

### V. Recovery Package: Public-Private Partnerships (PPPs) and Risk Sharing Finance Facility

The European Economic Recovery Plan adopted by the European Commission on 26 November 2008 and endorsed by the European Council on 11-12 December 2008 proposes actions to develop technologies for the manufacturing, construction and automotive sectors, which have recently seen demand plummet as a result of the crisis and which face significant challenges in the transition to the green economy. The Commission proposes to increase research financing through the RSFF instrument and to launch three Public-Private Partnerships (PPPs) which provide the required support to the three sectors:

- in the manufacturing sector: a 'Factories of the Future' initiative to help EU manufacturers across sectors, in particular SMEs, to adapt to global competitive pressures by increasing the technological base of EU manufacturing through the development and integration of the enabling technologies of the future, such as engineering technologies for adaptable machines and industrial processes, ICT, and advanced materials (EUR 1.2 billion);
- in the construction sector: an 'Energy-efficient Buildings' initiative to promote green technologies and the development of energy-efficient systems and materials in new and renovated buildings with a view to reducing radically their energy consumption and CO<sub>2</sub> emissions (EUR 1 billion);
- in the automotive sector: a 'Green Cars' initiative, involving research on a broad range of technologies and smart energy infrastructures essential to achieve a breakthrough in the use of renewable and non-polluting energy sources, safety and traffic fluidity (EUR 1 billion).

These initiatives are part of a comprehensive, integrated package to be implemented in cooperation between all the responsible services within the Commission, complemented by actions on the demand-side, such as public procurement, technical standards, and regulatory measures. This includes a further EUR 4 billion for non-research activities under the Green Cars Initiative.

The three PPPs are intended to prevent the crisis from deflecting attention from the EU's longer-term interests and the need to invest in its future. Research and Innovation are considered as strategic and "smart" investments to prepare the ground for the future of the EU economy which has to become a knowledge-based and low carbon economy, as stated in the Lisbon strategy. This is crucial for the EU to come out from the crisis stronger, more sustainable and more competitive.

The Commission is working in close collaboration with industrial representatives to develop longer-term research strategies for the three sectors, but to meet the need for a rapid start-up, the initiatives will be implemented in the first instance through a series of Cross-thematic Calls under the 2010 work programme 2010 between the relevant FP7 Themes. Responsibility for these Cross-thematic Calls is as follows:

- The 'Factories of the Future' initiative involves financial support from the NMP<sup>1</sup> and ICT<sup>2</sup> Themes;
- The 'Energy-efficient Buildings' initiative involves financial support from the NMP, Energy, ICT and Environment Themes;
- The 'Green Cars' initiative involves financial support from the Transport, ICT, NMP, Energy, and Environment Themes.

---

<sup>1</sup> Nanosciences, Nanotechnologies, Materials & New Production Technologies

<sup>2</sup> Information and Communication Technologies

## Annex 5 of the 2010 Cooperation Work Programme

In addressing the industrial needs and objectives of each PPP, the Themes will work closely together to ensure a coherent, complementary and holistic approach. To ensure high visibility and to promote cooperation and exchange of information between the research projects funded under the different Themes, it is intended to gather the researchers and the industrial stakeholders together in annual cross-thematic workshops and seminars for each PPP. This would be part of the implementation of the projects.

The Call Fiche for the Joint Call on Sustainable automotive electrochemical storage in the Green Car PPP is included in Annex 5. The Call Fiches for all the other topics can be found within the corresponding work programme chapter of each participating Theme. The topics in the FoF and EeB PPPs are organised in two Coordinated Calls with a common deadline. With the exception of the Joint Call on Sustainable automotive electrochemical storage, each Theme will remain responsible for its own budget and for the implementation of the related topics.

The corresponding research topics for each PPP under the work programme 2010 Cross-thematic Calls are given in the following three sections V.1 to V.3. A table providing a global overview of the PPP topics in 2010 is given at the end of Annex 5.

The RSFF will now include a front-loading measure as follows:

In line with this work programme and the amended version of Annex 4 of work programme 2009, a total amount of EUR 220 million will be at the disposal of the EIB by July 2009, allowing an estimated amount of RSFF loan financing under the EC window in 2009 of EUR 1.1 billion.

### **V.1 "Factories of the Future" Public-Private Partnership (FoF) - Cross-thematic cooperation between NMP and ICT**

Manufacturing is still the driving force of the European Economy. Manufacturing activity in Europe represents approximately **21% of the EU GDP** and provides about **20% of all jobs** (more than 30 million) in **25 different industrial sectors**, largely dominated **by SMEs**. With each job on the factory floor generating approximately two other jobs in services, about 60 million people are additionally engaged in the related service areas. Therefore, manufacturing is of high importance to Europe, with a huge potential to generate wealth, jobs and a better quality of life. The long-term shift from a cost-based competitive advantage to one based on high added value requires that European manufacturing increases its technological base, building on the EU's excellent R&D in this domain, and develops a number of **enabling trans-sectoral production technologies**.

The *Factories of the Future PPP Initiative* aims at helping EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by developing the necessary enabling technologies to support EU manufacturing across a broad range of sectors. It will help European industry to meet the increasing global consumer demand for greener, more customised and higher quality products through the necessary transition to a demand-driven industry with lower waste generation and energy consumption.

The activities will concentrate on increasing the technological base of EU manufacturing through the development and integration of the enabling technologies of the future, such as engineering technologies for adaptable machines and industrial processes, ICT for manufacturing, and the novel industrial handling of advanced materials. The initiative will concentrate on industry-led R&D projects and will include demonstration activities, such as large-scale production-line demonstrators for validation and market applications. The partnership will work together to identify the R&D needs of manufacturing industry and in particular SMEs. In order to further ensure the PPP

## Annex 5 of the 2010 Cooperation Work Programme

character of the initiative, a large part of the activities in the projects is expected to be performed by industrial organisations themselves. This initiative, being by nature **cross-sectoral** and including efforts to address the **needs of SMEs**, aims to transform Europe into a dynamic and competitive knowledge-based economy by delivering:

- A new European model of production systems for the factories of the future (e.g. transformable factories, networking factories of excellence, learning factories) depending on different drivers such as high performance, high customisation, environmental friendliness, high efficiency of resources, human potential and knowledge creation.
- ICT-based production systems and high quality manufacturing technologies capable of optimising their performance with a high degree of autonomy and adaptability for a balanced combination of high throughput and high accuracy production.
- Sustainable manufacturing tools, methodologies and processes that have the capability of cost-efficiently shaping, handling and assembling products composed of complex and novel materials.

The indicative budget for the "Factories of the future" PPP initiative is EUR 95 million in 2010, of which EUR 60 million is from the NMP Theme and EUR 35 million from the ICT Theme.

### V.1.1 "Factories of the Future (FoF)" - Topics covered by the NMP Theme

#### **FoF.NMP.2010-1                      Plug-and-Produce components for adaptive control**

**Technical content/scope:** The main objective is to develop active, self-optimising, portable plug-and-produce components for a new generation of adaptive production systems. These plug-and-produce components should hold the manufacturing process at optimal performance despite influence of disturbances, variations in plant performance or voluntary changes in the production. Research should also explore the potential of adaptive smart materials or combination of passive and active materials (mechatronic solutions and/or engineered materials) to increase the adaptability of production systems for changing conditions. The intelligent plug-and-produce systems can feature sensing and actuating structures, adaptive control and energy harvesting to allow a high accuracy in production systems under different conditions and to overcome the traditional limitations on dynamics versus precision.

Research should focus on self-sufficient intelligent plug-and-produce components with advanced sensing and actuating functionalities, e.g. based on smart materials. Such systems should easily implement and self-adapt their range of properties, depending on the changing process conditions. Regarding the use of smart materials, technical key points are the compensation of static and/or thermally induced dislocations, vibration damping and the decoupling of oscillations. Vibrations could be used for energy harvesting processes to transform kinetic energy into electric energy, to drive the intelligent system. Deliverables should include components and methods for intelligent, self-sufficient plug-and-produce systems. The system should be of an open architecture to facilitate any additions of new modules as needed for implementation in a new environment.

In order to ensure industrial relevance and impact of the research efforts, active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation.

