Smart Cities in Europe

High-Level Forum on "Setting the vision for smart sustainable cities"
-4th ITU Green Standards Week

24 September, 2014

Chris Brown
Director
EU-China Policy Dialogues Support Facility (PDSF)

EU Policy Support to Smart City Development

The main focus of EU smart city policy: measures:

- facilitating smart cities projects to extract more value from **existing** infrastructure and capital, via research, technical development and innovation;

- create **new** products and services that generate economic growth and which meet social and environmental challenges

EU 2020 goals

20% reduction in greenhouse gas emissions from 1990 levels

3%of the EU's GDP (public and private combined) to be invested in R&D/innovation

75% of 20-64 year olds to be employed

10% maximum school drop-out rate

20m fewer people in or at risk of poverty and social exclusion

Initial considerations

- Why and how will the city grow?
- What will be the age structure and range of professional activities of its citizens?
- What kind of medical services will be required?
- What kind of social interaction is desirable?

- Future energy costs?
- Regional and international migration developments
- Shifts in the socio-economic composition of the population

Making Sense of the "Smart City" concept

Digital infrastructure •new ICT infrastructure •high speed broadband •fibre optic cables, •wireless technologies •networked information systems	**Data** •Data collection, storage, and analysis at a city wide level, potentially through the 'Cloud', which can enhance a city's ability to predict and plan for the future **Information processing** •Processing of information to service programmes **Service development** •Development of service applications	
Smart Transport and Mobility •Bike schemes, •Real time bus timetable information •Electric Vehicle car pools •Congestion charging	**Renewable energy & energy efficiency** •Combined Heat and Power •Renewables •Electric Vehicle Charging Points •Sensors to monitor traffic, pollution, emissions, •Street lighting •Waste collection systems •Smart grids	**Smart and Sustainable Buildings** •Smart meters •Energy efficiency measures: Insulation, low energy lighting, efficient boilers •Building Integrated Renewables •Electric Vehicle Charging Point •Smart appliances •Motion detectors •Automatic weather forecasting

EU, Member States, Cities and Communities

- High degree of fiscal and political independence of cities and communities

- Considerable level of municipal debt

- Heterogeneous starting points

- Direct Smart City support from national and EU level mostly in the form of coordination, know-how exchange

"Advisory Group ICT Infrastructure for energy-efficient buildings and neighbourhoods for carbon-neutral cities"

- **"energy efficient neighbourhood"** concept

- **implementation of existing, advanced state of the art products and services**;

- Needed: research 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;

Commission Focus

- **Connectivity**: Pan-European connectivity is to be promoted through increased work on high-speed broadband availability. Smart city systems and solutions depend on high quality of communications infrastructure.

- **Open Data**: "open data by default" for the benefit of enterprises, citizens and the administration. Smart cities benefit by better solutions for key challenges such as transport and energy use.

- **Entrepreneurs and start-ups:** Initiatives such as the "Future Internet Lab" promote a dynamic entrepreneurial culture around the smart cities, intended to create synergies and the creation of innovation hubs.

- **5G**: Substantially improved next generation of networks. Smart city operation and management and the network usage demands of the businesses and citizens calls for fast entering the 5G stage.

- **Innovation**: European Innovation Partnership on Smart Cities and Communities was launched, intended to bring stakeholders from all relevant sectors together.

