

7 Appendices

7.1 Stakeholder Workshop on ICT Application Scenarios for energy efficiency in buildings 12 July

12 July 2011, Brussels, at 14.15 - 17.00

Project:	ICT4E2B Forum
Organisation:	D'Appolonia
Speakers:	Mercè Grierà i Fisa, DG INFSO Christian Mastrodonato, D'Appolonia Elisabetta Delponte, D'Appolonia Gloria Piaggio, Municipality of Genova Giselle Spano, ENEL Sorcha Edwards, CECODHAS Ruth Kerrigan, IES Cees Blok, IBM
Attendees:	70
Moderator/rapporteur:	Heidy van Beurden

1) Introduction

1.1 Objective of the workshop

ICT4E2B Forum organised its 5th Stakeholder Workshop on ICT Application Scenarios for energy efficiency in buildings on July 12th, 2011 in Brussels.

This workshop provided European stakeholders a better understanding of the context of the ICT4E2B Forum project (www.ict4e2b.eu) and allowed them to share their needs and vision for the technology roadmap prioritisation. In a closer dialogue with the stakeholders, the technical and non-technical gaps for prioritisation were identified, as well as the R&D topics that must be considered for future research and innovation priorities.

1.2 Context of the ICT4E2B Forum project

The ICT4E2B Forum project aims at the following objectives:

- Bring together the relevant stakeholders to identify and review the needs in terms of research and systems integration
- Update the REEB research roadmap, and create a technology roadmap focused on ICT for energy efficient buildings
- Promote the use and further development of ICT for improved energy efficiency of buildings

Workshops in different locations around Europe are organised to ensure that the technology roadmap takes into account the needs from the actors in the area of construction and building.

1.3 Set up of the workshop

- 1) A brief introduction by DG INFSO and the ICT4E2B Forum project team was given to provide the attendees an overview of the objectives of the project and that of this workshop.
- 2) The results from the 4 previous workshops were shared. Attendees were asked to fill in a form with their opinion on prioritisation topics for research & development, in the 5 thematic areas of:
 - Tools for Integrated design and Production.
 - Intelligent & Integrated Control
 - User awareness & decision support
 - Energy management & trading

- Integration technologies
- 3) The 5 stakeholder speakers represented different stakeholder groups (municipality, social housing, business, research). Each of them addressed their company/city/organisation vision on energy efficiency in the built environment, as well as the gap between the current situation and desired development in the future. Best practices were shared, including the identified success factors in these pilot projects. Each of the speakers focused on one of the 5 thematic areas as set out in the IT4E2B Forum project.
- 4) Round Table Discussion with the stakeholder speakers and the audience.

2) Stakeholders Presentations & Round Table Discussion

Each of the 5 stakeholder speakers focused on challenges, gaps and potential technical and non-technical solutions in their field of expertise; however, many of those issues overlapped the various stakeholder groups. The main challenges to be addressed were (i) the involvement of citizens/users, (ii) funding, (iii) a lack of regulation and (iv) a lack of long term strategic planning.

This section of the report shows a summary of the full workshop, with highlights from both the presentations and the round table discussion (section 2.1). The second part of this section consists of a summary of each presentation (section 2.2).

2.1 Summary

Citizens / end users

The speakers clearly divided the challenges and existing gaps in ICT solutions for the built environment, into those of people and those of capacities. Awareness and involvement of the citizens and end users was said to be key at all time. This is in line with the outcome of previous ICT4E2B Forum workshops. Involvement of communities in ICT solutions is a matter of demonstration impact and explaining how lives will be affected. It is *not* a matter of conviction. The human factor, which also implies stakeholder awareness, was seen as the most important differentiating element in successful pilot projects, with ICT being the facilitator.

Transparency is an important component of both stakeholder and citizen awareness. Change requires transparency, according to Mercè Griera i Fisa, although being transparent is something in which the ICT community has failed so far, she believed. It is also essential to address the issue of people being hesitant due to privacy issues and better insight in finance adds to address the challenge of funding.