The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be reflected in the evaluation.

**Funding Scheme:** Collaborative projects.

## Annex 5 of the 2010 Cooperation Work Programme

**Expected impact:** The new generations of adaptive production systems by means of active, self-optimising plug and produce components should lead to significantly improved dynamics, a higher precision as well as a high level of reliability in the use of changing process conditions. This should result in higher productivity as well as higher product quality.

### **FoF.NMP.2010-2                      Supply chain approaches for small series industrial production**

**Technical content/scope:** Manufacturing systems for small series production will enable the transition from mass production to the personalised, customer-oriented and eco-efficient manufacturing needs of the future, requiring innovative interactions between design, materials, processes and ICT. A complete supply chain model addressing new challenges such as involving customers in design, which could include the creation and management of personalised data files, and on-demand manufacturing, requiring appropriate raw materials availability, highly flexible, fast response manufacturing techniques and final product acceptance criteria and procedures, needs to be developed. Typically, data capture, reverse engineering, design activities and manufacturing may take place in various geographical locations and need reliable data transfer capabilities.

The research should focus on advanced techniques for fast and reliable data capture and data management (ensuring confidentiality of data), flexible and multifunctional computer-aided component design systems, on-purpose planned raw material specification and supply as well as on fostering on ad-hoc logistics, legislative and organisational aspects in order to offer solutions in building sustainable supply chain approaches. Special attention will be required for final product quality management in the whole production chain. Particular emphasis may also be given on developing machines capable of processing specifically upgraded single or multi-materials parts.

The topic is aimed at projects driven by industry and service-to-industry companies, with significant demonstration elements of the complete manufacturing cycle distributed over the whole value chain. The overall objective of the topic is to involve the relevant industrial sectors, including OEMs (Original Equipment Manufacturers), design and service providers as well as material manufacturers.

In order to ensure industrial relevance and impact of the research efforts, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation. Regarding industrial SMEs, a strong participation, a significant role in the decision making structure of the project and clear benefits in the exploitation of the results would also add value to the project.

The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be reflected in the evaluation.

**Funding Scheme:** Collaborative projects.

**Expected impact:** First-time right flexible, energy and eco-efficient manufacturing systems will play a crucial role in maintaining the economic viability of manufacturing organisations within the EU. It is expected that the removal of technical barriers will open the way for wide-scale introduction and implementation of those systems. For example, Rapid Manufacturing technologies are expected to be in the market place for high value added products (replacing 5-15% of the conventional production techniques within the next 5-10 years), in a wide range of sectors. New supply chain approaches are particularly crucial for sectors in which citizens play an important role, such as health, consumer, automotive, electronics, but also high-end equipment.

### **FoF.NMP.2010-3                      Intelligent, scalable, manufacturing platforms and equipment for components with micro- and nano-scale functional features**

**Technical content/scope:** In order to be competitive in the global market, manufacturing industry needs to be cost-efficient and flexible in volume and product features, meeting at the same time quality and sustainability targets. The integration of micro- and nano-features in products and production equipment shows high potential to enable the achievement of these targets. The aim is to deliver new reconfigurable, upscalable and multipurpose micro- and nano-manufacturing platforms and equipment that can facilitate cost efficient and competitive industrial-scale manufacturing of customised products. This will require the development of a new generation of modular, knowledge intensive, scalable and rapidly deployable systems, which should utilise the emerging technologies from micro- and nano-research and follow a flexible industrial production philosophy where production chains are easily downscalable in size or resolution, upscalable in volume and open to the introduction of new technologies, ensuring quality and reliability at low costs.

The research focus is on:

- New design and modelling tools for intelligent, integrated cross-domain design approaches to all aspects of the future manufacturing platforms (including design for manufacturing rules, prototyping, process & material characterisation, integrated process chains, assembly, packaging, metrology, testing, standardisation).
- New (in-line) control solutions and embedded sensor technologies for reconfigurable, modular micro- and nano-manufacturing systems, with potential link to factory level control systems (e.g. Manufacturing Executive System).
- Integrated new solutions for automatic handling of large volumes of very small parts or macro-components integrating small parts using high precision positioning and handling techniques.
- Novel solutions of nano-processing operations integrated within conventional mass production lines
- Modular and knowledge-based approaches, e.g. self-learning & auto-calibrating systems.
- Characterisation, quality control and yield management.

In order to ensure industrial relevance and impact of the research efforts, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation

The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be reflected in the evaluation.

The project consortia would benefit from the integration of players in the supply-chain of manufacturing systems and the integration of inter-sectoral technologies (micro- and nano-manufacturing, bio-, IT etc.).

**Funding Scheme:** Collaborative projects.

**Expected Impacts:** The approach must demonstrate its ability to:

- i) establish and to support a competitive European nano- and  $\mu$ -manufacturing industry, creating favourable conditions for private investment and economic growth;
- ii) enable new factories, new equipments and new products with micro- and nano-scale functional features, integrating results from manufacturing of nano-materials & nano-surfaces and production technologies for  $\mu$ -components;
- iii) upgrade existing factories by means of effective integration of nano-manufacturing processes; iv) reverse the trend of out-sourcing to low cost countries by allowing manufacturing on demand at the right

## Annex 5 of the 2010 Cooperation Work Programme

time and place. The target is to strengthen Europe as a NMT-location for both equipment and production industry by creating the technology and infrastructure basis.

### V.1.2 "Factories of the Future" - Topics covered by the ICT Theme

#### FoF.ICT.2010.10-1 Smart Factories: ICT for agile and environmentally friendly manufacturing

##### Targeted outcomes:

- Integrated process automation and optimisation for sustainable manufacturing: Highly integrated shopfloor-based platforms and systems<sup>3</sup>, in seamless cooperation with enterprise software<sup>4</sup>, capable of achieving operational targets, such as yield and quality increase, while ensuring energy efficiency and reduction of waste. R&D is expected to be accompanied by training measures.
- Applications based on context- and user-aware ICT and scalable networks of sensors, exhibiting features such as energy autonomy, wireless connectivity, self-configuration, diagnosis and repair integrated in machines and factory-level infrastructure, supporting real-time monitoring of energy use and material flow. Work should aim at promoting standards-based approaches in conjunction with international initiatives involving industry groups and standardisation bodies<sup>5</sup>.
- Robotics-enabled production processes tested and validated in real-world environments. Projects are expected to involve system integrators and manufacturers and to test and validate robotic prototypes, paving the way for large-scale operations in smart factory environments. The projects should target domains which have until now not made much use of robotics technology such as in food processing and packaging, service supply (logistics, transport and warehousing), lightweight goods industries and SMEs.
- Laser applications: To integrate, test and validate novel lasers and laser systems (including for example high-power sources, new wavelengths, frequency conversion and remote processing) in energy-efficient processes, and/or for the production of environmentally friendly products.
- European "ICT for Factories of the Future" Coordination Action: One coordination action should bring together all relevant stakeholders and aim at facilitating industrial learning about the role of ICT in "Factories of the Future" in Europe. Its tasks should include exchange of engineering and manufacturing knowledge across industry sectors and elaborate a European vision and roadmap "ICT for Factories of the Future" in conjunction with other related activities (e.g. Manufuture ETP and IMS).

Proposals in a), b), c), d) are expected to be industry-driven to focus on the use of advanced ICT based technologies and to contain a strong validation element with quantifiable targets.

---

<sup>3</sup> e.g. MCS, SCADA, DCS, PLC

<sup>4</sup> e.g. MIS, ERP, MES

<sup>5</sup> e.g. IEC/CENELEC, NAMUR, IEEE, ISA, NIST

## Annex 5 of the 2010 Cooperation Work Programme

### Expected impact:

- A higher level of intelligence and environmental consciousness on the shopfloor through context-aware, fault-tolerant, adaptable, reconfigurable, interoperable, wireless and robust ICT.
- Facilitated introduction of advanced automation into mainstream manufacturing, and promotion of the development of an early European market for advanced technologies such as electronic and photonic devices, control and new assistive automation and robot systems.
- Stronger penetration of advanced automation into small-scale manufacturing and crafts, especially through the introduction of new assistive automation and robot systems.
- Higher productivity of highly customised manufacturing in Europe and reduced emissions and waste.

