

# **Impact of the Energy Efficient Buildings PPP**

Report from the Workshop held on  
12-13 March 2013

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## Executive Summary

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The EeB PPP is a joint initiative of the EC and the 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 across Europe.

In March 2013 EC representatives, E2BA and partners of the 72 funded projects of the EeB PPP met in a 2-day workshop. The objectives of the workshop included assessing the impact of the PPP and exploring the opportunities derived from project clustering and cross-project collaboration. It also intended to share learning and experiences of the 4 years of implementation of the PPP through the parallel sessions and discussion panels.

Projects confirmed they are achieving targets and shared their approaches for dissemination and exploitation. On their presentations they also captured specific challenges that need to be addressed to maximise impact as technical and non-technical cross-cutting issues. Most common issues were related to the market and exploitation of results, such as the need for more cost effective solutions, new business model creation and the development of a platform to share business opportunities. Others were related to the benefits of joint working to share costs and knowledge and increase impact. Knowledge on user engagement, policy, regulation, market studies, etc. could be shared across related projects.

The opportunity for clustering is clearly a beneficial one. Clustering during the project life helps with networking, sharing solutions to common problems and exchanging best practices. As results become available, it enables joint dissemination, training and joint demonstration. One of the main benefits of clustering beyond the life of the project is to support the exploitation process by reducing risks and delays. Regulatory and standardisation clusters could provide immediate benefit when bringing products to market.

In order to make clustering a success issues related to IPR need to be resolved upfront by project coordinators and exploitation managers. The leadership of clusters beyond project completion should also be addressed to realise the benefits of clustering in supporting product commercialisation. The Nano-E2B cluster provides an example of clustering best practice where 6 projects are working together with a joint exploitation agreement in place.

The PPP approach has brought clear advantages to participating stakeholders by enabling focused cross-disciplinary collaboration to develop cost effective solutions. The PPP, supported by E2BA also enables better dissemination of projects. The 2-day workshop reinforced the success of the PPP initiative to date in driving innovation forward and also highlighted opportunities for improvement in view of PPP implementation during Horizon 2020.

Main recommendations are:

- Projects should start clustering activities following the model of existing successful clusters to share knowledge and organise joint activities namely around dissemination and demonstration.
- The challenge of cluster leadership after project completion should be addressed by the EC to maximise the benefits of clustering for results exploitation.

- Umbrella projects could support business awareness and exploitation activities to facilitate product commercialisation.
- E2BA could organise joint promotion actions and similar impact-type workshops outside Brussels closer to local stakeholders potentially engaging players outside the sector.

# 1 Introduction

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The European Commission (EC) ran the third annual workshop to assess impact of the Energy Efficient Buildings (EeB) Public Private Partnership (PPP) last 12 and 13 March 2013. Participants included representatives from the EC, the Energy Efficient Buildings Association (E2BA) and Ad-hoc Industrial Advisory Group (AIAG), coordinators and project partners of projects funded in 2010, 2011 and 2012.

The EC is currently finalising the assessment of the PPPs impact. The experience gathered from the four years of implementation of the PPPs will be key to shape the implementation of future contractual PPPs foreseen under Horizon 2020.

This report details the third impact assessment workshop and it outlines the evidence of impact provided by current EeB projects, the technical and non-technical challenges projects face, the potential to maximise impact through cluster activities and the lessons learnt from the experience to date.

## 1.1 Objectives

The workshop aimed to provide evidence of the role of the PPP leveraging industry investment, achieving EC political targets and generating innovation. In addition, the two day event captured lessons learnt from the implementation of the PPP instrument during the period from 2009 until 2013.

The objectives of the workshop can be captured in three keywords:

- **Impact:** Assessing the impact of the PPP in making construction industry more competitive and facilitating access of new knowledge to market for the benefit of society.
- **Synergies:** Exploring what can be done at PPP level and the opportunities derived from project clustering and cross-project collaboration.
- **Learning:** Sharing experiences from the four years of implementation of the PPP.

## 1.2 Background

The EeB PPP is a joint initiative of the EC and the 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 across Europe. The EeB PPP is not just a financing instrument, but also an effective mechanism of dialogue between industry and the EC services and it is being implemented in a true, positive partnership.

E2BA was founded in November 2008 as a spin out of the European Construction Technology Platform to help the construction industry reach the 2020 targets and achieve energy neutral buildings and districts by 2030. The vision of the E2BA by 2030, which is presented in its multiannual roadmap update, is to significantly increase 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.

The E2BA gathers large companies, SMEs, research centres and academic institutions and relevant stakeholders interested in RTD in energy efficient buildings and district. E2BA has also been liaising with member states and with other related national initiatives through the National Liaison Points network.

After extensive stakeholder consultation, the E2BA is currently finalising the new multiannual roadmap for the period 2014-2020 which provides the stakeholder's research and innovation priorities for a potential contractual EeB PPP under Horizon 2020. The roadmap is focused on to 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

### 1.3 Methodology

Directorate General (DG) Research organised this two day event, which gathered at least one representative from most of the funded project from the 2010, 2011 and 2012 calls. Members of E2BA and the AIAG as well as EC representatives were also taking part. (See Appendix 1 for the agenda and Appendix 2 for a list of pre-registered attendees).

The workshop started with three parallel sessions covering clusters of projects from different call topics. The objective of the sessions was to assess the achievement of the expected impacts and of potential benefits of clustering. The sessions were scheduled as follows:

Session 1: Development of new technologies in EeB – 24 projects in 9 call topics

Session 2: ICT for energy efficient buildings – 23 projects in 5 clusters (Building information modelling, Sensors and appliances networks, Key performance indicators, Energy management, and Smart cities)

Session 3: Integration and demonstration of technologies for energy efficiency – 24 projects in 10 call topics

Each cluster of projects was introduced by describing the rationale and goals of the topic and the expected impact. Each project then presented its objectives, achieved and expected impact, activities for dissemination/exploitation and the link to the multiannual roadmap. Cluster presentations concluded highlighting the technical and non-technical cross-cutting issues and the possible synergies and benefits of clustering.

The first day concluded with a networking reception where there were ample opportunities for participants to interact.

The second day kicked-off with presentations from Lorenzo Vallés and Herbert von Bose from DG Research. Luc Bourdeau spoke on behalf of the E2BA on industry viewpoints on PPP impact. Four high performing projects were selected as success stories to present and share experiences with participants.

The presentations were followed by two panel discussions chaired by Lorenzo Vallés. The first one covered the topic of increasing impact through synergies and cluster activities. The second one was focused on gathering the lessons from the four years of implementation of the EeB initiative. The panel discussion was seeded by preset questions which are listed in Appendix 3.

Participating panellists are listed below for Panel 1:

- Henri Obara, Schneider Electric
- Maria Moragues, Tecnia
- Juan Manuel Mieres, Solintel
- Claudia Dankl, OGUT

And for Panel 2:

- Bruno Smets, Philips
- Roland Göttig, Fraunhofer
- Agnieszka Lukazewska, FASADA
- Christian Mastrodonato, ICT4E2B

The workshop closed with final statements from industry and the Commission services.