Funding / Business models

Many EE solutions can be feasible, according to Gloria Piaggio from the Municipality of Genova, but banks must understand how their money is invested, which requires a different way to evaluate and monitor projects (in real time). To obtain more funding, we need figures on the table. We need accurate predicting costs and prove of results. ICT solutions such as building simulation are mentioned by Ruth Kerrigan (IES) as a tool to provide better insight in (cost) benefits over the longer term. For IBM, who believes there surely is a business case, analytics, monitoring and reporting are essential.

While a business model usually covers a shorter period of time than that of a building, we need a new business model and new stakeholders. This requires flexibility in tools, however, at the same time solutions need the right level of detail.

Viable business cases for ICT applications in buildings were discusses beyond the economic issues. User awareness and transparency are strong components to build on, as well as political and social will. Attendee Peter Visser from Philips pointed out that payback time is not the issue, but predictability of energy prices and measures such as emission schemes in the coming years. Because we don't oversee all these differences in a few years' time, change of behaviour was said to be the starting point.

Regulation

Regulation by government, such as tax reliefs for applying ICT in buildings, was discussed as being crucial to give E2B a strong push forward. However, despite the need for a long term strategic planning and the need for regulation, there are energy savings to be gained right away. Providing people with tools to measure their energy use at work or at home could be an easy first step to be made, in line with the need for citizen awareness and involvement.

2.2 Stakeholder presentations

This short report is intended to summarise the identified gaps, challenges and potential solutions as pointed out in the stakeholders' presentations, as well as the ideas that were discussed during the round table discussion. This report does not describe any defined steps to move forward on the road to energy efficient buildings, but will certainly contribute to the process of the prioritisation of future research.

The complete presentations of the stakeholders can be found at: www.ict4e2b.eu

Mercè Grieria i Fisa, Project Officer DG INFSO, European Commission

She stressed the importance of bringing together all relevant stakeholders in the ICT, and the buildings and construction domains, to ensure that the research needs, as developed within the ICT4E2B Forum, are taken into account in the general technology roadmap developed for the PPP. However, this project serves as a forum to listen to a wider community, going far beyond PPP. Physical meetings with the stakeholders are only one element of the project; the electronic meeting place is as important.

She identified three areas to focus on:

- 1) data models to create a repository from different projects
- 2) a wiki for regional and local decision makers with implemented best practices
- 3) building research roadmap

This is in fact not a new process, but builds on the REEB project and updates the research needs in the area of E2B. She invited everyone to contribute to this process.

Christian Mastrodonato, Project team ICT4E2B, D'Appolonia

Christian Mastrodonato explained the audience the context of today's workshop and the need for understanding and prioritising R&D topics that must be considered to bridging the gap between ICT providers and the construction and built environment.

He stressed the fact that this project extends the work carried out in the REEB project, and how important it is to foster the discussion. 'We need the intervention and we need to look outside the usual environment', he said.

The first draft of key points of the discussion will be shared by October 2011.

Elisabetta Delponte, Project team ICT4E2B, D'Appolonia

Elisabetta Delponte gave a presentation about the forum methodology, the results of the 4 previous workshops and the prioritisation matrix attendees received at the reception desk.

She discussed the setup and highlights of the previous workshops that each focused on different thematic areas. For example, in the workshop about Energy management, there was a strong focus on the storage of energy systems and to exploit how to get the most out of these systems. User awareness was highlighted in all previous workshops, with social pressure and the role of communications being discussed.

With regard to the prioritisation matrix, Elisabetta Delponte explained how data will be analysed and the challenge of trying to understand what kind of standards are relevant. An overview was given of the evaluation criteria attendees can use for their prioritisation, such as the availability

of technologies/infrastructures and the economic relevance for stakeholders along the value chain.

