NORTH SEA REGION ELECTRIC MOBILITY NETWORK

e-mobility NSR

WP3 Activity 3

A review of European projects in the field of electric vehicles

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The Interreg IVB North Sea Region Programme

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Contents

This report summarises information found regarding 70 projects which relate to electric vehicle research, undertaken in Europe. Information on electric vehicle projects was found by undertaking a systematic information search primarily using CORDIS and project web sites.

For each project, the following information was sought:

- Acronym
- Full project name
- Start and end date
- Source of funding
- Amount of funding
- Full project cost
- Short description
- Outputs
- Project web site

Where an item of information could not be found, the corresponding table entry is left blank.

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AMELIE	Advanced Fluorinated Materials for High Safety, Energy and Calendar Life Lithium Ion Batteries
Timescales: Jan 2011-Dec 013	Funding: FP7-TRANSPORT. Total cost €5.2m, funding €3.5m.
Description: "The focus of the project is on the development of fluorinated electrolyte/separator and binders in combination with active electrodes for high performing, safe and durable Li batteries. The main deliverables of the project are the development of cell prototypes capacity >10 A.h on which performance will be assessed towards objectives for EV and PHEV applications. Capacity of cells will target more than 200 Wh/kg with improved life time: >1000 cycles, High calendar life: >10 years, cost and high recyclability / recovery/ reuse will be a key focus as well. The utilization of higher performing 'inactive' organic materials (polymers and ionomers) will enable to reduce the amount of the same materials while increasing the energy and power densities of the battery, and consequently decreasing the cost per kWh of the final battery.In addition, the reuse of the components will contribute to the cost reduction of the battery. To this end a complete Life Cycle Analysis of the new battery components will be performed. As the developments in this field are extremely interconnected, improved Lithium ion batteries for automotive sector can be manufactured only by the synergistic optimisation of all their components: active materials and binders for electrodes, gel polymers, lithium salts and solvents for the ionic conductors. Although innovative materials are a key lever of such improvements, the cell design will be essential for both improved performances and safety."	
Outputs: Project flyer	

APPLES	Advanced, High Performance, Polymer Lithium Batteries for Electrochemical Storage
Timescales: Jun 2011-May 2014	Funding: FP7-ENERGY. Total cost €4.7m, funding €3.3m.

Description:
"The APPLES project is a 3-year project funded by the European Union which started on 1 June 2011. It aims to the development of an initial industrial level of an advanced, lithium ion battery for efficient application in the sustainable vehicle market.
The basic structure of this battery involves a lithium-metal (tin)-carbon, Sn-C, alloy anode, a lithium nickel manganese oxide, $LiNi_{0.5}Mn_{1.5}O_4$, cathode and a ceramic-added, gel-type membrane electrolyte and the battery will have improved performances regarding energy density, cycle life, cost, sustainability and safety.
A strong European consortium with partners from Germany, Italy and Sweden has been established to exploit the complementary experience of various interconnected unities, including academic laboratories and industrial companies:
The academic partners will mainly address the work on the optimization of the basic, electrochemical properties of the electrode and electrolyte materials, while the industrial partners mainly will focus on the determination of battery key aspects, such as the value of energy density under a large size capacity configuration, the definition of the safety by abuse test procedure protocols, the overall cost, the environmental sustainability and the recycling process.
It is expected that these combined efforts will lead to the industrial production of a battery having an energy density of the order of 300 Wh/kg, a cost considerably lower than batteries already on the market, environmental compatibility and highly reduced safety hazard. In synthesis, this project compares well with others in progress worldwide for the development of lithium batteries directed to an efficient application in the sustainable vehicle market."

Outputs:
Presentation: Lithium batteries, a look into the future

http://www.applesproject.eu/

AUTOSUPERCAP	Development of High Energy / High Density Supercapacitors for Automotive Applications
Timescales: Jan 2011-Dec 2013	Funding: FP7-NMP
Description: "Supercapacitors are essential in electric vehicles for supplying power during acceleration and recovering braking energy. High power and sufficient energy density (per kilo) are required for both an effective power system but also to reduce weight. There are several issues to achieve a high performance/low weight power system that need to be addressed by various groups of scientists and engineers in an integrated framework. In this proposal, we have assembled a multidisciplinary Consortium of leading researchers, organisations, highly experienced industrialists, and highly active SMEs to tackle the problems. As a result, we are aiming at developing supercapacitors of both high power and high energy density at affordable levels by the automotive industry, and of higher sustainability than many current electrochemical storage devices. These targets will be achieved by integrating several novel stages: (a) computer simulations to optimise the power system and the design of the supercapacitor bank for different supercapacitor models, representing the different supercapacitor cells to be developed and tested in this project; (b) we shall use carbon-based electrodes to reduce the amount of rare and expensive metals; (c) we shall use electrolytes of high operating voltage to increase both power and energy density, although the problem is that they have large ions that reduce the effective surface area of porous electrodes due to low diffusivity; (d) in this case, innovative electrode structures will be developed based on combinations of high surface area/large pore activated carbon electrodes and low resistance carbon fibrous materials or carbon nanotubes; graphene will also be investigated.(e) novel methodologies will be developed to integrate the innovative electrode materials in the fabrication process for manufacturing large supercapacitors. These will be tested both at small-scale, and in realistic electric car test rig tests, and be cost and life-cycle-assessed."	
Outputs:	
http://autosupercap.eps.surrey.ac.uk/	

CAPIRE	Co-ordinated Action on PPP Implementation for Road-transport Electrification
Timescales: Dec 2010-Dec 2014	Funding: EC Directorate General RTD

Description:
"CAPIRE is a Coordination Action within the framework of the European Green Cars Initiative and is intended to support the implementation of this PPP.
The project focuses on the definition of the potential Flagships projects which could foster the competitiveness of the European Automotive Industry in the domain of Transport Electrification as well as in the development of technologies and services to reduce the European CO2 footprint.
Major outcomes of CAPIRE will be a dedicated roadmap based on an elaborated and deep analysis of R&D needs, respective milestones and supporting measures. The goal is to increase by a joint approach of the involved economic sectors and the public authorities the competitiveness of European Automotive Industry in the domain of energy efficient, safe, non-polluting and CO2-free vehicles at the global scale. To be broad enough, this strategy has to be based on the three technology pillars of the EGCI:

- Passenger cars and LCV: to reduce local pollution, emission of green house gases, and noise by accelerating electrification of vehicles and provision of a dedicated infrastructure for the connection to CO2-free energy sources
- Trucks and Buses: to improve overall efficiency of transport of people and goods by the development of more effective vehicles, standardized load carriers and supporting ITS/ICT systems
- Logistics: to increase the efficiency of goods transport by optimizing loading rate of trucks and mixing different energy saving transport vectors as rail transport and road transport."

Outputs:	
What will make young professionals switch to EV.pdf Young professionals' preferences regarding electric vehicles for now and for the future.pdf CAPIRE PPP Workshop 7 April 2011 Vehicle technologies roadmap and recommendations for long distance trucks Logistics roadmap and recommendations	Market simulations Draft EV technologes roadmap update and recommendations European programme analysis for collaborative transport RTD Review of European and national research programmes for collaborative transport RTD Project assessment

http://www.capire.eu/

CARE-North	Carbon Responsible transport strategies for the North Sea Area
Timescales: Aug 2009-Aug 2012	Funding: EU Interreg and ERDF. Total cost €4.8m, funding €2.4m.
Description: "The aim of CARE-North is to develop a comprehensive, strategic and practical approach to urban and regional transport/accessibility in the North Sea Region in the context of climate change and declining oil supplies. While the North Sea Region deals with the effects of climate change, the traditional understanding of transport is leading to a continued increase in CO2 emissions, undermining other climate protection efforts. Concurrently, we are facing the impending limit of mineral oil supplies. We face an urgent need to develop and implement carbon reduction strategies and to secure an ongoing energy supply for transport. CARE-North has developed and proposes to implement innovative carbon reduction strategies for urban and regional transport to maintain and improve accessibility in a more carbon-responsible way, and to make the NSR a leader in carbon-efficient accessibility."	
Outputs: Assessment of economic and ecological impacts Getting transport to work: business and corporate social responsibility conference. 19-21/09/2011 Car-sharing seminar - How can we spur a market for car-sharing and car pooling? 16/03/2011 Carbon responsible transport strategies seminar. 12/10/10 World Expo Shanghai. 24-26/05/2010 March 2010 second partner meeting November 2009 first partner meeting	
http://www.care-north.eu/	

CASTOR	Car Multi Propulsion Integrated Power Train
Timescales: Jun 2010-May 2013	Funding: FP7-ICT. Total cost €5.3m, funding €3.4m
Description: "The main objective of CASTOR is to integrate an innovative distributed propulsion system on fully electrical vehicles. Future electrical propulsion concepts demand more efficiency and less complexity with great functionality, high robustness and light weight and need to run in a wide ambient temperature range. CASTOR is aimed at: Energy saving of 10 - 20% with respect to present propulsion systems. Cost reduction of about 25% (TBD) with respect to present propulsion systems. Increasing the safety due to traction properties and improved integrability into drive applications. Mileage improvement of 15 -20% due to higher efficiency and less weight.£	
Outputs: Presentation	
http://www.castor-project.eu/	

CATCH	Carbon Aware Cities: A Multi-Disciplinary Approach to Low Carbon Transport System
Timescales: 2009 to 2012	Funding: FP7
Description: "CATCH (Carbon Aware Travel CHoice) is a project with the ultimate aim to reduce the carbon dioxide emissions of the urban transport sector by encouraging carbon-friendly travel choices. In order for cities to encourage climate-friendly decision-making among their citizens, they must understand how to present information and knowledge to their citizens, and learn from good and bad examples. These factors provide the backdrop to the CATCH project: climate change, a lack of online mobility-related greenhouse gas reduction advice, travellers uncertainty in existing advice and confusion surrounding where they fit in to the global picture of climate change. In this context the vision of the CATCH Project is to become the natural place to look for mobility related GHG reduction advice and information. CATCH will develop and disseminate a knowledge platform to increase awareness of the environmental impacts of mobility and potential solutions to their management and to enable travellers to make informed climate-friendly travel choices. "	
Outputs: Behavioural inception report Research and design report First interest group meeting Second interest group meeting Third interest group meeting Presentations by the project consortium Catch project leaflet 2011 Catch co-benefit factsheets Academic conference presentations/papers Knowledge platform	
http://www.carbonaware.eu/	

CO³	Collaborative Concepts for Comodality
Timescales: Sep 2011-Aug 2014	Funding: FP7-TRANSPORT. Total cost €2.3m, funding €2m.
Description: "CO³ is a key priority project proposed by the European Intermodal Research Advisory Council (EIRAC). A recent study (Feb 2009) from the World Economic Forum estimates that the capacity utilization of European freight is currently as low as 43%. The EIRAC consensus is that we should set as a priority to increase to a more ambitious 70%. EIRAC believes a key strategy to achieve this objective is to stimulate and facilitate industrial collaboration in their systems of Distribution of Goods. CO3 is a simple and very practical action that could have however a great impact by chain effect. We have chartered a small group of Lawyers, economists and Industry players, to sit down together and prepare a common European conceptual template for Collaborative Transport Agreements among shippers. Such template, fairly splits cost and benefits, protects participating SMEs, while preserving large industrial players economy of scale. The agreements should have clear and transparent termination-entry clauses to enable their evolution without unnecessary stress. In particular it facilitates scale building giving the participating parties easier access to Intermodal Transport solution."	
Outputs: CO3 – Collaborative business model – executive summary CO3 – Framework for collaboration – executive summary CO3 - Case study JSP Hammerwerk	
http://www.co3-project.eu/	

COMCIS	Collaborative Information Services for Container Management
Timescales: Sep 2011-Aug 2013	Funding: FP7-TRANSPORT. Total cost €4.6m, funding €2.9m.
Description: "This project is about interoperability between existing e-freight systems. Shippers, beneficial cargo owners, LSPs as well as customs authorities will be offered information that will shorten lead times and increase reliability. We will unlock valuable information that is available somewhere throughout the logistics chain: Data from container security devices, port communities, logistics network, terminal operators, etc. Interoperability between systems is only useful if it leads to improved processes. COMCIS will therefore focus on better integration of customs processes, better interfaces between sea and hinterland, as well as better control on the hinterland part of the logistics chain which is often the largest cause of variability. For communication between abovementioned e-freight systems, we will use the common framework that is being developed in a cooperation between European e-Freight projects as well as industry driven initiatives like LIM (Logistics Interoperability Model) of GS-1. Demonstrations will take place in 3 business cases through ports of Antwerp and Rotterdam, involving DHL, MSC and ECT."	
Outputs:	

CORE	CO_2 REduction for Long Distance Transport
Timescales: Jan 2012-Dec 2015	Funding: FP&-TRANSPORT. Total cost €17m, funding €8.9m.
Description: "The objective of the project is to demonstrate a substantial reduction of CO2 emissions and fulfilling EuroVI emission legislation. By using novel technology and combine them in flexible engines with high level of precise control, performance advantages will be achieved with improved emissions and fuel consumption. The research will focus on efficient air management, combustion and control for the diesel engine, together with optimizing the powertrain layout utilizing electric hybridization, downsizing and alternative fuels. Research to the aftertreatment system is included to further improve the powertrain efficiency. This will be combined improvements to the base engine friction for developing highly efficient drivelines for long distance transports. CORE is divided into five sub-projects, three that will focus on different engine technologies. These activates are supported by two cross divisional projects where friction reduction and improvements to the NOx aftertreatment are studied. The project results will be assessed by vehicle simulations. The results will be evaluated for legislation test cycles and with real life drive cycles."	
Outputs:	

