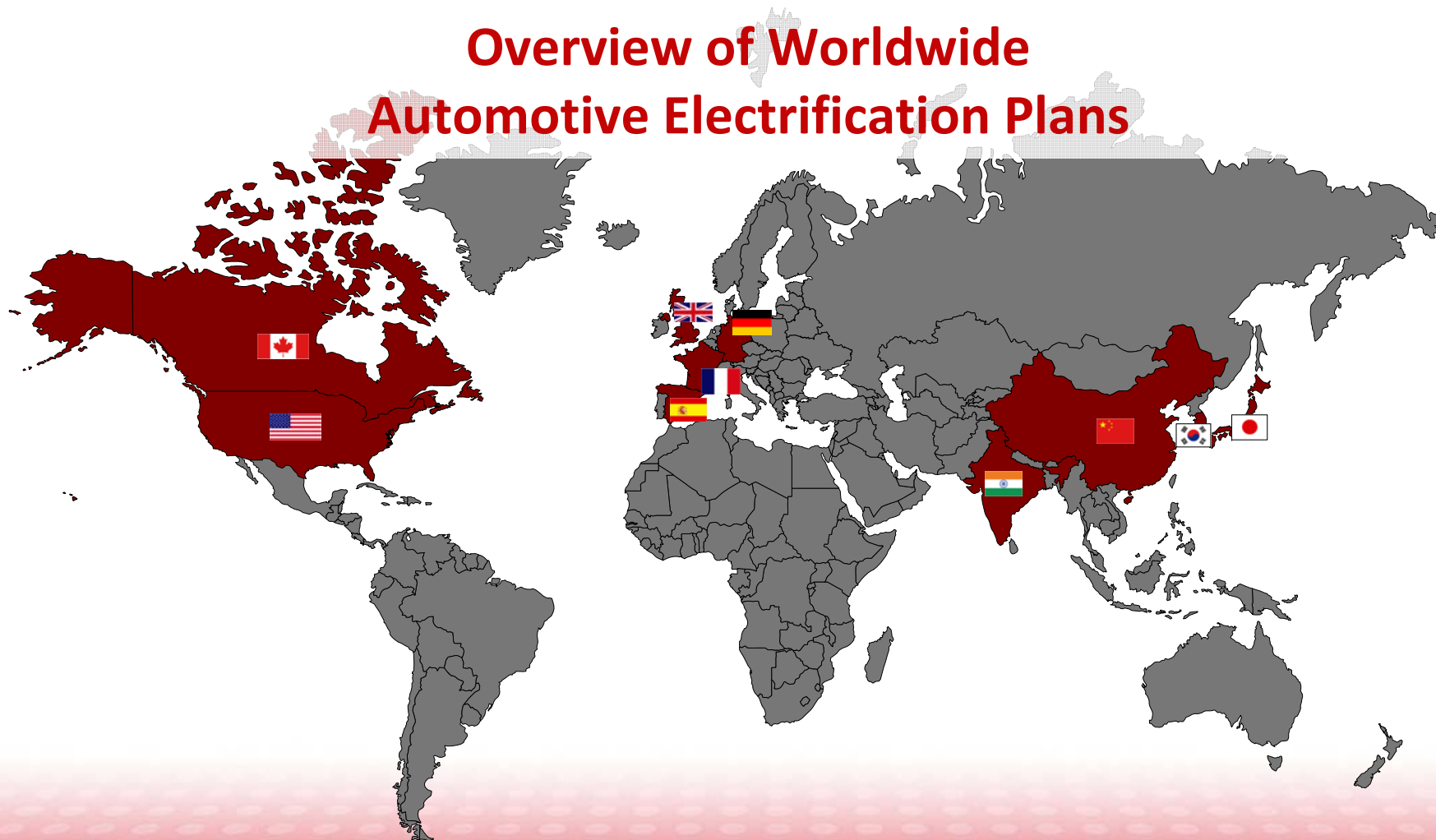


Overview of Worldwide Automotive Electrification Plans



18 December 2009

EAGAR is an EARPA Project with ...



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supported by the European Commission's
Seventh Framework Programme

