Report of the Meeting of Advisory group
ICT Infrastructure for energy-efficient buildings and neighbourhoods for carbon-neutral cities

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European Commission: Room 0/84,
Avenue de Beaulieu 31, 1160 Brussels

Contents

Preface

This report is the result of the second meeting of the Advisory Group (hereafter abbreviated to the "AG") on ICT Infrastructure for energy-efficient buildings and neighbourhoods for carbon-neutral cities. It builds on the foundation established in the first meeting held one year ago, on September 10th 2010, and documented in a report, published on the European Commission web site[1].

That first meeting concluded that energy efficient neighbourhoods should be developed as a strategic concept for Europe, with selected cities acting as pilots, providing information, motivation, and reassurance to encourage other European cities to adopt the concept and serving as test-beds, enabling the concept to develop and adapt by rapid development stimulated by international research, exchange of know-how and technology transfer. The report of the respective meeting also included strategic recommendations on topics to address and suggested activities to be undertaken in the short term (2011-2013).

The AG meeting held on September 16th 2011agreed that the conclusions of the first meeting are still valid and that developments over last 12 months are proving the timely relevance of this approach. This second meeting discussed the issues in more depth and in this context of rapid development, aiming to provide more specific conclusions and recommendations for future Smart Cities and Communities initiatives in the period 2014-2020.

[1] **http://ec.europa.eu/information_society/activities/sustainable_growth/docs/elsa/elsa_2010/report_elsa2010.pdf**

Executive summary

The remit of the 2011 AG meeting has been to provide advice on strategic objectives and priorities for smart cities initiatives in the next Framework Programme (Horizon 2020), to identify the key issues to be dealt with and anticipate the relevant areas for research and technological development.

At the European level, progress manifests itself in the Smart Cities and Communities topic within the current Energy Work Programme call for proposals[2], the plans for an ICT joint call in 2012 and the expectation of a large scale initiative in 2014 as part of Horizon 2020.

It is clear that ICT should be the connection to enable exploitation of potential synergies among the various "smart" realms of activity that will all contribute to achieving carbon-neutrality in cities. These realms include energy in buildings, electric mobility, eHealth, eCare, and eGovernance. European added value will come from achieving open standards and EU wide compatibility of systems enabling cross-border competitiveness, rapid progress and thus a competitive advantage in the global marketplace.

In the short term, the AG recommended that Smart Cities initiatives focus on each realm of activity (suggested as energy, eServices and ICT) whilst promoting interoperability and compatibility of communications between them and aiming for progressive integration.

The meeting concluded that:

- Smart Cities and Communities initiatives (hereafter abbreviated to "Smart Cities") should focus on implementation of existing, advanced state of the art products and services,
- research is needed on communications-related aspects to facilitate integration and interoperability issues, on utility networks and cyber security issues, on overcoming financial barriers, on developing suitable frameworks for public-private risk sharing enterprises and on societal aspects regarding behavioural change,
- flexibility is required in terms of definition of city and community,
- public private partnerships are a vital success factor in "smart" initiatives
- existing technology platforms, trade organisations and networks of towns and cities should be involved in the programme and in projects.

[2] FP7-ENERGY-SMARTCITIES-2012

The validity of the scope and definition of Smart Cities

There is general agreement that the primary objective of Smart Cities is the achievement of the 2020 energy objectives[3], towards carbon neutral cities and neighbourhoods, and towards European competitiveness. Beyond that, opinions vary from those advocating a very tight focus on energy related aspects (smart grids, smart meters, and intelligent buildings) to those advocating a much broader focus, including a wide range of community and citizen based services, where ICT has a role in replacing physical resources with digital resources and thus contributing to a more carbon neutral society.

There was solid agreement amongst the members of the AG present at the meeting that the energy efficient neighbourhood concept is definitely valid and should be kept as the focus at this first stage of development of Smart Cities. The implication here is that the focus should initially be kept tight in order to facilitate rapid development of coherent standards for interoperability. These standards should contemplate future systems and the widest range of applications that can be envisaged now.

