

# FINAL ASSESSMENT OF THE RESEARCH PPPs IN THE RECOVERY PLAN

*Factories of the Future  
Energy-efficient Buildings  
European Green Cars Initiative*



**EUROPEAN COMMISSION**

Directorate-General for Research and Innovation  
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## Glossary

<b>AIAG:</b>	Ad hoc Industrial Advisory Group
<b>E2BA:</b>	Energy-efficient Buildings Association
<b>EC:</b>	European Commission
<b>ECTP:</b>	European Construction Technology Platform
<b>EeB:</b>	Energy-efficient Buildings (research PPP)
<b>EERP:</b>	European Economic Recovery Plan
<b>EFFRA:</b>	European Factories of the Future Research Association
<b>EGVIA:</b>	European Green Vehicles Initiative Association
<b>EIB:</b>	European Investment Bank
<b>EIT:</b>	European Institute of Innovation and Technology
<b>EPoSS:</b>	European Technology Platform on Smart Systems Integration
<b>Ertrac:</b>	European Road Transport Research Advisory Council
<b>ETP:</b>	European Technology Platform
<b>FoF:</b>	Factories of the Future (research PPP)
<b>FP7:</b>	seventh framework programme (2007–13)
<b>GC:</b>	Green Cars (research PPP)
<b>H2020:</b>	Horizon 2020 EC framework programme for 2014–20
<b>JTI:</b>	joint technology initiative
<b>KET:</b>	key enabling technologies
<b>KIC:</b>	knowledge and innovation community
<b>LEIT:</b>	leadership in enabling and industrial technologies
<b>NCP:</b>	national contact point
<b>PPP:</b>	public–private partnership
<b>TRL:</b>	technology readiness level



## Executive summary

This report details the results of an assessment on the three research public-private partnerships (PPPs) that are running established under the European economic recovery programme. These research PPPs differ from previous PPPs in that, while the research needs of the programme are driven primarily by industry, the execution of the calls and programme management is undertaken by the Commission. The projects are then run under standard FP7 funding and operating rules, including those of openness and transparency. The three research PPPs cover the areas of Energy-efficient Buildings (EeB), Factories of the Future (FoF) and Green Cars (GC). This assessment builds upon a previous interim assessment carried out in 2011.

The overall result of this assessment is very supportive of the research PPP model, although it is noted that few of the projects have yet been completed and so it is still somewhat early to be definitive about the magnitude of the effect in terms of achieved commercialisation. However, the evidence suggests that the activities being pursued under the three research PPPs are more directly relevant to post-project commercialisation than is the case with standard FP7 Cooperation projects, which is a key objective of these research PPPs.

The data used in the assessment comes from a variety of sources but the primary data have been objective and statistical data relating to the relevant calls and call management information provided by the European Commission, interviews with key stakeholders both within and outside the PPPs and an online survey of more than 700 stakeholders, mainly participants in the PPP programmes. These data have been supplemented with information provided by the industrial research associations belonging to two of the three PPPs (Energy-efficient Buildings and Factories of the Future <sup>(1)</sup>), associated workshops and information from parallel assessment activities regarding the shape and content of Horizon 2020.

The three research PPPs target strategically important industries. Launched in November 2008, the PPPs were set up as a response to the financial crisis with a view to supporting research, development and innovation in the manufacturing, construction and automobile industries, which had seen demand plummet. Although originally envisaged as a short-term measure, the ongoing crisis, linked with a better understanding of the need for a long-term perspective on the support for these strategic industries, has led to a call from industry for a long-term commitment to these economically important industrial sectors and to these PPPs. The industrial stakeholders have mentioned that the current timescale of the action and the level of funding are insufficient to make a significant impact in global terms with regard to European competitiveness and that therefore the combined public and private funds applied to this activity would need to be increased.

The three PPPs were set up with a fairly informal structure that allowed the initiatives to get underway quickly. At the same time the use of standard FP7 funding and operating rules meant that the process was transparent at the point of call issue and proposal assessment. Nevertheless, the informal nature of the roles of the industrial research associations and the ad hoc industrial advisory groups has led to some concern about the openness of the process and the influence of the key players on the whole process. The review found that such doubts as may exist are misplaced and that the evidence shows that the process is open and fair, and

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1 The Green Cars PPP did not have an industrial research association in place for most of the period under review.

that efforts have always been made to be as inclusive as possible. Despite this, a key finding of the review is that the current roles need to be formalised and published so that the whole PPP activity is as transparent and open as possible to all European organisations.

The review also found good evidence that the activities of the PPPs had resulted in more close-to-market relevant projects and activities than is typically achieved within standard FP7 cooperative projects. Much of this relevance arises from the development and application of the industrially driven multiannual roadmaps which give a long-term context for industrial participation. Indeed, industrial participation by both large companies and small and medium-sized enterprises (SMEs) is significantly higher than with standard FP7 programmes. However, several stakeholders in the process emphasised that, to have significant global impact, the commitment to the PPPs by the public and private sides, both in terms of timescale and resources, needs to be increased.

A significant finding of the review was that, although using standard FP7 rules, the efficiency of the calls was significantly improved, particularly with respect to success rates and shorter time to grant. Despite this, there was strong anecdotal evidence that the process was still burdensome for industrial companies, particularly SMEs and that this can be a hurdle for getting involved in the process.

The relevance of the current research PPPs activities is underpinned by the industry-driven multiannual roadmaps. Nevertheless, the range of activities that can be funded under FP7 instruments is limited. Except for the EIB loans scheme associated with the Green Cars PPP, all the other available funding instruments are well-tried pre-competitive schemes. Within this range the PPPs have attempted to create industrially relevant actions, such as with the demonstration-targeted projects. These, however, are still insufficient to address adequately the 'valley of death' issues that hinder the commercialisation of leading research ideas. In order to improve the rate of commercialisation, PPPs within Horizon 2020 need also to address higher technology readiness levels (TRLs) within projects, using, where appropriate, schemes such as pilot plants to address close-to-market, but still pre-competitive, innovation actions involving the whole of the industry value chain.

Finally, the review found that while awareness and dissemination efforts were being made by the various public and private bodies associated with the PPPs, these were insufficient to capitalise on the potential benefits arising from these industrially relevant initiatives. While it is clear that the centre of PPP activity is collocated with the industrially active areas, there is little evidence of active and widespread engagement of participants from the new Member States (figures are similar to those of FP7 Cooperation). SME participation in the research PPPs is better when compared with other FP7 calls. In any case, to maximise the impact of the PPPs there should be a more active dissemination to engage a much wider range of SMEs, particularly using multiplier organisations such as trade bodies.

The expert group has formulated five main recommendations, summarised below. Each recommendation has an associated set of actions which are further detailed in the last section.

**Recommendation 1: The governance model of the research PPPs should be underpinned by a higher degree of formalisation, particularly with regard to the roles and duties of the private and public parties to the agreement. The valued contributions and commitments of the various actors involved would thereby be more appropriately recognised.**

While the expert group recognises that the current governance arrangements have allowed the PPPs to be implemented with speed and are working to achieve the objectives of these PPPs, they nevertheless leave uncertainties regarding the process as a whole, the roles of the individuals and, hence, the transparency of the whole process to external bodies and organisations. In particular, the role of the industrial research associations and their relationship with the Commission needs to be formalised, as does the role of the current ad hoc industrial advisory groups.

**Recommendation 2: The research PPP model should be further used, developed and expanded in scope within Horizon 2020 and provided with sufficient funding to achieve a significant industrial effect.**

There is good evidence that the research PPPs are capable of moving the research focus towards activities more relevant to exploitation. However, in order to make a significant step forward, there needs to be a long-term commitment from both the public and private sides to sustain support of the initiatives, and the combined level of public and private funding needs to be significantly increased in Horizon 2020 to stimulate sufficient leverage effect. Furthermore, future PPPs should be organised along European value chains to maximise the potential for European wealth creation.

**Recommendation 3: The PPPs should work under the Horizon 2020 common rules, but its procedures need to be further streamlined and simplified to increase ease of entry into PPP projects for industry, especially SMEs, and to broaden the appeal to a wider subset of the relevant value chain.**

The review identified strong benefits arising from the operation of the PPPs under common framework programme rules. However, while the expert group acknowledges that efforts have been made within the existing PPPs to simplify and streamline the procedures, more effort needs to be undertaken to speed up the entire process from application to grant, and also to streamline the up-front work, particularly for new entrants. While much of the simplification effort for Horizon 2020 has been focused on financial and reporting regulations, these are generally post-award activities. The major hurdle for a new entrant, particularly an SME, is the time and effort in getting to a grant award.

**Recommendation 4: The research PPPs in Horizon 2020 need to focus on actions which strengthen innovation activities and the likelihood of European-based products and services eventually reaching the markets.**

The current PPPs have, within the limits of the instruments available, moved the project activities closer to actions relevant to exploitation. However, PPP actions within Horizon 2020 need to widen the scope by also moving up the TRL scale, involving more innovation activities, and the assessment and review procedures need to focus further on the innovation aspects of the projects.

**Recommendation 5: In order to maximise the benefits and widen participation in the research PPP activities and results, awareness about the research PPPs needs to be strengthened, particularly among the often hard-to-reach SMEs. SMEs are critical to the industrial competitiveness of Europe and they increase the geographical spread of organisations involved along the key value chains.**

The current PPPs, while open, have still not achieved widespread awareness, particularly among industrial organisations in new Member States and SMEs. In order to maximise the impact of the programmes, more emphasis needs to be placed on raising awareness. In particular, the industrial research associations' role as external ambassadors for their PPPs needs to be strengthened and formalised.

# 1

## Introduction

This report details the findings of the expert group assessing the three research PPPs launched in November 2008 as part of the European Economic Recovery Plan <sup>(2)</sup>. The purpose of the report is twofold, namely to evaluate the contribution of the PPPs in their respective industrial areas and to make recommendations regarding the implementation of research PPPs within Horizon 2020. Even though this report builds upon the findings of the interim assessment carried out in 2011 <sup>(3)</sup>, this is a new stand-alone assessment.

The research PPPs support research, development and innovation in manufacturing, construction and the automobile industries, each of which had seen a dramatic fall in demand during the initial phases of the financial crisis and also faced significant challenges in the transition to the green economy. Total budgets (including both private and public investments) of the three parallel initiatives, as announced, were as follows.

- In the manufacturing sector, a EUR 1.2 billion Factories of the Future (FoF) initiative to promote the competitiveness and sustainability of the European manufacturing industry.
- In the construction sector, a European Energy-efficient Buildings (EeB) 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. The estimated envelope for this partnership was EUR 1 billion.
- In the automotive sector, a EUR 5 billion Green Cars (GC) initiative to improve the sustainability of all European road transport and accelerate the move towards the electrification of road and urban transport (EUR 1 billion of research funding supplemented by EUR 4 billion of EIB loans).

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<sup>2</sup> EC COM(2008) 800.

<sup>3</sup> *Interim assessment of the research PPPs in the European economic recovery plan*, Publications Office of the European Union, 2011 (ISBN 978-92-79-20425-8).

The format of this assessment was to review the research PPPs with respect to their implementation as well as their achievements and progress, particularly with respect to effectiveness, efficiency, quality and roadmap coverage.

The main information sources used in the assessment were:

- objective and statistical data relating to the calls provided by the European Commission;
- information provided by the industrial research associations and European technology platforms associated with the three areas relating to roadmaps, plans and outputs, as well as opinions regarding the effectiveness of the research PPPs;
- interviews, including interviews with representatives from the industrial research associations and European technology platforms, and also with Members of the European Parliament;
- an online survey of a wide range of research PPP stakeholders;
- the results of impact workshops for both the EeB and FoF research PPPs;
- parallel assessment activities being carried out with regard to the shape and content of Horizon 2020 programmes, in particular the Key Enabling Technologies High-Level Group recommendations.

The main task of the expert group was to analyse whether the research PPP structure is a suitable model for engaging industry in relevant research and innovation activities and whether it increases the uptake of collaborative research results. The overall assessment has been structured around the following main requirements that a research PPP should maintain and reinforce for the future: (1) transparent processes; (2) efficiency; and (3) clear responsibilities. In order to undertake this assessment the following questions were developed by the expert group to focus the main activity of this assessment.

1. What is the best way of making an open and inclusive research programme while keeping a clear industrial focus and coherence?
2. Are the various parties to the research PPPs meeting these requirements?
3. Are the programme requirements fit for purpose?
4. What is the right approach regarding rules of participation for the research PPPs in Horizon 2020: common rules for all PPPs or tailor-made rules depending upon context?
5. Who should be responsible for the evaluation of proposals submitted to PPP calls and for the overall management of these initiatives in Horizon 2020?

In answering these questions the expert group explicitly acknowledged that, under Horizon 2020, research PPPs of the type of those in the research plan will evolve into contractual PPPs. This evolution to a contractual PPP (and the difference between these and institutional PPPs) is discussed in Section 5.

The expert group was appointed by the European Commission and then operated independently according to its terms of reference. The panel comprised a mix of experts coming from different fields and backgrounds, some with specific expertise in the technological content of the research PPPs and others with general expertise in research and innovation programmes, strategy and management. Details are given in Annex B.

## 2

# Brief description of the research PPPs

## Aim and budget under the European Economic Recovery Plan

As a response to the financial and economic crisis, the European Commission launched, in November 2008, the European Economic Recovery Plan, with the aim of restoring consumer and business confidence, restarting lending, stimulating investment in the EU's economies and creating jobs.

This plan was structured into two pillars. The first was meant to create a major injection of purchasing power into the economy, to boost demand and stimulate confidence. The second pillar defined the concept of 'smart investment', meaning investing in the right skills for future needs.

Three sectors were identified as the most suitable to receive this investment in research (construction, automobile and manufacturing), and three major partnerships between the public and private sector were launched:

- the European Green Cars Initiative,
- Energy-efficient Buildings,
- Factories of the Future.

The research plan was adopted by the European Commission on 26 November 2008 and endorsed by the European Council on 11–12 December 2008. After a meeting held in Brussels on 30 March 2009 between the Commissioner for Research, Innovation and Science and high-level representatives of industry to review progress and discuss priorities for the



implementation of the research elements of the PPPs, a joint statement <sup>(4)</sup> was published establishing that the first PPP calls would be published in July 2009. Thus, in an unprecedentedly short time, the PPPs were launched and the first calls were closed in November 2009, following FP7 rules and procedures.

The principles of relevance, simplification, transparency, continuity, process review and impact assessment were the basis <sup>(5)</sup> of the implementation process of these PPPs and have been maintained through the deployment period.

The PPP calls gathered topics launched in the work programmes by different FP7 themes and were managed by the Commission services, thereby creating a truly cross-thematic initiative, using common FP7 rules, unlike JTIs which have specific rules, and assuring accessibility to and fairness of the process with non-discriminatory principles.

The PPPs also differ from standard FP7 Cooperation calls in the direct involvement of industry in the drafting of the priorities to be tackled, since the research needs as seen by the private side were previously established in a multiannual roadmap discussed and approved by the industry.

At the Competitiveness Council meeting on 26 May 2010 <sup>(6)</sup>, it was concluded that research PPPs were crucial in addressing the grand European socio-economic challenges and had the potential to foster productivity and sustainability by focusing on a limited number of industrial sectors, selected on the basis of their potential contribution to European GDP and employment.

