



# Key Innovations and Strategies

Smart Cities  
Stakeholder Platform




**Smart Cities**  
and Communities






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## What is the European Innovation Partnership for Smart Cities and Communities?

One of the greatest challenges facing the EU is how best to design and adapt cities into smart, intelligent and sustainable environments. Almost three quarters of Europeans live in cities, consuming 70% of the EU's energy. Congestion costs Europe about 1% of its GDP every year; most of it is located in urban areas. Smart urban technologies can make a major contribution to tackling many urban challenges.

With this in mind, the European Commission has launched the **Smart Cities and Communities European Innovation Partnership (SCC EIP)**. The partnership proposes to pool resources to support the demonstration of energy, transport and information and communication technologies (ICT) in urban areas. The energy, transport and ICT industries are invited to work together with cities to combine their technologies to address cities' needs. This will enable innovative, integrated and efficient technologies to roll out and enter the market more easily, while placing cities at the centre of innovation.

By launching a **Smart Cities and Communities European Innovation Partnership** the European Commission aims to boost the development of smart technologies in cities by pooling research resources from energy, transport and ICT and concentrating them on a small number of demonstration projects which will be implemented in partnership with the cities. For 2013 alone, €365 million in EU funds have been earmarked for the demonstration of these types of urban technology solutions.

## Smart Cities Stakeholder Platform

The Smart Cities Stakeholder Platform is an initiative of the European Commission with the dual aim of:

- Identifying and disseminating information required by practitioners on technology solutions and needs, and;
- Providing information for policy support to the High Level Group and the European Commission.

There is both a web-based and physical Platform open to anyone who registers. The backbone of the Platform, which is owned by its stakeholders, consists of bottom-up contributions made by the stakeholders themselves. The Platform is one of the two governance bodies of the Smart Cities and Communities European Innovation Partnership.

## Working Groups

The Platform has set up three thematic Technical Working Groups, each dedicated to one technology area (Transport & Mobility; Energy Supply & Networks; Energy Efficiency & Buildings) and two horizontal Coordination Groups (Finance and Roadmap Groups). A fourth thematic Working Group on ICT has been added in spring 2013.

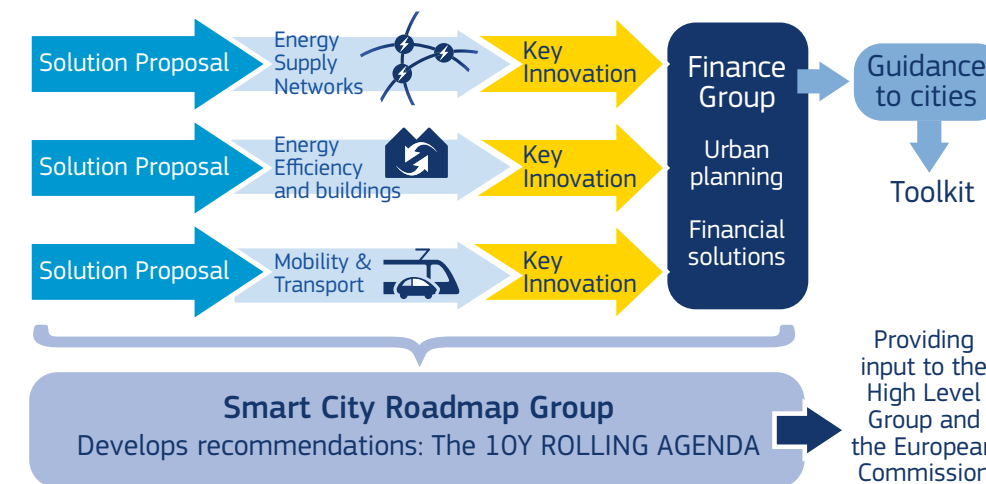
The Technical WGs review and rate the submitted **Solution Proposals** with a view of grouping them as **Key Innovations**. Results are visible for all stakeholders.

## Key Innovations

Smart urban technologies can provide an important contribution to the sustainable development of European and other cities. The EU's Smart Cities and Communities European Innovation Partnership stresses how important it is "to catalyse progress in areas where energy production, distribution and use; mobility and transport; and information and communication technologies (ICT) are intimately

linked and offer new interdisciplinary opportunities to improve services" while reducing the environmental footprint.

As a result, the principal objective of the Stakeholder Platform is to identify and assist deployment of technology opportunities that arise from integration. The Stakeholder Platform calls these Key Innovations.



Key Innovations are developed from the Solution Proposals submitted by any registered Platform member. The Solution Proposals used are selected by the technical Working Groups based on the evaluation criteria: applicability, simplicity, affordability, usability, the extent to which they address integration and if the potential impact is significant. The owners of the Solution Proposal are invited to participate in Key Innovation development. Every Key Innovation is developed from several Solution Proposals.

All Key Innovations and strategic documents will be subsequently available on the website [www.eu-smartcities.eu](http://www.eu-smartcities.eu)

All information on the Key Innovations and the strategic guidance documents has been submitted by the Platform's stakeholders.