European Innovation Partnership for Smart Cities and Communities (EIP-SCC)
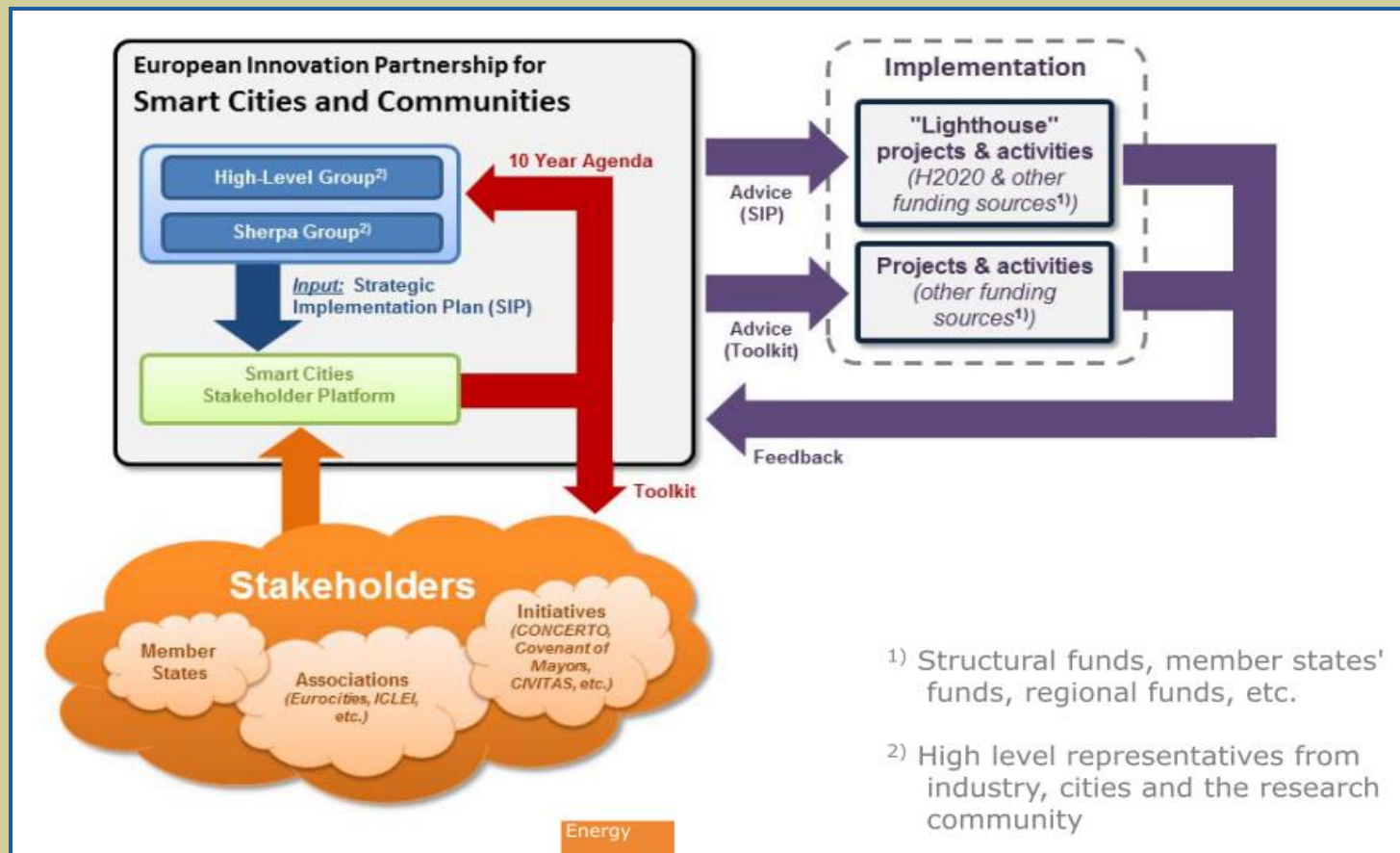
Main sources of EU funding

- **Horizon 2020:** Focus on research and innovation, Smart City "Lighthouse Projects" combining energy, transport and ICT
- **Cohesion Policy:** Focus on stimulation of regional socio-economic development :
- National and regional funding
- Combination of sources

- Support to financing Smart City Projects through financial instruments that reduce investment risk, in particular European Investment Bank (EIB):
  - ➤ **ELENA** (European Local Energy Assistance): assists local authorities in development of energy efficiency and renewable energy plans.
  - ➤ **JESSICA** (Joint European Support for Sustainable Investment in City Areas): created to help reduce funding cost for Smart City projects. Urban Development Funds to provide additional sources of funding and thus lower senior debt requirements, lead to an improved capital structure and senior debt credit quality.

Is it possible for Chinese cities to get involved?

- Chinese participation is welcomed in **all** Calls for Proposals of Horizon 2020
- In the 2014/2015 calls several topics are specifically flagged for targeted cooperation with China. Participation of Chinese partners is strongly encouraged:
  - ➢ Food,
  - ➢ Agriculture and Biotechnology,
  - ➢ Water,
  - ➢ **Energy,**
  - ➢ **Information and Communications Technologies,**
  - ➢ Nanotechnology,
  - ➢ Space
  - ➢ Polar research

- Same conditions and financial rules as other emerging economies and industrialised countries. Chinese participants need to cover their participation costs in Horizon 2020 projects with their own funds, e.g. through Chinese research and innovation funding agencies.