## **2 Impact of the EeB PPP – overview of projects**

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72 clustered projects were presented in 3 parallel sessions. They provided details of project goals and expected or achieved impact. They also presented on activities for dissemination, technical and non-technical cross-cutting issues and possible synergies and benefits of clustering. The following sections detail what was presented and discussed during the three parallel sessions.

### **2.1 Development of new technologies in EeB**

During this session 24 projects were presented, corresponding to 9 call topics (see agenda in Appendix 1 for the list of call topics).

The projects targeted a range of different objectives including:

- Development of multifunctional and nanotechnology supported materials/products
- Development of measurable/controllable products
- Development of bio-based materials
- Optimisation of material combinations
- Integration of wastes (recycling)
- Development of indoor monitoring tools and systems
- Development of solutions for heat generation and storage
- Development/improvement of methodologies

For all the technologies under development, the main aim was to improve material, product and technology characteristics in a cost effective way whilst ensuring a safe, healthy and comfortable environment. New technologies should reduce energy consumption and GHG emissions, reduce embodied energy and improve durability. Ultimately, the aspiration is to deliver new, integrated and sustainable design possibilities that offer easy installation and maintenance and can be applied in new and existing buildings.

There were also 4 other Coordination Support Action (CSA) projects with complementary targets to those above:

- Geo-clustering and creating of mapping tool
- Preparing guidance for the use of EE technologies
- Creation of a common knowledge platform
- Providing rules for uniform Life Cycle Assessment (LCA) studies for E2B projects
- Providing guidance material to ease the use of LCA
- Developing a framework for knowledge management and transfer within the value chain
- Developing smart phone applications

Projects dissemination is strongly supported and driven by industrial partners. They follow the usual dissemination routes such as websites (downloadable content, tools), technical and scientific publications, workshops, training seminars, lectures, participation in fairs, conferences and exhibitions, targeted campaigns to key stakeholders, etc. Demonstration activities are also a key part of projects in this session to bring products to prototype stage and promote research outcomes.

Regarding research results exploitation, projects are exploring the challenges of standardisation and developing test procedures. Some like HARWIN are applying for IP protection for resulting products.

## Cross-cutting issues

Technical cross-cutting issues among the projects that should be taken into account to increase the overall impact included:

- Common measurements, performance testing, calculations and standardization processes
- Evaluation of materials/products for long term performance
- Simple and robust system control and monitoring
- Possible different technologies and product combinations
- Composite material issues (recyclability, integration)
- Ease of application of the new products
- Cooperation within case studies
- Requirements/norms for implementation into energy efficient buildings
- LCA and labelling

Non-technical cross-cutting issues to consider in order to increase overall impact include:

- Psychological barriers and perceptions of the new materials or technologies e.g. high-tech products, recycled products and their acceptability by customers
- Common cluster and dissemination activities - addressing politicians, legislation and end users
- Lack of homogeneous knowledge across Europe: data, regulations, best practices
- Market study, cost-efficiency and business models
- Costs for demonstration on real-scale buildings

## Synergies and benefits of clustering

Regarding clustering activities they can add value to the project in different ways:

- Organizing joint actions - demonstration on real-scale buildings, presence at fairs and dissemination events.
- Providing greater weight and authority at the events (cross-sector or cross-industry presence)
- Presenting a holistic approach in energy efficiency and sustainability of buildings
- Identifying solutions to common problems
- Creating a common framework of analysis and research approach to initiatives in the same field
- Networking with different types of organisations and sharing of information.

Clustering activities can help exploitation of results after the project ends by:

- Involving European organizations, platforms, etc.
- Organizing joint promotion actions (brochures, videos)
- Organizing joint demonstration fields (Demo parks)
- Increasing the awareness about the projects among larger audience
- Setting up cross-project commercial partnerships
- Exchanging recommendations for guidelines, regulations and policies
- Creating a “Cluster brand image”

Projects in this session presented good experiences on a shared Demo Park that enabled joint activities, dissemination cost sharing, addressing logistic issues, etc. There is appetite to initiate broader clustering between projects from different calls with the same challenges, between projects of past and current calls and between CSAs and research projects. In order to improve clustering, it could be included in the description of work and ensure good coordination of CSAs and their network.

## 2.2 ICT for energy-efficient buildings

This session included 23 projects in 5 clusters. The clusters were:

### 1. Building Information Modelling (BIM) (4 projects)

The use of BIM in energy efficient buildings enables energy efficiency modelling at the design phase. The main objective of BIM is to create a model that embraces the whole Lifecycle Energy Management of a building: design, construction, fabrication procurement, operation and post-occupancy. It is expected, that through the integration across the different stages, the following benefits will be attained: earlier and more accurate visualizations of a Construction Design, consistency of all building representations, earlier and better communication among project team members (designers, consultants, clients, contractors and fabricators), better integration of building Energy Performance models and analysis (engineering services, such as structural, Energy profiling and energy analysis) in the Construction Design stage, improved Energy Efficiency and sustainability, earlier detection of design errors and omissions, better quality building, lower costs, reduced project duration, improved managing of the building maintenance and operation, supporting non-standard fabrication procedures (design for fabrication), better managing and operation facilities, integration of facilities operation and management systems.

### 2. Sensor and Appliances Networks (4 projects)

Projects in this cluster relate to product development and testing. Business models are being studied for the exploitation of products such as low power units for HVAC, powering sensors, sensors for fault detection, sensors for energy management, etc. Research challenges are being explored in a variety of settings including airports, metros, campus, etc.

### 3. Key Performance Indicators (3 projects)

The focus of this cluster is to develop a set of common metrics. The use of sensor and actuator networks and the integration of pre-existing energy ICT systems are key issues in these projects, which aim to develop a standardised self learning architecture. Intelligent systems can be applied to facilities management and beyond.

### 4. Energy Management (6 projects)

Projects focus on energy efficiency of buildings, neighbourhoods, public spaces and urban and rural areas. Research is addressing the need to base business decisions on real-time granular data. Some projects are building open platforms that can be used by public authorities to monitor and manage key indicators & energy control in neighbourhoods. Others are developing decisions support systems for building managers to improve energy efficiency and manage risks. Projects in this cluster aspire to predict energy demand at different levels of granularity i.e. region, country, energy distribution operator, city, business and household. Innovative approaches explored include the use of acoustics for energy management

### 5. Smart Cities (5 projects)

The key questions for projects in this cluster are: how we manage energy efficiency at district level and how we put energy efficiency into *smart*. Projects have a strong neighbourhood focus and are developing energy management and decision support systems e.g. data-driven approaches to improve building control and the management of district heating. Other projects are exploring neighbourhood energy management tools to optimise energy production and consumption. As part of this cluster, there is a CSA project (ICT4E2B Forum) which focused on maintaining a stakeholder community and on developing a research roadmap. The roadmap shows how technology can be developed and used to enable energy efficiency at a neighbourhood level and it includes tools for design, intelligent control, user awareness and decision support, energy management and trading and integration technologies

## Cross-cutting issues

Technical Cross-cutting issues that need to be considered in order to maximise impact include:

- Development of cost effective solutions for products and systems
- Modelling and simulation of neighbourhoods
- Standardisation & ontologies to provide interoperability of the systems
- Open standards that provide more flexibility to support the growing systems
- Quality data provision to sustain the quality of the application beyond the project lifecycle
- Validation methodologies that are comparable to others and can provide relevant data
- Utilising the evidence from pilots to feed into scenarios in different projects
- Development of open platforms
- Data integration, big data, operation in the cloud and the connection to the internet of things

Non-technical cross-cutting issues include:

- Cross discussions and joint working
- Holistic understanding of behaviour change to better engage the citizen
- Understanding that there is a common target audience to reduce competition between projects
- Opening up markets and integrating products from different vendors
- Developing new business models for different stakeholders
- Providing mechanisms so that projects running longer lead newer ones

Integration at a larger scale is still a challenge that needs to be addressed to enable smart cities, as well as interactions and inter-relations between different aspects. For these projects the dream is plug and play.

