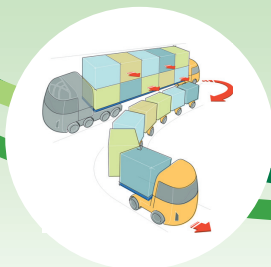




# Project Portfolio

## European Green Cars Initiative PPP



**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, 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. Two 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 and fourth rounds of calls will be published in mid-2011 and 2012.

The brochure at hand is containing the portfolio of projects of the European Green Cars Initiative which have started already or are in the final stages of evaluation. 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 in support of the PPP European Green Cars Initiative, CAPIRE and ICT4FEV, will continue to serve the community with information, dissemination and opportunities for networking, giving feedback and seeking advice.

# Projects

## 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

#### Project Partners:

- ▶ RECUPYL SAS
- ▶ TEMIC AUTOMOTIVE ELECTRIC MOTORS GMBH
- ▶ KIEV NATIONAL UNIVERSITY OF TECHNOLOGIES AND DESIGN
- ▶ ERAS LABO SARL
- ▶ CAE
- ▶ PRAYON S.A
- ▶ VOLVO TECHNOLOGY AB
- ▶ RENAULT S.A.S
- ▶ INSTITUT POLYTECHNIQUE DE GRENOBLE
- ▶ WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER
- ▶ UNIVERSITA DI BOLOGNA

## 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,  $\text{LiNi}_0.5\text{Mn}_1.5\text{O}_4$ , 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

#### Project Partners:

- ▶ Chalmers Tekniska Högskola AB
- ▶ Chemetall GmbH
- ▶ ENI S.p.A.
- ▶ ETC Battery and FuelCells Sweden AB
- ▶ Hydro-Eco, Sapienza Università di Roma
- ▶ SAES Getters S.p.A.
- ▶ Stena Metall AB
- ▶ Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Württemberg

## AUTOSUPERCAP

### Development of High Energy/ High Density Supercapacitors for Automotive Applications



Supercapacitors 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, organisations, highly experienced industrialists, and highly active SMEs to tackle the problems. As a result, we are aiming at developing supercapacitors of both high power and high energy density at affordable levels by the automotive industry, and of higher sustainability than many current electrochemical storage devices.

#### Project Coordinator

or

**Contact Person:** Constantina Lekakou

**Organisation:** University of Surrey

#### Project Partners:

- ▶ MAST Carbon International
- ▶ NCSR-Demokritos
- ▶ Bayer Technology Services GmbH
- ▶ Centro Ricerche Fiat SCPA
- ▶ IMCB-Consiglio Nazionale Delle Ricerche
- ▶ Oerlikon Graziano SpA
- ▶ Karlsruhe Institute of Technology
- ▶ AGM Batteries Ltd

## 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<sub>2</sub>-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:** Gonzalo Hennequet

**Organisation:** Renault

**Website:** [www.capire.eu](http://www.capire.eu)

#### Project Partners:

- ▶ AVL
- ▶ CRF
- ▶ Volvo
- ▶ VDI/VDE-IT
- ▶ BOSCH
- ▶ VALEO
- ▶ IBERDROLA
- ▶ TfL
- ▶ Continental
- ▶ Hidira
- ▶ P&G
- ▶ TÜV Rheinland
- ▶ SOLARIS

## 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

**Website:** [www.easybat-project.eu](http://www.easybat-project.eu)

### Project Partners:

- ▶ CRF
- ▶ VW
- ▶ SINTEF
- ▶ FICOSA
- ▶ University of Sheffield
- ▶ Magnomatics

## CO<sup>3</sup> Collaborative Concepts for Comodality



CO<sup>3</sup> 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<sup>3</sup> 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

### Project Partners:

- ▶ Argus
- ▶ Kneppelhout & Korthals
- ▶ Dutch Institute for Advanced Logistics
- ▶ Heriot Watt University
- ▶ TRI-Vizor
- ▶ Procter & Gamble Eurocor
- ▶ Cranfield University
- ▶ Zaragoza Logistics Center
- ▶ ELUPEG
- ▶ Instituto Tecnológico Del Embalaje
- ▶ Wincanton
- ▶ Jan de Rijk Logistics
- ▶ Planung Transport Verkehr
- ▶ Mines Paris Tech
- ▶ Pastu Consult
- ▶ Giventis
- ▶ D'Appolonia



## 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 a cooperation between European e-Freight projects as well as industry driven initiatives like LIM (Logistics Interoperability Model) of GS-1.