Gloria Piaggio, Head of the Office for European Projects and Cooperation at the Municipality of Genova

Thematic area: Intelligent and Integrated Control

Gloria Piaggio explained the city's approach in stakeholders' engagement for their Association Genova Smart City in 2010. This initiative, with the objective of increased energy efficiency in public and private buildings, was received with great enthusiasm at all stakeholder levels in the city. Involvement of the citizens included students and small children, and companies were asked to show their commitment by paying for their membership of the Association. Piaggio addressed three ways of achieving their objectives: 1) Business & research (MoU's, list of smart actions); 2) Institutions (planning); 3) Communication.

The main challenges she identified were a lack of long-term strategic planning and funding. 'Many EE solutions can be feasible, but banks must understand how their money is invested', she said. 'This requires a different way to evaluate projects.' Monitoring in social housing is carried out with companies in pilot projects, to read what is actually happening instead of setting supposed priorities.

Giselle Spano, responsible for Energy Efficiency at ENEL

Thematic area: Energy Management and Trading

ENEL's E2B approach is based on the wider Smart City Initiatives in which buildings are experiencing an evolution path from energy consumers to energy producers. The main challenges she addressed are related to funding and evaluation. Solutions deployed at larger scale require a lot of investment. A replicable and structured finance model is therefore required, which includes preliminary evaluation of project financing schemes. According to her, the main gap lies within the area of smart grid regulation and tariff numeration, which is crucial to speed up investment.

Sorcha Edwards, Deputy Secretary General and Energy Coordinator at CECODHAS Housing Europe

Thematic area: User awareness

'What is blocking deployment at large scale?' was the question Sorcha Edwards raised. She tried to answer this question from a non-technical point of view. Recipes for success, according to her, include political will and figures on the table. 'You need accurate predicting costs and clear retrofit schemes', she said.

CECODHAS' priorities on E2B are strongly related to the human dimension and the implication of the citizen at all times, which 'implies more than handing out leaflets'. Edwards: 'We have to explain how lives will be affected, also during retrofit.' She addressed the importance of facilitating transparency between local levels and how ICT could eventually address that. The issue of people being hesitant due to privacy issues is also closely related to transparency and lack of information.

Ruth Kerrigan, Research Project Manager at Integrated Environmental Solutions (IES)

Thematic area: Energy Efficient Design

In sharing IES' vision on E2B, Ruth Kerrigan focused on an integrated approach of looking at buildings as groups and how to link them together: 'Can we use energy elsewhere to create an overall master plan?' Priorities are, according to her, map simulation with real time information and the automation of that process. She identified a long list of gaps in buildings, cities and across the EU, of which many come back to information that isn't there and how technologies link into decision making. On EU level, the gaps include common simulation and common

compliance tools. 'Although you can do anything with simulation, it all comes back to cost and telling people what it is about', she said.

Cees Blok, Business Development Manager at IBM

Thematic area: Integration technologies

In describing IBM's holistic view on buildings getting smarter, Blok said: 'sure, there is money to earn', a topic that was also addressed during the round table discussion in terms of viable business models and return on investment. According to Blok, analytics are essential for managing smarter buildings: monitoring, improvement, reporting. He believes that the main gaps lie in the interoperability between systems. A common view on system of systems is needed to avoid that integrated technologies won't work.

When asked about the difficulties to convince communities to use more ICT, he mentioned that the issue is not to convince, but to focus on the demonstration impact of what ICT will do before conviction.

2.3 Round Table Discussion

The audience was invited to propose on topics to discuss according to their own needs in their field of expertise. When no topics were raised, the chairman started the discussion by asking for good examples of return on investment and the essential elements of a viable business case. The economic relevance for stakeholders along the value chain is one of the evaluation criteria for prioritisation in the ICT4E2B Forum roadmap.

When talking about return on investment, metrics are difficult to be qualified, someone mentioned. Followed by the observation that payback time is not the issue; more important is the predictability of energy prices or emission schemes to come. Because we do not oversee those differences in a few years' time; changing our behaviour should be the starting point. Actions to change often come back to social will.