**Funding Scheme:** Collaborative projects (IP for targeted outcomes a) and b); STREP for targeted outcomes c) and d)); CSA for targeted outcome e).

### **V.2 "Energy-efficient Buildings" - Public-Private Partnership (EeB) - Cross-thematic cooperation between NMP, ICT, Energy and Environment**

The construction industry accounts for more than 10 % of the EU's GDP and employs 32 million people in large, medium and small enterprises (direct and indirect employment). The construction sector is the highest contributor to the emission of Green House Gases with an average value estimated in most developed countries at close to 33%, knowing that around 40% of the total energy use corresponds to buildings, while their fossil-fuel heating represents a major share. Therefore, in the near future, the built environment in Europe needs to be designed, built and renovated with much higher energy efficiency. In order to contribute through Energy-efficient Buildings to the objectives adopted in March 2007 by the European Council for a reduction by 2020 of 20% in the total energy consumption, 20% contribution of renewable energies to total energy production and a 20% reduction of greenhouse gas emissions compared with the figures for 1990, a strong and continued effort in RTD and innovation in the short, medium and long term is needed.

The objective of the *Energy-efficient Buildings PPP Initiative* is to deliver, implement and optimise building and district concepts that have the technical, economic and societal potential to drastically reduce energy consumption and decrease CO<sub>2</sub> emissions, both in relation to new buildings and to the renovation of existing buildings. This new initiative should have a large payoff, as it will increase the market for energy-efficient, clean and affordable buildings. Research priority will be given to delivering new building materials and components for energy saving and energy generation, thermal energy storage systems, advance insulation systems, thermal distribution systems, lighting technologies, windows and glazing technologies, energy generation systems based on renewable sources, but also to reliable simulation and prediction tools, including assessment methods that integrate economical, social and environmental issues. To date, the construction industry has failed to effectively integrate key technologies into its operations in order to achieve sustainable, long-term competitiveness.

The aim of the activities is to identify, through the partnership with industry, the main RTD needs, and address a number of areas of clear industrial interest, such as tools, the building envelopes, systems and equipment, ICTs for energy efficiency, environmental technologies, social and

## Annex 5 of the 2010 Cooperation Work Programme

behavioural aspects, standardisation and business models. Specific deliverables expected for new and refurbished buildings (including cultural heritage) are:

- Research for new design and manufacturing technologies, focussing on new building materials and components, thermal energy storage systems, advanced insulation systems, thermal distribution systems, lighting technologies, windows and glazing technologies, and assessment methods which include guidelines/methodologies for the eco-design and the Life Cycle Assessment of energy-efficient buildings.
- Research on ICT for energy efficiency in buildings, such as design and simulation tools, inter-operability/standards, building management systems, smart metering and user-awareness tools.
- Research on resource efficiency (waste and energy use) to identify best practices to help set standards and establish public policies for higher energy efficiency and reduced environmental impact.
- Research on the application of technological, design and organisational improvements at district-level with the aim of reducing the energy and resource consumption.
- Research-related activities on key demonstration topics concerning integration of innovative products and systems, grid issues and business models.

The indicative budget for the "Energy-efficient buildings" PPP initiative is EUR 65 million in 2010, of which EUR 30 million is from the NMP Theme, EUR 15 million from the ICT Theme, EUR 15 million from the Energy Theme and EUR 5 million from the Environment Theme.

### V.2.1 "Energy-efficient Buildings (EeB)" - Topics covered by the NMP Theme

#### **EeB.NMP.2010-1                      New nanotechnology-based high performance insulation systems for energy efficiency**

**Technical content/scope:** Insulating materials are used to keep the temperature constant in an enclosed space such as a house, either warmer or colder than the surroundings, and in doing so can protect the environment through the reduction of greenhouse gases. Nanotechnology offers high potential for enhanced insulation allowing thinner coatings or fillings to prevent heat loss or gain which would not be possible with conventional materials. The research shall focus on development of nanotechnology based insulation systems for enhanced thermal and improved mechanical properties while reducing overall costs making wide-scale commercial application feasible, including the renovation of existing installations. Examples of materials systems for achieving this are aerogels/aerogels composites and nanofoams or thin nanostructured insulators based on thermally resistant (composite) nanoparticles, which can be applied directly to a surface as a film, spray or paint. A further research objective is to combine the insulating effect with other functionalities, for example with photocromic, thermocromic, electrochromic for windows or flame retardant effects, self-cleaning, biocide or humidity control properties, for walls and roofs. The safety of proposed solution(s) must be ensured for the full product life cycle (production, use, disposal/recycling). Economic performance of the proposed solutions should be demonstrated by service-life costing analysis.

In order to ensure industrial relevance and impact of the research effort, the active participation of industrial partners represents an added value to the activities and this will be reflected in the evaluation.

The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be reflected in the evaluation.

## Annex 5 of the 2010 Cooperation Work Programme

**Funding Scheme:** Collaborative projects

**Expected impact:** (i) Reduce the cost of nanotechnology-based insulation systems and make their wide-scale commercial application feasible (ii) reduce the heat losses and gains through the building envelope for reduced energy consumption and increased indoor comfort; (iii) for windows which are the weakest part on the energy efficiency performance, a reduction in the U/value by more than 35% is expected compared with conventional ones. For glass covered building it would reduce the energy bill for heating by 40% and for cooling by 7%.

### **EeB.NMP.2010-2                      New technologies for energy efficiency at district level**

**Technical content / scope:** The construction sector can provide a significant contribution to the reduction of resources consumption and to a wider use of renewable resources. The main objective of the topic is to develop new technologies and methods to help reduce the energy consumption and environmental impact of buildings during their entire life-cycle (80% of energy consumption occurs during service-life) at district level, since this cannot be achieved only at building level.

The main focus is on new concepts, technologies, design tools and business models at district level for "intelligent buildings", able to significantly reduce or even completely meet their own energy consumption; improvement of the building energy performance (through cladding and ventilation technologies, sensors, actuators and pervasive computing systems, utilisation of embedded renewable energy sources, etc.). Developments are also required at district level addressing new and improved materials and structures to improve the indoor environment as well as resource and climate, energy consumption conversion, storage capacities and energy carriers. Deliverables include the development, integration and demonstration, if possible at district level, of decision support systems and assessment tools of the above concepts e.g. for social housing, residential buildings, offices, and public buildings such as hospitals, schools and universities, railway- and underground-stations and airports.

In order to ensure industrial relevance and impact of the research efforts, the active participation of industrial partners, including SMEs, represents an added value to the activities and this will be reflected in the evaluation.

The projects are expected to cover demonstration activities, including pilot implementations in industrial settings, and this will be reflected in the evaluation.

**Funding scheme:** Collaborative projects.

**Expected impact:** The new technologies should contribute to a reduction of 50% in energy consumption compared to the 2005 values. The benefits for applying the new technologies at district level are expected to represent a significant reduction (around 20%) of the total costs compared to existing solutions. The return on investment for these additional costs should be preferably not more than 7 years, both in the case of new construction and retrofitting.

## **V.2.2 "Energy-efficient Buildings" (EeB) - Topics covered by the ICT Theme**

### **EeB.ICT.2010.10-2                      ICT for energy-efficient buildings and spaces of public use**

Targeted outcomes:

- Integrated ICT-based management and intelligent control systems governing all energy-efficient sub-systems, such as solid state lighting, heat exchange or air treatment, deployed in spaces of public use. These control systems should interoperate with other ICT-based sub-systems which may be in place to ensure security, safety and comfort.

## Annex 5 of the 2010 Cooperation Work Programme

The system may cover both the inside of buildings as well as the exterior and surrounding space. Examples of such spaces include: a motorway service area, a football stadium with its surrounding parking space, a university campus or a shopping mall.

In addition to systems integration, proposals should include a substantial validation phase focussing on the operation of the building(s) and surrounding space. During this phase, proposals should record evidence and draw lessons on the benefits and total cost of operation for use by those planning to deploy and finance such systems. Proposals should also consider any relevant contributions to/from standardisation and regulation measures, as well as guidelines for future procurement schemes.