Demonstrations will take place in 3 business cases through ports of Antwerp and Rotterdam, involving DHL, MSC and ECT.

#### Project Coordinator

or

**Contact Person:** Frank Knoors

**Organisation:** Logit Systems BVBA

#### Project Partners:

- ▶ Zemblaz NV (Descartes)
- ▶ DHL Global Forwarding - DHL Management Ltd.
- ▶ MSC Belgium NV
- ▶ Cargo Community System VZW
- ▶ Belgian Administration of Customs and Excises
- ▶ TNO
- ▶ ECT Participations B.V.
- ▶ BMT Group Limited
- ▶ Marlo AS
- ▶ Inlecom Systems (ILS)
- ▶ ILIM Institute of Logistics and Warehousing
- ▶ Bluegreen Strategy srl

## CORE

### CO<sub>2</sub> Reduction for Long Distance Transport

The objective of the project is to demonstrate a substantial reduction of CO<sub>2</sub> emissions and fulfilling EuroVI emission legislation. By using novel technology and combine them in flexible engines with high level of precise control, performance advantages will be achieved with improved emissions and fuel consumption. The research will focus on efficient air management, combustion and control for the diesel engine, together with optimizing the powertrain layout utilizing electric hybridization, downsizing and alternative fuels.

Research to the aftertreatment system is included to further improve the powertrain efficiency. This will be combined improvements to the base engine friction for developing highly efficient drivelines for long distance transports.

CORE is divided into five sub-projects, three that will focus on different engine technologies. These activities are supported by two cross divisional projects where friction reduction and improvements to the NO<sub>x</sub> aftertreatment are studied. The project results will be assessed by vehicle simulations. The results will be evaluated for legislation test cycles and with real life drive cycles.

#### Project Coordinator

or

**Contact Person:** Ronny Lindgren

**Organisation:** Volvo

#### Project Partners:

- ▶ Centro Ricerche Fiat S.C.p.A
- ▶ Chalmers University of Technology
- ▶ Daimler AG
- ▶ Federal Mogul
- ▶ Gottfried Wilhelm Leibniz Universität Hannover
- ▶ Honeywell
- ▶ IAV GmbH Ingenieurgesellschaft Auto und Verkehr
- ▶ Johnson Matthey
- ▶ Joint Research Centre - European Commission
- ▶ Metatron
- ▶ Politecnico di Milano
- ▶ Politecnico di Torino
- ▶ Rhodia
- ▶ Ricardo UK Ltd
- ▶ Umicore



## 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 University  
Institut für Kraftfahrzeuge (ika)

#### Project Partners:

- ▶ RWTH Aachen University
- ▶ Centro Ricerche Fiat
- ▶ Volkswagen
- ▶ Michelin
- ▶ CEGASA
- ▶ POLIS
- ▶ SP
- ▶ HPL Prototypes





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

**Website:** [www.e3car.eu](http://www.e3car.eu)

#### Project Partners:

- ▶ Infineon Technologies AG
- ▶ ATMEL Automotive GmbH
- ▶ Austriamicrosystems
- ▶ ON Semiconductor
- ▶ Robert Bosch GmbH
- ▶ STIFTELSEN SINTEF
- ▶ ElBil Norge AS
- ▶ Think Global AS
- ▶ Centro Ricerche Fiat
- ▶ STMicroelectronics S.r.l.
- ▶ Fraunhofer-Gesellschaft
- ▶ STMicroelectronics
- ▶ Consejo Superior de Investigaciones Científicas
- ▶ Fundación CIDETEC
- ▶ Okmetic
- ▶ VTI
- ▶ VTT
- ▶ Alcatel Thales III-V Lab
- ▶ Audi
- ▶ Tyndall National Institute
- ▶ IMA
- ▶ ATMEL France
- ▶ CISC Semiconductor
- ▶ VALEO
- ▶ Consiglio Nazionale delle Ricerche
- ▶ FH-JOANNEUM Gesellschaft mbH
- ▶ Technische Universität Wien
- ▶ SIEMENS
- ▶ Brno University of Technology
- ▶ CEA LETI
- ▶ Infineon Austria
- ▶ Philips Electronics Nederland B.V.
- ▶ Epyon

E<sup>3</sup>Car is, though associated with the European Green Cars Initiative, a project launched within the JTI ENIAC.

