

## **R&D involvement in the EU Economic Recovery Plan: focus on the three Public Private Partnerships**

### ***The Energy-efficient buildings, Factories of Future and European Green cars Initiatives***

This fact sheet presents the rationale, content and next steps towards the implementation of the three public private partnerships that are included in the European Economic Plan which was announced by the Commission last 26 November 2008.

The recovery package, adopted by the European Commission on 26 November 2008 and endorsed by the European Council on 11-12 December 2008, proposes actions to develop clean technologies for cars, construction and manufacture sector.

It states that "to support innovation in manufacturing, construction and in the automobile sector, 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 launch 3 major partnerships between the public and private sectors": The three Public-Private Partnerships (PPPs) planned to provide the required support respectively to the manufacturing, construction and automobile sectors are:

- In the construction sector: a 'European 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 CO2 emissions"* (European Economic Recovery Plan)
- In the manufacture 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 the enabling technologies of the future, such as engineering technologies for adaptable machines and industrial processes, ICT, and advanced materials"*. (European Economic Recovery Plan)
- In the car sector: a 'European 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"* (European Economic Recovery Plan)

These initiatives are part of a comprehensive package, based on an integrated approach complementing with actions on the demand-side, such as public procurement, technical standards, or regulatory measures. This will be done in cooperation with responsible DGs within the Commission.

The three PPPs are expected 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 of the future of 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 stronger from the crisis, more sustainable and more competitive. The Recovery plan proposes measures to boost research efforts and direct investments in industrial sectors affected by the economic downturn and which also have strong potential towards a greener economy.

## **Energy-efficient Buildings (EeB)**

Energy efficient buildings (EeB) will consist of a financial envelope of € 1 billion to boost the construction sector, and aims at promoting green technologies and the development of energy efficient systems and materials in new and renovated buildings - this, with a view to radically reducing their energy consumption and CO2 emissions.

The programme will be financed jointly by industry and the European Commission under the Seventh Framework Programme for Research (FP7). The research programme will begin with coordinated calls for research proposals which should be launched in July this year.

### **Facts and Figures<sup>1</sup>**

The public-private partnership "Energy efficient Buildings Initiative" is targeting the construction sector at large. Construction accounts for more than 10 % of the EU's GDP and employs 32 million people in large, medium and small enterprises. There are 2.7 million enterprises in the EU in the construction sector, of which 95 % are SMEs.

There is a stock of 160 million buildings in the EU. The present rate of construction of new buildings is below 2%/year in all major European countries. These figures push the hope of having a truly energy-efficient built environment far beyond one century and probably closer to two centuries if action is limited to new buildings. For that reason focus is needed on the renovation of existing buildings. There is a need to act at a EU level if we want to make a substantial impact. Public buildings will be considered as a priority.

### **Challenges ahead**

The energy consumption of houses and buildings taking into account the whole life cycle is responsible for 40% of total EU energy consumption and is the main contributor to greenhouse gas (GHG) emissions (about 36% of the EU's total CO2 emissions and for about half of the CO2 emissions which are not covered by the Emission Trading System). Therefore reducing energy consumption during the whole life-cycle of the buildings is an effective action against climate change and will also contribute to decreasing the EU's energy import dependence.

Having recognized the social and economic impacts of energy savings in construction, the sector is fully aware today of being confronted by a huge responsibility.

In March 2007, the European Council has set clear goals: Reduction of 20% of the total energy consumption; 20% contribution of Renewable energies to total energy production; 20% reduction of Greenhouse gases (GHG) below 1990 emissions.

In this context, the building sector must assume very ambitious objectives of 165 Mtoe (millions of tons of oil equivalent) in energy reduction and contribute with 50 Mtoe from Renewable energies in 2020. To understand the nature of the challenge, these figures are equivalent to the total joint energy consumption of Spain, Portugal, Greece and Ireland in 2004.

### **The way forward**

The PPP EeB will speed up research on key technologies and develop a competitive industry in the construction sector with the focus on energy-efficient processes, products and services. The main purpose is to reach the goals set forth for 2020 and 2050 to address climate change issues and contribute to improving EU energy security of supply, thereby transforming this challenge into a business opportunity. Specific attention will be given to the development and integration of design and simulation tools, new materials, building systems and equipment and ICT for energy efficiency. Main R&D priorities could focus on:

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<sup>1</sup> All figures come from: [www.fiec.org](http://www.fiec.org)

- Energy efficiency in buildings and districts while improving the quality of life (comfort and indoor environment) of citizens.
- Development of ICTs for energy-smart buildings and districts, and integration of Renewable Energy Systems in buildings and districts.
- Use of nanotechnologies, materials, components, systems, construction processes and their integration into energy-efficient buildings.
- Large scale demonstration actions will integrate and demonstrate innovative technologies in their final phase of development.
- Industrialisation of products and components contributing to the Energy Efficiency of Buildings, such as phase-change materials, insulation materials, smart windows and facades.
- Adaptation of design processes, finding adequate financing, initiating new commissioning procedures, tackling behavioural issues, ensuring knowledge transfer.
- EeB will benefit from the integration into buildings and districts of the latest technologies coming out of long-term research on Renewable Energy Systems and other clean technologies such as fuel cells being funded under other initiatives.

