important ones for the automotive R&D topics are:

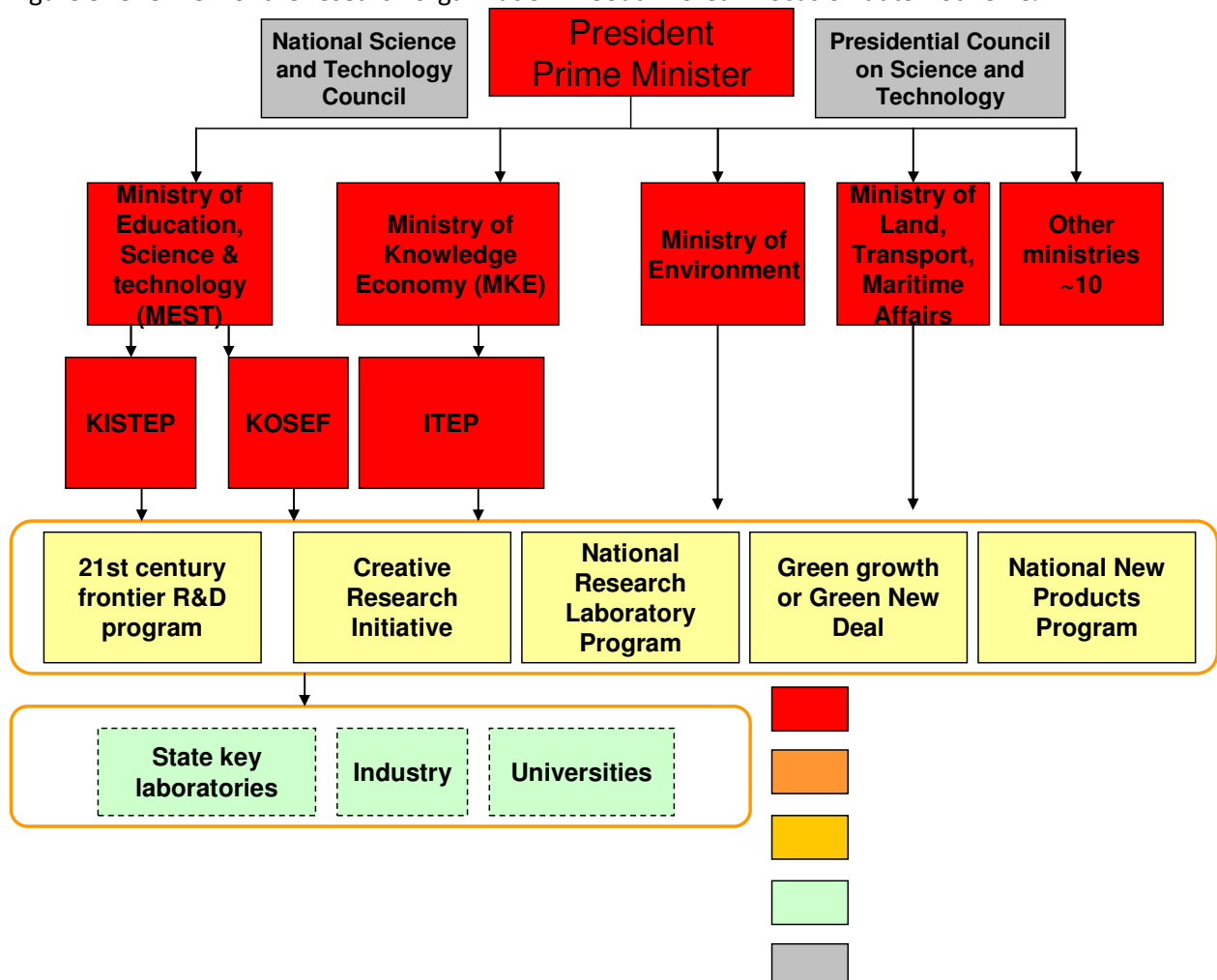
- Ministry of Education, Science and Technology (MEST) previously known as Ministry of Science and Technology (MOST) before the adding of the Education.
- Ministry of Land, Transport and Maritime Affairs (MLTM)
- MKE is the former MOCIE (the Ministry of Commerce, Industry and Energy)
- other ministries may be involved

One level lower there are three important players:

- Korea Institute of S&T Evaluation and Planning (KISTEP)
  - Korea Science and Engineering Foundation (KOSEF)
- KISTEP and KOSEF are separate entities which are linked to the MEST and they conduct, review and assess the programmes for the MEST.
- Korea Evaluation Institute of Industry Technology (ITEP), which is the parallel organisation of KISTEP for the industrial research under the influence of the MOCIE. This would be the most important organism for R&D management in the Energy field.