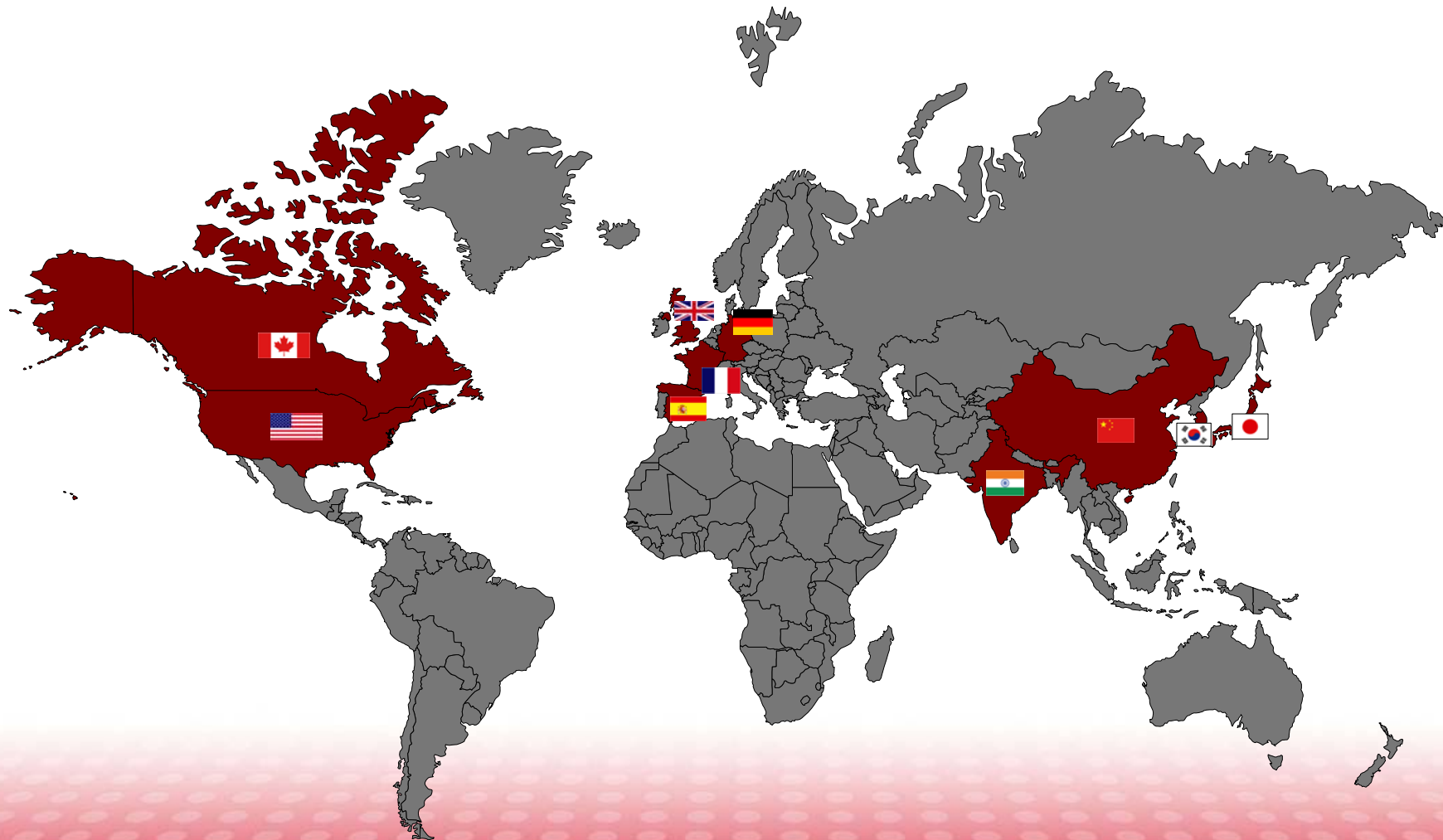


FP7 Contract SCS7-GA-2008-218529

Objectives of EAGAR:

- Create a methodology to enable benchmark comparison of automotive research in different countries
- Analyse automotive research in Europe, US, Canada, China, Japan, South Korea, India, Brazil, Russia and Malaysia
- Show a global perspective of automotive research priorities
- Contribute to the definition of European automotive research agendas
- Identify potential international cooperation areas

Overview of Worldwide Automotive Electrification Plans



UNITED STATES OF AMERICA

Vision, roadmaps and targets



- One million PHEV on road until 2015
- Electric propulsion for passenger cars until 2020:
 - Cost: < 8\$/kW,
 - specific power: >1,4 kW/kg;
 - power density: > 4,0 kW/L;
 - efficiency: > 94%
- Power electronics (5KW DC/DC Converter):
 - Cost: < 25\$/kW
 - specific power: >1,2 kW/kg
 - power density: > 3,0 kW/L
 - efficiency: > 96%
- Energy Storage: see next slide