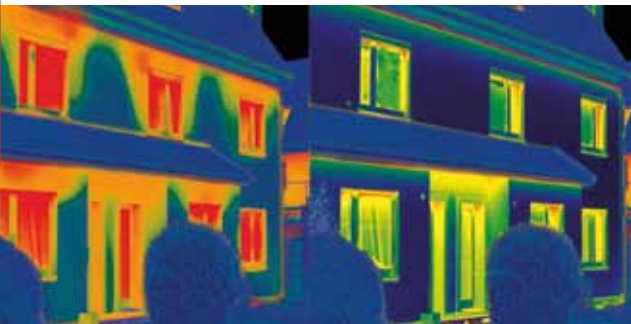
## Advanced Materials for Energy Efficient Buildings



The Chemical Industry is working closely with components suppliers and construction companies to provide high performance materials enabling high insulation performance of buildings. As such, these advanced materials are a key enabler in reaching the global goal of significantly reducing the energy consumption of buildings, which contributes to about 30% of European energy consumption.

The main categories of solutions offered by the chemical industry are:

- High performance insulation foams and coatings (indoor, outdoor)
- Reflective outdoor coatings for “cool roofs” (decreasing air conditioning costs) and indoor coatings with high light reflectivity (allowing lower lighting power)
- Smart windows with functionalized coatings ensuring control of heat or light transmission or reflection.
- Vacuum glass wall panels with high insulation performance.
- Embedded phase change materials for storing and releasing energy.
- Durable high performance sealing solutions.



Most importantly, the solutions offered are adapted to each particular case of building and situation; for instance for the renovation of old buildings, different solutions can be offered for wall insulation (composite coatings with high insulation properties outside or the injection of high performance foams inside the wall structure) and specific solutions are proposed for the roof and the windows etc... In the case of new buildings, these solutions contribute to the design of highly energy efficient buildings while giving a lot of design freedom to the architects, owners and other stakeholders.

Moreover, the chemical industry has a dynamic research and development programme that aims to constantly improve the performances of its materials, like for instance nano-structured foams that would allow a reduction of the thickness of the insulation layer, which is important when there are some space constraints.

## Heat Pump and Micro-CHP as Complementary Boiler Alternatives

Boilers for the production of heat for space heating and hot water have become much more efficient in recent years. However, we are unlikely to see a further increase in conversion efficiency, as the newest types retrieve almost all the energy from the burning of fuel, primarily gas.

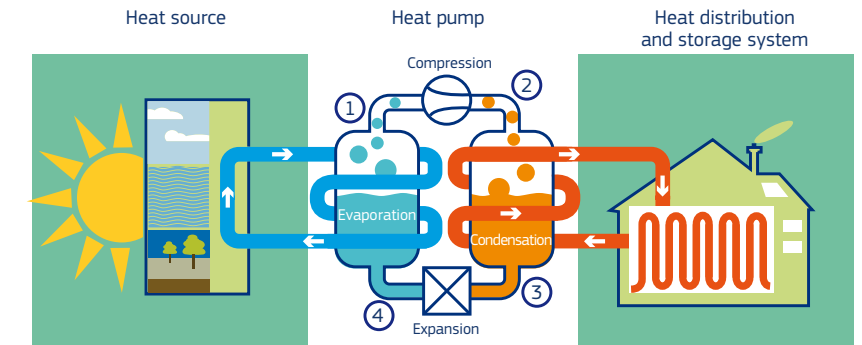
For new dwellings the goal is to achieve Near Zero Emissions by using a combination of substantially reducing heating needs and achieving (almost) emission free supply. One option is to arrange supply on the basis of the dwelling's own renewable sources which in practice involves a large exchange of electricity through the grid. However, this solution is not (economically) viable for existing dwellings as the heat demand can only be reduced by a limited extent and large scale application and grid integration of renewable sources is more difficult. For new buildings the same reasoning is valid, except that seasonal heat/cold storage is possible for new buildings, but normally not for existing buildings.

Therefore, radical action is needed to follow up on heat production with condensing boilers, which should lead to substantially higher conversion efficiencies, moderate extra costs and a limited burden on the electricity grid. This future system could be a mix of two complementary heat production options:

- Heat pumps, especially for dwellings/buildings with lower energy demand;
- Micro-CHP, especially for dwellings/buildings with higher energy demand.

Up till now both heat production options have been developed separately, on the assumption that one or the other will be installed in dwellings or buildings. For heat pumps the consequences of this were a strong focus on limiting power demand during cold spells and therefore the choice for e.g. ground-based heat exchangers which are difficult to apply in (existing) concentrated building areas. For micro-CHP this resulted in a choice of systems with a rather low electricity production because electricity demand was not high enough during times of increased heat demand.

This key innovation implies an integrated approach to both systems, removing the current design restrictions for both options. The excess electricity from micro-CHP (at high levels of heat demand) in one set of dwellings/buildings covers the peak demand for heat pumps in another set of dwellings/buildings, more or less nearby.



75% free environmental energy + 25% electrical energy = 100% heating energy

Both options are redesigned to complement each other to meet the needs of a street or district in a town, at the level of a community interested in maximum overall savings, low total costs and avoiding excessive use of the local grid and regional electricity production. Because of this integrated approach both heat production options are combined in one key innovation. The consequences for the development of heat-pumps and that of micro-CHP options will be taken into account and will be used to further develop the existing heat pump and micro-CHP technologies.