Based on funding from the EC to be matched by the private sector, the overall indicative research budgets of the three research PPPs for the period 2010–13 amounted to EUR 3.2 billion. The proposed EC contribution is detailed by theme in Table 1. Table 2 shows the final contributions of the different themes to the four annual PPP calls.

**Table 1:** Initially foreseen indicative funding distribution amongst the various FP7 Cooperation themes involved in the research PPPs

Budget (million EUR)	NMP	ICT	TRS	ENE	ENV	FP7
FoF	400	200				600
EeB	250	100		125	25	500
GC	60	120	220	50	50	500
Total	710	420	220	175	75	1 600

4 <http://ec.europa.eu/research/index.cfm?pg=newsalert&lg=en&year=2009&na=ppp-310309>

5 Conference: The European RTD Framework Programmes: From Economic Recovery to Sustainability, Valencia, April 2010.

6 Council of the European Union, 'Conclusions concerning various issues related to the development of the European Research Area', 3016th Competitiveness Council meeting, Brussels, 26 May 2010.

**Table 2:** Final funding distribution amongst the various FP7 Cooperation themes

Final (million EUR)	NMP	ICT	TRS	ENE	ENV	FP7
FoF	416	245				661
EeB	261	105		160	21.5	547.5
GC	60	120	233.7	10	15.5	439.2
Total	737	470	233.7	170	37	1 647.7

For both Energy-efficient Buildings and Factories of the Future the final EC funding has been higher than originally envisaged. For Green Cars the research PPP funding was lower but the PPP action inspired DG Mobility and Transport to fund projects in the Green Cars area, such as the Green eMotion project.

## The role of industry

The research PPPs were finally implemented as an element of the EERP, but the industry from the chosen sectors had already undertaken background work within their respective European technology platforms through the definition of their strategic research agendas. These documents reflected the research needs of the sectors before the research plan was adopted and were used as the basis for the multiannual roadmaps of each PPP.

One of the differences between the calls of the PPPs and business as usual in FP7 was the creation of ad hoc industrial advisory groups (AIAGs), one for each PPP, which facilitated the strategic dialogue between the Commission and industry. The AIAGs were initially formed by an agreement between the industrial stakeholder groups and the EC lead service (at the invitation of the EC lead service) The lead service was the unit of the Commission with the biggest budget in each of the PPPs. The initial list of external members was proposed by the private partners and included both members of the industrial research associations and other key experts or representatives of key stakeholders, to be appointed by the EC, with the aim of achieving a broad representation of the stakeholders. These groups, co-chaired by the Commission and the private side, have had a balanced composition of representatives coming from different types of organisations (i.e. industry, RTO and academia), but always with strong technical and R & D expertise. One of the first tasks, once the AIAGs were created, was the preparation of the multiannual roadmaps in consultation with all the relevant stakeholders, the relevant ETPs and the Commission services.

Two of the three PPPs created, from the beginning, non-profit industrial research associations to represent the private side in the partnership, under the umbrella of their respective technology platforms:

- the Energy-efficient Buildings Association (E2BA) for the EeB PPP;
- the European Factories of the Future Research Association (EFFRA) for the FoF PPP.

Green Cars chose to operate with an advisory group nominated through the three associated ETPs and only created an industrial research association after the last call of FP7, with the aim of preparing the continuation of the PPP in H2020.

It is important to keep in mind that, although the roadmaps contained the industrial research priorities to be addressed within the calls, the Commission has been responsible for the definition of the work programmes. In all calls under FP7, the content of the research PPP calls had to be discussed and approved by the programme committees, where Member States and associated states are represented.

- ▶ The EIB's European Clean Transport Facility (ECTF), set up in November 2008, supported investments in the European transport industry, primarily in the automotive sector, targeting research, development and innovation in the areas of emission reduction and energy efficiency. The emphasis was on support for R & D and the market introduction of transport technologies. At EU level, the ECTF had been integrated as a pillar of the EC's Green Cars Initiative, of which the Green Cars research PPP forms a part.
- ▶ The EIB's ECTF lending exceeded expectations: the EIB provided more than EUR 8 billion in lending as compared to the initially expected EUR 4 billion. This lending, as co-financing, helped catalyse an investment in the sector with a volume of more than EUR 20 billion. This investment helped primarily the private sector to retain its RDI programmes and therefore its competitiveness in a period of unprecedented weakness in demand.

It is worth emphasising that the research PPP funding comes from a number of different FP7 themes, as shown in Table 1. During the period 2010–13, the three research PPPs have used the current FP7 funding schemes and the calls were published under the respective themes' work programmes, but with a specific Annex V inserted in the work programme to bring together all the PPP topics. Besides the EUR 1 billion for research activities for GC, EIB lending was expanded to more than EUR 8 billion (see text box).

## The Factories of the Future PPP

The Factories of the Future PPP is a collaboration between the European Commission and industry to support the development of enabling technologies and to foster innovation in the EU manufacturing sector, with a particular emphasis on SMEs. Its focus is on restoring growth and achieving sustainability, which requires the boosting of competitiveness and a strategic shift in Europe from cost-based competition to an approach based on the creation of higher added value.

Manufacturing plays a vital role in Europe's economy, generating about 20 % of EU-27 added value and 18 % of EU-27 employment, providing more than 30 million jobs. It covers more than 25 different industrial sectors, largely dominated by SMEs. European manufacturing produces high-quality, state-of-the-art goods for domestic use and export, generating employment and wealth for Europe. Despite growing competition from emerging economies and established economies, Europe's manufacturing industry is well placed to undertake actions to secure its long-term sustainability and competitiveness. Research and innovation, and especially the PPP Factories of the Future, with support from the NMP and ICT themes of FP7, is essential to the achievement of this objective.

Responding to an increasing demand for more customised and higher-quality products is important for European manufacturing. There is also a need to address the 'green' challenge of producing more while consuming less material, using less energy and creating less waste. Both research and demonstration activities are important in this context, as is adopting an approach based on eco-design concepts.

The European Factories of the Future Research Association (EFFRA) was created by the ManuFuture Technology Platform and leading European industry associations in response to the need for an association to work closely with the European Commission and develop the research agenda for the Factories of the Future PPP. EFFRA exists to provide a 'one-stop shop' for the European Commission and for any organisation (company, research organisation, industry association, trade union, etc.) interested in the Factories of the Future PPP.

The key activities of EFFRA include the development of the strategic research roadmap (which identifies the research priorities for the partnership), the creation and maintenance of close links with other related programmes/initiatives such as national or regional Factories of the Future initiatives, promotion and dissemination activities and the deployment of a database of all 150 existing Factories of the Future projects. This database not only promotes the result of the work and allows continuous evaluation of the efficiency of the measures taken, but also helps organisations to identify possible partners in a concentrated area of expertise. Promotion activities also include the annual publication of a free research projects brochure and full engagement with social media.

Thanks to the PPP approach, EU research today matches the actual needs of companies. The PPP approach has resulted in an industry-relevant roadmap based upon the input of the industrial research community. Within the PPP we have seen a continued increase in industrial participation (including by SMEs), in contributions to the roadmap definition, in responding to the EU calls for proposals and in the selected projects, most of which include demonstration activities.

The Factories of the Future PPP is one of the few cross-sectorial activities at European level. The PPP does not address one specific sector, one specific product group or technological challenge, but deliberately has a cross-sectorial character. One of the aims is to stimulate technology transfer from one application sector to another one.

The Factories of the Future community around EFFRA is working on the following plans for the coming years.

1. Facilitating take-up of project results.
2. Smart specialisation.
3. The launch of the EIT KIC on added-value manufacturing.

Also according to EFFRA, to facilitate take-up of results, the Factories of the Future PPP has re-engaged industry in EU research and has successfully introduced a new demo-targeted project scheme that has attracted an unprecedented level of industrial participation.

In terms of smart specialisation, the Factories of the Future community has a strong network that links together all EU Member States and regions. Beside the relatively small European

layer, the community consists of some 28 national *ManuFuture* platforms, national industry associations and research organisations, and national PPPs and programmes, which are all developing their specific ‘smart specialisation’ visions and roadmaps for advanced manufacturing that are implemented at national and regional level. This community is involved in more than 40 national and regional research and innovation supporting programmes worth EUR 3.7 billion, covering complementary research activities and other stages of the innovation process, namely development, demonstration, pilot lines and market launch.

Finally, the European Union is planning to launch an EIT knowledge and innovation community (KIC) on added-value manufacturing. It is still unclear whether the launch will be part of the first wave of KICs in 2014 or in the second wave in 2017. EFFRA states that the Factories of the Future community is keen to support the implementation of the proposed KIC on added-value manufacturing in the first wave. Such a KIC would allow universities, enterprises and research organisations to use the KIC’s ‘knowledge triangle’ to better exploit research results, develop follow-up projects at the end of existing projects, and incorporate and expand skills for engineering graduates.

Two examples of the types of project undertaken within FoF (e-Custom and Femtoprint) are provided in Annex A1.

## The Energy-efficient Buildings PPP

The construction industry generates about 6.4 % of EU-27 added value and 7.2 % of EU-27 employment, corresponding to 16.4 million jobs. At present, buildings account for around 40 % of all the energy consumption in Europe and give rise to one third of the CO<sub>2</sub> emissions.

The EeB PPP has used existing FP7 mechanisms whilst providing a mid-term approach to R & D activities. It brings together various directorates-general (DGs) — DG Research and Innovation (nanoscience, nanotechnologies, materials and new production technologies (NMP) and environment (ENV)), DG Energy and DG Communications Networks, Content and Technology — in close dialogue with industry.

The EeB PPP is a joint initiative of the EC and the Energy-efficient Building Association (E2BA) to promote and support research and innovation to reduce the energy consumption and CO<sub>2</sub> emissions related to new and retrofitted buildings and districts across Europe. It is the opinion of the E2BA that the EeB PPP is not just a funding instrument, but also an effective mechanism of dialogue between industry and the EC services, and it is being implemented in a true, positive partnership.

The E2BA was founded in November 2008 as a spin-off from the European Construction Technology Platform (ECTP) and gathers together large companies, SMEs, RTOs, academic institutions and relevant stakeholders interested in RTD in energy-efficient buildings and districts. The E2BA has also been liaising with Member States and other related national initiatives through the national liaison points network.

In the framework of a broader multiannual ambition, built around a ‘wave action’, a 4-year roadmap was built up around three main challenges (renovation of the existing building stock,

positive-energy buildings and energy-efficient districts), for which relevant mid-term priorities were defined, as well as common transversal technical or organisational issues.

A lot of research is still needed, but most of the priorities defined in the multiannual roadmap for the 2010–14 period have been well covered by the four calls. This long-term programme set up by the industry also tackles the development of the enabling knowledge and technologies which are instrumental in order to achieve these targets, launching the required fundamental and applied research actions. This long-term approach effectively mobilised industry to reach over 50 % participation in the EeB PPP calls and raised SME involvement to around 30 %, figures which are well above business as usual in collaborative research projects under the framework programme.

The projects funded under the EeB PPP include research going well beyond the state of the art, covering several technology fields such as nanotechnology, advanced materials, processes and integration, energy systems and technologies, information and communication technologies, and environmental technologies, as well as non-technological activities such as user engagement, pre-normative research, dissemination and exploitation.

It is noteworthy that the participation of public entities in this PPP is much higher than in the other two PPPs (10 % EU contribution in EeB for public bodies vs 0.1 % in FoF and 4 % in GC). This is an asset particular to this industrial sector and the explanation is that many projects have demonstrators in buildings and neighbourhoods owned and managed by municipalities or other public bodies.

The construction and building sector has been able to respond strongly to the EeB PPP calls, showing a strong demand for collaboration along the value chain and attracting SMEs. This is a clear sign that the sector is moving, collaborating and more interested in investing in research and innovation than a few years ago.

The E2BA will also be engaged through several of its members within activities of the European Innovation Partnership on Smart Cities and Communities (the stakeholder platform), and there are close links to the SET (strategic energy technology) plan and EERA (European Energy Research Alliance) activities as well. By providing these different initiatives with information on the R & I needs identified by industry and on promising forthcoming innovation from PPP projects, the E2BA is a catalyst of innovation and market uptake.

The vision of the E2BA by 2030, which is presented in its multiannual roadmap update, is to increase significantly research and innovation to transform the construction sector into a mature, innovative and high-tech building industry and to turn energy efficiency into a sustainable business.

After extensive stakeholder consultation, the new multiannual roadmap for the period 2014–20 provides the stakeholders' research and innovation priorities for a potential contractual EeB PPP under Horizon 2020. The roadmap is focused on developing, integrating, demonstrating and validating technologies along three main research and demonstration lines:

- building stock renovation through research on systemic, cost effective solutions;
- interactive and sustainable buildings for smart cities;

- development of novel solutions to guarantee performance of new and renovated buildings and districts.

Two examples of the types of project undertaken under the EeB PPP (BEEM-UP and FC-district) are provided in Annex A2.

## The Green Cars PPP

The launch of the research plan in 2008 saw the European Commission collaborate with the European technology platforms ERTRAC, EPoSS and Smart Grids to involve public and private stakeholders in the area of cleaner and energy-saving road mobility. The automotive sector was targeted particularly, as sales in Europe declined to their lowest levels in decades, and because new 'green, cleaner and energy-efficient technologies' had reached such a technological readiness level that the time was right to focus on electromobility. Around one in ten jobs in Europe depends directly or indirectly on the automotive sector and the industry is the largest investor in innovation and R & D <sup>(7)</sup>.

The GC PPP was launched to improve the sustainability of all European road transport and accelerate the electrification of road and urban transport, a potential new market opportunity. Since European automobile producers must compete globally, the right technology choice at the right time is vital to industry success. Also unique among the three PPPs, the initiative included support from the European Investment Bank (EIB) under its European Clean Transport Facility (ECTF).

Based on the evidence gathered by the expert panel, prior to the existence of the GC PPP there had been little commitment by industry to invest into electromobility and sustainable transport solutions. Since the launch of the GC PPP, the growing commercial interest of the EU automotive sector in GC can be noted. This is driven by the high priority of the topic at EU policymaking level as well as by the eminent business need for EU companies to adapt to technological changes and consumer priorities. The numerous stakeholder participations in the GC PPP has positively influenced the preparedness of EU industries today to invest in green car technologies.

The GC PPP has accelerated technology development and take-up primarily through the inclusion of the broad value chain of car production and a large number of new players. This inclusion has meant that new perspectives are accommodated and new opportunities made available. Although SME participation in the GC PPP is lower than in other PPPs, there is still a significant increase from the thematic FP7 areas.

The first years of the GC PPP focused on electromobility, while other topics in the roadmap such as logistics and co-modality were addressed in both the PPP and other related FP7 thematic calls. Converging with the focus of the GC PPP, two JTI's (Artemis and ENIAC) also addressed the take-up of electromobility. The Commission directorates-general DG Mobility

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7 ACEA website ([http://www.acea.be/index.php/news/news\\_detail/economic\\_turmoil\\_hits\\_vehicle\\_makers\\_hard](http://www.acea.be/index.php/news/news_detail/economic_turmoil_hits_vehicle_makers_hard)).

and Transport and DG Communications Networks, Content and Technology published calls related to vehicle-to-grid, co-modality, logistics, smart city transportation and experimentation of electric vehicles in different regions.