## EASYBAT

### Models and Generic Interfaces for EASY and Safe BATTERY Integration and Swap in EV (EASYBAT)



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 Ltd

**Website:** [www.easybat-project.eu](http://www.easybat-project.eu)

#### Project Partners:

- ▶ BETTER PLACE LABS ISRAEL LTD
- ▶ TUV RHEINLAND KRAFTFAHRT GMBH
- ▶ CONTINENTAL ENGINEERING SERVICES GMBH
- ▶ FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V
- ▶ ERNST & YOUNG (ISRAEL) LTD
- ▶ UNIVERSITY OF HAIFA
- ▶ RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN

## 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 A.S.

#### Project Partners:

- ▶ PININFARINA S.p.A
- ▶ PTV Planung Transport Verkehr AG
- ▶ Fundacion Tecnalia Research and Innovation
- ▶ HI-IBERIA Ingenieria Y Proyectos SL
- ▶ University of Bradford
- ▶ Instytut Transportu Samochodowego – Motor Transport Institute
- ▶ Institute of Communication and Computer Systems
- ▶ COSMOTE Mobile Telecommunications SA
- ▶ SOFTECO Sismat S.p.A.
- ▶ NAVTEQ B.V.



## 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 consumption. 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

**Website:** ecoshell.eu

#### Project Partners:

- ▶ CITI Technologies
- ▶ CRANFIELD UNIVERSITY
- ▶ VALTION TEKNILLINEN TUTKIMUSKESKUS (VTT)
- ▶ FRAUNHOFER Institut für Chemische Technologie
- ▶ Université Henri Poincaré - ENSTIB 1
- ▶ MAHYTEC
- ▶ Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC)
- ▶ CADLM
- ▶ GRM Consulting Ltd

## 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 GmbH

#### Project Partners:

- ▶ Volkswagen
- ▶ Renault
- ▶ Centro Ricerche Fiat S.C.p.A.
- ▶ RWE
- ▶ ENDESA
- ▶ CEA List
- ▶ IBM
- ▶ Atos Origin
- ▶ TRIALOG
- ▶ TU Dortmund
- ▶ Knowledge Inside
- ▶ Eurisco
- ▶ ATB Bremen
- ▶ Broadbit
- ▶ Mitsubishi



## 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 GmbH & Co. KG

**Website:** [www.efuture-eu.org](http://www.efuture-eu.org)

#### Project Partners:

- ▶ Tata Motors European technical Centre PLC
- ▶ MILJØBIL GRENLAND AS
- ▶ Hella KGaA Hueck & Co.
- ▶ Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux (IFSTTAR)
- ▶ Würzburger Institut für Verkehrswissenschaften (WIVW)

## ELECTROGRAPH

### Graphene-based Electrodes for Application in Supercapacitors (ElectroGraph)

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

#### Project Partners:

- ▶ Fraunhofer Institute for Manufacturing Engineering and Automation
- ▶ Danubia NanoTech s.r.o. (Ltd.)
- ▶ Institute of Occupational Medicine
- ▶ Trinity College Dublin
- ▶ Centro Ricerche Fiat S.C.p.A.
- ▶ Instituto Nacional del Carbon - Consejo Superior de Investigaciones Científicas
- ▶ The University of Nottingham
- ▶ The Université Paris Diderot –Paris 7
- ▶ Maxwell Technologies SA
- ▶ The University of Exeter





## 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

**Website:** [www.elight-project.eu](http://www.elight-project.eu)

#### Project Partners:

- ▶ Tecnalia
- ▶ USFD (University of Sheffield)
- ▶ EAST-4D
- ▶ Ricardo
- ▶ PININFARINA
- ▶ POLE VEHICULE DU FUTUR

## 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 (ika)

**Website:** [www.elva-project.eu](http://www.elva-project.eu)

#### Project Partners:

- ▶ Continental Automotive
- ▶ Centro Ricerche Fiat
- ▶ IDIADA Automotive Technology
- ▶ Renault
- ▶ SAFER
- ▶ Volkswagen

## EM-Safety

### EM-Safety

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

#### Project Partners:

- ▶ Prysmian Limited
- ▶ Centro Ricerche Fiat S.C.p.A
- ▶ Gottfried Wilhelm Leibniz Universität Hannover
- ▶ Mira Limited
- ▶ Foundation of Turin University and San Giovanni Battista Hospital
- ▶ CEA-LETI
- ▶ Istituto PM s.r.l.
- ▶ University of Technology Braunschweig
- ▶ TAMAG Iberica S.L

## 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<sub>2</sub> footprint, E&D preferences, other user-specific options.