Vision, roadmaps and targets



FreedomCAR Energy Storage Goals		42-Volt ¹			HEV (Power-Assist) ²		DRAFT Fuel Cell Vehicle		Ultracapacitors ³			Battery EV		
Parameter	Unit	Start-Stop	M-HEV	P-HEV	Low Power	High-power	Low Power	High-power	12V Start-Stop	42V Start-Stop	42V Transient Power Assist	Comm. ⁴	Long Term ⁵	
Calendar Life	years	15			15		15		15			10		
Cycle Life	cycle	150k cycles & miles for 450k engine starts			300k cycles (of combined Baseline + 95th Percentile + 99th Percentile)		TBD		750k cycles for 150k miles				1000 DST cycles to 80% DOD	
Energy Efficiency (on Cycle-Life/Load Profile)	%	90 for Zero Power Assist	90 for Partial Power Assist	90 for Full Power Assist	90 for Baseline 25-Wh Cycle	90 for Baseline 50-Wh Cycle	90		95 for UC10 ⁶				80 for C/3 discharge with 6-hour charge	
Maximum Self-discharge	var	20 Wh/d			50 Wh/d		50 Wh/d		4% (72 hours from V _{max})				15% / mn	
Maximum Operating Voltage	Vdc	48 (Voc after 1 sec)			400		440		17	48				
Minimum Operating Voltage	Vdc	27			0.55 x Vmax		0.55 x Vmax		9	27				
Maximum System Weight	kg	10	25	35	40	60	32	65	5	10	20			
Maximum System Volume	liter	9	20	28	32	45	26	50	4	8	16			
Operating Temperature Range	°C	-30 to +52			-30 to +52		-30 to +52		-30 to +52			-40 to +50	-40 to +85	
Survival Temperature Range	°C	-46 to +66			-46 to +66		-46 to +66		-46 to +66					
Selling Price @ 100,000 units/year	\$	150	260	360	500	800	400	1000	40	80	130			
Selling Price @ 10,000(?) units (40 kWh)	\$/kWh											<150	<100	

Vision, roadmaps and targets



FreedomCAR Energy Storage Goals		42-Volt ¹			HEV (Power-Assist) ²		DRAFT Fuel Cell Vehicle		Ultracapacitors ³			Battery EV	
Parameter	Unit	Start-Stop	M-HEV	P-HEV	Low Power	High-power	Low Power	High-power	12V Start-Stop	42V Start-Stop	42V Transient Power Assist	Comm. ⁴	Long Term ⁵
Discharge Pulse Power	kW	6 for 2 sec	13 for 2 sec	18 for 10 sec	25 for 10 sec	40 for 10 sec	20 for 12 sec	50(?) for (?) sec	4.2 for 2 sec	6 for 2 sec	13 for 2 sec		
Regen Pulse Power	kW		8 for 2 sec	18 for 2 sec	20 for 10 sec	35 for 10 sec	25 for 5 sec	60(?) for (?) sec			8 for 2 sec		
Engine-off Accessory Load	kW	3 for 5 min											
Recharge Rate	kW	2.4	2.6	4.5					0.4	2.4	2.6		
Cold cranking power @ -30°C (3 pulses)	kW	8 @ >21V for 2 sec			5 @ ≥V _{min} for 2 sec	7 @ ≥V _{min} for 2 sec	5 for TBD min		4.2 @ ≥7V for 2 sec	8 @ >21V for 2 sec			
Discharge Specific Power 80% DOD/30 sec	W/kg											300	400
Regen Specific Power @ 20% DOD/10 sec	W/kg											150	200
Power Density	W/l											460	600
Available Energy	Wh	250 @ 3 kW	300 @ 3 kW	700 @ 3 kW	300 @ C _r /1	500 @ C _r /1	250	3000(?)	15 @ 1 kW	30 @ 1 kW	60 @ 1 kW		
Total Energy	Wh											40,000	
Specific Energy @ C/3 Discharge Rate	Wh/kg											150	200
Energy Density @ C/3 Discharge Rate	Wh/l											230	300
Specific Power/Specific Energy Ratio	h ⁻¹											2:01	

Programmes



Programme Name	Research Themes	Available Funding	Time Frame	Responsible Organisation(s)
Hybrid and vehicle systems	Veh. & Sys. Sim. & Testing, Technology validation, Energy Storage R&D, Advanced Power Electronics & Motors R&D	\$ 100Mio	2009	U.S. Department of Energy
Recovery Act-Transportation Electrification: Area of Interest 1: Electric Drive Vehicle Demonstration and Evaluation	RTD of PHEVs, EVs, or FCVs, PC and commercial, not 2-wheelers. Min 100 demo vehicles per project.	\$ 378 Mio	2009	DoE
Recovery Act-Transportation Electrification: Area of Interest 2: Transportation Sector Electrification	Truck stop electrification, idle reduction, electr truck refrigeration units, shoreside electrification, non-road vehicles, recharging and electrical support infrastructure. Demos: cargo handling equipment, electric airport ground support equipment, light duty passenger vehicles, mid&heavy duty veh., commercial rail, and marine vessels			DoE
Clean Cities FY 09 Petroleum Reduction Technologies, Projects for Transportation Sector	expand the use of alternative fueled vehicles and advanced technology vehicles. + required infrastructure, operation and maintenance	\$ 300 Mio	2009	DoE
Recovery Act - Electric Drive Vehicle Battery and Component Manufacturing Initiative	Construction)including production capacity increase of current plants), of U.S. based manufacturing plants to produce batteries and electric drive components	\$2000 Mio	2009	DoE

CANADA

Vision, roadmaps and targets



Climate change is a global issue of major concern to Canadians. Canada's comprehensive action plan to fight climate change will reduce emissions of greenhouse gases by 20% from 2006 levels by 2020, placing Canada on the path to achieve reductions of 60-70% by 2050.