PPP for Financing Smart Cities

- Promoting PPP

- E.g. the European Investment Bank's "European PPP Expertise Centre" (EPEC)

- "EPEC PPP Guide" as a web tool

Example: EPEC's standardised PPP model (street lighting)

- **Basic parameters:**
  - Contract period (of 20 years)
  - Core investment-period (5 years), further investments with annual budget
  - Operation and maintenance of facilities
  - Energy supply
  - Ownership of existing facilities remain with the municipality
  - Transfer of ownership of new assets to municipality once they are operational
  - Need for documentation of existing facilities, technologies, age and their status
  - Output-based specification

- **Lessons learned:**
  - PPP and partnering contracts offer fast replacement of old facilities to improve traffic safety and security
  - Prior to tender an inventory of existing facilities must be prepared by the authority
  - Case studies proof major energy-saving potentials, major cost-savings for municipalities and possible risk-transfer to private sector partners
  - Further LED-developments will increase the saving-potentials
  - The models can be standardised and repeated, but financing needs to be adapted to the institutions available.

EPEC's standardised PPP model
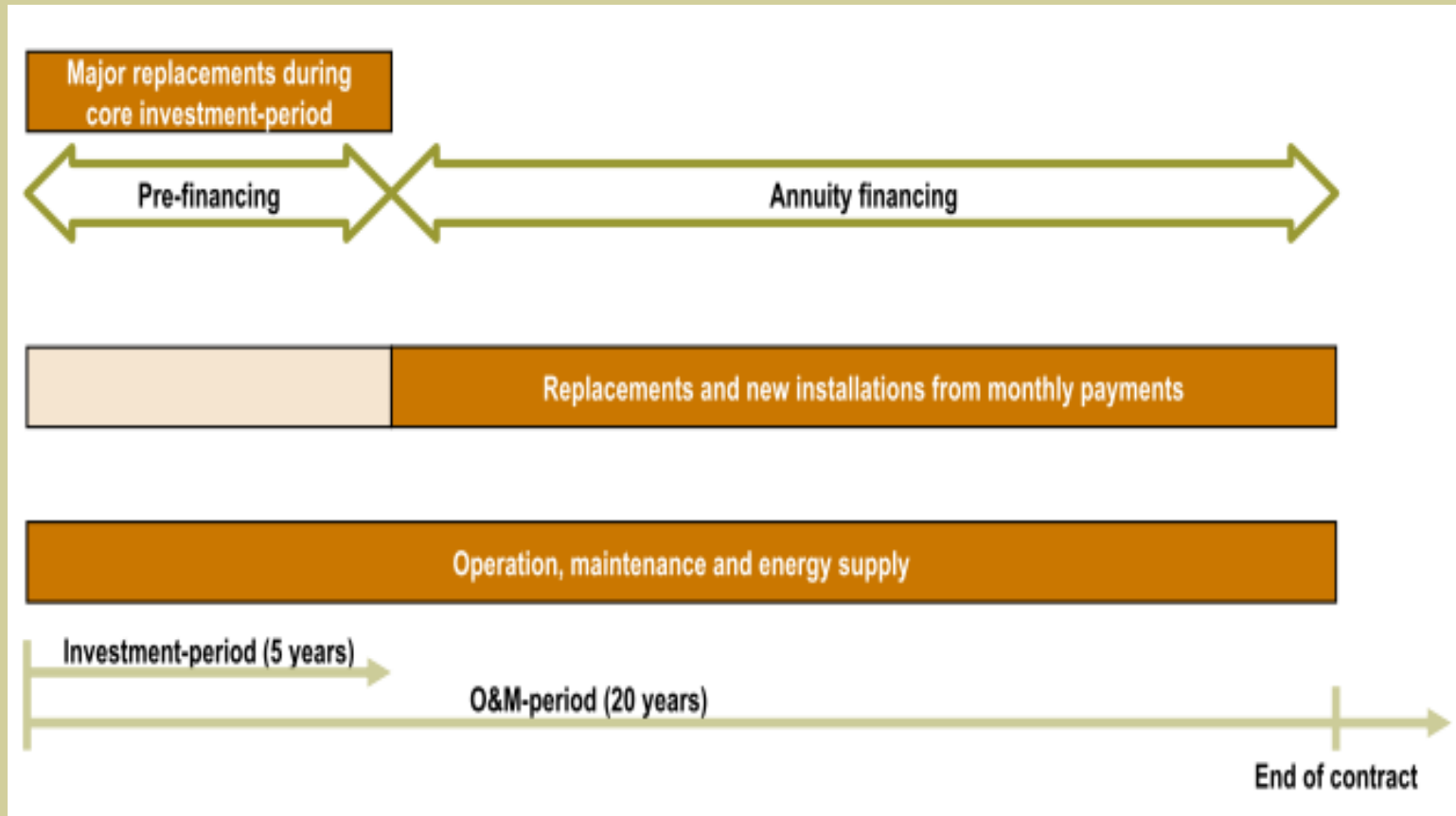
Member State Level Support, e.g. UK

- **UK Future Cities Demonstrator Programme**

- UK Technology Strategy Board started funding feasibility studies in UK cities to show the value of integrating city systems.