The funding is then decided and given in a direct way by those organisations to the R&D performers which (on public funds) are mainly institutes, state key laboratories (the official national R&D laboratories of the country) or universities.

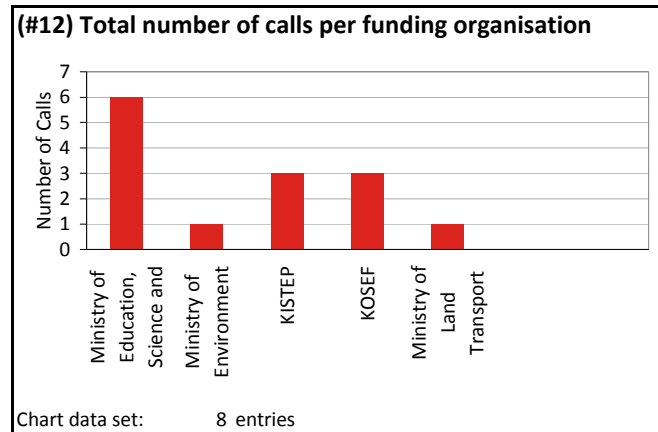
Figure 3: Overview of the research organization in South Korea – focus on automotive R&D



Source: EAGAR

The MEST is the most important player for automotive research in South Korea with six programmes funded by this ministry (see the figure below). KISTEP and KOSEF represent the executive forces of the MEST as they are involved in the funding of the six programmes funded by the MEST (three each).

Figure 4:



Source: EAGAR

The Ministry of Environment and the Ministry of Land Transport and Maritime Affairs (MLTM) fund one programme each. The MOCIE does not appear in the list (but appears in the scheme) as EAGAR could not link this Ministry to a specific programme funding but this ministry is still an important player as well as ITEP because they may influence the direction of a programme or influence their budget.

### Funding organisations and key players

The EAGAR project has identified the main sources of funding for the automotive R&D in South Korea. Six players have been considered as relevant:

Ministry of Knowledge Economy (MKE)	<a href="http://www.mke.go.kr/language/eng/">http://www.mke.go.kr/language/eng/</a>
The Ministry of Knowledge Economy (MKE) is concerned with regulating economic policy, especially with regard to the industrial and energy sectors. The ministry also works to encourage foreign investment in Korea. The main focus of this ministry is to make South Korea economy evolve towards a knowledge economy by supporting Information and Communications Technologies (ICT) and high-end manufacturing. This ministry is also in charge of energy cooperation projects and has the main objective of expanding the renewable sources of the country.	
Ministry of Education, Science and Technology (MEST)	<a href="http://english.mest.go.kr/">http://english.mest.go.kr/</a>
The main mission of this ministry is to revive the education and to build a leading country in science and technology. For MEST, the main aspects are to establish national science and technology strategies, to intensify the core abilities of college and research institutes and to fortify the infrastructure of research aid.	
Ministry of Land, Transport, Maritime Affairs (MLTM)	<a href="http://english.mltm.go.kr/intro.do">http://english.mltm.go.kr/intro.do</a>
The duty of the Ministry of Land, Transport and Maritime Affairs is to develop the transport infrastructure of the country and to have a vision of the evolution of mobility in the country.	

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Korea Institute of S&T Evaluation and Planning (KISTEP)	<a href="http://www.kistep.re.kr/eng/main.jsp">http://www.kistep.re.kr/eng/main.jsp</a>
KISTEP is a government research institute which is in charge of the evaluation and planning of the R&D policy in South Korea on behalf of the Ministry of Science and Technology.	

