Project Portfolio

European Green Cars Initiative PPP

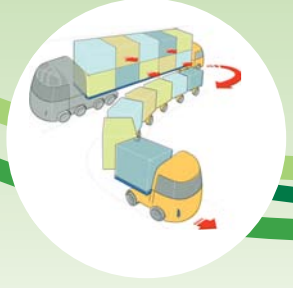
Calls 2010 - 2013

ERTRAC

EPoSS
European Technology Platform
on Smart Systems Integration

SMARTGRIDS

EIRAC
European Intermodal Research Advisory Council



European Green Cars Initiative

Preface

Aiming at economic recovery and the fight against climate change, the European Commission in response to the financial crisis of 2008 launched the European Green Cars Initiative, a Public-Private Partnership for research and development on zero emission, safe and efficient road vehicles and transportation. A total of 1 billion Euro was announced to be made available jointly by the European Union and the industry for collaborative research projects mainly in the field of electrification but also for developing novel solutions in long distance freight and logistics. At the side of the European Commission, the PPP European Green Cars Initiative has been implemented by the involved units of the Directorates General for Research, Information Society and Media (now DG Communications Networks, Content and Technology), Mobility, Environment as well as Enterprise and Industry. The industry has been included via three European Technology Platforms, namely the European Road Transport Research Advisory Council (ERTRAC), the European Technology Platform on Smart Systems Integration (EPoSS), and the SmartGrids Platform.

Forming an Industrial Advisory Group, members of these platforms edited a roadmap, at first on electrification, and later complemented by the other two technology fields, long distance freight and logistics. Moreover, a multi-annual plan prioritizing the topics for implementation in calls for proposals for the 7th Framework Programme has been presented. Four rounds of calls have been launched so far. The first, published in summer 2009, was mainly focused on components and architectures of the electric powertrain, electrochemical storage applications and demonstration of electric mobility. The second call, launched in 2010, dealt with the specific energy management, stability and safety issues of the electric vehicle as well as with system integration and manufacturing of batteries, the optimization of the internal combustion engine and efficiency gains in logistics. Moreover, a dedicated budget was made available for supporting a joint call of public authorities at member states and regional level in the framework of an ERA-Net Plus. The third call, opened in summer 2011, covered lightweight materials, power electronics, safety and durability and transport system integration. The fourth and final call for proposals of the PPP European Green Cars Initiative has been published in summer 2012. It called for projects dealing with improved battery materials, on-road charging, next generation electric motors, future light urban EVs, advanced system architecture and comprehensive energy management for FEVs. Topics in heavy duty transport and freight were configurable and adaptable trucks, high energy efficiency and connectivity. Furthermore, demonstrations of electric buses as urban public transport were called for.

The brochure at hand contains portfolio of projects of the European Green Cars Initiative which have already started and also those that are in the final stages of negotiation. It shows that the roadblocks of electric vehicle development, energy storage, electric motors, safety and reliability, vehicle system integration and the connection to the power grid are being addressed in a coherent and targeted manner by consortia representing major companies from the European vehicle manufacturing, automotive supply as well as the electrical engineering and electronics sectors. It also makes obvious the important share of optimizing conventional powertrains and logistics in the European Green Cars Initiative.

This document shall provide potential consortia of future projects with indications that may help to define their proposed work. At the same time, it shall help to compare the projects that have been implemented already with the recommendations made in the roadmaps in order to identify priorities for the next calls. The two Coordination Actions, CAPIRE and Smart EV-VC, supporting the PPP European Green Cars Initiative will continue to serve the community of the PPP European Green Vehicles Initiative in Horizon 2020 with information, dissemination and opportunities for networking, giving feedback and seeking advice.

Table of Projects

Electrification

Research & Innovation Directorate-General (DG RTD)

FP7-SST-2010-RTD-1

FP7-SST-2011-RTD-1

FP7-SST-2012-RTD-1

FP7-SST-2013-RTD-1

Heavy Duty Vehicles Based on Internal Combustion Engines

Research & Innovation Directorate-General (DG RTD)
FP7-SST-2011-RTD-1

Logistics & Co-Modality

Research & Innovation Directorate-General (DG RTD)
FP7-SST-2011-RTD-1

FP7-SST-2012-RTD-1

FP7-SST-2013-RTD-1

Transport & Mobility Directorate-General (DG MOVE)
FP7-TRANSPORT-2012-MOVE-1

Related Projects

Joint Technology Initiatives (JTI)
ENIAC-2008-1

ENIAC-2010-1

ARTEMIS-2009-1

ALIVE

Advanced High Volume Affordable Lightweighting for Future Electric Vehicles

ALIVE is an EU collaborative research project that aims to develop key vehicle light-weighting technologies based on advanced metal and hybrid materials. ALIVE aims for application in near-future electric vehicles (EV) to be introduced into the market from 2020 and at a level of technology readiness that would enable mass production.
Affordable weight reduction is one key factor for a more intensive market introduction of electric vehicles. However, further weight reduction leads to an exponential cost increase. Avoiding such cost increase is the main challenge of the ALIVE project. Thus, the key objective is to achieve affordable solutions for vehicle weight reduction, targeting a 45 - 50 % weight reduction of the Body-in-White (BiW) comparing to benchmark state-of-the-art EVs recently introduced to the market, as well as a 25 - 30 % weight saving in the hang-on parts, chassis and main interior sub-systems.

Project Coordinator or Contact Person: Jens Meschke

Organisation: Volkswagen AG (Germany)

Project Websites: www.project-alive.eu
www.seam-cluster.eu

Project Duration: 01.10.2012 – 30.09.2016

Project Partners:

- Volkswagen (Germany)
- Centro Ricerche Fiat (Italy)
- Renault (France)
- Faurecia (France)
- Forschungsgesellschaft Kraftfahrwesen mbH Aachen (Germany)
- KU Leuven (Belgium)
- LMS International (Belgium)
- Fraunhofer LBF (Germany)
- Jaguar Cars Limited (United Kingdom)
- Volvo Technology (Sweden)
- Magna Steyr (Austria)
- PE International (Germany)
- Fundacion Cidaut (Spain)
- Daimler (Germany)
- Porsche Engineering (Germany)
- Austria Metall (Austria)
- Voestalpine Stahl (Austria)
- Georg Fischer Automotive (Switzerland)
- Technische Universität Braunschweig (Germany)
- Benteler Automobiltechnik (Germany)
- Bax & Willems (Spain)
- Cosma Engineering Europe (Austria)
- Magna Exteriors & Interiors (Austria)

AMBER-ULV

Automotive Mechatronic Baseline for Electric Resilient Ultra-Light Vehicle

Ultra-Light Vehicles (ULV) intrinsically have a better efficiency due to their improved transport capability per vehicle mass. Additionally improved driving dynamics performance can more easily be achieved because of the reduced mass.
However, the design of ULV sharing the same road with heavier cars represents a complex technical challenge for achieving acceptable safety levels. Furthermore, at present the additional purchase costs of a pure battery electric vehicle one as compared with a gasoline is more than 15000 Euros. Consumers buy a new vehicle because many and diverse reasons, including purchase price (one of the main concerns of the majority of buyers when approaching to purchase a new vehicle), depreciation rate, styling, performance and handling, brand preference and social image. However, car owners tend to underestimate the costs of running a vehicle. Although they are very well aware of fuel costs, road tax and insurance, they do not always account for servicing, repair and cost of depreciation. Therefore, if one is interested in comparing the cost of EV with other competing vehicle technologies the parameter of interest should be the Total Cost of Ownership (TCO). The project proposal AMBER-ULV aims to develop and integrate several innovative concepts, resulting from successfully completed R&D projects, giving a socially acceptable answer to safety concerns but not penalising the driving experience.

Project Coordinator or Contact Person: Gian Mauro Maneia

Organisation: CESI (Italy)

Project Duration: 01.07.2013 - 30.06.2016

Project Partners:

- CESI (Italy)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany)
- Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO (Netherlands)
- Alma Mater Studiorum-Universita di Bologna (Italy)
- Formtech Composite Limited (UK)
- Sherpa Engineering SA (France)
- NTU International APS (Denmark)
- E.O.S. SPA (Italy)
- Nova SRL (Italy)
- LMS Imagine SA (France)

AMELIE

Advanced Fluorinated Materials for High Safety, Energy and Calendar Life Lithium Ion Batteries

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

Project Coordinator or Contact Person: Baert Thierry

Organisation: Solvay (Italy)

Project Website: amelie-green-car-project.fr

Project Duration: 01.01.2011 - 31.12.2013

Project Partners:

- Solvay (Italy)
- Recupyl (France)
- Temic Automotive Electric Motors (Germany)
- Kiev National University of Technologies and Design (Ukraine)
- ERAS Labo (France)
- CAE (France)
- Prayon (France)
- Volvo Technology (Sweden)
- Renault (France)
- Institut Polytechnique de Grenoble (France)
- Westfälische Wilhelms-Universität Münster (Germany)
- Universita di Bologna (Italy)

APPLES

Advanced, High Performance, Polymer Lithium Batteries for Electrochemical Storage

The project will develop an advanced, lithium ion battery for application in the sustainable vehicle market. The basic structure of the battery involves a lithium-metal (tin)-carbon, Sn-C, alloy anode, a lithium nickel manganese oxide, LiNi0.5Mn1.5O4, cathode and a ceramic-added, gel-type membrane electrolyte. The academic partners will address the optimization of the basic, electrochemical properties of the electrode and electrolyte materials, while the industrial partners will focus on determining the battery key aspects, such as: i) energy density under a large size capacity configuration, ii) safety by abuse test procedure protocols, iii) overall cost, iv) environmental sustainability and v) 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 much lower than batteries already on the market, improved environmental compatibility and highly reduced safety hazard.

Project Coordinator or Contact Person: Riccardo Carelli

Organisation: Consorzio Sapienza Innovazione (Italy)

Project Website: www.applesproject.eu

Project Duration: 01.06.2011 - 31.05.2014

Project Partners:

- Consorzio Sapienza Innovazione (Italy)
- Chalmers Tekniska Högskola (Sweden)
- Chemetall (Germany)
- ENI (Italy)
- ETC Battery and FuelCells Sweden (Sweden)
- Hydro-Eco, Sapienza Università di Roma (Italy)
- SAES Getters (Italy)
- Stena Metall (Sweden)
- Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Württemberg (Germany)

ARMEVA

Advanced Reluctance Motors for Electric Vehicle Applications

To enable a large scale adoption of EVs, a new generation of electric drive systems is needed to reduce dependency on rare earth materials, while improving energy efficiency, power density and reducing manufacturing/recycling costs. The ARMEVA project aims to develop a new rare-earth-free generation of advanced reluctance motors.
The main scientific objectives of the ARMEVA project are the development of multiphysics simulation models for advanced reluctance motors, comparative assessment to select optimal motor topology for future EV's and development of an integrated electric drive system. The entire system consisting of control software, power electronics and a physical electric motor will be integrated and validated in a vehicle platform. ARMEVA will use a system based approach using multi-attribute techniques to improve the overall concepts and multi-application, multi-operation analysis to optimize vehicle level efficiency in a wide range of realistic conditions.

Project Coordinator or Contact Person: Saphir Faid

Organisation: Punch Powertrain NV (Belgium)

Project Duration: 01.11.2013 – 30.04.2016

Project Partners:

- Punch Powertrain NV (Belgium)
- LMS International NV (Belgium)
- Prodrive BV (The Netherlands)
- TeKShift Gmbh (Germany)
- LMS Imagine (France)
- Technische Universiteit Eindhoven (The Netherlands)
- Universitatea Tehnica Cluj-Napoca (Romania)

ASTERICS

Ageing and efficiency Simulation & TEsting under Real world conditions for Innovative electric vehicle Components and Systems

Nowadays, there is a strong demand for electrification of transport in Europe, main drivers being the potential in primary energy saving and in the reduction of air emissions.
Overall performances of Fully Electric Vehicles (FEVs) have to be enhanced to meet customers' expectations on a broad basis. For OEMs, innovations are required in design, simulation and testing methodologies; development time has to be cut.
The ASTERICS project will contribute to a huge leap forward, improving modelling and testing tools needed for development of future FEVs throughout Europe.
ASTERICS will support the competitiveness of the sector in all its aspects: basic components, integrated components, sub-systems, algorithms, systems and OEMs applications.

Objectives & Results:

- Identification of Real world environment and conditions based drive cycles.
- Development of advanced testing methodologies to automatically populate the simulation models for Battery, Inverter and E-Motor.
- Development of procedures for accelerated ageing of Battery, Inverter and E-Motor to shorten the testing time.
- Development of accurate high fidelity model for Batteries, Inverters and E-Motors.
- Total system (E-driveline) models integration and validation on test bench.
- Integration of models (e.g. Battery model for Battery Simulator) into the test bench environment
- New test methods set up for identification of second life applications.

Project Coordinator or Contact Person: Horst Pflügl

Organisation: AVL List (Austria)

Project Website: www.asterics-project.eu

Project Duration: 01.10.2012 - 30.09.2015

Project Partners:

- AVL List (Austria)
- Centro Ricerche FIAT (Italy)
- FH JOANNEUM (Austria)
- Gustav Klein (Germany)
- LMS International NV (Belgium)
- LMS IMAGINE (Belgium)
- THIEN eDrives (Austria)
- Univerza v Ljubljani (Slovenia)
- Università degli Studi di Firenze (Italy)
- Volvo Technology (Sweden)

AUTOMICS

Pragmatic solution for parasitic-immune design of electronics ICs for automotive

Smart Power ICs are extensively used in automotive embedded systems due to their unique capabilities to merge low power and high voltage devices on the same chip, at competitive cost. In such devices, induced electrical coupling noise due to switching of the power stages when integrating such high voltage (HV) devices with low voltage (LV) functions is a big issue. The lack for a model strategy that would enable the accurate simulation of the injection of minority carriers in the substrate as part of the HV model, as well as its propagation in the substrate is one of the main reasons for this critical situation. This picture motivates the project proposal where all these aspects are addressed to create a link between circuit design, modelling and implementation in innovative computer aided design tools. This concerns smart power IC's dedicated to automotive applications requiring co-integration of high voltage power stages with low voltage analog/digital blocks on the same chip, still being reliable when operating at high temperature.

Project Coordinator or Contact Person: Ramy Iskander

Organisation: Université Pierre et Marie Curie - LIP6 (France)

Project Website: www.automics.eu

Project Duration: 01.07.2012 - 31.08.2015

Project Partners:

- Université Pierre et Marie Curie (France)
- Continental Automotive France SAS (France)
- Ecole Polytechnique Fédérale de Lausanne (Switzerland)
- austriamicrosystems (Austria)
- STMicroelectronics srl (Italy)
- Valeo (France)
- AdMOS (Germany)
- CNRS LAAS (France)

AUTOSUPERCAP

Development of High Energy/High Density Super capacitors for Automotive Applications

Super capacitors are essential in electric vehicles for supplying power during acceleration and recovering braking energy. High power and sufficient energy density 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 project, we have assembled a multidisciplinary Consortium of leading researchers, organizations, highly experienced industrialists, and highly active SMEs to tackle the problems. As a result, we are aiming at developing super capacitors 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.

Project Coordinator or Contact Person: Constantina Lekakou

Organisation: University of Surrey (United Kingdom)

Project Website: autosupercap.eps.surrey.ac.uk

Project Duration: 01.01.2011 - 31.12.2013

Project Partners:

- University of Surrey (United Kingdom)
- MAST Carbon International (United Kingdom)
- NCSR-Demokritos (United Kingdom)
- Bayer Technology Services (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- IMCB-Consiglio Nazionale Delle Ricerche (Italy)
- Oerlikon Graziano (Italy)
- Karlsruhe Institute of Technology (Germany)
- AGM Batteries (United Kingdom)

AVTR

Optimal Electrical Powertrain via Adaptable Voltage and Transmission Ratio

AVTR addresses the development of a complete Electrical powertrain optimized as a whole of systems, targeting the largest market context (vehicles weighing less than 1000kg) and featuring Energy saving in pure urban drive up to 20% with respect to state of-the-art fixed transmission ratio and avoiding the use of Rare-Earth Permanent Magnet Motors

- fun-to-drive experience by adaptable transmission ratio allowing highest acceleration in all conditions,
- Overall cost reduction per a defined range through a reduced battery capacity
- Reduced cost of ownership and maintenance by a significant reduction of electro-mechanical stresses due to power/energy transients.

The ambitious objectives are obtained by integrating in a single, air cooled, compact module: power electronic and related control performing energy conversion, AC induction motor drive, variable rate mechanical transmission and differential.
Early demonstration of the technology will be made by preparing specific AVTRs to be installed on a FEV of new concepts for urban mobility and easily adaptable to the majority of the forthcoming (2015-2020) light electrical vehicles.
Impact is expected on:

1) Improved energy efficiency and extended driving range of the FEV
2) Reduced costs of the electronic components and the overall FEV at increased performance
3) Mitigated constrains for the user of the FEV versus the Internal Combustion Engine Vehicle
4) Significant improvement of FEV's safety, comfort, new information, and comfort services for FEV users
5) Strengthened global competitiveness of the European automobile, ICT for PWT
6) Market penetration of key components of FEVs

Project Coordinator or Contact Person: Giuseppe Catona, Marco Ottella

Organisation: BITRON (Italy)

Project Website: www.avtr.eu

Project Duration: 01.05.2012 - 30.04.2015

Project Partners:

- Bitron (Italy)
- ST Microelectronics (Italy)
- Technical University of Warsaw (Poland)
- Fraunhofer IISB (Germany)
- Oerlikon-Graziano (Italy)
- Polimodel (Italy)
- CISC Semiconductor (Austria)
- IFEVS (Italy)

BATTERIES2020

Towards Realistic European Competitive Automotive Batteries

A lifetime of 4000 cycles at 80 % DOD and an energy density of 250 Wh/kg is a target for automotive batteries. The Batteries2020 project takes several steps to increase lifetime and energy density of large format lithium ion batteries towards these goals. Our approach is based on three parallel strategies: 1) highly focused materials development; 2) understanding ageing and degradation phenomena; and, 3) routes to reduce battery cost. We will improve cathode materials based on nickel/manganese/cobalt (NMC) oxides. Such materials have a high chance to be up-scaled and commercialized near-term. Only then, cell development efforts can be translated from pilot to mass production, a prerequisite for qualification in the automotive industry. We will start with state of the art cells and will develop two improved generations of NMC materials and cells towards high performance, high stability and cycleability. A deep understanding of ageing phenomena and degradation mechanisms can help to identify critical parameters that affect lifetime battery performance. This identification helps effectively improving materials, system and the development of materials selection criteria. However, ageing and degradation mechanisms have multiple reasons and are complex. We propose a realistic approach with a combined and well organised Consortium effort towards the development of robust testing methodology which will be improved in several steps. Combined accelerated, real tests, real field data, post-mortem, modelling and validation will provide a thorough understanding of ageing and degradation processes. Battery cost is a major barrier to EV market. Second life uses can reduce battery costs. We will analyse the potentiality of reusing and recycling batteries for providing economic viable project outputs.
Our consortium combines a wide range of expertise from materials development and battery production to lifetime characterisation and viability and sustainability of the chosen.

Project Coordinator or Contact Person: Chris Merveille

Organisation: IKERLAN (Spain)

Project Website: www.batteries2020.eu

Project Duration: 01.09.2013 - 31.08.2016

Project Partners:

- IKERLAN (Spain)
- Centro Ricerche Fiat SPCA (Italy)
- Aalborg Universitet (Denmark)
- Vrije Universiteit Brussel (Belgium)
- Umicore SA (Belgium)
- LeClanche SA (Switzerland)
- Abengoa Research SL (Spain)
- Rheinisch-Westfälische Technische Hochschule Aachen (Germany)
- Kellen Europe S.A.(Belgium)

BEHICLE

BEst in class HIriko vehiCLE: Safe urban mobility in a sustainable transport value-chain (BEHICLE)

The BEHICLE project will deliver a safe, lightweight, performance enhanced and updated version of an existing urban Electric Vehicle (EV), namely the IEM QBEAK car (http://e-mobility.insero.com/). In order to obtain a Best-in-Class rating, BEHICLE developments will be focused on fulfilling safety requirements as defined by EURONCAP assessment. It will pursue consumption and electric range targets established on the topic, by integrating off-the-shelf powertrain and battery systems, whilst maintaining a lightweight structure based on conventional manufacturing technologies. A preliminary crash test, performed at the beginning of the project on an IEM car, will serve as a benchmark to establish an Improvement Action Plan, from which a safer version will be conceived. Computed Aided Engineering (CAE) and numerical modeling tools will be used throughout the entire process. The improvement strategy will place emphasis on safety cage renewal and on the integration of frontal, side and rear energy absorption modules, as well as on innovative safety systems, such as 'Bag in Roof' and side airbags for driver and passenger. The Body-in-White (BiW) material mix will feature metallic materials and thermoplastics with metallic reinforcements. 4 BEHICLE prototypes will be manufactured and tested according to EuroNCAP requirements. Crash compatibility cases will also be assessed by virtual means. BEHICLE results related to the complete car will be exploited according to innovative business models. The modular conception of BEHICLE will allow decentralized production and local assembly in the user cities. This will provide with local job creation around all the European municipalities in which sustainable mobility by means of BEHICLE concepts will be implemented.

Project Coordinator or Contact Person: Iñaki Eguia Ibarzabal

Organisation: Tecnalia Research &Innovation (Spain)

Project Duration: 01.11.2013 - 31.10.2016

Project Partners:

- TECNALIA RESEARCH & INNOVATION (Spain)
- INSERO E-MOBILITY AS (Denmark)
- TECHNISCHE UNIVERSITAT BERLIN (Germany)
- TRL LIMITED (UK)
- BUSINESS INNOVATION BROKERS S. COOP. (Spain)
- GRUPO ANTOLIN ITALIA SRL (Italy)
- TRW AUTOMOTIVE GMBH (Germany)

CAPIRE

Coordination Action on PPP
Implementation for Road-transport Electrification

The Coordination Action CAPIRE prepares and supports the realization of a Public Private Partnership (PPP) sustaining and putting into practice the European Green Cars Initiative. Its activities focus on two major fields: a careful consideration of options for the aims, shape, and implementation paths a PPP, and the identification of technology roadblocks and the respective research needs within FP7. Major outcomes will be an appropriate and proven PPP implementation model and 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 global European Automotive Industry in the domain of energy efficient, safe, non-polluting and CO_2-free vehicles. This strategy has to be based on the three technology pillars Passenger cars and LCV, Trucks and Buses and Logistics.

Project Coordinator or Contact Person: Emma Briec

Organisation: Renault (France)

Project Website: www.capire.eu

Project Duration: 01.12.2010 - 30.11.2014

Project Partners:

- Renault (France)
- AVL LIST (Austria)
- CRF - Centro Ricerche Fiat (Italy)
- Volvo Technology (Sweden)
- VDI/VDE-IT (Germany)
- Robert Bosch (Germany)
- Valeo S.A. (France)
- IBERDROLA Distribucion Electrica (Spain)
- TfL - Transport for Lond(United Kingdom)
- Continental Teves (Germany)
- Hidira d.d. Podjetje za Ustanavljanje in Upravljanje Druzb (Slovenia)
- Procter & Gamble Eurocor (Belgium)
- TÜV Rheinland Consulting (Germany)
- SOLARIS Bus & Coach (Poland)

CASTOR

Car Multi-Propulsion Integrated Power Train

Future electrical propulsion concepts demand more efficiency and less complexity with great functionality, robustness and light weight, and the ability to operate in a wide ambient temperature range. CASTOR will explore architectural advantages of fully integrated power train electronics for distributed propulsion systems that enable future generations of electric vehicle (EV) and personal propulsion systems.

- Advancements in efficiency and safety will be achieved by implementing a multi-propulsion power train based on the synergic integration of the energy storage with the propulsion unit.
- The research will not only focus on the integration of the component functionalities but also adopt an holistic approach for thermal management.
- The research is aimed to achieve 10~20% energy saving, 25% cost reduction, 15~20% improvement in vehicle range, and increased safety and integrability against the current state-of-the art EV propulsion systems.

Project Coordinator or Contact Person: Reiner John

Organisation: Infineon (Germany)

Project Website: www.castor-project.eu

Project Duration: 01.06.2010 – 31.05.2013

Project Partners:

- Infineon (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Volkswagen (Germany)
- SINTEF (Norway)
- FICOSA (Spain)
- University of Sheffield (United Kingdom)
- Magnomatics (United Kingdom)

CO3

Collaborative Concepts for Comodality

CO^3 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. CO^3 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.