Achievements on power electronics <sup>(8)</sup> and battery management systems are tangible examples of the success of EU industry that were strengthened by the GC PPP. The high level of system integration is another aspect characterising EU industries which is reflected in several projects. In view of the positive experiences with demonstration projects in the GC PPP, it is emphasised for the future to put even more infrastructures in place to demonstrate the ease of electromobility and facilitate its uptake while discovering technology gaps.

According to the evidence gathered, the GC PPP roadmap, with its periodic revisions, can be considered as a success. The roadmap needs to be considered as a living document that should be revised and reoriented with some frequency. PPPs by their nature should be flexible in order to respond to technology and market evolutions. In a field as dynamic as green transport this should be at least a bi-yearly activity.

The efficiency of the GC PPP may be defined as ‘catalytic’, as its major achievement is the inclusion of the entire value chain and new players. The PPP offered chances for often disenfranchised organisations to make, with little money, significant developments that influenced organisations further up the chain. As such, the efficiency of the GC PPP may be described as causing supply chain push rather than large automotive industry pull.

The topics addressed in the GC calls have promoted the formation of well-structured consortia. Several projects involve SMEs, in cooperation with original equipment manufacturers and tier-one companies, that otherwise would not have participated in research activities or would not have actively joined proposals for calls with low success rates. This makes the transition from research to production less segmented and more fluid.

Unlike the other PPPs, there were multiple technology platform channels to include. An ad hoc advisory group was created in the same way as for the rest of the PPPs, but the industrial research association EVGIA was set up only in March 2013. This was done in view of the planned creation of contractual PPPs under Horizon 2020.

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<sup>8</sup> European semiconductor companies are by far the largest supplier of the electronics enabling electromobility used by Chinese original equipment manufacturers.



The existence of so much industry involvement in the projects leads to the preliminary conclusion that the research quality and focus would be on target. However, that cannot be taken for granted since most of the research projects are still ongoing. There are some documented successes from early projects as detailed by the two examples provided in Annex A3. E-Vectoorc has demonstrated vehicle stability through multi-motor controls and the development of an efficient motor which avoids the use of expensive strategic magnets from a non-EU competitor. Opener combines a series of ICT technologies to improve control and efficiency in a multi-motor configuration.

The research achievements in the sector cannot only be attributed to the 113 projects of the GC PPP, since about 400 EU projects addressing the take-up of electromobility have been started in EU Member States since the launch of the PPP <sup>(9)</sup>. It is felt that the initiative has also led to increased national support for research by leading the political commitment to stimulate research in the field <sup>(10)</sup>.

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9 Zubaryeva, A., Thiel, C., *Paving the way to electrified road transport*, JRC scientific and policy reports, 2013. Note: at the time this report was released the data from the fourth call of the GC PPP were not yet available. Also missing are Member State projects initiated in late 2012 or in 2013.

10 On top of the EUR 439 million spending from the GC PPP, the project spending on electromobility in Europe has been about EUR 1.5 billion. What was approved at the initial stage of the GC PPP has had a considerable funding leverage in most EU Member States. Strong impulse to the growth of the overall sector of electromobility can be attributed also to lending from the EIB.

# 3

## Assessment of the implementation of the research PPPs

### Setting up the calls

As mentioned before, although the research priorities have been established in the context of the AIAGs by the multiannual roadmaps, the final translation of these roadmaps within the work programme content from the different FP7 themes must follow the usual procedures of the Commission. That is, the final approval must involve the responsible programme committees where Member States and associated states are represented.

Similarly, the rest of the process, from the launching of the calls to the signing of the grant agreements, including evaluation, selection of proposals and negotiations, is under the responsibility of the Commission; the industrial research associations do not have a role to play there and are only informed through the AIAGs. This process has guaranteed the transparency, equality and fairness of the calls.

During the 4 years, PPP calls have contained topics from the work programmes in each of the thematic priorities involved, following the distribution showed in Table 3. In this distribution, the concept of topic might change between different themes (i.e. a topic in the ICT programme can use different funding schemes), and some topics might be funded by several themes.

The 2009 calls were published in July and it was not possible to arrange a unique deadline for all calls, so Green Cars topics were open until January 2010 and the rest closed in November 2009. For the rest of the calls, the same deadline was used for all PPPs and themes, approximately 5 months after the publication date, giving enough time to prepare quality proposals.

**Table 3:** Number of topics published in the various FP7 Cooperation theme work programmes

PPP	Call	Theme				
		NMP	ICT	TRS	ENE	ENV
FoF	2009	3	2			
	2010	6	3			
	2011	7	2			
	2012	11	2			
EeB	2009	2	2		1	1
	2010	4	2		1	2
	2011	6	1		1	1
	2012	6	1		1	1
GC	2009	1	1	10	1	1
	2010	1	1	12	1	2
	2011	2	1	11	-	1
	2012	1	1	9	-	-

## Evaluation procedures

The evaluation process used for the PPP calls was the same as that used for the rest of the FP7 calls in their respective themes, the only difference being in the composition of the evaluators' panel in terms of their profile

**Table 4:** Profile of evaluators in PPP calls and FP7 Cooperation

	Percentage of total expert number	
	PPP	FP7 average
Expert from research organisations (public or non-profit)	10.7 %	35.5 %
Other	17.9 %	9.6 %
Higher-education institutions	21.0 %	40.2 %
Industry	50.5 %	14.8 %
	100 %	100 %

As the PPPs have the aim of funding projects with high industrial relevance, it was also an objective within the NMP theme to have at least 60 % of the evaluators from industry. The shift from business as usual in FP7, where only around 15 % of the evaluators come from industry, was very important, and although the objective of 60 % was only implemented by NMP, the final overall figure of 50 % is indicative of very good progress.

The evaluation criteria for the PPP calls have been the same as in any FP7 call: scientific and technological quality, implementation and impact. Each criterion is assigned marks from 0 to 5, with the approval threshold at 3 and an overall threshold required of 10 points. However, the fact that there are more industrial evaluators increases the relevance of impact assessments as these assessors understand better the needs of industry and the relevance of impact objectives and actions in proposals.

For the sake of reducing the time to grant, it was decided to implement all PPP calls using a single-stage procedure, although some of the programmes involved have historically used two stages.

## Analysis of results

Overall, 1 734 proposals were submitted to the different PPP calls, and 377 of them were selected to be funded. It is necessary to point out that the data for the fourth call are based on preliminary information, since the grant negotiation process had not yet finished and the numbers shown as grants signed refer to proposals retained for negotiation.

With these figures, the rate of successful proposals in the PPPs reached 21.7 %, which compared to the 14 % average for all of FP7 means a substantial increase of around 50 %, although this figure of one in five may still seem low to industrial organisations faced with the substantial effort involved in putting together a competitive proposal. These figures suggest that the nature and format of the calls have created a good level of participant interest. This fact is also supported when comparing the success rate between calls, the first one being significantly high, when the PPPs were not yet widely known.

**Table 5:** Number of proposals submitted and retained for negotiation

		NUMBER OF SUBMITTED PROPOSALS	NUMBER OF RETAINED PROPOSALS	Ratio contracts/ Submitted	
FP7 COOPERATION		–	–	14 %	
PPP 1 <sup>ST</sup> Call	EeB	60	18	30 %	29.5 %
	FoF	97	25	26 %	
	GC	94	31	33 %	
PPP 2 <sup>ND</sup> Call	EeB	120	24	20 %	21.2 %
	FoF	193	36	19 %	
	GC	88	25	28 %	
PPP 3 <sup>RD</sup> Call	EeB	138	31	22 %	20.0 %
	FoF	251	37	15 %	
	GC	112	32	29 %	
PPP 4 <sup>TH</sup> Call	EeB	180	41	23 %	20.3 %
	FoF	310	52	17 %	
	GC	91	25	27 %	
Cumulative EeB		498	114	23 %	21.7 %
Cumulative FoF		851	150	18 %	
Cumulative GC		385	113	29 %	

The participation of entities involved in the industrial research associations created for the PPPs (EFFRA in the Factories of the Future PPP and the E2BA in the Energy-efficient Buildings PPP) in projects funded in the PPP calls is shown in Table 6. In total, 30 % of the overall EC contribution to FoF projects was received by members of EFFRA, while 34 % of the EC funds

devoted to EeB projects were captured by entities involved in the E2B association. Therefore, participants that are not part of these two associations have received around 70 % of the overall budget. In terms of the number of participations the figures are even more positive regarding non-member participants, with 75 % of all project participations across FoF and EeB coming from non-association organisations.

A single-stage proposal process is more attractive to industry as it shortens the overall time between call announcement and contract award. At the same time, the increased focus of these calls (demand-driven rather than curiosity-driven) allows the oversubscription to be minimised by restricting the scope of more general proposals.

Moreover, despite the advisory influence of the AIAG on defining the topics, evidence shows there is no higher concentration of 'frequent participants' in the PPP projects than in the rest of FP7 Cooperation projects (see also Table 10 below). This finding was also supported by the questionnaire data, where the majority of respondents disagreed with the statement that 'the PPP associations are closed organisations'.

On the other hand, this scenario shows that the industrial research associations have a good participation level, far from exclusive but enough to assure that they are representative and an important part of their respective sectors.

**Table 6:** Participation of industrial research association members

	EC Contribution		Participation		
	EFFRA non-member	EFFRA member	EFFRA non-member	EFFRA member	Count
Cumulative	70 %	30 %	78 %	22 %	1778
2010	63 %	37 %	71 %	29 %	275
2011	64 %	36 %	74 %	26 %	412
2012	72 %	28 %	80 %	20 %	407
2013	75 %	25 %	82 %	18 %	684
	EC Contribution		Participation		
	E2BA non-member	E2BA member	E2BA non-member	E2BA member	Count
Cumulative	66 %	34 %	71 %	29 %	1246
2010	64 %	36 %	71 %	29 %	223
2011	61 %	39 %	65 %	35 %	289
2012	70 %	30 %	74 %	26 %	380
2013	66 %	34 %	72 %	28 %	354

## Impact achieved and foreseen

At this moment, it is hard to evaluate the impact of the projects funded within these initiatives. The proposals approved in the first call started in 2010 and are now in their third year. Therefore, some of them may have finished recently but the majority are still in the last phases, where dissemination of results and evaluation of possible impacts should be done. On the

other hand, the projects from the last call, the biggest in budget, have not started yet or are involved in the very first stages.

Therefore, an evaluation of the impact of the individual projects is not yet possible, but looking at the current projects, over 700 enterprises and organisations in numerous fields of activity across Europe have made links to each other and work together in different constellations. Compared to other funding programs, PPP activities are expected to have an increased impact at project level due to the increased involvement of industry.

The PPP initiative has been a kind of catalyst to bring, for the first time, all relevant players to the table and make them work together: RTOs, companies (along the value chains), industry associations and other actors (for example business-angel-type organisations). Many actors have had links with each other before and were organised into structures (RTO organisations, industry associations). However, the PPP has stimulated these actors to work with each other in a structured way and with a longer time horizon.

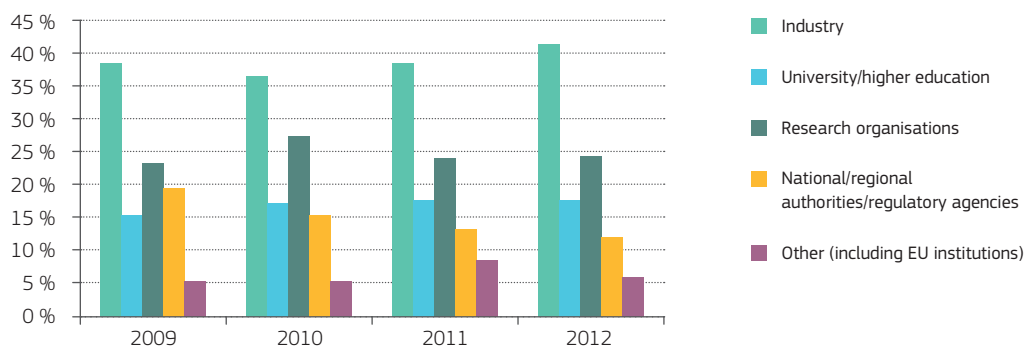
The projects that are running demonstrate the coverage of a wide range of innovative technologies, methods and processes. The implementation of existing technologies into real demonstrators may also provide opportunities to explore issues and improve deployment techniques.

## Other related activities

Several other activities have been carried out by the European Commission, the Member States, the European technology platforms and the industrial research associations.

All the EC services involved in the PPPs participated in the organisation of annual information days in Brussels, to promote the participation in the PPP calls. Four took place every July from 2009 to 2012, gathering participants with different profiles. First-hand information on the topics was given, along with information on calls and the evaluation processes. The distribution of the participant profiles for each event is shown in Figure 1.

**Figure 1:** Profiles of the participants in the four information days 2009–12



The format of the events was similar throughout the years, built around a plenary session where a general overview of all the PPPs was given and with parallel sessions, one for each PPP, where more specific information was provided. In addition, brokerage sessions gave the opportunity for future participants to present project ideas with the aim of building appropriate consortia.

The four events were oversubscribed, with over 850 participants on average, but the presentations from the Commission and the different speakers were made publicly available through the Internet <sup>(11)</sup>.

Independently, the European technology platforms and industrial research associations organised specific events for the promotion and dissemination of the research PPPs' activities.

Finally, for both Factories of the Future and Energy-efficient Buildings, impact workshops were held where the recipients of PPP grants presented their projects and activities, with discussions on early goals and the expected impacts of the projects. These workshops were held in November 2010, March 2012 and March 2013. The most recent workshops concluded that the two PPPs have managed to increase the industrial relevance of both the calls and the projects undertaken. Both PPPs are seen to be achieving their targets in terms of dissemination and exploitation. A significant recommendation arising from both of these PPPs is that, based on the perceived enhancement of exploitation and dissemination arising from cluster-based activities, clustering activities should be pursued more vigorously by both the EC and the industrial research associations.

For Green Cars, assessments of technology advancements, industrial achievements, market reactions and R & D initiatives are reported in the annual brochures <sup>(12)</sup> released following the regular cluster meetings organised by DG Communications Networks, Content and Technology, DG Research and Innovation and DG Mobility and Transport and on the websites of the CSA projects ICT4FEV <sup>(13)</sup>, Capire <sup>(14)</sup> and Smart EV-VC <sup>(15)</sup>.