## ICT Stack for Energy Management



This Key Innovation combines four ICT components, together with a sociotechnical understanding of energy use in context, to deliver significant savings in energy expenditure for many urban structures: dwellings, offices, schools, public buildings etc. Multiple wireless sensors deliver data which is mined using advanced machine-learning methods to gain an understanding of how energy is being used by occupants and systems. Personalised feedback of this information to stakeholders empowers them to reduce energy use. Smart energy management agents can use this understanding and data, guided by building stakeholders via effective and intuitive interfaces, to provide comfort and convenience to occupants while reducing energy use, and to offer peak-shaving services to electrical and thermal grids. A sociotechnical understanding of how energy is used in the context of specific technologies and social organisation is key to achieving significant and sustained reductions in energy use, and can make this technology stack effective at scale across a wide range of occupant and structure variables including function (dwelling, office, etc), fabric (newbuild, older, etc), installed energy technologies (generation, heating, etc), and organisation of occupants and stakeholders.

Various incarnations of much of this technology stack are deployed, or will soon be deployed, in pilot projects in a variety of European cities including Aberdeen, Barcelona, Bristol, Edinburgh, Eindhoven, Cologne, Milan, Milton Keynes, Salzburg, Tyneside, Zaragoza, and Zürich. A variety of commercial organisations act in this space including SMEs, energy supply companies, appliance vendors and telcos. The sensor technology is the best developed (established market), while data mining, personalised feedback, energy-management agents and intuitive interfaces are still experiencing rapid technical development with some aspects beginning to enter the market. Market growth is accelerating, with in-building services starting to give way to cloud-based solutions.

## Smart Reno-Up: Smart Renovation of Utility Patrimonium

In the Key Innovation "Smart Reno-UP", new retrofit solutions in planning, design, technology, construction, operation and use of non-residential buildings are researched, evaluated and implemented.

Traditional renovation of large utility constructions is in most cases very time and cost ineffective because the industry, and certainly most SME's involved in renovation projects, tend to consider every renovation project as if it was the first one ever to be conducted, using traditional techniques on site like the ones used for family dwellings. The owners or construction companies hardly ever take into account the extra possibilities for faster and cheaper standardized modular retrofit that many of these large buildings offer.

In a modular retrofit system, industrialized craftsmen, working within a temperate indoor climate, produce the new facade and roof components in factories, safely, cheaper and under much better working conditions than at the construction site.

The components (modules) are pre-fitted with heating, cooling and ventilation ducts as well as service ducts for energy and data transport and are then transported to the site and mounted on site with cranes. This mounting on site is done within a very short period (days instead of weeks / months).

The technologies and knowledge created for housing cannot be automatically transposed to utility buildings because of several factors. The main problems preventing the creation of a large industrialized mass retrofit market for utility buildings are:

- the impracticality of moving entire populations (students, patients, fire brigade, police, ...) for the long period necessary for traditional renovations; so a short on site construction period is required, without the need to move the populations of students, patients, personnel, ... Smart Reno-UP supports the use of industrialized modular PHS, NZEB and E+ retrofit.
- the impossibility of suspending public services so there is a need for adequate master planning of the retrofit of the local public building stock, using if necessary "domino effects" to re-house services temporarily within existing buildings. This KI provides the technology.
- retrofit of utility buildings with adequate cooling and ventilation is a big challenge (but feasible). They have a very different user/m<sup>2</sup> ratio than residential buildings and a different use during day and night as well as at different times of the year. Smart Reno-UP provides innovations for retrofit to PHS, NZEB or E+ standards with perfect indoor air quality.
- before any retrofit, acceptance by the users – being 'the public', has to be received and once retrofitted adequate use of the new infrastructure by the public



users has to be ensured to maximize return on investment. Smart Reno-UP offers a public lab.

- to improve the energy efficiency of the retrofitted building stock, connection to the grid should best be standardised. Smart Reno-UP will provide answers.

The Key Innovation project Smart Reno-UP deals with all the above challenges and creates a Technical Catalogue and a Network for all stakeholders involved in the modular retrofit of existing public utility building stock to the EU 20-20-20 standards

## Zero-energy Buildings with Low-exergy Storage

### Building concept

The Emporium building concept involves zero-energy solar energy dwellings or buildings that use energy and materials economically. This type of construction can provide occupants with a living environment that meets current standards.

It involves a low-exergy system where the temperature of the energy produced, distributed, stored and delivered for heating purposes is as close as possible to that of the requested heating and cooling media.

A warm water storage container and collectors provide heating and hot water supply for the space and a cold water storage container and collectors provide cooling and a source for the refrigeration. The water circulates without pumps; instead it uses a thermo-siphon, and therefore requires no high-grade energy such as electricity or fuel.

A lightweight construction supports the water storage containers. This mass of water also replaces the hot and cold accumulating capacity of the building mass. The building concept is suitable for free-standing, connected, or high-rise homes or utility buildings in all climate zones.

The storage systems can also facilitate the storage needs of nearby district heating systems and load management of the electricity system.

### Energy system

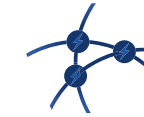
The building construction includes an energy producing climate system, that is composed of both low-exergy and zero-emission solar heat and infra-red cool energy sources, and heat and cool thermo-siphon circulations, and a prefabricated, collapsible, and above ground seasonal hot and cold storage. The technical feasibility has been proven and confirmed.