Project Coordinator or Contact Person: Dirk 't Hooft

Organisation: Holland International Distribution Council (Netherlands)

Project Website: www.co3-project.eu

Project Duration: 01.09.2011 - 31.08.2014

Project Partners:

- Holland International Distribution Council (Netherlands)
- Argus (The Netherlands)
- Kneppelhout & Korthals (The Netherlands)
- Dutch Institute for Advanced Logistics (The Netherlands)
- Heriot Watt University (United Kingdom)
- TRI-Vizor (Belgium)
- Procter & Gamble Eurocor (Belgium)
- Cranfield University (United Kingdom)
- Zaragoza Logistics Center (Spain)
- ELUPEG (United Kingdom)
- Instituto Tecnologico Del Embalaje (Spain)
- Wincanton (United Kingdom)
- Jan de Rijk Logistics (The Netherlands)
- Planung Transport Verkehr (Germany)
- Mines Paris Tech (France)
- Pastu Consult (Belgium)
- Giventis (The Netherlands)
- D'Appolonia (Italy)

COMCIS

Collaborative Information Services for Container Management

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 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.

Project Coordinator or Contact Person: Frank Knoors

Organisation: Logit Systems (Belgium)

Project Website: www.comcis.eu

Project Duration: 01.09.2011 - 31.08.2013

Project Partners:

- Logit Systems (Belgium)
- Zemblaz (Belgium)
- DHL Global Forwarding - DHL Management (Austria)
- MSC (Belgium)
- Cargo Community System (Belgium)
- Belgian Administration of Customs and Excises (Belgium)
- TNO (The Netherlands)
- ECT Participations (The Netherlands)
- BMT Group Limited (United Kingdom)
- Marlo AS (Norway)
- Inlecom Systems (United Kingdom)
- ILIM Institute of Logistics and Warehousing (Poland)
- Bluegreen Strategy (Italy)

CORE

CO_2 REduction for long distance transport

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 after-treatment 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 after-treatment 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.

Project Coordinator or Contact Person: Ronny Lindgren

Organisation: Volvo (Sweden)

Project Website: www.co2re.eu

Project Duration: 01.01.2012 - 31.12.2015

Project Partners:

- Volvo (Sweden)
- CRF - Centro Ricerche Fiat (Italy)
- Chalmers University of Technology (Sweden)
- Daimler (Germany)
- Federal Mogul (Germany)
- Gottfried Wilhelm Leibniz Universität Hannover (Germany)
- Honeywell (Switzerland)
- IAV - Ingenieurgesellschaft Auto und Verkehr (Germany)
- Johnson Matthey (United Kingdom)
- Joint Research Centre - European Commission (Belgium)
- Metatron (Italy)
- Politecnico di Milano (Italy)
- Politecnico di Torino (Italy)
- Rhodia (France)
- Ricardo (United Kingdom)
- Umicore (Germany)

COSIVU

Compact, Smart and Reliable Drive Unit for Fully Electric Vehicles

The project 'COSIVU' aims at new system architectures for drive-train by developing a smart, compact and durable single-wheel drive unit with integrated electric motor, compact transmission, full SiC power electronics (switches and diodes), a novel control and health monitoring module with wireless communication, and an advanced ultra-compact cooling solution. The advances over the current state of the art can be summarized as follows:

- Decentralized drive-train system with one compact system package and wireless communication between drive units and central computer
- Development of next generation of highly integrated inverter modules based on novel SiC technology (1200V, 500A)
- Fail safe concepts for increased functional safety
- Closed hardware-in-the-loop technology to always guarantee optimal working conditions
- Innovative functional and health monitoring
- Improvement of durability and total driving range by factor 2
- COSIVU solution demonstrated and proofed in a test rig, and In-vehicle tests.

Project Coordinator or Contact Person: Dag Andersson

Organisation: Swerea IVF AB (Sweden)

Project Website: www.cosivu.eu

Project Duration: 01.10.2012 - 30.09.2015

Project Partners:

- Swerea IVF AB (Sweden)
- Volvo Technology AB (Sweden)
- TranSiC AB TSC (Sweden)
- Hella Fahrzeugkomponenten (Germany)
- Sensitec (Germany)
- Elaphe d.o.o. (Slovenia)
- Berliner Nanotest und Design (Germany)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V. (Germany)
- Technische Universität Chemnitz (Germany)

COTEVOS

COncepts, Capacities and Methods for Testing EV systems and their interOperability within the Smart grid

COTEVOS aims to develop optimal structures and capacities to test the conformance, interoperability and performance of the different systems to be included in the infrastructure for smart charging of Electric Vehicles.
In order to improve the electro-mobility adoption and the sustainability of the EV market segment, the long-term, overall goals of COTEVOS are:

- to assess and improve the degree of interoperability of the pan-European charging services.
- to improve the conformance assessment cost and time, through the design of procedures and facilities, in agreement with standardization and industrial working groups.
- to facilitate a potential growth of customer acceptance of EVs, by reducing some known adoption barriers: availability of charging infrastructure, charging time, safety risk concerns and cost (beyond incentives policies).
- to assess new systems and applications for the electricity grid in order to allow grid operators to host a larger penetration of EVs within their management procedures.

Project Coordinator or Contact Person: Eduardo Zabala

Organisation: Tecnalia (Spain)

Project Website: www.cotevos.eu

Project Duration: 01.09.2013 – 29.02.2016

Project Partners:

- TECNALIA (Spain)
- AIT Austrian Institute of Technology (Austria)
- ALTRA SPA (Italy)
- DERlab European Distributed Energy Resources Laboratories eV (Germany)
- DTU Danmarks Tekniske Universitet (Denmark)
- ETREL svetovanje in druge storitve d.o.o. (Slovenia)
- IWES FRAUNHOFER (Germany)
- TUL in Politechnika Łódzka (Poland)
- RSE- Ricerca sul Sistema Energetico (Italy)
- TNO (Netherlands)
- ZSDis Zapadoslovenska Distribucna as (Slovakia)

DELIVER

Design of Electric Light Vans for Environment-impact Reduction

The DELIVER project concept aims to explore urban light duty vehicle concepts intended for larger scale production by executing a broad scope conceptual design study which will start by establishing initial design specifications and continue right through to the detailed realistic performance assessment of one prototyped vehicle concept.
DELIVER is pre-competitive, focusing on the rules of the design of ELDVs to be launched by 2020, and providing a platform for integrated design brought together into one holistic design by a team of experienced design engineers and design researchers of various backgrounds.
The project will build upon the progress made and foreseen in subsystems and main components that are to be integrated into the ELDV through networking with complementary R&D projects, as well as with the support of a multi stakeholder Advisory Board consisting of high level representatives of Europe's cities, large urban delivery fleet owners and others.

Project Coordinator or Contact Person: Micha Lesemann

Organisation: RWTH Aachen - Institut für Kraftfahrzeuge (IKA) (Germany)

Project Website: www.deliver-project.org

Project Duration: 01.11.2011 - 31.10.2014

Project Partners:

- RWTH Aachen - IKA (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Volkswagen (Germany)
- Liberty E-Tech (United Kingdom)
- Michelin (France)
- CEGASA (Spain)
- POLIS (Belgium)
- SP Technical Research Institute of Sweden (Sweden)
- HPL Prototypes (United Kingdom)

E³Car

Nanoelectronics for an Energy Efficient Electrical Car

Emissions from road vehicles have to be reduced substantially in the future. The ultimate goal of most car manufacturers is to get to a completely electric vehicle, protecting the environment from emissions and noise, with alternative on-board energy sources (solar) and connection to the grid. 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. The objectives of the project are:

- Development of nanoelectronics technologies, devices, circuits architectures and modules for electrical cars/vehicles and demonstration of these modules in a final systems.
- New design and concepts for power train, power conversion, power management and battery management.
- Achieve 35% energy saving, and increased integrability against the current state-of-the art EV power electronics systems.

Project Coordinator or Contact Person: Reiner John

Organisation: Infineon Technologies (Germany)

Project Website: www.e3car.eu

Project Duration: 01.04.2009 - 15.06.2012

Project Partners:

- Infineon Technologies (Germany)
- ATMEL Automotive (Germany)
- austriamicrosystems (Austria)
- ON Semiconductor (Belgium)
- Robert Bosch (Germany)
- Stiftelsen Sintef (Norway)
- ElBil Norge (Norway)
- Think Global (Norway)
- CRF - Centro Ricerche Fiat (Italy)
- STMicroelectronics (Italy)
- Fraunhofer Gesellschaft (Germany)
- STMicroelectronics (France)
- Consejo Superior de Investigacioones Cientificas (Spain)
- Fundacion CiDETEC (Spain)
- Okmetic (Finland)
- VTI (Finland)
- VTT (Finland)
- Alcatel Thales III-V Lab (France)
- Audi (Germany)
- Tyndall National Institute (Ireland)
- IMA (Czech Republic)
- ATMEL France (France)
- CISC Semiconductor (Austria)
- Valeo (France)
- Consiglio Nazionale delle Ricerche (Italy)
- FH Joanneum (Austria)
- Technische Universität Wien (Austria)
- Siemens (Germany)
- Brno University of Technology (Czech Republic)
- CEA - LETI (France)
- Infineon (Austria)
- Philips Electronics Nederland (The Neterlands)
- Epyon (The Netherlands)

EASYBAT

Models and Generic Interfaces for EASY and Safe BATtery Integration and Swap in EV

EASYBAT's mission is to address battery integration challenges by defining new concepts for the smart insertion of batteries and by developing generic interfaces for electric vehicles. EASYBAT 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 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. The EASYBAT system performance will be compared to alternative solutions for EVs.
EASYBAT will offer solutions enabling cost effective, environmental friendly switchable batteries and will contribute to unleashing the EVs potential for a wider use.

Project Coordinator or Contact Person: Chanan Gabay

Organisation: Better Place Labs Israel (Israel)

Project Website: www.easybat-project.eu

Project Duration: 01.01.2011 - 30.06.2013

Project Partners:

- Better Place Labs Israel (Israel)
- KEMA Nederland (The Netherlands)
- Telnologisk Institut (Denmark)
- Technische Universität München (Germany)
- TÜV Rheinland Kraftfahrt (Germany)
- Continental Engineering Services (Germany)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung (Germany)
- Ernst & Young (Israel)
- University of Haifa (Israel)
- RWTH Aachen (Germany)
- Renault (France)

eCo-FEV

efficient Cooperative infrastructure for Fully Electric Vehicles

eCo-FEV aims at fulfilling the specific targeted outcome f): Integration of the FEV in the cooperative transport infrastructure. It will develop an integrated IT e-mobility platform that enables the connection and information exchanges between multiple infrastructure systems that are relevant to the FEV such as road IT infrastructure, EV backend infrastructure and EV charging infrastructure. Over this platform, multiple advanced electric mobility services are able to be provided to FEV users to improve the energy management efficiency and usability of the FEV, e.g. in the context of Smart Cities.

Project Coordinator or Contact Person: Massimilian Lenardi

Organisation: HITACHI Europe Ltd (France)

Project Website: www.eco-fev.eu

Duration: 01.09.2012 – 31.05.2015

Project Partners:

- HITACHI Europe (United Kingdom)
- EICT (Germany)
- Renault (France)
- CRF - Centro Ricerche FIAT (Italy)
- Conseil General de l'Isère (France)
- SITAF (Italy)
- ENERGRID (Italy)
- CEA (France)
- Politecnico di Torino (Italy)
- TU Berlin (Germany)
- Bluethink (Italy)
- FACIT (Germany)
- IERC (Germany)

ECOGEM

Cooperative Advanced Driver Assisted System for Green Cars

EcoGem claims that the success and user acceptability of Fully Electric Vehicles (FEVs) will predominantly depend on their electrical energy consumption rate and the corresponding degree of autonomy that they can offer. EcoGem aims at providing efficient ICT-based solutions to this great issue, by designing and developing a FEV-oriented highly-innovative Advanced Driver Assistance System (ADAS), equipped with suitable monitoring, learning, reasoning and management capabilities that will help increase the FEV's autonomy and energy efficiency. EcoGem will base its approach on rendering the FEV:
capable of reaching the desired destinations through the most energy efficient routes possible; fully aware of surrounding recharging points/stations while on move. To achieve its goals, EcoGem will develop novel techniques: on-going learning-based traffic prediction; optimised route planning; interactive and inter-operative traffic, fleet and recharging management via V2X communication.

Project Coordinator or Contact Person: Burak Onur

Organisation: Temsa Global (Turkey)

Project Website: www.ecogem.eu

Project Duration: 01.09.2010 - 28.02.2013

Project Partners:

- Temsa Global (Turkey)
- Pininfarina (Italy)
- PTV Planung Transport Verkehr (Germany)
- Fundacion Tecnalia Research and Innovation (Spain)
- HI-IBERIA Ingenieria y Proyectos (Spain)
- University of Bradford (United Kingdom)
- Instytut Transportu Samochodowego – Motor Transport Institute (Poland)
- Institute of Communication and Computer Systems (Greece)
- COSMOTE Mobile Telecommunications (Greece)
- SOFTECO Sismat (Italy)
- NAVTEQ (The Netherlands)

ECOSHELL

Development of new light high-performance environmentally benign composites made of bio-materials and bio-resins for electric car application

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.

Project Coordinator or Contact Person: Efrén Hernandez

Organisation: HLP Développement (France)

Project Website: www.ecoshell.eu

Project Duration: 01.01.2011 - 30.09.2013

Project Partners:

- HLP Développement (France)
- CITI Technologies (France)
- Cranfield University (United Kingdom)
- VTT (Finland)
- Fraunhofer Institut für Chemische Technologie (Germany)
- Université Henri Poincaré - ENSTIB 1 (France)
- MAHYTEC (France)
- CSIC (Spain)
- CADLM (France)
- GRM Consulting (United Kingdom)

eDAS

Holistic Energy Management for third and fourth generation of EVs

eDAS will limit the negative impact of high and low environment temperatures from -50% today to a maximum of -20% of the reachable range in electric vehicles, which corresponds to an improvement of 60% compared to state of the art. The subsystems of the EV to the optimum operating temperature range for faster “fast charging”, pre-conditioned passenger compartment and battery, also safety and convenience features, such as de-iced windows during winter time, based on the available subsystems without adding cost and weight are put into priority. New designs and architectures combining battery, e-motor, electronics, charger and energy management will also be developed. Addressing this challenge of the architecture of all subsystems of the complete EV requires a wide area of expertise, and in consequence leads to a large consortium. To develop and demonstrate the innovative hardware and software solutions, including new materials, adequate resources and budget are required. eDAS will deliver following innovative demonstrators:

- Smart battery system with thermal management and peak temperature conditioning based on novel materials such as phase change materials (PCM)
- Novel e-motor with improved power density properties allowing reuse of thermal energy based on direct cooling of the coils
- Universal scalable and modular combined inverter / charger (power range 3-22 kW)
- Innovative accelerated inverter charger for faster “fast charging”
- Efficiency improvement in PHEV cars (e.g. pre-conditioning, exhaust gas energy recuperation)
- Wireless curb charging with thermal pre-conditioning (e.g. while parking) based on existing infrastructure in cities (power range 1-2 kW)
- Safe multi-core control architecture for the powertrain computer including energy resource scheduler and advanced management of electrical, mechanical and thermal energies
- Overall energy management including the before mentioned components and subsystems as well as the integration of 3D GPS data for energy optimal route selection

Standardization of the temperature levels of the different elements in the energy network will foster lower cost, higher efficient cooling solution and scalable systems and sub systems. The demonstrators will consider safety aspects and be evaluated with respect to robustness, by using fault injection methodologies. eDAS will build an energy network within the FEV, making use of the available energy sources (electrical, thermal, mechanical), control them in an optimized way to feed energy back to the system and to minimize the impact of the external factors (temperature) by preconditioning of the car in order to achieve predictable and reliable mileage.

eDAS will provide solutions for predictable mileage exploring novel concepts such as using the combination of different also non electrical energy sources and storages in the FEV as a network of energy elements and also directly influence the battery efficiency by preconditioning of the car itself. Thermal conditioning will set for example the temperature of the battery to the best operating range for faster and thermal peak or overload free "Fast Charging" also protecting the battery by actively controlling State of Charge and State of Health. These aspects together will definitely minimize the uncertainty in range. For getting energy "en route" eDAS will provide novel concepts of direct interaction of the FEV with the available infrastructure in urban environments (Smart Grid) and by using the available navigation systems to plan the optimal topology for the route.

Project Coordinator or Contact Person: Reiner John

Organisation: Infineon Technologies AG (Germany)

Project Website: www.edas-ev.eu

Project Duration: 01.10.2013 – 30.09.2016

Project Partners:

- Infineon Technologies AG(Germany)
- AVL Software and Functions GmbH (Germany)
- Fraunhofer (Germany)
- Technical University Dresden (Germany)
- University of Applied Sciences Amberg-Weiden (Germany)
- GEMAC(Germany)
- Infineon Technologies (Austria)
- AVL LIST GmbH (Austria)
- Technical University Graz (Austria)
- Kompetenzzentrum - Das Virtuelle Fahrzeug, Forschungs-gesellschaft mbH (Austria)
- Valéo Systèmes de Contrôle Moteur (France)
- Hutchinson SA (France)
- IDEAS & MOTION S.R.L. (Italy)
- Siemens AG (Germany)
- Daimler AG (Germany)

e-DASH

Electricity Demand and Supply Harmonization for EVs

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.

Project Coordinator or Contact Person: Gloria Pellischek

Organisation: ERPC (Germany)

Project Website: www.edash.eu

Project Duration: 01.09.2011 - 31.08.2014

Project Partners:

- ERPC (Germany)
- Eurisco APS (Denmark)
- Broadbit Slovakia SRO (Slovakia)
- Endesa Ingeniera SL (Spain)
- RWE Effizienz (Germany)
- Renault (France)
- Knowledge Inside (France)
- CEA (France)
- ERPC (Germany)
- Technische Universität Dortmund (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Institut für angewandte Systemtechnik Bremen (Germany)
- ATOS Origin Sociedad Anonima Espanola (Spain)
- Tiralog (France)
- Volkswagen (Germany)

EFUTURE

Safe and Efficient Electrical Vehicle

The idea of intelligent vehicles that cope with safety requirements and adapt their energy needs is a long-term strategy. eFuture wants to prepare the next generation of electric vehicle by creating a platform which minimises its energy needs while dynamically balancing safety and energy efficiency needs. Special interest is drawn to the influence of this strategy on the driver by acceptance investigations.

Optimising each component separately is not enough, an overall concept which looks at the interactions between the components is mandatory. The strategies to control the actuators will be integrated for safety issues, comfort driving and energy efficiency. ADAS functions will be re-worked and decision units will manage the transition between modes for safety and energy optimisation which also requires a strategy set for the priorities in terms of energy needs during requests collision.

Project Coordinator or Contact Person: Pascal Dégardins

Organisation: Intedis (Germany)

Project Website: www.efuture-eu.org

Project Duration: 01.09.2010 - 31.08.2013

Project Partners:

- Intedis (Germany)
- Tata Motors European technical Centre (United Kingdom)
- MILJØBIL GRENLAND (Norway)
- Hella KGaA Hueck (Germany)
- Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux (France)
- Würzburger Institut für Verkehrswissenschaften (Germany)

eLCAr

E-Mobility Life Cycle Assessment Recommendations

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.

Project Coordinator or Contact Person: Sebastian Winter

Organisation: RWTH Aachen University (Germany)

Project Website: www.elcar-project.eu

Project Duration: 01.02.2012 - 31.01.2013

Project Partners:

1. RWTH Aachen University (Germany)
2. Ifu Hamburg (Germany)
3. TU Braunschweig (Germany)
4. EMPA (Switzerland)

ELECTROGRAPH

Graphene-based Electrodes for Application in Supercapacitors

Supercapacitors are considered one of the newest innovations in the field of electrical energy storage. In hybrid electric vehicle, supercapacitors can be coupled with fuel cells or batteries to deliver high power needed during acceleration as well as to recover the available energy during regenerative braking.
The ElectroGraph project follows a technology driven approach. 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 supercapacitors. The combination of graphene and graphene-based material as electrode materials, and use of room temperature ionic liquids (RTILs) as electrolyte is the target of development. At the end of the project the performance of those materials is to be demonstrated in the functional model of supercapacitor.

Project Coordinator or Contact Person: Urszula Kosidlo

Organisation: Fraunhofer IPA (Germany)

Project Website: www.electrograph.eu

Project Duration: 01.06.2011 - 31.05.2014

Project Partners:

- Fraunhofer IPA (Germany)
- Danubia NanoTech (Slovakia)
- Institute of Occupational Medicine (United Kingdom)
- Trinity College Dublin (Ireland)
- CRF - Centro Ricerche Fiat (Italy)
- Instituto Nacional del Carbon - Consejo Superior de Investigaciones Científicas (Spain)
- The University of Nottingham (United Kingdom)
- The Université Paris Diderot – Paris 7 (France)
- Maxwell Technologies (Switzerland)
- The University of Exeter (United Kingdom)

ELIBAMA

European Li-Ion Battery Advanced Manufacturing for electric Vehicles

The global objective of ELIBAMA is to accelerate the creation of a strong European automotive battery industry structured around industrial companies already committed to mass production of Li-ion batteries for EV's. The project will exploit eco-design to guarantee gains in cost reduction and environment-friendliness across the whole battery production chain. Specifically, the project focuses on electrode production, electrolyte manufacturing, fast and homogenous cell filling, cell design and assembly. Moreover, the project will develop technologies to improve downstream quality and yield. This includes clean manufacturing, online high resolution monitoring and inspection, and non-destructive testing of Li-ion cells. The project will also study recycling and refurbishing of end-of-life Li-ion batteries in order to maximize their use and minimize their environmental impact. All these technical improvements will be closely monitored and validated by a consistent life cycle analysis.

Project Coordinator or Contact Person: Jérôme Perrin

Organisation: Renault (France)

Project Website: www.elibama.eu

Project Duration: 01.11.2011 - 31.10.2014

Project Partners:

- Renault (France)
- CEA - LITEN (France)
- Daimler (Germany)
- Entegris (France)
- EDI-VEOLIA (France)
- Fraunhofer (Germany)
- IN-CORE (France)
- Ingecal (France)
- Krönert (Germany)
- PE-International (Germany)
- Prayon (Belgium)
- Rhodia (France)
- Saft (France)
- Snam (France)
- Solvay - Solexis (Italy)
- Umicore (Belgium)
- University of NewCastle (United Kingdom)

E-LIGHT

Advanced Structural Light-Weight Architectures for Electric Vehicles

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 powertrain 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; and 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.

Project Coordinator or Contact Person: Luis de Prada

Organisation: CIDAUT (Spain)

Project Website: www.elight-project.eu

Project Duration: 01.01.2011 - 31.12.2013

Project Partners:

- CIDAUT (Spain)
- Tecnalia (Spain)
- University of Sheffield (United Kingdom)
- EAST-4D (Germany)
- Ricardo (United Kingdom)
- Pininfarina (Italy)
- Pôle Véhicule du Futur (France)

ELVA

Advanced Electric Vehicle Architectures

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. In the next two and a half years the ELVA partners will develop architectures for electric vehicles particularly designed for electric drive. The core objective is to fully exploit the new freedom in design given by the electrification of the vehicle.
In the first project phase a better understanding of the customer requirements for electric vehicles is developed together with a detailed overview of technologies for electric vehicle drives available from 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.

Project Coordinator or Contact Person: Micha Lesemann

Organisation: RWTH Aachen University
Institut für Kraftfahrzeuge (Germany)

Project Website: www.elva-project.eu

Project Duration: 01.12.2010 - 31.05.2013

Project Partners:

- RWTH Aachen - IKA (Germany)
- Continental Automotive (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- IDIADA Automotive Technology (Spain)
- Renault (France)
- SAFER (France)
- Volkswagen (Germany)

ELVIRE

ELectric Vehicle communication to Infrastructure, Road services and Electricity supply

For E.V.s, the development of an interactive electric energy ICT & Service interface between the vehicle and its electricity infrastructure is of utmost importance, next to creating effective business models. The rationale of this project is to contribute significantly to neutralize the driver's "range anxiety" and encourage the customers to embark the fully electric road transport. Therefore the objective of ELVIRE is to develop an on-board electric energy communication & service platform for realistic use-cases including the relevant external communication and services. Great emphasis is placed on the openness of the Electricity service platform granting access to multiple players maintaining the customer's choice. ELVIRE will become crucial to future electric road transport by closing the gap between vehicle technology and the off-board E-ICT and service environment. ELVIRE will have strong impact by strengthening competitiveness, energy efficiency and reduce emissions and improve by promoting electrification.