## Synergies and benefits from clustering

Cluster activities can add value to projects through:

- Developing new approaches to evaluate scenarios and energy efficiency-workflow constraints
- Enriching the vision of the whole neighbourhood model over an open source GIS Server
- Improving data exchange format, methodologies and protocols for the use of semantic based information exchanges
- Building on common design activities e.g definition of data sets, sensors accuracies, data transfer, data handling, etc.
- Developing handbooks with guideline on monitoring strategies
- Contribution to a common Ontology
- Definition of common metrics/KPIs for energy efficiency valid across Europe

Cluster activities also help exploitation of research results after the end of the project through:

- Influencing the development and promotion of standards and protocols to improve adoption of BIM at building and neighbourhood level
- Contributing to the market penetration of novel ICT solutions
- Publishing success stories
- Applying project results in case study sites of other projects
- Maintaining demonstration installations and evaluating long term performance

## 2.3 Integration and demonstration of technologies for energy efficiency

This session captured the achieved and expected impact of 24 projects under 10 call topics clustered in 5 different themes.

1. Research and development of technologies for energy efficiency, building interaction and integration with energy networks at district level. (4 projects)

Projects under this theme are researching the development of energy generation technologies at district scale such as a micro-Combined Heat and Power (CHP) system based on Solid Oxide Fuel Cells (SOFC) and energy from waste solutions. Development of advanced thermal storage is also being studied (e.g. Thermo Chemical Storage, solar road collector and thermo-active foundations) as well as external thermal insulation components and district heating pipes. Smart energy management tools such as matching supply and demand of electricity and heat enabled by wireless communication system is also a key goal to manage an integrated complete solution for districts. Projects are also exploring new business models to enable a new integrated concept of interconnectivity between buildings through distributed energy resources, grids and other networks at district level.

The impact of projects under this theme is being achieved through demonstrators, 8 full-scale and one at lab-scale (Poland, Italy, France, Greece, UK and Belgium). Primary energy demand of the district is being reduced from 20% to 60% and net energy costs are being optimised. Very dynamic dissemination activity has already led to patent application and a large number of publications (more than 20 scientific papers for one project).

2. Research and development of new technologies for building energy efficient retrofitting (5 projects).

Projects under this theme are studying the development of standardized systemic renovation packages and methods including multifunctional prefabricated elements and technical box. An example of these are use of expanded and synthetic perlite as a loose filler for cavity wall insulation and use of a combination of textile membranes, plasters and coatings for inner envelope retrofitting. Supervision and evaluation of the integration of new technologies into buildings through the use of building simulation is part of the goal for this call in addition to the development of SME friendly procedures for the assessment of the best building retrofitting solutions and for their optimized production system.

In terms of impact, these projects feature 23 demonstration sites addressing different building types and climatic zones some achieving building consumption lower than 50 kWh/m<sup>2</sup>/y and around 40% of average energy saving. Industrialization of the solutions through prefabricated kits, simplified auditing and decision making tool and a comprehensive solutions performance database will support ease of deployment. Acceptability of users is being achieved through cost-effective, easy-to-install solutions with a maximum payback period of 7 years.

3. Research and development of new technologies for Cultural Heritage building and district energy efficient retrofitting (2 projects)

The goal of this topic is to adapt existing solutions to the specific issues of historic buildings and define new technology strategies and products, such as: new window prototypes, low impact ventilation systems, compact HVAC, high efficiency capillary active insulation and other advanced materials. Other good examples include technical guidelines and tools for the multidisciplinary analysis and design approach, methodologies and criteria for selecting and prioritizing interventions and building management systems.

Several demonstrator buildings and 7 case studies at district level illustrate the potential impact of the research. Projects show the feasibility of factor 4 to factor 10 reduction in energy demand and reduction of GHG emissions in historic cities up to 25%. Reduction of waste and resources consumption by the reuse of historic structures is also an element of impact.

4. Demonstration of Energy Efficient systems for individual building retrofitting, for new buildings and renovation of cities and districts (10 projects)

These projects focused on the development of common methodologies to address energy efficiency building projects using BIM, integrated project delivery and other tools for integrating the whole value chain. Optimization and integration of advanced energy saving, energy use and energy generation systems such as insulation, industrialised components for retrofitting, advanced HVAC and management systems and distributed energy generation are key to achieve the goals of projects under this theme. In addition, monitoring and performance evaluation systems are important to provide clear economic evidence of the value of investment in energy reduction in existing buildings. Besides the technical research it is fundamental to study financial schemes and new business models alongside guidelines and tools that are applicable throughout the EU countries to set the basis for massive replication.

In total the 10 projects will deliver 44 demonstration sites, 600,000 m<sup>2</sup> of efficiently renovated buildings or nearly zero new buildings. That means over 4,000 new or renovated dwellings and more than 5,000 citizens involved. This in turn has avoided over 10,000 tCO<sub>2</sub> emissions. Projects have a strong focus on user engagement to minimize technical and social disturbance for users and they involve decision makers and public institutions. The demonstration sites were:

- 17 full scale demonstrators for individual building deep retrofitting (residential buildings, schools, etc), reducing the heating energy use over 75 %
- 14 demonstration sites for new buildings where primary energy consumption is lower than 60kWh/m<sup>2</sup>/y or even near zero energy for different building types and locations
- 13 districts (FR, ES, SE, NO, AU, FI, DE, SK, IT, TK) (i.e. around 500,000m<sup>2</sup>) showing between 35 and 85% energy saving

## 5. Development and validation of new processes and business models for energy efficient buildings (3 projects)

The objective of these projects is to exploit the market trend of Collective Self-Organised (CSO) housing for energy-efficient neighbourhoods. In order to do that an SME EeB product-service providers network is established and supported by an e-Marketplace. Projects are developing performance-based models for retrofitting projects depending on the typology of the building, the ownership scheme, the best technology to use for energy efficiency, the national and regional funding schemes, the fiscal incentives, etc. Impact of these projects is materialising through the interaction with real flagship projects in new districts (Lancaster Cohousing, UK and Erasmus Field, the Hague, NL) and district retrofitting (Raab-Sol, Győr, HU and Zelena Usporam, CZ).