Programmes



Programme Name	Research Themes	Available Funding (CAN)	Time Frame	Responsible Organisation(s)
Electric Mobility in 2018	By 2018, there will be 500,000 highway-capable plug-in electric-drive vehicles on Canadian roads, as well as what may be a larger number of hybrid-electric vehicles. All these vehicles will have more Canadian content in parts and manufacture than vehicles on the road in Canada in 2008.		2018	Government Canada
Electric Vehicle Technology Roadmap for Canada (evTRM)	The Electric Vehicle Technology Roadmap for Canada (evTRM) should help industry, its supply-chain, academic research groups, and governments come together to jointly identify and prioritize the technologies, policies, regulations and other actions needed to accelerate the introduction of electric traction vehicles in Canada. The Executive Summary identifies 21 strategic initiatives of critical importance in the next five to ten years like Technology, Codes, standards, regulations and infrastructure readiness, Studies and assessments, Education and outreach	currently open	5-10 years	Electro Mobility Canada

Programmes



Programme Name	Research Themes	Available Funding (CAN)	Time Frame	Responsible Organisation(s)
Automotive Partnership Canada	Advanced Powertrain & Energy Storage are two of ten priority research areas	145 mio* CAN for complete APC	5y	Industry Canada and others
Auto 21, a Network of Centres of Excellence	Battery Storage and Optimization of Plug-in Hybrids PEM Fuel Cells for Automotive Applications Energy Storage in Lithium Ion Batteries Infrastructure for Wide Market Adoption of PHEV are programmes founded by Auto 21	77 mio* for Auto 21	7y	Government Canada, Industry and institutional partners
CanmetENERGY	Development advanced battery technology and related vehicle components for hybrid and electric vehicles.	?	?	Natural Resources Canada's CanmetENERGY

*specific project founding not known

JAPAN

Central government

Buying incentive

- “Basis of incentive” is difference between EV/PHEV and baseline vehicle price
- Government will support half of the “basis of incentive”, e.g. For Mitsubishi i-MiEV, JPY 1,390,000

Weight tax

- Zero weight tax for EVs/PHEVs



R&D Funding

- For FY 2009 NEDO is supporting Next Generation High Performance Battery development with a budget of £15.5m (£1 = 160 Yen)

Local government

Buying incentive

- Dependent on local government
- Tokyo and Yokohama support half of central gov. support but conditions apply, e.g. for Mitsubishi i-MiEV, JPY 695,000
- Tokyo: only available for small enterprises, ltd to 250 car / year
- Yokohama: for all purchasers but only those with Li-Ion battery and rapid charging system

Purchase tax

- Tokyo: zero purchase tax & zero annual tax for 5 yrs
- Yokohama: zero purchase tax

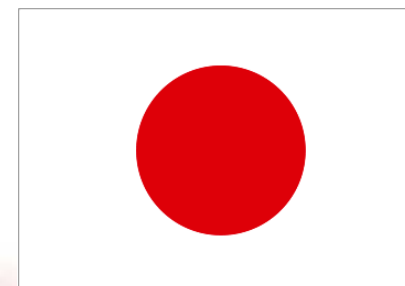
Other fiscal incentives

Parking

- 50% parking fee discount in Tokyo and Kanagawa for EVs/PHEVs

Toll Road fee refund

- Maximum refund of JPY 5,000 per month, only for wireless-paying system (ETC) users
- Only in limited prefectures like Kanagawa



Roadmap for Battery Technology



	Present	Improved Battery	Advanced Battery		Innovative Battery
	2007	2010	2015	2020	2030
Application	EV commuter for Energy Utility	High Performance Hybrid Vehicle	Fuel Cell & Plug-in Hybrid Vehicles	High Performance PHEV	Full EV
Performance Improvement	x1	x1	x1.5	x3	x7
Cost	100%	50%	14%	10%	2.5%
Current Activity	Private Sector	Private Sector	Collaboration of industry, academia and government		University and Research Laboratory
NEDO Projects	Public advertisement		Constituent Technology		Next generation development

CHINA

Vision, roadmaps and targets



- **Vision: China aims at being the leader on electric vehicles and hybrid vehicles**
- **Targets:**
 - 20% reduction in energy consumption per unit of GDP and an estimated 45% increase in GDP, each by 2010
 - China wants to raise its annual production capacity to 500,000 hybrid or all-electric cars and buses by the end of 2011, from 2,100 in 2008.
 - 15% EV and PHEV to be expected in 2020
 - Public use of EV and PHEV is heavily subsidized, EUR 6,800 for battery electric vehicles
 - EV infrastructure in 2020 to cover cities having >1.000 USD GDP/capita
 - The cost of the rechargeable battery is low than ¥2-3 RMB/ Wh