Project Coordinator or Contact Person: Hannes Lüttringhaus

Organisation: Continental Automotive (Germany)

Project Website: www.elvire-project.org

Project Duration: 01.01.2010 - 31.03.2013

Project Partners:

- Continental Automotive (Germany)
- Better Place Labs Israel (Israel)
- SAP (Germany)
- ENDESA (Spain)
- Volkswagen (Germany)
- ERPC (Germany)
- Lindholmen Science Park (Sweden)
- Institut für Angewandte Systemtechnik Bremen (Germany)
- CEA (France)
- Erasmushogeschool Brussel (Belgium)
- Renault (France)

EMERALD

Energy ManagEment and RechArging for efficient eLectric car Driving

EMERALD focuses on energy use optimisation and on the seamless integration of the FEV into the transport and energy infrastructure, the goal being to assist the FEV in becoming a successful commercial product.
To this end, EMERALD innovates a range of advanced ICT solutions, each one seamlessly integrated with the others, including:

- Dynamic energy-driven management of FEV auxiliaries tightly integrated with consumption prediction functionality, enabling pre-emptive energy conservation measures.
- Energy-efficient long-range route planning and optimisation, enabling extension of FEV's driving range and automatic scheduling of recharging stops en route.
- Performance-centric machine learning for consumption prediction, introducing optimisation and cooperative training of machine learning functions targeted for energy consumption and traffic prediction based on experience.
- Driver profiling functionalities, through monitoring of acceleration/braking patterns, for the enhancement of route consumption prediction functionality.
- V2G traffic and consumption data synchronisation, as a new cooperative information-sharing scheme.
- User-centric charge and discharge management, enabling automatically-generated, optimal for the user, charge and discharge schedules, accessible both on-board and on his mobile phone.

EMERALD will also introduce: Enhanced FEV-related power demand prediction and power flow management support, taking advantage of consumption patterns as shared in a cooperative manner by the FEVs themselves as well as from FEVs' recharging bookings; cooperative FEV fleet management, though holistic and dynamic; multi-parameter; fleet control optimisation, taking into account energy and recharging limitations; FEV-specific driver training for energy efficiency.

Project Coordinator or Contact Person: Marco Boero

Organisation: Softeco Sismat (Italy)

Project Website: www.emerald-project.eu

Project Duration: 01.10.2012 - 30.09.2015

Project Partners:

- Softeco Sismat Srl (Italy)
- PININFARINA (Italy)
- TEMSA Global (Turkey)
- PTV Planung Transport Verkehr AG (Germany)
- TECNALIA Research & Innovation (Spain)
- HI-IBERIA Ingenieria Y Proyectos SL (Spain)
- Instytut Transportu Samochodowego – Motor Transport Institute (Poland)
- Institute of Communication and Computer Systems (Greece)
- COSMOTE Mobile Telecommunications SA (Greece)
- MICRO-VETT (Italy)
- Nissan Motor Iberica (Spain)
- Public Power Corporation (Greece)

EM-Safety

EM safety and Hazards Mitigation by proper EV design

The project aims at increasing the public confidence in the safety regarding electromagnetic fields (EMF) in the fully electric vehicles (FEV). Public expectations to move towards the electrification of road transport are driven by a multitude of factors and concerns including: climate change, primary energy dependence and public health as well as cost and scarcity of raw materials. On the other hand, there is widespread public concern regarding the possible adverse effects of electromagnetic fields (EMF). Thus, there is a need to avoid the spread of panic or unjustified fears that would delay the enormous and crucial economic and environmental benefits that the FEV can provide when deployed on a large scale.
The project includes, therefore, a study of existing EM-fields in electric vehicles under certain driving conditions as well as simulation work based on these measurements. These inputs are used for minimizing EMF in electric cars as well as for studies of their effect.

Project Coordinator or Contact Person: Andreas Vogl

Organisation: SINTEF (Norway)

Project Website: www.sintef.no/Projectweb/EM-Safety

Project Duration: 01.05.2011 - 31.01.2014

Project Partners:

- SINTEF (Norway)
- Prysmian Limited (Italy)
- CRF - Centro Ricerche Fiat (Italy)
- Gottfried Wilhelm Leibniz Universität Hannover (Germany)
- MIRA (United Kingdom)
- Foundation of Turin University and San Giovanni Battista Hospital (Italy)
- CEA - LETI (France)
- Istituto PM (Italy)
- University of Technology Braunschweig (Germany)
- TAMAG Iberica (Spain)

Enhanced WISETRIP

Enhancing Intermodality of Content, Personalised Information and Functionality of WISETRIP Network of Journey Planning Engines

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 CO_2 footprint, E&D preferences, and other user-specific options.

Project Coordinator or Contact Person: Vassilis Spitadakis

Organisation: Hellenic Telecommunications & Telematics Applications Company (Greece)

Project Website: www.wisetrip.travel

Project Duration: 01.09.2011 - 28.02.2014

Project Partners:

- Hellenic Telecommunications & Telematics Applications Company (Greece)
- AUEB-RC/TRANSLOG (Greece)
- ETRA (Spain)
- TNO (Norway)
- The University Court of the University of Aberdeen (United Kingdom)
- Nextant (Italy)
- Telespazio (Italy)
- Niias (Russia)
- Beijing Transportation Research Centre (China)
- POLIS (Belgium)
- Empresa Municipal de Transportes de Madrid (Spain)
- RJ (Brazil)
- Tomtom International (The Netherlands)
- Reisinformatiegroep (The Netherlands)

ENLIGHT

Enhanced Lightweight Design

ENLIGHT aims to advance highly innovative lightweight material technologies for application in structural vehicle parts of future volume produced Electric Vehicles (EVs) along four axes: performance, manufacturability, cost effectiveness and lifecycle footprint. The main target is to develop viable and sustainable solutions for medium production volume EVs destined to reach the market in the next 8-12 years. In ENLIGHT each of the principal major weight-incorporating parts of a vehicle will be addressed directly by the five modules: a front module and central floor module, a front door, a sub-frame and suspension system as well as an integrated cockpit & firewall assembly.

The specific objectives of the ENLIGHT project are on holistic and integrated conceptual design and manufacturing concerning how the technologies and materials addressed can be combined into a representative medium-volume EV by around 2020. This design is targeted to have a 20% additional weight reduction compared to the targets that are pursued in the complementary ALIVE proposal.

Project Coordinator or Contact Person: Thilo Bein

Organisation: Fraunhofer-Institute for Structural Durability and System Reliability LBF (Germany)

Project Website: www.project-enlight.eu

Project Duration: 01.10.2013 - 30.09.2016

Project Partners:

- Fraunhofer LBF (Germany)
- Volkswagen (Germany)
- Centro Ricerche Fiat (Italy)
- Renault (France)
- Bax & Willems (Spain)
- Sistemas y procesos avanzados (SISPRA) (Spain)
- RWTH Aachen (ika) (Germany)
- KU Leuven (Belgium)
- Jaguar Cars Limited (UK)
- Volvo Technology (Sweden)
- Benteler Automobiltechnik (Germany)
- Instituto de Engenharia Mecanica (IDMEC) (Portugal)
- Leichtmetall Kompetenzzentrum Ranshofen (AIT-LKR) (Austria)
- Swerea SICOMP (Sweden)
- Sistemi Sospensioni Marelli (Italy)
- University of Warwick (UK)
- Tecnaro (Germany)
- DSM Ahead (The Netherlands)
- Universita degli studi di Firenzi (UNIFI) (Italy)
- Oxeon (Sweden)
- Airborne Technology Center (The Netherlands)

EPSILON

Small Electric Passenger vehicle with maximized Safety and Integrating a Lightweight Oriented Novel body architecture

As the global population gravitates towards increasingly large urban agglomerates, the density of movements and the sheer numbers of people displacements is growing so fast that existing vehicles for personal transport increasingly seem insufficient: consuming too much energy (present day cars), or exposing their drivers to larger-than-needed accident risks (motorcycles or bicycles). As especially urban climate is heating up worldwide, acclimatised personal transport is getting more and more the norm, as opposed to taking a bicycle to work.

Epsilon aims to conceptualize, develop and prototype a new category of vehicle in between the ultra-compact (urban) car and present day moped category small covered vehicles or semi-covered scooters. Epsilon underwrites the 'hard' performance targets defined in the call topic and seeks to meet these while ensuring a very competitive level of affordability and safety. Epsilon can achieve this by means of leveraging the substantial amount of previous and parallel (national & EU-funded) R&D of other projects in which epsilon partners participate, combined with the specific skills and expertise of the consortium members. As such it focuses on optimally integrating cutting edge yet available on prototype level components, materials, manufacturing technologies and subsystems into a drivable prototype plus 2 crash tested body structures. The extensive real experimental testing in combination with advanced performance simulations will allow full confidence verification of the performance of the vehicle and also will allow for strong promotion of the accomplished innovation.

Epsilon takes very serious care of the fit between vehicle classes as agreed in European and worldwide standards and the characteristics of the vehicle to be developed. The epsilon consortium includes 1 major carmaker, 1 automotive supplier, 3 specialized electric car engineering / prototyping companies and 4 research centres from 5 EU countries.

Project Coordinator or Contact Person: Kristian Seidel

Organisation: Forschungsgesellschaft Kraftfahrwesen mbH Aachen (Germany)

Project Duration: 01.11.2013 – 31.10.2016

Project Partners:

- Forschungsgesellschaft Kraftfahrwesen mbH Aachen (Germany)
- Kompetenzzentrum - Das Virtuelle Fahrzeug, Forschungsgesellschaft mbH (Austria)
- Centro Ricerche Fiat SCPA (Italy)
- Autoliv Development AB (Sweden)
- HPL Prototypes LTD (UK)
- Technische Universität Graz (Austria)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany)
- LEC 2 Limited (UK)
- Institut für Kraftfahrzeuge (ika) der RWTH Aachen University (Germany)

ESTRELIA

Energy Storage With Lowered Cost and Improved Safety and Reliability for Electrical Vehicles

ESTRELIA will provide building blocks with enhanced reliability and safety at lowered costs for smart energy storage in FEVs. This is accomplished by a modular approach with ultra capacitor power packs with higher energy density and new BMS ICs. The BMS IC concept will for the first time provide a flexible active cell balancing chip set also suited for the high accuracy required for Li-Ion batteries. This enables higher efficiency by lower energy loss and improved long term reliability at lower electronic component costs for Li-Ion energy packs. New safety gas sensors and flame detection sensors will provide general safety functions for all hazardous events in a FEV. The development of new innovative actuators as low cost power antifuse together with the new energy management HW (BMS IC) and SW will enable dynamic reconfigurable topologies for the energy storage unit, thus still enabling the functionality of the FEV despite single failing cells.

Project Coordinator or Contact Person: Ewald Wachmann

Organisation: austriamicrosystems (Austria)

Project Website: www.estrelia.eu

Project Duration: 01.05.2011 - 30.04.2014

Project Partners:

- austriamicrosystems (Austria)
- Valeo Electrical Systems (France)
- Fraunhofer Gesellschaft IISB (Germany)
- Corning (France)
- Austrian Battery Research Laboratory (Austria)
- Applied Sensors (Germany)
- CEA - LETI (France)
- Active Technologies (Italy)
- E4V (France)

EUNICE

Eco-design and Validation of In-Wheel Concept for Electric Vehicles

Promotion of Electric Vehicles is strategic for the European Community, but nowadays battery performance is still poor and all forecasts for near future transport electrification suggest that A-B class EV cars with limited range are the first step to develop. Even in the actual economic crisis, global demand of A-B class cars is expected to grow by about 5.3% in 2010, with a positive sale scenario in the next years. In-wheel electric motor architecture holds major advantages for these A-B classes, allowing high modularisation of the vehicle architecture, increased interior space and improved driveability. However, current existing solutions for in-wheel motor are still in prototype phases, resulting in non-existence of A-B class EV car commercialized and equipped with in-wheel motor, even though the predicted market for this technology is 100K vehicles for 2015.The main objective of this proposal is the design, development and validation of a complete in wheel motor assembly prototype (electric motor, power electronics, reduction gear, structural parts and wheel), based on a McPherson corner suspension topology, to meet the defined car top level specifications. The main technical risks associated with the use of an in-wheel concept are the thermal stress under extreme operation conditions, vehicle dynamics, driveability, safety and durability. The proposed baseline concept will be based on an air cooled motor in wheel concept, with conventional airflow driven by vehicle, and forced airflow provided by an innovative wheel design. Detailed specifications of extreme operation conditions will be defined and validated by the OEM, during the project, including the hot day-cold day conditions, representative of vehicle extreme use. During the assembly and testing phase, the aspects related to vehicle dynamics, driveability, safety, user acceptance, reliability, previously defined, will be validated with the motor in wheel prototypes installed in a test vehicle. In addition, aspects as eco-design, LCA of the concept and components, dismantling and recyclability of key materials and rare earths will be considered during the in-wheel concept design.

Project Coordinator or Contact Person: Alberto Peãa

Organisation: Fundacion Technalia Research & Innovation (Spain)

Project Website: www.eunice-project.eu

Project Duration: 01.09.2012 – 03.08.2015

Project Partners:

- Fundacion Technalia Reseach & Innovation (Spain)
- GKN Evo Drive Systems Limited (UK)
- Sistemi Sospensioni SPA (Italy)
- Infineon Technologies AG (Germany)
- Fundacion AIC Automotive Intelligence Center Fundazioa (Spain)
- Hayes Lemmerz SRL (Italy)
- IVL Svenska Miljoeinstitutet AB (Sweden)
- Pininfarina SPA (Italy)
- Comite de Liason de la Construction d'Equipements et de Pieces d'Automobiles Clepa Aisbl (Belgium)
- Industrias Puigjaner S.A. (Spain)
- Österreichisches Forschung- und Pröfzentrum Arsenal GmbH (Austria)
- Evo Electric Ltd (UK)
- Fundacion CIE I+D+I (Spain)

EUROLIION

High energy density Li-ion cells for traction

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 commercialization. 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. Eco-design and recycling are inherent parts of the project.

Project Coordinator or Contact Person: Erik M. Kelder

Organisation: Technische Universiteit Delft (Netherlands)

Project Website: www.euroliion.eu

Project Duration: 01.02.2011 - 31.01.2015

Project Partners:

- Technische Universiteit Delft (The Netherlands)
- Centre National de la Recherche Scientifique (France)
- Uppsala Universitet (Sweden)
- Kemijski Institut (Slovenia)
- University of Cambridge (United Kingdom)
- Politechnika Warszawaska (Poland)
- Volvo Technology (Sweden)
- Renault (France)
- Spijkstaal Elektro B.V. (The Netherlands)
- GAIA Akkumulatorenwerke (Germany)
- Commissariat a l' Energie Atomique (France)
- Zentrum für Sonnenenergie- und Wasserstoffforschung, Baden-Württemberg (Germany)
- Österreichisches Forschungs- und Prüfzentrum Arsenal (Austria)

EUROLIS

Advanced European lithium sulphur cells for automotive applications

Li-ion batteries become a reality in the future vehicles, although they do not fulfil completely the demands of consumers. In this respect batteries with higher energy density are required. Lithium technology utilizing sulphur as a cathode is one of the optimal choices since it offers the possibility of achieving high-energy, long-life storage batteries with a potential low price. At present, the practical use is faced with two major problems: (i) a low intrinsic conductivity of sulphur and polysulphides and (ii) loss of active materials due to solubility of the intermediate products in the commonly used electrolytes. The low intrinsic conductivity can be overcome using improved electronic wiring. The occurrence of soluble polysulphides is reflected as a loss of the active material during the cycling and additionally soluble polysulphides are responsible for overcharging problem which lowers the energy efficiency. With an aim to have stable capacity retention with a good cycling efficiency it is important to find a suitable electrochemical environment for the lithium sulphur batteries. Possible approaches are using polysulphide reservoirs with modified surfaces in the highly mesoporous conductive matrix. Proposed system with high surface area should enable weak adsorption of polysulphides intermediates allowing reversible desorption. This way a full utilization of the active material without significant losses can be obtained. In order to understand the influence of surface area and surface modification, including interactions between electrolyte and sulphur based cathode composite we need to have a reliable characterization techniques. In this respect different electrochemical, spectroscopic and physical characterization (in-situ or ex-situ) techniques can provide us valuable informations about the possible mechanism which can be used in planning of substrates for sulphur in the Li-S batteries.

Project Coordinator or Contact Person: Katja Molina

Organisation: Kemijski Institute (Slovenia)

Project Website: www.eurolis.eu

Project Duration: 01.10.2012 - 30.09.2016

Project Partners:

- Kemijski Institute (Slovenia)
- Chalmers Tekniska Hoegskola AB (Sweden)
- Renault S.A.S. represented by Gie Regienov (France)
- Saft SAS (France)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany)
- Max Planck Gesellschaft zur Förderung der Wissenschaften e.V. (Germany)
- Volvo Technology AB (Sweden)
- Solvionic SA (France)
- Centre National de la Recherche Scientifique (France)
- Center Odlicnosti Nizkoogljicne Technologije Zavod (Slovenia)
- Sincrotrone Trieste SCPA (Italy)

eVADER

Electric Vehicle Alert for Detection and Emergency Response

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 detectability 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.

Some of the most important areas covered are:

- Optimum warning signals definition to induce correct driver reaction for safe operation
- Adaptation of the warning signals to the real in-service vibro-acoustic environment as well as real urban and exterior noise
- Optimum warning signals definition for pedestrians in close-to-accident situations
- Integration of the generation of acoustic warning signals with in-vehicle intelligent systems data

Use of in-vehicle complementary information to improve characteristics of the warning signal, depending on real close-to accident scenario

Project Coordinator or Contact Person: Juan J. García

Organisation: IDIADA Automotive Technology (Spain)

Project Website: evader-project.eu

Project Duration: 01.10.2011 - 30.09.2014

Project Partners:

- IDIADA Automotive Technology (Spain)
- Technische Universität Darmstadt (Germany)
- LMS-International (Belgium)
- Österreichisches Forschungs- und Prüfzentrum Arsenal (Austria)
- TNO - Netherlands Organisation for Applied Scientific Research (The Netherlands)
- Institut National des Sciences Appliquées de Lyon (France)
- Nissan Motor Manufacturing (United Kingdom)
- Renault (France)
- PSA (France)
- Continental Automotive (France)
- European Blind Union (France)

E-VECTOORC

Electric Vehicle Control of Individual Wheel Torque for On- and Off-Road Conditions

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 research 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.

Project Coordinator or Contact Person: Aldo Sorniotti

Organisation: University of Surrey (UK)

Project Website: www.e-vectoorc.eu

Project Duration: 01.09.2011 - 31.08.2014

Project Partners:

- University of Surrey (United Kingdom)
- Technische Universität Ilmenau (Germany)
- Jaguar Cars / Land Rover (United Kingdom)
- Flanders' Drive CVBA-SO (Belgium)
- Inverto (Belgium)
- Fundacion CIDAUT (Spain)
- Instituto Tecnologico de Aragon (Spain)
- Skoda Auto (Czech Republic)
- Kompetenzzentrum - Das virtuelle Fahrzeug Forschungsgesellschaft (Austria)
- TRW Automotive -Lucas Varity (Germany)

EVOLUTION

The Electric Vehicle revOLUTION

Hybrid-EVs and Full-EVs on the market are products where the Internal-Combustion-Engine (ICE) is supplemented by an electric-motor (HEV) or replaced by an all-electric power-train (FEV). Both approaches do not address lightweight or modularity inheriting the same disadvantages as conventional ICEV - Electrification of mobility must face a conceptual rEVOLUTION! This project breaks the paradigm of current Body-in-White (BiW) by delegating the whole structural function to a novel BiW archetype made up of a Multifunctional-Rolling-Chassis (MRC) enabled by a new generation of highly-hybridized structural components and complemented by a non-structural upper-body. This MRC will be the common basis for a family of user friendly vehicles differing by changing only the upper-body according to the customer demand. Advanced materials will enable the development of novel super-lightweight hybrid components complying with safety standards and recycling constraints, and enable the design of the innovative MRC for FEV leading to a further weight reduction of 40% over that achieved using the current state of the art in the SuperLIGHT-CAR project. The EVolution goal is to demonstrate the sustainable production of a 600 kg weight FEV by the end of 2015. To this end EVolution addresses the whole vehicle by prototyping, assembling, and disassembling, the most representative components (MRC, crash cross-beam, crash box, suspension sub-frame, side-door, A-pillar, and a multifunctional-hard-top) made from raw polymers and aluminum alloys commonly used in the automotive industry, to ensure compliance with EC Directive 2000/53/EC 'End-of life vehicle' which imposes stringent requirements on the disposal and recycling of motor vehicles. Guaranteeing the safety and regulatory compliance, with a weight saving of 50%, each component chosen will prove, mutatis mutandis, the revolutionary potential of the EV solution in all components employed today in current high volume production.

Project Coordinator or Contact Person: Jesper deClaville Christiansen
Lone Varn Johannsen

Organisation: Aalborg University (Denmark)

Project Website: www.evolutionproject.eu

Project Duration: 01.11.2012 – 31.10.2016

Project Partners:

- Aalborg Universitet (Denmark)
- PININFARINA (Italy)
- Fundacion Tecnalia Research & Innovation, Tecnalia (Spain)
- Institutul National De Cercetare Dezvoltare Pentruchimie Si Petrochimie - Icechim Bucuresti (Romania)
- Association Pour La Recherche Et Le Developpement Des Methodes Et Processus Industriels – ARMINES (France)
- Teknologisk Institut (Denmark)
- Latvijas Valsts Koksnes Kimijas Instituts (Latvia)
- Universidad De Valladolid (Spain)
- Technische Universitat Berlin (Germany)
- Universita Di Pisa (Italy)
- University Of Patras (Greece)
- CRF - Centro Ricerche Fiat (Italy)
- Euro Master (Italy)
- The University Of Sheffield (United Kingdom)
- Centre De Recherche En Aeronautique Asbl – Cenaero (Belgium)
- RITOLS (Latvia)
- ABN Pipe Systems SL (Spain)
- Fundacion CIDAUT (Spain)
- Pohltec Metalfoam (Germany)
- Dow Europe (Switzerland)
- Innovazione Automotive E Metalmeccanica SCRL (Italy)
- KGR (Italy)
- FPK Lightweight Technologies S. Coop (Spain)
- Dantec Dynamics (Germany)
- Pole Vehicule Du Futur (France)

FABRIC

FeAsiBility analysis and development of on-Road chargIng solutions for future electric vehiCles

FABRIC responds to the need to assess the potential and feasibility of a more extensive integration of electric vehicles in the mobility and transportation system, focusing primarily on dynamic wireless charging which would allow practically all of the drawbacks of on-board battery pack to be avoided. Advanced solutions, conceived to enable full integration in the grid and road infrastructure within urban- and extra-urban environments for a wide range of future electric vehicles, will be implemented as prototypes and tested. Each key issue will be assessed directly and comprehensively, providing insights through experimental evaluations into the relevant technologies, investigating the present and future opportunities for such solutions, and identifying the future trends and requirements for research and development.

Technical Approach:

- Assessment of the feasibility to apply and modify existing prototypes of dynamic wireless charging solutions.
- Identification of technological and user requirements for a whole on-road charging system, such as cost, safety, transferable power, range and efficiency, from the point of view of different user groups and stakeholders.
- Perform a comprehensive impact assessment.
- Expected Achievement
- Select, develop and test ICT solutions to optimize EV recharging efficiency.
- Select and test the most promising dynamic wireless charging solutions for EVs.
- Verification and validation of the EV charging solutions in test sites located in France, Italy, Sweden, Germany.
- Feasibility analysis and assessment of impacts of the selected on-road charging options related to scaling up beyond the test track size.
- The central question is: “what are the consequences of deploying the technology that is tested and demonstrated on the test tracks at a scale that substantially impacts society?

Project Coordinator or Contact Person: Vittorio Ravello

Organisation: Centro Ricerche FIAT (Italy)

Project Duration: 01.11.2013 – 31.10.2017

Project Partners:

- Centro Ricerche FIAT Scpa (Italy)
- Applied Mechatronic Engineering & Technologies SRL (Italy)
- Bombardier Transportation GmbH (Germany)
- Commissariat a l Energie Atomique et aux Energies Alternatives (France)
- Fundacion Circe Centro de Investigacion de Recursos y Consumos Energeticos (Spain)
- Energrid Spa (Italy)
- Enide Solutions S.L. (Spain)
- ERLT Implementation Coordination Organisation Scrl (Belgium)
- Forschungsgesellschaft Kraftwesen mbH Aachen (Germany)
- Institute of Communication and Computer Systems (EL)
- Iren Energia Spa (Italy)
- Kungliga Tekniska Hoegskolan (Sweden)
- Mect SRL (Italy)
- Politecnico di Torino (Italy)
- Qualcomm CDMA Technologies GmbH (UK)
- Technositaf Spa (Italy)
- TNO (Netherlands)
- TRL Limited (UK)
- Volvo Technology AB (Sweden)
- Universita degli Studi di Genova (Italy)
- Scania CV AB (Sweden)
- Foundation Partenariale Mov'eoTEC (France)
- Associazione Tecnica dell'Automobile Consulting & Solutions SRL (Italy)
- SANEF (France)
- Qi Energy Assessment SL (Spain)
- SAET Spa (Italy)

FastInCharge

Innovative fast inductive charging solution for electric vehicles

The overall objective of FastInCharge is to foster the democratisation of electric vehicles in the urban environment by developing an easier and more comfortable charging solution which will enable to ease the EV use by the large public and facilitate their implementation in the urban grid. FastInCharge's intention is to develop a cost-effective modular infrastructure offering a global solution for EV charging. Its success will boost research in the direction of dynamic charging solutions.
The concept of FastInCharge is to create a highly performing inductive solution which will enable a 40 kW power transfer to the vehicles in two charging operational situations: one stationary and one on-route. The inductive technology developed will be integrated into one electric car (secondary charging block) and two charging stations, one stationary and one on-route (primary charging block). The full functional chain will be carefully scrutinized in order to ensure an optimal, safe, and sustainable solution: battery charging, EV performance and safety, EV range, communication EV/station, connection station to the grid, grid management, and energy supply, intelligent coordinated systems.