The challenge is to offer a wide variety of services focussed directly on citizens and through business and governance, the goal is to develop thriving industries founded on technological innovation.

It was suggested by the AG members representing municipal authorities that the energy efficient neighbourhood concept can serve to integrate many current concerns such as energy efficiency in buildings, decentralised generation and other complex activities being labelled as "smart". The potential to improve the quality of service and efficiency of resource use through "smart" eHealth[4] and care services (for example for elderly people) and citizen participation through eGovernance is also recognised. Electric mobility is seen as one component in a complex chain of mobility actions involving management of emissions, time, space, etc. offering opportunities to recover space and time for higher value uses.

It is clear that projects already being implemented prior to 2011 are already demonstrating the technological feasibility of "smart" solutions and that future projects can therefore be expected to be more ambitious, aiming to offer increasingly integrated solutions.

[3]Energy and climate change objectives for 2020 adopted by the European Council in 2007: to reduce greenhouse gas emissions by 20%, to increase the share of renewable energy to 20% and to make a 20% improvement in energy efficiency. Subsequently incorporated into the Europe 2020 Strategy for smart, sustainable and inclusive growth and into the initiative 'Resource efficient Europe'.
http://ec.europa.eu/energy/strategies/2010/2020_en.htm

[4] eHealth etc. where "e" is a prefix indicating processes supported by electronic processes and communication

How to define the area of intervention in order to maximise the European dimension

As a preface to discussion on this subject, it was noted that certain definitions require clarification. The CSTB (Centre Scientifique et Technique du Bâtiment) representative from France proposed the definitions they are using as a working model: "Neighbourhood" to be a group of buildings, "District" to be neighbourhoods plus public spaces, roads, etc.), and "City" to be a network of districts.

In terms of project development, those actively involved in on-going demonstration projects or in preparing Smart Cities project proposals suggested that it was wise to build project consortia with similar cities and with a limited number of dimensions within the project (focussing on a theme rather than trying to be innovative and smart in many areas at once).

A specific suggestion in terms of maximising the European dimension was to consider operating at 3 levels: (1) core cities demonstrating technology, (2) surrounding regions involved in the project and targeted for direct replication or exploitation of results and (3) satellites in similar or neighbouring member states (e.g. Czech Republic cities linked to German projects and visa versa) in order to maximise the European dimension.

The private sector perspective was that the clearest business case for pioneer market opportunities stays in large or densely populated cities. Conversely, where population density is lower, rates of return on infrastructure investments are lower making it harder to develop a viable business case for developing smart function capability. This was a clear contrast with the more territorial perspective of national representatives. Those ones highlighted the fact that countries and regions with dispersed populations have specific research interests in developing smart initiatives in order to improve service provision in less densely populated areas in order to improve energy grid stability and load management in the context of more distributed generation.

In conclusion, in terms of defining the area of action, "Cities and Communities" is a good inclusive title allowing all communities to be included in the initiative. However, within this, a clear terminology is needed to enable debate about levels of action (community, district, neighbourhood, etc.) to progress. In terms of the scale of the area of action, there is a good case for considering various degrees of activity around a core pilot action so as to maximise the European dimension. Finally, in terms of building public and private partnerships, business and public interests will coincide in large or densely populated cities. Smaller urban areas and less densely populated areas may need specific initiatives to be defined where the business opportunities are not so clear.

What to include in a Smart Cities programme

The remit here was to provide advice on how to organise the programme for achieving maximum EU level benefit in terms of requirements, scope and ambition. There was consensus that the prime requirement for "smartness" in cities and communities is interoperability: the ability for things to communicate effectively, and for systems to be integrated in such a way that they operate coherently in response to the users' requirements. Improved interoperability must therefore be a core element of all future initiatives. European added value will come from projects that contribute to the development of common, widely implemented, *de facto* open standards facilitating interoperability, and contributing to market development across Europe. The following paragraphs expand on these themes.