Korea Science and Engineering Foundation (KOSEF)	<a href="http://www.kosef.re.kr/english_new/">www.kosef.re.kr/english_new/</a>
Directly under the authority of the MEST, the KOSEF is a R&D support organisation. In 2005, KOSEF expanded the horizon of its activities to support not only basic science research, but also large-scale and fundamental R&D programmes such as the national and nuclear R&D programmes. The annual budget of KOSEF in 2005 exceeded USD 1 billion to carry out its expanded roles.	

Korea Evaluation Institute of Industry Technology (ITEP)	<a href="http://www.itep.re.kr">http://www.itep.re.kr</a>
The parallel organisation of KISTEP for the industrial R&D programmes, based under the authority of the Ministry of Commerce, Industry and Energy (MOCIE)	

### Remit for organisations & calls: overlaps or conflicts

All the Korean programme calls which have been analyzed are considered as permanently open as they involve the funding of universities, state laboratories and research centres.

## 2.3 Automotive Visions and Strategic Research Agendas

### Significant challenges for the national road transport sector.

The main challenge of South Korea is to develop a high end industry out of its historical manufacturing industry by following a sustainable way.

Korea is now focusing on supporting its economical growth in a sustainable way. That's the general principle of the vision named "Green Growth", a collaborative approach of sustainable development for the Asian and Pacific region, initiated in 2008.

The vision of the central government is then translated for specific fields. For specific Science and Technology visions, Korea is based on three pillars:

- Vision 2025 is a list of tasks and recommendations to drive Korea to a sustainable growth by achieving challenges from 2000 to 2025.
- The 10-year national plan for Energy Technology Development of 2003 was used to lead Korea out of oil-dependency by investigating other energy sources
- The Science and Technology basic plan is a reference publication from the Korean government published in 2001 and revised in 2003.

Table 4:

Vision name	Corresponding challenge	Description	Year

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Green Growth or Green Leap Forward	Fuel efficiency & greenhouse gas emissions	Green Growth is a policy focus for the Asia and Pacific region that emphasizes environmentally sustainable economic progress to foster low-carbon, socially inclusive development. Green Growth is a globally relevant approach to sustainable economic growth that was developed in Asia to fight poverty and achieve social progress in a sustainable way.	2008
Vision 2025 - Korea's long term plan for Science and Technology Development	Competitiveness	Vision 2025 is a list of 40 tasks and 20 recommendations aiming at achieving a transition towards a strong and sustainable economy by developing Science and Technology. Objectives are declined into three steps from 2000 to 2025.	2000
"10-year national plan for energy technology development"	Competitiveness	This policy aims to diversify Korea's energy supply and decrease its dependence on imports with new and renewable technology, cleaner technology and energy conservation. It provides R&D support and fiscal incentives (4% loans for up to 90% of the capital cost) to renewable energy producers and research organizations. The main focus of the push is on fuel switching (using waste, hydrogen, coal liquefaction/gasification), and cogeneration, but solar and other renewable and efficient technologies are also included.	1997
Basic Environmental Policy Act	Fuel efficiency & greenhouse gas emissions	The Basic Environmental Policy Act (1990) requires the establishment of a long-term environmental policy plan every ten years. Art. 35 of the Constitution guarantees the right to live in a clean and healthy environment.	1990
Green vision 21	Fuel efficiency & greenhouse gas emissions	The Green Vision 21 of 1997 was designed for the period of 1996-2005. Green Vision 21, still ongoing, was prepared as long-term environmental policy to improve the quality of life by harmonizing conservation and development. The Key contents of Green Vision 21 are to eliminate or reduce unsustainable production and consumption patterns by the following guiding principles. Guiding principles of the Green Visions 21: <ul style="list-style-type: none"> <li>* Reinforcing pollution prevention methods rather than pollution control</li> <li>* Integrating environmental and economic policy</li> </ul>	1997

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		<ul style="list-style-type: none"> <li>* Expanding and enforcing the Polluter-Pays Principle</li> <li>* Implementing market-based principles</li> <li>* Promoting principles of openness and participation</li> <li>* Promoting international cooperation.</li> </ul>	
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Source: EAGAR

**Visions & focused targets for road transport (is there some kind of control, are they realistic and up-to-date)**

In line with these visions, Korea has set a number of targets for the country to meet the challenges of competitiveness, fuel efficiency and reduction of greenhouse gas emissions.