Programmes



Programme Name	Research Themes	Available Funding	Time Frame	Responsible Organisation(s)
Automotive Industry Readjustment and revitalization plan	Special call for RMB 10 billion in special funds for automotive sector R&D. Some portion of this will almost certainly be earmarked for alternative energy automotive and auto parts development, industrialisation of electric vehicles and key parts.	10 billion yuan	Starting 2009	MOST
National High-tech program (863 program)	MOST initiated the major project "Fuel Efficient and New Fuel Vehicle Project" under the National 863 Program in the eleventh Five-Year Plan period(2006-2010) The main Electrification project is the "Energy-Efficient & New Energy Vehicles Major Project"	6.6 billion yuan	2006-2010	MOST
National Basic research Program	4 projects for hydrogen, fuel cell, and battery EV 1 Basic study for mass production of hydrogen, hydrogen storage and fuel cell application (2000-2005) 2 Fundamental Research of Novel and Green Systems of Secondary Batteries(2002-2007) 3 Basic study of hydrogen production by renewable energy (2003-2008) 4 Basic study to energy storage system (H ₂ & electricity storage) with low cost and high power density for electric vehicle (2007 2007-2011)	1.3 billion yuan overall	ending 2008?	MOST
National Key Laboratories Program	Laboratory of Automotive Safety and Energy State Key Laboratory of Automobile Dynamic Simulation State Key Laboratory of Environmental Simulation and Pollution Control State Key Laboratory of Vibration, Shock & Noise	1.4 billion yuan overall	Continuous	MOST
10 cities x 1000 vehicles	Plans to demonstrate hybrid power vehicles, pure electric vehicles and fuel cell vehicles and infrastructure of energy supply in more than 10 large and medium size cities in China each year in the next three years. Each city shall adopt 1000 new energy vehicles with subsidies from the government.	3 billion \$	3-4 years	MOST & Ministry of Finance

INDIA

Vision, roadmaps and targets



- "To emerge as the destination of choice in the world for design and manufacture of automobiles and auto components with output reaching a level of US\$ 145 billion accounting for more than 10% of the GDP and providing additional employment to 25 million people by 2016."
- Planning Commission of the Government of India: Invest in RTD for alternative propulsion systems: Fuel efficiency & greenhouse gas emissions, propulsion technology for use of hybrid cells, bio fuels, alternate energy

Programmes



Programme Name	Research Themes	Available Funding	Time Frame	Responsible Organisation(s)
National Hybrid Propulsion Program	<p>Enable and enhance the growth of hybrid vehicle technology indigenously, with stakeholders from Industry, Research labs and Academia. For two- & three-wheelers, passenger cars and commercial vehicles.</p> <p>Milestone 1: Deliver Technology Demos</p> <p>Milestone 2: Build In-country Capability</p> <p>Milestone 3: Pipeline of skill set in academia</p>	It is a total INR 700 crores (50-50 cost share program by government and industry)	Not Specified Yet	SIAM (Society for Indian Automobile Manufacturers) & Government of India
National Automotive Testing and R&D Infrastructure Project (NATRIP)	<p>the largest and one of the most significant initiatives in Automotive sector so far, represents a unique joining of hands between the Government of India, a number of State Governments and Indian Automotive Industry to create a state of the art Testing, Validation and R&D infrastructure in the country.</p> <p>Aims at setting up of 7 state-of-the-art automotive testing and R&D centres across the country and thereby :</p> <ul style="list-style-type: none"> i. Creating core global competencies. ii. Enhancing competitive skills for product development leading to deepening of manufacturing. iii. Synergizing Indias unique capabilities in Information Technology with the automotive sector. iv. Facilitating seamless integration of Indian automotive industry with the world to put India strongly on the global automotive map. 	Government has approved the setting up of the project NATRIP, at a cost of Rs. 1718 crore for developing testing infrastructure to support the growth of automotive industry.	Sep 2011 (facilities to be completed)	Gov. of India and industry association

SOUTH KOREA

Vision, roadmaps and targets

- Reduce CO2 emission by a factor of 50% by 2050 in every sector, including transport.
- The Korean government has also 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.
- 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.



Programmes



Programme Name	Research Themes	Available Funding	Time Frame	Responsible Organisation(s)
EV demonstration	Since 2009 trial operation with 27 vehicles, from 2010 >100 vehicles. Start in Seoul, a part of Kyong-gi and Jeju. Lead industry: CT&T with Neighborhood Electric Vehicles.		Since 2009	
National RD&D Organization for H2 & Fuel Cell	<p>Established in 2003 to expedite the commercialization of H2& fuel cell technology.</p> <ul style="list-style-type: none"> •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 programs supported by government 	677 billion KRW		Ministry of Knowledge and Economy
Eco-friendly car development program		125 billion KRW		Ministry of Environment

GERMANY

Vision, roadmaps and targets



- The goal of the European Union is to convert 10 % of the mobility to biofuel or renewable electricity until the year 2020. That implies a ratio of approximately 25 Mio. vehicles totaling 250 Mio. vehicles. The major part of the 25 Mio. vehicles are powered by biofuel, but there also remains a increasing part of electric mobility all over Europe.
- In September 2008 a strategy conference about electric mobility took place in Berlin. The result of the conference was a “Fuel- and Drive-Strategy” on national level. The strategy focuses the following:
 - Clean Fuels (synthetic fuels and progressive biofuels)
 - Hybrid / Plug-In-Hybrid –Electric-Vehicle (PHEV), **Electric Vehicle (EV)**
 - Fuel cell / hydrogen