Project Coordinator or Contact Person: David Mignan

Organisation: Douaisienne de Basse Tension (France)

Project Website: www.fastincharge.eu

Project Duration: 01.10.2012 – 30.09.2015

Project Partners:

- Douaisienne de Basse Tension (France)
- Technical University – Gabrovo (Bulgaria)
- Automotive Cluster - West Slovakia (Slovakia)
- Batz (Spain)
- Municipality of Douai (France)
- Euroquality (France)
- Institute of Communications and Computer Systems (Greece)
- Tecnalia (Spain)
- CRF - Centro Ricerche Fiat (Italy)

FREE-MOBY

People Centric easy to implement e-mobility

FREE-MOBY addresses:

- Full convergence between renewable energy and electromobility with common technology developments,
- Demonstration of secure and smart interactivity vehicle to infrastructures.

The partnership is organised in such a way that a new era of low cost but high performance micro e-vehicles production is opened across all EU countries. A relevant role is given to SMEs and regional SMEs clusters to assure competing speed and commitment.

Project Coordinator or Contact Person: Marco Ottella

Organisation: Bitron (Italy)

Project Duration: 01.09.2013 – 31.08.2016

Project Partners:

- Bitron (Italy)
- Lithium Balance (Denmark)
- ICPE (Romania)
- CIDAUT (Spain)
- BAEPS (Bulgaria)
- IMBIGS (Poland)
- University of Surrey (UK)
- STMicroelectronics (Italy)
- Ricerca sul Sistema Energetico (Italy)
- CISC Semiconductor GmbH (Austria)
- Enel Distribuzione Spa (Italy)
- Torino e-district (Italy)
- Polimodel (Italy)
- IFEVS (Italy)

FREVUE

FREVUEVALIDATING FREIGHT ELECTRIC VEHICLES IN URBAN EUROPE

Eight of Europe's largest cities, will demonstrate that electric vehicles operating "last mile" freight movements in urban centres can offer significant and achievable decarbonisation of the European transport system. Demonstrators will be deployed in Amsterdam, Lisbon, London, Madrid, Milan, Oslo, Rotterdam and Stockholm. The demonstrators have been designed to ensure FREVUE covers the breadth of urban freight applications which occur across Europe.

By exposing 127 electric vehicles to the day to day rigours of the urban logistics environment, the project will prove that the current generation of large electric vans and trucks can offer a viable alternative to diesel vehicles - particularly when combined with state of the art urban logistics applications, innovative logistics management software, and with well-designed local policy.

The project will demonstrate solutions to the barriers currently inhibiting uptake of EVs in the sector and includes leading European researchers who will design and then implement a common pan-European assessment framework to understand the impacts of these solutions. This will ensure that the project creates a valuable European evidence base on the role of EVs in urban logistics. Partners will produce a detailed White Paper on the feasibility of EV rollout in logistics across Europe, with chapters containing best practice advice on EV in logistics for: policy makers, logistics operators, their customers and companies developing technology to support the sector.

The final overarching objective is to encourage the exploitation of these best practice results through a targeted dissemination campaign aimed at decision makers in the logistics industry. To complement this, FREVUE will also create a network of "Phase 2" cities to directly share the lessons learned from the demonstrators. These cities are expected to be the first cities to expand the successful concepts developed by FREVUE.

Project Coordinator or Contact Person: Matthew Noon

Organisation: EVUE (UK)

Project Website: www.frevue.eu

Project Partners:

- EVUE (UK)
- Westminster City Council (UK)
- OVE ARUP & PARTNERS INTERNATIONAL LIMITED (UK)
- ATOS SPAIN SA (Spain)
- Bring Express Norge AS (Norway)
- CAMARA MUNICIPAL DE LISBOA (Portugal)
- OSLO KOMMUNE (Norway)
- STOCKHOLMS STAD (Sweden)
- CTT Correios de Portugal SA (Portugal)
- Empresa Publica Municipal de Estacionamento de Lisboa (Portugal)
- Fortum Power and Heat AB (Sweden)
- Heineken Supply Chain B.V (Netherlands)
- European Regions and Municipalities Partnership on Hydrogen and Fuel Cells (Belgium)
- Imperial College of Science, Technology and Medicine (UK)
- Instituto Tecnologico del Embalaje, Transporte y Logistica (Spain)
- Gemeente Amsterdam (Netherlands)
- Ayuntamiento de Madrid (Spain)
- COMUNE DI MILANO (Italy)
- Nissan International SA (UK)
- Grupo Leche Pascual (Portugal)
- Promotion of Operational Links with Integrated Services, Association Internationale (Belgium)
- Gemeente Rotterdam (Netherlands)
- SEUR,S.A. (Spain)
- STIFTELSEN SINTEF (Norway)
- Smith Electric Vehicles (UK)
- TRAFIKVERKET – TRV (Sweden)
- TRANSPORT FOR LONDON*TFL (UK)
- TNO (Netherlands)
- TNT Express Worldwide N.V. (Netherlands)
- UK POWER NETWORKS (OPERATIONS) LTD (UK)
- UPS Europe SA / NU (UK)

FUEREX

Multifuel Range Extender with High Efficiency and Ultra-Low Emissions

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.

Project Coordinator or Contact Person: Theodor Sams

Organisation: AVL List (Austria)

Project Website: www.fuerex.eu

Project Duration: 01.01.2011 - 31.12.2012

Project Partners:

- AVL List (Austria)
- Uniresearch (The Netherlands)
- AVL-SCHRICK (Germany)
- ALTRA (Italy)
- CRF - Centro Ricerche Fiat (Italy)
- Chalmers University of Technology (Sweden)
- Robert Bosch (Germany)
- Volvo Personvagnar (Sweden)

FURBOT

Freight Urban RoBOTic vehicle

The project proposes novel concept architectures of light-duty, full-electrical vehicles for efficient sustainable urban freight transport and will develop a FURBOT vehicle prototype. The main paradigms are: energy efficiency, sustainability, mobility dexterity, modularity, intelligent automated driving and freight handling robotization. The design approach will integrate the knowledge of advanced technologies in the field of efficient electric power supply and drive trains, in wheel motors, lightweight high strength materials, frame structures, perceptual systems, new robotic tools for freights manipulation and intelligent controls. The payload is considered packaged in freights boxes or ISO pallets. FURBOT can be used in a fleet offering a new sustainable, evolvable urban freight transport system. The system will be modelled and a simulator developed.

Project Coordinator or Contact Person: Molfino Rezia

Organisation: DIMEC - Università di Genova (Italy)

Project Website: www.furbot.eu

Project Duration: 01.11.2011 - 31.10.2014

Project Partners:

- DIMEC - Università di Genova (Italy)
- Bremach Industrie (Italy)
- Persico (Italy)
- Mazel Ingenieros, Sociedad Anonima (Spain)
- ZTS Vyskumno-Vyvojovy Ustav Kosice (Slovakia)
- Transportes Colectivos do Barreiro (Portugal)
- Universita di Pisa (Italy)
- Institut National de Recherche en Informatique et en Automatique (France)

G4V

Analysis of the impact and possibilities of a mass introduction of electric and plug-in hybrid vehicles on the electricity networks in Europe

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. On the one hand, the aim is to clearly understand the effects of a mass introduction under physically given parameters and taking into account local aspects in different EU member states. On the other hand, the opportunities consisting in active demand and storage possibilities will be extensively explored as these also imply options for managing the possible negative impacts on the grid. The project will deliver recommendations on aspects such as possible ICT solutions, grid services anticipating, RES integration, and prediction of mobile customers who are potential energy traders and the impact of dedicated tariffs. To ensure an open and holistic approach, the project will take all stakeholders into account and has established an advisory board consisting of institutions along the whole value chain. 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.

Project Coordinator or Contact Person: Thomas Theisen

Organisation: RWE Deutschland AG (Germany)

Project Website: www.g4v.eu

Project Duration: 01.01.2010 – 30.06.2011

Project Partners:

- RWE Deutschland AG (Germany)
- Chalmers Tekniska Hoegskola AB (Sweden)
- Imperial College of Science, Technology and Medicine (UK)
- Vattenfall Research and Development AB (Sweden)
- Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek - TNO (NL)
- Enel Distribuzione S.P.A. (Italy)
- Electricite de France S.A. (France)
- Universitat Politecnica de Valencia (Spain)
- Technische Universität Dortmund (Germany)
- EDP Inovacao SA (Spain)
- Rheinisch-Westfälische technische Hochschule Aachen (Germany)
- Endesa Network Factory SL (Spain)
- Stichting Energieonderzoek Centrum Nederland (NL)

GASTONE

New powertrain concept based on the integration of energy recovery, storage and re-use system with engine system and control strategies

High efficient energy conversion concept based on the integration of energy recovery devices, energy storage and engine auxiliaries' electrification on a Natural Gas heavy duty engine.
The energy recovery strategy is based on two mainstreams:

- recovery of a portion of the kinetic energy thanks to the adoption of a belt driven generator
- recovery of the waste heat with an energy cascading approach: thermoelectric generator operating at high temperature subsequent turbo-generator

The system includes an appropriate energy storage system and electrified auxiliaries such as coolant and oil pumps, auxiliary turbo charger, air and air conditioning compressors. The engine control strategies will be tuned and optimised (combustion, cylinder de-activation) to maximise the efficiency of the energy recovery and re-use subsystems and the benefit the auxiliaries electrification. Finally the combination of the electric auxiliary turbocharger and the abortion of a liquid cooled charge air cooler will be implemented as part of the whole strategy to optimise the engine efficiency. The Project results will be experimentally demonstrated at bench level (engine test rig) while the benefits of the engine down-sizing, combination of control strategies and the reference mission(s) and integration with hybrid or hybrid-like powertrains will be evaluated at vehicle level thanks to advanced dynamic models. The industrial feasibility, the portability on diesel engine and the cost estimation are also included in the as well as a preliminary packaging study to assure the on board integrability. The Project most important outcome will be a new powertrain concept based on a combined energy recovery, storage and re-use system integrated and optimised with the engine system and controls. The project will answer to the request to achieve an efficiency at vehicle level well above 50% at acceptable cost.

Project Coordinator or Contact Person: Daniela Magnetto

Organisation: Centro Ricerche Fiat (Italy)

Project Duration: 01.11.2013 – 31.05.2017

Project Partners:

- Centro Ricerche Fiat (Italy)
- Engineering Center Steyr GMBH & CO. KG (Austria)
- Gentherm Europe GMBH (Germany)
- FPT Industrial (Italy)
- Continental Automotive GMBH (Germany)
- Universitat Politècnica de València (Spain)

GO4SEM

Global Opportunities for SMEs in Electro-Mobility

The GO4SEM project will detect and analyze the specific technology and product needs in emerging e-mobility supply chains in third countries. It will use this analysis to assess and evaluate strengths and weaknesses of global e-mobility supply chains and define possible opportunities for European SME's for a competitive entry in those supply chains, whereby a special focus on ICT will be taken. As such it will indicate R&D priorities for the European SMEs and other stakeholders in order to improve or develop the adequate technologies for these opportunities. As a consequence, the GO4SEM project will give input through the core group members and the associated partners assisting the European Commission in setting up ICT focused research agendas for Horizon 2020 and the future European Green Cars Initiative PPP, especially with respect to dedicated initiatives targeted SMEs. In addition, since the complete e-mobility supply chain is considered, it can be expected that in these recommendations will stimulate discussions and agendas in other areas.

Project Coordinator or Contact Person: Thierry Coosemans

Organisation: VUB (Belgium)

Project Website: www.go4sem.eu

Project Duration: 01.09.2013 – 31.08.2015

Project Partners:

- VUB (Belgium)
- CLEPA - European Association of Automotive Suppliers (Belgium)
- VDI/VDE Innovation + Technik (Germany)
- Vrije Universiteit Brussel (Belgium)
- Torino E-district (Italy)
- MIRA (United Kingdom)
- Delphi Automotive Systems Luxembourg (Luxembourg)
- AUTOMON (Spain)
- Institutul de Cercetari Electrotehnice (Romania)
- NXP Semiconductors (Netherlands)
- Hella KGaA Hueck & Co. (Germany)

Green eMotion

Green eMotion

42 partners from industry, the energy sector, electric vehicles manufacturers, municipalities as well as universities and research institutions have joined forces in the Green eMotion project. The aim is to develop and to demonstrate a commonly accepted framework to enable 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. A virtual marketplace will be created to enable the different actors to interact and to allow for new high value transportation services as well as EV-user convenience in billing. 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. The elaborated technological solutions will be demonstrated in some of the participating demonstration regions.

Project Coordinator or Contact Person: Norbert Vierheilig

Organisation: Siemens (Germany)

Project Website: www.greenemotion-project.eu

Project Duration: 01.03.2011 – 28.02.2015

Project Partners:

- Siemens (Germany)
- Alstom (Germany)
- better place (Germany)
- Robert Bosch (Germany)
- IBM (Germany)
- SAP (Germany)
- Danskenergy (Denmark)
- edf (France)
- Endesa (Spain)
- Enel (Italy)
- ecars (Belgium)
- eurelectric (Belgium)
- IBERDROLA (Spain)
- PPC (Greece)
- RWE (Germany)
- BMW (Germany)
- Daimler (Germany)
- Micro-Vett (Italy)
- Nissan (Japan)
- Renault (France)
- Ajuntament de Barcelona (Spain)
- beBerlin (Germany)
- Bright Green Island Bornholm (Denmark)
- City of Copenhagen (Denmark)
- City of Cork (Ireland)
- Codema (Ireland)
- Ayuntamiento de Malaga (Spain)
- Malmö stad (Sweden)
- Roma Capitale (Italy)
- Cartif (Spain)
- Centro di Recerca per il Trasporto e la Logistica (Italy)
- Cidaut (Spain)
- DTU (Denmark)
- ECN (The Netherlands)
- Imperial College London (United Kingdom)
- IREC (Spain)
- RSE (Spain)
- Trinity College Dublin (Ireland)
- Tecnalia (Spain)
- Danish Technological Institute (Denmark)
- fka (Germany)
- TÜV Nord (Germany)

GREENLION

Advanced manufacturing processes for Low Cost Greener Li-Ion batteries

GREENLION focuses on the manufacturing of greener and cheaper Li-Ion batteries for electric vehicles via the use of water soluble, fluorine-free, high thermally stable binders with the following 6 key objectives:

- development of new active and inactive battery materials viable for water processing (green chemistry)
- innovative processes (coating from aqueous slurries) leading to reduced electrode production cost and avoid environmental pollution
- development of new assembly procedures (including laser cutting and high temperature pre-treatment) capable of substantially reducing the time and the cost of cell fabrication
- lighter battery modules with air cooling and easier disassembly through eco-designed bonding techniques
- development of an automated module and battery pack assembly line for increased production output and reduced cost
- waste reduction, which, by making use of the water solubility of the binder, allows the extensive recovery of the active and inactive battery materials

Project Coordinator or Contact Person: Oscar Miguel Crespo

Organisation: Fundacion Cidetec (Spain)

Project Website: www.greenlionproject.eu

Project Duration: 01.11.2011 - 31.10.2015

Project Partners:

- Fundacion Cidetec (Spain)
- Westfälische Wilhelms-Universität Münster (Germany)
- Polytype Converting (Switzerland)
- Kemet Electronics Italia SRL (Italy)
- Politecnico di Milano (Italy)
- Agenzia nazionale per le nuove (Italy)
- Tecnologie L'Energia lo Sviluppo Economico Sostenibile Celaya, Emperanza y Galdos Internacional (Spain)
- University of Limerick (Ireland)
- Solvay Fluor (Germany)
- Timcal (Switzerland)
- Mondragon Assembly (France)
- Östereichisches Forschungs- und Prüfzentrum Arsenal (Austria)
- RESCOLL (France)
- Tecnicas Reunidas (Spain)
- CRF - Centro Tecnico de Seat (Spain)
- Volkswagen (Germany)

HELIOS

High Energy Lithium-IOn Storage Solutions

A large consortium including six car manufacturers, laboratories and test institutes, one recycler and two battery manufacturers will combine their efforts to understand the causes behind the battery cells aging and safety behavior. The study is performed on large High Energy cells for Electric Vehicles, PHEV and Hybrid Heavy Duty trucks applications.
The objectives of the HELIOS project are to:

- Evaluate the performances on representative large cell formats (~40Ah cells) using 4 different positive electrodes (NCA, LMO blend, LFP & NMC) / graphite anode.
- Propose updated safety and life test procedures for high energy battery cells used in European context
- Have the cells samples analyzed "post-mortem" before and after ageing tests to identify for each technology the aging and safety mechanisms.
- Estimate the recyclability & perform the cost evaluation on the cells and then on the whole battery pack.

Project Coordinator or Contact Person: Frédérique del Corso

Organisation: Renault (France)

Project Website: www.helios-eu.org

Project Duration: 01.09.2010 - 31.08.2013

Project Partners:

- Renault (France)
- OPEL (Germany)
- PSA (France)
- Volvo (Sweden)
- Ford (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- CNRS (France)
- Uppsala University (Sweden)
- RWTH Aachen (Germany)
- Umicore (Belgium)
- INERIS (France)
- ZSW (Germany)
- edf (France)
- JCHAR (Germany)
- Arsenal (AIT) (Austria)
- CEA (France)
- ENEA (Italy)
- SAFT (France)

HEMIS

Electrical powertrain HEalth Monitoring for Increased Safety of FEVs

The advent of Fully Electric Vehicle (FEV) in mass production presents new challenges to automotive manufacturers due to the immaturity of the new building blocks, which can reduce their safety and reliability. Among these blocks is the electric powertrain (electric traction motor and power electronics motor control). HEMIS project has two objectives. The first one is to design a Prognostic Health Monitoring System able to provide a failsafe state regarding the electric powertrain and the emitted electromagnetic field. It will also predict the remaining useful life of the equipment, thus enabling enhanced maintenance and reduction of costs. The second objective is to assess electromagnetic compatibility issues and the impact of electromagnetic fields (including low frequency emissions) on human health. Based on this research, electric cars manufacturers will be provided with design and testing guidelines regarding the emitted electromagnetic fields. Testing guidelines are also expected to be incorporated as a part of emissions standards.

Project Coordinator or Contact Person: Ainhoa Galarza

Organisation: CEIT (Spain)

Project Website: www.hemis-eu.org

Project Duration: 01.06.2012 - 30.11.2014

Project Partners:

- CEIT (Spain)
- York EMC Services (United Kingdom)
- IDIADA Automotive Technology (Spain)
- VTT (Findland)
- Politecnico di Milano (Italy)
- MIRA (United Kingdom)
- JEMA Energy (Spain)

Hi-Wi

Materials and Drives for High & Wide Efficiency Electric Powertrains

At present, motors for FEV (Fully Electric Vehicle) and HEV (Hybrid Electric Vehicle) applications develop their highest efficiency of around 93~95% within a speed range of typically 1/4 to 1/3 of the maximum rotating speed, and at an ideal torque, whereas in real usage - in the majority of driving cycles - the motor operates at a wider range of speeds and at partial load (low torque) resulting in much lower efficiency. HI-WI will address the mismatch between the region of HIGH efficiency and the WIDE region of frequent operation with advances in the design and manufacture of motors. HI-WI will couple its novel design approach to breakthroughs in materials and manufacturing, winning size, weight, and cost savings. The three-year HI-WI project will deliver prototyping and demonstration of innovative motors; new approaches to the holistic design of motors nano-scale materials advances to create magnets with reduced rare-earth content; micro/nano-scale manufacturing advances to create permanent magnets and integrated assemblies.

Project Coordinator or Contact Person: William O'Neill

Organisation: Centre for Industrial Photonics University of Cambridge (United Kingdom)

Project Website: www.hiwi-eu.org

Project Duration: 01.12.2012 - 30.11.2013

Project Partners:

- Centre for Industrial Photonics University of Cambridge (United Kingdom)
- University of Sheffield (United Kingdom)
- Istituto P.M. (Italy)
- CRF - Centro Ricerche Fiat (Italy)
- STMicroelectronics (Italy)
- CEDRAT (France)
- Siemens (Germany)

HUBWAYS (ECOHUBS)

coHerent measures and environmental interventions to debottleneck hUBs of the multimodal netWork fAvoured bY Seamless flow of goods

HUBWAYS provides models and capabilities for cooperation and communication between multimodal terminal network stakeholders, amplifying, thus, their joint capabilities. It also establishes Common Value Added Services which, combined with existing services, facilitate end-to-end co-modal, low-CO2 transport solutions that maximise utilisation of terminal and logistics resources and transform multimodal terminals into Green Hubs. These are, a multimodal terminal eco-efficiency calculator which provides the missing carbon footprint information in multimodal terminal networks; integrated competitive services for managing improvements in eco-efficiency; and a Measuring and Benchmarking System to provide the means for long term monitoring of greening activities. Terminal Owners and Operators, Freight Forwarders, and Shippers who organize their own transport operations are project stakeholders and the direct target audience for HUBWAYS results.
HUBWAYS demonstrations will take place across several representative operating scenarios in four Business Cases through terminals in Italy, Sweden, Slovenia and Belgium. By allowing the industry stakeholders to drive HUBWAYS, the output solutions will address the real needs of this sector in a cost-effective way. Cooperation with existing research projects will enable evaluation of the approach in the overall context of co-modal transport and will provide data for measuring the actual impact.

Project Coordinator or Contact Person: Mary Vayou

Organisation: BMT Group (United Kingdom)

Project Website: www.eskema.eu/ecohubsknowledge

Project Duration: 01.11.2012 – 30.04.2015

Project Partners:

- BMT Group (United Kingdom)
- Consorzio IB Innovation (Italy)
- KOMBICONSULT (Germany)
- HaCon Ingenieurgesellschaft mbH (Germany)
- INLECOM Ltd (United Kingdom)
- MARLO (Norway)
- Deutsche GVZ-Gesellschaft mbH (Germany)
- SINTEF (Norway)
- UIRR (Belgium)
- Jernhusen AB (Sweden)
- Adria kombi d.o.o. (Slovenia)
- Lindholmen Science Park (Sweden)
- PE International (Germany)
- Interferryboats NV (Belgium)

ICE

MagnetoCaloric Refrigeration for Efficient Electric Air Conditioning

ICE is focused on the development of a new air conditioning and heat pump system based on the Magneto Caloric heat pump and a on the redesign of the cabin air conditioning.
A IVECO ALTRA Electric bus has been selected as demonstrator vehicle: it is a challenging application, is commercially available and is in use. The project major contents are
Efficient electric Magneto Caloric heat pump (COP > 5 in cooling mode) using high efficiency magnetic materials, smart design and high performance heat exchangers.
Redesign of the thermal power distribution: a coolant loop distributes locally the thermal power
Microclimate control system based on thermal comfort and able to control the system considering the occupants' number.
Sustainable Cost:
The project results will be validated installing the system on an electrical bus and testing it also with road tests.
The project includes also a dissemination and exploitation activity to promote the application of the ICE on passenger cars and other vehicles.

Project Coordinator or Contact Person: Carloandrea Malvicino

Organisation: CRF - Centro Ricerche Fiat (Italy)

Project Website: www.ice-mac-ev.eu

Project Duration: 01.11.2010 – 30.04.2014

Project Partners:

- CRF - Centro Ricerche Fiat (Italy)
- COOLTECH Applications (France)
- Behr France (France)
- Universidad Politecnica de Valencia (Spain)
- Institut National des Sciences Appliquées, Strasbourg (France)
- ALTRA (Italy)

iCOMPOSE

Integrated Control of Multiple-Motor and Multiple-Storage Fully Electric Vehicles

To improve energy efficiency of fully electric vehicles (FEV), iCOMPOSE proposes a step change in the control software architecture with particular focus on comprehensive energy management. This will lead to extended driving range, with additional benefits of improved safety and comfort. The key objectives are:

- Integration of the energy management, driveability and vehicle dynamics control into a single supervisory controller with failsafe control functions, using control allocation and model predictive control techniques.
- Demonstration of the compatibility of the integrated control software with the actual computational power of novel multi-core automotive control units.
- Integration of cloud-sourced information for the enhanced estimation of the vehicle states within a cooperative vehicle-road infrastructure.