- European "ICT for Energy-efficient Buildings" Forum: One coordination action should bring together all relevant stakeholders to identify and review the needs in terms of research and systems integration. Its tasks should include editing and up-dating the REEB research Roadmap<sup>6</sup>, the organisation of expert hearings, and dissemination and networking events. The Forum should also aim at contributing to standardisation and regulation.

### Expected impact:

- Contribution to the opening of a market for ICT-based customized solutions integrating numerous products from different vendors and offering services from design of integrated systems to the operation and maintenance phases.
- Establishment of a collaboration framework between the ICT and buildings and construction sectors aimed at exploiting opportunities for the development of ICT-based systems in compliance with the Energy Performance of Buildings Directive.
- Radical reduction of energy consumption and CO<sub>2</sub> emissions, in line with the policy framework for facilitating the transition to an energy-efficient, low-carbon economy through ICT<sup>7</sup>.

**Funding Scheme:** Collaborative projects (STREP) for targeted outcome a); CSA for targeted outcome b).

### V.2.3 "Energy-efficient Buildings" - Topics covered by the Environment Theme

#### **EeB.ENV.2010.3.2.4-1 Compatible solutions for improving the energy efficiency of historic buildings in urban areas**

The objective is to develop new technologies and systems as well as compatible materials for improved energy efficiency of historic buildings while ensuring their sustainable protection and integration in urban areas. Proposals will target rehabilitation or adaptation of historic buildings to make them highly resource and energy efficient by improving architectural components, thermal insulation, air conditioning and ventilation, heating, lighting, and other appropriate solutions. Developments should also promote innovative methods and materials for the monitoring and control of energy consumption and of indoor climate including air pollution and possibly be applicable to cultural heritage collections located in historic buildings. Solutions for the rehabilitation and/or retrofitting of historic buildings must respect the integrity, authenticity and

---

<sup>6</sup> REEB: The European Strategic Research Roadmap to ICT enabled Energy-Efficiency in Building and Construction, <http://www.ict-reeb.eu/>

<sup>7</sup> COM(2009)111.

## Annex 5 of the 2010 Cooperation Work Programme

compatibility between the old and new materials and techniques, and be economically viable to enable a widespread application to a vast majority of urban historic buildings, whether they are or not protected by legislation.

Protocols and tools for the planning and implementation of heritage rehabilitation works should be adapted to consider the specific cultural value and priorities required of heritage building interventions and to ensure their effective transferability to other historic buildings located in other urban centres or their surroundings across Europe.

A significant participation of industrial partners including SMEs is required. The participation of local authorities or agencies in charge of the rehabilitation and adaptation of ancient and historic buildings in rehabilitated urban areas is encouraged. This will be considered in the evaluation.

**Funding scheme:** Collaborative Project (large scale integrating project, upper financial contribution EUR 5 000 000)<sup>8</sup>

**Expected impact:** Proposals should contribute to the European Economic Recovery Plan and lead to widespread improvement of energy saving in historic buildings, sustainable renovation of ancient infrastructure and improved living conditions within historic urban areas. Research should contribute to improved quality management of historic cities and cultural tourism, and also help implement the EU Environmental Impact Assessment Directives when applied to historic buildings<sup>9</sup>. Proposals should contribute to the EU Energy Performance of Buildings and other relevant policy regulations. Proposals will also support the Strategic Research Agenda of the European Construction Technology Platform and its Focus Area in Cultural heritage.

### V.2.4 "Energy-efficient Buildings" - Topics covered by the Energy Theme

#### **EeB.ENERGY.2010.8.1-2: Demonstration of Energy Efficiency through Retrofitting of Buildings**

##### ***Content/scope:***

Demonstrate in the building sector, high energy efficient innovative retrofitting technologies and measures for low energy performing buildings, the typology of which is representative for large geographical areas in Europe.

The project(s) shall use innovation in technology, design, planning, operation or systems integration with a strong preference for residential buildings and address socio economic issues.

While the project(s) could contain a single building or a number of buildings, located in one or more countries, effort and budget should be balanced amongst participants from at least three Member States/Associated States.

Retrofitting should be as cost effective as possible. The return to investment for the energy saving measures should be calculated and presented and should be reasonable under current market standards.

Detailed information should be provided on the building(s) existing envelope and its current energy use and the energy efficiency measures to be applied should also be described extensively. The gross floor area of the building(s) should be specified together with the targeted annual energy use per m<sup>2</sup> (kWh/m<sup>2</sup>/year, broken down by space heating, cooling, domestic hot water heating, lighting, etc)

---

<sup>8</sup> No more than one project will be supported.

<sup>9</sup> See the guidelines resulting from the EC project SUIT at <http://www.suitproject.net>

## Annex 5 of the 2010 Cooperation Work Programme

In addition to the technical measures to be undertaken, additional accompanying measures affecting the future operation of the building (e.g. behavioural changes, post occupancy evaluation) should also be clearly addressed.

The energy use should achieve at least the national limit values for new buildings according to the applicable legislation based on the Energy Performance of Buildings Directive (for 2010).

A holistic approach is expected in the measures to be taken and all elements and systems of the building that could contribute to its becoming more energy efficient should be envisaged. The space heat use (kWh/m<sup>2</sup>/year) should be reduced by about 75%.

The project(s) should have a high potential of replication contributing to large scale market deployment before 2020; a dissemination and market deployment programme should be included in the proposal. The detailed metering/monitoring programme should last at least for one year, however, longer term commitment and programmes of the building operators (e.g. in continuous monitoring and/or guarantees of performance to the tenants) would give an added value to the proposal.

**Funding scheme:** Collaborative Projects.

### **Expected impact:**

- Large scale market deployment in retrofitting of buildings before 2020
- Accelerate the retrofitting uptake of low efficient building stock in EU.
- Offer cost effective highly energy efficient retrofitting practices.
- Accelerate the market uptake of the most innovative ICT tools for efficient buildings management
- Create best practice examples for the construction sector based on innovation and competitiveness, with benefits for the citizens and the environment.
- Contribute to raise the performance standards and regulations on European, national and local level, in the construction industry and building sector, through the best practice examples.

### **Additional information:**

- In addition to the detailed description of the buildings and the measures to be taken, it is strongly suggested for participants to complete and include in the proposals the Building Energy Specification Tables (BEST) summarising this information for every type of building proposed. The template for the BEST table can be downloaded from the following web address: [ftp://ftp.cordis.europa.eu/pub/fp7/docs/wp/cooperation/energy/e\\_best\\_2010\\_en.xls](ftp://ftp.cordis.europa.eu/pub/fp7/docs/wp/cooperation/energy/e_best_2010_en.xls).
- Successful proposals will be asked to follow a common monitoring data structure, using a common methodology, in order to feed the relevant Commission data bases (e.g. CONCERTO data base).
- The form of grant applied in area 8.1.2. 'Energy efficiency in Buildings' is based on additional energy efficiency measures in buildings. The grant will be composed of a combination of:
  - the typical reimbursement of eligible costs, and
  - flat rate financing determined on the basis of scale of unit costs only for the demonstration part of the buildings.
- The scale of unit cost of Community financial contribution is fixed to EUR 100 /m<sup>2</sup> eligible costs and thus EUR 50 /m<sup>2</sup> Community contribution.
- The eligible costs per building used in the projects are fixed costs.
- The total of Community financial contribution based on scale of unit costs may not exceed EUR 6 million for one demonstration site.

## Annex 5 of the 2010 Cooperation Work Programme

- The evaluation of the proposals will also take into account the degree of excellence and innovation of the technology used and the most cost effective practices (euros/efficiency gain; euros/CO<sub>2</sub> reduction, kWh/m<sup>2</sup>/year saved). For this reason, the above figures should be indicated in the proposal.
- Up to four (4) projects will be supported.

### V.3 'European Green Cars' Public-Private Partnership (GC)

The automotive industry is one of Europe's key industrial sectors, whose importance is largely derived from its linkages within the domestic and international economy and its complex value chain. It is estimated to account for close to 8% of total manufacturing value added (ca. EUR 120 billion, 2006) and about 6% of total manufacturing employment (over 2 million employees). The automotive industry also provides an indirect employment to 10-11 million persons and is one of the largest RTD investors in the EU with over EUR 20 billion annually (ca. 5% of its turnover)<sup>10</sup>.