National Strategy (1/2)



- The national government are presently compiling a “national development plan for electric mobility” over a ten-year-period. The parties hereto are four ministries (BMW National Ministry for Economy and Technology, BMVBS National Ministry for Transport, BMU National Ministry for Environment, BMBF National Ministry for Education and Research)
- Thus the electric vehicle will be part of the everyday traffic-life above all the city traffic. Until the year 2020 already one million rechargeable electric vehicles and so-called Plug-In-Hybrid-vehicles will drive on German streets.
- To reach this goal, the national government will pool the strengths of economy, science and politics. Furthermore they will adopt measures about sponsorships for battery-research and incentives for market introduction. These measures will be summarized in a catalog.

National Strategy (2/2)



- The sponsorship amounts 500 Mio Euro for projects on national level with subsidies from “Konjunkturpaket II”. Thus Germany should become the main market for electric mobility in the next ten years. That increases the international competitiveness of Germany and support the climate protection.
- The financial support rate of 50 % results in a project volume of about 1.000 Mio. Euro

National Funding



Overview of the 15 research projects on national level:

- P1: Construction of a network of competence application research electric mobility
- P2: Research centers for increasing competences in electrochemistry
- P3: Energy research: Memory, network, integration
- P4: Production technologies for Li-Ion-cells/Batteries
- P5: Transport research: system development and field test
- P6: Information-Communication-Technique: Intelligent networks
- P7: Field test electric mobility in automobile traffic
- P8: Field test electric mobility in freights traffic
- P9: Electric mobility in public sector within model-regions
- P10: Battery center
- P11: Pilot plant for recycling of Li-Ion-Batteries
- P12: Hybrid buses for environment-friendly public passenger traffic
- P13: Construction of 25 hydrogen-stations
- P14: Pilot project "Mobile with Biomethane"
- P15: Pilot plant for production of synthetic fuels

Funding in North Rhine-Westphalia



- The commitment about 115 Mio. Euro from National Transport Ministry for eight model-regions demonstrate the electric mobility (Plug-In-Hybrid and Electric-Vehicle) within the scope of field tests. The eight model-regions are:
 - Berlin/Potsdam
 - Bremen/Oldenburg
 - Hamburg
 - München
 - Rhein-Main
 - **Rhein-Ruhr /NRW (with competence-centers in Aachen and Münster)**
 - Sachsen (main areas: Dresden and Leipzig)
 - Stuttgart
- The state North Rhine-Westphalia (NRW) has been chosen as one model-region. Hence NRW will be financially supported in a sum of approximately 20 Mio. Euro for the next years.
- Additionally NRW commit another financial support about 60 Mio. Euros under the name of “Electric-mobility.NRW”. NRW provide the committed amount for the following projects: “Research- and Development-Projects” (20 Mio Euro), “Infrastructure Project” (20 Mio. Euro) and “Commercial Investment Intentions” (20 Mio. Euro). The sponsorship is limited with 50 % of the total project volume. The NRW Ministry of Economy is realizing the sponsorship.

SPAIN

Vision, roadmaps and targets



VISION

- Reduce the impact on the Spanish economy of the fossil energies
- Favor the energy efficiency, safety and sustainability of the industry

ROADMAPS

- **National Scientific Research, Development and Technological Innovation Program** (The objective of this plan is to establish the guidelines to be followed in the R+D+i path within the National Science and Technology Strategy towards 2015. The plan includes research and development, scientific actions, equal employment opportunities and social development programs.)
- **„Saving and energy efficiency Plan“ 2008-2011** (Pilot plan to introduce the electric vehicle, to demonstrate its technical, energetic and economical feasibility).