Table 5:

Target name	Corresponding challenge	Description including addressed research themes, technologies	By date	Reference	Year of publication
Electric vehicles penetration	Competitiveness	The Korean government has come up with a blueprint to commercialize electric cars by 2011, and the government is targeting 10% penetration of fully electric vehicles for the Korean market by 2020.	2020	Electric Vehicle Blueprint	2009
50% in 2050	Fuel efficiency & greenhouse gas emissions	Reduce CO2 emission by a factor of 50% by 2050 in every sector, including transport. The base year could not be retrieved.	2050		
R&D competitiveness	competitiveness	In 2012, South Korea will dedicate 5% of its GDP to R&D with priorities for health, environment and energy. The share for R&D from public sources should be raised to more than 30% by 2015. By 2015, it will become the major R&D hub in the Asia Pacific region. By 2025, Korea will reach the level of competitiveness of	2012 & 2015 & 2030	Vision 2025	2000

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		countries from the G-7.			
Development of hydrogen technologies	Fuel efficiency & greenhouse gas emissions	The goals for 2012 include the development of hydrogen production systems using electrolysis-based renewables, a stationary 370 MW fuel cell, and the introduction of 10,000 fuel cell vehicles.	2012	Green Growth Plan	2008
Energy efficiency improvement	Fuel efficiency & greenhouse gas emissions	By 2030, Korea will reduce its energy intensity level to 0,185 TOE <sup>2</sup> /US\$1,000 from the current 0,341 and cut energy consumption by 42 million TOE	2030	Green Growth Plan	2008
Reduction of the use of fossil fuels	Fuel efficiency & greenhouse gas emissions	By 2030, fossil fuels will account for only 61% of total energy consumption down from the current 83 % and the use of renewables will increase to 11 % from 2,4% in 2007	2030	Green Growth Plan	2008
Boost in the green energy industry	Competitiveness	By 2030, Korea's green energy technologies will be comparable to levels of most advanced countries > how to measure?	2030	Green Growth Plan	2008
140 g/km	Fuel efficiency & greenhouse gas emissions	Korea Automotive Manufacturer Association has reduced its fleet average CO <sub>2</sub> from 197g/km in 1995 to 167g/km in 2005. KAMA has also repeatedly confirmed its commitment to meeting the 140g/km target by 2009	2009	KAMA	2005
Renewable share target	Fuel efficiency & greenhouse gas emissions	The objective of the plan is to attain a 3% share of New and Renewable Energy by 2006 and 5% by 2012. It aims to have 100 000 PV roofs and 70,000 buildings by 2012 (total capacity of	2012	KEMCO	2003

<sup>2</sup> TOE = tonne of oil equivalent

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		1,3 GW)			
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Source: EAGAR

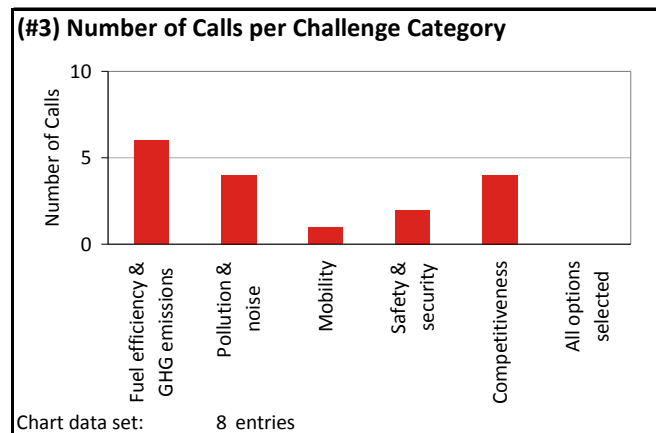
All these targets are integrated in a common vision, set in a path with several steps and a lot of them are clearly measurable. Framed by Vision 2025 and the Science and Technology plans, the Korean targets seem realistic. They are also quite recent as most of them are published in 2008 and they give a long-term vision of the Korean development with objectives for as far as 2030.