Technical requirements

FP7 funded projects addressing smart buildings and energy efficiency have been built around the assumptions that an appropriate, ICT enabled, information infrastructure will exist to help with the management of the energy usage in buildings and public spaces. This infrastructure has primarily focused on (the expected future) availability of smart meters, and various smart grid technologies that will, potentially, allow neighbourhoods to share energy services, both for consumption and local generation. The projects also make fundamental assumptions that the home automation/smart home ICT solutions exist, and that they are robust enough to be deployed in all dimensions: reliability, verifiability of applications, interoperability, trust and security. However, the outcome of FP7 funded work in this area appears to strongly suggest that, alongside trials and development projects, some of the challenges are more fundamental and require a strong research action to enable the expected innovation and subsequent commercial exploitation of the results.

Interoperability of communication system components and distributed systems has typically been addressed through standardisation routes. Standards have served reasonably well in vertical high-volume markets with relatively well-specified service applications (e.g. cellular technologies, Wi-Fi, or DLNA for home entertainment systems), but they appear to have been only partially successful in the horizontal multi-service application markets (e.g. smart home technologies, home automation).

Open interoperability solutions for in-home systems are needed to enable true innovation of the energy efficiency services, and more, in homes and buildings. Initial work on this has been started by CENELEC[5]. Its initial point is that no single specification, standard or technology is going to win an "interoperability race" in the home and building electronic systems space. Therefore, the way forward is the development of an interoperability ecosystem for the smart buildings. Participation in this ecosystem is encouraged through peer-to-peer testing; in such a way standardisation is only needed to test against requirements and not for each system component.

[5] CENELEC - the European Committee for Electrotechnical Standardization. Interoperability framework requirements specification for service to the home (IFRS) (CWA 50560:2010)
http://www.cenelec.eu/dyn/www/f?p=104:110:4454842742787079:::FSP_PROJECT,FSP_LANG_ID:22584,25

Political requirements

At the political level the pre-requisite for becoming a smart city is to identify, monitor and control the relevant flows (whether energy, people, service provision, etc.) and set realistic targets for improvement. Managing them in an integrated manner (e.g. not only electrical energy but also gas and heat) is the challenge and is where ICT is expected to provide smart solutions. The process to follow starts with the development of a quantified energy plan of the area (district, city, etc.) leading to developing more open energy access initiatives such as smart grid pilots and district heating schemes and culminates with smart strategies being built into strategic land use planning.

The process requires the creation of suitable political structures and building a consensus that allows a stable framework to be developed with a suitably long-term perspective. There is consensus that these structures should include public private partnerships and be supported by multidisciplinary thematic project groups working in collaboration with a wider sustainability forum.

To summarise, first the requirements to be met must be defined, agreed politically leading to institutional commitment to developing solutions to meet the requirements. Secondly, participatory structures involving public, private and community based organisations must be designed, constituted and consolidated. Only with these pillars in place, can a realistic plan for making the city "smarter" be developed.

Relevant political support structures already exist that offer synergies with Smart Cities objectives. For example, the European Commission led Covenant of Mayors initiative[6] requires signatories to develop local energy action plans. Most signatories are now challenged to achieve the objectives in their plans. This challenge is driving smart initiatives as they are perceived as relatively cost effective due to the high degree of integration and optimisation of various factors that can be achieved.

There are two conclusions to be made here. Firstly, as relevant networks and initiatives for pro-active cities exist, a city or neighbourhood that wants to get EU support to be "smart" should already be on the road, in the right direction, with a clear idea of where they want to go and good indications of how to get there. Secondly, the lead cities in Europe are already demonstrating the validity of the Smart City concept as their strategic plans and quantified targets all include improvements in the operational efficiency of systems through the application of ICT as a means of achieving their goals.

Finally, European added value from the political point of view will come from sharing experiences in areas such as developing strategic plans, joint procurement of technologies, economies of scale, and other activities linking neighbourhoods, markets, and cities and driving interoperability of technical solutions.

[6] See relevant initiatives section

Business requirements

The background for business is the changing marketplace influenced by climate change related policy and consequently ruled by carbon management criteria.