- The Board identified three systems that lack viable solutions on the market

  - platforms to identify community energy patterns down to the building level, with the ability to predict future demand;

  - data management platforms to connect city's many disparate data sets, including innovative ways to analyse and display that data;

  - real-time route planners for commuters, delivery vans, tourists, etc.

- Total £24 Mio grant. Each participating city was granted 50,000 Euro to develop an innovative proposal.

- A condition for entering the contest was that entrants use non-proprietary data formats and APIs.

- Winner: Glasgow used the grant money to invest in "super intelligent" CCTV cameras that can be used to raise alarm when unattended bags are detected, and apps that can help visitors find the quickest routes
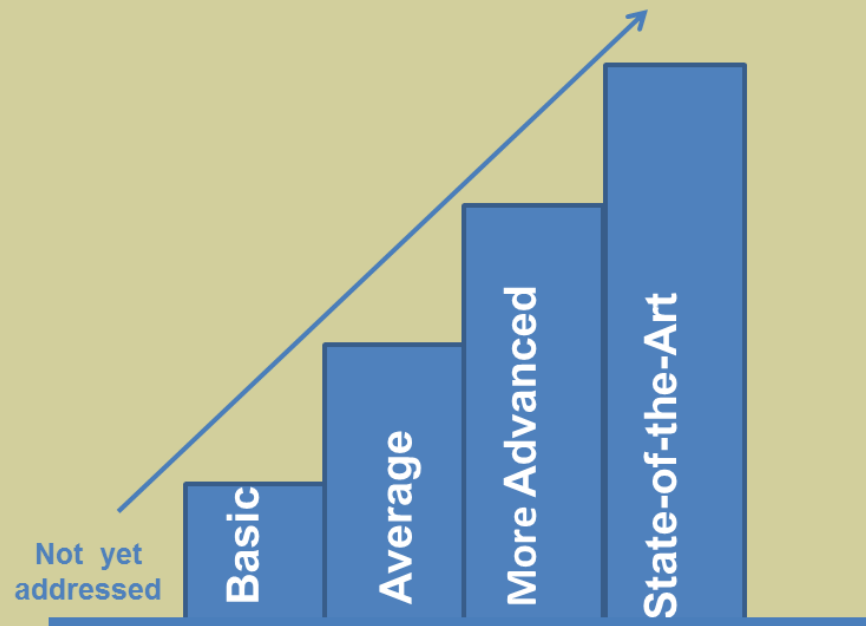
EU-China Comparative Study on Smart Green Cities
Assessment Framework

- The objective of the assessment framework to *compare* the various characteristics of each Smart City project in order to
  - Identify "good practise" in the various components of a Smart City project
    - Assessed against a common set of criteria
  - Understand emerging challenges in Smart City projects
  - Develop a "Good Practice Framework for Smart City Planning and Development"

中华人民共和国工业和信息化部
Ministry of Industry and Information Technology of the People's Republic of China

工业和信息化部电信研究院
China Academy of Telecommunication Research of MIIT

欧盟委员会通信网络内容与技术总司
DG Connect of EU Commission

中欧政策对话支持项目
PDSF

Recommendations

- The recommendation is a roadmap for continuous improvement where cities to advance step by step until reaching the "state-of-the-art" level of maturity

Not yet addressed

Basic

Average

More Advanced

State-of-the-Art

The Smart City Staircase Roadmap towards Maturity

EU-China Comparative Study on Smart Green Cities I

	State of the Art
Smart City Strategy	• Smart city KPI's benchmarked against international standards, which are made available to all stakeholders • ICT plans ensure major technology trends are included in their city planning
Stakeholders	• Uses multiple forms of interactive technologies to engage with citizens, e.g. Micro-blog, mobile social applications, Crowd-sourcing, Gamification, etc. as mechanisms to engage with citizens • Actively promotes and publicises smart City developments to stakeholders • Provides training to help citizens adopt new services

Governance	• Processes in place to
	   ○ Allow stakeholders to participate in decision-making; and
	   ○ Ensure there is transparency and accountability of the various stakeholders