The foreseeable shortage in crude oil based energy carriers is driving fears about energy security: 73% of all oil consumed in Europe is used in transport and estimates predict a doubling of passenger cars within the next 20 years. From an environmental and energy point of view there is an urgent need to find alternatives to fossil fuels in order to secure future energy supply, to guarantee the availability of appropriate material recycling technologies, and to reduce greenhouse gas emissions and other potential environmental impacts related to the automotive industry entire life-cycle. It is thus increasingly evident that a particular emphasis should be put on the rapid development of technologies supporting the massive emergence of more efficient and sustainable road transport solutions based on alternative fuels/energy, and on the RTD efforts associated with them.

The '*European Green Cars*' PPP Initiative is a series of measures boosting research and innovation aiming at facilitating the deployment of a new generation of passenger cars, trucks and buses that will spare our environment and lives and ensure jobs, economic activity and competitive advantage to car industries in the global market. A series of different measures are proposed: support to research and innovation through FP7 funding schemes, specific EIB loans to the automotive and other transport industries and its suppliers, in particular for innovative clean road transport, and a series of legislative measures to promote the greening of road transport (circulation and registration taxes, scrapping of old cars, procurement rules, the CARS21 initiative).

Other actions that are very closely related to the 'European Green Cars' Initiative but not formally included in it are being implemented, such as the 'Fuel Cell and Hydrogen' (FCH) Joint Technology Initiative and the road transport projects funded under the FP7 Transport activity '7.2.1. The Greening of Surface Transport' in its 2007 and 2008 Calls.

The 'European Green Cars' Initiative includes three major research and development avenues within its RTD pillar:

- **Research for heavy duty vehicles based on internal combustion engines (ICE)** [Sustainable Surface Transport sub-theme (SST)]: The research will primarily concentrate on advanced ICE with emphasis on new combustion, the use of alternative fuels (e.g. bio-methane), intelligent control systems, 'mild' hybridisation (use of recuperated electricity to power the auxiliary systems) and special tyres for low rolling resistance.
- **Research on electric and hybrid vehicles:** This component will be the most essential in this package. To have a real impact on the green economy, research in this field should no

---

<sup>10</sup> "European industry – a sectoral overview, 2006 update, EC-DG ENTR

## Annex 5 of the 2010 Cooperation Work Programme

longer focus on electric vehicle technologies seen in isolation from the rest of the transport system: a massive introduction of the technology requires the availability of smart electricity grids and intelligent vehicle charging systems tailored to customers' needs.

- **Logistics and co-modality** combined with **intelligent transport system** technologies are essential to optimize the overall system efficiency and sustainability avoiding for example that empty trucks circulate on highways due to sub-optimal logistics. In this respect, smooth and co-operative interactions between the different transport modes will be essential.

The 2010 work programme focuses on the second research avenue: electric and hybrid vehicles and their infrastructures. Three groups of topics covering collaborative research activities as well as coordination and support actions are included:

- Materials, technologies and processes for sustainable automotive electrochemical storage applications, implemented through a Joint Call with other Themes.
- Research on electric and hybrid vehicles, implemented through the Sustainable Surface Transport (SST) sub-theme of the Transport Theme.
- Information and Communication Technologies for the fully electric vehicle, implemented through the ICT Theme.

The indicative budget for the "European Green Cars" PPP initiative is EUR 108 million in 2010, of which EUR 68 million is from the Transport Theme, EUR 10 million from the NMP Theme, EUR 20 million from the ICT Theme, EUR 5 million from the Environment Theme and EUR 5 million from the Energy Theme.

### V.3.1 "European Green Cars" (GC) – Topic implemented via a Joint Call between the following Themes: NMP, Energy, Environment and Transport.

One of the crucial aspects of research needed for electric and hybrid vehicles related to electrochemical storage. It should concentrate on both: new low cost materials (nickel and cobalt oxides are expensive and their prices are exploding) and on safety problems related to thermal runaway. Research on these issues is multidisciplinary and must involve several Themes to gather specialised knowledge and critical mass in a research field where step changes are needed. Another aspect that will be looked at is the issue of the recycling of batteries at the end of their life cycle and the development of technologies to maximise the recovery of materials, in particular for those of high added-value or presenting high environmental impacts.

The Joint Call is jointly organised by the Directorates NMP, Energy, Environment and Transport of DG RTD. The indicative budget of the NMP part for this "Green cars" PPP initiative is 10 million Euros in 2010, while the other Directorates each contribute 5 million Euros. The Community funding part of the indicative budget of the Call is thus 25 million Euros. The deadline is fixed on January 14, 2010 at 17.00 (Brussels local time). The Call Fiche of this Joint Call is below.

**GC.NMP.2010-1,                      Materials, technologies and processes for sustainable  
GC.ENERGY.2010.10.2-2,        automotive electrochemical storage applications  
GC.ENV.2010.3.1.3-3,  
GC.SST.2010.7-9**

**Contents/scope:** Research projects are called for, addressing innovative materials and technologies for battery components, material architectures and systems for automotive electrochemical storage within a responsible, sustainable and environmental-friendly approach looking at the entire life cycle.

## Annex 5 of the 2010 Cooperation Work Programme

Projects for batteries and/or electrochemical capacitors are eligible. For batteries, research should focus on innovative developments for lithium-based energy storage technologies improving on safety and energy density. Alternatively, projects can be looking at completely different technologies, architectures and chemistries, such as open cells for higher energy densities.

For existing or near-to-market types of lithium-based batteries, projects dealing with the recycling, recovering and re-use of materials are eligible, as well as projects on the comprehension, modelling and management of degradation drivers and processes with the aim to extend the calendar and operational life of the cells.

The environmental sustainability of each developed solution shall be assessed via life cycle assessment studies carried out according to the International Reference Life Cycle Data System (ILCD) Handbook<sup>11</sup>.

Cost, recyclability and safety issues should be prominently emphasized in all projects, as well as proof of concept in terms of product and/or process (not necessarily reaching the industrial scale but convincingly proving scalability towards industrial needs), thereby exploring their standardisation potential. The effect of bidirectional flow at charge stations should be taken in due account, as well as the potential for fast charging (at least 5C) without significant life reduction.

Participation from the manufacturing industrial sector is requested in each project. Aspects like characterisation, standardisation and synergies with other applications, availability of concerned materials, eco-design, manufacturing, can be covered.

At the same level of quality resulting from the evaluation by independent experts, priority for funding should be given to proposals that allow covering this topic as completely as possible.

Work on fuel cells is excluded since it is already covered in the related JTI, but synergies of storage chemistries and architectures with fuel cell vehicle applications showing performance beyond the Call targets, can be covered.

**Funding Scheme:** Collaborative projects

**Expected impact:** Establishing the basis for a world level European automotive battery and electrochemical capacitors industry, with significant contributions to lead the market in the area of recycling<sup>12</sup>. Fostering the constitution of interdisciplinary consortia. The expected impact has to be credibly motivated in terms of performance, cost, recyclability and life-cycle sustainability. Quantitative targets for lithium-based energy storage technologies include cost reduction down to a system level target value<sup>13</sup> of maximum 150€/kWh for mass production and improvement of safety and energy density up to at least 200 Wh/kg. For electrochemical capacitors the corresponding targets are respectively a cost reduction down to a maximum of 10€/kW and a specific power of at least 25 kW/kg, with an energy density of at least 10 Wh/kg. Advanced chemistries should target energy densities of at least 300 Wh/kg.

### V.3.2 "European Green Cars" (GC) – Topics covered by the Sustainable Surface Transport (SST) sub-Theme of Transport Theme.

This part is implemented by DG RTD (Directorate H - Transport) and by DG TREN (Directorate D - New and renewable sources of energy, energy efficiency and innovation). Topics of the 'European Green Cars Initiative' are part of these two Calls:

- Call FP7-SST-2010-RTD-1 (Indicative budget: EUR 40 million)

---

<sup>11</sup> [http://lca.jrc.ec.europa.eu/EPLCA/Deliverables/ILCD\\_handbook.htm](http://lca.jrc.ec.europa.eu/EPLCA/Deliverables/ILCD_handbook.htm)

<sup>12</sup> A Lead Market Initiative for Europe, <http://ec.europa.eu/enterprise/leadmarket/recycling.htm>.