The results will be assessed on highly versatile FEV demonstrators with different drivetrains and energy storage systems comprising of batteries and supercapacitors.

Project Coordinator or Contact Person: Danie Watzenig

Organisation: Kompetenzzentrum - Das virtuelle Fahrzeug, Forschungsgesellschaft (Austria)

Project Website: www.i-compose.eu

Project Duration: 01.10.2013 - 30.09.2016

Project Partners:

- Kompetenzzentrum - Das virtuelle Fahrzeug, Forschungsgesellschaft (Austria)
- University of Surrey (United Kingdom)
- Lotus Cars (United Kingdom)
- Škoda Auto (Czech Republic)
- Flanders DRIVE (Belgium)
- Hutchinson (France)
- AVL List (Austria)
- Infineon Germany (Germany)
- Fraunhofer IVI (Germany)

ICT4EVEU

ICT services for Electric Vehicle Enhancing the User experience

Due to the increasing awareness of climate change and the rising of fuel and oil prices, sustainable transport system with lower carbon emissions have prompted most of the world's developed countries to step up the research, demonstration and deployment of transport systems that use more energy-efficient and less fuel-dependent vehicles.
In this context, electromobility is seen as one of the largest opportunities to radically change today's transport system and make a quantum leap into the next generation of sustainable mobility.
The ICT4EVEU project intends to facilitate and enhance the user experience and acceptance of electrical vehicles both individually and collectively by deploying a set of ICT-based services for Electric Vehicle focused on the integration of innovative technologies.
This project is included in the Information and Communication Technologies Policy Support Program (ICT-PSP) Smart Connected Electro Mobility.
A consortium of 16 private and public organizations from the UK, Slovenia, Spain and Austria works in this initiative to be developed from 2012 to 2014 and manages by the Government of Navarre.

Project Coordinator or Contact Person: Carlos Lopez Ruiz

Organisation: Government of Navarre (Spain)

Project Website: www.ict4eveu.eu

Project Duration: 01.01.2012 – 31.12.2014

Project Partners:

- Government of Navarre (Spain)
- Pamplona City Council (Spain)
- European Business Innovation Centre of Navarre, CEIN SL (Spain)
- Vitoria-Gasteiz City Council (Spain)
- Tecnalia Research & Innovation (Spain)
- Acciona Energía (Spain)
- Ingeteam Energy (Spain)
- Ente Vasco de la Energía, EVE (Spain)
- Bristol City Council (United Kingdom)
- ETREL (Slovenia)
- Elektro Ljubljana d.d .-ELLJ (Slovenia)
- Elektro Ljubljana OVE.-EL OVE (Slovenia)
- Elektro Maribor d.d.- ELMB (Slovenia)
- Mobilitätsconsulting & Engineering B.I.M (Austria)
- Landes Energie Verein-LEV (Austria)
- Centro Tecnológico de Automoción de Navarra CITEAN (Spain)

ICT4FEV

Information and Communication Technologies for the Full Electric Vehicle

The coordination action ICT4FEV addresses enabling technologies of full electric vehicles (FEV). The focus of the initiative is set on ICT which open new technology paths towards energy efficiency, functionality and usability and are complementary to future advances in performance of battery cell technology. To fight climate change, cut emissions and secure energy supply, transport based on FEVs will soon be strongly demanded by public and private stakeholders worldwide.

ICT4FEV is building a R&D community, creating a European roadmap and recommending standards, regulations, business cases and R&D priorities for the FEV. In its core consortium it therefore brings together for the first time major industrial partners to start a dialogue on a common understanding about impact, R&D priorities, infrastructure needs and requirements. Opportunities of technology transfer are taken into account and foresighted recommendations will be made.

Project Coordinator or Contact Person: Gereon Meyer

Organisation: VDI/VDE-IT (Germany)

Project Website: www.ict4fev.eu

Project Duration: 01.05.2010 – 30.09.2012

Project Partners:

- VDI/VDE-IT (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Siemens (Germany)
- NXP (The Netherlands)
- EADS (France)
- AVL List (Austria)

ID4FEV

Intelligent Dynamics for fully Electric Vehicles

The objective of the ID4EV project is to develop brake and chassis systems for the needs of fully electric vehicles. Optimization on vehicle level will be done with a new approach of a network system as well as new HMI concepts.
Electrified auxiliaries like brake and chassis systems will lead to new possibilities for vehicle control resulting from an enhanced cooperative interaction between mechatronical systems. The aim is to provide best-practice safe electrified brake and chassis systems which meet the high quality and safety standards of the European automotive industry and will consequently lead to a high user/customer acceptance.
To reach the safety targets and to provide solutions to the market in the immediate future, existing systems will be adapted to the special requirements of fully electric vehicles. The project will concentrate on topics of energy efficiency, safety and interconnection between the vehicle chassis, the optimized drive train/ safety systems and the driver.

Project Coordinator or Contact Person: Patrick Spall

Organisation: Continental Engineering Services (Germany)

Project Website: www.id4ev.eu

Project Duration: 01.06.2010 - 31.08.2012

Project Partners:

- Continental Engineering Services (Germany)
- ZF Friedrichshafen (Germany)
- Renault (France)
- fka (Germany)
- Applus IDIADA (Spain)
- TNO (The Netherlands)
- Chalmers University of Technology (Sweden)
- ICOOR (Italy)

IMPROVE

Integration and Management of Performance and Road Efficiency of Electric Vehicle Electronics

IMPROVE focuses on in-vehicle Information and Communication Technologies (ICT) innovations for commercial (fleet operated) vehiclesWithin this focus, IMPROVE leverages a set of hardware and software innovations that in combination add a target of +20% range for the same battery capacity; increase the life of the battery, reduce the cost of key components and uses deeply integrated interconnections between subsystems inside the vehicle and between the vehicle (sub-) system and the outside world (cloud, grid, work, office). All these performance increases are achieved while maintaining safety and increasing comfort and wellbeing for the driver(s) of the vehicle.
IMPROVE integrates an induction e-motor (without permanent magnet) with an inverter to decrease cost; it integrates model embedded predictive controlling into advanced algorithms to optimise energy efficiency and -recovery. It leverages data extracted from cloud, grid, infrastructure and (back-) office applications of the driver for in-vehicle control optimisation. All these elements are prototyped and assembled to a drivable test vehicle which will be submitted to extensive tests.

Project Coordinator or Contact Person: Alois Danninger

Organisation: Virtual Vehicle Competence Center (Austria)

Project Duration: 01.07.2013 – 30.06.2016

Project Partners:

- Virtual Vehicle Competence Center (Austria)
- Brusa Elektronik AG (Switzerland)
- Continental Temic Automotive Electric Motors (Germany)
- Czech Technical University in Prague (Czech Republic)
- Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung (Germany)
- IDIADA Automotive Technology (Spain)
- LMS (France)
- SIC! Software (Germany)
- TOFAS (Turkey)
- University Firenze (Italy)

INCOBAT

Innovative Cost Efficient Management System for Next Generation High Voltage Batteries

In recent years, electric mobility has been promoted as the clean and cost-efficient alternative to combustion engines. Although there are already solutions on the market, mass take-up has not yet taken place. There are different challenges that hinder this process from an end user point of view such as costs of the vehicle, driving range, or infrastructure support. Several of these challenges are directly connected to the battery, the central element of the full electric vehicle (FEV).
The aim of INCOBAT is to provide innovative and cost efficient battery management systems for next generation HV-batteries. To that end, INCOBAT will propose a platform concept in order to achieve cost reduction, reduced complexity, increased reliability as well as flexibility and higher energy efficiency. INCOBAT is in the position to provide a 100% European value chain for the development of next generation HV battery management systems.

Project Coordinator or Contact Person: Ingrid Kundner

Organisation: AVL List (Austria)

Project Website: www.incobat-project.eu

Project Duration: 01.10.2013 – 30.09.2016

Project Partners:

- AVL List (Austria)
- Ideas & Motion (Italy)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung (Germany)
- Infineon Technologies Austria (Austria)
- Infineon Technologies (Germany)
- Impact Clean Power Technology (Poland)
- Kemet Electronics Italia (Italy)
- Chemnitzer Werkstoffmechanik (Germany)

ioE

Internet of Energy for Electric Mobility

The objective of IoE is to develop hardware, software and middleware for seamless, secure connectivity and interoperability achieved by connecting the Internet with the energy grids. The application of the IoE will be the infrastructure for the electric mobility. The underlying architecture is of distributed Embedded Systems (ESs), combining power electronics, integrated circuits, sensors, processing units, storage technologies, algorithms, and software. Reference designs and ESs architectures for high efficiency innovative smart network systems will be addressed with regard to requirements of compatibility, networking, security, robustness, diagnosis, maintenance, integrated resource management, and selforganization. The future smart grid will converge with the Internet based on standard interfaces, and a physical infrastructure to support electric mobility and the efficient distribution of power and information.

Project Coordinator or Contact Person: Ovidiu Vermesan

Organisation: Sintef (Norway)

Project Website: www.artemis-ioe.eu

Project Duration: 01.05.2011 - 30.04.2014

Project Partners:

- Sintef (Norway)
- Infineon (Germany)
- Siemens (Germany)
- RWE (Germany)
- Lantiq (Luxembourg)
- Technische Unversität Braunschweig (Germany)
- Centrosolar (Germany)
- PUREMobility (Norway)
- Think (Norway)
- STMicroelectronics (Italy)
- CRF - Centro Ricerche Fiat (Italy)
- Enel (Italy)
- Universita di Bologna (Italy)
- NXP Semiconductors (The Netherlands)
- Technolution (The Netherlands)
- QinetiQ (United Kingdom)
- University of Sheffield (United Kingdom)
- Birmingham City Council (United Kingdom)
- Royal Holloway University of London (United Kingdom)
- GreenPower (Spain)
- Indra (Spain)
- Tecnalia (Spain)
- Aicia (Spain)
- Acciona (Spain)
- Lantiq (Austria)
- Cellstrom (Austria)
- CISC (Austria)
- Technikon (Germany)
- Triphase (Belgium)
- Etemele (Finland)
- Nokia Siemens Networks (Finland)
- Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Württemberg (Germany)

LABOHR

Lithium-Air Batteries with split Oxygen Harvesting and Redox processes

LABOHR aims to develop Ultra High-Energy battery systems for automotive applications. LABOHR has 5 key objectives: (i) development of a green and safe electrolyte chemistry based on non-volatile, non-flammable ionic liquids; (ii) use of novel nanostructured high capacity anodes in combination with ionic liquid-based electrolytes; (iii) use of novel 3-D nanostructured 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. LABOHR aims to overcome the energy limitation for the application of the present Li-ion technology in electric vehicles with the goal to perform frontier research and breakthrough work to position Europe as a leader in the developing field of high energy, environmentally benign and safe batteries.

Project Coordinator or Contact Person: Stefano Passerini

Organisation: Universität Münster (Germany)

Project Website: www.labohr.eu

Project Duration: 01.04.2011 - 31.03.2014

Project Partners:

- Universität Münster (Germany)
- AVL (Austria)
- CSIC (Spain)
- Tel Aviv University (Israel)
- SAES (Italy)
- Kiev National University of Technology and Design (Ukraine)
- University of Bologna (Italy)
- University of Southampton (United Kingdom)
- Chemetall (Germany)
- Volkswagen (Germany)
- ERS (Germany)

LIBRALATO

Libralato Engine Prototype

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.

Project Coordinator or Contact Person: Raymond Kent

Organisation: Loughborough University (United Kingdom)

Project Website: www.libralato.co.uk

Project Duration: 01.12.2011 - 31.05.2014

Project Partners:

- Loughborough University (United Kingdom)
- Dolomiti CAD (Italy)
- ATARD (Turkey)
- Libralato Holdings (United Kingdom)
- CRITT M2A (France)
- Bucharest University (Romania)
- Infineon Technologies (Germany)
- The Engine Consultancy (United Kingdom)

LISSEN

Lithium Sulfur Superbattery Exploitating Nanotechnology

This project is aimed to the identification and development of nanostructured electrode and electrolyte materials to promote the practical implementation of the very high energy lithium-sulfur battery. In particular, the project will be directed to the definition and test of a new, lithium metal-free battery configuration based on the use of lithiated silicon as the anode and a nanostructured sulfur-carbon composite as the cathode. It is expected that this battery will offer an energy density at least three times higher than that available from the present lithium battery technology, a comparatively long cycle life, a much lower cost (replacement of cobalt-based with a sulfur-based cathode) and a high safety degree (no use of lithium metal). All the necessary steps for reaching this goal are considered, starting from material synthesis and characterization, exploiting nanotechnology for improving rate capability and fast charging, the fabrication and test of large scale prototypes and to the completion of the cycle by setting the conditions for the recycling process. A team of experts have been selected as partners of the project, including a number of academic laboratories, all with worldwide recognized experience in the lithium battery field, whose task will be that of defining the most appropriate electrode and electrolyte nanostructures. The project will benefit by the support of a laboratory expert in battery modeling to provide the theoretical guidelines for materials' optimization. Large research laboratories, having advanced and modern battery producing machineries will be involved in the preparation and test of middle size battery prototypes. Finally, chemical and battery manufacturing industries will assure the necessary materials scaling-up and the fabrication and test of large batteries and particular attention will be devoted to the control of the safety and to definition and practical demonstration of its most appropriate recycling process.

Project Coordinator or Contact Person: Bruno Scrosati

Organisation: Consorzio Sapienza Innovazione (Italy)

Project Website: www.lissen.eu

Project Duration: 01.09.2012-31.08.2015

Project Partners:

- Consorzio Sapienza Innovazione (Italy)
- Chalmers Tekniska Hoegskola AB (Sweden)
- Rockwood Lithium (Germany)
- Sapienza Università di Roma (Italy)
- Volkswagen AG (Germany)
- Celaya, Emparanza y Galdos International (Spain)
- Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Württemberg (Germany)
- Università degli Studi G. D'Annunzio Chieti Pescara (Italia)
- Westfaelische Wilhelms-Universitaet Muenster (Germany)
- Industry - university Cooperation foundation of Hanyang University (Republic of Korea)
- Deutsches Zentrum fuer luft-und raumfahrt EV (Germany)

LNG BLUE CORRIDORS

LNG-BC: Liquefied Natural Gas Blue Corridors

The LNG Blue Corridors project's aim is to establish LNG as a real alternative for medium & long distance transport - first as a complementary fuel and later as an adequate substitute for diesel.
To accomplish its objective it has defined a roadmap of LNG refuelling points along four corridors covering the Atlantic area, the Mediterranean region and connecting Europe's South with the North and its West and East accordingly. In order to implement a sustainable transport network for Europe, the project has set the goal to build approximately 14 new LNG or L-CNG stations, both permanent and mobile, on critical locations along the Blue Corridors whilst building up a fleet of approximately 100 Heavy Duty Vehicles powered by LNG. The project is co-funded by the European Commission with the amount of 7.96 M€ (total investments amounting to 14.33 M€), involving 27 partners from 11 countries, all members of NGVA Europe.

Project Coordinator or Contact Person: Xavier Ribas

Organisation: Applus IDIADA (Spain)

Project Website: www.lngbluecorridors.eu

Project Duration: 01.05.2013 – 30.04.2017

Project Partners:

- Applus IDIADA (Spain)
- Ballast Nedam (Netherlands)
- Cloud Energy Lda (Portugal)
- Centro Ricerche Fiat (Italy)
- Drive Systems N.V. (Belgium)
- Energy Institute Hrvoje Pozar (Croatia)
- ENI S.p.A. (Italy)
- ENOS LNG d.o.o. (Slovenia)
- Erdgas Mobil (Germany)
- Fluxys SA (Belgium)
- Galp Power (Portugal)
- Gasrec Ltd (UK)
- Gas Natural Fenosa (Spain)
- GNVERT-GDF Suez (France)
- GoldEnergy (Portugal)
- Grupo HAM (Spain)
- Hardstaff Group (UK)
- Iveco España S.L. (Spain)
- Linde Industrial Gases (Germany)
- Mendyra S.L. (Spain)
- Monfort Logistica (Spain)
- NGVA Europe (Spain/Brussels)
- Renault Trucks SAS (France)
- Swedish Gas Association (Sweden)
- VITO (Belgium)
- Volvo Technology AB (Sweden)

MAENAD

Model-based Analysis & Engineering of Novel Architectures for Dependable Electric Vehicles

Fully Electrical Vehicles pose new challenges to the engineering of the electrical and embedded systems. Systems will have more authority, share common resources, and rely less on mechanical backups. Complex power management and optimization algorithms are needed.
To succeed in meeting these challenges, appropriate engineering support is required.
The objective of MAENAD is to:

- Assist the safety process defined in the ISO 26262 automotive safety standard
- Provide effective prediction of quality attributes (dependability and performance)
- Provide tool support for the automated exploration of design spaces (dependability, performance and cost optimization)

MAENAD technology is based on the AUTOSAR-compliant EAST-ADL architecture description language.

Project Coordinator or Contact Person: Henrik Lönn

Organisation: Volvo Technology (Sweden)

Project Website: www.maenad.eu

Project Duration: 01.09.2010 - 31.08.2013

Project Partners:

- Volvo Technology (Sweden)
- CRF - Centro Ricerche Fiat (Italy)
- Continental (Germany)
- Delphi/Mecel (Sweden)
- 4S Group (Italy)
- MetaCase (Finland)
- Pulse-AR (France)
- Systemite (Sweden)
- CEA - LIST (France)
- KTH Stockholm (Sweden)
- TU Berlin (Germany)
- University of Hull (United Kingdom)

MAG-DRIVE

New permanent magnets for electric-vehicle drive applications

The future of road transport is electric - within the foreseeable future, pure electric vehicles (EVs) will populate our roads. Vital to the success of this transition is improved, next-generation motors based on improved magnetic materials; which provide high levels of flux at elevated temperatures, while retaining resistance to reverse magnetic fields and the corrosion problems associated with running electric motors in an automotive application. Currently, these magnets are based on the rare-earth elements neodymium and dysprosium, which are predominantly mined in China (>95%). Exports are being restricted as a result of an expanding domestic market and a policy of relocating magnet manufacturing to China, thereby multiplying the costs of raw materials for magnet manufacturers in Europe. The rare-earth crisis is particularly critical for heavy rare earths such as dysprosium that are currently required to assure the high-temperature performance of magnets. MAG-DRIVE will research and develop novel microstructural-engineering strategies that will dramatically improve the properties of magnets based on light rare-earth elements, especially the coercivity, which will enable them to be used for EV applications above 100°C. These magnets will also be designed-to-recycle, with an emphasis on reducing conventional rare-earth magnets' need for easily oxidising grain boundaries. The project will integrate these magnets into motors that have increased efficiency, with a system developed by Volkswagen for integration into their next generation of pure EVs. This project includes leading research groups from Slovenia, Serbia and the UK, together with SMEs from Slovenia and Germany and Volkswagen, Europe's largest manufacturer of cars, and will deliver materials and systems with increased energy efficiency over a wide range of temperatures and operating conditions as well as reducing costs and dependency on imports for next-generation electric vehicles.

Project Coordinator or Contact Person: Paul Mcguiness

Organisation: Josef Stefan Institut (Slovenia)

Project Duration: 01.10.2013 – 30.09.2017

Project Partners:

- Jozef Stefan Institut (Slovenia)
- Valeo Equipments Electriques Moteur SAS (France)
- Dr. Kochanek Entwicklungsgesellschaft (Germany)
- The University of Birmingham (UK)
- Magneti Ljubljana Podjetje za proizvodnjo magnetnih materialov, D.D (Slovenia)
- Institute of Chemistry, Techonology and Metallurgy (Serbia)
- Queen Mary and Westfield College, University of London (UK)

MARS-EV

Materials for Ageing Resistant Li-ion High Energy Storage for the Electric Vehicle

MARS-EV aims to overcome the ageing phenomenon in Li-ion cells by focusing on the development of high-energy electrode materials (250 Wh/kg at cell level) via sustainable scaled-up synthesis and safe electrolyte systems with improved cycle life (> 3000 cycles at 100%DOD). Through industrial prototype cell assembly and testing coupled with modelling MARS-EV will improve the understanding of the ageing behaviour at the electrode and system levels. Finally, it will address a full life cycle assessment of the developed technology.

MARS-EV proposal has six objectives:

(i) Synthesis of novel nano-structured, high voltage cathodes (Mn, Co and Ni phosphates and low-cobalt, Li-rich NMC) and high capacity anodes (Silicon alloys and interconversion oxides);

(ii) Development of green and safe, electrolyte chemistries, including ionic liquids, with high performance even at ambient and sub-ambient temperature, as well as electrolyte additives for safe high voltage cathode operation;

(iii) Investigation of the peculiar electrolyte properties and their interactions with anode and cathode materials;

(iv) Understanding the ageing and degradation processes with the support of modelling, in order to improve the electrode and electrolyte properties and, thus, their reciprocal interactions and their effects on battery lifetime;

(v) Realization of up to B5 format pre-industrial pouch cells with optimized electrode and electrolyte components and eco-designed durable packaging;

(vi) Boost EU cell and battery manufacturers via the development of economic viable and technologically feasible advanced materials and processes, realization of high-energy, ageing-resistant, easily recyclable cells.

MARS-EV brings together partners with complementary skills and expertise, including industry covering the complete chain from active materials suppliers to cell and battery manufacturers, thus ensuring that developments in MARS-EV will directly improve European battery production capacities.

Project Coordinator or Contact Person: Jon Lacunza

Organisation: Fundacion Cidetec (Spain)

Project Duration: 01.10.2013 – 30.09.2017

Project Partners:

- Fundacion Cidetec (Spain)
- Tel Aviv University (Israel)
- Oxford Brookes University (UK)
- Imperial College of Science, Technology and Medicine (UK)
- Politecnico di Torino (Italy)
- Westfälische-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany)
- SGL Carbon GmbH (Germany)
  Lithops S.r.l (Italy)
- Centre Technique de l'Industrie des Papiers, Cartons et Celluloses (France)
- Solvionic SA (France)
- Celaya, Emparanza y Galdos Internacional S.A. (Spain)
- Rockwood Italia SPA (Italy)
- Recupyl SAS (France)
- Johnson Matthey Plc (UK)
- Axeon Technologies Limited (UK)
- Agenzia Nazionale per le Nuove Technologie, l'Energia e lo Sviluppo Economico Sostenibile (Italy)

MAT4BAT

Advanced Materials for Batteries

Li-ion technologies initiated in the 90' at a fast development pace thanks mainly to emerging ICTs with more than 20 GWh sold in 2010. Soon, it appeared as a credible technology for electrical vehicles as it could provide average energy densities of about 140 Wh/kg. However and since then, major breakthroughs have been expected to reach higher storage levels of 250 Wh/kg on battery system level with an acceptable lifetime of 3000 cycles in order to develop an affordable economical business plan for car batteries. MAT4BAT builds-up its EVs battery strategy on advanced materials and pilot line processes, proposing three novel concepts of cells initiating from a state-of-the art combination of cell materials (NMC/Carbonate liquid electrolyte/Graphite). MAT4BAT will address all critical ageing mechanisms associated to this technology and having direct impacts on product lifetime & safety by implementing two work programs for Battery Assessment (#1) and Battery Technologies (#2).
Program #1 will set a framework to define critical charging modalities for a battery system during practical use and associated testing tools & methods for relevant functional performance & lifetime assessment. Within this framework, the program #2 will implement three generations of cells with a focus on electrolytes which will be steadily transformed from Liquid to Gel to All-Solid state electrolytes in order to promote substantial gain in cell lifetime and safety by preventing degradations and hazards and improving energy density with a separator-free cell (all-solid state electrolyte). 100 state-of-the-art commercial cells will be assessed to define normal and critical charge/discharge conditions of testing with appropriate testing protocols. Besides, materials increments will be screened out on coin-cells prior a benchmarking of most promising materials at full cells level. Eventually,(10-40 A.h) prototypes will be produced to validate MAT4BAT best technologies against quantified objectives.