Stakeholder awareness was discussed in relation to the building design. ICT installed on a building gives a more direct understanding of energy efficiency. Can architects make the buildings more efficient? Devices on buildings were said to be the easiest case, because there are already methodologies and measurements in place. It's a matter of tuning up knowledge on that topic. At the same time, we have to take into account the risk of predicting outcomes: who is accountable if it doesn't work?

According to stakeholder speaker Ruth Kerrigan simulation models *do* show cost over time and therefore we are able to see return on investment. Mercè Grierà i Fisa, DG INFSO, points out that there is not such a business case in terms of return on investment, while a business case strongly requires social and cultural values and the involvement of users and citizens. This justifies the intervention of public powers through regulation and subsidies. She stressed the importance of being transparent to allow change to happen, in which the ICT community has failed so far, she believed. However, market failure up till now was questioned by the audience and differences between the US and European business cases were discussed, as well as the question whether successful business cases are driven by EE or other purposes.

Regulation by government, such as tax reliefs for applying ICT in buildings, was identified as a strong incentive to move things forward, as was the importance of measuring and identifying parameters and the right infrastructure to collect data.

An attendee from university stressed the fact that education is part of the game. 'What we need are projects with really young children, before they reach the high level business discussions', she said. The human dimension was identified as the most important differentiator in successful projects, and ICT being the facilitator. It is important to identify what the end user want. It was suggested to give people tools to measure within the company or at home, just to get started and not wait for all the pieces in the puzzle to be sorted out.

In the end of the session, the difficulties of a business model were once more discussed in light of the long life of buildings, more than over twenty years. While a business model usually covers a shorter period of time. This requires new business models as well as new stakeholders. It also requires flexibility in tools, however, at the same time solutions need the right level of detail. 'We will foster the discussion to find the right balance', said Christian Mastrodonato.

Orientations

Priorities to address in future work on the Technology Roadmap towards energy efficient buildings. Challenges, Gaps and potential Solutions.

People

Communication

- more awareness end user
- explain how lives will be affected (also during retrofit)
- it's a matter of demonstration, not of conviction
- (avoid) lack of information
- neutral information
- forum

Involvement

- knowledge management
- give people tools to measure (at work or at home)
- transparency
- do not undermine trust of users
- education / start with children
- social and cultural values
- aim of defending decent housing
- privacy issues

Mindset

- political/social will
- start acting step by step, do not wait for others
- client doesn't push beyond compliance

Capacities

Long term strategic planning

- common, holistic view (to avoid integrated technologies won't work)
- political will, social will
- list of smart actions
- simplify bureaucracy
- vertical and horizontal partnerships
- integrated approach; look at buildings as groups integrated in a master plan

Commitment stakeholders

- more control of business performance
- paid membership association
- prove and results needed
- awareness / knowledge management
- MoU's (business & research)

Funding

- different evaluation of projects (for banks to trust their loans)
- we do not oversee changes in prices or emissions schemes in next years(and how they affect business models)

- accurate predicting costs needed
- clear retrofit schemes needed
- return on investment: metrics difficult to be qualified

Transparency

- open up data (if available)
- facilitate transparency between local levels

Regulation

- is key to speed up investment
- intervention of public powers through regulation and subsidies
- tax relief for applying ICT in buildings

Technology solutions

- flexibility in tools
- enough detail in solutions
- building simulation tools
- accountability. (Who to blame in case of failure?)
- real time information/control
- link into decision making
- data security
- system of systems
- focus on storage systems, connection with other levels
- open protocols

Monitoring

- analytics are key
- infrastructure to collect data
- measuring still a black box. Identify parameters
- transparency in figures

7.2 Template for gap analysis

State of the art (Respective thematic area)	Recently finished and on-going projects (Info from D1.3)	Gaps	Vision (Info from D2.1)
1.1 Research topic			
1.2 Research topic			
1.3 Research topic			
1.4 Research topic			

7.3 Prioritisation template for RTD topics



European stakeholders' forum crossing value and innovation chains to explore needs challenges and opportunities in further research and integration of ICT systems for Energy Efficiency in Buildings



ICT 4 E2B Forum is a Coordination Action project supported by the European Commission under the FP7 ICT programme. The project is assigned to consult with relevant stakeholders about research priorities in the area of ICT for Energy Efficient Buildings. The findings will be considered for planning future research programs in the area.