A low-exergy system is an energy system that aims at the lowest exergy loss between the requested energy on the one hand, and the energy produced, distributed, stored and delivered on the other hand. For a thermal energy system this means that all temperatures within the system are as close as possible to that of the requested heating and cooling media.

Energy production (quantity) with a high exergy value (quality) requires a high effort of sustainable energy sources, so that low exergy systems using sustainable energy sources will be cheaper.



Exergy regards the quality of energy carriers/media, while energy regards the quantity or energy content. The energy content of natural gas is 35 MJ/m<sup>3</sup> and has the same potential exergy value, given a temperature of 2500 °C when burned and converted into other energy forms, like electricity. From this 2500 °C source, the residual 1000 °C heat can be used to bake stones, 500 °C to bake bread, 100 °C to boil water, and with the remaining residual 50 °C heat a whole building can be heated. This means that with the direct consumption of natural gas for building heating 97% of the quality (50 °C against 2500 °C) is lost through the chimney.



## Virtual Power Plant

A Virtual Power Plant manages energy systems in a residential area, district or city with efficient heating by coordinating heat pumps, solar PV panels, loading facilities for electrical cars and nearby wind turbines. It helps keep supply and demand well balanced, and stimulates cost-effective and energy efficient behaviour. It can be operated like a conventional centralized power plant.

This Key Innovation is based on the PowerMatcher, one of the Virtual Power Plant systems that have been developed. It consists of the open source solution PowerMatcher, the Flexible Power Suite making the ICT system interoperable and a prototype for heat by the so called HeatMatcher. This way, it links the heat and electricity system in the city. It has been tested in PowerMatching City I and II and Couperus Ypenburg in the Netherlands. It is also deployed on the island of Bornholm, Denmark, to be demonstrated as a large scale EU project in 2013.

Virtual Power Plant systems can contribute to energy savings in the order of 5 to 40%, in four main areas.

- Introducing Virtual Power Plant technology for electricity allows for **greater integration of renewables in the electricity grid**. The energy savings achieved depend on the number of extra renewables introduced compared to a normal situation. Using a Virtual Power Plant allows for a renewables penetration of

up to 80%, depending on the share of biogas-based systems available for peak production and reserve power. Energy savings also depend on the efficiency gained by the technologies included, e.g. a heat pump can achieve a COP of 5 when designed for smart grid operation and optimally used. Thus we can arrive at savings up to 40%.

- Virtual Power Plant technology **facilitates the uptake and integration of electric transport**, managing the demand from electric vehicles and, in the mid to long term, giving access to vehicle-to-grid storage.
- Overall, Virtual Power Plant systems can offer better transparency to end-consumers on the real-time use of the energy and its costs, encouraging energy efficiency measures and behaviour, stimulating **load shifting to reduce demand during peak** system conditions.
- Virtual Power Plant systems can contribute to **more effective network planning and operation**. By making more effective use of available network capacity, the system can help reduce the amount of extra grid and back up generation capacity required to achieve the 20-20-20 objective, thereby reducing the network costs in end user electricity bills. These energy savings from more effective network operation, without introducing renewable devices, are estimated to be about 5%.



When applying a Virtual Power Plant to the heating system, the efficiency gain largely depends strongly on the installation and systems connected and the efficiency of the conventional system that is displaced. For example, when the heat from a solar collector used for tap water heating can also be transported to a buffer for providing space heating, the smart grid can offer more efficiency gain than when such a connection is not available. Estimated energy savings vary from 5% to 40%.



## Smart Thermal Grids



Smart Thermal grids can play an important role in the future Smart Cities by ensuring a reliable and affordable heating and cooling supply to various customers with low-carbon and renewable energy carriers like waste heat, waste-to-energy, solar thermal, biomass and geothermal energy.

Smart thermal grids make it possible to adapt to changing circumstances in supply and demand in the short, medium and long term, and facilitate participation of end-users, for instance by supplying heating or cooling back to the network. To do so, they need to be spatially integrated in the whole urban energy system and interact with other urban infrastructure, such as networks for electricity, sewage, waste, ICT, etc. By optimising the combination of technologies and enabling the maximum exploitation of available local energy resources through cascade usage, smart thermal grids can contribute to improving the efficiency of urban heating and cooling, while increasing cost efficiency and the security of supply at a local level by using local sources of energy. The scale of smart thermal grids can range from neighbourhood-level systems to city-wide applications, depending on heating and cooling demand and urban context.

Technical elements of smart thermal grids cover thermal generation like small-scale low-carbon heating and

cooling systems, CHP and new approaches for producing domestic hot water, thermal storage technologies and innovative network improvements such as new piping materials new piping layouts and non-invasive construction and maintenance of thermal networks. Network-integrated sensors and smart heat meters allow for more effective and efficient use of the separate components, supported by overarching energy management.

Smart thermal grids pilot projects that form the basis of the Key Innovation include the thermal network in Heerlen, the Netherlands, the Sunstore4 demonstration in Marstal, Denmark, the smart thermal grid at the TU Delft campus in the Netherlands and the geothermal district heating system in the Paris Basin.