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11 [http://ec.europa.eu/research/industrial\\_technologies/ppp-in-research\\_en.html](http://ec.europa.eu/research/industrial_technologies/ppp-in-research_en.html)

12 [http://cordis.europa.eu/fp7/ict/micro-nanosystems/ict-for-green-cars\\_en.html](http://cordis.europa.eu/fp7/ict/micro-nanosystems/ict-for-green-cars_en.html)

13 <http://www.ict4fev.eu>

14 <http://www.capire.eu>

15 <http://www.smartev-vc.eu>



# Achievement and progress towards the objectives

## General analysis of consultation

The consultation questionnaire survey was completed by 409 respondents. In terms of the three PPP areas the number of respondents was:

EeB:..... 149  
FoF: ..... 162  
GC: ..... 98

The number of respondents <sup>(16)</sup> in each category was:

Coordinators:..... 130  
Participants:..... 220  
Industrial research associations: ..... 7  
Programme committees/NCPs:..... 47

In addition, the open (qualitative) questions were sent to four thematic programmes within the EC (DG Communications Networks, Content and Technology, DG Mobility and Transport, RTD ENV and RTD Transport).

The questionnaire consisted of a collection of 210 questions, of which 199 sought a quantitative agreement with statements rated on a scale from 1 to 5. Each group was guided to answer a different subset of the questions (with a maximum of 58), although many were common.

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16 Five respondents did not give a specific stakeholder category but were classified as participants as far as the analysis was concerned.



The results obtained were overwhelmingly positive towards the PPP initiatives. The table below shows the net positive percentage scores (i.e. the percentage of 4 and 5 scores minus the percentage of 1 and 2 scores).

**Table 7:** Questionnaire net percentage scores

	EeB	FoF	GC
<b>Coordinators</b>	53.0 %	51.2 %	43.9 %
<b>Participants</b>	41.2 %	37.1 %	22.1 %
<b>Industrial research associations</b>	69.6 %	57.8 %	-
<b>PC/NCP</b>	32.8 %	45.1 %	30.7 %

In terms of the issues attracting the strongest support, these can be summarised as:

- research PPPs are being run efficiently;
- research PPPs are both beneficial and appropriate;
- research PPPs are an appropriate model for pursuing innovation actions in Horizon 2020;
- programme committee delegates/national contact points consider research PPPs appropriate for demonstration instrument projects in FP7 and for larger demonstrations and pilot plants within Horizon 2020 (particularly with respect to Green Cars).

In terms of perceived negative aspects of the PPPs, the following aspects were notable:

- research PPPs have not adequately contributed to standardisation activities;
- there also appear to be some shared concerns, particularly among the programme committee delegates and national contact points, that the PPPs may not be having a significant impact in terms of growth, job creation and leveraging industrial investment.

With regard to the general responses to the open (qualitative) questions, while there was a wide range of opinions expressed, there were also some common themes. These included:

- a need for simplification with less bureaucracy and faster time to grants, including specific support for SMEs;
- more awareness and dissemination activity;
- increased funding and funding rates together with long-term and flexible funding arrangements;
- support for the PPP model being extended into H2020;

- a need for stronger and even more transparent governance rules covering both the private and public parties and greater involvement of all stakeholders;
- a need for extended innovation actions including involvement of Structural Funds, regional bodies, end-users, etc.;
- a perceived benefit of follow-up actions for successful projects as, for instance, demo-targeted projects or new instruments for supporting close-to-market activities;
- the need for greater emphasis on IPR focus in proposals and projects, including specific support for SMEs.

## Effectiveness

One of the aims of the research PPPs when they were set up was to achieve matched funding from industry. As Table 8 below shows, this was not fully achieved as the average contribution of the EC was 65 %. However, this is largely due to the fact that the research PPPs were implemented using FP7 rules, and under these rules both RTOs and academic partners, but also, importantly, SMEs, received 75 % funding of their RTD activities. However, the EC percentage funding of PPPs is four percentage points lower than that of FP7 Cooperation as a whole, mainly due to increased large-industry participation and the increase in the funding of demonstration activities.

**Table 8:** Percentage of total costs funded by the EC

Contracts (cumulatively 2010–12)	
EC contribution as a percentage of total costs	
EeB	65 %
FoF	67 %
GC	62 %
Total	65 %
FP7 Cooperation	69 %

Figure 2 shows the proportion of the funds spent on various activities within the PPP versus standard FP7 collaborative projects. As can be seen, the level of demonstration activities undertaken within research PPPs is significantly higher, by almost a factor of four. This has been achieved despite the lower funding rate available for this type of activity for SMEs, RTOs and universities, demonstrating that this type of activity has a real perceived benefit to the participants of the research PPPs.

**Figure 2:** Percentage of type of activities in PPP projects and FP7

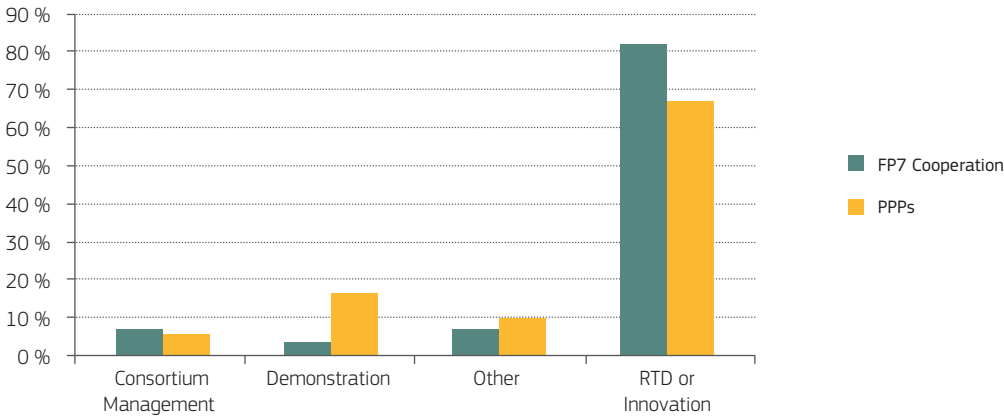
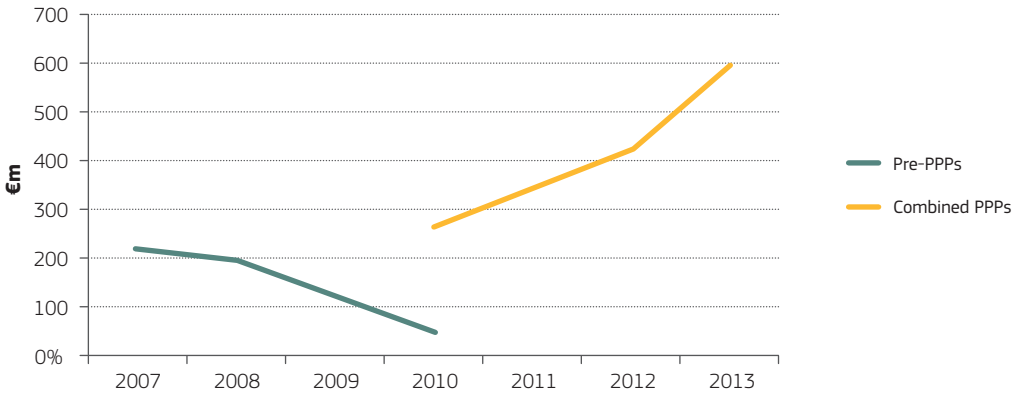


Figure 3 shows the funding that was allocated across the four research PPP calls and compares this with the funding that was made available for projects pursuing similar research topics prior to the set-up of the PPPs. Three features can be discerned from this graph: first, the funding for these industrial research areas was declining prior to the launch of the research PPPs; second, the PPPs achieved a step change in funding available to these topics, right from their inception; third, the financial support has increased significantly during the life of the research PPPs within FP7. This has allowed the expansion of relevant topics shown in Table 3 while keeping the focus of each topic, and therefore the oversubscription rate is significantly below general FP7 rates, as shown in Table 5 above.

**Figure 3:** Funding for PPP-relevant area projects



## Efficiency

One of the key factors for industry (and particularly SMEs) affecting the relevance and perceived bureaucracy of a collaborative project call is the time to grant (TtG), or time between the proposal being submitted and the award of a grant. The longer the TtG, the longer before the product or service idea can be developed ready for market and the greater the chances are of the proposal ideas being overtaken by events or by the competition. This is reflected in the questionnaire responses, where TtG and overall bureaucracy were the two factors most often quoted as needing improvement under the general heading of simplification. As can be seen from Table 9, all three research PPPs made improvements in the average TtG <sup>(17)</sup> by the time of the third call (data for the final call were not available when this report was finalised as project negotiations were ongoing, but the first figures reflect the continuation of this improvement). By the time of the 2011 call, the cumulative average of the TtG for the three PPPs was 42 days faster than the average FP7 calls, with the best (FoF) being some 64 days faster. However, despite these welcome improvements in the average TtG and accepting the fact that these are still using standard evaluation and negotiation procedures, even the best times achieved fall short of the targets for H2020. Therefore this is one area where significant improvements would be expected for H2020.

It is understood that there were special circumstances regarding the 2010 call, in which funding availability was partly delayed, which led to the relatively poor time achieved for this call. These figures are shown in graphic form in Figure 4.

**Table 9:** Time-to-grant averages

	2009 call	2010 call	2011 call	Cumulative average per PPP type
EeB	338	335	287	316
FoF	263	309	271	283
GC	354	325	286	322
Cumulative average per year of the call	318	321	281	305
FP7 Cooperation average TTG				347

<sup>17</sup> Time to grant is calculated only with the projects in the main list, since it is understood that projects from the reserve list are under special circumstances.

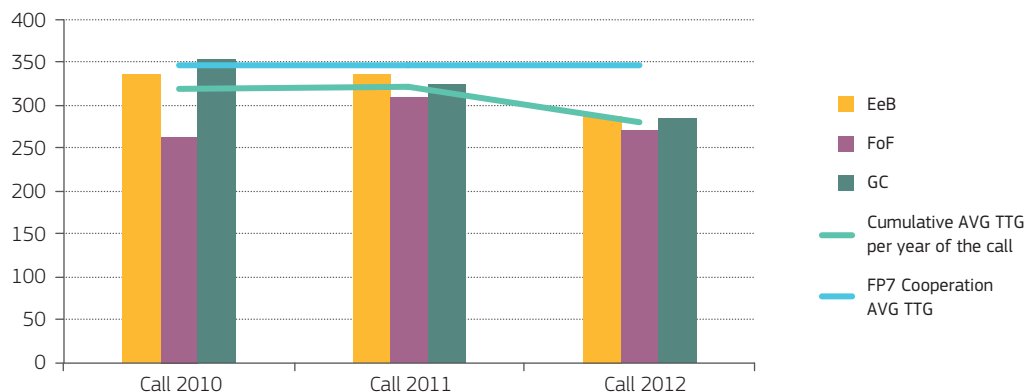
**Figure 4: Time to grant in the PPPs and FP7**

Figure 5 shows the share of funding in the first three calls for all the PPPs by organisation type. As can be seen, the participation by large industry and by SMEs is significantly greater than for standard FP7 calls, with overall industrial participation in the PPPs being almost 50 %, compared with less than 35 % for FP7 overall. This demonstrates that industry views these programmes as being of high relevance.

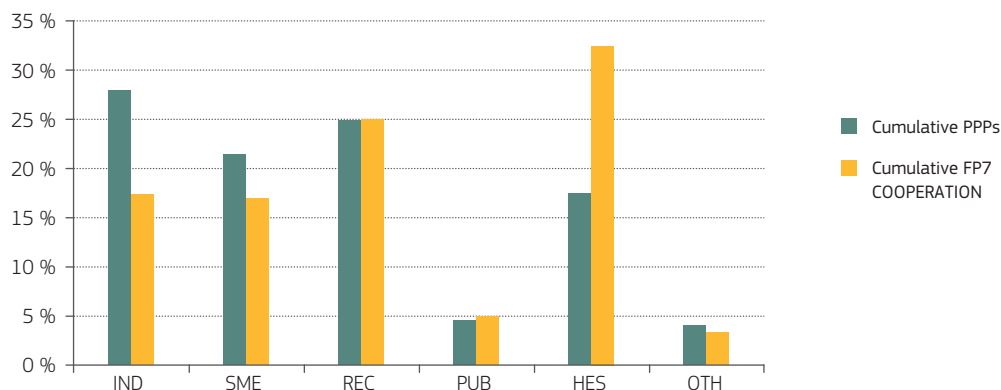
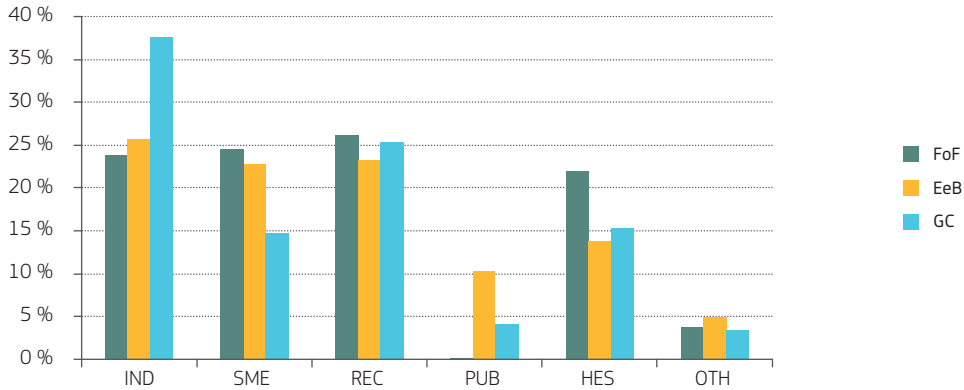
**Figure 5: Share of funding of PPPs vs FP7 Cooperation <sup>(18)</sup>**

Figure 6 shows the distribution of funding by organisation type across the three research PPPs. The overall funding going to industry (by adding IND and SME) is 48 % for FoF, 49 % for EeB and 52 % for GC. The first point to note is the much higher percentage of large-industry funding within the GC PPP, reflecting the structure of that sector. However, it is the FoF PPP that achieves the highest level of overall industrial participations when considering the combined

18 IND: industry; REC: research organisations; PUB: public bodies; HES: higher education; OTH: other.

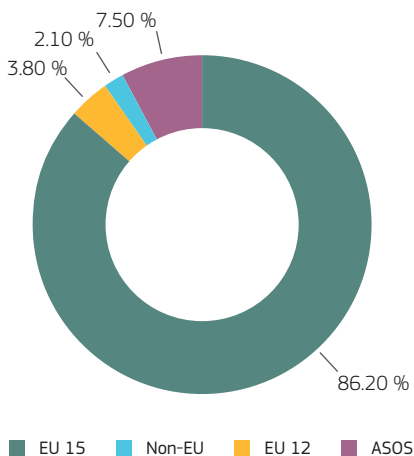
participations of both large industry and SMEs (59 % for FoF, 54 % for EeB, 56 % for GC). The second point to note is the relatively high participation of public bodies in the EeB PPP, which reflects their direct involvement in this area of activity.