Projects are developing economic, organizational and social innovation solutions by proposing new business performance-based models that will boost the market of the energy-efficient solutions in retrofitting projects.

### Cross-cutting issues

Technical Cross-cutting issues that need to be considered in order to maximise impact include:

- Generation and exchange of common cost-effective solutions for specific building typologies
- Knowledge share with decision makers and planners e.g. technical support for tender contest of public buildings
- Guidelines to improve the acceptance of innovative solutions by end-users, public building administrators, real-estate owners, etc.
- Metering and verification systems to be implemented to assess the effectiveness of the retrofitting
- Availability of non-confidential data, to populate the decision support tools, and therefore enable “cross-project” solutions identification
- Capture feedback related to demonstration activities for facades across Europe with particular reference to user behavior and acceptance and low intrusive approaches as well as business models and strategies to reduce return on investments
- Technical results evaluation
- Benchmarking monitoring strategies and parameters
- The use of BIM methodology and tools in the building’s design as well as development of guidelines and recommendations to boost the use of BIM models
- Promotion of labels adoption by future projects
- Development of a methodology for a systemic approach for energy efficient district retrofitting
- Standardized energy performance evaluation procedures for district energy performance
- Context-sensitive identification of most widely accepted retrofitting techniques
- Common monitoring data structure and results sharing between the different projects

Non-technical cross cutting issues that need to be considered to maximise impact include:

- Sharing of business models and web platform market opportunities
- Collaborative networks to share ideas
- Development of benchmark systems
- Sharing experiences on tenant involvement strategies
- Limiting disturbance for tenants/users during construction
- Accessing credit for private and public sectors and financial schemes
- Share policies and regulation information to support impact strategies
- Development of joint activities for dissemination
- Standardisation by joint efforts

### **Synergies and benefits of clustering**

For demonstration projects, clustering is adding value by:

- Demonstrating potential for replication
- Showing decision makers the need for energy efficient renovation
- Promoting environmentally friendly retrofitting solutions/services/business
- Increasing awareness and visibility
- Reducing risk of failure
- Exchanging public information for a more efficient use of resources
- Improving decision support tools through sharing results
- Sharing demonstration sites for economic efficiency and larger impact

Clustering activities can also help exploitation of research results in a number of ways:

- Collaborating and networking can help dissemination and creation of new services
- Developing best business strategies collaboratively
- Collaborating for standardisation
- Exchanging information about markets, technology trends, user acceptance, policies and regulation
- “Filling the gap” – missing expertise in own network
- Improving the branding for the sector – attracting employees to the construction sector
- Adding value to participant portfolios

This parallel session also contributed with a number of questions and issues for debate. These questions are listed in Appendix 3 and they may serve as reference for future impact events.

## 3 Success stories

Four success stories from different topic areas were selected to present on their achievements and generated impact to date. These projects shared best practice on product creation, dissemination, end-user engagement, clustering across projects and working towards standardisation. This section will provide details of their accomplishments.

### **3NCULT, Efficient energy for EU cultural heritage**

[www.3encult.eu](http://www.3encult.eu)

Coordinator: EURAC

3NCULT demonstrates the feasibility of “Factor 4” to “Factor 10” reduction in energy demand of historic buildings, depending on the case and the heritage value.

Key achievements include the development of several prototypes including conservation compatible windows, enhanced internal insulation and low impact ventilation. Application and solution guidelines and diagnosis and planning tools are also key deliverables. Besides the technical development, one of the most significant advances is the approach for communication across disciplines.

A multidisciplinary design approach has been developed from diagnosis through design to documentation and monitoring. Collection and simultaneous visualisation of data on conservation compatibility and energy saving potential is a fundamental issue for. 3NCULT has come up with a successful approach to do this. The project has collaborated with the BUILD UP project to capture the energy efficiency solutions developed in a virtual library.

3NCULT has also put strong emphasis on participating in standardisation bodies for the elaboration of appropriate standards for heritage buildings.

### **BEEM-UP, Building energy efficiency for massive market uptake**

[www.beem-up.eu](http://www.beem-up.eu)

Coordinator: Acciona Infraestructuras

BEEM UP focuses on developing and demonstrating cost-effective and high performance renovation of existing residential multi-family buildings, drastically reducing the energy consumption (space heating: 77%, hot water: 45%, lighting: 42%).

The project is built around 3 demonstration sites in Sweden, The Netherlands and France with 300, 108 and 87 apartments respectively. A common methodology for refurbishment has been developed evaluating refurbishment scenarios on the basis of energy savings, investment costs and impact of tenants. Then the selected scenarios undergo optimisation and planning.

BEEM UP is an example of best practice in the involvement of tenants and building owners in the research project. Partners have worked to set their expectations, engage tenants in the project and keep them updated on progress. This has worked well across the three sites and in one case tenants have even built their own website.

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

[www.fc-district.eu](http://www.fc-district.eu)

Coordinator: Mostostal

FC-DISTRICT optimizes and implements an innovative energy production and distribution concept for sustainable and energy efficient districts exploiting decentralized co-generation coupled with optimized building and district heat storage and distribution network targeting reduction in annual primary energy consumption at district level up to 60%.

Key achievements have been the development of 5 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:

- 1) Micro-CHP System based on SOFC contributing to reduce emission through a more efficient and flexible approach of dispersed co-generation. There are several project partners planning to commercialise the new components.
- 2) 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.
- 3) 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.
- 4) 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.
- 5) 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.

### **HESMOS, ICT platform for holistic energy efficiency simulation and lifecycle management of public use facilities**

<http://hesmos.eu/>

Coordinator: TU Dresden

The resulting product of the HESMOS project is an Integrated Virtual Energy Lab (IVEL). It is an open platform with standardized interfaces providing a BIM-based energy related data management platform. It provides the basis for exchangeable energy calculations, CAD. Monitoring and facilities management tools. The platform is an information management repository for building and energy life cycle and it acts as a sustainable simulation and monitoring lab.

One of the key achievements of this project has been the development of a number of products and the steps taken towards standardisation of resulting products:

- 1) Extending BIM-CAD by web services to act as an open platform. IVEL enabling the study of design and retrofitting alternatives concerning energy performance and total costs.
- 2) Integrating advanced energy simulation tools into the design and facilities management (FM) process, so that BIM-CAD and FM tools can be used as building energy simulator and gap identifier.
- 3) Build an energy efficient BIM framework to extend the BIM model to visualize building performance in an easy to understand way that can quickly display impacts of changed building/space parameters. This would provide fast feedback of the impact of design parameters on lifecycle energy performance.
- 4) Integrated Delivery Manual (IDM) capturing an operational procedure. This manual has been taken up by the international industry standardisation community (buildingSMART) and has been accepted for recommendation for energy efficient BIM and to work out a more pragmatic IDM approach.

## 4 Synergies and cluster activities to increase impact

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The first discussion panel focused on how to encourage and support cluster activities and identifying the potential challenges that clusters may face. Several examples of best practice in clustering were highlighted and the role of the PPP was also explored. The questions that were raised for the discussion are listed in Appendix 4.