#### Project Coordinator

or

**Contact Person:** Vassilis Spitadakis

**Organisation:** HELLENIC TELECOMMUNICATIONS & TELEMATICS APPLICATIONS COMPANY

#### Project Partners:

- ▶ AUEB-RC/TRANSLOG
- ▶ ETRA INVESTIGACIÓN Y DESARROLLO
- ▶ TNO
- ▶ UNIABDN
- ▶ NEXTANT SPA
- ▶ TELESPAZIO SPA
- ▶ NIAS
- ▶ BEIJING TRANSPORTATION RESEARCH CENTRE
- ▶ POLIS
- ▶ EMPRESA MUNICIPAL DE TRANSPORTES DE MADRID S.A.
- ▶ RJ CONSULTORES
- ▶ TOM TOM INTERNATIONAL NV
- ▶ REISINFORMATIEGROEP BV



## 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 ultracapacitor 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

**Website:** www.estrelia.eu

#### Project Partners:

- ▶ Valeo Electrical Systems
- ▶ Fraunhofer Gesellschaft IISB
- ▶ Corning SAS
- ▶ Austrian Battery Research Laboratory GmbH
- ▶ Applied Sensors GmbH
- ▶ CEA LETI
- ▶ Active Technologies S.R.L
- ▶ E4V

## 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 LiFePO<sub>4</sub> cells cannot reach the energy density criterion, and in addition, LiFePO<sub>4</sub> 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 LiCoO<sub>2</sub>). 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

#### Project Partners:

- ▶ Centre National de la Recherche Scientifique
- ▶ Uppsala Universitet
- ▶ KEMIJSKI INSTITUT
- ▶ UNIVERSITY OF CAMBRIDGE
- ▶ POLITECHNIKA WARSZAWSKA
- ▶ VOLVO TECHNOLOGY AB
- ▶ RENAULT
- ▶ SPIJKSTAAL ELEKTO B.V.
- ▶ GAIA AKKUMULATORENWERKE GmbH
- ▶ COMMISSARIAT A L' ENERGIE ATOMIQUE
- ▶ ZENTRUM FUER SONNENENERGIE- UND WASSERSTOFF-FORSCHUNG, BADEN-WUERTEMBERG
- ▶ ÖSTERREICHISCHES FORSCHUNGS- UND PRÜFZENTRUM ARSENAL GES.M.B.H.



## eVADER

### eVADER

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

#### Project Partners:

- ▶ Technische Universität Darmstadt
- ▶ LMS-International
- ▶ Österreichisches Forschungs- und Prüfzentrum Arsenal GmbH
- ▶ TNO - Netherlands Organisation for Applied Scientific Research
- ▶ Institut National des Sciences Appliquées de Lyon
- ▶ NISSAN Motor Manufacturing UK Limited
- ▶ RENAULT
- ▶ Peugeot Citroën Automobiles S.A.
- ▶ CONTINENTAL Automotive France SAS
- ▶ European Blind Union

## 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

#### Project Partners:

- ▶ Technische Universität Ilmenau
- ▶ Jaguar Cars Limited / Land Rover
- ▶ Flanders' Drive CVBA-SO
- ▶ Inverto NV
- ▶ Fundacion CIDAUT
- ▶ Instituto Tecnológico de Aragon
- ▶ Skoda Auto AS
- ▶ Kompetenzzentrum - Das virtuelle Fahrzeug Forschungsgesellschaft mbH
- ▶ TRW Automotive -Lucas Varity GmbH



## 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:** Cor van der Zweep

**Organisation:** Uniresearch BV

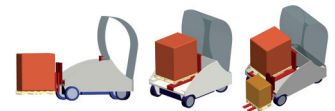
**Website:** [www.fuerex.eu](http://www.fuerex.eu)

#### Project Partners:

- ▶ AVL List GmbH
- ▶ AVL-SCHRICK GmbH
- ▶ ALTRA SpA
- ▶ Centro Ricerche FIAT SCPA
- ▶ Chalmers Tekniska Hoegskola SHC
- ▶ Robert Bosch GmbH
- ▶ Volvo Personvagnar AB