DELIVER	Design of Electric Light Vans for Environment-Impact Reduction
Timescales: Nov 2011-Oct 2014	Funding: FP7-TRANSPORT. Total cost €4.3m, funding €2.8m.
Description: "CO2 emissions, noise emissions and other negative impacts caused by present urban delivery concepts and specifically by the delivery vehicles are unsustainable in present and future European urban life. Fully electric light delivery vehicles (LDV) not only offer zero local CO2 emissions and close-to-zero noise emissions. The change in propulsion technology from ICE to electric powertrains will lead to the integration of new components and systems, while others undergo changes or become obsolete. The possibility to integrate the electric motor into the wheel further increases the design freedom, especially if also suspension and regenerative braking can be integrated into it. This opens up new freedom in design and clears the way for new urban delivery vehicle concepts. DELIVER is to produce and physically showcase design research results that allow for full exploitation of this new freedom, while responding to changing future market demands. To achieve this key objective, the project generates, investigates and analyzes innovative design concepts for electric LDVs with motorized wheels. It delivers a range of advanced architectures which enable at least the same high level of intrinsic safety as known from current best in class conventional vehicles at minimal weight, maximised energy efficiency (40 % better than best-in-class ICE benchmark), optimized ergonomics & loading space at affordable costs as well as acceptable levels of comfort and driving performance. The program will culminate in a driving concept validation vehicle which will embody the optimum integration of systems as researched during the design and development stage. The purpose of the vehicle is to validate the research results with the highest degree of reality possible within the budget. Some specific targets will be verified by simulation such as crash. "	
Outputs: Report on technology, market and urban logistics roadmap from 2020 and beyond Requirements document with quantified performance targets Input document regarding allowable EM radiation levels in various parts of the vehicle Develpoment of the DELIVER vehicle design concept Development of a fully electric light duty vehicle – the DELIVER project	
http://www.deliver-project.org/	

DEMOCRITOS	Developing the mobility credits integrated platform enabling travellers to improve urban transport sustainability
Timescales: unknown	Funding: FP7-TRANSPORT. Total cost €1.7m, funding €1.6m.
Description: "The project introduces the "Mobility Credits Model" as a transport specific platform that will enable travellers, mobility providers, technology providers and transport planners to understand the implications of climate policy and increasing prices for greenhouse gas emissions and to identify new opportunities in urban mobility first and in extra-urban mobility later. The concept of the "Mobility Credits" was originally developed by the Italian firms Evidenze and RightStrategy with the support of Fondazione Italiana Accenture (owner of the trademark "Crediti di Mobilità"TM) and was further developed through the collaboration with the Municipality of Genova. The rationale of the Mobility Credits Model is based on setting as quantitative target the "sustainable load of GHG (Greenhouse Gases)" of the study area. Subsequently the GHG load is converted into a "total amount of mobility credits" distributed to all the travellers of the area. Based on their mobility behaviours, individuals "consume" their initial endowment of mobility credits. In addition, depending on their mobility habits, people could have needs higher or lower than the mobility budget assigned: as a reaction, exchange mechanisms develop in the system, regulated through a sort of bank where credits are bought by the individuals or returned with monetary benefit in case they have been unused."	
Outputs: Summary of Deliverable 1 Deliverable 2 Deliverable 2 Annex 1 Deliverable 2 Annex 2 Deliverable 2 Annex 3 Summary of Deliverable 4 Summary of Deliverable 8 Final conference presentations	
http://www.democritos.ipacv.ro/	

E³Car	Nanoelectronics for an Energy Efficient Electrical Car
Timescales:	Funding: FP7
Description: "Advancement of technologies for environmentally friendly and energy efficient vehicles, that contributes to the European targets for reducing CO2 emission, fossil fuel liquids consumption and the development of "green technologies". The project aims at creating a breakthrough in the development of nanoelectronics technologies, devices, miniaturized sub systems for the next generation electric vehicles and accelerates the commercialising of the electric vehicles segment. In this context the project is addressing the development of highly efficient electrical vehicles, the battery control, the high voltage components (IGBTs, high voltage FETs) and the architectures and subsystems for the electronics of electrical vehicles."	
Outputs: Electric Vehicles: A Force for the Future An integrated low power buck converter with a comparator controlled low-side switch ROBUST DESIGN FOR HIGH TEMPERATURE AND HIGH VOLTAGE APPLICATIONS Nanoelectronics: Key Enabler for Energy Efficient Electrical Vehicles High temperature power electronics IGBT modules for electrical and hybrid vehicles High temperature nanoelectronics for electrical and hybrid vehicles Project flyer	
http://www.e3car.eu/	

EASYBAT	Models and Generic Interfaces for EASY and Safe BATtery Integration and Swap in EV
Timescales: Jan 2011-Jun 2013	Funding: FP7-TRANSPORT. Total cost €3.7m, funding €2.2m.
Description: "'The Battery is the Car'. New traction battery packs make the fully electric & plug-in vehicles more and more capable. Their share of the price of the car is set to become even more dominant. Factors driving this include the strident demand for better car range. Battery packs increasingly incorporate electronics for safety and power conversion. The integration of these new complex battery packs presents major challenges especially considering the current lack of standards. EASYBAT's main mission is to address these integration challenges by defining new concepts for the smart insertion of batteries and by developing in particular generic interfaces for electric vehicles. This research aims at enabling smooth batteries integration and swap. The EASYBAT integration system will be developed for fully electric vehicles. EASYBAT will develop (i) generic interfaces to improve interoperability between the battery system modules and the vehicle on board-systems and (ii) new components for an easy & safe location and quick integration of the battery in the vehicle. (iii) At each stage of the project, the EASYBAT partners will assess the feasibility of the overall battery swapping concept considering costs, logistics, and environmental aspects. Based on these parameters, the EASYBAT system performance will be compared to alternative solutions for EVs. The EASYBAT consortium includes a major electric vehicle services provider, one of the top global OEMs, a leading automotive supplier, research institutes covering fields of expertise such as safety & security, interfaces and communication protocols, EVs electrical architecture, and standardization within the IEC/ISO. Together, the EASYBAT partners will offer solutions enabling cost effective, environmental friendly switchable battery packs and will contribute unleashing the EVs potential for a wider use."	
Outputs: European Energy Innovation: Electric Vehicle Supplement	
http://www.easybat-project.eu/	

ECOGEM	Cooperative Advanced Driver Assisted System for Green Cars
Timescales: Sep 2010-Feb 2013	Funding: FP7-ICT. Total cost €3.2m, funding €2m.
Description: "EcoGem's key-objective is to integrate intelligence and learning functionalities to on-board systems for FEVs, enabling autonomous as well as interactive learning through V2X interfacing. EcoGem vehicles will learn over time to predict (and thus avoid) congested and energy consuming routes, based on experience that they gather. This learning process will render each EcoGem FEV capable of autonomously classifying routes according to their degree of congestion, enabling energy-driven route planning optimization."	
Outputs: Project flyer ICT for the fully electric vehicle	
http://www.ecogem.eu/	

ECOSHELL	Development of New Light High-Performance Environmentally Benign Composites Made of Bio-Materials and Bio-Resins for Electric Car Application
Timescales: Jan 2011-Sep 2013	Funding: FP7-TRANSPORT. Total cost €3.9m, funding €2.8m.
Description: "ECOSHELL is concerned with the development of optimal structural solutions for superlight electric vehicles (category L6 and L7e), decreasing its environmental footprint and using an innovative bio-composite material for the vehicle body. Traditionally this category of urban vehicles has been relatively expensive and lacking of sufficient security measures compared to a classic vehicle (category m1 n1), thus less attractive for popular use. However, a body car lighter than 100Kg can allow the electric vehicles to have acceptable performances at an affordable price, due to lower power of the engine and lower energy consummation. This project aims at handling the first two major draw backs (production cost and safety) while further improving the associated environmental advantages via the application of innovative biodegradable materials for the vehicle body . ECOSHELL partners will work at the same time on: -The material: finding the best material for such application : natural fibber, resin and glue -The structural parts: defining the optimum geometry and architecture of the body and the optimum shape of the different parts -The vehicle: defining the optimum shape and architecture. The work will be carried out throw three subprojects: -'Manufacturing': Manufacturing the material, manufacturing and assembling the parts of the body and assembling the car. -'Live cycle': Finding materials whose properties are in accordance with the vehicle live cycle, defining the parts of the body responding to the constraints of the vehicle live cycle and defining the vehicle, testing it against torsion, flexion and crash. -'End of live ': defining the end of live for the material, the structural parts, and the car (disassembly) ECOSHELL stands out clearly as an innovative project compared to most currently related activities which are mostly concerned with the improvement of production and weight of small size vehicles. "	
Outputs: Summary	
http://www.ecoshell.eu/	

e-DASH	Electricity Demand and Supply Harmonization for EVs
Timescales: Sep 2011-Aug 2014	Funding: FP7-ICT. Total cost €8.5m, funding €5.3m.
Description: "The sustainable integration of FEVs requires an intelligent charging system for the real-time exchange of charge related data between EVs and the grid in order to allow the management of: high-current fast-charging for large numbers of EVs brand-independently, price-adaptive charging/reverse-charging at optimum price, the real-time grid balancing according to spatial and temporal needs and capacities, influenced by the demand and the supply side, remote load charging process control. It is the objective of e-DASH to develop those ICT and processes that are needed to achieve the real-time integration of "FEVs" in the European Electricity Grid (optimum electricity price, effective load balancing in the grid). e-DASH will provide the necessary intelligent charging system, which is able to balance locally and temporarily in almost real-time the electricity demand of large numbers of EVs (fast charging) and instable regenerative energy supply."	
Outputs:	
http://www.edash.eu/	

EFUTURE	Safe and Efficient Electrical Vehicle
Timescales: Sep 2010-Aug 2013	Funding: FP7-ICT. Total cost €7m, funding €4m.
Description: "The idea of intelligent vehicles that cope with safety requirements and adapt their energy needs is a long-term strategy. We have started our work with successive European research projects in the last years by starting with the development of a drive-by-wire platform, but the combustion engine is still a drawback. eFuture wants to prepare the next generation of electric vehicle based on our first prototype by creating a platform which minimises its energy needs but can still optimise dynamically its decision between safety and energy efficiency. Our key issues will be the optimisation of this energy usage and its influence on the vehicle/driver. We have already seen that optimising each component separately is not enough, an overall concept is mandatory to look at the interactions between the components. The strategies to control the actuators will be integrated for safety issues, comfort driving and energy efficiency and the management of the transitions between these controllers. Second ADAS functions will be re-worked to manage these different aspects and a decision unit will base on the proposed time horizon to pre-compensate the transition between modes for energy optimisation. Beside the technical developments, a major aim of the project is to look at the driver who will be confronted with dynamical properties as this energy management will have a high impact on driving. At the end eFuture will be ready with a static (right configuration of components) and a dynamic (software based synchronization of command and execution layer) optimisations. Transitions between different vehicle behaviours (safety, performance, efficiency) will be designed and a strategy set for the priorities in terms of energy needs during requests collision will be developed. In addition the acceptance of the driver to this dynamical behaviour will be investigated."	
Outputs: E/E architecture for battery electric vehicles Development of an adaptive vehicle observer for an electric vehicle Preliminary results of vehicle dynamics and stability Torque Vectoring with a feedback and feed forward controller - applied to a through the road hybrid electric vehicle Scenarios description	
http://www.efuture-eu.org/	

e-harbours	
Timescales: 2010 to 2013	Funding: EU Interreg. Total cost €4.8m, funding €2.4m.
Description: "The e-harbours project aims at stimulating renewable energy for power and transport by optimizing energy usage and production. The challenge is to create a more sustainable energy model in harbour regions on the basis of innovative intelligent energy networks (smart grids). e-harbours focuses on 3 objectives: ■Increase the production and use of renewable energy in harbour cities. Harbour cities have extensive industrial areas with a great potential for development of sustainable energies; from wind, solar PV, tide, waves and the reuse of industrial waste, heat or cooling available; ■Increase the use of energy smart grids. Attuning demand and supply of energy by flexible demand management, instantaneous load shedding (both directions), energy labelling, intelligent storage; ■Increase the use of electric transport, a perfect partner to connect to large scale renewable energies and leading to a more healthy environment in the harbour regions."	
Outputs: Project flyer Communication plan Stakeholder analysis WP3: Smart grids and virtual power plants WP4: Electricity mobility	Electric harbour logistics Presentations from mid-term conference: Matthijs Kok Jaak Vlasveld Tessa Major Jans Declercq Rene Kamphuis Hans Schaefers Jef Verbeeck Jan Schreuder
http://eharbours.eu/	

eLCAr	E-Mobility Life Cycle Assessment Recommendations
Timescales: Feb 2012-Jan 2013	Funding: FP7-ENVIRONMENT. Total cost €0.5, funding €0.5m.
Description: "The eLCAr project aims at supporting the process of assessing the environmental impact of electric vehicles. In order to do so a set of guidelines derived from the ILCD Handbook and adapted to the specific requirements of the projects of the European Green Cars Initiative is designed. This set of guidelines will be benchmarked according to a set of criteria such as applicability, practicability and ease of use and disseminated in an up to date fashion relying on interactive and online training materials. The guidelines will answer questions of how to treat ambiguities in the analysis of all aspects of electric mobility. They also provide a coherent benchmark framework enabling an ecological comparison of electric vehicles with other technological such as bio-fuel propelled cars and hydrogen based mobility. The project work plan reflects the broad range of topics such as battery and electric component production, typical vehicle utilization and driving cycles, interaction between electricity storage, power generation and grid services, end of life and recycling."	
Outputs: Flyer Workshop 1 report Technical briefing note Workshop 1 plenum presentation Working group 1 presentation Working group 2 presentation Working group 3 presentation Consumption presentation	
http://www.elcar-project.eu/	