There is strong agreement that clustering activities across projects bring benefits beyond project delivery. However, IPR management, SMEs engagement and timescales for standardisation were challenges highlighted by panellists that need to be overcome to maximise the impact of clustering not only for R&D activities but also at the macroeconomic level.

IPR is a complicated issue but can be resolved by finding the right way of working and much of that depends on the attitude of the project coordinator and the exploitation manager. With exploitation and non-disclosure agreements in place, collaboration can take place by, for example, comparing results to a common reference model.

Members of the panel presented three examples of synergies and clustering best practice which are already happening:

- 1) Nano-E2B cluster where 6 projects have been working together from 2011. 52% of participants are industry. Projects are developing common dissemination activities and a joint Demo-park to compare demonstrations for mid-scale buildings. They hold regular meetings and projects have a joint exploitation agreement with the view of bringing industrial products closer to market.
- 2) Eracobuild where Member States worked to identify synergies across countries and develop common research calls.
- 3) Building-Up where 6 European Technology Platforms (ETPs) were participating to define common challenges and research priorities interesting for members from all platforms. ETPs then took the topics to members and identified 8 cross-platform issues.

Training and dissemination are recognised as the first and most obvious actions that can be promoted at cluster level by potentially jointly funding activities across projects. Regulatory clusters as well as bringing together all stakeholders and industrial enablers could help to avoid delays in exploitation. Following project completion, leadership of clusters would be a challenge that possibly ECTP could address provided there is funding in place. It would certainly be worth continuing joint participation at major EU events for broader dissemination as well as promoting clustering at impact workshops.

Support for this activity could come from umbrella projects for business awareness and exploitation to encourage product commercialisation. Access to other agencies and directories such as DG Enterprise would also help to push the needs of participants as a cluster.

The PPP plays a key role to maximise impact of project innovations. It has supported a culture of collaboration across industries and the engagement of other ETPs. The increased industrial participation translates into closer to market product development by large and small companies.

## 5 Lessons learnt from EeB implementation

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There are a number of lessons that can be drawn from the four years of implementation of the PPP. The second discussion panel focused on capturing these lessons and how to maximise impact of the PPP during Horizon 2020. Panellist and participants had a number of propositions and recommendations to enhance the impact of the PPP based on what has been learnt to date:

- Engage different stakeholders across industries to shape priorities so there is buy-in from the start
- Start clustering at the description of work level and link projects when they are at negotiation stage to improve knowledge exchange across projects
- Increase engagement of end-users in projects
- Develop solid exploitation strategies to reduce time to market considering the different needs of different countries and run exploitation seminars
- Improve dissemination by better promotion of successful demonstrators and obtaining support from the EC to present research results and prototypes at trade fairs
- Focus standardisation efforts where needed (not for every element of the project)
- Measure impact of projects with defined Key Performance Indicators (KPIs)
- Build a database of research results
- Ensure interoperability of solutions provided (ICT sector)
- Promote a better exchange of knowledge and promote innovation management (what is available on the market)
- Better define the expected impact of projects (ideally more market-oriented)

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.

The continuation of the PPP in Horizon 2020 received unanimous support considering the ambitious goals of the work programme, the evident market needs and the appropriate timing. However, complimentary actions and tools are needed with an evolutionary approach.

To ensure the highest industrial impact and leverage, the EC looks to industry to understand what the competitive advantages companies get from participating in the PPP are. The challenge of smart cities is too large for industry alone and the PPP is facilitating collaboration across industries and a diverse group of stakeholders.

The PPP also enables better dissemination of projects and this can be enhanced by participating in major fairs, better exploiting demonstration sites and engaging with politicians, local authorities, the covenant of mayors and Member States. Publications like the E2B Project Review produced by E2BA also help with promotion of both new products and the PPP.

Associations like E2BA can help support dissemination but also expand the role of the national platforms and facilitate networking with organisations outside the sector.

## 6 Conclusions and Recommendations

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The two-day event organised by DG Research aimed at assessing the impact of the PPP to date, exploring the benefits of clustering to enhance synergies across projects, and gathering lessons learnt from the four years of implementation of the PPP.

There is clear evidence of the success of the PPP leveraging private investment. Also, there is a dynamic, enthusiastic and growing community with high industry participation over 50% of which 30% are SMEs. So far, there are over 350 organisations participating and the increasing level of clustering activity demonstrates that industry is not doing 'business as usual'.

The different participating DGs from the EC confirmed their interest in continuing to work across services and with the building sector through the EeB PPP and they acknowledged the technical complexities behind energy efficient buildings.

However, there is a need to continue to demonstrate openness of industry and the E2BA and impact in the market by adoption of new technologies. The EeB community needs to work towards making project results better known to the broad public, demonstrating the step change that will be achieved with the €500m of EC funding and making a real change to energy savings in buildings.

E2BA believes that the PPP will bring long term impact through increased economic activity, job creation through a renewed more skilled workforce and a minimum depth of renovation to achieve 50% consumption reduction at an average 4% rate of renovation per year.

Past and current projects captured the specific challenges that need to be considered to maximise impact. Technical cross-cutting issues were specific to each project group whilst non-technical cross-cutting issues were common across all projects: more cost effective solutions, new business models, engagement in clustering activities, knowledge sharing and joint activities development.

The opportunity for project clustering was explored. There was agreement that clustering adds value by sharing solutions to common problems, exchanging best practices, joint dissemination and promotion of results and demonstrators and facilitating networking. It builds a brand for the sector whilst reducing risks and potential delays in exploitation. Regulatory and standardisation clusters could bring immediate benefit to projects. Leadership of clusters beyond project completion was identified as a challenge to consider. The Nano-E2B cluster is a good example of a successful cluster of 6 projects working together with a joint exploitation agreement in place.

The PPP approach has brought clear advantages to industry, SMEs, academia and research centres. It enables focused cross-disciplinary collaboration to develop cost effective solutions and improve the dissemination of research results. The community is excited about the prospect to continue the EeB PPP in Horizon 2020. E2BA has led the development of a new challenge oriented roadmap to guide future calls.

The following are a set of short (could be acted upon now) and medium to long term (from 2014 onwards) recommendations that emerged from the 2-day workshop to enhance clustering activity and build on the learning to date. These are suggestions for EeB projects, the EC or the E2BA to maximise the impact of the PPP:

#### Projects:

- Create a forum within which to discuss results and to obtain the views of stakeholders on prototypes and demonstrators (Medium to long)
- Hold workshops among dissemination leaders to identify common actions (Short)
- Engage different stakeholders across different industries to shape priorities so there is buy into results from the start (Medium to long)
- Increase engagement of end-users in projects (Short)
- Develop exploitation strategies to reduce time-to-market considering the different needs of different countries and run exploitation seminars (Short)
- Improve dissemination by better promotion of successful demonstrators (Short)
- Setting up cross-project commercial partnerships (Medium to long)
- Organizing joint demonstration fields (Demo parks)
- Exchanging recommendations for guidelines, regulations and policies (Short)

#### EC

- Provide access to other agencies and directories, such as DG Enterprise, which would also help to push the needs of participants as a cluster (Medium to long)
- Consider the continuation of cluster leadership after project completion (Short)
- Start clustering at the description of work level and link projects when they are at negotiation stage to improve knowledge exchange across projects (Medium to long)
- Provide support to present research results and prototypes at trade fairs (Short)
- Measure impact of projects with defined Key Performance Indicators (Medium to long)

#### E2BA

- Simplify the roadmap as the current scope is too broad for the amount of funding available (Short)
- Support dissemination but also expand the role of the national platforms and facilitate networking with organisations outside the sector (Medium to long)
- Build a database of research results (Medium to long)
- Organizing joint promotion actions e.g. brochures, videos
- Organise similar impact-type Workshops outside Brussels close to local stakeholders.