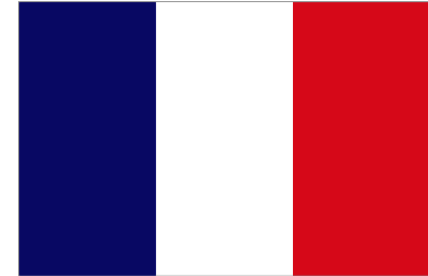
Programmes



Programme Name	Research Themes	Available Funding	Time Frame	Responsible Organisation(s)
Proyecto MOVELE	The project is focused on running an initial test on economical, ecological and technical viability of electrical vehicles.	10 M€	2009-2010	Ministry of Industry, Tourism and Commerce (Institute for Energy Diversification and Economization)
Plan Vehículo Innovador Vehículo Ecológico (VIVE 2008 - 2011)	In 2008 the Ministry of Industry and the ICO started Plan VIVE to impulse the substitution of older vehicles.	1200 M€	2008-2011	Ministry of Industry, Tourism and Commerce (General Industry Direction)
Plan 2000E	For 2009, a second automotive renewal program is established. It will coexist with Plan VIVE and the amount of the fund is 2000 euros per car.	2000€ per car	2009	Ministry of Industry, Tourism and Commerce (General Industry Direction)
Support for pilot programs that promote sustainable mobility in urban and metropolitan environments.	Promote a sustainable urban and metropolitan mobility and define the tasks of the Ministry of Public Works in an integrated and coordinated action with the relevant administrations.	9 M€		Ministry of Public Works
LIVE (Logistic per the implementation of the electric vehicle)	Promote the introduction of the electric vehicle in the city of Barcelona, Madrid and Sevilla, starting in Barcelona.	380 EVs for and 191 charging docks for Phase 1	Nov 2009	Barcelona City Hall, SEAT, Nissan, Endesa, RACC

FRANCE

Vision, roadmaps and targets



- 2 million of EVs and plug-in hybrid vehicles produced by 2020.
- French carmakers are leading different options
 - Renault is more involved in the electric vehicle development: 4 models should be produced between 2011 and 2012.
 - PSA Peugeot Citroen will launch Diesel hybrid vehicles.

Programmes



Programme Name	Research Themes	Available Funding	Time Frame	Responsible Organisation(s)
Battle for Electric Cars	This is a government initiative to help launch the EV in France by financing a fleet of cars, the buy of charging infrastructures to reach a market by 2020.	1.5 B€ overall; 900 Me from public funds	2020	MEEDDM
Demonstration Fund	Energies, residential and transport 11 clean vehicles projects have been selected VELROUE: hybrid vehicle with wheel-engines FOREWHEEL: new architectures for electric vehicles HYDOLE: versatile electric vehicles MYGHALE: Mild hybridization for mass market VEGA/THOP: high autonomy electric vehicle DHRT2: plug-in hybrid VELECTA and QUAT'ODE: light electric 4-wheelers WATT: electric vehicles and charging system ELLYSUP: hybrid bus MELODYS: hybrid heavy-duty truck	56 M€	4 years	ADEME
PREDIT4	PREDIT is a program of research, experimentation and innovation in land transport, started and implemented by the Ministries in charge of research, transport, environment and industry, ADEME and OSEO	400 M€ overall, 280 M€ for vehicle technologies	5 years	MEEDM
MOVEO (competitiveness cluster)		97 M€		ANR
MTA- Mobility and advanced Transport (competitiveness cluster)		40 M€		ANR
Pacte automobile (economic recovery fund)	The Automobile pact is a recovery plan aiming at helping the automotive industry by giving funds to recover from the economic crisis. On of these helps is given as loans to carmakers which will develop hybrid powertrains and batteries.	250 M€	5 years	ANR, ADEME

UNITED KINGDOM

Visions, Roadmaps & Targets (1/2)

*“Our priority must be to make the world's leading
ultra-low carbon car industry in the UK.”*

Science Minister Lord Drayson,
LCV Conference, London, September 2009



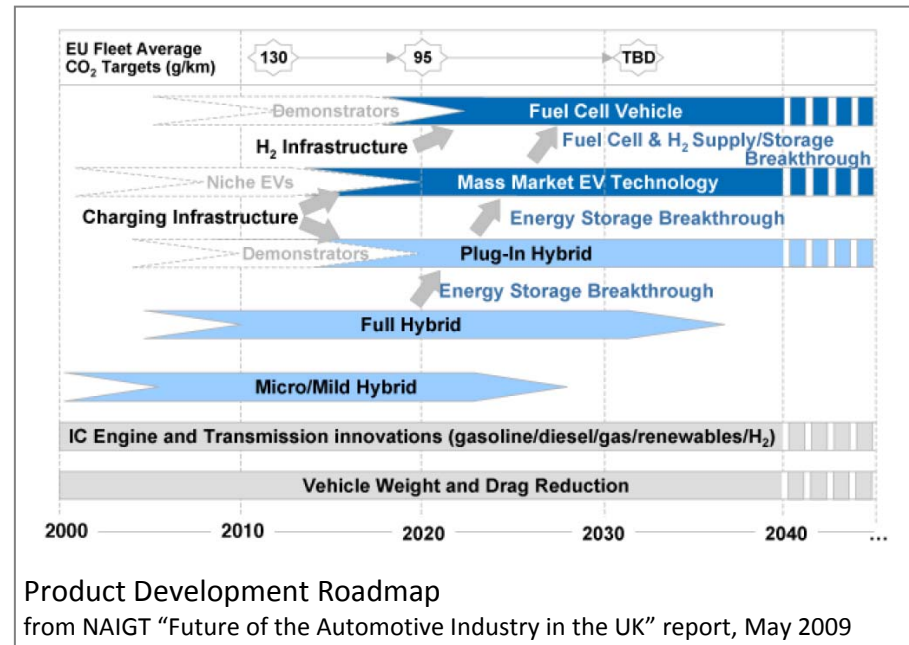
- The UK Government plans to:
 - Make the UK the centre of green industry
 - Reduce GHG emissions from road transport through shifting to ultra-low carbon vehicles by promoting EVs and PHEVs
 - Host the world's largest demonstration project for new EVs (demonstration of 340 EVs and Low Carbon Cars on UK roads)
 - Achieve 10% renewable transport energy by 2020 (EVs can contribute to this target)
- In December 2009 the Chancellor, Alistair Darling, announced that electric cars would be exempt from company car tax for five years, along with 100% first year capital allowance for electric vans