In the urban context, companies with vested interests, particularly utility companies with embedded investments in distribution networks, aim to be market leaders in order to maintain their share of business, to expand their activities and to gain a competitive edge. This explains the motivation of these companies to participate in Smart Cities initiatives. Their research objectives involve establishing the optimal technical mix of solutions and devising financing mechanisms and viable business models that enable commercial exploitation in these solutions.

The construction sector

The role of the construction sector is to support cities in the transition to carbon neutrality, understand cities' energy use and requirements, and provide a portfolio of solutions with as much added value as possible. This portfolio includes highly energy-efficient solutions and the integration of ICT in new buildings and refurbishment projects. However, it is important to recognise that there are various economic, cultural and technical constraints that must be addressed in order to favour the selection of the best solutions for developing "smart", carbon-neutral, cities.

Although research will continue to offer new and better solutions, the companies involved in Smart City initiatives already have considerable technical and technological capability. The challenge is organisational: there are many stakeholders, clients and actors in a smart city. This makes it a complex market to target. Given the fact that the European and global trend is for population to be increasingly concentrated in urban areas, there is no doubt that political, social and business interests coincide with a focus on the transition towards carbon-neutral cities.

In summary, cities need to be more efficient and liveable to be sustainable and that means being "smarter". In the short term (until 2020), this means rapid and extensive implementation of solutions adapted to restricted budgets, integrated to cover all needs and exploiting the best technology currently available.

The Energy sector

One of the peculiarities of utility businesses is that the specifications of the product they are to deliver are defined and regulated by law as is the reliability of service that can be expected (~100% in most cases). New market needs, such as more sustainable energy, low carbon energy and energy efficiency, require knowledge and expertise in long term solutions in order to continue to respond to customer demands that, over time, become regulatory requirements, whilst also fulfilling shareholders' expectations.

Conceptually, large urban clients for energy companies are: municipalities, local manufacturing, universities and other public buildings. Small businesses and the domestic sector represent different challenges as they are small clients in terms of individual consumption although collectively they represent the largest and least controllable part of the client base and distribution system. The product base consists of energy supply (conventional

generation and renewable energy sources in the case of electricity, gas and heating supplies) and of energy services.

Practically, a smart grid is the nexus of all initiatives in the electricity sector, with interoperability a requirement for bilateral communication allowing consumers to become "prosumers" and contribute their intelligence to the "smartness" of the system and the local/regional marketplace. The ICT sector is included in this vision as their technology is needed as an integral part of this smart grid.

In terms of communication, to start to become "smart", energy companies need real time information concerning the operational aspects of their distribution grid. This requires ubiquitous, bilateral communication. The ideal to be pursued is full interoperability of systems and components. ICT must provide more ubiquitous connections, enabling more complete information availability.

In terms of energy generation technology and management systems, many suitable substitutes and solutions exist to improve energy management (in terms of efficiency improvements and reductions of emissions and costs. These include renewable energy sources, CHP/DHC, smart meters, e-mobility, biomass, energy efficiency solutions, etc. The key requirement is financing. Focussing on financing highlights attention is needed such as de-risking investments by providing a stable framework for collaboration between stakeholders in the urban environment so that investment in equipment with a long expected lifetime (such as meters and street lights) can be financed on affordable terms.

The ICT Sector

In terms of ICT applied to the built environment, the definition of scope agreed at the previous meeting is still valid as demonstrated by trends in the reorganisation of the sector. By way of example, Siemens has recently restructured its organisation and has created a new sector called "Infrastructure and cities" to develop integral solutions related to Smart Cities.

The key to meeting the 2020 energy objectives is implementation, starting with manageable, large scale demonstration as part of a strategic programme to scale up Smart Cities in order to develop a European market, foster European technology applications and support adoption of technical standards originating in the EU. The ability to bring together the diverse stakeholders and organisations with obvious synergies in the urban environment will be a key factor in the success of the programme. These include, for example, relevant trade organisations such as eu.bac[7], the German DIN DKE[8] and emerging networks such as the Covenant of Mayors.