## FURBOT

### FURBOT



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:** Rezia Molfino

**Organisation:** DIMEC - Università di Genova



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

**Website:** [www.greenemotion-project.eu](http://www.greenemotion-project.eu)

**Project Partners:**

- ▶ Alstom
- ▶ better place
- ▶ Bosch
- ▶ IBM
- ▶ SAP
- ▶ danskenegy
- ▶ eDF
- ▶ endesa
- ▶ Enel
- ▶ ecars
- ▶ eurelectric
- ▶ IBERDROLA
- ▶ EH
- ▶ RWE
- ▶ BMW
- ▶ Daimler
- ▶ MICRO-VETT
- ▶ Nissan
- ▶ Renault
- ▶ Ajuntament de Barcelona
- ▶ beBerlin
- ▶ Bright Green Island Bornholm
- ▶ City of Copenhagen
- ▶ City of Cork
- ▶ Codema
- ▶ Ayuntamiento de Malaga
- ▶ Malmö stad
- ▶ Roma Capitale
- ▶ CARTIF
- ▶ Cidaut
- ▶ DTU
- ▶ CTL
- ▶ ECN
- ▶ Imperial College London
- ▶ IREC
- ▶ RSE
- ▶ Trinity College Dublin
- ▶ Tecnalia
- ▶ Danish Technological Institute
- ▶ Fka
- ▶ TÜV Nord



## 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 analysed “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 SAS

**Website:** [www.helios-eu.org](http://www.helios-eu.org)

#### Project Partners:

- ▶ OPEL
- ▶ PCA
- ▶ Volvo
- ▶ Ford
- ▶ CRF
- ▶ CNRS
- ▶ Uppsala University
- ▶ RWTH
- ▶ Umicore
- ▶ INERIS
- ▶ ZSW
- ▶ EDF
- ▶ JCHAR
- ▶ Arsenal (AIT)
- ▶ CEA
- ▶ ENEA
- ▶ SAFT

## 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

**Website:** [www.hiwi-eu.org](http://www.hiwi-eu.org)

#### Project Partners:

- ▶ University of Sheffield
- ▶ I.P.M SRL
- ▶ FIAT CRF
- ▶ STM Micro SRL
- ▶ CEDRAT
- ▶ SIEMENS



## ICE

### Thermal System Integration for Fuel Economy



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:** Centro Ricerche Fiat

**Website:** [www.ice-mac-ev.eu](http://www.ice-mac-ev.eu)

#### Project Partners:

- ▶ Cooltech Applications SAS
- ▶ BEHR FRANCE ROUFFACH SAS
- ▶ Universidad Politecnica de Valencia
- ▶ Institut National des Sciences Appliquées, Strasbourg
- ▶ ALTRA SPA

## 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 GmbH

**Website:** [www.ict4fev.eu](http://www.ict4fev.eu)

#### Project Partners:

- ▶ CRF
- ▶ Siemens
- ▶ NXP
- ▶ EADS
- ▶ AVL List



## 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

**Website:** [www.id4ev.eu](http://www.id4ev.eu)

### Project Partners:

- ▶ Continental Teves
- ▶ ZF
- ▶ Continental Automotive
- ▶ Renault
- ▶ fka
- ▶ IDIADA
- ▶ TNO
- ▶ Chalmers
- ▶ ICOOR

## Job VehElec Raising Awareness of Job Opportunities in Vehicle Electrification



The shifting into an electric road transport paradigm will require new dimensions to the traditional skills and capabilities of road transport engineers and technicians. The transition requires not only new approaches to vehicle manufacture and development, but also to road transport education. To ensure that young people (age 15-18) respond to the important and attractive opportunities arising in the transition, JobVehElec will perform Coordination and Support Actions designed for the purposes of:

- ▶ Evaluating and demonstrating job creation in the electrification sector;
- ▶ Encouraging young persons to seek jobs in electrification of road transport; and
- ▶ Arranging communication and stimulation campaigns such as;
  - ▶ Web Portal linking to social media,
  - ▶ Road Show visiting high schools,
  - ▶ Concept Competition and
  - ▶ Summer School.

The partner universities are supported by an Advisory Board of ten industry actors and by the regional networks of the universities.