ELCIDIS	Electric Vehicle City Distribution Systems
Timescales: 1998-2002	Funding: EU THERMIE
Description: "Most European cities are confronted with problems regarding the distribution of goods. The evolution of urban logistics has led to the increasing use of heavy goods vehicles in city centres. The nuisance caused by these vehicles to traffic fluidity and the environment is growing, and becoming less acceptable. Shops and businesses suffer from the poor accessibility of the city and residents and shoppers experience the negative effects from the pollution caused by these heavy vehicles. Both the economic and environmental viability of cities are affected by the present organisation of urban goods distribution. The ELCIDIS project, electric vehicle city distribution systems, wants to find a solution for urban logistics by approaching the subject in a dual way, taking into account the interests of all parties involved: • By organising urban distribution using quiet and clean (hybrid) electric vehicles, the nuisance of distribution activities can be decreased dramatically. The improved living climate of the city will benefit residents and shoppers as well as shopkeepers. • A more efficient organisation of urban logistics can be achieved by a more efficient routing of the vehicles and the use of central distribution centres. A more efficient organisation will decrease the number of journeys made by heavy vehicles and increase traffic fluidity in urban areas. The improved accessibility of the city will especially benefit transport companies, shopkeepers and businesses which operate in the city. Taking into consideration the interests of all parties involved, ELCIDIS wants to set an example for clean and efficient Urban Distribution in the 21st century."	
Outputs: Final report ECN evaluation report	
http://www.elcidis.org/	

ELECTROGRAPH	Graphene-based Electrodes for Application in Supercapacitors
Timescales: Jun 2011-May 2014	Funding: FP7-NMP. Total cost €4.9, funding €3.6m.
Description: "For vehicle applications, it is desirable to have devices with high energy density, high power density, long cycle and shelf life, and low cost. Super-capacitors are considered one of the newest innovations in the field of electrical energy storage. In hybrid electric vehicle, super-capacitors can be coupled with fuel cells or batteries to deliver the high power needed during acceleration as well as to recover the available energy during regenerative braking. To design a super-capacitor for a specific application that requires high energy density or high power density or both, proper electrode materials and a suitable electrolyte are to be chosen. The combination of graphene and graphene-based material as electrode materials, and the use of room temperature ionic liquids (RTILs) may exhibit excellent performance in super-capacitors. Graphene based materials can be obtained by a bottom-up approach in a more controllable fashion. The enhanced capacitive behaviour of this material may be obtained by the proper alignment of graphene sheets as well as the interconnected nanos-cale channels. However, these studies are still at the primary stage, and further studies are necessary. The ElectroGraph project follows a technology driven approach. It is thus obvious that the development of both electrode materials as well as the electrolyte solutions is required in order to optimize the overall performance of the super-capacitor. The main novelty of the technical development is the optimised production of graphene with its properties specifically defined and adjusted for application as electrode material in energy storage devices. This would be achieved through defining of processing parameters to tailor-made graphene with a specific surface area, size and corresponding electrical properties is a new consideration. The ElectroGraph will use an integrated approach in development of both electrode materials as well as the electrolyte solutions as required for optimising the overall performance of super-capacitors."	
Outputs: Introduction Nanodays conference poster	
http://www.electrograph.eu/	

ELIBAMA	European Li-Ion Battery Advanced Manufacturing for Electric Vehicles
Timescales: Nov 2011-Oct 2014	Funding: FP7-TRANSPORT. Total cost €15.4, funding €9m.
Description: "The global objective of the ELIBAMA project is to enhance and accelerate the creation of a strong European automotive battery industry structured around industrial companies already committed to mass production of Li-ion cells and batteries for EVs. Europe faces strong competition from Asia and the USA where more investments and production capacities for Li-ion batteries currently exist. The ELIBAMA project will exploit advanced eco-design methods of manufacturing battery cells in order to guarantee drastic gains in cost reduction and environment-friendliness across the value chain of the battery production. This will allow the production of competitively priced EVs while improving the overall safety and efficiency of the battery pack in use. Specifically, the project will focus on the development of eco-friendly processes for electrode production, electrolyte manufacturing, fast and homogenous electrolyte filling processes, cell design and assembly. Moreover, the project will develop new technologies that will allow to improve downstream quality and reduce the rate of defective products at the end of the manufacturing chain. Such technologies include introducing clean room manufacturing processes, online high resolution monitoring and inspection solutions and non-destructive testing processes for Li-ion cells. The recycling and refurbishing of end-of-life Li-ion batteries will be realized in three ways: (a) defining schemes for their safe take back and transportation, (b) developing diagnostic methods for the monitoring of used commercial batteries to assess their second life potential, and (c) defining best practices for the eco-design conception and easy dismantling of batteries in order to maximize their recycling potential. All these technical improvements will be closely monitored and validated from the environmental point of view by providing an integrated environmental assessment of the different technologies developed in the course of the ELIBAMA project."	
Outputs: Presentation at European Green Cars Initiative Presentation and fuels and powertrains program board Newsletter Free acid removal from electrolyte	
http://elibama.eu/	

E-LIGHT	Advanced Structural Light-Weight Architectures for Electric Vehicles
Timescales: Jan 2011-Dec 2013	Funding: FP7-TRANSPORT. Total cost €2.9, funding €2.1m.
Description: "The automotive industry has not yet decided which the optimum architecture solution for electric vehicles is; this and the fact that requirements and constraints deriving from an electrical power-train are much less stringent in several areas make necessary to study new solutions specifically designed for the particularities of electric vehicles. Therefore E-LIGHT proposal aims at exploring all the aspects and requirements for optimal electric vehicle architectures. These particularities will be studied in E-Light project, focussing on: - Modularity of components - Ergonomic designs - Innovative safety concepts - Better aerodynamic performance and lesser weight which will decrease the overall power consumption and consequently will increase the range. The main objective of E-Light project is to develop an innovative multi-material modular architecture specifically designed for electric vehicles, achieving optimal light weight and crashworthy performances while ensuring ergonomic on board. In order to achieve this objective, the following scientific and technical objectives have been defined: - Identification of architectural requirements for future EV, focussing on lightweight for different battery and electric motor configurations (front or rear stand alone, wheel in hub). - Identification of optimal multi-materials solution to become part of the EV architectures. - The optimal geometries and designs for the EV architectures, taking into account previously studied architectural requirements and materials. - Definition of design methodology and testing procedures in order to develop general design guidelines and testing procedures towards more sustainable, lightweight, modular concepts of the design process."	
Outputs:	
http://www.elight-project.eu/	

ELVA	Advanced Electric Vehicle Architectures
Timescales: Dec 2010-May 2013	Funding: FP7-TRANSPORT. Total cost €4.8, funding €2.9m.

Description:
"While the first mass-produced electric vehicles are currently arriving on European roads, most of them are models originally intended to be driven by a combustion engine. As electric vehicles, they have an electric motor and a battery instead of a combustion engine and a fuel tank. These modifications require extensive adoptions in order to integrate the battery in a safe and sound manner. As a result, necessary reinforcement measures hinder to fully exploit the new freedom in design given by the electrification of the vehicle.
In the next two and a half years a European consortium consisting of seven partners will develop architectures for electric vehicles particularly designed for electric drive. The project, which is called ELVA, is coordinated by the Institut für Kraftfahrzeuge (ika) of RWTH Aachen University. Furthermore, four of the largest European automobile manufacturers and suppliers, namely Fiat, Renault, Volkswagen as well as Continental participate in the project. The consortium is supplemented by the Swedish Vehicle and Traffic Safety Centre SAFER as well as IDIADA Automotive Technology from Spain.
The aim of the first project phase is to get a better understanding of the customer requirements for electric vehicles and to generate a detailed overview of technologies for electric vehicle drives available until 2020. On this basis, main concepts for battery-driven city cars will be developed in a creative phase. Three of these concepts will be chosen, designed in detail and afterwards analysed and evaluated with regard to several key requirements.
A special feature of the project is a design competition in which free-lance designers and design studios as well as students and other interested parties can take part."

Outputs:
Societal scenarios and available technologies for electric vehicle architectures in 2020
EV preferences
Design brief
Presentation: To EEVC, 26-28/10/11
Presentation: To Electric Vehicle System Integration and Architecture Workshop, 30/06/11
Presentation: To Third Workshop on Research for the Fully Electric Vehicle, 1/06/11

http://www.elva-project.eu/

ELVIRE	ELectric Vehicle communication to Infrastructure, Road services and Electricity supply
Timescales: Jan 2010-Mar 2013	Funding: FP7-ICT. Total cost €9.2, funding €5.2m.

Description:
"Taking into account that to date, in Europe, 73% of all oil is consumed by transport, the introduction of Electric Vehicles is considered being of high urgency. However, in order to be ready to embark E-driving, customers need to be free from concerns to get stranded because of lack of power. This project focuses on the development of an effective communication and service platform that helps drivers to manage the charge of their Electric Vehicle and enables efficient use of sustainable energy.
The project's purpose is to develop an effective system which is able to neutralize the driver's "range anxiety", i.e. the fear to break down due to the vehicle's power range limitation. In order to ease and optimize energy management of Electric Vehicles (EV) and to cope with the sparse distribution of electrical supply points during the ramp-up phase, innovative Information and Communications Technologies and service concepts will be developed."

Outputs:
Electric vehicles: An interview study investigating the phenomenon of range anxiety
Elvire scenario and electric mobility: Business model documentation
Electric vehicles: The phenomenon of range anxiety
Periodic project report
ELVIRE EU Project Presentation at 4th ERCIM eMobility Workshop 2010:
Paper
Presentation
Newsletter
Press release
Factsheet

http://www.elvire.eu/

EM-Safety	Standards for electromagnetic exposure
Timescales: May 2011-Feb 2013	Funding: FM7
Description: “Depending on the magnitude and frequency of the field, exposure to an electromagnetic field may affect both electronic components and biological matter. International standards exist to ensure that the products on the market are safe. Safety includes two important factors. The first is that the products are not affected by present electromagnetic fields in a way that may cause harmful effects for the surroundings. The second is that the products do not transmit electromagnetic fields that may cause harmful effects to the surroundings. In both cases, the surroundings also means the user of the equipment. “	
Outputs:	
http://www.sintef.no/Projectweb/EM-Safety/	

ENEVATE	European Network of Electric Vehicles and Transferring Expertise
Timescales: Jan 2009 to Jun 2013	Funding: EU Interreg ERDF. Total cost €5.0m, funding €2.5m.
Description: "The rate at which electric mobility develops and is taken up as a transport mode depends in part on our ability to engage and learn from initiatives and on the extent of cooperation between various stakeholders. Inefficiencies of weak coordination and dispersed, ad hoc activity mean potential has not been fulfilled. This applies within North-West Europe (NWE), individual States and also at a global level. It is in recognition of this situation, the need to avoid further duplication and resource waste that the ENEVATE consortium formed. Consisting of 14 partners from NWE, the European Network of Electric Vehicles and Transferring Expertise will work together to provide tested, evidence-based solutions. ENEVATE aims to facilitate and to support an accelerated and well informed introduction of electric mobility in Northwest Europe through structured transnational cooperation between public authorities and business representatives. In doing so the project aims to boost innovation and competitiveness of the rapidly developing electric vehicle sector in NWE and at the same time contribute to the urgent environmental challenge of reducing CO2 emissions. Expertise, technologies and implementation of local actions will both reduce carbon emissions and improve infrastructure long-term. ENEVATE targets electric road vehicles, energy infrastructure, integrated mobility concepts, and demonstrates the potentials through pilot actions and enables other actors, too."	
Outputs: Presentation to e-mobility conference. 13-16/09/11 Presentation on work package 1 Paper on work package 1 Work package 3 niche typology Work package 3 methodology Survey methodology Survey form - English Survey form - German Survey form - French Survey form - Dutch Database	
http://www.enevate.eu/	

Enhanced WISETRIP	Enhancing Intermodality of Content, Personalised Information and Functionality of WISETRIP Network of Journey Planning Engines
Timescales: Sep 2011-Feb 2014	Funding: FP7-TRANSPORT. Total cost €2.6, funding €1.8m.
Description: "WISETRIP FP7 Project created an innovative multi-modal trip planner for international travellers able to give personalized information under different scenarios sourced from variant planners. Enhanced WISETRIP project aims to add possibilities for planning, booking and travelling multimodal journeys adapted to all user needs, multiple trip criteria, environmental impact and personal preferences. To manage unexpected scenarios, it will realise integration of real-time data sources and information on extraordinary conditions (strikes, disasters, bad weather) and employ decision management mechanism that will be considered for traveller alerting and trip redesign. It advances the state-of-the-art towards efficient and green planning of multimodal trips, through its unique mixture of features, which include criteria that form the basis of variant trip strategies and govern selection process at all trip phases. Criteria include CO2 footprint, E&D preferences, other user-specific options."	
Outputs:	