PRIORITISATION OF RESEARCH & DEVELOPMENT TOPICS

Organisation: _____ Place & Date: _____

Person name: _____ Email: _____

Your answer will be used for statistical analysis and will **not be published separately**. If you give your **name**, then we shall acknowledge your contribution. If you give your **email**, then we may invite you to provide your views on other matters.

Which kind of stakeholders' class do you represent?

Building client / owner / housing organisation	Public authority (for buildings)
Architect / Building designer	ICT provider / developer
Construction company / Subcontractor	Energy Utility
Material / product supplier	Research Institute / University / Research funding organisation
Building automation company	Financial organisation / business developer
Building operator / facility manager	Other (please specify): _____
Building occupant	

Please **evaluate** the following **Categories**, **Subcategories** and **Research topics** against the following criteria:

- 4 = MUST have this as soon as possible.
- 3 = SHOULD have this in near future.
- 2 = COULD be nice to have if it is easy to adopt.
- 1 = NOT now but maybe in the future.

Blank = Cannot see any need for this.

Evaluate the importance those issues that are relevant to you. So you can fill only part of the questionnaire. Please clearly write a number 1...4 in the box on the left of to each issue. As far as feasible try to assign **different scores** within each group of issues.

Category	Subcategory	Research topics
Tools for integrated design and production	Design	Requirement definition, concept design
		Detailed design, CAD
		Configuration management
		Visualisation of design solutions
	Production management	Contract & supply network management
		Procurement
		Logistics
		Onsite and off-site production management
	Modelling	Building & district modelling
		Ontologies, data models
		Semantic mapping
	Performance estimation	Simulation
		Whole-life costing
		Life cycle assessment
	Other (please specify)	
Intelligent & Integrated Control	Automation & control	System concepts
		Intelligent HVAC
		Smart lighting
		ICT for microgeneration & storage systems
		Predictive control
	Monitoring	Instrumentation
		Smart metering
	Quality of service	Improved diagnostics
		Secure communications
	WSN	Hardware
		Operating systems
		Network design
	Other (please specify)	
User awareness & decision support	Performance management	Understanding ICT impacts
		Performance specification
		Performance metrics
		Performance analysis and evaluation
		Conformance validation
		Commissioning, audits, labelling
	Visualisation of energy use	Fun and easy interfaces
		User centric design
		Social media
	Behavioural change	Social Pressure
	Other (please specify)	

Category		Subcategory		Research topics	
	Energy management & trading	Building and District energy management			Building management systems
					Metering infrastructure
					On-demand energy management and optimisation
					Load and distributed energy resources
					Smart appliances
					Forecast algorithms
		Smart grids and the built environment			Demand response capabilities
					Real-time self-assessment
					Load balancing techniques
					Secure ubiquitous and low-latency Communications
					Energy network design and integration
		Other (please specify)			
	Integration technologies	Process integration			Collaboration support
					Groupware tools
					Electronic conferencing
					Distributed systems
					Business models and processes
		System integration			Plug & play connections
					Service oriented architectures
					Integration and service platforms
					Cabling
					Gateways
					Middleware
					Development methods and tools
		Knowledge sharing			Access to knowledge
					Knowledge management
					Knowledge repositories
					Knowledge mining and semantic search
					Long-term data archival and recovery
		Interoperability & standards			BIM standardisation
					Simulation and interoperability
					Protocols for real time operation
					Energy trading protocols
		Other (please specify)			