### Project Coordinator

or

**Contact Person:** Mia Björkil

**Organisation:** Chalmers Industriteknik

**Website:** [www.egomotion.eu](http://www.egomotion.eu)

### Project Partners:

- ▶ Chalmers University of Technology
- ▶ Chalmers University of Technology
- ▶ ARMINES, École des Mines de Paris
- ▶ Karlsruhe Institute of Technology
- ▶ Politecnico di Torino
- ▶ RWTH Aachen University

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 O<sub>2</sub> cathodes making use of IL-based O<sub>2</sub> 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 O<sub>2</sub> from air; and (v) construction of fully integrated rechargeable lithium-Air cells with optimized electrodes, electrolytes, O<sub>2</sub>-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

**Project Partners:**

- ▶ AVL
- ▶ CSIC
- ▶ Tel Aviv University
- ▶ SAES
- ▶ Kiev National University of Technology and Design
- ▶ University of Bologna
- ▶ University of Southampton
- ▶ Chemetall
- ▶ Volkswagen AG
- ▶ ERS

**MAENAD**

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

**MAENAD**

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

**Website:** [www.maenad.eu](http://www.maenad.eu)

**Project Partners:**

- ▶ Centro Recherche FIAT
- ▶ Continental
- ▶ Delphi/Mecel
- ▶ 4S Group
- ▶ MetaCase
- ▶ Pulse-AR
- ▶ Systemite
- ▶ CEA LIST
- ▶ KTH Stockholm
- ▶ TU Berlin
- ▶ University of Hull



## 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:** Centro Ricerche Fiat

#### Project Partners:

- ▶ Volvo Technology Corporation
- ▶ AVL List GmbH
- ▶ Faurecia
- ▶ Dell'Orto
- ▶ University of Liège

## 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 GmbH

**Website:** [www.fp7-opener.eu](http://www.fp7-opener.eu)

#### Project Partners:

- ▶ PCA - PEUGEOT CITROEN AUTOMOBILES S.A.
- ▶ ROBERT BOSCH CAR MULTIMEDIA GMBH
- ▶ AVL List GmbH
- ▶ CTAG - FUNDACION PARA LA PROMOCION DE LA INNOVACION, INVESTIGACION Y DESARROLLO TECNOLOGICO EN LA INDUSTRIA DE AUTOMOCION DE GALICIA
- ▶ FZI - FORSCHUNGSZENTRUM INFORMATIK AN DER UNIVERSITAET KARLSRUHE

## 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

**Website:** <http://optibody.unizar.es>

#### Project Partners:

- ▶ UNIVERSITY OF ZARAGOZA
- ▶ POLITECNICO DI TORINO
- ▶ AUTOMOTIVE INDUSTRY INSTITUTE (PIMOT)
- ▶ IDIADA AUTOMOTIVE TECHNOLOGY SA
- ▶ INSTITUTO DE INVESTIGACION SOBRE REPARACION DE VEHÍCULOS, S.A (CENTRO ZARAGOZA)
- ▶ MONDRAGON AUTOMOCION
- ▶ AMZ-KUTNO Sp. z o.o
- ▶ ITALDESIGN GIUGIARO
- ▶ ZAKLAD KOMPOZYTOW SP. Z O.O. (BELLA)
- ▶ SSAB

## 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<sub>2</sub> 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 Ltd.

#### Project Partners:

- ▶ Autoliv
- ▶ CRF
- ▶ Ficosa
- ▶ Cracow University
- ▶ Magneti Marelli
- ▶ Valence
- ▶ ZF-fka



## 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

**Website:** [www.picav.eu](http://www.picav.eu)

#### Project Partners:

- ▶ INRIA
- ▶ UCL
- ▶ Università di Pisa
- ▶ Serviços Municipalizados de Transportes Colectivos do Barreiro
- ▶ ZTS VVÚ KOŠICE a.s.
- ▶ Mazel Ingenieros, S. A.