EPoSS	European Platform on Smart Systems integration
Timescales: Ongoing	Funding: Via membership fees
Description: "EPoSS, the European Technology Platform on Smart Systems Integration, is an industry-driven policy initiative, defining R&D and innovation needs as well as policy requirements related to Smart Systems Integration and integrated Micro- and Nanosystems. EPoSS is contributing to the Lisbon Strategy, aiming at boosting economic growth, creating more and better jobs and ensuring sustainable prosperity in Europe. A group of major industrial companies and research organizations (see EPoSS Members) from more than 20 European Member States intend to co-ordinate their activities in Smart Systems Integration. A main objective is to develop a Vision and to set-up a Strategic Research Agenda on Innovative Smart Systems Integration."	
Outputs: Smart Systems for the Full Electric Vehicle, EPoSS Strategy Paper 2008 Workshop "Smart Systems for the Full Electric Vehicle": Opening Session Round Table #1 : Smart Systems for the Management of Accumulators Round Table #2 : Advanced Vehicle to Grid Connection Systems Round Table #3 : Active Control Units for Electric Motors and Wheels Round Table #4 : Intelligent Power Electronic Devices Round Table : Smart Integration of Range Extenders Closing remarks – European Commission Workshop "Batteries and Storage Systems for the Fully Electric Vehicle" Report on batteries Presentations ICT for the Fully Electric Vehicle	
http://www.smart-systems-integration.org/public	

ESTRELIA	Energy Storage with lowered cost and improved Safety and Reliability for electrical vehicles
Timescales: May 2011-Apr 2014	Funding: FP7-ICT. Total cost €6.9, funding €4.4m.
Description: "For a significant improvement of FEV's safety and comfort as well as the improvement of the energy efficiency and extended driving range an innovative battery management and control solution is essential. Clearly, what is needed is a focused approach on the battery management system on the one hand but also the cost effective system integration into the vehicles on the other hand. The ESTRELIA consortium fully concentrates therefore on the whole value added-chain to guarantee a wide acceptance to the industry and attract at the end of the day to the end-users which are people of the European community. Only when it is possible to mitigate the constraints for the user of the FEV's a wide acceptance and broad adoption will be guaranteed of these new effective, innovative solutions for future mobility. The Consortium of this project has the full range of industry-leading capabilities to ensure a significant improvement of FEV in terms of performance, long term reliability, safety and comfort. Research objectives to evaluate further cost reduction and safety improvement potential •develop and evaluate new advanced MEMS based spark detection sensor to improve safety monitoring of energy storage systems •verify new advanced Li-Ion BMS reliability and improved long-term stability •investigate future BMS ICs technology integration and cost improvement potential •develop new cost effective power antifuse for dynamical configuration of energy storage units •Investigate gas sensor hot plate and CMOS integration potential for cost reduction"	
Outputs:	
http://www.estrelia.eu/	

EUROLIION	High energy density Li-ion cells for traction
Timescales:	Funding: FP7
Description: “The research described in this proposal aims to develop a new Li-ion cell for traction purposes with the following characteristics: 'High energy density of at least 200 Wh/kg 'Low costs i. e. , a maximum of 150 Euro/kWh 'Improved safety Although the Li-ion cell appears to be the most appropriate technology to meet these goals, considerable research and development is required. For example, the much-used LiFePO4 cells cannot reach the energy density criterion, and in addition, LiFePO4 is patented, which hampers worldwide commercialisation. Many other materials are either too expensive or do not meet current safety, environmental standards (e. g. , cobalt in LiCoO2). Thus, we propose a shift from carbon to the much higher capacity silicon-based anodes, and from cobalt-based to iron and/or manganese/nickel-based cathodes, and to use novel electrolyte salts. To successfully develop a European Li-ion technology, the R&D will start at the anode side, i. e. Si, with a LiFePO4-C material at the cathode side. This requires a new electrode formulation with respect to binder, electrolyte salt, solvent, and composition. The change in formulation at the anode and electrolyte allows for a change in the cathode materials ' and a series of both novel (e. g. , fluorosulfates, LiFeSO4F) and more established systems, will be investigated. New synthetic routes are proposed, along with an extensive characterization program. Scale-up, testing and benchmarking of optimum formulations will be performed. The outcome will be a newly developed cell, manufactured and tested by end-users. The new cell consists of i) a newly formulated Si-negative electrode, ii) newly designed low cost salts, and iii) modified positive electrodes. To achieve these goals, the consortium includes renowned universities and knowledge institutes; a SME battery producer and the car industry as end-users. Thus, the composition of the consortium covers the whole spectrum of R&D, manufacturing and testing. “	
Outputs: Factsheet	
http://www.euroliion.eu/	

European Green Cars Initiative	
Timescales:	Funding:
Description: "The European Green Cars Initiative is one of the three Public Private Partnerships (PPP) of the European Economic Recovery Plan announced by the President of the European Commission on the 26th of November 2008. The objective of the initiative is to support R&D on technologies and infrastructures that are essential for achieving breakthroughs in the use of renewable and non-polluting energy sources, safety and traffic fluidity. Despite its name the Green Cars Initiative is not only for passenger cars. Under the Green Cars Initiative, the topics include research on trucks, internal combustion engines, bio-methane use, and logistics. However a main focus is on the electrification of mobility and road transport. Beyond providing loans through the European Investment Bank, the PPP European Green Cars Initiative is making available a total of one billion EUR for R&D through joint funding programmes of the European Commission, the industry and the member states. These financial support measures will be supplemented by demand-side measures, involving regulatory action by Member States and the EU, such as the reduction of car registration taxes on low CO2 cars to stimulate car purchase by citizens. For a rapid implementation of the PPP European Green Cars Initiative, the instruments of the 7th Framework Programme were chosen. The industry is represented by select members the European Technology Platforms European Road Transport Research Advisory Council (ERTRAC), European Technology Platform on Smart Systems Integration, SmartGrids and other stakeholders. The Ad-Hoc Industrial Advisory Group is chaired by Prof. Dr. Wolfgang Steiger from Volkswagen."	
Outputs: Project Portfolio of the European Green Cars Initiative Roadmaps Report: Batteries and Storage Systems for the Fully Electric Vehicle Paper: The Electrification Approachto Urban Mobility and Transport	
http://www.green-cars-initiative.eu/public/	

Evader	Electric Vehicle Alert for Detection and Emergency Response
Timescales: Oct 2011-Sep 2014	Funding: FP7-TRANSPORT. Total cost €2.9m, funding €1.8m.
Description: "Recent studies suggest that vehicles, driven in electric mode, either hybrid or pure electric vehicles, are considerably quiet and, thus, that they constitute a safety hazard for pedestrians and bicyclists in traffic. It is claimed that such vehicles are not acoustically perceived due to the power unit being exchanged from a combustion engine to electric motors; something that essentially cuts away all power unit noise and leaves tyre/road noise, the latter of which is the same as for similar-sized vehicles with combustion engines. Actions have been taken by the US and Japanese governments as well as within international bodies such as UN/ECE and ISO, with the expected outcome that "minimum noise" of vehicles shall be measured with a standard method and legal limit values for such "minimum noise" shall be established. eVADER will investigate the interior and exterior sound scape of electric vehicle for safe operation, considering driver's feedback, feasible pedestrian reactions, driver and pedestrian warning systems and pedestrian safety. The project will also analyse innovative methods to improve the acoustic detectatibility of electric vehicles in urban scenarios. The project will define solutions to warn vulnerable users of a nearby moving vehicle while providing means for heightening the awareness of drivers in critical situations."	
Outputs:	

E-VECTOORC	Electric-VEhicle Control of individual wheel Torque for On- and Off-Road Conditions (E-VECTOORC)
Timescales: Sep2011-Aug 2014	Funding: FP7-ICT. Total cost €4.8m, funding €3.1m.
Description: "The E-VECTOORC project brings together 11 complementary partners from industrial and research backgrounds to address the individual control of the electric motor torques of fully electric vehicles to enhance safety, comfort and fun-to-drive in both on- and off-road driving conditions. The key objectives of the project are: •Development and demonstration of yaw rate and sideslip angle control algorithms based on the combination of front/rear and left/right torque vectoring to improve overall vehicle dynamic performance. •Development and demonstration of novel strategies for the modulation of the torque output of the individual electric motors to enhance brake energy recuperation, Anti lock Brake function and Traction Control function. The benefits of these strategies include reductions in: I) vehicle energy consumption, II) stopping distance, and III) acceleration times. All developed algorithms will include failsafe strategies and controlled shutdown procedures. The overall control strategy will employ a modular control architecture to allow an easy implementation for different vehicle layouts (e.g., the number of individually controlled motors), vehicle sizes and vehicle applications (from small city cars to sports cars and SUVs). The activity will be carried out using vehicle dynamics simulations and Hardware-In-the-Loop testing of vehicle components and subsystems, which will be complemented by full scale experimental testing of the entire system using a highly versatile vehicle demonstrator that can represent drivetrain architectures with 2, 3 or 4 electric motors. Experimental testing will provide comprehensive information for quantifying the benefits of the proposed control system in both on-road and off-road driving conditions. "	
Outputs: Press release Presentation – Flemish and European Initiatives Presentation – Torque vectoring Presentaton – Torque vectoring	
http://www.e-vectoorc.eu/	

EVUE	Electric Vehicles in Urban Environments
Timescales: 2009 to 2012	Funding: EU Interreg ERDF. Total cost €67.8m, funding €53.3m.

Description:
"Electric Vehicles in Urban Europe focuses on the development of integrated, sustainable strategies and dynamic leadership techniques for cities to promote the use of electric vehicles. Urban initiatives to encourage the public and business to use EV's will contribute to EU clean air and car fleets targets, making cities more attractive and competitive. EVUE will exchange and disseminate solutions to key barriers such as public resistance, lack of infrastructure, rapid technology change and obsolete economic modelling. Our project will look at how cities can develop integrated and sustainable strategies to increase the use of electric vehicles.
This includes:
•Infrastructure requirements and options, especially in congested areas: e.g., on street vs off street charging points, standard/fast/rapid charging, green energy.
•Policy framework: incentives, parking & congestion implications, modal shift.
•Marketing & Communication: education & awareness raising"

Outputs:	
Frankfurt evaluation report	Is the big apple ripe for electric cars?
Presentation: turning London electric	Beja sustainability day April 2011
Presentation: early adoption in Oslo	EVUE brochure
Presentation: MOBI.E project in Portugal	EVUE seminar Suceava
Presentation: clean vehicle experience Stockholm	EVUE seminar Katowice
Presentation: e-mobility in Frankfurt	EVUE Madrid report
Presentation: EVUE 2011 Frankfurt	EVUE Romania report
Preparing for a lifecycle CO2 measure	EVUE Poland report
Project get ready	EVUE baseline study
	Drivers and inhibitors of EV adoption

http://urbact.eu/en/projects/low-carbon-urban-environments/evue/homepage/

Fuerex	Multi-fuel Range Extender with high efficiency and ultra low emissions
Timescales: Jan 2011-Dec 2012	Funding: FP7-TRANSPORT. Total cost €4.4m, funding €2.4m.

Description:
"Worldwide, there is a strong trend towards highly efficient, low (preferably zero) emission vehicles, i.e. electrical vehicles. In order to facilitate the transition from conventional fuel-driven vehicles towards electrically driven vehicles, there is a short(er) term need for advanced plug-in hybrids and electrical vehicles with range extenders. For this purpose, highly efficient, compact, clean and low cost engines are required. Such engines are to provide battery charging over longer trips and/or in areas where electric recharge infrastructure is not (yet) available. Moreover, these engines should be able to significantly improve over future Euro 6 standards for noxious emissions. FUEREX covers all of the above mentioned aspects with the focus on the application in battery electric vehicles with range extenders capable of using regular fuels as well as bio fuels.
The CONCEPT is based upon:
1. Three compact spark-ignition engines: (a) rotary engine, b) 2 cylinder piston engine, and c) gas engine as these type of engines have the highest potential to meet the requirements in terms of efficiency, fuel types, exhaust emissions, dimension, weight and costs.
2. Multi fuel Capability for regular fuels: petrol, LPG and CNG and for bio fuels: ethanol and biogas as these fuel types are broadly available and have the largest market potential;
3. Integration of the range extenders with state of the art battery packs
4. Demonstration of the integrated technology at a realistic scale.
The targeted end result of FUEREX is to prove the feasibility/viability of the range extender technology for the markets for sub-compact passenger cars up to light duty trucks. This will allow large market penetration of electrical vehicles.

Outputs:	
European roadmap of electrification of road transport Vehicle requirements Range extender requirements	Design and hardware Technical specification Flyer

http://www.fuerex.eu/

FURBOT	Freight Urban RoBOTic vehicle
Timescales: Nov 2011-Oct 2014	Funding: FP7-TRANSPORT. Total cost €3.3m, funding €2.3m.
Description: "The project proposes novel concept architectures of light-duty, full-electrical vehicles for efficient sustainable urban freight transport and will develop FURBOT, a vehicle prototype, to factually demonstrate the performances expected. The main paradigms of the new vehicle design are: energy efficiency, sustainability, mobility dexterity, modularity, intelligent automated driving and freight handling robotization. The design approach is oriented to harmonically integrate the new features into the vehicle architectures, based on the knowledge of advanced technologies in the field of the electric power supply and drive trains, in wheel motors, lightweight high strength materials, perceptual systems and intelligent controls. FURBOT will present new frame-platform structure, new efficient power supply and drive train layout including X-by wire transmission, new robotic tools for freights manipulation, new internal state sensorial/monitoring system and new perceptual/automated control functions. The vehicle architecture is conceived modularly. The payload is considered packaged in freights boxes or ISO pallets. Attention will be paid to the modularity and standardization of components as well as to safety issues about crashworthiness and EMI/EMC, radiation health impact issues. A great effort will be devoted to improve the energy efficiency of the system by exploiting different aspects: a new power train layout integrated in the chassis; new battery and energy management system; last generation lightweight, direct drive electric motors; regenerative braking on the four driving wheels; reduced mass; attentive use of power addressed by the driver assistant or operating within the automated driving module. The FURBOT represents a transport agent that can be used by alone but that better exploits its power if used in a fleet offering a new sustainable and very adaptable (evolvable) urban freight transport system. The system will be modeled and a simulator developed. "	
Outputs:	
http://www.furbot.eu/	

G4V	Grid for vehicles: Analysis of the impact and possibilities of a mass introduction of electric and plug-in hybrid vehicles on the electricity networks in Europe
Timescales: Oct 2010-Jun 2011	Funding: FP7-ENERGY. Total cost €3.8m, funding €2.5m.