## Appendix 1 Agenda

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## Preliminary Agenda Workshop Impact of the Energy-efficient Buildings PPP

**Date and Place:** 12-13 March 2013, Brussels, Belgium

**Rapporteur for the event:** Marta Fernandez, ARUP

### 12 March, Tuesday

**Venue:** Centre Borschette, rue Froissart 36, Brussels

**13:30-14:00**      **Registration**

**14:00-14:30**      **Getting together in preparation of the parallel sessions**

#### **Parallel sessions - Rooms AB-3A, AB-3B, AB-3D**

**14:30-18:00**      **Presentations on the Impact of EeB PPP Projects (by topic)**  
Objective: Assessing the achievement of the expected impacts and of potential benefits of clustering

*(Coffee break 16:00-16:30)*

#### Session 1: Development of new technologies in EeB - 24 Projects in 9 Topics

Chair: George Katalagarianakis, EC, DG RTD

Rapporteur: Sabina Jordan, ZAG

Topics:

*EeB.NMP.2010-1 New nanotechnology-based insulation systems – 6 projects*

*EeB.NMP.2011-1 Materials for components with reduced embodied energy – 3 projects*

*EeB.NMP.2011-2 Solutions for energy generation, storage and use related to space heating and domestic hot water in existing buildings – 2 projects*

*EeB.ENV.2011.3.1.5-1 Technologies for indoor environment – 2 projects*

*EeB.NMP.2012-4 Nanotechnology for HVAC systems – 3 projects*

*EeB.NMP.2012-5 Novel materials for smart windows – 4 projects*

*EeB.NMP.2011-4 Geo-clusters approach (CSA) – 1 project*

*+ EeB.ENV.2011.3.1.5-2 Life Cycle Assessment studies of the EeB Initiative (CSA) – 1 project*

*+ EeB.NMP.2012-6 Knowledge transfer within the value chain (CSA) – 2 projects*

Session 2: ICT for energy-efficient buildings - 23 Projects in 5 Clusters

Chair: Rogelio Segovia, EC, DG CONNECT

Rapporteur: Martine Tommis, Manchester City Council

Clusters:

*1 – Building Information Modelling (4 projects)*

*2 – Sensor and Appliances Networks (4 projects)*

*3 – Key Performance Indicators (3 projects)*

*4 – Energy Management (7 projects)*

*5 – Smart Cities (5 projects)*

Session 3: Integration and demonstration of technologies for energy efficiency - 24 Projects in 10 Topics

Chair: Patrice Millet, EC DG RTD

Rapporteur: Jesus Isoird, ACCIONA

Topics:

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

*EeB.ENV.2010.3.2.4-1 Solutions for energy efficiency of historic buildings in urban area – 1 project*

*+ EeB.ENV.2012.6.6-2 Solutions for energy efficiency of historic buildings, in particular at urban district scale – 1 project*

*EeB.ENERGY.2010.8.1-2 Demonstration of Energy Efficiency through retrofitting of buildings – 3 projects*

*EeB.NMP.2011-3 Technologies for building envelope retrofitting – 2 projects*

*EeB.ENERGY.2011.8.1-1 Demonstration of very low energy new buildings – 4 projects*

*EeB.NMP.2012-1 Interaction and integration between buildings, grids, heating and cooling networks and energy storage and energy generation systems – 2 projects*

*EeB.NMP.2012-2 Systemic approach for retrofitting existing buildings – 3 projects*

*EeB.NMP.2012-3 'Processes and business models' for the next generation of performance based energy-efficient buildings – 3 projects*

*EeB.ENERGY.2012.8.8.3 Demonstration of nearly Zero Energy Building Renovation for cities and districts – 3 projects*

## **13 March 2012, Wednesday**

**Venue:** Centre Borschette, rue Froissart 36, Brussels

### **Plenary session – Room AB-0A**

**Chair:** José-Lorenzo Vallés, Head of Unit, DG RTD

- 9:00-9:10**            **Welcome and Objectives of the Workshop**
- 9:10-9:25**            **Energy-efficient Buildings and Horizon 2020**  
Herbert von Bose, Director, DG RTD, Industrial Technologies
- 9:25-9:40**            **Impact of the EeB PPP – Viewpoints of Industry**  
Luc Bourdeau, E2BA
- 9:40-10:30**          **Feedback on the parallel sessions**
- 10:30-11:00**        **Coffee break**
- 11:00-11:45**        **Success Stories**  
- FC-DISTRICT, Juliusz Zach, Mostostal  
- 3ENCULT, Roberto Lollini, EURAC  
- BEEM-UP, Juan Ramon Cuevas, ACCIONA  
- HESMOS, Prof. Raimar J. Scherer, Technische Universitaet Dresden
- 11:45-12:45**        **Panel/Roundtable discussion: How can synergies and cluster activities increase the impact of the EeB initiative?**  
- Henri Obara, Schneider Electric  
- Maria Moragues, Tecnalia  
- Juan Manuel Mieres, Solintel  
- Claudia Dankl, OGUT
- 12:45-14:00**        **Lunch Break**
- 14:00-15:00**        **Panel/Roundtable discussion: What lessons can be drawn from the four years of implementation of the EeB initiative?**  
- Bruno Smets, Philips  
- Roland Göttig, Fraunhofer  
- Agnieszka Lukazewska, FASADA  
- Christian Mastrodonato, ICT4E2B
- 15:00-15:30**        **Rapporteur's Summary & Conclusions**
- 15:30-15:45**        **Statement from the Private side of the EeB PPP**  
Paul Cartuyvels, Bouygues
- 15:45-16:00**        **Statement from the Public side of the EeB PPP**  
EC Representatives
- 16:00**                **End**

## **Session 1: Development of new technologies in EeB** **24 projects**

Topics:

*EeB.NMP.2010-1 New nanotechnology-based high performance insulation systems for energy efficiency – 6 projects*  
**NANOPCM, NANOINSULATE, HIPIN, NANOFOAM, COOLCOVERINGS, AEROCOINS**

*EeB.NMP.2011-1 Materials for new energy efficient building components with reduced embodied energy – 3 projects*  
**LEEMA, SUSCON, BIOBUILD**

*EeB.NMP.2011-2 New efficient solutions for energy generation, storage and use related to space heating and domestic hot water in existing buildings – 2 projects*  
**EINSTEIN, HEAT4YOU**

*EeB.ENV.2011.3.1.5-1 Technologies for ensuring, monitoring and/or controlling a high quality indoor environment particularly in relation with energy-efficient buildings – 2 projects*  
**INTASENSE, CETIEB**