<sup>13</sup> All targets are at end of life, cell level for mass produced elements unless otherwise specified.

## **Annex 5 of the 2010 Cooperation Work Programme**

- Call FP7-TRANSPORT-2010-TREN-1 (Indicative budget: EUR 23 million)

These topics are grouped in the corresponding Call Fiches and clearly identified.

Limits on the EC financial contribution apply for some of these topics. These are implemented strictly as formal eligibility criteria. You must refer to the Call Fiches for details of these limits and other relevant information.

### **GC.SST.2010.7-1 Electrical machines**

The successful introduction of electric vehicles in the market requires the development of electric machines that are at the same time cheap and highly efficient (on a wide torque/speed range) with high power to weight and volume ratios. At the same time they should also be reliable and robust, in order to withstand the harsh environmental and usage conditions imposed by the automotive standards achieved with the internal combustion engines.

With regard to the integration of electrical machines in a car, it is of high relevance to develop electronic architectures, compact/miniaturised mechatronic modules and highly integrated, energy efficient power electronics technologies and subsystems for power conversion.

At the same time these advanced machines will have to be produced in numbers which have never been achieved before, and this might put a strain not only on the current production technologies, but also on the availability of some raw materials, in particular those needed for the magnetic components. Particular attention should therefore be paid to these aspects when designing these devices, as well as to the integration with the required electronic components. The proposals should therefore focus on achieving the above mentioned requirements by:

- Exploring innovative topologies and concepts (including consideration of intrinsic fault tolerance or methods to cope with unavoidable faults) for the various types of applications (from in-wheel to stand-alone or engine-integrated ones).
- Researching high performance conductive, magnetic and insulating materials.
- Defining simplified, high efficiency cooling concepts.
- Developing advanced magnetic modelling tools.
- Defining automated manufacturing concepts that, given the gradual introduction of these devices, are flexible enough to be capable of supporting efficient manufacturing at the different rates needed in the early and full scale phases of the electrification process.

**Funding Scheme:** Collaborative projects

### **GC.SST.2010.7-2 Integrated electric auxiliaries and on-board systems**

The challenges of the implementation of a world class electric car include matching as well as possible current customer expectations in other domains such as comfort, safety and driveability. This entails the electrification and integration on board of several power-hungry devices, from climate control to lighting, from power steering to infotainment, from braking systems to pumps for several liquids (cooling, fuel, oils, depending on the application) and after-treatment. These should be optimised in order to be competitive with the highly refined mechanical equivalents, and not to add too large an energy burden to the vehicle.

The proposals should therefore focus on:

- Developing optimised electrified components and subsystems (as listed above) in terms of efficiency, size, power-class, weight and cost (design for manufacturing) In some cases, such as steering and braking, due consideration of regulations and safety, needs to taken.

## **Annex 5 of the 2010 Cooperation Work Programme**

- Developing energy harvesting concepts which could compensate other auxiliaries' energy consumptions.
- Studying other energy control devices, such as actively controlled glasses, to optimize the energy flows.

Electric safety of the new on-board devices and systems must be kept at least at the safety level which is established today for other type of equipments through the EC Low Voltage Directive. The development of specific auxiliaries and heat recovery systems for heavy duty vehicles (in particular buses) is also acceptable for applications where these differ significantly from light duty vehicle ones and where they represent a significant share of the vehicle's global energy requirements and therefore would provide a significant power saving potential. Synergies with other transport modes such as light rail would be preferable.

**Funding Scheme:** Collaborative projects

### **GC.SST.2010.7-3 Optimised thermal engine development and integration**

Advanced plug-in hybrids and electric vehicles with range extenders need to benefit from highly efficient, compact, clean and low cost engines to provide battery charging over longer trips or in areas where electric recharge infrastructure is not available. In order to be consistent with the "zero emissions" label of electric vehicles, these engines should aim at significantly improving over future Euro 6 standards for noxious emissions.

Proposals should therefore deal with the development and integration of:

- Highly innovative engines, based on alternative architectures or cycles, particularly adapted for this application.
- Extremely downsized automotive engines with the associated gearbox if necessary.
- Existing engines from other applications potentially well adapted to the range extender role

**Funding Scheme:** Collaborative projects

### **GC.SST.2010.7-4 Smart storage integration**

Battery packs for pure electric and plug-in vehicles, even with the most advanced batteries available today and in the near future, will be bulky and heavy components. Their integration would therefore be problematic, and even more so when the emerging concepts in which these packs would need to be removable for fast "refuelling" over long trips are considered.

Proposals will therefore aim at:

- Developing innovative concepts for the physical integration in the vehicle structure.
- Smartly integrating the battery pack in the various on-board systems (electric, cooling, monitoring).
- Considering the implications of both the above points in the case of removable packs and assess the benefits and disadvantage, and therefore the feasibility of the quick-change concept (if possible also in view of its environmental, cost, logistic and life cycle impacts).

The novel concepts for smart electrical storage in vehicles must also provide adequate level of safety. Proposals may address aspects of electrical safety, fire and safety at misuse.

**Funding Scheme:** Collaborative projects

## **Annex 5 of the 2010 Cooperation Work Programme**

### **GC.SST.2010.7-5                      Advanced electric vehicle concepts**

The electrification of road vehicles, if brought to its extreme consequences, can have a significant impact on the basic vehicle concept. Today's cars are shaped in ways that strongly descend from the presence of an internal combustion engine on board, with its architectural constraints, dictated by mechanical, thermal, or safety considerations.

The requirements and constraints deriving from an electrical powertrain are much less stringent in several areas, yet not fully explored.

Therefore projects aiming at exploring all the aspects and requirements emerging from this new paradigm are needed, particularly for urban vehicles.

Proposals will address aspects such as:

- Innovative concepts for light weight and crashworthy architectures.
- Optimised aerodynamic bodies for the new packaging constraints.
- Ergonomic on board passenger space and for assembly/maintenance/repair accessibility.
- Modular vehicle architectures that benefit from the absence of many mechanical constraints in the current vehicles both in the construction and use phases.
- EMI/EMC aspects of the new electric vehicle to ensure the successful integration of novel drive systems into complete vehicles.
  - 1) Overall optimization of efficiency and reliability of the drive train.

These concepts will be considered in a holistic way to achieve optimised performance with as little as possible cost, weight, comfort and performance penalties compared to today's vehicles.

**Funding Scheme:** Collaborative projects

### **GC.SST.2010.7-6                      Implementing Public-Private Partnership in the 'European Green Cars Initiative'**

In the frame of the recently launched 'European Green Cars Initiative' this Coordination Action will support the realisation of a Public Private Partnership (PPP) in connection to this initiative (In particular, research priorities within FP7 and a roadmap of R&D activities for Europe).

In this context, road transport sector industries will interact with public authorities both at the level of the implementation of FP7 and national schemes. This Coordination Action will also look at coordinating efforts at the level of the different European Technology Platforms linked to the "European Green Cars Initiative" (ERTRAC, EPoSS and Smart Grid) and research supported by MS/AS.

**Funding Scheme:** CSA

### **GC.SST.2010.7-7                      Raising awareness of potential job opportunities related to the electrification of road transport**

This Coordination Action aims at raising awareness of job creation opportunities and future prospects for young people deriving from the emergence of electrification as an important research and development trend in the automotive sector, which adds a new dimension to the traditional skills taught to automotive engineers and technicians.

The following activities might be included:

## **Annex 5 of the 2010 Cooperation Work Programme**

- Encourage young people to seek for high skilled jobs in sectors related to road transport electrification with special focus on science, research and innovation.
- Evaluate and demonstrate the potential of research outputs, outcomes and impacts to create and maintain jobs giving special consideration to opportunities for young people and gender balance.
- Extensive and broad communication and stimulation campaigns targeting young people of different ages (from high school to university). These could be: travelling workshops, competitions, animations and broad media actions directed to a young target, etc.

Proposals will focus on all major research priority lines defined for electrification research activities and might involve all major research stakeholders from industry, academia and society.