Description:
"Electric and plug-in hybrid vehicles (EV, PHEV) have the potential to contribute significantly to solving contemporary and future environmental and economic challenges of mobility. Various projects in different EU member states are currently addressing the subject in an isolated manner. The G4V consortium consisting of major European electric utilities and distinguished academic institutions are now adopting a holistic European approach to analyse the impact of a mass introduction in detail in order to optimise the grid infrastructure and make use of the inherent opportunities this represents for the operation of smart grids and energy efficiency. The objective of the project is to develop an analytical framework for the planning of technological developments in the grid infrastructure and the definition of related ICT and policy requirements in order to cope with the mass introduction of EV and PHEV. The project will deliver recommendations on aspects such as possible ICT solutions, grid services anticipating, RES integration, prediction of mobile customers who are potential energy traders and the impact of dedicated tariffs. The project will generate fast and openly available results within 18 months: An analytical framework to evaluate the impact of a large scale introduction on the grid infrastructure and a visionary road map for the year 2020 and beyond."

Outputs:	
Final conference	Barriers for deployment
Flyer	ID and charging architecture
Parameter manual	Billing and aggregator architecture
Trends in European power supply	ICT requirements and recommendations
Scenario worlds	Modelling energy demand
Value chain analysis	Requirements for infrastructure
Basic business concepts	Recommendations grid infrastructure
Cost benefit and business models	Impacts on power system management
Economic and environmental impact	Grid management
Social aspects	Concepts and tools for design of a roadmap
	Roadmap

http://www.g4v.eu

<table>
<tr><td>Green eMotion</td><td colspan="2">Development of an European Framework for Electromobility</td></tr>
<tr><td>Timescales: Mar 2011-</td><td colspan="2">Funding: FP7</td></tr>
<tr><td colspan="3">Description:
“Within the Green Cars Initiative launched in the context of the European Recovery Plan, the European Union supports research and development of road transport solutions which have the potential to achieve a breakthrough in the use of renewable and non-polluting energy sources. With dwindling fossil resources, electromobility and EV become ever more important, especially with respect to climate change. To this end, the project Green eMotion was selected to enable a mass deployment of electromobility in Europe. Green eMotion will connect ongoing regional and national electromobility initiatives leveraging on the results and comparing the different technology approaches to ensure the best solutions prevail for the European market. A virtual marketplace will be created to enable the different actors to interact and to allow for new highvalue transportation services as well as EV-user convenience in billing (EU Clearing House). In addition, the Green eMotion project will demonstrate the integration of electromobility into electrical networks and contribute to the improvement and development of new and existing standards for electromobility interfaces, as the acceptance of electromobility requires international harmonization and depends to a large extent on: the ability to recharge batteries safely, anytime and anywhere; an interface that make recharging as easy as pumping fuel, e. g. with rapid DC charging technologies, inductive and battery swapping infrastructures; a telecommunications infrastructure that enables billing and recharging anywhere in Europe; or for short: standards for interoperability in Europe. To prove the interoperability of the framework, Green eMotion will demonstrate the elaborate technical solutions in some of the participating demonstration regions.”</td></tr>
<tr><td>Outputs:
Review of technologies and standards in the demonstration projects
Business analysis
Standardization issues and needs for standardization and interoperability
ICT reference architecture</td><td colspan="2">Services use cases & requirements description
Annual Reports on dissemination activities addressing intended audience
Specification for minimum requirements for charging spots
Standards and protocols specification
Core services and transactions design specification
Detailed summary of the Electro-mobility vision, strategy and policy</td></tr>
<tr><td colspan="3">http://www.greenemotion-project.eu/</td></tr>
</table>

	Greening European transportation infrastructure for electric vehicles
Timescales: Sep 2010-Dec 2012	Funding: TEN-T EA. Total cost €9.9m, funding €5m.
Description: "This Action will be an essential first step towards the mass deployment and availability of charging infrastructure for Electric Vehicles (EV) across the EU over the next ten years. It is a highly innovative project which combines "traditional" road transportation infrastructure, electric network infrastructure and Intelligent Transport Systems (ITS), contributing significantly toward a sustainable, economical and environmentally friendly transportation alternative within Europe that relies exclusively on electric mobility (e-mobility). The Action aims at analysing and testing the deployment of an integrated battery charging and switching infrastructure that allows for long distance travels, modal shift with railways, integration of ITS, and sourcing of renewable energies. An extensive feasibility study, addressing conditions for service concepts, infrastructure requirements and network planning, along with three pilot projects in Denmark and in the Netherlands, will constitute the framework for this approach."	
Outputs: Leaflet	

Greenlion	Advanced manufacturing processes for Low Cost Greener Li-Ion batteries
Timescales: Nov 2011-Oct 2015	Funding: FP7-NMP. Total cost €8.6m, funding €5.6m.
Description: "GREENLION is a Large Scale Collaborative Project with the FP7 (topic GC.NMP.2011-1) leading to the manufacturing of greener and cheaper Li-Ion batteries for electric vehicle applications via the use of water soluble, fluorine-free, high thermally stable binders, which would eliminate the use of VOCs and reduce the cell assembly cost. GREENLION has 6 key objectives: (i) development of new active and inactive battery materials viable for water processes (green chemistry); (ii) development of innovative processes (coating from aqueous slurries) capable of reducing electrode production cost and avoid environmental pollution; (iii) development of new assembly procedures (including laser cutting and high temperature pre-treatment) capable of substantially reduce the time and the cost of cell fabrication; (iv) lighter battery modules with air cooling and easier disassembly through eco-designed bonding techniques (v) waste reduction, which, by making use of the water solubility of the binder, allows the extensive recovery of the active and inactive battery materials; and (v) construction of fully integrated battery module for electric vehicle applications with optimized cells, modules, and other ancillaries. Accordingly, GREENLION aims to overcome the limitations of present Li-ion manufacturing technology for electric vehicle batteries with the goal to: 1- perform breakthrough work to position Europe as a leader in the manufacturing of high energy and environmentally benign batteries; 2- develop highly effective eco-designed processes; 3- develop automotive battery module systems with: A) specific energy higher than 100 Wh/kg and specific power higher than 500 W/kg with respect to the overall weight of the system; B) coulombic efficiency on average higher than 99.95% during cycling; C) cycle life of 1,000 cycles with 20% maximum loss of capacity upon cycling between 100% and 0% SOC; and D) evaluate their integration in electric cars and renewable energy systems. "	
Outputs: Leaflet Newsletter Presentation	
http://www.greenlionproject.eu/homepage	

HELIOS	High energy lithium-ion storage solutions
Timescales: Nov 2009-Oct 2012	Funding: FP7-TRANSPORT. Total cost €4.3m, funding €2.8m.
Description: "The reluctance of OEM worldwide to extend electric drive applications to the private customers depends partly from considerations on customer acceptance (limited range in the case of EV, long charging time after depletion of the battery, cost), but also from the increased reliability and life span that private customers are entitled to expect. The first goal of HELIOS project is to evaluate electrochemical couples whose lower voltage window matches perfectly with the stability window of the electrolyte, which should guarantee an outstanding steadiness of the performance during ageing, and an intrinsic excellent safety. The items evaluated by the project are: performance, safety, life, recyclability and global cost. Another issue addressed by the project is the definition of a European standard for safety and life (cycle/storage) tests, adapted to High Energy applications such ad EV, PHEV and Heavy Duty Hybrid Truck. The project partners include six OEMs, one battery manufacturer, test Institutes/Universities and one recycler. "	
Outputs: Capacity Decrease vs. Impedance Increase of Lithium Batteries. A comparative study. Abstract, IWIS 2012: A Nonlinear Impedance Normal	
http://www.helios-eu.org/	

Hi-Wi	Materials and drives for High & Wide efficiency electric powertrains
Timescales: Dec 2010-Nov 2013	Funding: FP7-TRANSPORT. Total cost €3.6m, funding €2.4m.
Description: "Presently, drives for Fully Electric Vehicles and Hybrid Electric Vehicles develop their highest efficiency of around 93~95% within a speed range of usually 1/4 to 1/3 of the maximum, and at an ideal torque, whereas in real-life driving cycles the motor operates at a wider range of speeds and at partial load, resulting in much lower efficiency. Hi-Wi will address this mismatch by advancing the design and manufacture of drive trains through: - Holistic design across magnetic, thermal, mechanical and control electronics/algorithms in line with real-life use rather than a single-point 'rating'. - The use of variable flux approaches in which the flux of the motor can be adjusted in real-time according to the load condition to maximise efficiency. In addition to the above efficiency gains, Hi-Wi will couple its novel design approach to breakthroughs in materials and manufacturing, winning size, weight, logistical and cost savings through: - Adopting nano-scale materials advances to create superior field strengths with reduced reliance upon rare earths and their economically-vulnerable strategic supply chains. - Adopting nano-scale manufacturing advances to create permanent magnets having ideal geometries, reduced size and weight, and improved mechanical and thermal behaviour."	
Outputs:	
http://www.hiwi-eu.org/	

HYER	Hydrogen Fuel Cells and Electro-mobility in European Regions
Timescales:	Funding:
Description: "HyER, the European Association for Hydrogen and fuel cells and Electro-mobility in European Regions (formally HyRaMP), was established in collaboration with the EU Commission in 2008. HyER supports the deployment and uptake of hydrogen and fuel cell technologies and electro-mobility in Europe to contribute positively to carbon dioxide emissions reduction, environment protection as well as economic growth and employment. HyER is representing over 30 regions and cities in Europe. Through the active monitoring and collecting of current project results and industrial developments and as partner in several EU projects for dissemination and communication, HyER seeks to develop fact-based policy at EU, national and local level to establish robust local deployment channels and a first customer base. For this purpose HyER is currently facilitating the development of a European wide electro-mobility monitoring facility to collect data and experiences of electric mobility projects throughout Europe."	
Outputs:	
http://www.hyer.eu	

ICE	MagnetoCaloric Refrigeration for Efficient Electric Air Conditioning
Timescales: Nov 2010-Apr 2014	Funding: FP7-TRANSPORT. Total cost €4.2m, funding €2.8m.
Description: "The proposal is focused on the development of an Efficient air-conditioning and heating system based on a Magneto Caloric heat pump and a new system architecture to fulfil the thermal comfort and energy requirements of Fully Electric Vehicles (FEVs). A conventional vehicle uses the engine waste heat to assure the cabin heating and window de-icing and defogging requiring from 5 kW to 10 kW, while a mechanically driven (powered by the engine by means of a conveyor belt and pulley) vapour compression cycle guarantees the cabin cooling and dehumidification, absorbing up to 3 kW and generating up to 5 kW of cooling power. On a FEV the available heat is limited and at low temperature (e.g.2-3 kW @ 40 °C) and to operate a conventional automotive air-conditioning (A/C) system a relevant amount of energy is required having a significant impact on vehicle autonomy. For these reasons a specific approach and solution should be identified and adopted to guarantee heating and air conditioning on a FEV. Within the ICE a new air-conditioning and heat pump system will be developed and prototyped based on a Magneto Caloric heat pump, on the redesign of the cabin air- conditioning and on efficient control strategies offering both high comfort and safety solutions (de-fogging and de-icing)."	
Outputs: 4th European Workshop on Mobile Air Conditioning and Vehicle Thermal Systems, December 2011 (Turin, Italy) 13th European Automotive Congress, June 2011 (Valencia, Spain) Paper 13th European Automotive Congress, June 2011 (Valencia, Spain) Poster	
http://www.ice-mac-ev.eu	

ICT4FEV	Information and Communication Technologies for the Full Electric Vehicle
Timescales: May2010-Apr 2012	Funding: FP7-ICT.
Description: "ICT4FEV is a Coordination Action in the framwork of the European Green Cars Initiative. The focus of the project is on enabling the full electric vehicle (FEV) by opening new technology paths towards energy efficiency, functionality and usability that are complementary to future advances in performance of battery cell technology. The objectives of the project include: to build a R&D community, to edit a European roadmap, to recommend standards, regulations, business cases and R&D priorities, and to establish a European Organization / Think Tank for the FEV. The consortium is lead by VDI/VDE-IT and includes as members CRF (I), Siemens (D), NXP (NL), and EADS (F), as well as AVL List (A). Further organisations have been invited to contribute to the project as associate partners. ICT4FEV started on 1 May 2010 as the first project of the European Green Cars Initiative. It is funded by the European Commission's Directorate General Information Society and Media and has a duration of 24 months."	
Outputs: Roadmap: electrification of road transport ICT for the fully electric vehicle: research needs and challenges ahead Project portfolio: European Green Cars Initiative PPP 3rd newsletter 2nd newsletter 1st newsletter Call for experts for ICT for EV Report on a European Commission workshop regarding R&D for the FEV Batteries and storage systems for the FEV EPoSS strategy paper	
http://www.ict4fev.eu	

ID4EV	Intelligent dynamics for fully electric vehicles
Timescales: Jun 2010-Aug 2012	Funding: FP7-ICT. Total cost €6.7m, funding €3.8m.