### **Next steps**

In order to guarantee a quick start, we will make use of existing instruments. The Commission should launch cross-thematic calls for research proposals from the FP7 thematic areas "Nanotechnologies, Materials and Production technologies", Environment, Energy and ICT in July 2009. A multi-annual work programme will be developed together with the industry.

For the construction sector, complementary actions with existing activities done by Member States will be sought. For instance, an ERANET<sup>2</sup> "ERACOBUILD" has recently been established. which involves 21 Member States and focuses on sustainable renovation of buildings and value-driven construction processes.

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<sup>2</sup> An ERA Net is a scheme dedicated to support the coordination and networking of national and regional research programmes from different EU Member states and FP7 Associated countries

## **FACTORIES OF THE FUTURE**

The "Factories of the Future" is one of the three Public-Private Partnership included in the Commission's recovery package. It will consist of a research programme of 1.2 billion Euro to support the manufacturing industry in the development of new and sustainable technologies. The programme will be financed jointly by industry and the European Commission under the Seventh Framework Programme. The research programme will begin with coordinated calls for research proposals which should be launched in July this year. The objective is to help EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by improving the technological base of EU manufacturing across a broad range of sectors.

On 11 March 2009, a first step has been made with the decision of the European Technology Platform on future manufacturing technologies, MANUFUTURE, to engage in a partnership with the European Commission for the development of 'Factories of the Future'.

### **Facts and Figures<sup>3</sup>**

The public-private partnership "Factories of the Future" (PPP FoF) is targeting the manufacturing industry. Manufacturing is still the driving force of the European economy, contributing over 6 500 billion euro in GDP and providing more than 30 million jobs. It covers more than 25 different industrial sectors, largely dominated by SMEs, and generates annually 1 500 billion euro of value added.

Building on the EU's excellent R&D base, the future of manufacturing is vital to European economic growth and sustainability. 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 and develops a number of new enabling production technologies with cross-sectoral benefits. There is an increasing demand for greener, more customised and higher quality products. This initiative will help European industry to meet these needs by converting to a demand-driven industry with lower waste generation and energy consumption.

### **Challenges ahead**

The European manufacturing sector faces an intense and growing competitive pressure in global markets. European companies are faced with a continuous competition in the high-tech sectors from other developed economies, such as the U.S., Japan and Korea.

Manufacturing has to address the challenge of producing more products with less material, less energy and less waste. Our living standards are on the rise; global manufacturing today has to meet a constantly increasing demand for consumer goods. Manufacturing has to improve its innovation activity. New ideas have to be transformed into new products and processes. Many of the manufacturing companies are SMEs and only a few of them have research capacity and the financial potential to implement high-risk innovative manufacturing technologies.

### **The way forward**

The activities of the PPP FoF will concentrate on increasing the technological base of European manufacturing. The focus will be on the development and integration of enabling technologies, such as engineering technologies, ICT, and advanced materials for adaptable machines and industrial processes. The activities of the initiative will be defined on the basis of the medium and shorter term R&D and innovation needs of the industry and in particular SMEs. Demonstration of newly-developed industrial technologies, ICT and materials will improve the competitiveness of the companies. This initiative is expected to deliver in particular:

- ✓ **A new European model of production systems for the factories of the future** (e.g. transformable factories, networked factories, learning factories) depending on

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<sup>3</sup> Source: OECD and Eurostat

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.

### **Next steps**

In order to guarantee a quick start, we will make use of existing instruments. The Commission should launch cross-thematic calls for research proposals from the FP7 thematic areas 'Nanotechnologies, Materials and Production Technologies', and ICT in July 2009. A multi-annual work programme will be developed together with the industry.

Member States have also expressed a desire to work more closely together to support research into eco-innovation for the manufacturing sector. The European Commission is therefore preparing to launch a new tool to support the coordination of national research programmes - an ERANET<sup>4</sup> on Manufacturing. This will allow Member States' to align their research strategies and their own research funds and issue joint calls for proposals.

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<sup>4</sup> An ERA Net is a scheme dedicated to support the coordination and networking of national and regional research programmes from different EU Member states and FP7 Associated countries

## **European Green Cars initiative**

The European Green Cars Initiative is one of the three PPP included in the Commission's recovery package. The envelope for this initiative is foreseen at €5 billion to boost to the automotive industry in a time of economic hardship, and support the development of new, sustainable forms of road transport. Of this financial envelope, €4 billion will be made available through loans by the European Investment Bank (EIB), and €1 billion through support to research, with equal contribution from the Seventh Framework Programme for Research (FP7) and from the private sector. The scope of this initiative is broader than the two other PPP, and research is just one part of it. Several coordinated calls for research proposals should be launched in July this year. These financial support measures will be supplemented by demand-side measures, involving regulatory action by Member States and the EU, such as the reduction of car registration taxes on low CO2 cars to stimulate car purchase by citizens.