### 2.4 Funding Programmes

#### The link between vision & targets and funding allocation

When considering the number of calls per challenge category, there is a direct connection between the main challenges (competitiveness of the country and sustainable development) and the number of calls, predominantly spread between "Fuel efficiency & GHG emissions", "pollution & noise" and "competitiveness". Very few calls have a focus on mobility and safety & security.

Figure 5:

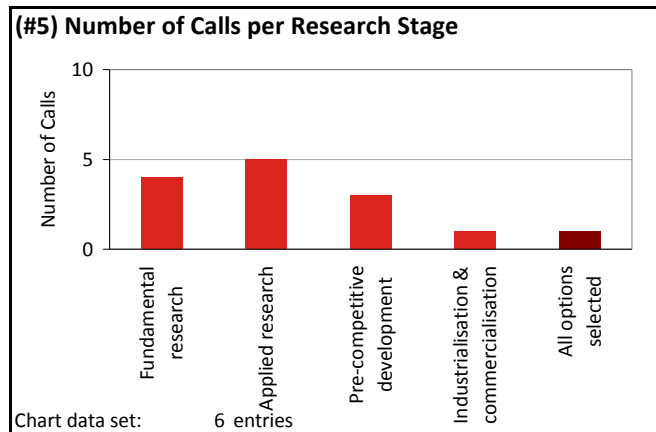


Source: EAGAR

#### Funding programmes and stages of RTD as well as different types of instruments

The balance of calls across RTD stages (figure X below) shows that the government supported R&D is more focused on early stages of research (fundamental and applied research). This is in line with the Korean visions and the targets set by the government but this may also be explained by the strong automotive industry in Korea which performs most of the R&D in the country as may suggest the balance between private and public funds for automotive R&D as shown in chapter 2.1. So the automotive industry takes care of the latest R&D stages (pre-competitive development and Industrialisation) while the public R&D focuses on the fundamental and applied research.

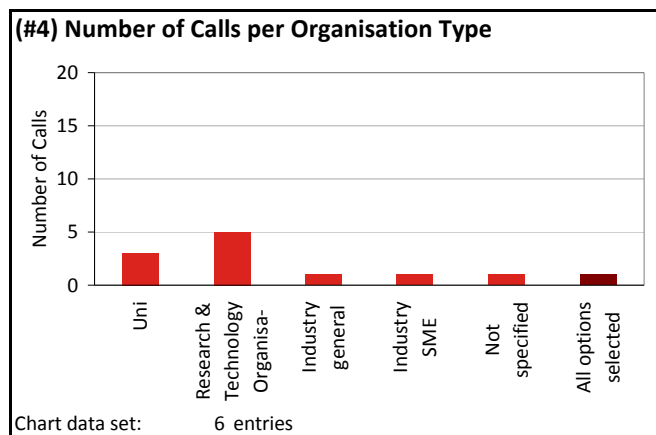
Figure 6:



Source: EAGAR

Korea has a long heritage of R&D supported by public institutes and universities. What EAGAR investigations have shown is that RTO are involved in five out of eight calls for automotive purposes and universities are present for three of the eight calls, sometimes in a collaborative way but EAGAR findings cannot lead to any conclusion about the type of projects (collaborative vs. individual ones).

Figure 7:



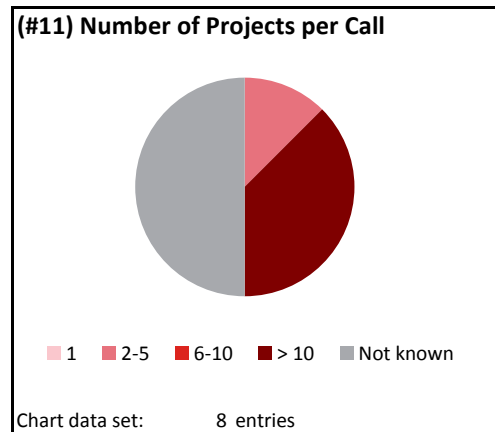
Source: EAGAR

### Overview of technology specific programmes for automotive RTD

Most of the Korean programmes cover a wide range of technologies, spread along various projects. Most of the programmes EAGAR identified have more than six calls, and commonly these calls are due to permanently open programmes which aim at funding RTOs or some RTD performed by universities.