Description:
"The objective of the ID4EV project is to develop energy efficient and safe brake and chassis systems for the needs of fully electric vehicles and the improvement of active safety and comfort for a faster introduction of fully electric vehicles. These systems will be optimized to the requirements for FEVs. Beside the development and optimization of the most relevant sub-systems of a vehicle with regard to active safety and comfort, the brake and the chassis system, optimization on vehicle level will done with a new approach of a network system as well as new HMI concepts for FEVs.
Electrified auxiliaries like the brake systems and the chassis will lead to new possibilities to vehicle control and a better cooperative interaction between these distributed systems. For a fast introduction of fully electric vehicles these systems have to be safe and must have a defined fail safe concept. The aim is to provide absolute safe electrified brake and chassis systems that lead to a high user/customer acceptance. To reach this safety approach the target is to adapt existing systems to the requirements of fully electric vehicles.
The project will concentrate on the topics of energy efficiency, safety and the interaction between the vehicle, the optimized systems and the driver.
To address both possibilities of drive-train concepts of fully electric vehicles, both concepts will take into account and their impact of the adapted systems will be analysed and solutions presented.
To reach a significant breakthrough of fully electric vehicles the adapted systems will be tested on test benches and under real world conditions in demonstrator vehicles to ensure the functionality and to prove the safety. "

Outputs:
Requirements and specifications derived from user needs and sota analysis
System specification summary document
Abstract – Paper presented to International SIA Conference Vehicle Dynamics, 5-6 October 2011
Paper – presented at Aachen Colloquium, 10-12 October 2011

http://www.id4ev.eu

ID4EVEU	ICT services for Electric Vehicle Enhancing the User experience
Timescales: Jan 2012-Dec 2014	Funding: CIP-ICT. Total cost €4.4m, funding €2.2m.
Description: "ICT 4 EVEU is a project born with the aim of deploying an innovative set of ICT services for electric vehicles (EV) in different and complementary pilots across Europe. The scope of the ICT services is the integration of different management systems operating on the existing EV infrastructures in the cities where the pilots will be run, so that related services are deployed making use of these interconnected infrastructures. The pilots will be based in a growing, geographically speaking, scope. There will be three main pilots: 1.Based in Bristol, UK, and its commute area 2.Based in Spanish towns of Vitoria and Pamplona, creating a common corridor of 100 Km length 3.Based in Slovenia, within the main cities of the country, Ljubljana and Maribor. It will be combining the union of two cities plus an international scope, as this pilot will count with the observers from the region of Styria in Austria, which have shown a big interest in the proposal."	
Outputs: Leaflet Factsheet Presentation	
http://www.ict4eveu.eu/	

Job VehElec	Raising awareness of job opportunities in vehicle electrification
Timescales: Jan 2011-Dec 2013	Funding: FP7-TRANSPORT. Total cost €1.4m, funding €1.3m.
Description: "Vehicle electrification plays a significant role in the process of lowering road transport emissions, and this role will continue to grow as we shift to an electric road transport paradigm. The successful development of the infrastructure, vehicles, and research breakthroughs that will enable a competitive transition to electric vehicle transport requires adding new dimensions to the traditional skills and capabilities of road transport engineers and technicians. Therefore, the transition requires not only new approaches to vehicle manufacture and development, but also to road transport education. To ensure that young people respond to the important and attractive opportunities arising in the transition, JobVehElec aims to raise awareness of the future jobs in vehicle electrification and the educational paths for reaching these jobs among the engineers and technicians of tomorrow. In order to do so, JobVehElec aims to bring together a consortium of five leading European universities with experience of, and commitment to, the shift to an electric road transport sector, and coordinate their efforts in joint activities designed for the purposes of: - Evaluating and demonstrating job creation in the electrification sector; - Encouraging young persons to seek jobs in electrification of road transport; and - Arranging communication and stimulation campaigns targeting young persons. The universities are supported by an Advisory Board of seven industry actors and by the regional networks of the universities. JobVehElec's work plan consists of three communication action Work Packages including: awareness stimulation events; information campaigns; and a European electrification concept competition. These communication actions are based on three fundamental Work Packages for: management and coordination of the project; analysis of the future job profiles and trends in the electrification industry; and creation of a communication strategy for the actions. "	
Outputs:	
http://www.e-gomotion.eu	

LABOHR	Lithium-Air Batteries with split Oxygen Harvesting and Redox processes
Timescales: Apr 2011-Mar 2014	Funding: FP7-NMP. Total cost €4.5m, funding €2.9m.
Description: "LABOHR aims to develop Ultra High-Energy battery systems for automotive applications making use of lithium or novel alloy anodes, innovative O2 cathode operating in the liquid phase and a novel system for harvesting O2 from air, which can be regenerated during their operative life without need of disassembling. LABOHR has 5 key objectives: (i) development of a green and safe electrolyte chemistry based on non-volatile, non-flammable ionic liquids (ILs); (ii) use of novel nanostructured high capacity anodes in combination with ionic liquid-based electrolytes; (iii) use of novel 3-D nano-structured O2 cathodes making use of IL-based O2 carriers/electrolytes with the goal to understand and improve the electrode and electrolyte properties and thus their interactions; (iv) development of an innovative device capable of harvesting dry O2 from air; and (v) construction of fully integrated rechargeable lithium-Air cells with optimized electrodes, electrolytes, O2-harvesting system and other ancillaries. Accordingly, LABOHR aims to overcome the energy limitation for the application of the present Li-ion technology in electric vehicles with the goal to: 1- perform frontier research and breakthrough work to position Europe as a leader in the developing field of high energy, environmentally benign and safe batteries and to maintain the leadership in the field of ILs; 2- develop appropriate electrolytes and nano-structured electrodes which combination allows to realize ultra-high energy batteries; 3- develop a battery system concept as well as prototypes of the key components (cell and O2-harvesting device) to verify the feasibility of automotive systems with: A) specific energy and power higher than 500 Wh/kg and 200 W/kg; B) coulombic efficiency higher than 99% during cycling; C) cycle life of 1,000 cycles with 40% maximum loss of capacity, cycling between 90% and 10% SOC; and D) evaluate their integration in electric cars and renewable energy systems. "	
Outputs:	
http://www.labohr.eu	

LIBRALATO	Libralato engine prototype
Timescales: Dec 2011-May 2014	Funding: FP7-TRANSPORT. Total cost €2.5m, funding €1.8m.
Description: "The Libralato rotary engine is a potential breakthrough technology, an eco-engine for the 21st century, with a new thermodynamic cycle and very different mechanical dynamics than is the case with conventional internal combustion engines. The project will investigate the design potential of the Libralato engine through an iterative cycle of simulation and modeling, prototype construction and test bed evaluation. The main claims made about the Libralato engine are: 1) Only 4 principal moving parts: leading rotor, following rotor, sliding connecting vane, rotating exhaust port - dynamically balanced with exceptionally low vibration. 2) New Libralato thermodynamic cycle based on gas exchange between three chamber interfaces. 3) Predicted 9% absolute efficiency increase (30% CO2 reduction relative to 30% efficient gasoline engine and 22% reduction relative to 40% efficient diesel engine). 4) Predicted 4% thermal efficiency increase due to asymmetrical compression and expansion volumes. 5) Predicted 5% mechanical efficiency increase due to rotary design - torque transferred directly to output shaft. 6) Predicted to exceed Euro 6 emission standards due to longer and more complete combustion phase, homogeneous type fuel air mixing, complete scavenge of residual exhaust gas and lower demand on after treatment. 7) Predicted 50% size and weight reduction due to rotary design (similar to Wankel). 8) Predicted 30% reduction in cost due to: reduced mass, elination of con-rods, crankshafts, valve trains, camshafts etc and reduced manufacturing tolerances. 9) Predicted 50% reduction in noise due to rotary design and low velocity exhaust gas. The consortium comprises 2 academic partners and 6 industrial partners plus an Industrial Advisory Group (Deutz AG, SMTC UK, JCB, Mahindra and BAE Systems) providing a balance of research expertise, SME business innovation skills and commercial exploitation capability. "	
Outputs:	

MAENAD	Model based analysis and engineering of novel architectures for dependable electric vehicles
Timescales: Sep 2010-Aug 2013	Funding: FP7-ICT. Total cost €4m, funding €2.5,

Description:
"Fully Electric Vehicles (FEV) promise clear benefits to society. At the same time, the engineering of FEV introduces significant new challenges. FEV will be highly integrated and increasingly dependent on software and electronics. FEV systems will have more authority, share common components and rely less on mechanical backups. New complex power management and optimization algorithms are needed to ensure high performance, range of travel and low energy consumption. We argue that the challenges faced in the engineering of FEV are already partly met by EAST-ADL2, an emerging automotive architecture description language (ADL) compliant with AUTOSAR, and that EAST-ADL2 is the appropriate vehicle for fully meeting these challenges. MAENAD will extend EAST-ADL2 with advanced capabilities to facilitate development of dependable, efficient and affordable FEV.
The project will achieve language and tool support for: ISO 26262 automotive safety standard, including a novel approach for automatic allocation of safety requirements to components of an evolving architecture; effective model-based prediction of quality attributes of FEV such as the dependability and performance, via use of advanced, scalable, automated techniques; automated exploration of potentially huge design spaces to achieve better or optimal trade-offs among dependability, performance and cost.
The scope of the modelling language and analysis focuses on the system structure and dynamics, in terms of physical, computational and communication components, their composition and interactions. To achieve those objectives, MAENAD will exploit and further develop the present state of the art in model-based design, assessment and optimization technologies. In addition, MAENAD will propose an overall design methodology for FEV and evaluate its application via a realistic case study on an innovative FEV system which represents a current design challenge. "

Outputs:
EAST-ADL language specification
EAST-ADL specification for MARTE
EAST-ADL XML Schema

http://www.maenad.eu

NoWaste	Engine waste heat recovery and re-use
Timescales: Oct 2011-Mar 2015	Funding: FP7-TRANSPORT. Total cost €4.5m, funding €2.7m.
Description: "The reduction of CO2 emissions from road vehicles is a strategic goal of the EU, and heavy duty vehicles are required to contribute to this objective in a significant way. One very promising solution is the re-use of the waste heat, which represents approx. the 60% of the combustion energy, by transforming it into mechanical or electrical energy thus increasing the overall vehicle energy efficiency directly. Depending on the operational conditions, fuel consumption and hence CO2 emissions can be reduced by between 10% and 15%. Such benefits can be higher in the case of a hybrid or hybrid-like powertrain where it is possible to store and then use the generated energy subsequently when most convenient. Heat re-use can be performed by means of a thermodynamic cycle (e.g. organic or non-organic Rankine cycles) using the waste heat as a source of energy, as is already being developed for application in large stationary applications. The adoption of such technology in the automotive domain requires specific R&D activities to develop the components and identify the most appropriate system architectures and level of integration in order to achieve sustainable costs and the required level of reliability. Objectives The NoWaste Project aims to develop such an engine waste hear recovery and re-use system for automotive applications and demonstrate its feasibility within both a purpose-built test rig and a vehicle demonstrator."	
Outputs: Flyer	

OpEneR	Optimal energy consumption and recovery based on system network
Timescales: May 2011-Apr 2014	Funding: FP7-ICT. Total cost €7.7m, funding €4.4m.
Description: "Today's Fully Electric Vehicles (FEV) have limited driving ranges. Customer surveys prove an adequately long and dependable driving range is more important than the cost of ownership. Therefore considerable efforts are being made to meet this challenge, e.g. higher capacity batteries and powertrain efficiencies. The OpEneR project (Optimal Energy consumption and Recovery) addresses this fundamental FEV weakness. OpEneR aims to unlock the FEV market by increasing the driving range, not by enhancing battery technologies, but by the development of an intelligent energy management and recovery system, integrating existing subsystems with on-board and off-board sensors. The objective is a new energy manager coordinating control strategies to maximise real world energy saving. The system provides advanced driver support based on a networked architecture comprising battery management, e machine, regenerative braking, satellite navigation, dashboard displays, whilst integration of the vehicle stability controller and environmental sensing care also for safety issues. OpEneR considers the dynamic boundary conditions for electric braking, i.e. traction limits, system temperatures, battery charge. The driver is assisted to maximise energy recovery, avoiding unnecessary disc braking. Driver support includes estimated braking distance, recuperation capability visualization and braking tips based on traffic flow / navigation data and predictive cooperative information, car-to-car (c2c) and car-to-infrastructure (c2i). This requires a new integrated approach where all available information is used to generate safe and efficient predictions. The final project goal is to demonstrate the benefits of OpEneR strategies with 2 fully operational FEV tested in real world conditions. "	
Outputs: Definition of use case and requirements for Level 1 software development Flyer Poster Press release Factsheet	
http://www.fp7-opener.eu	