**Funding Scheme:** CSA

### **GC.SST.2010.7-8                      Green Cars - Integrated EU demonstration project on electromobility**

#### **Context and scope**

The development of an electric vehicle market in the EU shall be stimulated through a large size integrated demonstration project, including vehicles, infrastructure and standards. Such a European project should also provide input for the smart grid development, integrating a whole new category of electricity users. This large-scale project should include demonstration in cities of captive fleets and their charging infrastructure. Electric vehicles are well adapted to urban vehicle mission profiles and the electrical infrastructure can readily be upgraded in cities, as can support services - leading to greater impact.

Fleets are expected to include several types of autonomous road vehicles with differing drive-train technologies, provided electricity for the electric drive can be taken from the grid. The demonstrations should be broad ranging - investigating different scenarios for vehicle-grid interaction. The project time-frame should consider latest technological developments in Community-funded or national and regional programs. The best use of electric vehicles in terms of range, CO<sub>2</sub> emission and pollutant emissions should be considered. Fuel cell electric vehicles are not addressed here, as they are covered by the Fuel Cells and Hydrogen Joint Undertaking.

#### **Activities**

The activities to be carried out should include:

- Demonstration of the use of electricity as energy vector for road transport in a wide range of real-life operating conditions, including climatic and geographical conditions. The project should demonstrate several autonomous vehicle types from powered two-wheelers to buses with different types of electrical power train systems, including plug-in-hybrid to full battery electric technologies. Focus should be on vehicles where fossil fuel can be substituted and with an electric-only range consistent with typical operating ranges.
- Demonstration of all aspects of fixed infrastructure including different and bidirectional vehicle-to-grid interactions scenarios, and maintenance facilities.
- Development of standards; comprehensive safety assessment of vehicles and infrastructure; Technology validation for performance, durability and costs, under real-world driving conditions and including full energy and environmental impact.
- Assessment of impact on the electricity grids of a broad roll-out of electric vehicles, using modelling based on the real-life results of the project.
- Assessment of the impact on energy and environment, including a Well-to-Wheels analysis and assessment of the lifetime economics.

## Annex 5 of the 2010 Cooperation Work Programme

2) Assessment of customer acceptance, markets potentials and travel patterns.

- Communication, dissemination of information, and education.

The marginal cost associated with the innovation element compared to state-of-the-art vehicles will be considered as eligible cost.

**Funding Scheme:** Collaborative projects (with a predominant demonstration component).

### Expected impact

The expected impact of this project is an acceleration of the market roll-out of electric vehicles in order to meet EU policy objectives. This project should contribute to clarify the safety, economic and technical viability of the different types of electrical vehicles for broad market introduction, as well as identify needed standards and requirements for fixed electrical infrastructure at European level. The results will be used as input for next generation development of electric vehicles and components.

### Other information

A typical consortium could include cities or regional authorities, fleet operators, vehicles and equipment manufacturers, utilities, research centres and universities.

### V.3.3 "European Green Cars" (GC) – Topics covered by the ICT Theme.

ICT is essential for developing fully electrical vehicles, e.g. for battery management and power supply, for control mechanisms and for the interconnections with the transport and power infrastructures.

#### GC.ICT.2010.10-3                      ICT for the Fully Electric Vehicle

##### Target outcomes:

- a) Highly energy-efficient ICT components and solutions for Fully Electric Vehicles (FEVs), including adaptive and distributed control solutions, as well as new architectures, infrastructure interfaces (with both the road and the power grid) and overall system optimization. Projects should address optimization at vehicle and system levels, derive requirements and define standards - where appropriate - for subsystems, components, communications and closed-loop control, making components and subsystems work together in synergy.

In order to reach significant breakthroughs in performance, efficiency, complexity management, system integration, safety of components and cost reduction while ensuring robustness and reliability, thorough modelling, simulation, implementation and testing of overall systems and components will be required. Research should also consider life-cycle assessment and well-to-wheel analysis, electromagnetic compatibility, high voltage, high power and high temperature components, and standardisation (voltage, current, temperature, connectivity, communication and data protocols). Safety procedures, qualification and validation tests, and adaptation of safety systems for electric vehicles should also be addressed. Projects should preferably address several topics, and consortia should represent a critical mass along the value chain.

Research priorities are:

1. New solutions for overall efficiency gains in the electric vehicle:
  - (i) smart ICT solutions and models for electrical and thermal management, including battery control and charger management

## Annex 5 of the 2010 Cooperation Work Programme

- (ii) development of energy efficient and lightweight electrified auxiliaries (e.g. air conditioning, steering, lighting, brakes)
- (iii) closed-loop control and cooperative interaction of distributed subsystems

2. Safe and robust sub-systems: communication, sensors, actuators, distributed controls, power electronics, as well as adaptive components and associated real-time monitoring and control for active safety and comfort.

3. Advanced fail-safe systems and electrical architectures, new concepts for vehicle-to-road infrastructure integration based on cooperative system concepts and new generation Advanced Driver Assistance System (ADAS) and active safety systems for FEVs including methods and systems for safety assessment and evaluation.

b) European Fully Electric Vehicle Coordination Action: Coordination of FEVs research activities to identify and continuously review the needs in terms of research, components, systems integration and standardisation. This includes editing and regularly updating a European FEV roadmap, the organisation of expert hearings and networking events, and coordination with FEV-related activities at the national and global levels.

Additional coordination activities can include assessment of energy efficiency and life cycle impact, infrastructure and regulations enabling and leveraging the technologies for FEVs and their convergence with regenerative energy sources, as well as road and passenger safety.

### Expected impacts:

- Increased overall power and energy efficiency of FEVs through ICT solutions for optimised architecture, integration, controls, systems and components, given current and anticipated constraints in terms of energy storage systems.
- Strengthened global competitiveness of the European automobile sector, including the components and systems suppliers and contribution to the creation of knowledge-based jobs in a sector of strong economic impact for Europe.
- European leadership in the move towards the electrification of mobility and transport of goods and passengers.
- Reinforced coordination of the research activities on FEVs across Europe.

**Funding Scheme:** Collaborative projects (STREP) for targeted outcome a); CSA for targeted outcome b).

## Annex 5 of the 2010 Cooperation Work Programme

**Public-Private Partnership "Green Cars": Cross-Thematic cooperation between NMP, ENERGY, ENVIRONMENT (including Climate Change), TRANSPORT (including Aeronautics)**

**Call title: Sustainable automotive electrochemical storage**

**Call identifier:** FP7-2010-GC-ELECTROCHEMICAL-STORAGE

**Date of publication:** 30 July 2009<sup>14</sup>

**Deadline:** 14 January 2010<sup>15</sup> at 17.00.00, Brussels local time

**Indicative budget** <sup>16,17</sup>: EUR 25 million from the 2010 budget of which:

- EUR 10 million from Theme 4 – Nanosciences, nanotechnologies, materials and new production technologies (NMP)
- EUR 5 million from Theme 5 – Energy
- EUR 5 million from Theme 6 – Environment (including Climate Change)
- EUR 5 million from Theme 7 – Transport (including Aeronautics).

The budget for this call is indicative. The final budget of the call may vary by up to 10% of the total value of the indicated budget for the call.

In case the budget can not be consumed (totally or partially), the remaining budget will be returned to each FP7 theme according to its respective contribution.

### **Topics called:**

The topic on Sustainable Automotive Electrochemical Storage is evaluated and implemented jointly by the Themes 4, 5, 6, and 7. It is identical in each Theme. When applying for this Call please use one of the activity codes below. Each proposal must be submitted only once.

<b>Activity/ Area</b>	<b>Topics called</b>	<b>Funding Schemes</b>
GC.NMP.2010-1	<b>Materials, technologies and processes for sustainable automotive electrochemical storage applications</b>	Collaborative Project
GC.ENERGY.2010.10.2-2		
GC.ENV.2010.3.1.3-3		
GC.SST.2010.7-9		

### **Eligibility Conditions**

The general eligibility criteria are set out in Annex 2 of this work programme, and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable.