In terms of contributing to standards, there is a relevant example to be emulated: the success of the GSM standard, developed in the EU and now used by about 80% of the global mobile market. Conversely, lessons should be learnt from the building sector where the American LEED[9] energy certification scheme is globally recognised as a standard to the detriment of the opportunities for a unified EU approach to energy certification offered by the EPBD[10]. This is a clear example of where Smart Cities initiatives could deliver European added value

[7]European Building Automation and Controls Association (eu.bac) http://www.eubac.org/

[8] The DKE is the German organization responsible for the elaboration of standards and safety specifications covering the areas of electrical engineering, electronics and information technology. http://www.dke.de

[9]Leadership in Energy and Environmental Design (LEED)

[10]Energy Performance in Buildings Directive (EPBD)

by contributing to the adoption of standards that serve to drive down costs for investors and manufacturers thus giving competitive advantages in terms of market position and penetration.

From the telecoms sector in Italy, the perception is that the entrance barriers are high and that the capacity of local authorities to invest in infrastructure projects is likely to be severely compromised in the short term by current economic conditions.

The ambition of the Smart Cities concept requires a considerable effort in team building in order to bring together many diverse actors in both the public and private sectors, often with competing competence or business interests.

A real need is identified for a systems approach to overcome traditional segmentation of urban elements and develop strong teams to break down barriers and gain momentum for change. A portfolio approach is proposed to enable flexibility and creativity in developing solutions that may be adapted to the unique circumstances of each neighbourhood, community and city.

The role of the telecoms industry in the smart city is to continue developing broader bandwidth, to ensure ubiquitous service provision and to contribute service enabling platforms and supporting modular peer-to-peer management approaches.

Given these barriers and limitations, part of the Smart Cities approach must be to find synergies when renovating existing urban infrastructure, overcoming the traditional segmentation of utilities in order to provide integrated smart services through the distribution networks owned by the utility companies and public authorities. Management for energy-efficiency should be integrated across all kinds of energy distribution networks so that these networks become increasingly interoperable from the user perspective and accessible from the company perspective.

One example from Italian towns is the opportunity presented by the need for street lighting renovation. Replacement not only offers considerable energy saving and cost reduction potential, but the street lamps can also be integrated in the data transmission network, offering Wi-Fi access, and the possibility to add sensors that could provide information on everything from traffic flows to environmental quality factors, and business opportunities for digital signage, advertising and publicity. This example illustrates not only the potential for synergies but also the need for coordination of all stakeholders to achieve smart solutions. The list of stakeholders includes equipment manufacturers, telecoms sector, energy sector and the various departments with relevant competence (planning, infrastructure investment, maintenance, lighting, visual impact, promotion, environment, etc.).

European added value will come from sharing pioneering experiences and best practice so that the coordination and collaboration required to achieve such progress ceases to be extraordinary and becomes standard practice with models that can be copied and adopted in any municipality, city and region.

Reflections on project requirements, focus and characteristics

It is considered important to achieve a balance between demand pull and technology push. In this context the role of public private partnerships (PPPs) is viewed as very important, facilitating the growth of demand for smart services and accelerating the penetration of the available technology. Evidence was provided to support both private and public leadership of such partnerships depending on the circumstances.

In the timeframe of the next framework programme, it was suggested that 3 focus areas could be promoted: Energy, eServices and ICT, all with a view towards progressive integration of the three areas aiming to achieve ubiquitous communication, seamless connection and interoperability.

Research into the success factors of existing PPPs and demonstration projects was presented as a means to defining the requirements and scope of such projects. It was observed that opportune location, in terms of both time and space, for example coincidence with international events and with significant infrastructure or urban regeneration projects, were key success factors. Projects with these factors have a considerable advantage in terms of achieving a critical mass of political momentum and achieving impacts beyond the project itself. As for project specific variables it was observed that certain energy related themes were recurrent in successful projects suggesting that a non-exclusive, list of key technologies or systems to be considered for inclusion could be useful in a programme of work description.

Regarding the ambition of present and future projects, the AG suggested that a lack of integration is the factor limiting the impact of present projects and that a more integrated approach is therefore needed. It was also suggested that successfully defining the ambition of a project involves achieving a balance between innovation and implementation, between and research and development.