OPTIBODY	Optimized structural components and add-ons to improve passive safety in new electric light trucks and vans
Timescales: Apr 2011-Mar 2014	Funding: FP7-TRANSPORT. Total cost €3m, funding €2m.
Description: "OPTIBODY, is a new concept of modular structural architecture for electric light trucks or vans (ELTVs) that will focus on the improvement of passive safety in order to help to reduce the number of fatalities and severe injuries. This new structural concept is composed of a chassis; a cabin improving current levels of EVs' comfort, occupant protection and ergonomics; and a number of add-ons bringing specific self protection in case of impacts or rollover, and providing partner protection (crash compatibility) while interacting with other vehicles or vulnerable users. Each module can be individually optimized. OPTIBODY, together with the less restrictive distribution of internal components of EVs (with less architectural constraints than conventional ones) will represent a unique opportunity to implement innovative solutions for passive safety in ELTVs. OPTIBODY, as a module-based design, has also important results in terms of repairability. An optimum choice for the different modules' features will make repairability and maintenance procedures easier and more cost efficient. Currently, the EVs figures are still reduced, but the 21st century will most likely see the replacement of vehicles relying on the internal combustion engine by EVs (as stated in 'A Sustainable Future for Transport'- Communication adopted by the EC -17/06/2009). In accordance with this idea, the 'National Development Plan on Electric-Drive Vehicles' (German Federal Cabinet -19/08/2009), plans to get 1 million EVs on Germany by 2020; the Spanish Ministry of Industry intends to reach the 1 million EVs in Spain by 2014; manufacturers like RENAULT have forecasted 6 million EVs in Europe by 2010; besides, encouraging the EV is one of the main objectives of the Spanish presidency of the UE. OPTIBODY will imply decreases in severity of injuries as a result of traffic accidents involving ELTVs, this will mean important reductions in sanitary costs to the National Health Services of the Member State "	
Outputs:	
http://optibody.unizar.eu	

OSTLER	Optimised storage integration for the electric car
Timescales: Jun 2011-May 2014	Funding: FP-TRANSPORT. Total cost €4.3m, funding €2.5m.
Description: "Present-day electric vehicles are typically designed by starting from an existing vehicle platform and designing a storage device (battery pack) to fit the constraints of the existing vehicle. OSTLER is based on the concept of modular storage devices around which an electric vehicle (EV) can be designed. The vehicle designer can select storage capacity to give range in EV mode (e.g. 20 km, 50 km, 100 km) in much the same way as current-generation vehicles are designed around different powertrain packages (e.g. 1.6 litre, 1.8 litre, 2.0 litre). OSTLER will develop novel solutions for mechanical, thermal and electrical integration based around such a modular concept of storage-centric design. The project will further investigate the implications of these integration solution if one or more of the storage packs is removable, and hence evaluate the feasibility of a removable concepts e.g. quick drop or user-changeable packs."	
Outputs:	
http://www.mira.co.uk/research/ostler	

PICAV	Personal intelligent city accessible vehicle system
Timescales: Aug 2009-Jul 2012	Funding: FP7-TRANSPORT. Total cost €3.9m, funding €2.8m.
Description: "The proposal presents a new mobility concept for passengers ensuring accessibility for all in urban pedestrian environments. The concept addresses a new Personal Intelligent City Accessible Vehicle (PICAV) and a new transport system that integrates a fleet of PICAV units. The transport system will ensure accessibility for everybody and some of its features are specifically designed for people whose mobility is restricted for different reasons, particularly (but not only) elderly and disabled people. Ergonomics, comfort, stability, assisted driving, eco-sustainability, parking and mobility dexterity as well as vehicle/infrastructures intelligent networking are the main drivers of PICAV design. The innovative electrical vehicle will present new frame-suspension structure, new seating sub-assembly, new efficient power supply module. The PICAV transport system will provide an efficient and rational service to citizen within urban traffic restricted areas: the application fields of PICAV are outdoor pedestrian environments where usual public transport services cannot operate because of the width and slope of the infrastructures, uneven pavements and the interactions with high pedestrian flows. This transport system is on-demand and it is based on the car-sharing concept. To overcome the barriers of traditional car-sharing systems, the following specific services will be provided: * instant access * open-ended reservation * one-way trips. The single units are networked and can communicate each other, with city infrastructure, public transport on the surrounding area and emergency services allowing high level of intermodal integration."	
Outputs: PICAV concept Report on Greek transport system Citycar	
http://www.picav.eu	

P-mob	Integrated Enabling Technologies for Efficient Electrical Personal Mobility
Timescales: May 2010-Apr 2013	Funding: FP7-ICT. Total cost €4.4m, funding €2.8m.
Description: "The P-MOB project is aiming at breaking the link between the growth in transport capacity and increased fatalities, congestion and pollution. Transport is responsible for 73% of total oil consumption in EU, it is a major source of pollution and greenhouse gas emissions and the chief sector driving future growth in world oil demand. Most continents have an increasing dependence from primary energy. The demand on increased safety, reduced noxious and green house emissions has the following expectations: less than 30.000 fatalities in EU in the 2010, radical reduction of both CO2 and NOx aiming at zero local emissions. Transport will be faced to the followings: People and good will increase their need of mobility some 35% per decade for at least 3-4 decades - The number of megalopolis is increasing and most of the traffic will be urban - Urban centres are more and more congested and closed to traffic; 1% of our GDP is wasted in congestion - Mobility is related to invariants such as: people move 1 hour a day - The average speed, since it has measured the first time in 1923, is stable in the range 35-40km/h - people tend to relate mobility to a mental freedom and as many as 90% of km are run with a single occupant - In EU 1 more million cars are on the road every 50 days and globally the number of vehicles is projected to 2200 millions in the 2050. The emerging markets require at most low cost and environment compatible vehicles. P-MOB addresses the above challenges proposing: a novel concept of fully electrical personal mobility, reduction of system complexity concentrating on the essentials, advanced systems integration including solar cells, e-motor and magnetic torque control of the wheel, power-energy management, distributed pack of accumulators, technologies to sell-buy electricity by adaptable vehicle to grid connections. On an average day in South EU the propose vehicle is aiming at 20 km/day by using solar energy only."	
Outputs:	
http://eeepro.shef.ac.uk/p-mob/	

POLLUX	Process oriented electronic control unit for electric vehicles developed on a multi-system real-time embedded platform
Timescales: Mar 2010-Feb 2013	Funding: FP7-JTI. Total cost €33m, funding €5.5m
Description: "Establishment of a common multi-domain architecture and design platform for advanced multi-core hardware and middleware solutions for electrical vehicles to enable the flexible and evolvable interoperation of systems, including sensors, actuators, information systems, control systems across multiple domains and using a component based design methodology. Establishment of heterogeneous multi-domain architectures to produce integrable and interoperable sub systems to support real-time data-processing to be used in electrical vehicle design and development of reference designs to achieve energy efficient HW/SW architectures. Development of design tools and associated runtime support to enable composability, predictability, parallelisation, aggregation and management of systems according to a service driven or data-centric approach, performance and energy modelling and analysis, verification, scalability in electrical vehicle design while preserving system level predictability and appropriate levels of safety. Development of architectures of networked embedded systems for electrical vehicle, employing heterogeneous devices and advanced communication technologies working in managed, safety critical and harsh environments, that require different safety and security schemes generated in different dynamic domains, and depending on the system properties such as reliability, dependability, maintainability, security, and survivability. New approaches to certification and qualification required to accommodate the new embedded system technologies for electrical vehicles."	
Outputs:	
http://www.artemis-pollux.eu	

POWERFUL	Powertrain for future light-duty vehicles
Timescales: Jan 2010-Dec 2013	Funding: FP7-TRANSPORT. Total cost €24.3m, funding €13.5m.
Description: "The Project aims to develop new powertrain concepts able to give a substantial contribution to the achievement of a 50% CO2 reduction (based on 2005 figures) for passenger cars and light-duty vehicles for the new vehicle fleet in 2020. In particular, the research target on spark ignited (SI) engines powered vehicles is to achieve 40% lower CO2 emissions with respect to the 2005 values and 20% lower CO2 emission than the 2005 level for compression ignition (CI) engine powered vehicles. The objective includes also the target of near-zero emission levels (better than EURO 6) maintained during the useful life of the engines and keeping into account real life emissions, in line with the intention to amend the test procedures in emission legislation in view of real life emissions. Three different concepts will be investigated and implemented: - ultradownsizing gasoline engine integrating VVA, advanced turbocharging and Direct Injection; - two-stroke downsized diesel engine integrating HCCI and low temperature combustion modes; - combined combustion system based on Compression Ignited engine dedicated to new fuel formulation. Transversal supporting activities will be integrated for evaluating and assessing: advanced simulation methodologies for powertrain integration, advanced approaches for friction reduction (design solutions, coatings and surface treatments, lubricants), PEMS methodologies for real world emission analysis. "	
Outputs:	
http://www.powerful-eu.org	

PowerUp	Specification, Implementation, Field Trial, and Standardisation of the Vehicle-2-Grid Interface
Timescales: Jul 2011-Jun 2013	Funding: FP7-ICT. Total cost €3.5m, funding €2.4m.
Description: "PowerUp aims to develop the Vehicle-2-Grid (V2G) interface, involving a full development cycle of physical/link-layer specification, charging control protocol design, prototyping, conformance testing, field trials, and standardisation. Its results will ensure that FEVs smoothly integrate into emerging smart-grid networks. Thereby the efficiencies resulting from robust grid operation may be achieved; V2G capabilities will smoothen the daily fluctuation of electricity demand and will enable FEVs to act as emergency energy supplies. To achieve these desired results, it is essential that any electric vehicle type would be compatible with any European smart-grid network. V2G technology will be developed in liaison with the ongoing ISO/IEC standardisation of the V2G interface, and it will extend existing smart-metering standards and ETSI ITS standards for vehicular communications. On the grid side, smart electric meters will be enhanced for V2G capability and V2G-specific demand-balancing control algorithms will be researched. The specification phase will synthesise requirements of both vehicle manufacturers and utility operators. The produced V2G adapter prototypes will undergo conformance testing and field trials. The testing part will also cover safety and security aspects. The field trial activities will demonstrate end-to-end integration with the chain of smart-grid control systems. These trials will be furthermore complemented by simulations of larger V2G uptake rates, which assess V2G impact on grid stability and robustness. The validated PowerUp results will be contributed into standardisation, completing the overall R&D cycle. We aim to ensure industrial consensus on V2G interface, and carefully trial V2G implementations in a realistic integrated environment. PowerUp partners are capable of follow-up project results deployment; its impact will facilitate reaching FEVs full potential economic and environmental benefits. "	
Outputs: Project description Preliminary architecture	
http://www.power-up.org	

SmartBatt	Smart and Safe Integration of batteries in electric vehicles
Timescales: Jan 2011-Dec 2012	Funding: FP7-TRANSPORT. Total cost €3.2m, funding €2.2m.
Description: "The European countries are committed to keep on reducing CO2 emissions and slowing down the climate change. For the individual transport system, the pure electric vehicle technology powered by 'green' electricity offers a great chance for an important contribution to the protection of the environment. Resulting from low energy density of batteries and the need to offer a convenient range, the battery packs of the near future will be heavy and bulky (despite the latest advances in Li-Ion cells). The objective of SmartBatt is to develop and proof an innovative, multifunctional, light and safe concept of an energy storage system which is integrated in the pure electric car's structure. The main challenges of this smart integration are the combination of lightweight design with a high safety level against all kinds of hazards, the optimization of functions and the intelligent design of interfaces to various on-board systems. In order to meet the various challenges, a consortium of different companies and institutes with good reputation was formed capable of viewing on the problem from all important sides and willing to contribute with their knowledge and capacities to the solutions for this specific topic. The expertise of all partners comprises complete vehicle competence, electrics, electronics, batteries, lightweight design, engineering, materials, testing and validation. All 10 partners from 5 European countries are well experienced in running EC projects. The consortium is well balanced: 5 industrial (incl. 2 SMEs) and 5 research partners. The exploitation is not limited to the partners but results will be distributed on different ways e. g. project website, papers or trainings as well as face-to-face workshops and meetings with OEMs. As the automotive sector is a traditionally 'male' dominated area the SmartBatt project aims at initiating a next step towards change. A Gender Action Plan will raise awareness of the gender dissemination and encourage women to participate in research as scientists. "	
Outputs:	
http://www.smartbatt.eu/	

SMART-LIC	Smart and Compact Battery Management System Module for Integration into Lithium-Ion Cell for Fully Electric Vehicles
Timescales: May 2011-Apr 2014	Funding: FP7-ICT. Total cost €5.7m, funding €3.5m.
Description: "SMART-LIC addresses the development of a new Battery Management System concept aiming at: - Lower system complexity by a radical reduction of wiring and connectors cause of EMF emissions and major source of malfunctions - Higher efficiency of the battery packs because of the local control - Increased overall reliability and safety such that early determination of irregularities and failures of the actual battery cells is possible and not impaired by defects in wiring connectors and remote electronics - Increased flexibility of the overall energy-power routing such to assure that all cells could perform at their maximum rating independently from the rating of the others. - Radical overall cost reduction of the overall BMS because of reduced cabling and connectors as well as simplification of the electronics - Increased precision in determining the states of charge, of health, and of function of the individual cells and of the entire battery by applying a new battery model based on electrochemical impedance spectroscopy (EIS) - Reduced maintenance of the battery packs assured by the monitoring of the single cell (macrocell) with the possibility to switch it off from the rest of the pack. - Reduced cost of ownership for the end user due a significant increase in battery lifetime caused by the improved management on cell level. The ambitious objectives are obtained by realizing the BMS module as a system-in-package (SiP) directly integrated into the lithium-ion cell for fully electric vehicles by using advanced packaging technologies. Early demonstration of the technology will be made by preparing specific battery packs to be installed both on a commercially electrified vehicle and on a FEV of new concepts. "	
Outputs:	