Project Coordinator or Contact Person: Yves Hussenot

Organisation: Commissariat à l'énergie atomique et aux énergies alternatives (France)

Project Duration: 01.09.2013 – 28.02.2017

Project Partners:

- Commissariat à l'énergie atomique et aux énergies alternatives (France)
- Vlaamse Instelling voor Technologisch Onderzoek N.V (Belgium)
- Directa Plus SPA (Italy)
- Karlsruher Institut für Technologie (Deutschland)
- Celaya, Emparanza y Galdos Internacional S.A (Spain)
- Renault SAS (France)
- Kurt Simon Luxembourg S.A (Luxembourg Grand-Duche)
- Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Würtemberg (Germany)
- Timcal SA (Switzerland)
- Solvionic SA (France)
- University of Newcastle upon Tyne (UK)
- Fundacion Cidetec (Spain)
- Solvay Specialty Polymers Italy SPA (Italy)
- Centro de Investigacion Cooperativade Energias Alternativas Fundacion (Spain)
- Association de gestion de l'ecole d'ingénieurs en génie des systèmes industriels (France)
- Ustav Makromolekularni Chemie AV CR, V.V.I. (Czech Republic)
- Institut National des Sciences Appliquees de Lyon (France)

MATTISE

Modelling And Testing for Improved Safety of key composite StructurEs in alternatively powered vehicles

MATISSE aims to make a significant step forward in the capability of the automotive industry to model, predict and optimise the crash behaviour of mass produced Fibre Reinforced Polymer (FRP) composite structures, which will be extensively used in Alternatively Powered Vehicles. The ability to investigate crashworthiness of FRP vehicle structures by numerical simulation is crucial for these lightweight materials to see widespread use in future cars. By delivering this ability MATISSE will lead to safer, more efficient and more desirable cars. Modelling tools developed will be further validated through two automotive solution components: adaptive crash structures and high-pressure storage tanks. Future crash scenarios will be assessed and new evaluation criteria regarding safety will be developed. With a consortium led by automotive industry yet including partners active in the aerospace domain (where FRP structures are widely used), MATISSE leverages the knowledge from the aeronautical sector while assuring that advances in modelling, simulation and testing capabilities will be directly applicable to and acceptable for automotive applications, reinforcing the European automotive sector.
MATISSE comprises 11 partners from 6 countries, including four high ranking European universities/research centres, three SMEs with extensive experience in FP projects, two innovative tier-1 suppliers and two major European vehicles manufacturers. The balance and complementarity of the partners is ensured as each of them has been selected to cover a specific knowledge gap. The consortium as a whole has all the expertise required for the successful implementation of MATISSE objectives. Finally, MATISE will cooperate with existing and future parallel projects through a specific clustering committee created for this purpose. Specific measures for the efficient dissemination and exploitation of project results have been designed and will be implemented in order to maximize its impact.

Project Coordinator or Contact Person: Roland Wohlecker

Organisation: Forschungsgesellschaft Kraftfahrwesen mbH Aachen (Germany)

Project Website: www.project-matisse.eu

Project Duration: 01.10.2012 – 30.09.2015

Project Partners:

- Forschungsgesellschaft Kraftfahrwesen mbH Aachen (Germany)
- Technische Universität München (Germany)
- Chalmers Tekniska Hoegskola AM (Sweden)
- Autoliv Development AB (Sweden)
- Xperion Energy & Environment GmbH (Germany)
- Airborne Technology Center B.V. (Netherlands)
- Technische Universität Graz (Austria)
- Centro Ricerche Fiat Spca (Italy)
- Dynamore Nordic AB (Sweden)
- Sistemas y Procesos Avanzados SL (Spain)
- Daimler AG (Germany)

MERGE

Mobile Energy Resources in Grids of Electricity

Electric power systems are facing a major new challenge (and hence opportunity): future massive integration in the electric grid of electric plug-in vehicles (EV). Distribution and transmission grids and power system architectures still follow planning rules and procedures defined for the traditional operational paradigm. Therefore, it is necessary to identify and prepare solutions for the operational problems that will be caused on the electric grid, to the generation sub-system and to its commercial operation as a result of progressively increasing deployment of EV.

The conceptual approach in this project involves the development of a methodology consisting of two synergetic pathways:

- Development of a management and control concept that will facilitate the actual transition the MERGE concept
- Development of an evaluation suite that consists of methods and programs of modelling, analysis, and optimization of electric networks into which electric vehicles and their charging infrastructure is integrated

The MERGE concept is inspired from consideration of DER deployment but differs in that we consider now the resources to be mobile in terms of their connection to the grid. Analogies will be derived and adapted to the case of mobile resources, which can be either consumers (when in charging mode) or injectors of power (if batteries are delivering power back to the grid).

By exploiting a specific computational evaluation suite that is capable of simulating real world power systems (generation, transmission and distribution) for either steady state or dynamic behaviour it will be possible to test the adequacy of EV preliminary smart control interfaces that will be developed in the project. It will address comprehensively the impact of EV presence regarding steady state operation, intermittent RES integration, system stability and dynamic behaviour, system restoration, regulatory aspects and market arrangements.

Project Coordinator or Contact Person: Nikos Chatziagyriou

Organisation: Public Power Cooperation SA (Greece)

Project Website: www.ev-merge.eu

Project Duration: 01.01.2010 – 31.12.2011

Project Partners:

- Public Power Cooperation SA (Greece)
- Inspire Invest AS (Norway)
- Regulatory Authority for Energy (Rythmistiki arhi Energias) (Greece)
- Universisad Pontificia Commilas (Spain)
- Iberdrola Distribution Electrica, S.A. (Spain)
- REN - Rede Electrica Nacional S.A. (Portugal)
- Ricardo UKLimited (UK)
- IMRWORLD Ltd (UK)
- Association Europeenne des Vehicules Electriques a Batteries, Hybrides et a pile a Combustible (BE)
- Technische Universität Berlin (Germany)
- Consulting4Drive GmbH
- ESB Networks Ltd

Mobi.Europe

Integrated and Interoperable ICT Applications for Electro-Mobility in Europe

MOBI.Europe will promote the full integration and interoperability of a cloud of ICT applications associated with electro-mobility, which were already developed and are in the process of being tested. It is built upon the Portuguese, the Irish, the city of Amsterdam (The Netherlands), and the Galician (Spain) ongoing electro-mobility initiatives. Involving all the relevant stakeholders, it will be capable of delivering comprehensive and innovative solutions to foster electro-mobility among European citizens. The Project aims to integrate these four initiatives, generating additional mobility services in benefit of the EV user. Its main features are: i) make the user more comfortable to use EV beyond the limits of "range anxiety" by providing EV users with universal access to an interoperable charging infrastructure independent from its energy utility and region; ii) promote energy-efficient mobility services through a seamless integration with the transport system and with the EV ecosystem; iii) contribute to the standardization and openness of the EV ecosystem through a System of Systems (SoS) approach establishing open interfaces between the different systems and stakeholders; and iv) establish the management interface between the EV infrastructure and the electric grid, taking benefit of this information to create a more reliable and efficient end-to-end energy system. MOBI.Europe will enable also the assessment of energy sources and the tracking of each user carbon footprint, opening the door to the integration of a new credit model based on CO2 emissions, thus setting a benchmark for rewarding consumers. Specific action plans for each country, together with the maturity of the technical solution and the accumulated experience and compromise of MOBI.Europe partners are the key elements to assure future scalability and long term deployment.

Project Coordinator or Contact Person: João Jesus Caetano

Organisation: Inteli (Portugal)

Project Website: www.mobieurope.eu

Project Duration: 01.01.2012 – 31.12.2014

Project Partners:

- Inteli (Portugal)
- Alliander (The Netherlands)
- CEIIA (Portugal)
- City of Amsterdam (The Netherlands)
- Critical Software (Portugal)
- CTAG (Spain)
- ESB ecars (Ireland)
- FAIMEVI (Spain)
- INTEL (Ireland)
- Limerick City Council (Ireland)
- Renault (France)
- Welgood Solutions (Spain)

Mobility2.0

Co-operative ITS Systems for Enhanced Electric Vehicle Mobility

Mobility2.0 will develop and test an in-vehicle commuting assistant for FEV mobility, resulting in more reliable and energy efficient electro-mobility. In order to achieve a maximum impact, Mobility2.0 takes an integrated approach of addressing the main bottlenecks of urban FEV mobility: 'range anxiety' related to the limited FEV range, scarcity of parking spaces with public recharging spots, and the congestion of urban roads. Our integrated approach means the application developed by Mobility2.0 will utilise co-operative systems to simultaneously consider these bottlenecks, so that such an optimisation can be achieved which still guarantees reliable transportation for each FEV owner. Mobility2.0 will focus on assisting the daily urban commute, which represents the bulk of urban mobility. In this context, the FEV-specific guidance aspect includes the integrated reservation of a suitable FEV recharging spot, while also prioritising FEVs with low battery levels for the reservation, and making optimal use of the available public transportation along the journey. While the at least partial modal shift will result in very significant energy savings - in direct proportion to the reduced driving mileage - it can be achieved seamlessly only via an integrated co-operative process, which enables efficiency gains without sacrificing the FEV driver's comfort. The project will focus on the specification and standardisation of the messaging interface for the co-operative commuting assistant, and shall validate this co-operative application end-to-end at two test sites. In addition, the generic technology aspects of integrating FEVs into transport infrastructure will be developed by enabling plugged-in FEVs to act as 5.9 GHz road-side units, maintaining infrastructure connectivity via the V2G interface.

Project Coordinator or Contact Person: Andras Kovacs

Organisation: BroadBit (Slovakia)

Project Website: www.mobility2.eu

Project Duration: 01.09.2012 – 28.02.2015

Project Partners:

- BroadBit (Slovakia)
- ETRA (Spain)
- Fundació Privada Barcelona Digital Centre Tecnològic (ES)
- ICCS (Greece)
- Municipality of Reggio-Emilia (Italy)
- LaRA Joint Research Unit / Armines (France)
- University of Twente (Netherlands)
- Privé (Italy)
- NEC Europe Ltd (United Kingdom)

MOBINCITY

Smart Mobility in Smart City

MOBINCITY intends to optimize FEV autonomy range and increase energy efficiency based on an ICT-based integrated system, in which it will enable interaction between driver, vehicle and transport and energy infrastructures. Retrieval of this information will enable optimization of both energy charging and discharging processes. The development of this system will include:

- Installation of a system inside the vehicle which will enable information retrieval from the surrounding environment that influences the vehicle performance (traffic information, weather and road conditions and energy grid).
- Optimization of the trip planning and routing of FEV using information from these external sources including alternatives from other transport modes adapted to user's needs.
- Increasing efficiency and optimization of charging strategies (including routing) adapted to user, FEV needs and grid conditions.
- Implementation of additional energy saving methods such as driving modes and In-Car Energy Management Services within the FEV interaction with the driver.

Project Coordinator or Contact Person: Sixto Santonja-Hernández

Organisation: Asociacion Instituto Tecnologico de la Energia (Spain)

Project Website: www.mobincity.eu

Project Duration: 01.07.2012 – 30.06.2015

Project Partners:

- ITE - Asociacion Instituto Technologico de la Energia (Spain)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V (Germany)
- Etra - Etra Electronic Trafic SA (Spain)
- EIHP - Energy Institute "Hrvoje Pozar" (Croatia)
- Enel - Enel Distribuzione S.P.A. (Italy)
- CIT Development S.L. (Spain)
- Elektro Ljubljana Podjete Za Distribucijo Elektricne Energije D.D. (ELEKTRO-LJUBLJANA) (Slovenia)
- Hrvatski Telekom (Croatia)
- Technomar GmbH (Germany)
- Oprema Ravne (Slovenia)
- Etrel Svetovanje in Druge Storitve Doo (ETREL) (Slovenia)
- Consorzio per la Ricerca nell' Automatica e nelle Telecomunicazioni (Italy)
- Zabala Innovation Consulting, S.A. (Spain)

MODULUSHCA

Modular Logistics Units in Shared Co-modal Networks

The objective of MODULUSHCA is to achieve the first genuine contribution to the development of interconnected logistics at the European level, in close coordination with North American partners and the international Physical Internet Initiative. The goal of the project is to enable operating with developed iso-modular logistics units of sizes adequate for real modal and co-modal flows of fast-moving consumer goods (FMCG), providing a basis for an interconnected logistics system for 2030.
MODULUSHCA integrates five interrelated working fields: (1) developing a vision addressing the user needs for interconnected logistics in the FMCG domain, (2) the development of a set of exchangeable (ISO) modular logistics units providing a building block of smaller units, (3) establishing digital interconnectivity of the units, (4) development of an interconnected logistics operations platform leading to a significant reduction in costs and CO2 emissions that will be (5) demonstrated in two implementation pilots for interconnected solutions.
MODULUSHCA will establish a robust and replicable methodology to develop and evaluate solutions for interconnected logistics looking at other elements of the supply chain. Two implementation pilots will be executed integrating key MODULUSHCA developments in significantly different supply chains: (1) a closed pilot evaluating the benefits on a inter-site supply chain addressing handling and transportation of iso-modular logistics units within one company, and (2) an open network pilot will evaluate the impact of iso-modular logistics units in cross docking and transhipment processes.
MODULUSHCA efforts will lead to the development of a road map towards a fully interconnected logistics system in 2030. The road map will address the changes and necessary steps to change the logistics system gradually, exploiting progresses in digital, physical and operational interconnectivity, building on current players, assets, and infrastructures.

Project Coordinator or Contact Person: Marcel Huschebeck

Organisation: PTV Planung Transport Verkehr AG (Germany)

Project Website: www.modulushca.eu

Project Partners:

- PTV Planung Transport Verkehr AG (Germany)
- Procter & Gamble (Belgium)
- Association pour la Recherche et le Développement des Méthodes et Processus Industriels (France)
- École Polytechnique Fédérale de Lausanne (Switzerland)
- CIRRELT (Canada)
- Berlin University of Technology (Germany)
- Kirsen Global Security (Germany)
- Italian Post (Italy)
- CHEP (United Kingdom)
- Incept (United Kingdom)
- ITENE (Spain)
- Poznan Institute of Logistics and Warehousing (Poland)
- Jan De Rijk (Netherlands)
- SY-KON INTERNATIONAL Ltd. (United Kingdom)
- MEWARE (Italy)
- Technical University of Graz (Austria)

MOLECULES

Mobility based on eLectric Connected vehicles in Urban and interurban smart, cLean, EnvironmentS

Electro-mobility (for the purpose of this document, Electro-Mobility is the mobility offer by electric vehicles that are fully integrated into a well adapted transport system) is seen as one of the largest opportunities to radically change today's transport system and make a quantum leap into the next generation of sustainable mobility. The aim is to contribute to a pre-deployment and wider uptake of smart connected electromobility as a radical departure from today's transport system towards lower carbon emissions. The Pilot actions will test urban and inter-urban ICT services that facilitate and enhance the user experience of electrical vehicles. Such ICT services would support real-time interaction between the driver, the vehicle and the transport and energy infrastructures. This includes for instance Electric Vehicle pre-trip and on-trip planning and optimization including energy use and charging as well as vehicle to grid connectivity, through e.g. co-operative systems. ICT support systems to facilitate car-sharing schemes for electrical vehicles in urban areas and the associated business models, billing and seamless integration with other modes of transport is another area of interest for this objective.

Project Coordinator or Contact Person: Antonio Marques Moreno

Organisation: ETRA I+D (Spain)

Project Website: www.molecules-project.eu

Project Duration: 01.01.2012 - 31.12.2014

Project Partners:

- ETRA I+D (Spain)
- Infineon (Germany)
- Arcotronics Industries (Italy)
- POLIS (Belgium)
- Sante & Environment (France)
- VMZ Berlin Betreibergesellschaft (Germany)
- Senatsverwaltung für Stadtentwicklung (Germany)
- Deutsches Zentrum für Luft- und Raumfahrt (Germany)
- Going Green (Spain)
- Fundacio Privada Barcelona Digital Centre Tecnologic (Spain)
- Ajuntament de Barcelona (Spain)
- Collect Car (The Netherlands)

MOTORBRAIN

Nanoelectronics for electric vehicle intelligent failsafe powertrain

The overall objective is to develop sustainable drive train technologies and control concepts/platforms for inherently safe electric vehicle powertrains. Target activities include:

- Development of an intrinsic fail safe and fault tolerant highly efficient propulsion system based on electrical motor, novel power electronic packaging and advanced control systems.
- Development of fail safe and fault tolerant components and electronic (sub-) systems as a cross functional priority, which applies to all existing car electronics, and to all technologies to be developed in the above mentioned topics.
- Power and high voltage electronics and smart miniaturized systems for electrical cars.

Project Coordinator or Contact Person: Reiner John

Organisation: Infineon (Germany)

Project Website: www.motorbrain.eu

Project Duration: 01.04.2011 - 31.10.2014

Project Partners:

- Infineon (Germany)
- Arcotronics Industries (Italy)
- AVL List (Austria)
- CRF - Centro Ricerche Fiat (Italy)
- Technische Universität Dresden (Germany)
- STMicroelectronics (The Netherlands)
- Volkswagen (Germany)
- E3DC Energy Storage (Germany)
- Greenpower (Germany)
- FH Joanneum (Austria)
- ZF Friedrichshafen (Germany)
- Egston (Austria)
- Höganäs (Sweden)
- HS Amberg-Weiden (Germany)
- OFFIS (Germany)
- Instituto P.M. (Italy)
- NXP Semiconductors (The Netherlands)
- Universidad de Sevillia (Spain)
- Siemens (Germany)
- Politechnico di Torino (Italy)
- Robox (Italy)
- Seuffer (Germany)
- Austrian Institute of Technology (Austria)
- QinetiQ (United Kingdom)
- University of Sheffield (United Kingdom)

NECOBAUT

New Concept of Metal-Air Battery for Automotive Application based on Advanced Nanomaterials

The aim of NECOBAUT Project is to develop a new concept of battery for automotive based on a new metal/air technology that overcomes the energy density limitation of the Li-ion battery used at present for Electrical Vehicles. Some metal/air cells were developed in the past, but did not give the demanded requirements for commercial use. Two decades of improvements in materials for electrodes, electrolytes and batteries and mainly in nanomaterials were helpful for developing a battery that should fulfill the requirements of the car industry. The technology that is developed in the project addresses mainly the design and manufacturing of both electrodes of the battery: the negative electrode composed by the selected metal, and the air cathode with the catalyst supported on a carbonaceous material. Air is necessary for running the battery and allows having a very light battery, which is essential for the automotive industry. Another important advantage is the low cost of the materials used for manufacturing the battery: the selected metal, carbon support electrode and potassium hydroxide as electrolyte. All these materials are recyclable. A proof-of-concept metal/air cell is manufactured and tested in the project. In addition, the battery concept is validated for automotive application.
The consortium is composed of 8 partners (3 IND, 2 Universities and 3 RTD) covering the complete value chain: battery manufacturer, nanomaterials development (i.e.; nanocatalys, additives and support materials such as carbon), modeling and simulation for cells and batteries design, scaling-up, safety and risks studies for batteries.

Project Coordinator or Contact Person: Alberto García

Organisation: TECNALIA (Spain)

Project Duration: 01.10.2012 - 30.09.2015

Project Partners:

- TECNALIA (Spain)
- University of Southampton (United Kingdom)
- ITAE / CNR (Italy)
- The University of Warwick (United Kingdom)
- INERIS (France)
- Técnicas Reunidas (Spain)
- TIMCAL (Switzerland)
- SAFT Baterías (Spain)

NoWaste

Engine Waste Heat Recovery and Re-Use

The re-use of the waste heat (60% of the combustion energy) could allow to increase in overall vehicle energy of up to the 15%, this benefit could be higher in case of hybrid powertrain where generated electric energy could be used when more convenient. NoWaste aims to demonstrate the feasibility of such a system based on thermodynamic cycle (e.g. Rankine).
The Project key points are:

- Definition of a reference mission
- Selection of the most appropriate architecture
- Heat rejection system minimizing the cooling drag and the impact on the front-end
- Heat exchangers development to maximize the heat recuperation efficiency
- Integration with the exhaust system
- Validation of the developed system at first on a test rig and then on vehicle demonstrator based on a hybrid powertrain
- System benefit evaluation to various heavy duty powertrains thanks to a model approach

Target Performance:

- Fuel Economy: > -12%
- Cost (for the OEM): < 4500 Euro/system
- Weight: < 150 kg

Project Coordinator or Contact Person: Carloandrea Malvicino

Organisation: CRF - Centro Ricerche Fiat (Italy)

Project Website: www.nowasteproject.eu

Project Duration: 01.10.2011 - 31.03.2015

Project Partners:

- CRF - Centro Ricerche Fiat (Italy)
- Volvo Technology Corporation (Sweden)
- AVL List (Austria)
- Faurecia (France)
- Dell'Orto (Italy)
- University of Liège (Belgium)

ODIN

Optimized electric Drivetrain by Integration

This project aims to develop a compact, efficient, highly integrated electro-mechanical powertrain, production optimized to deliver key cost reduction goals. The partners will focus on optimizing the integrated unit for an entry power level of a typical urban vehicle. In parallel they will assess scalability potential to meet the performance criteria of other platforms. Innovative simulation and optimization software tools will be used early in the concept phase to assess optimal design variations, the output of which will be a key input into determining how difficult they will be to scale between differing vehicle and system sizes. Built up of prototypes and implementation in a demo car is planned.

Project Coordinator or Contact Person: Martin Braun

Organisation: Robert Bosch (Germany)

Project Website: www.fp7-odin.eu

Project Duration: 01.07.2012 - 30.06.2015

Project Partners:

- Robert Bosch (Germany)
- GKN Driveline (France)
- Fuchs Petrolub AG (Germany)
- Fundacion CIE I+D+i (Spain)
- Romax Technology (United Kingdom)
- RWTH Aachen (Germany)
- Renault (France)

OPERA4FEV

Operating Energy Rack for Full Electric Vehicle

The OPERA4FEV project aims to develop thermoplastic battery racks on two functional demonstrators: one for a large scale vehicle from FIAT and one for a niche car, the F-City from FAM, that will integrate electrical, hydraulic connections and component housing in a thermoplastic approach.
OPERA4FEV will pay particular attention to evaluate the effects of the rack characteristics regarding vehicle crash safety, and will focus on the potential risks for the vehicle and its occupants.
The main issues relative to OPERA4FEV are the integration of cells into the thermoplastic rack; an easier mounting and fast connections of cells; the reduction of assembly time and the improvement of dismantling; 25% cost, 50% number and 30% weight reduction on components (cells excluded); the eco-design and easier end of life based on LCA, the plastics parts design to improve thermal regulation, the use of recycled polymers, a concept proposal adaptable to automotive industry and evaluated with an representative tools and assembly line.

Project Coordinator or Contact Person: Erwan Le Floch

Organisation: CMECACORP - MECAPLAST Group (France and Monaco)

Project Website: www.opera4fev.eu

Project Duration: 01.09.2011 - 28.02.2015

Project Partners:

- CMECACORP - MECAPLAST Group (France and Monaco)
- CRF - Centro Ricerche Fiat (Italy)
- CETHIL (France)
- Vrije Universiteit Brussel (Belgium)
- EVE System (France)
- FAM Automobiles (France)
- Olesa (Portugal)
- Grupo Repol (Spain)

OpEneR

Optimal Energy Consumption and Recovery based on system network

The major criticism in customer surveys on Fully Electric Vehicles (FEV) is the strongly limited driving range compared to vehicles with a conventional internal combustion engine. The OpEneR project addresses this so called "range anxiety" and aims to unlock the FEV market by increasing the driving range. The approach is not the enhancement of battery technologies, but the development of an intelligent energy management and recovery system. This system will provide advanced driver support based on a networked architecture comprising battery, e-machine, regenerative braking, satellite navigation, dashboard displays and predictive cooperative information. An advanced vehicle stability controller and environmental sensing guarantee the safety of the driver. OpEneR brings a new integrated approach where all available and emerging information is used to generate safe and efficient predictions. The project results will be demonstrated in 2 fully operational FEV in real world conditions.

Project Coordinator or Contact Person: Kosmas Knödler

Organisation: Robert Bosch (Germany)

Project Website: www.fp7-opener.eu

Project Duration: 01.05.2011 - 30.04.2014

Project Partners:

- Robert Bosch (Germany)
- PSA (France)
- Robert Bosch Car Multimedia (Germany)
- AVL List (Austria)
- CTAG - Fundacion para la Promocion de Innovacion, Investigacion y Desarrollo Tecnologico en la Industria de Automocion de Galicia (Spain)
- FZI - Forschungszentrum Informatik an der Universität Karlsruhe (Germany)

OPTIBODY

Optimized Structural components and add-ons to improve passive safety in new Electric Light Trucks and Vans (ELTVs)

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.