**Figure 6:** Share of funding by PPP

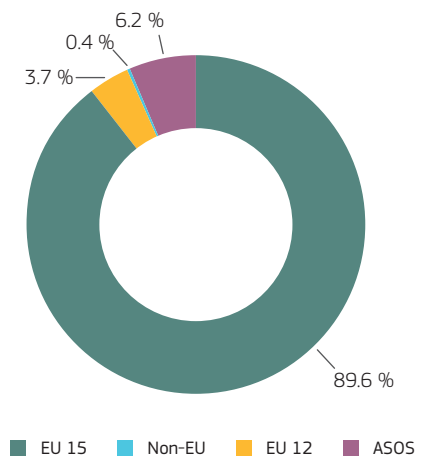


When considering the geographic reach of the PPPs, it is useful to compare the make-up of participants by country. Figure 7 shows the distribution for overall FP7 Cooperation projects, while Figure 8 shows the distribution for projects originating in the research PPPs. As can be seen, the overall distribution between these two is similar, although, perhaps unsurprisingly given the relevance of the research PPPs to European industrial competitiveness, the involvement of non-EU partners is about one fifth the level for overall FP7 Cooperation. Other than this, the involvement of participants from EU-15 countries is up slightly in the research PPPs (almost 4 %), with participants from EU-12 countries being almost the same and those from associated countries being down by around 15 %.

**Figure 7:** Geographic distribution for FP7 Cooperation



**Figure 8:** Geographic distribution for research PPPs

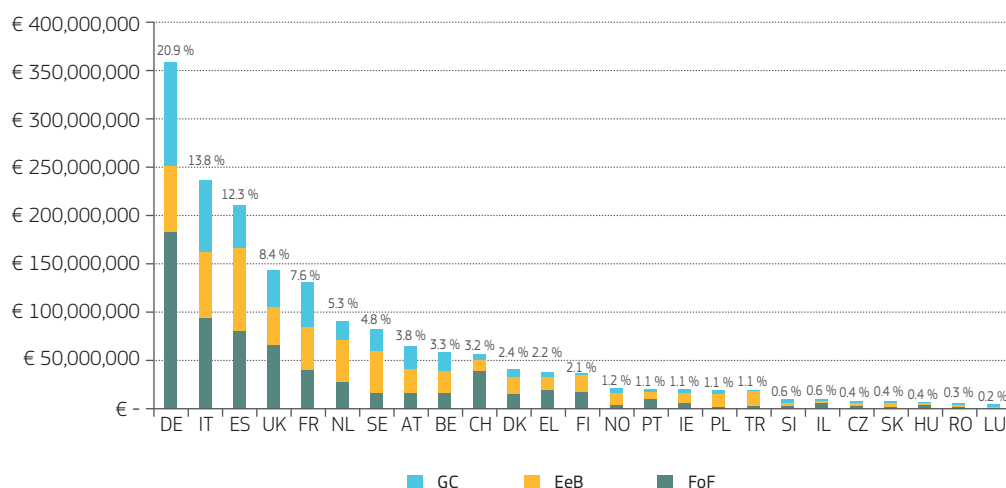


## Quality

Data on participation shows that the research PPPs have attracted high-quality stakeholders in terms of overall research investment. The top 10 countries where beneficiaries are located are also predictable in terms of reflecting the dominant economic powers within the EU.

The funding of participants by individual country and by PPP is shown in Figure 9. As can be seen, the pattern for each PPP follows the relevant industrial concentration with, as noted above, good participation by EU-15 members. Overall, this distribution follows the standard distribution for most FP7 Cooperation projects, although Spain has the highest participation in EeB, which improves its overall research PPP ranking, and Switzerland has the fifth-highest participation in FoF, which again affects its overall ranking.

**Figure 9:** EC Funding by country



In terms of frequent participants, Table 10 lists statistics for the top 10 participants and coordinators <sup>(19)</sup>. The top 10 participants in the three PPPs combined represent 10.7 % of the overall participations for the first three calls. The figure is higher than but comparable to the one referring to the NMP theme (portfolio of large, small and SME-targeted projects), which encompasses several different research areas besides the three PPP sectors. For this reason, the research PPPs are not considered to be unnaturally biased to a small group of participants.

<sup>19</sup> Table 10 refers only to the first three calls of the PPPs.

When looking at coordinators, again the figures for the PPPs and NMP <sup>(20)</sup> are similar (25 % vs 26 %). Naturally, this percentage becomes higher when considering each PPP separately, as reducing the width of the sector logically increases the concentration. In the case of EeB, for example, statistics show that 40 % of the projects, or 29 projects over 73, are coordinated by the first 10 entities. It is difficult to say if this concentration may or may not be suggestive of a bias, as this figure should be related to a comparable case in terms of width of the sector and number of projects. The issue could be investigated further, but would require entering into the specifics of the sectors.

Therefore, as a conclusion, it can be confirmed that there is no ground to say that PPPs have a bigger concentration of participants than other programmes of FP7 Cooperation.

This table also shows the figures of the entity (top 1) with the highest number of participations (79), and coordinator roles (16). This entity is Fraunhofer-Gesellschaft. Looking at the overall results, the first industry in number of participations is Centro Ricerche Fiat Scpa, which holds second position in participations with 48 and third in coordinations with 8, behind another RTO, Fundacion Tecnalia, with 12.

**Table 10:** Level of frequent participations

Participations	NMP	Total PPP	FoF	EeB	GC
Top 10	154	321	146	132	149
Max (top 1)	34	79	39	23	37
Total	2 023	3 003	1 095	892	1 016
% top 10	7.6 %	10.7 %	13.3 %	14.8 %	14.7 %
Max %	2 %	3 %	4 %	3 %	4 %

Coordinations	NMP	Total PPP	FoF	EeB	GC
Top 10	41	65	37	29	28
Max (top 1)	8	16	11	6	6
Total	158	259	98	73	88
% top 10	26 %	25 %	38 %	40 %	32 %
Max %	5 %	6 %	11 %	8 %	7 %

## Level of coverage of the roadmaps

The evidence gained from both the questionnaire data and the interviews with the industrial research associations suggested that the level of coverage of the roadmaps achieved by the final call was very good, with EFFRA stating that almost 100 % coverage of its roadmap had been achieved.

<sup>20</sup> The comparison with NMP is provided to have an idea of a programme with a similar size, because a bigger and wider programme, like cooperation, would have too big a scope and the concentration of participants would be much lower. Therefore, the comparison of NMP with one of the PPPs would not be significant. The NMP figures refer to large, small and SME-targeted projects in the 3 years of reference.



## Initiatives and impact of projects

The first projects are only just finishing so judging the project impact is still somewhat premature. As with all projects a definitive answer on the impact will only be achieved with a follow-up assessment some years after the projects are completed. However, the annual impact workshops being held by both the FoF and EeB PPPs do report that there is evidence of a greater focus (than in normal FP7 Cooperation projects) on exploitation activities and that they are achieving their targets in terms of both exploitation and dissemination. In particular, EeB reported four success stories in their latest impact workshop report where the projects had undertaken routes to exploitation through demonstration work involving end users and development of prototypes and product examples. Similarly, FoF reported four success stories covering pilot testing of web-based collaborative tools, demonstration work and the production of product modules.

Within the GC PPP the cluster meeting reports have also revealed promising progress with some evidence that impacts might be achieved faster than the 7 to 8 years that is typical for getting a new technology into the industry, particularly in the area of power electronics.

## Steps towards innovation

In order to increase the degree of innovation activities undertaken within the research PPPs there have been a number of actions undertaken by the Commission. One of these is the introduction of a demonstration-targeted instrument among the NMP topics of the last two calls of the FoF PPP and the final call of the EeB PPP. The demo-targeted instrument involves a standard cooperation project, with the exception that around 50 % of the funding is directed towards demonstration activities. The aim is to link research with demonstration and to concentrate the latter activity on real-world demonstration of capability that is relevant to potential users and end customers of the technology.

Another approach to increase innovation activities is the use of an Echord-type instrument <sup>(21)</sup> to increase SME participation and uptake of results by the market. These were large (~ EUR 15–20 million) projects where over half of the project funds were dedicated to small projects to be undertaken by new entrant SMEs (i.e. not project partners at inception) over a relatively short timescale (12–18 months). The aim was to support short, focused sub-projects with low bureaucratic overheads that would interest market-focused SMEs and provide a channel for project results to reach the marketplace quickly.

Data from the questionnaire show that these, and other, nearer-market activities are seen as beneficial to exploitation. However, as well as continuing with these, more needs to be done including upscaling and standardisation of new technology solutions, investment in large-scale pilot plants, integration of Horizon 2020 with Structural Funds and EIB mechanisms, project

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21 Echord was a large-scale integrated project in the FP7 ICT challenge 2 area.

involvement from a wider selection of near-market stakeholders and making best use of demand-side innovation measures.

Looking at the questionnaire answers, the continuation of successful projects as demonstration-targeted projects is suggested as a possible good approach to pave the way to the market for results from PPP projects.

## SME participation

As has already been shown in Figure 5 and Figure 6 above, the PPPs have been successful in increasing the overall participation of SMEs compared with the overall FP7 programme. In fact, with the exception of the GC PPP, where SME participation has remained close to average FP7 levels, SME participation has risen by well over 50 %. With their generally faster innovation cycles and the ability to open niche markets and to bring disruptive technologies to the market and grow employment, this is a promising development. However, further work needs to be done to increase SME participation. Evidence from the questionnaire suggests that this could partly be achieved through greater awareness activity among SMEs and SME networks; the benefits of access to new supply chains and being able to play a stronger role in supply chains need to be made more visible. A second method suggested is to use the existing supply and value chains of larger companies to construct projects which address the whole chain and thereby bring benefits to all participants, including the SMEs.

## Contributions to the Europe 2020 strategy and the ERA

As already mentioned, the research PPPs were set up as a quick response to the economic crisis. The essential features of the research PPPs were to have an industry lead on the definition of the research needs and implementation of the work programme under standard FP7 rules. To achieve these, an ad hoc arrangement of cooperation between the industry (and other private-side players) and the Commission (the public side) was implemented, with the key tool being the ad hoc industrial advisory groups. In two of the three research PPPs the AIAGs were backed by the creation of an industrial research association, although this was not a formal requirement. These research PPPs have been perceived, both by industry and the Commission, as fulfilling a useful role. It is therefore useful to draw lessons from this experience when designing the contractual PPP model for Horizon 2020. However, while the key features are seen as beneficial, the ad hoc nature of the arrangements is not seen as ideal by any of the parties or stakeholders. For this reason, PPPs of a similar nature and intent as the research PPPs in FP7 are presented as contractual PPPs within the EC proposal for Horizon 2020. For these contractual PPPs, a contractual arrangement between the public and private sides of the PPP would formalise the informal roles and relationships existing in the research PPPs under FP7 and guarantee transparency of the operating procedures. One of the key differences is that the contractual PPPs would have a requirement for an industrial research association, or

an equivalent set of legal entities, to fulfil the legal role of the private side of the partnership and enter into the contractual agreement.

Building on the experience of the research PPPs, the contractual PPPs would ideally:

- provide a leading role for industry in defining research priorities;
- have the private side advising on implementation;
- have multiannual roadmaps to allow the development of long-term investment plans;
- have a pre-defined budget to ensure continuity;
- place more emphasis on the relevance of industry and on achieving industrial impact;
- focus on enabling industrial technologies;
- have increased use of SME-friendly instruments and demonstrations;
- have a high share of industrial experts in the evaluations;
- implement single-stage evaluations to reduce TtG;
- execute coordinated and joint calls between themes;
- maintain openness to all, according to normal H2020 rules;

It is anticipated that within Horizon 2020 there will be a wider use of the contractual PPP than with the research PPP in FP7 and that this should assist relevant areas in the achievement of the goals of Horizon 2020 strategy, particularly with respect to leadership in enabling and industrial technologies (LEIT), as well as in addressing the societal challenges. Greater emphasis on, and achievement of, innovation goals will enable contractual PPPs to support the Europe 2020 strategy, including impact on growth and jobs through private investments along the value chains in Europe, thus creating pan-European added value.

It should be noted that contractual PPPs differ from institutional PPPs (such as JTIs) in that the latter, while having a joint undertaking with the Commission, operate on industry-specific rules and use their own evaluation procedures, i.e. the same organisation that is setting the industrial priorities is also evaluating the calls.

Further to the use of contractual PPPs in Horizon 2020, it has been observed that there has been a degree of mirroring of the research PPP activities at national and regional level, both loosely and rigorously. Such mirroring shows that the goals, programmes and methods of the PPPs are supported at a national and regional level and go some way to supporting the ERA. Further extension of the contractual PPPs to include linkages to programmes at a national and regional level, particularly those underpinned by Structural Funds, would further enhance the ERA goals.

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## Research PPPs: the way forward

Within the Commission proposal <sup>(22)</sup> for establishing the new Horizon 2020 programme, there is a new vision of how PPPs could be implemented. Article 19 establishes two types of partnerships as follows.

- The first type regards financial contributions from the European Union made to joint undertakings established on the basis of Article 187. It also states that this form of partnership shall only be implemented where the scope of the objectives pursued and the scale of the resources required justify it.
- The second type would involve a partnership created by a contractual agreement being entered into between the partners, in which the objectives of the partnership, respective commitments, key performance indicators and outputs to be delivered will be included.

From these definitions, under Horizon 2020 two different types of PPPs would coexist: institutional PPPs and contractual PPPs, the former being the continuation of the JTI model and the latter being the continuation of the research PPP model, particularly of those that were established in the research plan.

An appropriate level of formal agreement where the roles of private and public parties are defined in future contractual PPPs will be necessary. Realistic and measurable key performance indicators (KPIs) may be defined to monitor the evolution of the contractual PPP programmes, which should be maintained as open, transparent and industry-oriented research programmes to attract industry, including SMEs, using the same rules as the Horizon 2020 normal calls.

As a consequence, additional efforts will have to be made to increase the general awareness of opportunities and activities within contractual PPPs: dissemination of project results including

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22 Proposal for a regulation of the European Parliament and Council establishing Horizon 2020 — the framework programme for research and innovation (2014–20) (COM(2011) 809 final).

project monitoring and impact assessment, and support activities to better reach the market. The associations representing the private side could play a relevant role in these activities and this task may also be included in the formal agreement on the contractual PPPs.

The agreement to set up a contractual PPP would include the commitment from both sides to implement the PPP jointly. A reference should be made to a Commission industry group where call topics and implementation of the PPP shall be discussed, without pre-judging the opinion of the relevant programme committee. The private side would include industrial companies, including SMEs, and a representation of research-performing organisations, as it will be an R & D & I-oriented PPP. Moreover, it would be best to avoid too-specific impact targets in the agreement on the contractual PPP; it is important to take into account that specific outcomes such as leverage factors and number of patents or spin-offs may not be in the immediate influence of the PPP. It will also be important to make sure that no additional bureaucratic burden for projects and project participants is created. Research PPPs have been demonstrated to be industry and SME friendly. Therefore, procedures of contractual PPPs should not be more complicated than procedures in ordinary Horizon 2020 projects.

## Covering the innovation chain from research to market: strategy on research and innovation roadmaps

The novelty of Horizon 2020 is the integration of research and innovation through seamless and coherent funding from idea to market and allocating increasing support for innovation activities that are closer to the market, leading to a direct economic stimulus.

Research PPPs represent a good example of how to engage industry in European research programmes, and thus they have an important role to play in the future Horizon 2020 programme in parallel with normal calls.

One of the novelties that research PPPs have used has been the new demo-targeted instrument for funding projects having a high demonstration component. The demo-targeted instrument established as an objective that around 50 % of the total costs should be allocated to demonstration activities, and it created high interest among participants. The number of proposals received was high, although the funding rate of demonstration activities was lower than the R & D funding rate in FP7.