A key message from the AG was that there are many suitable technological solutions that are mature and commercially viable for large scale implementation subject to overcoming barriers related to finance and communications infrastructures. Therefore the technological focus should be on implementation of existing, advanced state of the art products and services with research focussing mainly on communications aspects to facilitate systems integration (see conclusions and recommendations for a detailed list of suggested topics), on overcoming financial barriers and developing suitable frameworks for public-private risk sharing enterprises, and on societal aspects regarding behavioural change.

The goals will move over time. The scale for smart management systems have already moved from buildings to neighbourhoods and, within the lifetime of Horizon 2020, it can be expected to move neighbourhoods to districts, and cities. This scaling up will require achievement of technical objectives in terms of interoperability and a transition from current pilot experiments/research projects towards a more holistic vision encompassing the organisation of urban patterns, management and costs, renovation and evolution.

Conclusions and recommendations

As mentioned in the preface to this document, the conclusions of the previous meeting are still valid and the September 16th 2011 meeting sought to review progress and build on them, offer more detailed insight and give specific recommendations for initiatives in the period 2014-2020.

The scope for Smart Cities should remain wide, in order to foster creativity and innovation and yet, in order to maintain a clear direction and focus, should be guided by the principle that Smart City initiatives should contribute to the achievement of the EU 2020 energy objectives, towards carbon neutral cities and neighbourhoods, and towards European competitiveness.

Given Europe's geographical diversity, it is clear that flexibility is required in terms of definition of city and community.

A key message from the AG was that the implementation of existing, advanced state of the art products and services should be the top priority for the programme. Research should focus on communications aspects to facilitate integration and interoperability, on overcoming financial barriers, on developing suitable frameworks for public-private risk sharing enterprises and on societal aspects regarding behavioural change (see annexes for details). Work on standards is also seen as necessary, in collaboration with trade and statutory organisations, and in building on progress already made.

Collaboration with existing networks of towns and cities to exploit existing knowledge and to build on work already done is seen as essential. These networks were also recommended as suitable channels for promoting Smart Cities rather than the suggestion of promoting "Champion" Smart Cities.

It was suggested that 3 focus areas, Energy, eServices and ICT, could be promoted the next framework programme. The aim should be to progressively integrate these areas, in order to achieve ubiquitous communication, seamless connection and interoperability.

The starting point for potential projects should be cities in Europe already demonstrating the validity of the Smart City concept and participating in relevant networks and initiatives for pro-active cities. Their strategic plans and quantified targets should include improvements in operational efficiency of systems through the application of ICT as a means of achieving their goals. Therefore a city or neighbourhood that requests EU support should already be on the road, in the right direction, with a clear idea of where they want to go and a good plan of how to get there.

In terms of political and organisation structures, it is recognised that achieving results requires creating suitable political structures and building a consensus that allows a stable framework to be developed with a suitably long-term perspective. Public private partnerships have a clear role to play and the structures developed should maximise public participation (for example through thematic project groups working in collaboration with a wider sustainability forum).

Cities need to be more efficient, to improve in terms of quality of life indicators, to be more sustainable and to do so with limited resources. That means being smarter. In the short term (until 2020), this involves rapid and extensive implementation of solutions adapted to

restricted budgets, integrated to cover all needs and exploiting the best available technology. In terms of infrastructure, part of the approach must be to find synergies when renovating existing urban networks: overcoming the traditional segmentation of utilities in order to provide integrated smart services through the distribution networks owned by the utility companies and public authorities. These networks should become increasingly interoperable and accessible.

For energy companies, real time information of the operational aspects of their distribution grid is needed. This requires ubiquitous, bilateral communication and increasingly interoperable systems and components with data handling and transmission capabilities. The ICT sector needs to provide more ubiquitous connections and greater capacity, enabling more complete, integrated, information availability. Privacy and data security must be considered carefully in order to gain broad acceptance of and trust in the ICT systems.

Energy generation technology and management systems have suitable existing substitutes and solutions to deliver the required improvements. What are needed are suitable financing mechanisms: innovative ways of de-risking investments and providing a stable long term framework must be developed. Also required are ways of sharing risk between partners in the urban environment so that investments with a long expected lifetime can be financed on affordable terms.