### **Developing greener road transport**

Greening road transport is necessary to achieve EU and world targets in emissions reductions. In the EU, 19% of total EU greenhouse gas emissions and 28% of CO2 emissions in 2005 are linked to the transport sector. More than 90 % of total EU transport emissions are due to road transport. While total EU emissions declined, transport emissions increased continuously between 1990 and 2005 due to high growth in both passenger (28 %) and freight transport (62 %).

Research is the way to develop the sustainable transport methods we need. Such "eco-innovation" will serve both to protect the environment, and to offer competitive advantage to those seeking to create new innovation-driven markets.

### **Measures** contained in the European Green Cars Initiative

The European Green Cars Initiative contains three streams of action:

- R&D, mainly through FP7 grants for research on greening road transport. Budget: €1 billion, of which €500 million from the Commission, matched by €500 million from industry and Member States
- Support to industrial innovation through EIB loans. Budget: €4 billion (in addition to existing loans)
- Demand side measures & public procurement, such as reduction of circulation and registration taxes for low-CO2 cars

Despite its name, the Green Cars Initiative is not only for passenger cars. Under the Green Cars Initiative, the research topics include:

- Research for trucks;
- Research on greening internal combustion engines;
- Research on bio methane use;
- Logistics, transport system optimisation;
- Hydrogen and fuel cells; and
- Research on electric and hybrid vehicles, notably research on :
  - High density batteries;
  - Electric engines; and
  - Smart electricity grids and vehicle charging systems.

### **Next steps**

Under FP7, four Calls should be launched in July 2009 to implement the Green Cars Initiative, with an overall budget of around €100 million. The Commission's Directorates-General for

Research, Transport and Energy, and Information Society will each launch Calls that focus on electrification of road transport, along with a fourth, joint call on Electric Batteries. In other words, the funding for road transport projects under FP7 in 2010 will all be focused on the electrification of road transport and research into hybrid technologies; a critical mass which is expected to produce a step change in innovation in these technologies.

In the following FP7 Calls, in 2011, the topics for projects to be funded should broaden to the other areas of the Green Cars Initiative: research into trucks, internal combustion engines, logistics, and intelligent transport systems. In 2011, there could be also a Joint Call on “smart grid and recharging systems” between several services of the Commission.

### **EIB loans**

In addition to grants received from FP7 funding, organisations involved in transport research can also apply for loans from the EIB. These will be the best tools for projects that involve greater risk.

Two EIB loan mechanisms will provide the bulk of financing under the EGCI:

- The Risk-Sharing Finance Facility (RSFF); and
- The European Clean Transport Facility (ECTF); a loan instrument which has been specifically designed for the transport industry.

The RSFF is a guarantee fund for research, development and innovation. The scope of eligible activities extends from “traditional” investments in basic or applied research and demonstration activities, to equipment and soft investments such as R&D operating cost, salaries of researchers, management and support staff, and IPR acquisition or protection costs. Any organisation can apply for an RSFF loan – large corporations and SMEs, universities and research institutes, publicly or privately owned.

While the RSFF is a financing instrument that existed before the current financial crisis, the ECTF has been created in response to the crisis and its effect on the transport industry, aimed specifically at transport research, and at one research goal: lowering emissions in transport. The European Clean Transport Facility will support investments in research, development and innovation aimed at emission reduction and energy efficiency in the European transport industry.

Both the RSFF and ECTF loans are attractively priced, and with long maturities.

### **Other existing EU research actions in greening transport**

#### *The Hydrogen and Fuel Cells JTI*

The EGCI, focusing as it does on electrification of road transport, is complementary to the Hydrogen and Fuel Cells Joint Technology Initiative launched last year. This public-private joint technology initiative (JTI) will implement the EU target-oriented research and development to support the broad market introduction of these technologies. Founding members are the European Community and a non-profit association of European industry interests composed of a major share of Europe's fuel cells and hydrogen companies of all sizes from micro to large multinationals. The Commission is expected to fund 470 M€ from the Seventh Framework Programme for a period of six years which will be at least matched by industry contributions.

#### *Past collaborative projects*

The objectives of the European Green Cars Initiative are achievable: under EU-financed projects under FP6, for example, a research project entitled POMEROL developed and tested a new lithium ion car battery which, as well as producing no greenhouse gas emissions, achieved a charge of close to 3000 watts per kilo, for a cost of only € 20 per kilowatt of energy produced. The ILHYPOS and HyHEELS projects, meanwhile, developed four different hybrid architectures, from small to medium sized vehicles, which are both technologically innovative, and cost competitive for mass production. These and more technological developments can be deepened

with the financing support of the European Green Cars Initiative, to produce a step change in research in order to bring to market the sustainable transport systems in the next decade.

#### Future ERA-NET<sup>5</sup>

Member States have also expressed a desire to work more closely together to support research into eco-innovation for road transport. The European Commission is therefore preparing to launch a new tool to support the coordination national research programmes – an "ERA-NET Plus" action – in road transport greening. This will allow Member States' own research funds to align their research strategies and issue joint calls for proposals, supported by EU financing.

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<sup>5</sup> An ERA Net is a scheme dedicated to support the coordination and networking of national and regional research programmes from different EU Member states and FP7 Associated countries