Project Coordinator or Contact Person: Juan J. Alba López

Organisation: University of Zaragoza (Spain)

Project Website: www.optibody.unizar.es

Project Duration: 01.04.2011 - 31.03.2014

Project Partners:

- University of Zaragoza (Spain)
- Politecnico di Torino (Italy)
- PIMOT - Automotive Industry Institute (Poland)
- IDIADA Automotive Technology (Spain)
- CENTRO ZARAGOZA - Instituto de Investigacion Sobre Reparacion de Vehiculos (Spain)
- Mondragon Automocion (Spain)
- AMZ - KUTNO (Poland)
- Italdesign Giugiaro (Italy)
- BELLA Zaklad Kompozytow (Poland)
- SSAB (Sweden)

OPTIMORE

Optimised Modular Range Extender for every day customer usage

The OptiMoRE project takes on the challenge to develop and optimise the concept of the fully-integrated, range-extended, electrified light duty vehicle. Three different RE concepts will be developed and demonstrated to serve the niches from city vehicles, medium sized passenger cars up to light commercial vehicles. OptiMoRE is based upon the following major elements:

1) Definition of real-world driving conditions (driving cycles and comfort requirements) as a baseline for further optimisation and EV assessment
2) Optimisation of components and the whole RE system regarding emission, fuel consumption, cost, weight and exhaust gas after-treatment
3) Modular setup of an EV concept to fulfil a wide range of customer expectations
4) Advanced control strategies as a key for cost reduction and system optimisation
5) Functional and Electrical safety analysis and concept development to define necessary measures to fulfil and implement the ISO 26262 standard
6) Build-up and optimisation of three technology demonstrator vehicles covering EV aspects for delivery trucks, all-purpose vehicles and city cars

Project Coordinator or Contact Person: Theodor Sams

Organisation: Uniresearch BV (Netherlands)

Project Website: www.optimore-project.eu

Project Duration: 01.10.2012 – 30.09.2014

Project Partners:

- AVL List (Austria)
- Chalmers tekniska hoegskola AB (Sweden)
- CRF - Centro Ricerche Fiat (Italy)
- IVECO SPA (Italy)
- AVL-Schrick (Germany)
- Uniresearch BV (Netherlands)
- VOLVO Personvagnar AB (Sweden)
- Getrag International (Germany)

OSTLER

Optimised storage integration for the electric car

The OSTLER project will take a modular approach to integrating energy storage into EVs. The benefits will be that purpose-built EVs can readily be designed around their energy store and, crucially from a market attractiveness point of view, will give manufacturers the flexibility to offer model variants of an EV (or a plug-in hybrid vehicle) based on green attributes, specifically zero-emission range, rather than speed or acceleration as might be the case with conventional vehicles. The concept responds to the challenge of reconciling utility with pushing down the base level of CO_2 emissions.
In more detail, the showroom choice could be between three versions of a gasoline-electric hybrid car: one with a 10 km range in EV mode and having a 20 kg battery pack, another with 20 km range and a 40 kg battery and yet another with 50 km range and 100 kg of battery. The customer would knowingly be compromising luggage and passenger space to achieve his or her target range. The manufacturer drawing upon OSTLER's smart integration and modular approach will be able to mitigate the penalties of the compromise.

Project Coordinator or Contact Person: Gabrielle Cross

Organisation: MIRA (United Kingdom)

Project Website: www.ostlerproject.com

Project Duration: 01.06.2011 - 31.05.2014

Project Partners:

- MIRA (United Kingdom)
- Autoliv (Sweden)
- CRF - Centro Ricerche Fiat (Italy)
- Ficosa (Spain)
- Cracow University (Poland)
- Magneti Marelli (Italy)
- Valence (United States)
- ZF-fka (Germany)

PICAV

Personal Intelligent City Accessible Vehicle System

The project concerns a new Vehicle (PICAV) and a new transport system that integrates a fleet of PICAV units.
The transport system ensures accessibility for everybody and is designed for weak mobility people. Ergonomics, comfort, stability, assisted driving, eco-sustainability, parking and mobility dexterity are the main drivers of PICAV design. The electrical vehicle presents new frame-suspensions, new seat, new efficient power supply.
The PICAV transport system provides an efficient service to citizen within urban traffic restricted areas 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 is based on the car-sharing concept. 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 inter-modal integration

Project Coordinator or Contact Person: Rezia Molfino

Organisation: DIMEC - Università di Genova (Italy)

Project Website: www.picav.eu

Project Duration: 01.08.2009 - 30.09.2012

Project Partners:

- DIMEC - Università di Genova (Italy)
- INRIA (France)
- UCL (United Kingdom)
- Università di Pisa (Italy)
- Serviços Municipalizados de Transportes Colectivos do Barreiro (Portugal)
- ZTS VVÚ KOŠICE (Slovakia)
- Mazel Ingenieros (Spain)

PLUS-MOBY

Premium Low weight Urban Sustainable e-MOBilitY

The PLUS-MOBY project is focused to the implementation of low cost and low energy intensity technologies to manufacture premium four wheel fully electrical micro vehicles (450-700kg and speeds up to 90+ km/h)) that can be upgraded to M1 configurations.

Referring to a basic design for passengers' applications in a highly ergonomic configuration, a safe and integrated chassis will be demonstrated in a reconfigurable architecture that could be easily adapted to a wide range of uses for either delivery of goods or leisure.
Technologies and methodologies developed in previous calls of the EU Green Car Initiative will be implemented in terms of low aero-drag and safe structural designs, system integration on powertrain, batteries, solar panels, energy management, design criteria to reduce electromagnetic emissions, customer demand

Project Coordinator or Contact Person: Marco Ottella

Organisation: BITRON (Italy)

Project Duration: 01.09.2013 - 31.08.2016

Project Partners:

- BITRON (Italy)
- Magnetto Automotive CLN Group (Italy)
- ICPE (Romania)
- Cidaut (Spain)
- Bulgarian Electric Vehicles Association (Bulgaria)
- IMBIGiS (Poland)
- University of Surrey (United Kingdom)
- Torino e-district (Italy)
- Polimodel (Italy)
- IFEVS (Italy)

P-MOB

Integrated Enabling Technologies for Efficient Electrical Personal Mobility

The P-MOB project is aiming at breaking the link between the growth in transport capacity and increased fatalities, congestion and pollution. It addresses the integration of smart systems enabling efficient fully electrical personal mobility. The project focuses on the 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.

Project Coordinator or Contact Person: Andrea Pipino

Organisation: CRF – Centro Ricerche Fiat (Italy)

Project Website: www.eeepro.shef.ac.uk/p-mob

Project Duration: 01.05.2010 - 30.04.2013

Project Partners:

- CRF – Centro Ricerche Fiat (Italy)
- Siemens (Germany)
- University of Sheffield (United Kingdom)
- Magnomatics (United Kingdom)
- Integrare (Italy)
- Mazel (Spain)
- Polimodel (Italy)

POLLUX

Process Oriented Electronic Control Unit for Electric Vehicles Developed on a multi-system real-time embedded platform

Pollux is aiming to reduce the development time and cost of the complex, high-reliability mechatronic systems needed for the mass deployment of electric vehicles through the creation of a reference architecture for distributed embedded systems, including real-time middleware and multi-core hardware. This to enable the flexible, and evolvable and networked interoperation of systems (sensors, actuators, batteries, converters, ECUs,…) plus the deployment of advanced vehicle and powertrain management algorithms and strategies

Project Coordinator or Contact Person: Marco Ottella

Organisation: CRF - Centro Ricerche Fiat (Italy)

Project Website: www.artemis-pollux.eu

Project Duration: 01.03.2010 - 28.02.2013

Project Partners:

- CRF - Centro Ricerche Fiat (Italy)
- STMicroelectronics (Italy)
- NXP Semiconductors (The Netherlands)
- austriamicrosystems (Austria)
- ON Semiconductor (Belgium)
- Stiftelsen Sintef (Norway)
- Pure Mobility (Norway)
- Think Global (Norway)
- Austria Institute of Technology (Austria)
- CEA - LETI (France)
- Continental (France)
- Infineon Austria (Austria)
- CISC Semiconductor Design+Consulting (Austria)
- Consejo Superior de Investigaciones Científicas (Spain)
- Integra (Italy)
- Università di Pisa (Italy)
- PSA (France)
- AVL (Austria)
- QinetiQ (United Kingdom)
- Kompetenzzentrum - Das Virtuelle Fahrzeug Forschungsgesellschaft(Austria)
- University of Sheffield (United Kingdom)
- Institut Mikroelektronickych Aplikaci (Czech republic)
- Politecnico di Torino (Italy)
- Asociacion de Investigacion y Cooperacion Industrial de Andalucia (Spain)
- GreenPower (Spain)
- Ficosa (Spain)
- Triphase (Belgium)
- Brno University of Technology (Czech Republic)
- NXP Semiconductors Germany (Germany)
- AVL Software and Functions (Germany)
- FH Joanneum (Austria)
- TTTech Computertechnik (Austria)
- Duracar Holding (The Netherlands)
- Österreichisches Forschungs- und Prüfzentrum Arsenal (Austria)
- Infineon (United Kingdom)
- Universidad Autonoma de Barcelona (Spain)

POWERFUL

POWERtrain for Future Light-duty vehicles

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.
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.

Project Coordinator or Contact Person: Pascal Tribotté

Organisation: Renault (France)

Project Website: www.powerful-eu.org

Project Duration: 01.01.2010 – 31.12.2013

Project Partners:

- Renault (France)
- Volkswagen (Germany)
- AVL List (Austria)
- FEV (Germany)
- IFPEN (France)
- LMM (France)
- UPVLC (Spain)
- JBRC (Czech Republic)
- ECOCAT (Finland)
- RWTH Aachen - VKA (Germany)
- PUT-ISSIT (Poland)
- MM-PWT (Italy)
- UNIGE (Italy)
- TEKNIKER (Spain)
- TUL (Poland)
- JRC (Belgium)
- CRF - Centro Ricerche Fiat (Italy)
- Delphi (France)

PowerUp

Specification, Implementation, Field Trial, and Standardisation of the Vehicle-2-Grid Interface

PowerUp will develop the Vehicle-2-Grid (V2G) interface technology, 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. V2G technology will be developed in liaison with the ongoing related ISO/IEC standardisation, existing smart-metering standards and ETSI ITS standards will be extended as needed. On the grid side, smart meters will be enhanced for V2G capability and V2G-specific demand-balancing control algorithms will be researched. The specification phase will synthesise requirements of vehicle manufacturers and utility operators. The produced V2G adapter prototypes will undergo conformance testing and field trials. The validated PowerUp results will be contributed into standardisation, completing the overall R&D cycle.
PowerUp impact will facilitate reaching FEVs' full potential economic and environmental benefits.

Project Coordinator or Contact Person: Andras Kovacs

Organisation: BroadBit (Slovakia)

Project Website: www.power-up.org

Project Duration: 01.07.2011 - 30.06.2013

Project Partners:

- BroadBit (Slovakia)
- CRF - Centro Ricerche Fiat (Italy)
- Corinex (Slovakia)
- DENSO (Germany)
- ETSI (France)
- ICCS (Greece)
- Itron (France)
- Systema (Greece)
- Technolution (The Netherlands)
- Volvo Technology (Sweden)
- Public Power Corporation of Greece (Greece)

SafeAdapt

Safe Adaptive Software for Fully Electric Vehicles

SafeAdapt develops novel architecture concepts based on adaptation to address the needs of a new E/E architecture for fully electric vehicles regarding safety, reliability and cost-efficiency. These concepts will reduce the complexity of the system by generic, system-wide fault and adaptation handling. Through this, extended reliability despite failures, improvements of active safety and optimized resources are enabled.
SafeAdapt follows a holistic approach for building adaptable systems in safety-critical environments. This ranges from tool chain support, reference architectures, modelling of system design and validation & verification. The technical approach builds on a core component, encapsulating basic adaptation mechanisms for re-allocating and updating functionalities in networked systems. Functional safety is considered with respect to ISO 26262. SafeAdapt will be the basis for an interoperable and standardized solution for adaptation and fault handling aligned with AUTOSAR.

Project Coordinator or Contact Person: Dirk Eilers

Organisation: Fraunhofer ESK (Germany)

Project Website: www.safeadapt.eu

Project Duration: 01.07.2013 – 30.06.2016

Project Partners:

- Fraunhofer ESK (Germany)
- TTTech Computertechnik (Austria)
- Fico Mirrors (Spain)
- Fundación Tecnalia Research & Innovation Spain
- Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA) LIST (France)
- Siemens, Corporate Technology (Germany)
- Pininfarina (Italy)
- Duracar Holding (Netherlands)
- AWEFLEX Systems (Netherlands)
- Delphi Deutschland (Germany)

SafeEV

Safe Small Electric Vehicles through Advanced Simulation Methodologies

In the next 20 years the number of small and light-weight fully electric vehicles will substantially increase especially in urban areas. These Small Electric Vehicles (SEVs) show distinctive design differences compared to the traditional car (e.g. no bonnets, vertical windscreens, outstanding wheels). Thus the consequences of impacts of SEVs with vulnerable road users (VRU) and other (heavier) vehicles will be different from traditional collisions. These fundamental changes are not adequately addressed by current vehicle safety evaluation methods and regulations. VRU protection, compatibility with heavier opponents and the introduction of active safety systems have to be appropriately taken into account in order to avoid any SEV over-engineering (e.g. heavy or complex vehicle body) by applying current regulations and substantially impair the SEVs (environmental) efficiency.
Therefore, the project SafeEV aims are based on future accident scenarios to define advanced test scenarios and evaluation criteria for VRU, occupant safety and compatibility of SEVs. Moreover, industrial applicable methods for virtual testing of these scenarios and criteria (e.g. a method for active occupant safety assessment) will be developed. These methods are applied in order to derive protection systems for enhanced VRU and occupant safety for SEVs. The evaluation of one developed hardware system will be used to demonstrate the potential and applicability of these new methods. Dedicated best practice guidelines for VRU and occupant safety evaluation of SEVs will ensure a sustainable impact for industry and regulative organisations beyond the project duration. With the new evaluation methods developed, vehicle safety for SEV on urban roads in the next decade will be adequately addressed resulting in less fatalities and injuries without compromising vehicle efficiency. Moreover, cost-efficient development of SEVs will be made possible by the new virtual testing methodologies developed.

Project Coordinator or Contact Person: Andreas Teibinger

Organisation: Kompetenzzentrum - Das Virtuelle Fahrzeug Forschungsgesellschaft (Germany)

Project Website: www.project-safeev.eu

Project Duration: 01.10.2012 - 30.09.2015

Project Partners:

- Kompetenzzentrum - Das Virtuelle Fahrzeug Forschungsgesellschaft (Germany)
- Volkswagen (Germany)
- Daimler (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Pininfarina (Italy)
- Chalmers University of Technology (Sweden)
- Université de Strasbourg (France)
- RWTH Aachen University (Germany)
- Graz University of Technology (Austria)
- Robert Bosch (Germany)

SmartBatt

Smart and Safe Integration of Batteries in Electric Vehicles

The objective of SmartBatt was to develop and proof and innovative, multifunctional, light and safe concept of an energy storage system which is integrated in the electric car's structure. Using an integrative approach and innovative materials it has been made possible to halve the weight of the battery housing and making the battery system as a whole 20% lighter. The use of these innovative lightweight construction materials and the completely new integrative approach required the use of cutting-edge simulation methods and CAD tools in the design process. Extensive crash simulations and laboratory tests carried out in the development and validation phase and showed that the housing is able to absorb any forces acting on the vehicle body in the case of an accident, despite its extremely low weight. The project was concluded successfully by end of March 2013.
Highlights:

- Complete assembled and fully functional battery SmartBatt prototype available.
- Total weight of 155kg achieved (goal was 169kg).
- 23kWh with a total mass of 155kg (reduction in housing mass to just 8.5kg). The ratio between cell and total mass increased to over 80% by use of new materials such as Aluminium hybrid foam sandwich for the battery housing and smart integration.

Project Coordinator or Contact Person: Hansjörg Kapeller

Organisation: AIT Austrian Institute of Technology GmbH (Austria)

Project Website: www.smartbatt.eu

Project Duration: 01.01.2011 - 31.12.2012

Project Partners:

- AIT Austrian Institute of Technology - Mobility Department (Project Coordination) (Austria)
- AIT Austrian Institute of Technology - LKR Leichtmetallkompetenzzentrum Ranshofen GmbH (Austria)
- Axeon Power Ltd - A Johnson Matthey Company (UK)
- Fraunhofer (Germany)
- Impact Design Europe (Poland)
- Ricardo UK Ltd (United Kingdom)
- SP Technical Research Institute of Sweden (Sweden)
- Graz University of Technology - Vehicle Safety Institute (Austria)
- Volkswagen AG (Germany)

smartCEM

Smart Connected Electro Mobility

Four European cities/regions (Barcelona, Gipuzkoa-San Sebastian, Newcastle and Reggio Emilia) have come together to demonstrate the role of ICT solutions for cities and citizens in addressing shortcomings of electro mobility. Electric power solutions have proven to offer a potentially ground-breaking solution for more energy-efficient and less petrol-dependent vehicles and transport systems. The consortium aims to integrate regional initiatives which have been established all over Europe. However, it is known by everybody that electric vehicles (EV) are under-used due to their limitations and lack of peoples' confidence in this type of transport mode. The smartCEM project aims to minimize the current EV limitations, by applying advanced mobility services (EV-navigation, EV-efficient driving, EV-trip management, EV-charging station management) to existing multimodal electro-mobility transport modes. The combination of technology and electromobility aims to increase awareness and standardize the use of electrical mode. The objectives of the project are the following:

1) Prove that user acceptance of electrical vehicles can be increased by at least 15% thanks to smartCEM services.
2) Evaluate how much the efficiency of transport can be optimised, taking into account environmental sustainability.
3) Develop of tools for measuring, monitoring and assessing carbon emissions.
4) Identify and address all deployment elements such as business models, legal aspects and privacy
5) Optimization of the energy use in the vehicle and infrastructure.
6) Support pan-European interoperability by standardisation between operations performed by different services and facilitating the interoperability between different systems and vehicles.
7) A complete integration of new services such as car-sharing within the public transport system.
8) Expand the pilot to more cities, operators, or service providers.

Project Coordinator or Contact Person: Fernando Zubillaga

Organisation: Asociacion Cluster de Movilidad y Logistica de Euskadi (Spain)

Project Website: www.smartcem-project.eu

Project Duration: 01.01.2012 - 31.12.2014

Project Partners:

- Asociacion Cluster de Movilidad y Logistica de Euskadi (Spain)
- European Road Transport Telematics Implementation Coordination Organisation (Belgium)
- Federation INternationale de l'Automobile (France)
- Robert Bosch (Germany)
- PTV (Germany)
- Deutsches Zentrum für Luft- und Raumfahrt (Germany)
- Universita Degli Studi di Modena e Reggio Emilia (Italy)
- Pluservice (Italy)
- Eenergy Resources (Italy)
- Consorzio Interuniversitario per l'Ottimizzazione e la Ricerca Operativa (Italy)
- Centro Ricerche Fiat (Italy)
- Teamnet International (Romania)
- IDIADA Automotive Technology (Spain)
- Gipuzkoako Foru Aldundia (Spain)
- Fundación Creafutur (Spain)
- Fomento de San Sebastian (Spain)
- Fundacion Tecnalia Research & Innovation (Spain)
- ENNERA nergy and Mobility (Spain)
- Compania del Tranvia de San Sebastian (Spain)
- Ayuntamiento de Donostia San Sebastian (Spain)
- Automobil Club Assistencia (Spain)
- Ajuntament de Barcelona (Spain)
- Affiliated Computer Services (The Netherlands)
- University of Newcastle Upon Tyne (United Kingdom)
- NEC Europe (United Kingdom)
- Gateshead College (United Kingdom)
- AVID Innovation (United Kingdom)

Smart EV-VC

Smart Electric Vehicle Value Chains

The objectives of sustainable road mobility, i.e. energy efficiency, climate protection, and zero emissions, imply a paradigm shift in the concept of the automobile regarding its architecture, design, materials, and propulsion technology. The fully electric vehicle (FEV) is widely considered the most suitable option for the 'green' car of the future, even though it is still facing a multitude of challenges in terms of product maturity In order to maintain its role as the world's largest producer of cars, Europe has to anticipate these challenges of a move towards the FEV and adapt its automotive value chain to them in due time. The proposed Coordination Action Smart EV-VC will develop, recommend and initiate a multitude of tangible measures for this purpose, including the definition of common goals in terms of unique selling points of the FEV "made in Europe", the compilation of a European roadmap, the promotion of novel links in the European FEV value chain by e.g. developing harmonized curricula for education and training, initiating standards, and drafting concepts for shared facilities as well as giving advice for the inclusion of small and medium sized enterprises (SME).

Based on initial FEV related technology roadmap activities by members of the European Technology Platforms EPoSS, ERTRAC, and SmartGrids in the Public-Private Partnership European Green Cars Initiative, and sustaining the work carried out previously within projects funded under the umbrella of this initiative, the Smart EV-VC project will compile a dedicated implementation agenda in preparation of Horizon 2020, also aiming at coherences and complementarities between EU and members states programmes, and at establishing contacts at an international level beyond Europe. It will cover strategic research, development and innovation for the FEV "made in Europe" with a particular focus on ICT and smart systems as key enabling technologies.

Within its core consortium Smart EV-VC will therefore bring together major industrial partners from all involved sectors along the value chain around a dialogue on a common understanding about impact, R&D priorities, infrastructure needs and framework requirements. To broaden the view of its work, the project will also involve about 20 other organizations as associated partners.

Project Coordinator or Contact Person: Gereon Meyer

Organisation: VDI/VDE Innovation + Technik (Germany)

Project Website: www.smartev-vc.eu

Project Duration: 01.10.2012 - 30.09.2014

Project Partners:

- VDI/VDE Innovation + Technik (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Renault (France)
- Robert Bosch (Germany)
- Siemens AG (Germany)
- ST Microelectronics (France)
- AVL List (Austria)
- Vrije Universiteit Brussels (Belgium)
- Sernauto (Spain)
- Interactive Electric Vehicles (Italy)

SMART-LIC

Smart and Compact Battery Management System Module for Integration into Lithium-Ion Cell for Fully Electric Vehicles

Smart-LIC' addresses the development of a 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 such that failures would be determined by battery cells rather than by electronics and wiring connectors
- 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 cell / battery model based on electrochemical impedance spectroscopy (EIS)
- Reduced maintenance of the battery packs assured by the monitoring of the single cell (macro cell) 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

Project Coordinator or Contact Person: Jochen Langheim

Organisation: STMicroelectronics (France)

Project Website: www.smart-lic.com

Project Duration: 01.05.2011 - 30.04.2014

Project Partners:

- STMicroelectronics (France)
- STMicroelectronics (Germany)
- Berliner Nanotest und Design (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Fraunhofer Gesellschaft für Förderung der Angewandten Forschung (Germany)
- Technische Universität Chemnitz (Germany)
- Kemet Electronics (Italy)
- Micro-Vett SPA (Italy)
- Continental Temic Microelectronic (Germany)

SMARTOP

Self-powered vehicle roof for on-board comfort and energy saving

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.
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.
The concept addressed by SMARTOP is to develop an autonomous smart roof integrating solar cells, energy storage systems and auxiliaries as thermoelectric climatic control, electrochromic glazing, courtesy and LEDs lighting able to increase comfort and fuel economy for both FEV and ICE vehicles. SMARTOP addresses the needs of vehicle electrification integrating on board power hungry devices and matching the comfort and safety customer expectations.

Project Coordinator or Contact Person: Mauro Brignone

Organisation: CRF - Centro Ricerche Fiat (Italy)

Project Website: www.smartop.eu

Project Duration: 01.11.2010 - 31.10.2013

Project Partners:

- CRF - Centro Ricerche Fiat (Italy)
- Trinity College Dublin (Ireland)
- ADETEL group (France)
- SolarPrint (Ireland)
- Imperial College London (United Kingdom)
- Infineon (Germany)
- University College Dublin (Ireland)
- Webasto (Italy)

SMARTV2G

Smart Vehicle to Grid Interface

Concept and Project Objectives:

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 order to be able to reach the mentioned objective, the following specific objectives have been defined:

- Develop a V2G system made up of a smart grid of charging stations, where vehicles are allowed to carry out the charging/discharging operations.
- Define control systems architecture.
- Develop technical communication and information processing between EV and charging stations.
- Define specification of communication standards and interfaces/information processing standards.
- Ensure security in charging stations and identification.
- Test and validate the developed technology and systems.
- Disseminate project results and ensure scalability and compatibility.

Project Coordinator or Contact Person: Sixto Santonja

Organisation: Instituto Tecnológico de la Energía (Spain)

Project Website: www.smartv2g.eu

Project Duration: 01.06.2011 - 31.05.2014

Project Partners:

- Instituto Tecnológico de la Energía (Spain)
- Fraunhofer ESK (Germay)
- ETREL (Slowenia)
- CIT Development (Spain)
- Sapienza Universita di Roma (Italy)
- Technomar (Germany)
- Elektro Ljubljiana (Slowenia)

SOMABAT

Development of novel SOlid MAterials for high power Li polymer BATteries

SOMABAT aims to develop more environmentally 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. 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.