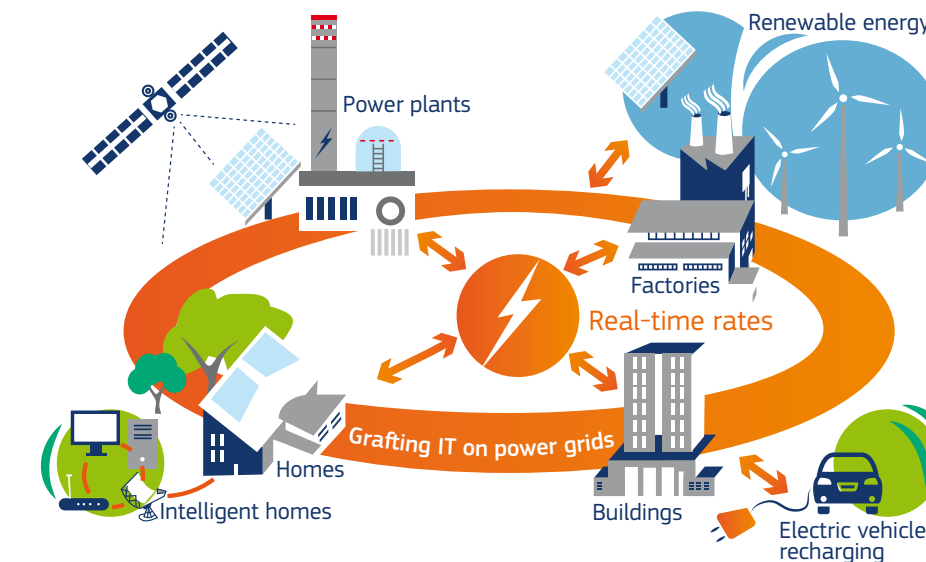


## Smart Integrated Energy Governance

Integrated energy management and governance capabilities are essential for implementing Smart Cities initiatives successfully. They support cities in realising and coordinating measures for improving energy efficiency, and create economic value for both cities and businesses by integrating distributed renewable energy power plants, in both urban and rural areas.

The integrated approach described aims to create a business and environmental advantage for the entire system, based upon the direct and active involvement of private entities and investors. Real-life implementation of innovative systems and technology involves a range of stakeholders in a bottom-up process, so that governance matches the innovative business models of different parties. The participation of local authorities, energy producers, energy distribution and transmission operators, storage systems manufacturers, financial entities, and others, also ensures a broad base of support.

This Key Innovation is based on the ENERGOV\_FVG project in the Autonomous Region Friuli Venezia Giulia (FVG region). Energov\_FVG builds clusters of private enterprises for energy management, using the potential for renewable energy production of the FVG region. It is an inclusive initiative open to all interested stakeholders to define jointly innovative business models and financial mechanisms. Together, private and public stakeholders



create new markets for innovative energy services including smart grids, energy storage systems, distributed intelligence and a virtual power plant for integrating and optimising the different systems. The initiative also supports the growth of testing facilities for emerging energy technologies, enabling a "Smart Cities" approach and interoperability between different energy systems.

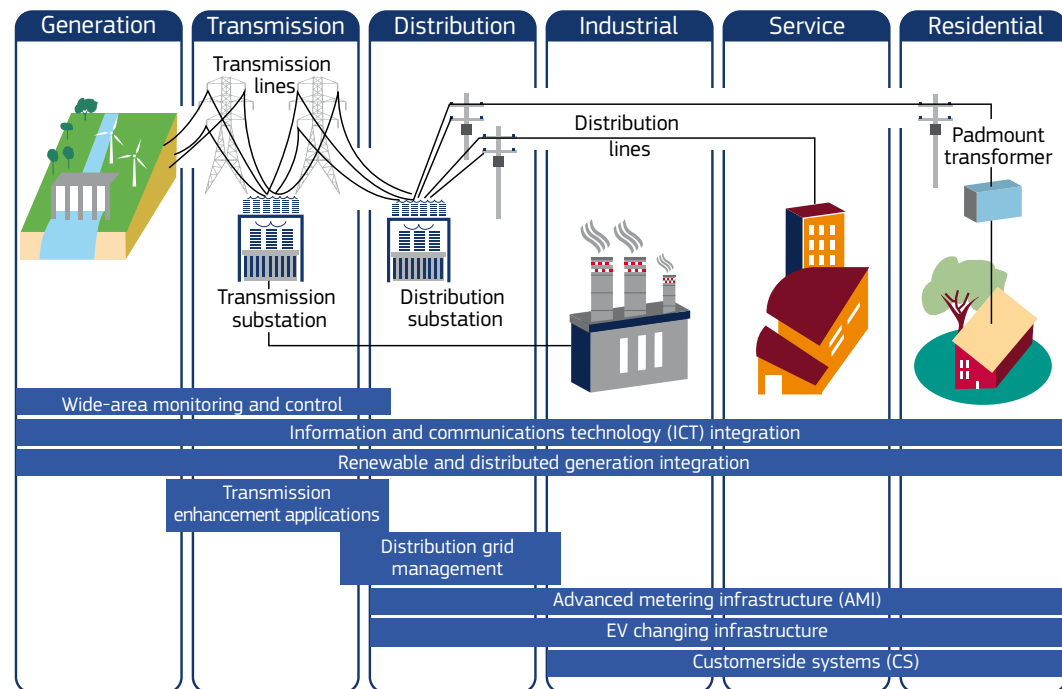
Complementing the activities within the FVG region, the project aims to be replicated in neighbouring Austria and Slovenia, creating trans-boundary cooperation to create links with the Balkan Area. Cyber security of ICT infrastructures is central to this international aspect of the project. In this way, Energov\_FVG is building a smart cross-border community, in which energy represents the key factor for value creation.