*EeB.NMP.2012-4 Nanotechnology based approaches to increase the performance of HVAC systems – 3 projects*  
**NANO-HVAC, ENE-HVAC, NANOCOOL**

*EeB.NMP.2012-5 Novel materials for smart windows conceived as affordable multifunctional systems offering enhanced energy control – 4 projects*  
**WINSMART, SMARTBLIND, MEM4WIN, HARWIN**

*EeB.NMP.2011-4 Geo-clusters approach to support European energy-efficiency goals (CSA) – 1 project*  
+ *EeB.ENV.2011.3.1.5-2 Operational guidance for Life Cycle Assessment studies of the Energy Efficient Building Initiative (CSA) – 1 project*  
+ *EeB.NMP.2012-6 Methodologies for Knowledge transfer within the value chain and particularly to SMEs (CSA) – 2 projects*  
**GE20, EEBGUIDE, EE-WISE, ENBUS**

## **Session 2: ICT for energy-efficient buildings** **23 projects**

*1 – Building Information Modelling (4 projects)*  
**HESMOS, KNOHOLEM, ODYSSEUS, ORIGIN**

*2 – Sensor and Appliances Networks (4 projects)*  
**TIBUCON, SEEMSPUB, CASCADE, SEAM4US**

*3 – Key Performance Indicators (3 projects)*  
**SEEDS, BEAMS, EPIC-HUB**

*4 – Energy Management (7 projects)*  
**ENRIMA, SPORTE2, S4EEB, SKYNET, COOPERATE, E-PLUS, NRG4CAST**

*5 – Smart Cities (5 projects)*  
**IREEN, CAMPUS21, EEPOS, URB-GRADE, IDEAS**

**Session 3: Integration and demonstration of new technologies**  
**24 projects**

Topics:

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

**FC-DISTRICT, E-HUB**

*EeB.ENV.2010.3.2.4-1 Compatible solutions for improving the energy efficiency of historic buildings in urban area – 1 project*

+ *EeB.ENV.2012.6.6-2 Concepts and solutions for improving energy efficiency of historic buildings, in particular at urban district scale – 1 project*

**3ENCULT, EFFESUS**

*EeB.ENERGY.2010.8.1-2 Demonstration of Energy Efficiency through retrofitting of buildings – 3 projects*

**E2REBUILD, SCHOOL OF THE FUTURE, BEEM-UP**

*EeB.NMP.2011-3 Energy saving technologies for building envelope retrofitting – 2 projects*

**MEEFS, EASEE**

*EeB.ENERGY.2011.8.1-1 Demonstration of very low energy new buildings – 4 projects*

**NEXT BUILDINGS, BUILDSMART, NEED4B, DIRECTION**

*EeB.NMP.2012-1 Interaction and integration between buildings, grids, heating and cooling networks and energy storage and energy generation systems – 2 projects*

**AMBASSADOR, RESILIENT**

*EeB.NMP.2012-2 Systemic approach for retrofitting existing buildings, including envelope upgrading, high performance lighting systems, energy-efficient HVAC systems and renewable energy generation systems – 3 projects*

**RETROKIT, HERB, INSPIRE**

*EeB.NMP.2012-3 Development and validation of new 'processes and business models' for the next generation of performance based energy-efficient buildings integrating new systems – 3 projects*

**PROFICIENT, UMBRELLA, NEWBEE**

*EeB.ENERGY.2012.8.8.3 Demonstration of nearly Zero Energy Building Renovation for cities and districts – 3 projects*

**ZENN, R2CITIES, EU-GUGLE**

## Appendix 2 List of registered participants

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First name	Last name	Project	Organisation name
Olaf	Adan	AIAG	TNO
Lola	Alacreu	Skynet	ETRA I+D
Samuele	Ambrosetti	GE20	D'APPOLONIA
Christian	Artelt	AIAG	HeidelbergCement
Yasmine	Assef	COOPERATE	EMBIX
Yasmine	Assef	COOPERATE	EMBIX
Lenka	Bajarova	AMBASSADOR	AMIRES
Carlos	Barcena	AIAG	DRAGADOS
Rob	Bell	INTASENSE	C-Tech Innovation Ltd NCC Construction Sverige
Birgitta	Berglund	E2ReBuild	AB
Javier	Bescos	URB-Grade	Fenie Energia DNV KEMA Energy & Sustainability
Yvonne	Boerakker	NEXT-Buildings	Sustainability
María José	Bohórquez	ee-WiSE	Intromac Tecnalia Research & Innovation
Sergio Saiz	Bombin	EINSTEIN	Innovation
Luc	Bourdeau	AIAG	CSTB CIRCE - Centro de investigación de recursos y consumos energéticos
Elena	Calvo	NEED4B	consumos energéticos
José	Campos	AIAG	TECNALIA
Jose María	Campos	ZenN	TECNALIA
Stefano	Carosio	AIAG	D'Appolonia
Paul	Cartuyvels	AIAG	Bouygues
Lawrence	Chee	HIPIN	Orient Research
Paolo	Corvaglia	SUS-CON	CETMA National University of Ireland in Galway
Andrea	Costa	CASCADE	Ireland in Galway
José	Cubillo	NANOPCM	ACCIONA
Juan	Cuevas	BEEM-UP	ACCIONA
Claudia	Dankl	Building Up	Ogut Teesside University -
Nashwan	Dawood	IDEAS	TFI/CCIR
Antonio	De Ferrari	CoolCoverings	D'APPOLONIA Tecnalia Research & Innovation
Andoni Diaz	de Mendibil	NANOCOOL	S&B Industrial Minerals S.A
Christos	Dedeloudis	LEEMA	S.A
Javier	del Pozo	NewBEE Nano-E2B-Cluster (of projects NanoPCM, COOLCoverings, NanoInsulate, Aerocoins,	TECNALIA
Marcel	Dierselhuis	Hipin and NanoFoam)	pentri
Angel	Diez	AIAG	Mondragon
Piotr	Dymarski	TIBUCON	Mostostal Warszawa S.A.
Roberto	Fedrizzi	INSPIRE	EURAC