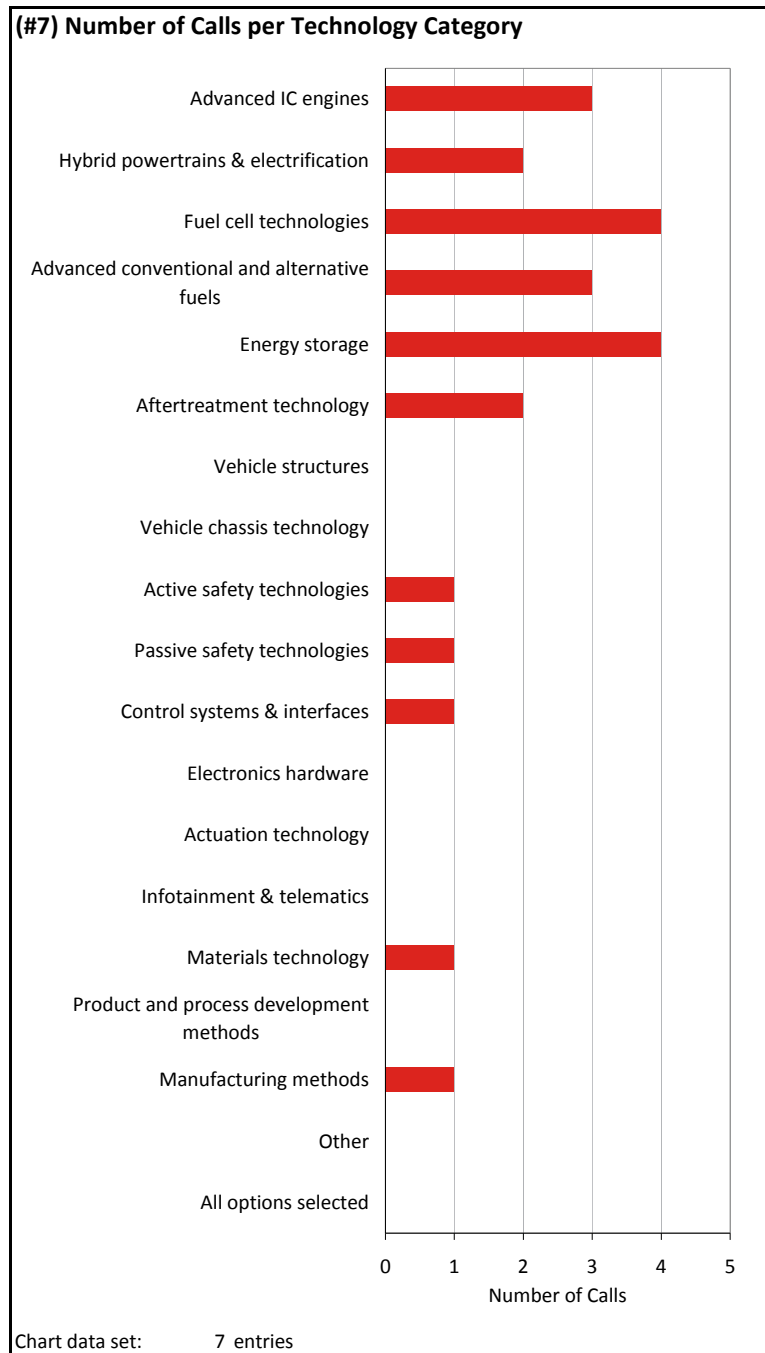
Figure 8:





Among them, there is a strong focus on powertrains and engines both for improving conventional engines and to develop new hybrid solutions. In parallel, South Korea is deeply involved in the development of fuel cell as well as the hydrogen storage solutions which will allow fuel cell cars to be introduced on the mass market.

Figure 9:



Source: EAGAR

During the data search process, the funding programmes in South Korea have been identified and analyzed in depth to find the more details available to characterize the kind of R&D and the topics they are related with.