## 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:** Pietro Perlo

**Organisation:** Centro Ricerche Fiat S.c.p.A.

**Website:** [www.eepro.shef.ac.uk/p-mob](http://www.eepro.shef.ac.uk/p-mob)

#### Project Partners:

- ▶ Centro Ricerche Fiat S.c.p.A.
- ▶ Siemens
- ▶ University of Sheffield
- ▶ Magnomatics
- ▶ Integrare
- ▶ Mazel
- ▶ Polimodel

## 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:** Centro Ricerche Fiat S.c.p.A.

**Website:** [www.artemis-pollux.eu](http://www.artemis-pollux.eu)

#### Project Partners:

- ▶ STMicroelectronics S.r.l.
- ▶ NXP SEMICONDUCTORS
- ▶ Austriamicrosystems AG
- ▶ ON Semiconductor
- ▶ STIFTELSEN SINTEF
- ▶ Pure Mobility AS
- ▶ Think Global AS
- ▶ Austria Institute of Technology
- ▶ CEA LETI
- ▶ Continental
- ▶ Infineon Austria
- ▶ CISC Semiconductor Design+Consulting GmbH
- ▶ Consejo Superior de Investigaciones Científicas
- ▶ Integre
- ▶ Università di Pisa
- ▶ PSA PEUGEOT CITROEN
- ▶ AVL
- ▶ QinetiQ Ltd
- ▶ Kompetenzzentrum - Das Virtuelle Fahrzeug
- ▶ University of Sheffield
- ▶ Institut mikroelektronických aplikací s.r.o.
- ▶ Politecnico di Torino
- ▶ Asociación De Investigación Y Cooperación Industrial De Andalucía
- ▶ GREENPOWER SL
- ▶ FICOSA SA
- ▶ Triphase
- ▶ Brno University of Technology
- ▶ NXP Semiconductors Germany GmbH
- ▶ AVL Software and Functions GmbH
- ▶ FH-JOANNEUM Gesellschaft mbH
- ▶ TTTech Computertechnik AG
- ▶ Duracar Holding B.V.
- ▶ Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H.
- ▶ Infineon
- ▶ Universidad Autónoma de Barcelona

Pollux is, though associated with the European Green Cars Initiative, a project launched within the JTI ARTEMIS.



## 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% CO<sub>2</sub> 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 CO<sub>2</sub> emissions with respect to the 2005 values and 20% lower CO<sub>2</sub> 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

**Website:** [www.powerful-eu.org](http://www.powerful-eu.org)

#### Project Partners:

- ▶ Volkswagen
- ▶ AVL
- ▶ FEV
- ▶ IFPEN
- ▶ LMM
- ▶ UPVLC
- ▶ JBRC
- ▶ ECOCAT
- ▶ RWTH-VKA
- ▶ PUT-ISSIT
- ▶ MM-PWT
- ▶ UNIGE
- ▶ TEKINIKER
- ▶ TUL
- ▶ JRC
- ▶ CRF
- ▶ DELPHI

## PowerUp

### PowerUp



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

**Website:** [www.power-up.org](http://www.power-up.org)

#### Project Partners:

- ▶ Centro Ricerche Fiat
- ▶ Corinex
- ▶ DENSO
- ▶ ETSI
- ▶ ICCS
- ▶ Itron
- ▶ Systema
- ▶ Technolution
- ▶ Volvo Technology
- ▶ Public Power Corporation of Greece



## SmartBatt

### Smart and Safe Integration of Batteries in Electric Vehicles



The objective of SmartBatt is to develop and proof an innovative, multifunctional, light and safe concept of an energy storage system which is integrated in the pure electric car's structure. The main challenges of this smart integration are the combination of lightweight design with a high safety level against all kinds of hazards, the optimization of functions and the intelligent design of interfaces to various on-board systems.

The expertise of all partners comprises complete vehicle competence, electrics, electronics, batteries, lightweight design, engineering, materials, testing and validation.

The consortium consists of 4 industrial (incl. 2 SMEs) and 5 research partners from 5 European countries. The exploitation is not limited to the partners but results will be distributed on different ways e.g. project website, papers or trainings as well as face-to-face workshops and meetings with OEMs.

#### Project Coordinator

or

**Contact Person:** Elisabeth Dörr

**Organisation:** Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H..

**Website:** [www.smartbatt.eu](http://www.smartbatt.eu)

#### Project Partners:

- ▶ LKR Leichtmetallkompetenzzentrum Ranshofen GmbH
- ▶ Axeon Technologies Limited
- ▶ Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung E.V.
- ▶ Impact Design Europe
- ▶ Ricardo UK limited
- ▶ SP Sveriges Tekniska Forskningsinstitut AB
- ▶ Technische Universität Graz
- ▶ Volkswagen AG

## SMART-LIC

### SMART-LIC



„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 S.A.