First name	Last name	Project	Organisation name
Bruno	Fies	Odysseus	CSTB
Carla	Finocchiaro	HEAT4U	Cf Consulting
Anna	Florea	URB-Grade	Tampere University (TUT) Materials Testing Institute – MPA, University of Stuttgart
Jürgen	Frick	CETIEB	ACCIONA
Mónica	Garcia	NanoPCM	FCC CO
Ricardo	García	AIAG	CEIT
Gemma	Garcia Mandayo	INTASENSE	ACCIONA
Monica	Garcia Ortega	NANO-HVAC	CARTIF Technological Centre
Rubén	García Pajares	R2CITIES	Swerea IVF AB
Karin	Garmer	ENBUS	University Bayreuth
Thorsten	Gerdes	HarWin	COFELY ITALIA S.p.A
Alberto	Giretti	SEAM4US	Fraunhofer
Roland	Göttig	AIAG	KERABEN GRUPO, S.A.
Luis	Guaita	CoolCoverings	Danish Technological Institute
Jacob Ask	Hansen	EnE-HVAC	D'Appolonia SpA
Giammario	Incao	EPIC-HUB	ACCIONA
Jesus	Isoird	AIAG	CIRCE - Centro de investigación de recursos y consumos energéticos
María	Izquierdo	NEED4B	Lafarge
Pierre-Henri	Jezequel	AIAG	Cemosa
Noemi	Jimenez-Redondo	SEEDS	ZAG
Sabina	Jordan	AIAG	TNO
Frans.G.H.	Koene	E-hub	GREENNOVATE
Katharina	Krell	EU-GUGLE	VTT Technical Research Centre of Finland
Veijo	Lappalainen	EEPOS	EURAC research
Roberto	Lollini	3ENCULT	AIDICO
Angel	Lopez	AIAG	FASADA
Agnieszka	Lukazewska	EASEE	Politecnico di Torino
Enrico	Macii	SEEMPUBS	CENER
Florencio	Manteca González	EU-GUGLE	Solintel M&P, S. L.
Arturo	Marquina Abril	S4EeB	EDF
Alain	Marti	AIAG	D'Appolonia
Christian	Mastrodonato	ICT4E2B	IRUSE
Karsten	Menzel	CAMPUS 21	Solintel M&P, S. L.
Juan Manuel	Mieres	AIAG	TECNALIA
María	Moragues	AEROCOINs	E2B association
Joao	Moreira	GE20	CIRCE - Centro de investigación de recursos y consumos energéticos
Enrique	Morgades Prat	E+	Danish Technological Institute, Wood &
Niels	Morsing	WINSMART	

First name	Last name	Project	Organisation name
			Biomaterials
Björn	Nienborg	HEAT4U	Fraunhofer-Institute
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Giovanni	Pescatori	SEAM4US	COFELY ITALIA S.p.A
			VTT Technical Research
Isabel	Pinto Seppä	AIAG	Centre of Finland
Mirko	Presser	URB-Grade	Alexandra Instituttet A/S
Malcolm P	Rochefort	NanoInsulate	Kingspan Insulation Ltd.
Francisco	Rodríguez Pérez-Curiel	ZenN	TECNALIA
			DNV KEMA Energy & Sustainability
Rudy	Rooth	NEXT-Buildings	ACCIONA
Magdalena	Rozanska	MEEFS	Schneider Electric
Alfredo	Samperio	AMBASSADOR	CARTIF Technological Centre
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Sergio	Sanz Hernando	DIRECTION	AGC
			TNO
Raimar J.	Scherer	HESMOS	ETRA I+D
Niels	Schreuder	AIAG	University College London
Rizal	Sebastian	PROFICIENT	Environment Department, City of Malmö
Manuel	Serrano	BEAMS	POLYIMAGE
Afzal	Siddiqui	EnRiMa	Jozef Stefan Institute
			Philips
Michael	Sillén	Buildsmart	TECNALIA
Pierre	Sixou	SmartBlind	University of Nottingham
Maja	Skrjanc	NRG4cast	Manchester Digital
Bruno	Smets	AIAG	Development Agency
Mikel	Sorli	NewBEE	BRE
David	Tetlow	HERB	Intromac
			ECCREDI
Martine	Tommis	IREEN	University Bayreuth
Nick	Tune	KNOHOLEM	Fraunhofer-Institute for Building Physics
Raúl	Vega	ee-WiSE	Mostostal Warszawa S.A.
Joost	Wentink	AIAG	E2BA
Monika	Willert-Porada	HarWin	
Bastian	Wittstock	EeBGUIDE	
Juliusz	Żach	FC-DISTRICT	
Silvia	Zinetti		
Claudia	Boldrini		European Commission
Alexandre	D'Angelo		European Commission
Ekaterini	Hambouri		European Commission
George	Katalagarianakis		European Commission
Alexandros	Kotronaros		European Commission

First name	Last name	Project	Organisation name
Monique	Levy		European Commission
Adele	Lydon		European Commission
Patrice	Millet		European Commission
Giulio	Pattanaro		European Commission
Javier	Peinado		European Commission
Erik	Pentimalli		European Commission
Dominique	Planchon		European Commission
Luisa	Prista		European Commission
Mathias	Reddmann		European Commission
Rogelio	Segovia		European Commission
Lorenzo	Valles		European Commission
Herbert	von Bose		European Commission

## Appendix 3 Questions for debate from Session 3

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- 1) In the future PPP programme, it is expected to have a closer monitoring of the individual PPP projects in order to assess the impact and evolution of the PPP through Key Performance Indicators. From your experience, which KPIs would you suggest at project level and what are the barriers that could affect to an efficient monitoring of the KPIs?
- 2) PPP projects are showing a greater industrial participation, including SMEs, over 50%, compared to normal FP calls. In your opinion, which are the key factors that you consider essential for such a high participation of the industrial sector?
- 3) Dissemination is a key activity to increase the awareness and the knowledge based on the project achievements. How could the PPP help the individual projects to increase the dissemination level?
- 4) In the PPP programme, we see projects oriented to demonstration and research projects with a demonstration component. Demonstrators are an important asset for the PPP, therefore, how could the PPP increase their visibility?
- 5) Related to the demonstration activities, how are you engaging the relevant stakeholders for the future adoption of the technologies like public authorities, building owner and tenants? Are you using these demonstrators for training? Are you considering giving continuity to the demonstrators as show cases after the project conclusion?
- 6) The PPP programme should improve the market impact of conventional instruments. Taking into account, that the definition of the exploitation strategies is an internal activity of the projects, do you think that the PPP could contribute to improve this process? How?
- 7) Are you identifying new needs for standards in your project? Do you think that a coordinated action at PPP level, clustering project needs, would facilitate this process of identification and recommendation for new standards?
- 8) There are three projects working on the development of new processes and business models. Are you collaborating with the rest of PPP projects which are developing their individual exploitation strategies and business models? For the development of business models is critical the involvement of the actors of the value chain and a good knowledge of market conditions, how are you involving those stakeholders?

## Appendix 4 Panel Discussion Questions

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# PPP Impact Workshops March 2013

## Questions for the discussion panels

### Panel discussion 1

How can synergies and cluster activities increase the impact of the PPP initiative?

- 1) What activities bringing added value in terms of impact should be promoted at cluster level?
- 2) To which extent should cluster activities be supported by the public side and by the Associations?
- 3) Which cluster activities are still worth continuing after the end of the projects?
- 4) Can clustering bring problems with IPR and exploitation?
- 5) How can the PPP approach bring activities and synergies to help reach a greater overall impact than for just FP7 projects?
- 6) What is the impact of the PPP on achieving higher innovation?

### Panel discussion 2

What lessons can be drawn from the four years of implementation of the PPP initiative?

- 1) Has the PPP approach been advantageous for industry and in particular SMEs?
- 2) Is a PPP approach also interesting for academia and research centres?
- 3) Is there a justification to continue with this PPP in Horizon 2020 with similar goals?
- 4) How could the PPP ensure the highest industrial impact and leverage?
- 5) How can we achieve broader dissemination & stakeholder participation?
- 6) What could be the future role of the Associations in the PPPs?