## Smart Grid Systems

The Key Innovation based on smart grids technologies encompasses a set of innovative solutions enabling new products and services central to achieving a real Smart City. Smart Grids are the backbone of a Smart City by enabling the integration of small distributed energy resources

in the urban network, increasing the customers awareness, providing real-time optimization of energy flows at the urban level, enabling interdependence and facilitating a multi-services approach linking the electricity carrier and other infrastructure.



The Key Innovation on Smart Grids sets out various innovative solutions that allow for increasing the hosting capacity of the network, strengthening the security of supply in the urban area. The solutions described help avoid additional investments to cover the peak load demand, while increasing the network stability and reliability through better monitoring of network operating conditions. They offer improved quality of service for final customers, new added value services for both market players/consumers, and help cities realise costs savings by optimising energy consumption.

The KI was developed according to measurable and updated outcomes of pilot projects currently on-going, and in particular the Isernia Project, run by Enel Distribuzione and co-funded by the Italian National Regulatory Authority. The project foresees the demonstration, under real operating conditions, of an innovative model for the protection, automation and management of power generation in the distribution network.

The Key Innovation on Smart Grids has many interfaces with Key Innovations on Mobility and Buildings. The interaction between Smart Grids and innovative solutions in construction and in the transport sector can contribute to achieving the energy efficiency and mobility objectives at both the urban and European level.



## E-mobility and Power Matching

Electro mobility is currently the most important alternative transport technology with reduced environmental effects for urban areas: It is beneficial in terms of noise and air quality and also in terms of GHG reduction, if the electricity is generated from renewable sources. It can be applied to different transport modes such as passenger cars, light vehicles, buses, e-bikes (pedelecs) and it enables new light vehicle concepts.

Moreover it is closely related to the electricity production, storage and distribution systems and energy buffering. This requires smart technologies to optimally match the power demand for charging e-vehicles with the fluctuating supply of renewable electricity as well as the right location of charging facilities.

The solutions backing this Key Innovation aim to match the transport demand and supply on the one hand (by promoting electric vehicles or bicycles), and the electricity demand for e-mobility and power supply capacity (by promoting smart charging stations and connection with smart grids) at the right place and time on the other hand.

Studies show that beyond many pilot projects one of the main obstacles is the deployment of electro-mobility on a larger scale. This is mainly due to the higher cost of electric vehicles as well as the high costs and short lifetime of batteries.

Therefore a focus should be made on organisations with large vehicle fleets operated regularly but on shorter daily trips such as fleet operators in an urban context (e.g. parcel services, at-home care services for the elderly, car-sharing), (charging) infrastructure suppliers, the public sector, and the users of this form of innovative individual mobility.







## Cooperative Intelligent Transport Systems and Services



Modern vehicles equipped with driver assistance systems can “feel” (with sensors), “see” (with cameras) and – in the future – “speak” (with communication systems). Cooperative Intelligent Transport Systems and Services (C-ITS) are based on the principle that all cooperative parties (ITS stations, i.e. vehicles, road side units) exchange information between each other. Thereby these stations use standardised message sets. The receiving ITS station analyses the in-coming data and makes use of it. This concept enables self-organisation at a local level as well as competition between the companies driving further innovations. Up-to-date traffic information, improved road safety – by avoiding accidents and reducing the severity of injuries – and traffic efficiency – by harmonising traffic flows and planned driving – as well as increased driver comfort are supported from the very beginning. Intermodal – by involving public transport, cyclists and pedestrians – and environmental capabilities, autonomous driving as well as further functions will be addressed as a second step when C-ITS has reached a sufficient market penetration.

Based on the European Mandate M/453, the minimum set of standards for cooperative Intelligent Transport Systems and Services (ITS) is currently developed and will essentially be finalised in 2013. The vehicle manufacturers have already announced that they will start Day One deployment of C-ITS in Europe based on ITS G5 technology beginning in 2015. Some front running road operators and road authorities aim to strengthen this voluntary deployment process by investing in cooperative Road Side Units on the infrastructure side.



## Enabling Seamless Multimodality for End Users

The seamless use of different and optimally combined transport modes within the trip chain (“fifth mode”) is one of the key approaches towards greater sustainability in urban transport. Each mode has its own advantages any of which may satisfy different trip purposes and needs. The core of new multi-modal urban mobility concepts is to combine public transport with other motorised and non-motorised modes as well as with new concepts of vehicle ownership. This involves car-sharing, bike-sharing and ride-sharing in line with the trend of sharing and using instead of possessing vehicles. Furthermore it involves the use of innovative technologies, such as small electric vehicles with two, three or four wheels.