Demo-targeted projects represent just a step towards the market uptake from research in FP7, but they give an important model to build on in Horizon 2020.

Under Horizon 2020 an objective of the PPPs should be to use the opportunities available to cover higher TRLs using both kinds of projects: research and demonstration.

The industrial research associations from the current PPPs are forums gathering stakeholders of many kinds working in the same industrial sector, from RTOs to SMEs through universities and large industrial groups. These networks have helped the interchange of expertise

by learning from each other and developing trust, allowing the different players to engage in business relationships outside research projects. Such newly created businesses lead to innovation and market uptake.

## Research PPPs and the KET policy

Focus on industry-driven applied research and demonstration activities in the research PPPs has encouraged industry participation (both large companies and SMEs) in FP7. The Horizon 2020 programme should make the best use of the research PPP experience in cross-thematic strategic programming when implementing the KET policy, which is to cover the multi-technology approach and all TRLs.

Depending on the sector or challenge, the KET policy can efficiently be implemented through the newly defined contractual PPPs both in the industrial leadership pillar and the societal challenges pillar: PPPs should have a clear KET/multi-KET element and address societal challenges. A clear impact expectation for technology-based solutions, with adequate follow-up mechanisms and key performance indicators, should be set out for the implementation of the PPPs within the industrial leadership and societal challenges pillars. At present, a sectorial approach may have been prevailing in the research PPPs. However, a strong link to societal challenges, and a broader approach towards upstream and downstream activities in the value chains, would be necessary in order to implement the KET policy through PPPs in the future.

## Implementation of research PPPs in Horizon 2020

At the time of writing of this report, the Horizon 2020 programme has not yet been approved and discussions on funding levels for collaborative research in general or closer to market research in particular are taking place.

As mentioned before, the proposal of the Commission for the new programme defines a specific type of PPP (contractual) for the continuation of the research PPP instrument created in FP7. The opinion of this expert panel on how this new PPP instrument would operate under H2020 can be found in Section 8.

It is expected that the four current PPPs, the three established in the research plan and Future Internet, will continue in H2020 and that more could be created. The first calls, envisaged for early 2014, may already include parts related to the roadmaps from the PPPs which are in preparation: Factories of the Future, Energy-efficient Buildings, Green Cars, Future Internet and the newly considered SPIRE, Robotics2020, High-Performance Computing and Photonics.

SPIRE (Sustainable process industry through resource and energy efficiency) is a proposal for a PPP driven by the European process industry, with the aim of rejuvenating the European process industry, making it more competitive and sustainable and leading to European growth and jobs. This industry is uniquely positioned to drive the work towards these objectives as it

represents the economic roots of the European economy (by transforming raw materials into intermediate and end-user products).

Robotics2020 is a proposal for a contractual PPP driven by the European robotics industry with the aim of defragmenting the industry and providing the basis for a globally competitive industry that will lead to job preservation and creation not only in the robotics industry but also in the many industries whose competitiveness is, and will be, underpinned by robotics. This industry represents both the current industrial robot manufacturers and also the emerging areas of service robots that are seen as key growth engines for the future.

DG Communications Networks, Content and Technology, based on the work done by the European technology platform Photonics<sup>21</sup>, which already involved most of the industrial and academic stakeholders in the field of photonics, is considering whether to launch a new PPP on photonics at the beginning of Horizon 2020. This PPP would focus on widening the application of photonics technologies to different sectors or application fields in which Europe is strong and which are not currently taking advantage of these technologies to improve or create new services and products that could, in the end, benefit the lives of European citizens or create new or strengthened business opportunities and new markets. Among the sectors identified to benefit from the application of this key enabling technology can be highlighted not only electronics and telecommunications, but also automotive, foodstuffs, textiles, energy, environment, pharmaceuticals, construction, etc.

The PPP on High-Performance Computing (HPC) is an initiative of the ETP4HPC European Technology Platform. It would strive to play an active role in positioning Europe as a centre of industrial innovation and a hub of scientific excellence by developing technologies, products and services essential to the EU's social, economic and scientific development and competitiveness.

All these proposed research PPPs have developed a roadmap for 2014–20, gathering opinions internally within the industrial research associations and externally through public consultations. Preparations have taken place to enable the proposed contractual PPPs to start at the beginning of Horizon 2020, once the details of the framework are known.

Industrial participation in Horizon 2020 can be boosted by the moving forward along the TRL scale of projects and PPPs that have already demonstrated their usefulness in this sense. However, care should be taken when considering the transformation from product development into production, with a need for investment in large pilot lines. It seems clear that, when funding higher TRL projects, the public contribution should decrease, and at some point it should be purely private funding and, for example, EIB mechanisms that are paying for them, instead of a public grant. Moreover, public funding of the operation of a pilot line or demonstrator should follow the principle of access and availability to outside entities.



# Findings

Having analysed the data and the interviews, the expert group has put together a number of key findings regarding the implementation of the research PPP model established in the context of the European Economic Recovery Plan.

1. Research PPPs are inclusive, as supported by the fact that the participation of organisations not belonging to the industrial research associations is around 75 % and they receive around 70 % of the whole EC funding.
2. Research PPPs have strong potential for a good overall leverage effect for private investment, and have boosted industrial participation compared with the standard FP7 Cooperation programmes (57 % in PPPs vs 34 % in FP7 Cooperation).
3. Research PPPs are seamlessly integrated into the FP7 logic, making use of the common FP7 set of rules, including comitology <sup>(23)</sup> procedures, having calls and evaluations run objectively by the European Commission, assuring excellence, transparency, fairness and accessibility, with quicker time to contract than standard FP7 calls while benefiting from the same IPR regulations as standard FP7 projects. This use of common rules has had strong support in the stakeholder community compared with the tailor-made rules and evaluation approach adopted by JTIs.
4. The stable funding of the research PPPs throughout their 4 years of implementation, as well as the competitive process of distributing the funding without the use of direct beneficiaries, as sometimes used in JTIs, gives increased confidence to industry to invest in participating in these projects. This effect can be observed not only in the industrial involvement in the calls, but also in the high level of SME involvement in retained projects. However, the lack of formal arrangements in the commitment for both the Commission and the industrial

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23 Procedures by which the European Commission agrees with Member and Associated States the launching of calls through Programme Committees.



research association may hamper the sustainable impact of the initiative in the longer term.

5. Research PPPs have moved forward in the latest calls to enlarge their coverage of the innovation chain closer to the market. In particular, the demo-targeted instrument implemented from 2012 in FoF and EeB has contributed to multiplying by four the demonstration activities within the PPP projects and has achieved even higher industrial participation.
6. The PPPs have positively reversed a declining funding trend related to research and innovation activities within FP7 for the industrial and technology areas covered by the three PPPs (see Figure 3). Not only did the implementation of the PPPs result in a step change in financial support, but the funding has continued to increase during the 4 years of the call implementation.
7. The PPPs have proved useful in strengthening the European value chains and in particular in giving a role to SMEs.
8. Industry has been found to agree that the research PPP model is not a general panacea to be superimposed on all technology or application areas. Therefore, looking towards Horizon 2020, it is recommended that a clear set of principles should guide the launch of contractual PPPs, for example:
  - demonstrating clear added value at European level;
  - demonstrating the usefulness of the PPP instrument for its goals (particularly research and innovation activity driven by a focused multiannual roadmap);
  - having clear and measurable societal and competitiveness objectives;
  - having a clear commitment from the private sector to the initiative;
  - having a PPP programme which supports the strategic objectives of Horizon 2020 and has a seamless character;
  - addressing areas within the specific programme for Horizon 2020.

# 7

## Conclusions

The three research PPPs were set up within the European Economic Recovery Plan with the specific purpose of mobilising public and private resources for research activities to stimulate a strong resurgence of these three sectors from the crisis, giving confidence to industry to invest in long-term research even when faced with short-term economic problems. The impact expectations of PPPs are critical for Europe: sustainable growth and competitiveness through the renewal of industry and creation of jobs.

These research PPPs were created on the basis of existing industrial European technology platforms such as the European Construction Technology Platform (ECTP), *ManuFuture*, EPoSS, ETRAC and Smartgrids, and, unlike the joint technology initiatives (JTIs), they were not implemented as independent legal entities. Their implementation differs from the traditional collaborative projects in FP7 in the fact that industry defines the multiannual roadmaps which provide the basis for the topics to be funded under the different work programmes, and therefore they are able to cover interests and needs from the whole value chain.

The first projects of the three PPPs are only now finishing. Therefore, it is too early to be definitive about the impact that this form of research and innovation approach may have in terms of commercialisation of results and contribution to Europe's overall competitiveness and leadership in industrial technologies. However, the assessment has found strong evidence that the research PPPs have conditions that are, at the very least, conducive to increased commercialisation.

In particular, the assessment notes the following positive aspects.

- The industrial focus of the PPPs, with roadmap-based research, has provided a focused and coherent framework that allows companies to align their long-term innovation strategy to that of the PPP.
- The relevance of the topics, being industrially geared, fits better with the needs of industry, focuses the funding on topics seen as relevant by the whole value chain and therefore attracted much higher participation of both large and small industry than the average calls in FP7.

- The focus on deployment of research and innovation results, both in terms of the evaluation of proposals and the execution of projects.
- The good engagement with relevant stakeholders from all levels of the value chain, including also the research community.
- The relevant improvement in the implementation speed (i.e. time to grant), since time is the most valuable asset in industry.

The expert group's focus was on analysing whether the research PPP structure was a suitable model for engaging industry in relevant research and innovation activities and in increasing the uptake of collaborative research results. The overall assessment has been structured around the following main requirements that a research PPP should maintain and reinforce for the future: (1) transparent processes, (2) efficiency and (3) clear responsibilities.

To assess how far the current PPPs are fulfilling these requirements, the expert group has tried to answer the following questions.

- What is the best way of making an open and inclusive research programme while keeping a clear industrial focus and coherence?
- Are the various parties to the research PPPs meeting these requirements?
- Are the programme requirements fit for purpose?
- What is the right approach regarding rules of participation for the research PPPs in Horizon 2020, common rules for all PPPs or tailor-made rules depending upon context?
- Who should be responsible for the evaluation of proposals submitted to PPP calls and for the overall management of these initiatives in Horizon 2020?

## Strengths and weaknesses

The expert group has detected the following strengths and weaknesses.

### Strengths

1. The research PPPs have demonstrated a high degree of coordination between themes (NMP, ICT, ENV, Transport, etc.) to implement cross-thematic strategies through calls managed by the Commission. This has been one of the key elements of success with the research PPPs and has ended up in a coherent set of research and innovation opportunities presented in the different thematic parts of the work programmes which contributed to the PPPs.

2. The definition of topics in the PPP calls is based on an industrial roadmap. This has improved the focus of the proposals received, and the overall call success rate has increased to more than 21 % on average for the research PPPs (vs 14 % for overall FP7 projects). This can be considered as an acceptable ratio for competitive calls. Moreover, despite of the influence of the AIAGs on defining the topics, there is little evidence of a higher concentration of 'frequent participants' in the research PPP projects than in the rest of FP7 Cooperation themes.
3. The research PPPs have provided SMEs with good opportunities to partner with large industries in their sector value chain. Figures show that, within the research PPPs, SME participation was on average 25 %, while in the overall FP7 Cooperation programmes SME participation reached 15 %.
4. The research PPPs have included mechanisms that support the transfer of project results to the market, especially in the latest calls, by using the demo-targeted funding scheme in the FoF and EeB PPPs. Overall, PPP projects have dedicated on average 17 % of their budget to demonstration activities, in contrast with only 4 % in the standard FP7 Cooperation project.
5. The time to grant (TtG) has been reduced by streamlining the process while operating under current FP7 rules (both for proposals and comitology). Although the achievement represents only a 12 % saving in time, it has impacted greatly on the perceived improvement in the research PPP project TtG with respect to standard FP7 projects, since time is an important asset for industry.
6. The research PPPs have taken advantage of the experience from the EC in managing the calls and have thereby achieved greater transparency and efficiency than other PPPs (such as the JTIs). This has been accomplished through the use of common FP7 management procedures and rules executed in a more streamlined manner. This success confirms that this particular type of PPP concept is an effective mechanism to organise the cooperation between the different stakeholders, notably the European Commission and industry.

## Weaknesses

1. Although the PPP implementation has streamlined the process of topic selection/prioritisation by the industrial research associations, the current research PPP model does not have a formal definition of roles and commitment from the public and private parts of the partnership to guarantee the sustainable and long-term stability of the research PPPs that are running.
2. Even if, as mentioned earlier, the AIAGs had a good mix of representatives coming from different types of organisations, with the exception of the EeB PPP a predominance of large industrial players was observed among the private-side members. The relevance of the research PPPs for a wider stakeholder group implies that besides having fair conditions for participation there should also be fair inclusion of all key actors of the value chains in the advisory mechanisms, in particular SME representatives.

3. As is the case for the usual FP7 cooperative projects, the research PPPs have not achieved a regionally balanced engagement as it has been shown that sector specificities have a stronger role in defining funding opportunities than geographical parity. Although these geographical disparities can be partially explained by the clustering of the associated industry within the PPP scope, more targeted methods of awareness-raising are necessary to guarantee PPPs impact to a wider coverage in Europe of the sectors within the PPP scope.

There is currently no statistically significant data on finished projects to assess the real impact of the research PPPs thoroughly. So far, the leverage effect of research PPPs on large-scale industry investment has been rather limited. To have a real sustainable effect there needs to be a long-term visible commitment and stable, adequate funding both from the private side and the public side.

## Progress towards objectives

At the time of this analysis, the progress of the research PPPs towards their objectives can be summarised as follows.

- The three research PPPs have demonstrated the value of the PPP model to strengthen the technology base of high-added-value industries, gaining resilience in European industry for future crises. The fulfilment of this objective is demonstrated by the much higher industrial participation in these calls compared to the standard FP7 project, as well as the wider coverage of the whole value chain, particularly with respect to market-facing entities.
- The introduction of the demo-targeted funding scheme in the last calls of the FoF and EeB PPPs, as a result of experience gained in the earlier calls, has become a first step forward towards one of the main objectives in Horizon 2020: properly addressing the industrial needs related to global competitiveness. The use of this scheme received good support from FoF and EeB participants, as was shown in the questionnaire results.
- While the research PPP model has been shown to have the potential for improving competitiveness for the three areas currently so engaged, it is unlikely to be the universal panacea or appropriate instrument for all industrial sectors. Specifically, implementation of any new PPPs should take into account the critical mass and relevance of the value chain together with the sector competitiveness challenges and the alignment with the strategic goals of Horizon 2020 and the European industrial policy priorities.

## Impact and dissemination

The research PPP concept has been validated in practice. Research PPPs are regarded as a successful model for the engagement of industry and for providing a clear focus and enough flexibility to adapt quickly to changes in the environment.

The research PPPs have raised awareness within whole value chains, attracting high-quality proposals with very relevant industrial participation of both large enterprises and SMEs while maintaining an adequate level of participation by research organisations. This increases the impact potential.

The conclusions of the FoF and EeB impact workshops show that the research PPPs are meeting their impact and dissemination targets, but that more could be achieved through greater use of clustering between projects with similar targets and approaches.