Sources: “Ultra-Low Carbon Vehicles in the UK”, HM Government, April 2009; “The UK Low Carbon Transition Plan”, HM Government, July 2009; “The UK Renewable Energy Strategy”, HM Government, July 2009; “Low Carbon Transport: A Greener Future”, DfT, July 2009; <http://news.bbc.co.uk/1/hi/business/8403593.stm>

Visions, Roadmaps & Targets (2/2)



- In May 2009, the UK New Automotive Innovation and Growth Team (NAIGT) published a Product Development Roadmap for low carbon vehicles, which includes the introduction of PHEV, EV and FCV technologies
- A recent report for the Committee for Climate Change, published in October 2009, urged the UK Government to make a step change towards meeting the UK Carbon Budgets. The recommendations for Transport included:
 - Reduce average new car CO₂ to 95g/km by 2020 (currently 160 g CO₂ /km)
 - 240,000 EVs & PHEVs by 2015 (pilot projects), and 1.7m on road by 2020
 - Develop EV charging infrastructure



Programmes



- The UK Government's vision to promote ultra low carbon transport over the next five years was launched on 17 April 2009. Central to the strategy is an initiative to promote EVs and PHEVs
 - The new £250m scheme (DfT EV consumer incentive package) will take effect from 2011
 - £230m, will provide motorists with grants of between £2,000 and £5,000 to buy EVs and PHEVs. It will be introduced in 2011 to coincide with the expected mass introduction of EVs and PHEVs into the market
 - £20m will fund charging points and related infrastructure in two or three "electric cities"
- The UK Government has already committed around £150 million of support to encourage development and uptake of ultra-low emission vehicles
 - £23 million for the TSB Low Carbon Vehicle Innovation Platform - phase 1
 - The competition focused on developing demonstration EVs and PHEVs
 - £100 million for the TSB Low Carbon Vehicle Integrated Delivery Programme
 - The competition focused on developing ultra-efficient electrical systems for EVs and HEVs
 - £20 million for the DfT Low Carbon Vehicle Public Procurement Programme
 - Encouraging deployment of low carbon vans
- In February 2009 the UK Government launched the Automotive Assistance Programme (AAP)), a £2.3 billion package to assist the automotive sector in economic downturn. The AAP is tailored to support the long-term future of the UK automotive sector as a world leading low carbon industry

Sources: "Ultra-Low Carbon Vehicles in the UK", HM Government, April 2009; "The UK Low Carbon Transition Plan", HM Government, July 2009; "The UK Renewable Energy Strategy", HM Government, July 2009; "Low Carbon Transport: A Greener Future", DfT, July 2009; "Meeting Carbon Budgets – the need for a step change", CCC, October 2009

Other Plans (1/2)



- **London**

- The Mayor of London aims to make London the EV capital of Europe, part of the strategy to decarbonise transport and improve air quality in London
 - **Infrastructure** – aim to deliver comprehensive coverage of charging points across London
 - 25,000 EV points by 2015, including network of fast charge sites
 - **Vehicles** – electrify the public sector vehicle fleet and stimulate the wider EV market
 - Mayor is committed to a step-change in the number of EVs, with 100,000 EVs on the streets of London as soon as possible
 - » Deliver 1,000 EVs in GLA (Greater London Authority) fleet by 2015
 - **Incentives, marketing & communications** – increase and communicate customer benefits
 - 100% Congestion Charge discount, worth £1,700/year
 - The Plan will be delivered in partnership with the London boroughs, central Government and the private sector - ~£60 million investment required
 - Working with DfT to secure a share of the £20m funding available for infrastructure announced in April 2009 and with CENEX to secure a share of £50m fund to promote low carbon vehicle technology
- The Mayor of London is still committed to supporting the London Hydrogen Partnership and the use of bio-fuels in the bus fleet

Sources: "An Electric Vehicle Delivery Plan for London", Mayor of London, May 2009;

Other Plans (2/2)



- **Midlands - The CABLED project** (www.cabled.org.uk)
 - The CABLED project will showcase electric vehicles across Coventry and Birmingham in the West Midlands, as part of a UK wide trial
 - The project will deliver:
 - A demonstration of 110 ultra low carbon vehicles, including 2-seater, 4-seater and SUVs, powered by battery electric, hydrogen fuel cell and plug-in hybrid technology, driven in real world conditions
 - The infrastructure of EV charging points required by users