Yet there are several obstacles to overcome, such as lack of information and data, separate responsibilities and parallel and unconnected systems each with their own entry barriers. In order to increase the user friendliness, several Solution Proposals within this Key Innovation are based on ICT-based approaches such as mobile personal mobility assistance, web based multimodal information platforms, smart bicycle parking facilities and urban traffic control systems. These applications involve booking and



smart ticketing and could also allow the application of a mobility credit system in order to influence personal mobility and relieve congestion and space problems. Multimodality implies the

development of new business models e.g. for the new sharing-systems and the role of an integrator in order to overcome the traditional market competition and develop common benefits from integration.

The deployment status of the Solution Proposals is quite heterogeneous depending on the degree of complexity and they are characterised by different innovation maturities. However, in order to provide seamless multimodal door-to-door mobility a strong focus is placed on user needs and possible barriers. By developing solutions in cooperation with the end user the barriers, especially for elderly and disabled people, can be reduced.





## Smart Organisation of Traffic Flows and Logistics

Timely and cost-efficient mobility of passengers and distribution of goods and services are the economic and social lifelines of cities. However, current passenger transport and city logistics still cause substantial environmental problems in terms of air quality (especially NOx and PM10), noise and congestion. On a global scale, energy consumption and GHG emissions are important issues.

One inexpensive approach in terms of investment costs to cope with growing transport demand is to provide technological solutions to organise passenger mobility and freight distribution in a smarter way. Within the overall aim of increasing multimodality this involves multi-agency interaction, linking individual mobility with public transport services. Beyond the technical requirements of data exchange it also requires new governance structures to reach changes in mobility behaviour. Moreover, the requirement of knowledge of various logistic flows and the optimisation of transport resources enables the development of new business models.

This Key Innovation is based on Solution Proposals, which are project ideas and pilot projects on data exchange within an integrated city management, using global information on multimodal options, optimised city logistics and stakeholder assistance, and vehicle technologies to reduce negative environmental effects. Thereby interfaces with existing systems, dissemination engines, data fusion and forecast/simulation are tackled.

It can be expected that the better utilisation of existing systems and smart ways of data exchange will allow a more efficient use of the transport system as a whole.



## Using EU Financial Support to Develop Smart Cities

Transforming European cities requires a considerable investment. Unfortunately, the debt crisis has hit many municipal budgets severely. Not only are investment requirements large, but cities have neither the means nor the credit rating to find cheap sources of funding. Falling tax revenues and austerity measures from the central government risk delaying the decarbonisation of cities, a core requirement for reducing EU greenhouse gas emissions. This will also negatively affect industries in the low-carbon sector, employment and ultimately adversely hit the economy, as energy, transport and ICT are core economic sectors. Given the strategic importance of cities, it is important to deploy all possible financial tools to make a low carbon transition possible and affordable.

The objective of this guidance document is to provide concise information on the opportunities that EU Funding instruments provide and to assist regional authorities in preparing the programming documents for the period 2014-2020. The Cohesion Policy, together with the EU's Competitiveness and Innovation Funds (Horizon 2020, COSME) allow the development of powerful integrated energy, transport and ICT investments. The EIB's instruments, such as Jessica and Elena, will be reinforced and will complement the EU budget funds and private investments.

The impact, however, will depend on the quality of the programming documents. Without a strategic change in the objectives and planning of national and local authorities the impact of the EU Funds will be insufficient. Once the 2014-2020 programming period starts, correcting for weak programs is difficult. The report will present the new instruments for the period 2014 and guidance on how to integrate smart city investment in the programming process, taking full advantage of the opportunities to combine regional funding with other sources. This will enable cities and local governments to apply strategic and integrated planning and finance the introduction of key innovations. This should lead to the acceleration of development and deployment of energy efficient and low-carbon technological applications at the urban level in Europe, in both in the short and long term.



## Smart Urban Investment Planning Process – The EU Case



This short guidance document focuses on the needs of European cities when embarking on a smart city strategy. It identifies the most important aspects to be taken into account when adopting integrated innovations, such as the ones identified in the Stakeholder Platform.

One of the major challenges when it comes to devising and implementing a Smart City strategy is the complexity of the city itself and of the (decision-making) processes that need to be put in motion to change the status quo. This challenge often materialises in the form of understanding the potential solutions for the city and overcoming very practical barriers that concern

the regulatory environment, decision-making processes, and existing governance mechanisms. This guidance document aims at providing preliminary guidance on how to embark on a smart city path and break down barriers related to context and process into more analytically manageable components/steps. It also addresses the question of how to develop and appraise “business models” when implementing new integrated innovative solutions, and of cities finding the right balance between public intervention and private operations.

The document is designed to offer practical solutions and takes the reader through the different steps required from the development of a solid and realistic strategy down to implementation. The city strategy should not only focus on emission reductions, but also on the socio-economic linkages, reinforcing positive feedbacks. The document will include guidance for the development of a clear strategic vision and the completion of a Strategic Energy Action Plan (SEAP) based on a solid analysis of the city’s potential and needs, as well as a list of important steps when selecting a technological solution and implementing it. It also provides links to other key guidance documents and good practice examples.

## Public Procurement for Smart Cities

There is growing recognition that the LCEGS sector is a growing part of the EU economy, with the associated economic and social benefits that this brings. This high value sector has potential for exponential growth based on increased global demand for low carbon, resource-efficient goods and services.

The public sector will increasingly become a key player in driving investment in smart technologies in the low carbon and environmental goods and services (LCEGS) sector through public procurement, for example;

- retrofitting of public sector building stock;
- smart energy grids and broadband access;
- electric vehicle charging infrastructure;
- installation of heat networks;
- onsite renewable energy generation;
- involvement in more general adaptation / mitigation.