The general consensus of the questionnaire responses was that research PPPs were a more effective approach to achieving market impact than standard FP7 projects, but that more could be done in terms of near-market actions to improve the chances of high market-related impact.

There is clear evidence of the success of the PPPs in leveraging private investment. Also, there is a dynamic, enthusiastic and growing community with high industry participation. The PPP approach has brought clear advantages to industry and SMEs by enabling enriching interactions between companies from different backgrounds. SMEs in particular benefit from a more product-focused approach, and working with larger organisations helps them to better access market information. Academia and research centres today are also financially driven, and the PPP approach supports their work to develop cost-effective solutions.

However, there is a need to continue to demonstrate the openness of industry and the impact on the market by the adoption of new technologies. The PPP community needs to work towards making project results better known to the wider public. In this sense, clustering may add value by sharing solutions to common problems, exchanging best practices, joint dissemination and promotion of results and demonstrators, and facilitating networking.

The research PPP model has brought clear advantages to industry, SMEs, RTOs and academia. It enables focused, cost-effective and cross-disciplinary collaboration to improve the deployment of research results and to develop new competitive solutions for the market.



# Recommendations

Following the review and analysis, the expert group makes a series of recommendations for improving and developing both the existing research PPPs, but also for implementing other ‘contractual’ <sup>(24)</sup> PPPs within Horizon 2020. Research or contractual PPPs are not seen as the total panacea for the innovation problem in all sectors being confronted by Horizon 2020, but rather a type of partnership that is very useful for addressing the societal challenges and the enabling industrial technologies, to complement the standard Horizon 2020 calls, particularly in terms of industrial competitiveness in key strategic value chains. The major advantage of this PPP model is that it helps to address industry-relevant issues that are closer to the market, pulling together most elements of the value chain while utilising the common, validated and transparent procedures of the bulk of the framework programme.

**Recommendation 1: The governance model of the research PPPs needs to be formalised to recognise the contribution and commitments of the various actors involved in order to guarantee long-term sustainability and impact within the sectors of the partnership.**

While the expert group recognises that the current governance arrangements have allowed the PPPs to be implemented swiftly and are working properly to achieve the objectives of the current PPP framework, there is still room for increasing the transparency of the process to external bodies and organisations as a whole, as well as guaranteeing the commitment for the long term. In particular, the role (rights and obligations) of the industrial research associations and the current ad hoc industrial advisory groups, and their relationship with the Commission, needs to be formalised.

- 1.1. The associations behind the PPPs should be legally established and should reach an agreement with the European Commission that should be monitored and assessed against agreed KPIs on a regular basis with respect to its strategic objectives and impact on the sector.

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24 A contractual PPP is a more formalised form of a research PPP that has been planned within Horizon 2020. For further clarification see Section 5.

- 1.2. The commitment of the private sector within the partnership should include, besides the performance with respect to the multiannual roadmap, measures within the sector to achieve the desired impact in the long term, while the European Commission commitment within the partnership should guarantee the stability of the funding framework during Horizon 2020. Furthermore, the Member States should be involved in the annual implementation of these partnerships within the Horizon 2020 programme committees.
- 1.3. The current character of industry-driven programmes needs to be retained, but given the active participation of some SMEs and RTOs, AIAGs should be more representative of the sector stakeholders and include complementary competences from the whole value chain.

**Recommendation 2: The research PPP model should be further used, developed and expanded in scope within Horizon 2020 and provided with sufficient funding to achieve a significant industrial effect.**

- 2.1. Having demonstrated the value of the PPP model, it is still unlikely that PPPs will achieve a sustainable leap forward unless the current level of combined private and public funding is sufficiently increased in Horizon 2020. So far, the leveraging effect of the research PPPs on overall industry R & D investments in the sectors covered has been rather limited, and further measures need to be taken to create a long-term commitment that stimulates more industry investment in R & D.
- 2.2. The European Commission and industry should commit to the long-term support of the current research PPPs to align the strategic goals of European industry and to address societal needs. This will also provide industry with the confidence to bring forward investment plans in Europe and benefit under Horizon 2020 from more opportunities for close-to-market actions. Within the framework of Horizon 2020, there could be a role for the EIB and the European Investment Fund to stimulate investments, for instance in the final deployment phases.
- 2.3. Implementation of new PPPs should take into account the critical mass and relevance of the value chain, the definition of clear societal and competitiveness challenges, a balanced private and public commitment and clear alignment with the strategic goals of Horizon 2020.
- 2.4. Future research PPPs should be organised along European value chains, rather than necessarily being aligned to traditional sectors, in order to enhance innovation with a greater chance of European wealth creation by focusing on critical productive technologies and capabilities.
- 2.5. Research PPPs have been found to boost industrial participation when calls have been more focused on closer-to-market actions, as shown by the demo-targeted type of projects from the calls of 2011 and 2012. PPPs should be expanded in their scope to include, as project outputs, prototype products or pilot lines working under representative operational conditions.



- 2.6. PPPs should be encouraged to play a greater role in standardisation activities and utilise both their project results and the expertise in their networks to focus on standardisation actions of benefit to the European manufacturing industry.

**Recommendation 3: The PPPs should work under the Horizon 2020 common rules, but their procedures need to be further streamlined and simplified to increase the relevance of the PPPs to industry and to broaden the appeal to a wider subset of the relevant value chain.**

The expert group acknowledges the benefit of the PPPs to work under the same rules as the bulk of the framework programme and therefore suggests continuing with that approach for H2020. Despite the effort already made by the existing PPPs to simplify and streamline the procedures, more effort needs to be undertaken to speed up the entire application-to-grant process and also to streamline the up-front effort, particularly for new entrants. While much of the simplification effort for Horizon 2020 has been focused on financial and reporting regulations and will automatically apply also to PPP projects, these are generally post-award activities. The major hurdle for a new entrant, particularly an SME, is the time and effort in getting to a grant award.

In particular the expert group recommends the following.

- 3.1. A single access point for all calls originating from a single PPP should be established, with clear identification of topics. These PPP calls should be functionally independent calls but with a clear indication that common Horizon 2020 rules apply. In other words, for any PPP, there should be a single point of information that any organisation needs to monitor. Ideally this single entry point should carry information on closely related areas.
- 3.2. The time to grant must be further reduced in line with the Horizon 2020 targets. Any further saving in time is perceived as a great improvement in PPP projects and is far more relevant as the call is more focused on closer-to-market actions.
- 3.3. Clear, focused calls that prevent oversubscription are an important element in streamlining the process. Particular attention needs to be paid to calls aimed specifically at SME participation, where appropriate. Faster and simpler schemes should be adopted.
- 3.4. Project follow-up logic should change from one of auditing costs and milestones towards maximising impact from the 'investment', in addition to the delivery of agreed project results. The overall focus should be on social and economic return on investment, with clear and measurable indicators to be monitored also when the project has ended. As one of the questionnaire responses from the EeB PPP participants put it, projects should be handled 'like in real construction projects'.

**Recommendation 4: The research PPPs in Horizon 2020 need to focus on actions which strengthen innovation activities and the likelihood of European-based products and services eventually reaching the markets.**

The current PPPs have, within the limits of the instruments available, moved the project activities closer to actions relevant to exploitation. However, PPP actions within Horizon 2020 need to widen the scope by also moving up the TRL scale, and the assessment and review procedures need to be adapted accordingly to focus on the innovation aspects of the project.

- 4.1. In Horizon 2020 the research PPPs should concentrate on activities related to overcoming the ‘valley of death’, in particular demonstration projects and experiments, such as proof of concept for European added value on an early industrial scale (TRL 5–7).
- 4.2. Research PPPs should link with upstream as well as downstream activities in the innovation/value chains in Europe, including various measures at the European level that go beyond pre-competitive R & D, such as pilot plants and demonstrator facilities. Beyond TRL 7, EIB loans and guarantees should be used, as well as in cases of very high investment <sup>(25)</sup>.
- 4.3. PPPs should benefit from the same approaches suggested for Horizon 2020, with respect to the use of other funding sources and its coordination with Member States and regional programmes. There should also be an engagement with the relevant European innovation partnerships, where activities in the PPPs could find synergies with the EIP objectives.
- 4.4. The project evaluation process in the contractual PPPs needs to follow H2020 evaluation criteria but should promote higher-value-chain involvement or industrial relevance as part of its impact evaluation criterion, possibly including a higher threshold for that criterion, as already done in many programmes in FP7.

**Recommendation 5: In order to maximise the benefits and widen participation in the research PPP activities and results, awareness about the research PPPs needs to be strengthened, particularly among the often hard-to-reach SMEs. SMEs are critical to the industrial competitiveness of Europe and they increase the geographical spread of organisations involved along the key value chains.**

- 5.1. The usual channels for the dissemination of calls in the framework programmes have to be used in a more active way and specific events for the PPPs, such as PPP infodays, should be organised in a targeted way.
- 5.2. Specific measures aimed at widening awareness and facilitating access to both PPP and related non-PPP funding need to be taken, including the use of Structural Funds to address issues faced by many organisations in currently under-represented regions.

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<sup>25</sup> See the mid-term report of the Expert Group on KETs (February 2011): [http://ec.europa.eu/enterprise/sectors/ict/key\\_technologies/kets\\_high\\_level\\_group\\_en.htm](http://ec.europa.eu/enterprise/sectors/ict/key_technologies/kets_high_level_group_en.htm)

- 5.3. There should be more proactive awareness-raising measures regarding the roadmap and work programmes of the PPPs, with a particular focus on SMEs and mid-cap companies in order to include them in the roadmap definition/update processes. Industrial research associations should become ambassadors for the relevant PPP and enhance PPP awareness beyond the internal membership, e.g. representative trade organisations.
- 5.4. Dissemination of results: funds should be provided to support the dissemination of project results via regular output conferences organised in parallel with major technology fairs (where it could be expected that the relevant players will have a presence). In addition, both the EC and the industrial research associations should facilitate clustering activities between appropriate projects to enhance both the dissemination of results and the range of exploitation opportunities.

# ANNEX A:

## Projects

### Annex A1: Factories of the Future



**e-Custom: A web-based collaborative system for mass customisation**

<http://www.ecustom-project.eu>

e-Custom addresses the development of a set of tools and methods for supporting mass customisation, with demonstrations of the project results through pilot applications in three sectors: automotive, healthcare and machine tools. The project's focus is on engaging customers in the customisation process, with a strong orientation towards an eco-friendly approach.

e-Custom's main exploitable results are software modules that comprise:

- a web-based user-friendly tool for the integration of the customer in the design phase of new products;
- an advanced virtual and augmented reality visualisation feature usable via a web-browser, based on free and open-source software;
- a web-based platform for supporting the decision-making procedure for the production of individualised products in a fast, cost-efficient and environmentally friendly way;
- a module to provide an assessment of the environmental footprint of supply-chain configurations, using simulation-based metrics.

Early results from pilots indicate a clear environmental benefit in the form of reductions in energy costs (in the range 5–10 %), as well as other benefits, which include a reduction in transportation costs of up to 20 %, a 15 % shorter design time for personalised products, a decrease in time-to-market of up to 15 % and a reduction in delivery time of approximately 15–20 %.



## Femtoprint: A femtosecond laser printer for micro- and nano-scale systems

<http://www.femtoprint.eu>

Femtoprint has been implementing a new method for manufacturing microsystems and devices by bypassing the need for large scale infrastructures for producing microsystems. To this end, the project has successfully developed and demonstrated a tabletop printer for producing microsystems with nano-scale features. This has potential applications in the production of optical and opto-mechanical devices, as well as lab-on-a-chip devices used for opto-fluidics, and the marking of optical memories.

A key advantage of the printer is that it has the potential to boost innovations in microsystems by providing affordable rapid-prototyping tools to SMEs. Femtoprint has also demonstrated, using the printer, a number of important technical achievements:

- first demonstration of exotic polarisation state converters;
- first demonstration of an optically transparent glass actuator;
- evidence of 5D optical memories;
- chaotic to self-organised bubble patterns.

The Femtoprint project, in addition to producing the prototype tabletop printer, has made two patent applications, and is in the process of addressing the set-up of a spin-off company to further develop and market the printer.

## Annex A2: Energy-efficient Buildings



### BEEM-UP

<http://www.beem-up.eu>

The BEEM-UP project ('Building energy efficiency for massive market uptake') has demonstrated the economic, social and technical feasibility of retrofitting initiatives for drastically reducing the energy consumption in existing buildings, and laid the ground for massive market uptake.

BEEM-UP involves key expertise to implement and demonstrate innovative building and energy management approaches with the overall aim of improving energy efficiency in existing buildings and obtaining better indoor comfort conditions.

Barriers to retrofitting	BEEM-UP project
A lack of easily accessible cost-effective solutions.	Novel integration and optimisation methods and advances in specific features for large-scale application.
Occupants' acceptance of innovative solutions.	
A lack of energy saving technology solutions optimised for large-scale uptake of retrofitting.	

The BEEM-UP project takes an integral approach to overcoming these technical, social and economic barriers through three ambitious retrofitting projects in France, the Netherlands and Sweden.

Forty dwellings have been retrofitted, with an average net energy reduction of 75 % on HVAC, lighting and hot water, including the integration of renewable energy.

#### *Overall objective of the BEEM-UP project*

To develop and demonstrate cost-effective and high-performance renovation of existing residential multi-family buildings, drastically reducing the energy consumption.

#### *Expected figures*

- Reduction in the energy demand for space heating: 77 %.
- Reduction in the energy need for hot water: 45 %.
- Reduction in lighting: 42 %.

The action has directly led to a total energy reduction of 4 GWh/year, and a 1 041 t CO<sub>2</sub> reduction per year.

As a demonstration project, BEEM-UP selected three building sites on which to implement its methodology in three different locations in Europe, to try to prove the repeatability of the BEEM-UP concept. France, the Netherlands and Sweden were the chosen countries.

- In France, a building in the centre of Paris, built in around 1950 and composed of 87, in which the aim is for over 75 % energy savings.
- In the Netherlands, 28 attached houses and 80 apartment blocks are part of the BEEM-UP project, with an energy savings goal of 75 %.
- In Sweden, eight blocks have been refurbished under passive-house standards, achieving savings of around 76 %.



## FC-district, new $\mu$ -CHP network technologies for energy-efficient and sustainable districts

<http://www.fc-district.eu>

FC-district optimises and implements an innovative energy-production and distribution concept for sustainable and energy-efficient districts, exploiting decentralised co-generation coupled with optimised building and district heat storage and distribution networks, targeting a reduction in annual primary energy consumption at district level of up to 60 %.

Key achievements have been the development of five products that can be integrated as a complex solution for districts to reduce energy use and increase the uptake of renewable energy. These products are as follows.

- A micro-CHP system based on SOFC, contributing to reducing emissions through a more efficient and flexible approach of dispersed co-generation. There are several project partners planning to commercialise the new components.
- An innovative method for food-waste exploitation through a well-instrumented waste collection tank for energy generation providing additional income for households. This product will be offered to water or waste-management companies.
- External thermal-insulation component systems with reduced thickness and improved performance, ideal for historic building facade retrofitting. The prototype has been developed but further work needs to be done to take it to production.
- A district heating pipe with improved insulation based on vacuum insulation panels and polyurethane foams. This product could be taken to market in 2014 by one of the partners.
- A wireless/hybrid communication network for controlling energy in districts that makes energy-management systems more efficient and available. The product will be ready for commercialisation a year after the project completion.