Work still needs to be done to achieve full implementation of the EPBD and EED in the EU member states. There is a need for a European label for energy efficiency certification in buildings in order to reduce costs and improve EU competitiveness.

Buildings built before 1978 account for 80% of energy used today and buildings already built will account for 80% of the buildings stock in 2030 (based on an annual renovation rate of 1.5-2%) so focusing existing buildings is the key to achieving targets.

Substantial savings of up to 30% can be achieved with relatively short paybacks by the improvement of operation, controls and energy generation appliances. Therefore an ICT based approach is valid in all buildings, and in particular commercial/industrial buildings where buildings management systems are increasingly being installed as part of refurbishment work.

Annexes

A1: List of workshop participants

National Strategies

- Dr. Elena Villalba, Ministry of Science and Innovation, Spain
- Kim Davis, Research Council of Norway

Cities Strategies

- Dr. Peter Pluschke, Deputy Mayor for Environment, City of Nürnberg, Germany
- Alexander (Sandy) Taylor, Head of Climate Change and Sustainability, Birmingham City Council, United Kingdom

Academia

- Professor Joe McGeehan, Director, Centre for Communications Research, University of Bristol, United Kingdom

The Construction Sector

- Professor Ger Maas, Director for Strategy Royal BAM Group, Netherlands
- Dr. Alain Zarli, Head of Division - Information Technologies and Knowledge Dissemination Department, CSTB, France

The Energy Sector

- Anders Johnson, Head of Program Sustainable Cities, Vattenfall AB, Sweden
- Alain Glatigny, Innovation, Solution & Smart Grid Manager, Energy Business, Schneider Electric, France
- Jesus García Martin, Business Manager, Iberdrola, Spain

The ICT Sector

- Martin Schaer, Vice President, Senior Advisor to the Management Board, , Building Technologies Division, Siemens Switzerland
- Andrea Costa, Vice President Vertical Marketing & Smart Service of the Business Unit Public Sector, Telecom Italia, Italy
- Friedrich Georg Schwarzländer, Industry Business Development, SAP Deutschland AG & Co. KG, Germany

Also

- Jan Franke, Eurocities, Belgium

Invitees who could not attend but who provided position papers

- Professor Kenneth Asp, the Swedish National Energy Agency, Sweden

- Dr. Andreas Goerdeler, Head of Division "Development of Convergent ICT", German Federal Ministry of Economics and Technology, Germany
- Miguel Angel Sánchez Fornié, Director de Sistemas de Control y Telecomunicaciones Iberdrola, Spain
- Maher Chebbo, Vice President Head of Utilities Industry for EMEA, SAP France

European Commission Officials

- Colette Maloney – DG INFSO, Head of Unit ICT for Sustainable Growth
- Merce Griera-i-Fisa – DG INFSO, ICT for Sustainable Growth
- Bernard Barani – DG INFSO, Assistant to Megan Richards - Director Converged Networks & Services
- Georg Houben – DG ENER

- Meeting Organiser and contact point Patricia Arsene – DG INFSO, ICT for Sustainable Growth

Rapporteur for the Advisory Group

- Mike Barker, Building Energy and Environment Group, CIMNE (UPC), Spain

A2: Research topics suggestions

ICT

- Correlation of information to business processes (from data to knowledge)
- Definition of "system-border" BACS/ EMS and ICT
- Dynamic discovery of information and sources (CPS/SoS)
- Federated architectures depending on CPS and large-scale SoS
- Guarantee Quality of Service (QoS), timely delivery and processing of key events
- High-volume data management,
- ICT approach in existing commercial/industrial buildings
- Information/Content centric networking and deep advanced information modelling (internet of services)
- M2M (Machine-to-Machine or the Internet of Things)
- Optimisation of connectivity and information transfer
- Sensor networks (including the use of mesh networking, cloud computing and relaying)
- System integration (i.e., how to build a smart city from component systems)
- Systems of systems
- Tap into existing infrastructure (e.g. mobile phones, body to body networks, etc.)
- Temporal and spatial uncertainty management
- The impact of ICT on the security of energy supply