EU-China Comparative Study on Smart Green Cities II

Funding	• No funding issues and funding available to meet **all** smart city objectives
Value Assessment	• The assessment evaluates the **overall** impact (economic, environmental, social and cultural outcomes) of all smart city projects
Business models	• Uses a variety of business models that have been implemented for full scale projects
ICT infrastructure	• 100% high speed (>20 Mbs) broadband coverage • Real-time city operations are optimised • ICT vision and strategy overseen by dedicated City CIO o Measures in place to ensure the city 'future proofs' its investment in ICT infrastructure

Participating Cities (EU)

European Pilot Smart Cities
Amsterdam, Netherlands
Barcelona, Spain
Bristol, UK
Copenhagen, Denmark
Florence/Prato, Italy
Frankfurt, Germany
Issy-les-Moulineaux, France
Lyons, France
Malmö, Sweden
Manchester, UK
Riga, Latvia
Tallinn, Estonia
Venice, Italy
Vilnius, Lithuania
Zagreb, Croatia

Barcelona, Spain

Examples EU Smart Cities

Service 1	Intelligent **traffic data** management, with the creation of a Situation Room to control the city from one single center.
Service 2	**Open Government project**, based on the promotion of citizen participation, cooperation and transparency, especially making public data and infrastructures available.(2012) (Open Data, OVAC, e-administration)
Service 3	Development of **energy efficiency in buildings** based on the incorporation of solar panels, mixed uses, joint heating and water recycling under the framework of Energetic self-sufficiency plan (self-sufficient building blocks, smart grid, heating and cooling network)
Service 4	**Smart Innovation** includes the following projects: Innovation District 22@, Smart City Campus, Smart City Tour, Smart City Cluster, Urban Lab, and Competence center mSmart City. Urban Lab, 2008, is a tool created to allow the use of public space for companies to test solutions and services in a real urban environment.
Service 5	Development of an **Urban Platform for city management** to unify data from various sources (this project will be ready in 2014) which includes the projects: CityOS, Barcelona Sensors Platform, i-City.

Bristol, UK

Examples EU Smart Cities

Service 1	**Digital Environment Home Energy Management System (DEHEMS)**: The project looked at how technology can improve domestic energy efficiency. Intention was to develop and test a home energy management system with the aim of improving the current monitoring approach to levels of energy being used by households in order to reduce CO_2 emissions.
Service 2	**3e-Houses:** The project consists of integrating the most common ICTs into social housing in order to allow homes to save energy, shift their consumption from peak to off-peak hours and reduce CO_2 emissions.
Service 3	**ICT services for Electric Vehicle Enhancing the User experience (ICT 4 EVEU):** The project aims to deploy an innovative set of ICT services for electric vehicles in pilots across Europe. Integration of different Management Systems operating on the existing EV infrastructures in the cities, related services can be deployed and make use of these interconnected infrastructures (charging points, control centres and vehicles).
Service 4	**Urban Traffic Control Centre (UTCC):** The Centre now uses more than 200 cameras to monitor vehicular movements throughout the city, linked to the remote communications and equipment room via the council's own fibre network (B-Net), the images are displayed for operators on a large rear-projection video wall.
Service 5	**B-Open Data Store:** Open Data Portal to promote transparency and increase public and neighbourhood engagement, encouraging citizens to work with information and data to create applications, websites, mobile products or installations.

Florence, Italy

Examples EU Smart Cities

Service 1	**Smart Lighting:** use of advanced technologies related to **lighting** (lighting with LED sources) for energy savings and reduced environmental impact
Service 2	**ELECTRA:** promoting a new urban sustainable **mobility** model. Increase the electric scooters use in urban areas, through short sharing (e.g. for one day) or rent (e.g. for six months)
Service 3	**Open Data:** Florence has launched a section of its website dedicated to recently released mobile apps. - **Florence Heritage:** information about elements of the city that contribute to its UNESCO Heritage status, including historic shops and Palazzi, itineraries and in depth information. - **FirenzeUp:** connects to the city's events database - **Firenze the Walking City:** suggests historic and panoramic walking itineraries, including a guide to open Wi-Fi hotspots
Service 4	**GEO** is a service of geo-referencing information resources in the field of mobility. Provides access to a family of related services to the mobility and provides real-time traffic situation of Florence. Possible to see construction work, accidents, speed cameras, detours, etc.

More background

- http://www.eu-chinapdsf.org/:

- Summary of Exchange Meeting of EU and Chinese Cities
- White Paper and Comparative Report

4th ITU **Green Standards** Week

Thank you