The minimum number of participating entities required, for all funding schemes, is set out in the Rules for Participation: For Collaborative projects, the minimum condition shall be the participation of 3 independent legal entities, each of which is established in a Member State or Associated Country and no two of which are established in the same Member State or Associated Country.

<sup>14</sup> The Director-General responsible for the call may publish it up to one month prior to or after the envisaged date of publication

<sup>15</sup> The Director-General responsible may delay this deadline by up to two months

<sup>16</sup> A single reserve list will be constituted if there are a sufficient number of good quality proposals. It will be used if extra budget becomes available.

<sup>17</sup> Under the condition that the preliminary draft budget for 2010 is adopted without modification by the budgetary authority.

## Annex 5 of the 2010 Cooperation Work Programme

Under this topic, the requested Community contribution must not exceed EUR 4 million.

Only information provided in part A will be used to determine whether the proposal is eligible with respect to budget thresholds and partnership.

### Evaluation procedure:

- For this Call the evaluation shall follow a single-stage evaluation procedure.
- Proposals will not be evaluated anonymously.
- Proposals will be evaluated remotely with the consensus session being held in Brussels.
- The page limits that apply to proposals submitted under this Call are given in the Guide for Applicants and in the proposal part B template available through the EPSS. The Commission will instruct the experts to disregard any pages in excess of these limits.
- At the Panel stage, proposals with equal overall scores will be prioritised according to their scores for the S/T Quality criterion. If they are still tied, they will be prioritised according to their scores for the Impact criterion.
- Proposals are evaluated on the basis of the following three criteria: **1. S/T quality; 2. Implementation; 3. Impact.** For each criterion marks from 0 to 5 will be given, with the possibility of 0.5 point scores. Successful proposals must pass the minimum thresholds as follows:

	<b>Minimum threshold</b>
<b>S/T quality</b>	<b>3/5</b>
<b>Implementation</b>	<b>3/5</b>
<b>Impact</b>	<b>3/5</b>
<b>Overall threshold required</b>	<b>10/15</b>

### Particular requirements for participation, evaluation and implementation:

The forms of grants and maximum reimbursement rates which will be offered are specified in Annex 3 to the Cooperation work programme.

### Indicative Evaluation and contractual timetable

Evaluation: remote phase January 2010, consensus phase February 2010. Evaluation results: estimated to be available by April 2010. A single reserve list of projects might be established, for which the results are estimated to be available by the second semester of 2010.

### Consortia agreements

Participants in Collaborative Projects are required to conclude a consortium agreement prior to grant agreement.

### Use of flat rates for subsistence costs:

In accordance with Annex 3 of this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available at the following website: [http://cordis.europa.eu/fp7/find-doc\\_en.html](http://cordis.europa.eu/fp7/find-doc_en.html) under 'Guidance documents/Flat rates for daily allowances'.

## Annex 5 of the 2010 Cooperation Work Programme

### Overview of the PPPs Topics implemented in 2010

#### 1. Factories of the Future (FoF)<sup>56</sup>

FP7 Theme	Topic	Budget (mio EUR)	Call references	Funding scheme	Deadline
NMP – Nanosciences, nanotechnologies, Materials and new Production	<b>FoF.NMP.2010-1</b> Plug and Produce components for adaptive control	60	FP7-2010-NMP- ICT- FoF	Collaborative Projects	3 November 2009
	<b>FoF.NMP.2010-2</b> Supply chain approaches for small series industrial production				
	<b>FoF.NMP.2010-3</b> Intelligent, scalable, manufacturing platforms and equipment for components with micro- and nano-scale functional features				
ICT – Information and Communication Technologies	<b>FoF.ICT.2010.10-1</b> Smart Factories: ICT for agile and environmentally friendly manufacturing – a), b), c), d) targeted outcomes	33.5		CSA	
	<b>FoF.ICT.2010.10-1</b> Smart Factories: ICT for agile and environmentally friendly manufacturing – e) <b>targeted outcome</b>	1.5			

<sup>56</sup> Proposers have to check the legal and procedural requirements described in the respective chapters of the work programme Cooperation relating to the Themes concerned

## Annex 5 of the 2010 Cooperation Work Programme

### 2. Energy-efficient Buildings (EeB)<sup>57</sup>

FP7 Theme	Topic	Budget (mio EUR)	Call references	Funding scheme	Deadline
NMP – Nanosciences, nanotechnologies, Materials and new Production	<b>EeB.NMP.2010-1</b> New nanotechnology-based high performance insulation systems for energy efficiency	<b>30</b>	<b>FP7-2010-NMP- ENV-ENERGY-ICT- EeB</b>	<b>Collaborative Projects</b>	<b>3 November 2009</b>
	<b>EeB.NMP.2010-2</b> New technologies for energy efficiency at district level				
<b>Environment</b> (including Climate Change)	<b>EeB.ENV.2010.3.2.4-1</b> Compatible solutions for improving the energy efficiency of historic buildings in urban areas	<b>5</b>			
<b>Energy</b>	<b>EeB.ENERGY.2010.8.1-2</b> Demonstration of Energy Efficiency through Retrofitting of Buildings	<b>15</b>			
<b>ICT – Information and Communication Technologies</b>	<b>EeB.ICT.2010.10-2</b> ICT for energy-efficient buildings and spaces of public use - <b>a) targeted outcome</b>	<b>14</b>			
	<b>EeB.ICT.2010.10-2</b> ICT for energy-efficient buildings and spaces of public use - <b>b) targeted outcome</b>	<b>1</b>		<b>CSA</b>	

<sup>57</sup> Proposers have to check the legal and procedural requirements described in the respective chapters of the work programme Cooperation relating to the Themes concerned

## Annex 5 of the 2010 Cooperation Work Programme

### 3 . Green cars (GC)<sup>58</sup>

FP7 Theme	Topic	Budget (mio EUR)	Call references	Funding scheme	Deadline
<b>Joint Call NMP, Energy, Environment, Transport</b>	Materials, technologies and processes for sustainable automotive electrochemical storage applications. <b>This topic is published under:</b> <b>GC.NMP.2010-1</b> <b>GC.ENERGY.2010.10.2-2</b> <b>GC.ENV-2010.3.1.3-3</b> <b>G.-SST.2010.7-9</b>	<b>25</b>	<b>FP7-2010-GC-ELECTROCHEMICAL-STORAGE</b>		
<b>Transport</b> (Sustainable Surface Transport)	<b>GC.SST.2010.7-1</b> Electrical machines	<b>40</b>	<b>FP7-SUSTAINABLE SURFACE TRANSPORT (SST)-2010-RTD-1</b>	<b>Collaborative Projects</b>	<b>14 January 2010</b>
	<b>GC.SST.2010.7-2</b> Integrated electric auxiliaries and on-board systems				
	<b>GC.SST.2010.7-3</b> Optimised thermal engine development and integration				
	<b>GC.SST.2010.7-4</b> Smart storage integration				
	<b>GC.SST.2010.7-5</b> Advanced electric vehicle concepts				

<sup>58</sup> Proposers have to check the legal and procedural requirements described in the respective chapters of the work programme Cooperation relating to the Themes concerned, **except for call FP7-2010-GC-ELECTROCHEMICAL-STORAGE for which the call fiche is included in this Annex**

**Annex 5 of the 2010 Cooperation Work Programme**

	<b>GC.SST.2010.7-6</b> Implementing Public-Private Partnership in the European Green Cars initiative			<b>CSA</b>	
	<b>GC.SST.2010.7-7</b> Raising awareness of potential job opportunities related to the electrification of road transport				
	<b>GC.SST.2010.7-8</b> Green Cars - Integrated EU demonstration project on electromobility	<b>23</b>	<b>FP7-TRANSPORT-2010-TREN-1</b>	<b>Collaborative Projects</b>	
<b>ICT – Information and Communication Technologies</b>	<b>GC.ICT.2010.10-3</b> ICT for the fully electrical vehicle - <b>a) targeted outcomes</b>	<b>19</b>	<b>FP7-2010-ICT-GC</b>	<b>Collaborative Projects</b>	<b>3 November 2009</b>
	<b>GC.ICT.2010.10-3</b> ICT for the fully electrical vehicle - <b>b) targeted outcomes</b>	<b>1</b>		<b>CSA</b>	