#### Project Partners:

- ▶ STMicroelectronics SRL
- ▶ Berliner Nanotest und Design GmbH
- ▶ Centro Ricerche Fiat SCPA
- ▶ Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung e.V.
- ▶ Technische Universität Chemnitz
- ▶ Kemet Electronics Italia SRL
- ▶ Micro-Vett SPA
- ▶ Continental Temic Microelectronic GmbH



## SMARTOP SMARTOP



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

**Website:** [www.smartop.eu](http://www.smartop.eu)

### Project Partners:

- ▶ Trinity College Dublin
- ▶ ADETEL group
- ▶ SolarPrint
- ▶ Imperial College London
- ▶ Infineon
- ▶ University College Dublin
- ▶ Webasto

## SMARTV2G SMARTV2G



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

### Project Partners:

- ▶ Fraunhofer ESK
- ▶ ETREL
- ▶ CIT Developmnet
- ▶ Sapienza Universita di Roma
- ▶ Technomar
- ▶ Elektro Ljubljiana





## 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

**Website:** [www.somabat.eu](http://www.somabat.eu)

#### Project Partners:

- ▶ Université de Liège
- ▶ Kompetenzzentrum – Das virtuelle Fahrzeug Forschungsgesellschaft mbH
- ▶ Kyiv National University of Technologies and Design
- ▶ Institute of Chemistry Timisoara of Romanian Academy
- ▶ CleanCarb
- ▶ Consejo Superior de Investigaciones Científicas
- ▶ Recupyl
- ▶ Accurec
- ▶ Lithium Balance
- ▶ Cegasa Internacional
- ▶ Umicore
- ▶ Atos Origin Sociedad Anónima Española

## STRAIGHTSOL

### STRAIGHTSOL

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:** Transportøkonomisk institutt

#### Project Partners:

- ▶ Vrije Universiteit Brussel
- ▶ CERTH
- ▶ University of Southampton
- ▶ Instituto Superior Tecnico
- ▶ Centre d'Innovació del Transport
- ▶ TNO
- ▶ Univerza v Ljubljani
- ▶ KUEHNE+NAGEL
- ▶ Oxfam
- ▶ DHL EXEL SUPPLY CHAIN
- ▶ Ajuntament de l'Hospitalet de Llobregat
- ▶ EMEL
- ▶ TNT Express Worldwide N.V.
- ▶ GS1 - The Global Language of Business



## 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 GmbH

#### Project Partners:

- ▶ Robert-Bosch-GmbH
- ▶ Centre Ricerche Fiat S.p.A.
- ▶ European Batteries Oy
- ▶ Fraunhofer-Gesellschaft e.V.
- ▶ Energies nouvelles
- ▶ Valeo Equipments Electriques Moteur SAS
- ▶ Volvo Technology AB
- ▶ Vrije Universiteit Brussel
- ▶ K&S GmbH Projektmanagement

## 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 (ADAPTexture) that replaces the out-dated “platform” concept with a modular building block concept. Active vehicle dynamics are incorporated through controlled structures and active suspension modules. A High-level control architecture controls the complete system the vehicle dynamics, active safety, energy requirements and driver interaction.

The specifications of these modular LDV are based on a radical new Deposit, Rapid Recharge and Recollect (D3R) system for last mile delivery tracking.

A complete prototype vehicle will be developed during the project.

#### Project Coordinator

or

**Contact Person:** Aazir Khan

**Organisation:** Ayton Willow Ltd

#### Project Partners:

- ▶ Cranfield University
- ▶ Tuk Tuk Factory B.V.
- ▶ DENSO Automotive GmbH
- ▶ Cleancarb sarl
- ▶ Technische Universität Hamburg Harburg
- ▶ Kings College London
- ▶ CRP Henri Tudor
- ▶ Timoney Technology

## 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

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**Organisation:** Centro Ricerche Fiat

**Website:** [www.eeepro.shef.ac.uk/wide-mob/index.html](http://www.eeepro.shef.ac.uk/wide-mob/index.html)

#### Project Partners:

- ▶ University of Sheffield
- ▶ STMicroelectronics
- ▶ IFP Energies Nouvelles
- ▶ DuPont
- ▶ Polimodel
- ▶ Warsaw University of Technology



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**[www.ict4fev.eu](http://www.ict4fev.eu)**