Energy

- Battery storage systems and micro energy management systems
- Efficiency and loss issues related to long distance energy transmission
- Impact of all energy-storage possibilities (thermal and power) to EMS and ICT Monitoring of energy flows and related Energy-Management System tasks EMS / ICT
- Operational optimisation of multiple factors (e.g. processes, services, localised/distributed global/centralised optimisation?) exploiting predictive energy-demand models for buildings, neighbourhoods, districts and cities and integrating of data from other sources such as LCA, GIS, BEMS and urban planning tools
- Efficient integration of electric vehicles in the urban infrastructure (interaction with energy grids, mobility providers, traffic management etc.)

E-services / other

- Business models – context based solutions (no one size fits all)
- Criteria for success of "smart" initiatives (learning from completed projects)
- Examination of skills and behavior changes needed to facilitate change
- Interdisciplinary actions linking ICT with socio-techno-economic systems thinking - i.e., how to 'sell' smart ideas, which ideas will have the largest social impact, etc.
- Privacy/Security/Trust
- Self-sustainability (self-* features e.g. self-management, etc.)

A3: Relevant initiatives

Covenant of Mayors

The mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and use of renewable energy sources on their territories. By their commitment, Covenant signatories aim to meet and exceed the European Union 20% CO2 reduction objective by 2020. http://www.eumayors.eu

Green Digital Charter

The Green Digital Charter commits cities to work together to deliver on the EU climate objectives using digital technologies that increase energy efficiency, facilitate emissions reductions and forestall climate change. So far 24 cities have signed up to the Green Digital Charter and many others are interested committing to:

- Deploy five large-scale pilot projects before 2015.
- Decrease ICT's direct carbon footprint by 30% by 2020.
- Create a partnership of cities on ICT & Energy Efficiency to work until 2011.

http://eurocities.wordpress.com/eurocities%E2%80%99-green-digital-charter/
http://ec.europa.eu/information_society/activities/sustainable_growth/green_digital_charter/index_en.htm

European Urban Knowledge Network

The European Urban Knowledge Network (EUKN) shares knowledge and experience on tackling urban issues. The key objective is to enhance the exchange of knowledge and expertise on urban development throughout Europe, bridging urban policy, research and practice. http://www.eukn.org/

JPI Urban Europe

Urban Europe is a research and innovation initiative of EU Member and Associated States to the EU Framework Programme and aspires to rethink and manage the increasing urban orientation and concentration in Europe in order to create and exploit synergy in an urbanised Europe, from an economic, social, environmental and transport-related perspective, leading to a strengthened global position of Europe. http://www.jpi-urbaneurope.eu/

Networking Intelligent Cities for Energy Efficiency (NICE).

In the context of the Green Digital Charter, a relevant project defined as an accompanying measure recently started (1/9/2011): Networking Intelligent Cities for Energy Efficiency (NICE). Nice will be used to promote and support the implementation of Charter commitments, developing a common implementation framework, reporting tools and information resources for classifying, measuring, reporting and supporting actions.
NICE also intends to build links with the Covenant of Mayors activities.
See Also DG Energy Smart Cities and Communities initiative:
http://ec.europa.eu/energy/technology/initiatives/smart_cities_en.htm

A4: Definitions

Smart City

1) A city can be defined as 'smart' when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory governance. (http://en.wikipedia.org/wiki/Smart_city)
2) The "utilisation of networked infrastructure to improve economic and political efficiency and enable social, cultural and urban development" (Hollands, R. G (2008). "Will the real smart city please stand up?" City 12 (3): 303–320.)http://en.wikipedia.org/wiki/Smart_city#cite_ref-Hollands2008_10-0

Interoperability

The ability of two or more (digital) systems or components to exchange information and to use the information that has been exchanged (Institute of Electrical and Electronics Engineers. IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries. New York, NY: 1990.(iftikahr).http://en.wikipedia.org/wiki/Interoperability#cite_note-0