SMARTOP	Self powered vehicle roof for on-board comfort and energy saving
Timescales: Nov 2010-Oct 2013	Funding: FP7-TRANSPORT. Total cost €4.7m, funding €2.9m.
Description: "The electrical loads of present automobiles are related to multimedia, heating, ventilation, and air conditioning (HVAC), body electronics (power windows and heated backlight) and lighting (exterior and interior) and their consumption is above 3 kW. A conventional vehicle with internal combustion engine uses part of the mechanical power (about 5 kW) to drive the mentioned on-board equipments through the alternator considering its efficiency of approximately 60%; regarding cabin heating, engine waste heat assures the cabin thermal comfort that requires 5-10 kW, while a mechanically driven vapour compression cycle guarantees the cabin cooling in summer, absorbing up to 3 kW electric and generating up to 5 kW of cooling power. On a FEV electrical auxiliaries are supplied by the batteries pack resulting in increased mass installed to guarantee reasonable covered ranges from 50 to 100 km; the power consumption of any kind of auxiliary contributes to reduce this range and to decrease the battery lifetime; moreover the amount of heat available for cabin heating is very small (less than 5 kW) and the energy available to supply an air conditioning system is far low than normally required by a conventional one. The concept addressed by SMARTOP is to develop an autonomous smart roof integrating solar cells (PV), energy storage systems and auxiliaries as thermoelectric (TE) climatic control, electrochromic (EC) glazing, courtesy LEDs lighting and actuators able to increase comfort and fuel economy for both fully electrical (FEV) and internal combustion engine (ICE) vehicles. SMARTOP addresses the needs of vehicle electrification integrating on board power hungry devices and matching the comfort and safety customer expectations. "	
Outputs: Presentation regarding project	
http://www.smartop.eu	

SMARTV2G	Smart vehicle to grid interface
Timescales: Jun 2011-May 2014	Funding: FP7-ICT. Total funding €3.3m, funding €2.5m.
Description: "In a context of an obliged continuous optimisation of the energy consumption rates in developed societies, embedded systems and solutions can perform a significant role in the transition process towards a Sustainable Urban Life concept in European countries. One of the main and most promising technological areas that are expected to be able to contribute in a most relevant way to that overall target is the one constituted by the electric vehicles. In that sense, the main objective targeted by the SMARTV2G Project aims at connecting the electric vehicle to the grid by enabling controlled flow of energy and power through safe, secure, energy efficient and convenient transfer of electricity and data. This will entail, among other specific objectives, the development of a new generation of technologies allowing the seamless and user-friendly energy load of electric vehicles in urban environments in the frame of an intelligent energy supply network managed by an embedded control system. In order to be able to achieve the exposed objectives, the project Consortium is comprised of a well-balanced group of 7 partners from 4 European countries with complementary skills and expertise, including all the necessary profiles to deal with the scheduled project work plan. Furthermore, key industrial companies in the field of electro-mobility have shown their interest and commitment to the project. This interdisciplinary group of the energy industry, alternative energy components developers, software & embedded systems developers, and technological R&D centres are strongly committed to efficiently coordinate their resources over the 36 months duration of the project in order to be able to reach all expected project outcomes. "	
Outputs: Flyer	
http://www.smartv2g.eu/	

SOMABAT	Development of novel solid materials for high power Li polymer batteries
Timescales: Jan 2011-Dec 2013	Funding: FP7-NMP. Total cost €5m, funding €3.7m.
Description: "SOMABAT aims to develop more environmental friendly, safer and better performing high power Li polymer battery by the development of novel breakthrough recyclable solid materials to be used as anode, cathode and solid polymer electrolyte, new alternatives to recycle the different components of the battery and cycle life analysis. This challenge will be achieved by using new low-cost synthesis and processing methods in which it is possible to tailor the different properties of the materials. Development of different novel synthetic and recyclable materials based carbon based hybrid materials, novel LiFePO4 and LiFeMnPO4 based nanocomposite cathode with a conductive polymers or carbons, and highly conductive electrolyte membranes with porous architecture based on fluorinated matrices with nanosized particles and others based on a series of polyphosphates and polyphosphonates polymers will respond to the very ambitious challenge of adequate energy density, lifetime and safety. An assessment and test of the potential recyclability and revalorisation of the battery components developed and life cycle assessment of the cell will allow the development of a more environmental friendly Li polymer battery in which a 50 % weight of the battery will be recyclable and a reduction of the final cost of the battery up to 150 ?/KWh. The consortium has made up with experts in the field and complementary in terms of R&D expertise and geographic distribution."	
Outputs: Periodic summary report Brochure Portal Initial brochure Initial poster	
http://www.somabat.eu/	

STRAIGHTSOL	Strategies and measures for smarter urban freight solutions
Timescales: Sep 2011-Aug 2014	Funding: FP7-TRANSPORT. Total cost €4.2m, funding €2.9m.
Description: "Urban areas represent particular challenges for freight transport, both in terms of logistical performance and environmental impact. A range of regulatory, technological and logistical measures have been applied, most of them suffering from a lack of systematic evaluation and assessment related to their short and long term effects which impedes knowledge transfer and the adoption of best practice. As a consequence, large scale adaptations do often not come off, although many initiatives seemed successful in pilots and demonstrations. There is a clear need for a comprehensive approach to urban freight solutions, particularly linking urban to interurban freight movements. The objectives of STRAIGHTSOL are threefold: 1) Develop a new impact assessment framework for measures applied to urban-interurban freight transport interfaces. 2) Support a set of innovative field demonstrations showcasing improved urban-interurban freight operations in Europe. 3) Apply the impact assessment framework to the live demonstrations and develop specific recommendations for future freight policies and measures. The demonstrations represent cutting edge initiatives from leading stakeholders like DHL, Kuehne+Nagel and TNT, and cover Brussels, Barcelona, Thessaloniki, Utrecht, Lisbon, Oslo and the south of England. The STRAIGHTSOL demonstrations and deliverables will give policy makers and transport industry players input for future measures in the field of last mile distribution and urban-interurban freight transport interfaces at the European, country, region, city and local levels."	
Outputs: Newsletter Leaflet	
http://www.straightsol.eu	

SUPERLIB	Smart battery control system based on a charge-equalisation circuit for an advanced dual-cell battery for electric vehicles
Timescales: May 2011-Apr 2014	Funding: FP7-ICT. Total cost €6.5m, funding €4.2m.
Description: "The STREP project Smart Battery Control System based on a Charge-equalization Circuit for an advanced Dual-Cell Battery for Electric Vehicles (SuperLIB) addresses the objectives of the call ICT for fully electric vehicles, targeting the energy storage system. SuperLIB focuses on smart control system solutions for batteries. To enhance the overall performance, the battery consists of high-power and high-energy cells. This combination of two different types of cells together with a smart control strategy and a highly integrated package significantly improves the lifetime, the reliability and the cost/performance ratio of the battery system, by also adding the possibility of fast charging without degrading its lifetime. The control strategy is based on accurate model-based estimators, which are mandatory for precise monitoring of the battery state. The electronic architecture required for the connection of the high-power and high-energy cells enables an efficient management of the current and charge distribution inside the package. The architecture will include electronic circuits for charge equalization and DC-DC converters utilizing advanced techniques of zero-current and zero-voltage switching for higher efficiencies and lower electromagnetic interferences. Safety and control system relevant temperature sensors will be developed for an improved thermal management of the package, thus a potential thermal runaway of a single battery cell can be avoided through early detection of local overheating. In addition this will increase the accuracy of the battery state estimation, which allows the utilization of a wide range of the battery state-of-charge. Thus, the battery can be sized smaller and kept cheaper with still providing the required usable energy content and power performance. "	
Outputs:	
http://www.superlib.eu/	

V-FEATHER	Innovative flexible electric transport
Timescales: Jul 2012-Oct 2015	Funding: FP7-TRANSPORT. Total cost €3.7m, funding €2.6m.
Description: "The V-FEATHER project presents a complete electric vehicle architecture vision on how urban light duty vehicles will be designed, built and run in the near future. This project is led by industrial partners with emphasis on energy efficiency, commercial viability, life cycle design and development of new technologies for LDVs steered by leading research institutes. The vehicle is built around an active adaptive structural architecture (ADAPTecture) that replaces the out-dated "platform" concept with a modular building block concept. Active vehicle dynamics are incorporated through controlled structures and active suspension modules. A High-level control architecture controls the complete system the vehicle dynamics, active safety, energy requirements and driver interaction. The specifications of these modular LDV are based on a radical new Deposit, Rapid Recharge and Recollect (D3R) system for last mile delivery tracking. A complete prototype vehicle will be developed during the project."	
Outputs:	

WIDE-MOB	Building blocks concepts for efficient and safe multiuse urban electric vehicles
Timescales: Dec 2010-Nov 2013	Funding: FP7-TRANSPORT. 3.9m, funding €2.6m.
Description: "While architectural requirements, and mechanical and thermal constraints imposed on an electrical power-train are much less stringent when compared to conventional ICE based vehicles, the needs for cost reduction and range enhancement demand light structures, advanced aerodynamic solutions and optimisation of the drive train as a whole. WIDE-MOB addresses the design and development of EV's basic building blocks, including: - Optimised aerodynamic bodies with embedded synthetic micro-jets that radically reduce the drag at any speeds - Lightweight and low cost bodies designed for high safety under both frontal and lateral crash - Overall system optimisation based on distributed propulsion including: i) fail safe distributed propulsion; ii) e-motor and torque control of the wheel; iii) integrated power-energy management and distributed battery super-capacitor packs (high efficiencies over a wide torque/speed range demanded by real-use driving cycles). - Application of EMC-EMR and low frequency electromagnetic field (EMF) design concepts based on 'prudent avoidance practices' for field mitigation on occupants. The high currents and voltages produced in electric drive trains pose new problems in terms of EMF which may become a health risk to occupants - Modular and reconfigurable design addressing the WIDEst needs with ergonomic on board space - Solar panels distributed on both horizontal and vertical surfaces with adaptive electronic for a higher range of operation and minimal needs of infrastructures The 3-year WIDE-MOB project will deliver: - A prototype and demo vehicle for urban mobility integrating the proposed innovative concepts. - Guidelines for the developed concepts to be widely applied to most EVs and HEvs architectures thus generating IPR and knowledge/experience upon which to build a world-leading EU position to track and exploit the global uptake of electrical mobility."	
Outputs:	
http://eeepro.shef.ac.uk/wide-mob/index.html	

SUMMARY

A total of 70 projects were identified, using CORDIS and a number of electric vehicle internet information sources. For each, where possible, information was recorded regarding the project acronym, full name, start and end dates, source and amount of funding, brief description, list of outputs and associated web site. This information was not obtained for all projects.

The majority of projects described in this report are funded under FP7-TRANSPORT and FP7-ICT.

	TRANSPORT Project cost (€m)	Funding (€m)		ICT Project cost (€m)	Funding (€m)
AMELIE	5.2	3.5	CASTOR	5.3	3.4
CO3	2.3	2	ECOGEM	3.2	2
COMCIS	4.6	2.9	E-DASH	8.5	5.3
CORE	17	8.9	EFUTURE	7	4
DELIVER	4.3	2.8	ELVIRE	9.2	5.2
DEMOCRITOS	1.7	1.6	ESTRELIA	6.9	4.4
EASYBAT	3.7	2.2	E-VECTOORC	4.8	3.1
ECOSHELL	3.9	2.8	ID4EV	6.7	3.8
ELIBAMA	15.4	9	MAENAD	4	2.5
E-LIGHT	2.9	2.1	OPENER	7.7	4.4
ELVA	4.8	2.9	P-MOB	4.4	2.8
ENHANCED WISETRIP	2.6	1.8	POWERUP	3.5	2.4
EVADER	2.9	1.8	SMART-LIC	5.7	3.5
FUEREX	4.4	2.4	SMARTV2G	3.3	2.5
FURBOT	3.3	2.3	SUPERLIB	6.5	4.2
HI-WI	3.6	2.4	**TOTAL**	**86.7**	**53.5**
ICE	4.2	2.8			
JOB VEHELEC	1.4	1.3			
LIBRALATO	2.5	1.8			
NOWASTE	4.5	2.7			
OPTIBODY	3	2			
OSTLER	4.3	2.5			
PICAV	3.9	2.8			
POWERFUL	24.3	13.5			
SMARTBATT	3.2	2.2			
SMARTOP	4.7	2.9			
STRAIGHTSOL	4.2	2.9			
V-FEATHER	3.7	2.6			
WIDE-MOB	3.9	2.6			
TOTAL	**150.4**	**94**			

TRANSPORT and ICT projects account for approximately €148m of EU grant funding. A smaller number of projects were funded under EU schemes FP7-ENERGY, FP7-NMP and INTERREG. These are shown in the table below.

	ENERGY	
	Project cost (€m)	Funding (€m)
APPLES	4.7	3.3
G4V	3.8	2.5
	NMP	
	Project cost (€m)	Funding (€m)
ELECTROGRAPH	4.9	3.6
GREENLION	8.6	5.6
LABOHR	4.5	2.9
SOMABAT	5	3.7
	INTERREG	
	Project cost (€m)	Funding (€m)
CARE-NORTH	4.8	2.4
E-HARBOURS	4.8	2.4
ENEVATE	5.0	2.5
EVUE	67.8	53.3

The ENERGY, NMP and INTERREG projects account for approximately €82.2m of EU grant funding (65% of that for 1 large project, EVUE). Note that this project, NSR- E-mobility, is funded under Interreg ERDF for a total €3.2m grant.

The nature of the project outputs included: flyers, magazine articles, press releases, newsletters, communication plans, journal articles, case studies, partner meeting reports, presentations, conference and workshop outputs and posters, deliverable reports, action plans and route maps.

NORTH SEA REGION ELECTRIC MOBILITY NETWORK

e-mobility NSR

About E-Mobility NSR

The Interreg North Sea Region project North Sea Electric Mobility Network (E-Mobility NSR) will help to create favorable conditions to promote the common development of e-mobility in the North Sea Region. Transnational support structures in the shape of a network and virtual routes are envisaged as part of the project, striving towards improving accessibility and the wider use of e-mobility in the North Sea Region countries.

www.e-mobility-nsr.eu

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