Smart Cities need to be able to identify and procure the best technical solution for their communities and businesses whilst demonstrating the local economic benefit of that procurement. Wherever possible, the procurement process should also be used to increase innovation in sustainability.

This guidance document has the objective of assisting cities to implement the most appropriate public procurement mechanisms, while advising the EU and national authorities of potential reforms. The document will thus:

- identify existing good public procurement practice in smart cities;
- identify the common characteristics of exemplary procurement processes;
- identify current barriers to uptake of exemplary procurement processes and potential solutions;
- offer guidance to the Commission, City Authorities and Member States on how to accelerate the uptake of exemplary procurement processes to optimise investment in the LCEGS sector; and
- offer guidance to the Commission, City Authorities and Member States on how businesses in the LCEGS sector can more easily access and respond to tendering opportunities;



## Stakeholder Engagement Mechanisms for Smart Cities

There is a growing awareness that, regardless of the technological and theoretical quality of projects, a top down implementation may result into an unexpected sub-optimal result. In addition to the practical problems of finance and procurement, the integration of smart technologies in cities needs to be in tune with the

socioeconomic reality of the city. The implementation has to take into account the different stakeholders involved. Who are the final users and how will they respond? Who will operate the technology(-ies)? Which organisations will need to be involved in the realization of the projects? What is the level of communication between the key players?

It is important that the vision and the expected results of the low-carbon projects are based on a realistic scenario of a real world application. This can only be achieved with a clear understanding of behaviour on the ground and involvement of the right stakeholders. New technologies need in fact to reflect the needs of the ultimate beneficiaries and users, i.e. the citizens. This requires an early involvement of citizens, in particular if they are also expected to share the cost of the deployment.

This guidance document presents some key recommendations based on experience in large low carbon technology demonstrations undertaken in European cities. References to findings and projects will be given. This short and concise document should help to avoid the repetition of past mistakes.



## 10 Year Rolling Agenda

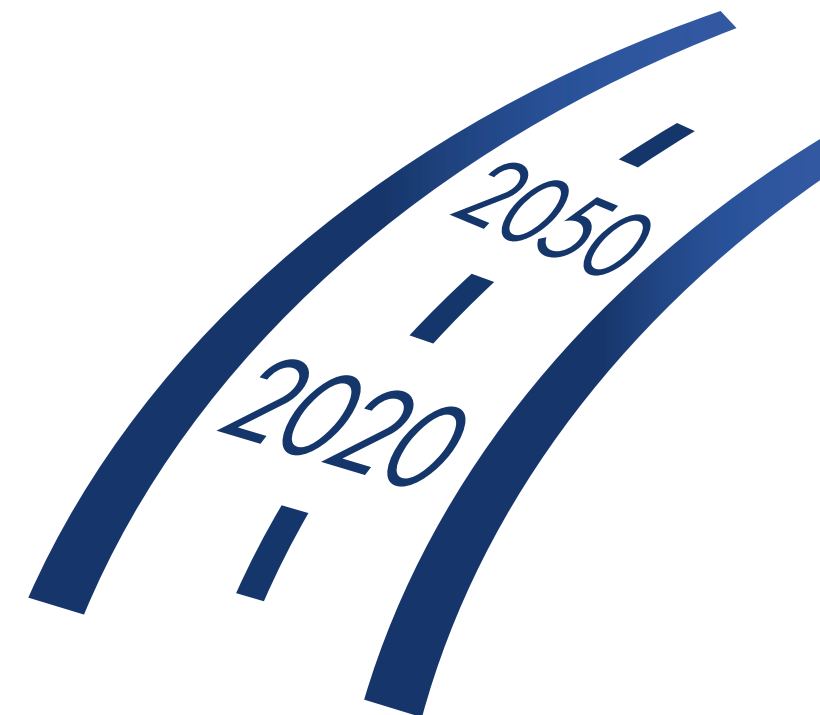
The '10 Year Rolling Agenda' is a 'practical vision' by stakeholders on how to accelerate the deployment and integration of technologies, which are required to transform European cities and communities into smart cities and communities.

The Agenda is principally addressed to the High-Level Group of the Smart Cities and Communities European Innovation Partnership and to the European Commission. Thereby it provides a bottom-up contribution to policy formulation and implementation.

In parallel, parts of the Agenda are directed towards cities and communities to assist their day-to-day work in deploying smart cities and communities technologies.

The Agenda is prepared by the Platform's Smartcity Roadmap Group. The Roadmap Group meets physically to discuss the outline and content of the Agenda. In parallel it has created a virtual space where all members of the Platform can contribute to the Agenda by commenting on drafts or submitting input. The Agenda is subject to open web-based consultation so that all stakeholders can contribute.

Membership in the Agenda Group is open to all Working Group members of the Platform. It is inclusive and based on self-nomination to capture the breadth and depth of the knowledge available on the web-based Platform. Specialists identified from outside and members of the Platform are invited to join.





## Contribute to the Platform

- register your personal Smart City expert profile
- publish your ideas, submit innovations, adopt a city
- find partners to create high quality project proposals

**...and shape the future of your Smart City**



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