EAGAR identified eight programme calls from eight distinct initiatives dealing with automotive R&D and based on public funding for a total budget of 806 billion won (approx. 569 million euro) on the 2006-2009 time frame.

Figure 10:

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<b>Total number of Programme Calls</b>	<b>8</b>	
<b>Total number of Programme Initiatives</b>	<b>8</b>	
<b>Total number of Funding Organisations</b>	<b>4</b>	
<b>Total Budget related to EAGAR projects</b>	<b>568,90</b>	€ million
(Based on 8 data entries)		

Source: EAGAR

Table 6: Overview of automotive R&D programmes

<b>Overall programme initiative name</b>	<b>Programme call name</b>	<b>Programme call description</b>	<b>Funding organisation</b>
Green growth or Green New Deal	Green Car Development programme	This is a massive set of development projects . The 50-trillion-won (40 billion euros) projects have two goals: to realize low-carbon green growth and to create more jobs.	Ministry of Knowledge and Economy
Green car safety standard development			Ministry of Land, Transport, Maritime Affairs
Eco-friendly car development programme			Ministry of Environment
National Research Laboratory Programme	National Research Laboratory Programme	Launched in 1999, it aims to develop research centers for excellence, which will play a pivotal role in improving technological competitiveness, 250 000 \$ are annually granted for each laboratory up to five years through in-process evaluation.	Ministry of knowledge and Economy
National RD&D Organization for H2 & Fuel Cell		Established in 2003 to expedite the commercialization of H2 & fuel cell technology <ul style="list-style-type: none"> <li>Propose the vision for hydrogen economy in Korea</li> <li>Develop a national plan, road maps to create a new industry</li> <li>Set up a detailed action plan to meet nation's dissemination target</li> <li>Coordinate and allocate R&amp;D programmes supported by government</li> </ul>	Ministry of knowledge and Economy
21st century frontier R&D programme		This programme emphasizes on emerging technologies such as biotechnologies, information technology, nanotechnology, aeronautics and some traditional industries like automobile.	Ministry of knowledge and Economy
Future National Promising Technologies 21	New generation cars	The National Science and Technology Council selected 21 technologies which have been seen as promising and which will serve as a basis of development for	MEST

		Korea's economy and quality of life.	
Creative Research Initiative	Creative Research Initiative	<p>Launched in 1997, it symbolizes the policy shift in S&amp;T development in Korea from imitation to innovation. It aims to strengthen the national potential for technological competitiveness through creative basic research. It focuses on exploring various phenomena that will happen in the nature, developing new fields of scientific research, and making technological breakthroughs. The grant supports the areas of research based on creativity and originality.</p> <p>The CRI emphasizes a high level of flexibility in research to enhance creativity. The project leader, who is selected by a strict criteria based on creativity, leadership, research experience, etc., has exclusive authority and responsibility in managing a project.</p>	Ministry of knowledge and Economy

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

Due to the lack of details, the partners have found during the project, there is no sufficient information to comment on the efficiency, success rate and flexibility of the funding process in South Korea.

### **Transparency & openness**

The data collection in South Korea has proven to be very difficult. Information sources were incomplete, missing, or simply not translated in English. The data collection showed that no more than 75% of a specific programme information could be found by desk research. And sometimes (just over 50% of the programmes), we could only identify less than 25% of detailed information.

Furthermore, no details have been found about the dissemination activities which have to be done after the completion of a programme.

### **Foreign collaboration**

Most of the programmes do not seem to be available to foreign organisations. But as a significant part of the programme calls have been marked as 'not specified', the balance can be deeply modified by the missing data.

### **3 Discussion and Conclusion**

The R&D policy of South Korea is centered on competitiveness. The country is heavily involved in becoming a major place for R&D and sets objectives for its R&D expenditures for the next years. They want to catch the pace of G8 countries and to become the first country for its R&D intensity. But this objective is set keeping in mind a sustainable way of development. Fuel efficiency and GHG emission reduction is of primary importance and the country has set several targets in this purpose.