The key challenges of the FC-district project are three demonstration actions.

- Unit-level demo in Spain — testing of SOFC unit operation.
- Building-level demo in Greece — proof of integration of building storage and SOFC unit, energy management.
- District-level demo in Poland — proof of concept: micro-grid/heat network arrangement of dispersed  $\mu$ -CHPs, 60 % reduction in primary energy use.



## Annex A3: Green Cars



<http://www.e-vectoorc.eu/>

The 3-year E-Vectoorc ('Electric-vehicle control of individual wheel torque for on- and off-road conditions') project started on 1 September 2011 with 11 complementary participants from industrial and research backgrounds. The project addresses the individual control of the electric motor torques of fully electric vehicles to enhance safety, comfort and fun in both on- and off-road driving conditions. The key achievements are as follows.

- The creation of a simulation platform for the comprehensive investigation of different torque-vectoring strategies and powertrain architectures, including two to four electric motor drives (in-wheel and on-board layouts).
- The development of new yaw-rate and sideslip-angle control algorithms for the continuous actuation of front/rear and left/right torque vectoring to achieve vehicle handling behaviour according to manufacturer specifications.
- The experimental testing of the key hardware components — the novel switched reluctance motors (by Inverto NV) and the electro-hydraulic braking system (TRW slip control boost unit) — for model parameterisation, validation and hardware control (Figure 1).
- The completion of the first stage of conversion of a Range Rover Evoque to a fully electric four-wheel-drive configuration and testing of the first iteration of the E-Vectoorc controllers in steady-state and transient conditions at the Lommel proving ground (Figure 2).



<http://www.fp7-opener.eu/>

The OpEneR integrated overall vehicle energy-management system, communicating with and fusing data from existing and future subsystems that are most relevant with respect to safety, energy consumption, energy recovery and driving-range prediction.

Demonstrated technologies:

- fully electric vehicle (Peugeot 3008) driven by two e-machines, one on each axle;
- intelligent radar sensor technology and video cameras for driver assistance systems to monitor the vehicle surroundings and to define smooth driving strategies which encourage the economy and safety of the new system;
- integration of predictive traffic information coming from cooperative car-to-car (c2c) and car-to-infrastructure (c2i) technologies;
- intuitive dashboard HMI that supports and also encourages the driver to control the vehicle optimally, to allow the driver to complete the journey comfortably and quickly and in the most energy-efficient and safe way possible, especially under highly dynamic real-world conditions;
- integration of 3D digital route map information including approaching altitudes and slopes;
- regenerative braking system for optimal support of energy recuperation through the two e-machines; braking will also cooperate with other sub-systems, e.g. adaptive cruise control (ACC), to help to increase the electric range of FEVs.

# ANNEX B:

## Details of the group of experts

Elisa Robles	(Chair)	CDTI
Geoff Pegman	(Rapporteur)	R U Robots Ltd
Eberhard Bessey		Daimler AG
Edward Chlebus		Wroclaw University of Technology
Kim Davis		Research Council of Norway
Gunnar Muent		European Investment Bank
Henri Obara		Schneider Electric Industries SAS
Pietro Perlo		IFEVS, Torino e-district
Leena Sarvaranta		VTT

**Elisa Robles** (Chair) (Spain), is Director-General of the Centre for Development of Industrial Technology (CDTI), a public entity depending from the Spanish Ministry of Economy and Competitiveness that supports the technological development and innovation of Spanish companies funding national and international R & D & I projects.

**Geoff Pegman** (Rapporteur) (United Kingdom) is Managing Director of R U Robots Ltd, an advanced robotics company (SME). He is the current Chair of the Robotics and Mechatronics PN and the Vice-President of the International Advanced Robotics Programme, UK representative to the IEEE Robotics and Automation Society Industrial Activities Board and member of the Executive Board of the European Robotics Technology Platform.

**Eberhard Bessey** (Germany) is Senior Adviser at Daimler. He manages the Research and Advanced Engineering Group and the Product Innovations and Process Technologies (Materials Manufacturing Concepts) Group of the company. Since 2004 he has been a member of the Support Group ETP ManuFuture, becoming the secretary of ETP ManuFuture in 2006.

**Edward Chlebus** (Poland) is Professor of Technical Sciences at Wrocław University of Technology and Director of the Institute of Production Engineering and Automation. He is also President of the Management Board of Lower Silesian Innovation and Science Park. He is

a member of the High-Level Group of ETP *ManuFuture*, as well as the Coordinator of the Production Processes NoE in Poland.

**Kim Davis** (Norway) is Senior Advisor in the Innovation Division of the Research Council of Norway, the public agency funding research. The Division for Innovation is responsible for mobilising and funding research within and for Norwegian trade and industry. She is the national contact point for the European Commission's ICT programme.

**Gunnar Muent** (Germany) is Director of the Innovation and Competitiveness Department within the European Investment Bank (EIB) Projects Directorate, in Luxembourg, which is responsible for the technical and commercial due diligence of investment proposals. His department focuses on digital economy, education, life sciences and health, and innovative industries, including the engineering, automotive, chemical and pharmaceutical industries.

**Henri Obara** (France) is Programme Regulations and Standards Manager at Schneider Electric Industries SAS. He is a Breeam International Assessor as well as a LEED Green Associate. He was responsible for European projects in Schneider Electric group subsidiaries and as product manager at Schneider Electric France. He is a member of the Energy-efficient Buildings Association and various European standardisation committees on buildings energy efficiency.

**Pietro Perlo** (Italy) is Director at IFEVS and Vice-President of the Torino e-District. He was Director for the EU Network at Centro Ricerche Fiat. For 15 years he has been a contract professor at the Institute of Physics of the University of Torino. He focuses his interest on the optimal integration of enabling technologies for green mobility. Since 2011 he has been the Chairman of the Automotive Working Group of the EU Technology Platform EPoSS.

**Leena Sarvaranta** (Finland) is Vice-President of EU Affairs at the VTT Technical Research Centre in Finland. She is responsible for defining VTT's strategies towards EU research, including models of collaboration with various stakeholders in Finland and Europe.

# ANNEX C:

## The questionnaire

- Questions are divided into sections corresponding to the elements to be analysed.
- Implemented via an online form.
- The online form allows, by choosing the role in the PPPs, access only to your target questions.

General information of the respondent
Mr/Ms + name and surname
Position
Name of organisation
E-mail
Country
In what call have you participated?
Type of entity: choose between: <ul style="list-style-type: none"><li>• university</li><li>• research and technology organisation</li><li>• large industry</li><li>• small and medium-sized enterprise</li><li>• public national body</li><li>• European Commission</li><li>• independent</li></ul>
Main field of expertise: to choose between FoF, EeB, GC, public funding

Role in the PPPs: choose between (multiple choice):

- project coordinator — (P)
  - project participant — (PP)
  - programme committee members and NCP networks (N)
  - EC — DG Research and Innovation
  - EC — DG Communications Networks, Content and Technology
  - EC — DG Energy
  - EC — DG Enterprise and Industry
  - industrial research associations (I)
- } Managers (M)

I agree to be included in the list of experts interviewed that will be included in the final evaluation report: Yes/No

Please, evaluate the questions using the grades from 0 to 5, these being:

0 — Don't know

1 — Very poor

2 — Poor

3 — Adequate

4 — Good

5 — Very good

	Effectiveness	Role
1.	How have the PPP objectives been implemented through coordinated calls following FP7 rules?	P, M, N, I
2.	How has the cooperation been (in terms of cross-thematic calls, topics selection and funding contribution) between the specific themes (Transport, NMP, ICT, Energy, Environment)?	P, M, N, I
3.	How effective has the public-private cooperation been (functioning of ad hoc industrial advisory groups, coverage of the roadmap, initiative reviews) between the private part and the European Commission?	P, M, N, I
4.	Is this kind of initiative, based in multiannual programmes, an appropriate tool for increasing long-term research and innovation investment?	P, M, N, I
5.	Has the PPP succeeded in networking/pooling various stakeholders? For instance: public and private, European platforms, ad hoc industrial associations, different DGs in the European Commission, Member States, etc.	P, M, N, I
6.	Has the PPP succeeded in combining private-sector investment and European public funding?	P, M, N, I
7.	Has the leverage effect of the research PPPs in terms of extra private commitment been ...	P, M, N, I
8.	How well are the roadmaps reflected in the call text?	P, M, I

9.	As a participant, how useful has the support provided by the PPP private part been to advanced technologies in manufacturing/construction/transport research and development in Europe?	P, PP
10.	Has your involvement in PPPs benefited your organisation?	P, PP
11.	Has your involvement in PPPs supported work that would not have been done otherwise?	P, I, PP
12.	Has your involvement in PPPs helped in moving your developments/product/expertise closer to the market?	P, PP
13.	Do you think the PPP mechanisms are effective in bringing about faster innovation and commercialisation of results?	P, M, N, I, PP
14.	Do you have the feeling that associations are a closed organisation?	P, PP
15.	Has your involvement in PPPs boosted the involvement of your organisation in multidisciplinary research?	P, PP
16.	Are the research PPPs a more attractive initiative compared to other instruments or initiatives/regular calls?	P, I, PP
17.	Has the PPP contributed/promoted the participation/involvement of industry, particularly small and medium-sized enterprises (SMEs), in its supported research activities (through awareness and dissemination events and specific research topics)?	P, M, N, I
18.	Has the PPP contributed to the identification and solution of research bottlenecks in its supported research activities?	P, M, N, I
19.	Has the use of demo-targeted projects fitted the objectives of the PPPs?	P, M, N, I
20.	The appropriateness of the technology readiness levels reached or proposed in the demo-targeted projects for the research PPPs, has been?	P, M, N, I
21.	Has the PPP contributed to standardisation in its supported research activities?	P, M, N, I
22.	Has the PPP contributed to innovation in its supported research activities?	P, M, N, I
23.	The governance structure of PPPs has been adequate to achieve the policy objectives of the European Economic Recovery Plan, compared with other initiatives like JTIs.	P, M, N, I
24.	Will the results of the PPPs make an impact in terms of growth and job creation in the short term?	P, M, N, I, PP

	Efficiency	
25.	Does the PPP implementation, through coordinated and joint calls following the FP7 rules, allow an efficient implementation of its objectives?	P, N, I
26.	Has the preparation of PPP calls been carried out efficiently?	P, M, N, I
27.	Has the dissemination of the PPP calls been carried out efficiently?	P, M, N, I
28.	Has the evaluation of the PPP calls been carried out efficiently?	P, M, N, I

29.	Has the negotiation of the PPP projects been carried out efficiently?	P, M, N, I
30.	Has the IPR management/support of the PPP projects been carried out efficiently?	P, M, N, I
31.	Have the activities of industrial associations through roadmaps, dissemination, brokerage, review of progress, steps towards the future, etc. been carried out efficiently?	P, M, N, PP
32.	Has the public-private interaction been efficient in preparing roadmaps and advisory work?	P, M, N, I
33.	Has the public-private interaction been clearly established (clear ways of interaction, clear roles)?	P, M, N, I
34.	Have the levels of funding and other resources been adequate to reach the objectives set in the European Economic Recovery Plan?	P, M, N, I
35.	How efficient are the PPP mechanisms in terms of promoting dissemination and exploitation of results?	P, M, N, I
36.	Have the ad hoc advisory groups fulfilled their duties?	P, M, N, I

	Quality	
37.	Has the PPP attracted the best researchers and research organisations active in the field?	P, M, N, I
38.	Are the industrial associations contributing to the PPP objectives and promoting the participation of industry and SMEs, gathering stakeholders, promoting innovation and openness?	P, M, N, PP

	The way forward	
39.	Will the PPPs approach fit in Horizon 2020?	P, M, N,, I
40.	Would a more formalised role of the industrial associations increase the impact and dissemination of PPP projects?	P, M, N, I
41.	Would an enhanced private role, through activities of the associations, increase the impact and market uptake of PPP project results?	P, M, N
42.	Are the measures described in the multiannual roadmaps and the topic descriptions in the calls appropriate to ensure that innovation will result?	P, M, N, I
43.	The balance between research and innovation issues addressed in the roadmap for 2014–20 of the PPPs is ...	P, M, N, I
44.	Would it be appropriate to link the developments of the future PPPs and the KET agenda?	P, M, N, I
45.	Would it be appropriate to link the research PPPs scheme to market evolution and policy measures with regard to KETs and societal challenges?	P, M, N, I
46.	Should the commitment and role of both public and private partners in future research PPPs be streamlined?	P, M, N, I



47.	Clear objectives for a leverage effect should be defined when launching future PPPs and have a regular follow-up.	P, M, N, I
48.	Should a future approach for research PPPs include a technology-readiness-level assessment at the end of the projects?	P, M, N, I
49.	Should a future approach for research PPPs include achievement of industrial scale-up, larger demonstrations and pilot plants?	P, M, N, I
50.	Should the future PPPs give more importance to IPR issues?	P, M, N, I
51.	Should the future PPPs continue the coordinated and joint calls, following the general participation rules and combining different kinds of instruments? (Different types of collaborative projects, SME instrument, risk finance, EIB funds, public procurement, Structural Funds, etc.)	P, M, N, I
52.	The research PPPs initiative was launched in order to boost competitiveness and job creation in sectors hit by the financial crisis in the framework of the European Economic Recovery Plan. Would this approach also be attractive in economic boom times in key sectors?	P, M, N, I

	Open questions	P, M, N, I
53.	What can be done to improve the effectiveness of the PPPs?	
54.	What could be done further to ensure Europe's best researchers from industry and academia are involved in projects supported by PPPs?	
55.	What could be done further to ensure SMEs are involved in projects supported by PPPs?	
56.	What are your main recommendations concerning the role of this type of PPP in H2020?	
57.	What are your main recommendations in order to pave the way for results from PPP projects to the market?	
58.	Any other comments.	

European Commission

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This report outlines the results of the Final Assessment of the four years of implementation of the three research Public Private Partnerships (PPPs) established under the European Economic Recovery Plan: Factories of the Future (FoF), Energy-efficient Buildings (EeB) and Green Cars (GC).

Launched in November 2008, the PPPs were originally envisaged as a quick response to the financial crisis, but a better understanding of the need for a long-term perspective for the support to research and innovation in these strategic sectors has led to a call from industry for a renewed commitment to these partnerships.

Although it is still somewhat early to be definitive about the magnitude of the impact of these initiatives, since so far only a few PPP projects have been completed, evidence suggests that the activities pursued under the three research PPPs are more directly relevant to exploitation and post-project commercialisation of results than in the case of standard FP7 cooperation projects.

The review also found a significantly higher industrial participation by both large companies and SMEs than with standard FP7 programmes – one of the reasons being that the research PPPs activities are underpinned by industry-driven multi-annual roadmaps.

Overall, this assessment is very supportive of the research PPP tool and suggests that the research PPP model should be further used, developed and expanded in scope within Horizon 2020.



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