Project Coordinator or Contact Person: Mayte Gil–Agustí

Organisation: Asociación Instituto Tecnológico de la Energía (Spain)

Project Website: www.somabat.eu

Project Duration: 01.01.2011 - 31.12.2013

Project Partners:

- Asociación Instituto Tecnológico de la Energía (Spain)
- Université de Liège (Belgium)
- Kompetenzzentrum – Das virtuelle Fahrzeug Forschungsgesellschaft (Austria)
- Kiev National University of Technologies and Design (Ukraine)
- Institute of Chemistry Timisoara of Romanian Academy (Romania)
- CleanCarb (Luxemburg)
- Consejo Superior de Investigaciones Científicas (Spain)
- Recupyl (France)
- Accurec (Germany)
- Lithium Balance (Denmark)
- Cegasa Internacional (Spain)
- Umicore (Belgium)
- Atos Origin Sociedad Anónima Española (Spain)

STABLE

STable high-capacity lithium-Air Batteries with Long cycle life for Electric cars

An electric car is considered as the most promising technical solution for automotive industries in 21st century since the use of electric energy not only slows down the petrol consumption but also contribute to reduce the CO2 emission and toxic air pollutants. Due to its good performance, Li-air batteries have attracted worldwide attentions as an ideal alternative, because their outstanding energy density is extremely high compared to other rechargeable batteries.
In this project, a multidisciplinary work team in materials synthesis and characterization, cell assembly and test will cooperate to perform a joint research to deliver a Li-air battery cell for EVs with high capacity and long cycle life in laboratory scale.
The main objective of this project focuses on innovations of battery anode, cathode, electrolyte materials and technologies, as well as an assembly of batteries cells which are crucial on battery performance, cost and environmental impact.

Project Coordinator or Contact Person: Qiuping Chen

Organisation: Politecnico di Torino (Italy)

Project Website: www.fp7-stable.com

Project Duration: 01.09.2012 - 31.08.2015

Project Partners:

- Politecnico di Torino (Italy)
- Acondicionamiento Tarrasense Associacion (Spain)
- L'Urederra, Fundacion Para el Desarrollo Tecnologico y Social (Spain)
- SWEAR IVF AB (Sweden)
- University College Cork, National University of Ireland, Cork (Ireland)
- Sakarya Universiitesi (Turkey)
- Celaya,Emparanza y Galdos Internacional (Spain)
- Elaphe, Podjetje za Razvoj in Prodajo Elektricnih Vozil Ter Energijskih Virov (Slovenia)

STRAIGHTSOL

STRAtegies and measures for smarter urban freIGHT SOLutions

Urban areas represent particular challenges for freight transport, both in terms of logistical performance and environmental impact. Past measures suffer from a lack of systematic evaluation and assessment of short and long term effects. There is thus a clear need for a comprehensive approach to urban freight solutions, particularly linking urban to interurban freight movements. The objectives of STRAIGHTSOL are to:

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 England.

Project Coordinator or Contact Person: Jardar Andersen

Organisation: Transportokonomisk Institutt (Norway)

Project Website: www.straightsol.eu

Project Duration: 01.09.2011 - 31.08.2014

Project Partners:

- Transportokonomisk Institutt (Norway)
- Vrije Universiteit Brussel (Belgium)
- CERTH (Greece)
- University of Southampton (United Kingdom)
- Instituto Superior Tecnico (Portugal)
- Centre d'Innovació del Transport (Spain)
- TNO (The Netherlands)
- Univerza v Ljubljani (Slovenia)
- KUEHNE+NAGEL (Greece)
- Oxfam (United Kingdom)
- DHL Exel Supply Chain (Spain)
- Ajuntament de l'Hospitalet de Llobregat (Spain)
- EMEL (Portugal)
- TNT Express Worldwide (The Netherlands)
- GS1 - The Global Language of Business (Norway)

SuperLIB

Smart Battery Control System based on a Charge-equalization Circuit for an advanced Dual-Cell Battery for Electric Vehicles

SuperLIB focuses on smart control system solutions for batteries. To enhance the overall performance, the battery consists of HP and HE cells. This combination 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. The electronic architecture required for the connection of the HP and HE cells enables an efficient management of the current and charge distribution. The architecture will include electronic circuits for charge equalization and DC-DC converters utilizing advanced techniques of zero-current and zero-voltage switching. Safety and control system relevant temperature sensors will be developed for an improved thermal management, 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 smaller and cheaper with still providing the required usable energy content and power performance.

Project Coordinator or Contact Person: Volker Hennige

Organisation: AVL List (Austria)

Project Website: www.superlib.eu

Project Duration: 01.05.2011 - 30.04.2014

Project Partners:

- AVL List (Austria)
- Robert Bosch (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- European Batteries Oy (Finland)
- Fraunhofer Gesellschaft (Germany)
- IFP Energies Nouvelles (France)
- Valeo Equipments Electriques Moteur (France)
- Volvo Technology (Sweden)
- Vrije Universiteit Brussel (Belgium)
- K&S Projektmanagement (Germany)

SYRNEMO

Synchronous Reluctance Next Generation Efficient Motors for Electric Vehicles

SyrNemo is an innovative synchronous reluctance machine (SYRM) with higher power density and higher driving cycle efficiency at lower cost than state of the art permanent magnet (PM) synchronous machines.

- The mass and volume specific power densities are increased by approximately 5%.
- The dependency on rare earth PMs is eliminated by using either no permanent magnets or optional ferrites.
- The proposed rotor design allows for use of future magnet materials with high energy density once they are available on the market.
- The proposed SYRM is easy to manufacture, dismantle, and recycle. This way manufacturing cost can be reduced by 20% and more compared to PM synchronous machines (PMSMs).
- The insulation system will be designed for a total lifetime of 10 years and 10,000 operating hours to reduce cost.
- The proposed SYRM has a high efficiency over a wide range of speed and torque. Therefore, the overall driving cycle efficiency of SYRM can be improved by 5–15% compared to PMSMs.

Project Coordinator or Contact Person: Oliver Winter

Organisation: AIT (Austria)

Project Website: www.syrnemo.eu

Project Duration: 01.10.2013 – 30.09.2016

Project Partners:

- AIT Austrian Institute of Technology GmbH (Austria)
- AVL List GmbH (Austria)
- Centro Ricerche Fiat SpcA (Italy)
- Fundación Tecnalia Research & Innovation (Spain)
- University of Bologna (Italy)
- Leibniz University of Hannover (Germany)
- Thien eDrives GmbH (Austria)
- Vrije Universiteit Brussel (Belgium)

TelliSys

Intelligent Transport System for Innovative Intermodal Freight Transport

The trend towards increasing transport demand - prerequisite for economic growth - is still challenging the European transport system. On the other hand Europe aims to reduce emissions dramatically. A crucial measure achieving this ambitious aim is to lower transport emissions by increasing the share of inherently more resource-friendly modes of transport.

The “Intelligent Transport System for Innovative Intermodal Freight Transport” (TelliSys) will actively promote the EU’s objective of optimizing the performance of intermodal logistic chains and will provide smooth and cooperative interactions between different modes of transport. Scientific aim is to develop an intelligent transport system that is applicable for road (in line with Directive 96/53/EC), rail, short sea and inland shipping, which consists of a modular set of volume-optimised and traceable MegaSwapBoxes (MSB), an adapted tractor, and a trailer for the road transport. Ideas and contributions from the consortium together with the advice of outstanding key players of the transport business guarantee the holistic approach and market acceptance of the project outcomes. TelliSys is the follow-up of the successful TelliBox project and the now modular MSB will be based on the unique selling propositions like stackability, three openable sides, three meters loading height, trimodality, pallet wide and cargo security. In addition, the new developed tractor will provide an extra low fifth wheel height (low deck) designed for volume-optimised road transport and the adapted trailer will be flexible to transport conventional loading units as well as the new MSBs. Within TelliSys, an interdisciplinary European consortium of experts in the field of freight forwarding, manufacturing and science will deliver concepts, prototypes and a proof of concepts via extensive test runs. A complementary bundle of scientific evaluation methods, profitability calculations and risk mitigation actions will guarantee the project success.

Project Coordinator or Contact Person: Sabina Jeschke, Max Klingender

Organisation: RWTH Aachen (Germany)

Project Duration: 01.12.2012 – 30.11.2015

Project Partners:

- RWTH Aachen (Germany)
- Wecon (Germany)
- Wesob (Poland)
- European Intermodal Association (Belgium)
- DAF Trucks (Netherlands)

TRANSFORMERS

Configurable and Adaptable Trucks and Trailers for Optimal Transport Efficiency

Today trucks are designed and optimised towards a limited variance set of usage and for maximum payload. Future trucks-trailers are easily adaptable for each freight, load and mission. And, in the operation phase, the vehicle combination automatically adjusts itself to the actual driving environment (i.e. traffic situation, topology, and payload). This option has large potential to contribute to the achievement of the EC's targets for reducing the consumption of fossil energy resources, increasing transport - and fuel efficiency.
The objective of the project is to develop and demonstrate innovative and energy efficient trucks and load carriers for long distance transport assignments with an improved load efficiency leading to an overall 25% less energy consumption on a t.km basis and a lower impact on the road infrastructure.

This is achieved by the CONCEPT proposed that is based upon the following key innovations:

1) A distributed, modular, and mission adaptable Hybrid-on-Demand (HoD) driveline concept that is applicable to both, existing and future trucks,
2) A pre-standard electric Hybrid-on-Demand Framework that supports a broad market introduction of hybrid commercial vehicles and provides planning certainty for future RTD activities.
3) Mission-based configurable aerodynamic overall truck-trailer design (toolbox);
4) Loading efficiency optimised trailer interior design (toolbox);

TransFormers focus on achieving these key innovations within the existing European legal and regulatory framework in terms of dimensions, weight and loads.
The main results of the project will be:

- Key performance indicators and use cases
- Holistic simulation study results for the design of the Hybrid on demand driveline concepts and use for optimal component selection
- HoD driveline concept defined, implemented and demonstrated in truck (semi) trailers
- Tool box with a set of aerodynamic solutions and trailer concepts for optimised transport efficiency (loading)

Project Coordinator or Contact Person: Joakim Svensson

Organisation: Volvo (Sweden)

Project Duration: 01.07.2013 – 31.01.2017

Project Partners:

- Volvo Technology AB
- Robert Bosch GmbH
- DAF Trucks NV
- Daimler AG
- FEHRL
- Fraunhofer-Gesellschaft zur Foerderung der angewandten Forschung E.V.
- IFSTTAR
- International Road Transport Union ASBL
- Procter & Gamble
- Eurocor N.V.
- Schmitz Cargobull AG
- TNO
- Uniresearch BV
- Van Eck Group
- Kompetenzzentrum – Das Virtuelle Fahrzeug Forschungsgesellschaft mbH

UNPLUGGED

Wireless charging for Electric Vehicles

The UNPLUGGED project aims to investigate how the use of inductive charging of Electric Vehicles (EV) in urban environments improves the convenience and sustainability of car-based mobility. In particular, it will be investigated how smart inductive charging infrastructure can facilitate full EV integration in the urban road systems while improving customer acceptance and perceived practicality. UNPLUGGED will achieve these goals by examining in detail the technical feasibility, practical issues, interoperability, user perception and socio-economic impacts of inductive charging. As one special variant, inductive en-route charging will be investigated thoroughly. As part of the project, two smart inductive charging systems will be built, taking into consideration requirements from OEMs, energy utilities and end users. The systems will be innovative and will go beyond the current state of the art in terms of high power transfer, allowing for smart communication between the vehicle and the grid, as well as being in line with the latest inductive charging standards and considering interoperability. These innovative inductive charging systems designed and built as part of the project will then be tested and assessed in order to understand their potential impacts on urban mobility and the acceptance of e-mobility. Application in an en-route charging scenario in particular will be examined for different vehicle types, ranging from cars to buses. It is anticipated that UNPLUGGED will provide clear evidence on and demonstrate whether the use of smart inductive charging infrastructure can overcome some of the perceived barriers for e-mobility, such as range and size of on-board energy storage, and practical difficulties associated with installing traditional charging post infrastructure. UNPLUGGED will also include a feasibility study and economic model for dynamic en-route inductive charging. This technology is currently less mature than static en-route charging, however, it has the potential to provide larger improvements to the range and cost of EVs.

Project Coordinator or Contact Person: Stefano Persi

Organisation: ENIDE (Spain)

Project Website: www.unplugged-project.eu

Project Duration: 01.10.2012 – 31.03.2015

Project Partners:

- ENIDE (Spain)
- Forschungsgesellschaft Kraftfahrwesen Aachen (Germany)
- CRF - Centro Ricerche Fiat (Italy)
- Università degli Studi di Firenze (Italy)
- Volvo Technology Corp (Sweden)
- Continental Automotive (Germany)
- Hella (Germany)
- Vrije Universiteit Brussel (Belgium)
- IDIADA Automotive Technology (Spain)
- Transport Research Laboratory (United Kingdom)
- Commissariat-à-l'Energie-Atomique (France)
- Endesa (Spain)
- Enel Distribuzione (Italy)
- FUNDACION CIRCE (Spain)
- Politecnico di Torino (Italy)
- Transport for London (United Kingdom)
- BAE Systems (United Kingdom)

URBAN-EV

Super Light Architectures for Safe and Affordable Urban Electric Vehicles

URBAN-EV will apply innovative manufacturing technologies and materials to produce prototypes of a 2-seat urban electric vehicle with considerably enhanced autonomy vs. the SoTA EV of its kind, and a similar occupant safety level than normal passenger cars. Specifically, a purely electric range (in urban conditions) of 150 Km is targeted as well as a compelling acceleration time of 10 s for 0-100 Km/h. The platform where these innovations will be introduced is the Casple-EV with an overall target weight of about 720 Kg including the battery.

In order to achieve the goals, a new lighter architecture will be designed, manufactured and demonstrated with enhanced engineering reliability for the principal systems of the vehicle such as chassis and body in white as well as several interior parts. Main construction materials will be light alloys and low cost polymeric composites, which will be combined using an advanced multi-material design approach. Complementary to the innovations in vehicle's architecture, a braking system with enhanced energy recuperation capacity will be developed and demonstrated. Furthermore, cost efficient, high integrity manufacturing processes will be applied liable to execute more functions without increasing cost.

Project Coordinator or Contact Person: Christian Diefenbach

Organisation: Fraunhofer-Institute for Structural Durability and System Reliability LBF (Germany)

Project Duration: 01.09.2013 – 31.08.2016

Project Partners:

- Fraunhofer LBF (Germany)
- Fundacion Cidaut (Spain)
- Leichtmetall Kompetenzzentrum Ranshofen (AIT-LKR) (Austria)
- Fonderia Maspero (Italy)
- Grupo Antolin-Ingenieria (Spain)
- PST Products (Germany)
- PE International (Germany)
- Tubitak (Turkey)
- Casple (Spain)
- Creadora New Business Concepts (Spain)

V-FEATHER

InnoVative Flexible Electric Transport

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. 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.

Project Coordinator or Contact Person: Aazir Khan

Organisation: Ayton Willow (United Kingdom)

Project Duration: 01.07.2012 - 31.10.2015

Project Partners:

- Ayton Willow (United Kingdom)
- Cranfield University (United Kingdom)
- Tuk Tuk Factory (The Netherlands)
- DENSO Automotive (Germany)
- Cleancarb (Luxemburg)
- Technische Universität Hamburg Harburg (Germany)
- Kings College London (United Kingdom)
- CRP Henri Tudor (Luxemburg)
- Timoney Technology (Ireland)

WIDE-MOB

Building blocks concepts for efficient and safe multiuse urban electrical vehicles

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 Lightweight and low cost bodies designed for high safety under both frontal and lateral crash.
- Application of EMC-EMR and low frequency electromagnetic field (EMF) design concepts based on "prudent avoidance practices" for field mitigation on occupants.
- Solar panels distributed on both horizontal and vertical surfaces with adaptive electronic for a higher range of operation and minimal needs of infrastructures.

Project Coordinator or Contact Person: Andrea Pipino

Organisation: CRF - Centro Ricerche Fiat (Italy)

Project Website: eeepro.shef.ac.uk/wide-mob/index.html

Project Duration: 01.12.2010 - 30.11.2013

Project Partners:

- CRF - Centro Ricerche Fiat (Italy)
- University of Sheffield (United Kingdom)
- STMicroelectronics (Italy)
- IFP Energies Nouvelles (France)
- DuPont (Switzerland)
- Polimodel (Italy)
- Warsaw University of Technology (Poland)

WINN

European Platform Driving KnoWledge to INNovations in Freight Logistics

European Platform Driving KnoWledge to INNovation in Freight Logistics, WINN, is a step forward to increase collaboration and consensus building of the different stakeholders dealing with sustainability in the freight transport logistics and intermodality. Sustainability is a major challenge for the sector. New policies, regulatory measures and financial mechanisms will be required to ensure the implementation of new technologies and business processes that enable the European sector to reach sustainability and competitiveness targets.

WINN project will establish a broad collaboration framework built upon main stakeholders operating at European level (CO-Tree, EIRAC heritage) and national triple helix networks that include public bodies, companies, and excellence research centres in logistics operating in different countries in Europe.

WINN will focus on sustainability, efficiency, and competitiveness of intermodal freight transport allowing economic growth. Some key approaches to reach these goals are:

Reducing the indicator (Ton*Km) of the goods physically transported for a given economic growth, for example optimizing the complete supply chains (engineering, manufacturing and distribution processes).

Modal shift solutions to "greener" modes (rail, maritime and inland waterways) and choosing the most sustainable combination of transport modes for long distance transport including optimised freight corridors.

Increasing load factors and choosing the most efficient routes avoiding congestion through collaboration.

Applying a seamless logistics chain that operates without failures, breaches, and redundant operations, minimizing the operations required, leveraging information flows to reduce failures and bureaucracy.

Efficient interfaces in the transport system and innovative information and communication services for the optimised use of co-modal freight transport management making co-modal transport operation as easy as door to door trucking.

Strategic objective of WINN:

- Build a collaboration framework between already established networks in freight logistics operating in different areas and in different geographical levels.

Operational objectives of WINN:

- Develop a supporting framework for innovation implementation in sustainable freight logistics at European and National levels.
- Establish joint network assessment of policies, regulatory measures, financial mechanisms and socioeconomic aspects to broaden logistics market and benefit innovation penetration.
- Disseminate and exploitation support for project results and outcomes.

Project Coordinator or Contact Person: Fernando Liesa

Organisation: Centro Nacional de Competencia en Logística Integral (Spain)

Project Website: www.winn-project.eu

Project Duration: 01.10.2012 – 31.03.2015

Project Partners:

- Centro Nacional de Competencia en Logística Integral - CNC-LOGISTICA (Spain)
- Dutch Institute for Advanced Logistics (Netherlands)
- European Earth Friendly Logistics Association (Belgium)
- Instytut Logistyki i Magazynowania - ILiM (Poland)
- Enide Solutions, SL - ENIDE (Spain)
- Bluegreen Strategy srl - BLUEGREEN (Italy)

ZeEUS

Zero Emission Urban Bus Systems

ZeEUS – Answering environmental urban challenges through the electrification of urban buses

UITP coordinates a consortium of 40 partners to work on the 42-months demonstration project ZeEUS aiming at extending the fully-electric solution to a wider part of the urban bus network. Developing electric vehicles of large capacity and creating an infrastructure able to provide the required charging energy will facilitate the market up-take of electric buses in Europe. ZeEUS covers innovative electric bus solutions with different electric powertrain systems to be demonstrated in 8 cities: Barcelona, Bonn, Glasgow, London, Münster, Plzen, Rome and Stockholm. ZeEUS' analyses will allow developing guidelines and tools to support stakeholders in efficiently introducing electrified bus systems in European cities. As the coming years will see many pilots, demonstrations and purchases of electric vehicles, an Observatory will be set-up to discuss the progress of bus systems electrification in Europe and contribute to the definition of strategies for electric bus fleets deployment.

Project Coordinator or Contact Person: Umberto Guida

Organisation: UITP (Belgium)

Project Duration: To be announced
Duration: 42 Months

Project Partners:

- Union Internationale des Transports Publics – UITP (Belgium)
- Transports de Barcelona SA (Spain)
- Endesa SA (Spain)
- Enide Solutions .S.L (Spain)
- Universitat Politechnica de Catalunya (Spain)
- Idiada Automotive Technology (Spain)
- Azienda per la Mobilita del Comune di Roma SPA (Italy)
- D'Appolonia SPA (Italy)
- Rheinisch-Westfälische Technische Hochschule Aachen (Germany)
- Helmut Berends (Germany)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V 9 (Germany)
- Solaris Bus & Coach S.A. (Poland)
- Skoda Electric a.s. (Czech Republic)
- Volvo Bus Corporation (Sweden)
- Stadtwerke Münster GmbH (Germany)
- Západočeská Univerzita v Plzni (Czech Republic)
- Grupo Mecanica Del Vuelo Sistemas, S.A. (Spain)
- Union of the Electricity Industry - EURELECTRIC AISBL (Belgium)
- Hochschule Landshut (Germany)
- VDL Bus & Coach BV (Netherlands)
- Vattenfall AB (Sweden)
- Stadtwerke Bonn Verkehrs GmbH (Germany)
- Plzeňské městské dopravní podniky, a.s. (Czech Republic)
- Plzeňská teplárenská, a.s. (Czech Republic)
- Storstockholms Lokaltrafik AB SL (Sweden)
- Transport for London TFL (UK)
- Transport & Travel Research Ltd (UK)
- TRL Limited (UK)
- Teknologian Tutkimuskekus VTT (Finland)
- Alexander Dennis Limited (UK)
- PE International AG (Germany)
- Universita degli Studi di Roma la Sapienza (Italy)
- ASSTRA - Associazione Trasporti (Italy)
- It Forskningsinstitutet Viktoria AB (Sweden)
- Verband Deutscher Verkehrsunternehmen (Germany)
- POLIS – Promotion of Operational Links with Integrated Services (Germany)
- Scottish and Southern Energy PLC (UK)
- Union des Transports Publics UTP (France)
- Strathclyde Partnership for Transport (UK)
- IRIZAR (Spain)

Imprint

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CAPIRE
www.capire.eu

Smart EVVC
www.smartev-vc.eu

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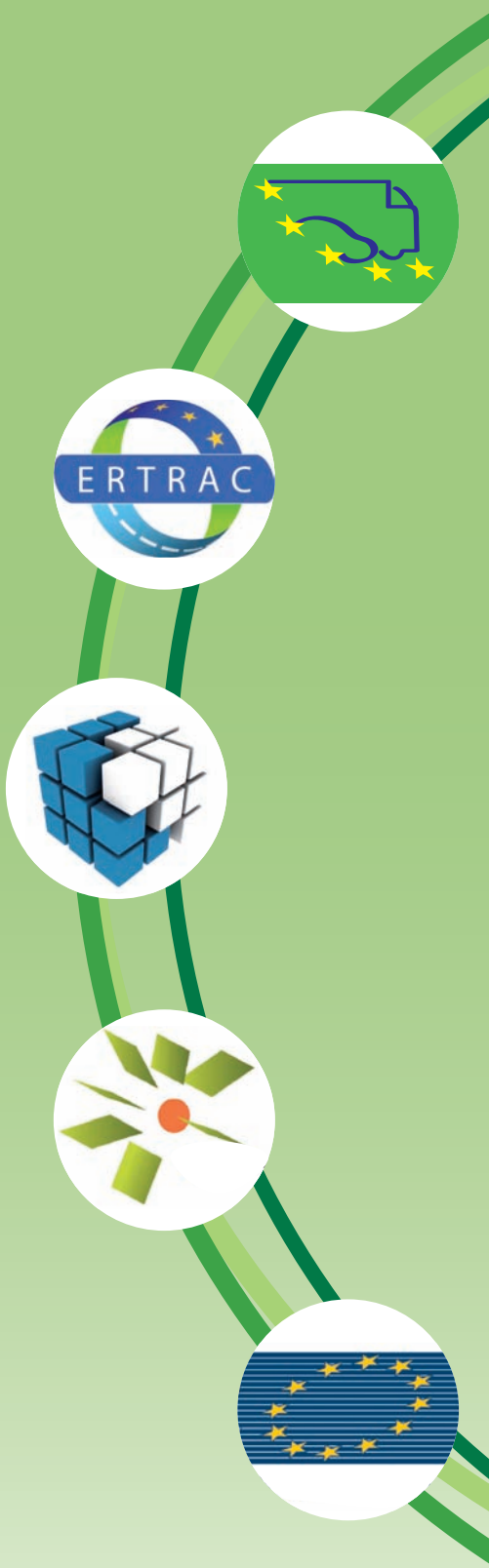

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