The structure of RTD is quite clear in South Korea, when considering the funding. The Ministry of Education, Science and Technology (MEST) is the main player and the one involved in most of the programmes using two organisms the KISTEP and the KOSEF, which are directly linked to it, to help running and funding the projects. Two other ministries are also involved: Environment on one hand and Land and Transport on the other hand. This leads to a very vertical structure where the MEST leads the Korean RTD under the influence of the political will represented by the president and the prime minister.

The main goals of this organization is to achieve a sustainable economic growth to ensure that South Korea becomes a leading country in Asia and to reach the G8 level.

Eight public RTD programmes have been identified. They deal mostly with advanced IC engines and more importantly the main focus is on energy storage: fuel cells is the main topic according to the amount of money spent each year by the Korean government. It is then followed by the technologies to achieve the electrification of vehicles. This is mainly explained by two facts: Korea focuses a lot on very high technology RTD such as fuel cells which are long-term technologies and the trend to build a sustainable future for the country. The analysis shows that South Korea looks at becoming the leading country for fuel cell research.

One can also observe a particular focus on safety issues both on passive and active technologies.

The analysis of South Korean automotive RTD programmes has been sometimes quite difficult. EAGAR project has faced the few public information available either not translated in english or simply not disclosed on websites. When identified half of the programmes have been characterized more than 50% and for all, less than 75% of the details we were looking for could be retrieved. This is the main limitation of EAGAR findings for South Korea.

The desk research as well as the distributed questionnaires also lead to a subjective interpretation of the South Korean R&D policy and R&D programmes where statistical data or specific information are missing. Nevertheless the available information on the considered programmes does allow an analysis of the South Korean policy, identifying trends as well as benchmarking with other economies.

## **4 References**

French Association of Carmakers (CCFA), World markets 2008, 2009

European Commission, ERAWatch National profile of the Republic of South Korea, ERAWatch website, 2009

International Association of Traffic and Safety Science, IATSS Research paper, 2008

## 5 Annex

Overall programme initiative name	Programme call name	Programme call description	Funding organisation	Programme call end date
Green growth or Green New Deal	Green Car Development programme	The just-announced massive development projects are the Korean version of a "Green New Deal," which is emerging as a catchphrase around the world. The 50-trillion-won (\$37.8-billion) projects have two goals: to realize low-carbon green growth and to create more jobs. The New Deal plan is attractive as it can serve as a new growth engine for the Korean economy that is rapidly losing steam amid the global financial and economic crisis.	Ministry of Knowledge and Economy	30.12.2012
Green car safety standard development programme			Ministry of Land, Transport, Maritime Affairs	
Eco-friendly car development programme			Ministry of Environment	
National Research Laboratory Programme	National Research Laboratory Programme	Launched in 1999, it aims to explore and foster research centers for excellence, which will play a pivotal role in improving technological competitiveness, 250 000 \$ are annually granted for each laboratory up to five years through in-process evaluation.	Ministry of knowledge and Economy	
National RD&D Organization for H2 & Fuel Cell		Established in 2003 to expedite the commercialization of H2& fuel cell technology Propose the vision for hydrogen economy in Korea Develop a national plan, road maps to create a new industry Set up a detailed action plan to meet nation's dissemination target Coordinate and allocate R&D programmes supported by government	Ministry of knowledge and Economy	30.12.2010
21st century frontier R&D programme		This programme emphasizes on emerging technologies such as biotechnologies, information technology, nanotechnology, aeronautics and some traditional industries like automobile.	Ministry of knowledge and Economy	30.12.2009
Future National Promising Technologies 21	New generation cars	NSTC selected 21 technologies which have been seen as promising and which will serve as a basis of development for Korea's economy and quality of life.	MEST	

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Creative Research Initiative	Creative Research Initiative	Launched in 1997, it symbolizes the policy shift in S&T development in Korea from imitation to innovation. It aims to strengthen the national potential for technological competitiveness through creative basic research. It focuses on exploring various phenomena that will happen in the nature, developing new fields of scientific research, and making technological breakthroughs. The grant supports the areas of research based on creativity and originality. The CRI emphasizes a high level of flexibility in research to enhance creativity. The project leader, who is selected by a strict criteria based on creativity, leadership, research experience, etc., has exclusive authority and responsibility in managing a project.	Ministry of knowledge and Economy	30.12.2016
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