



**“REgeneration MOdel for accelerating the smart URBAN transformation”**

**HORIZON 2020-WORK PROGRAMME 2004-2015 – 10. Secure, clean and efficient energy**

**SCC 1–2014: Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects**

*Document title*

## **D5.2: Model for replication potential**

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**Author(s):** Miguel Á. García<sup>1</sup>, Cristina de Torre<sup>1</sup>, Ana Quijano<sup>1</sup>, Marian Gallego<sup>1</sup>, Jane Lumb<sup>2</sup>, Murat Aksu<sup>3</sup>, Baturay Yenilmez<sup>3</sup>, Angela Rivada<sup>4</sup>, Elena Hoyos<sup>4</sup>, Isabel Tomé<sup>5</sup>, Marjan Sarshar<sup>6</sup>, Muhammad Usman Mazhar<sup>6</sup>, Marcello Bardellini<sup>7</sup>, Elisabeth Schmid<sup>7</sup>, Matthieu Grosjean<sup>8</sup>, Valerie Bahn<sup>8</sup>, Philippe Compère<sup>9</sup>, Christelle Degard<sup>9</sup>, Zoé Lejeune<sup>9</sup>, István Nagy<sup>10</sup>, Alessandra Cassisi<sup>11</sup>, Anna Rita Giacobelli<sup>11</sup> (<sup>1</sup>CAR, <sup>2</sup>NCC, <sup>3</sup>TEP, <sup>4</sup>VAL, <sup>5</sup>IBE, <sup>6</sup>NTU, <sup>7</sup>YOU, <sup>8</sup>SEZ, <sup>9</sup>SER, <sup>10</sup>MIS, <sup>11</sup>VER)



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## Abbreviations and Acronyms

Acronym	Description
ARA	Assessment of Resource Adequacy
BCO	Build Own Operate
BEC	Building Energy Certificate
BOOT	Build Own Operate Transfer
BOT	Build Operate Transfer
CEF	Connecting Europe Facility
CEI	Community Engagement Index
CEO	Chief Executive Officer
CIT	Cluster Identification Tool
CMM	Capability Maturity Model
CSA	Coordination and Support Actions
CTI	Comparative Tracking Index
D&C	Dissemination and Communication
DBFO	Design Built Finance Operate
EBRD	European Bank of Reconstruction and Development
EEEF	European Energy Efficiency Fund
EFG	Equity Facility for Growth
EFSI	European Funds for Strategic Investment
EIAH	European Investment Advisory Hub
EIB	European Investment Bank
EIF	European Investment Fund
EIP	Entrepreneurship and Innovation Program
EIP-SCC	European Innovation Partnership on Smart Cities and Communities
EJP	European Joint Programme
ELENA	European Local Energy Assistant

<b>EPC</b>	Energy Performance Contracting
<b>ERDF</b>	European Regional Development Fund
<b>ESF</b>	European Social Fund
<b>ESIF</b>	European Structural and Investment Funds
<b>ETC</b>	European Territorial Cooperation
<b>FEV</b>	Fully Electric Vehicle
<b>FFA</b>	Financial Feasibility Analysis
<b>FS</b>	Feasibility Study
<b>GBP</b>	Green Bond Principals
<b>GDP</b>	Gross Domestic Product
<b>GHG</b>	Greenhouse Gas
<b>IA</b>	Innovation Actions
<b>ICPC</b>	International Cooperation Partner Countries
<b>ICT</b>	Information Communication Technologies
<b>IEE</b>	Intelligent Energy Europe
<b>INEA</b>	Innovation and Networks Executive Agency
<b>IPA</b>	Investment for Pre-Accession Assistance
<b>ITI</b>	Integrated Territorial Investments
<b>IUP</b>	Integrated Urban Plan
<b>JASMINE</b>	Joint Action to Support Microfinance Institutions in Europe
<b>JASPERS</b>	Joint Assistance to Support Project sin European Regions
<b>JEREMIE</b>	Joint European Resources for Micro to Medium Enterprises
<b>JESSICA</b>	Joint European Support for Sustainable Investment in City Areas
<b>KPI</b>	Key Performance Indicator
<b>LA</b>	Local Authorities
<b>LGT</b>	Loan Guarantee Facility
<b>NEEAP</b>	National Energy Efficiency Action Plan

<b>NGO</b>	Non-Governmental Organisation
<b>O&amp;M</b>	Operation and Maintenance
<b>OPRD</b>	Organic Process Research and Development
<b>P2P</b>	Peer to Peer
<b>PA</b>	Public Administration
<b>PCI</b>	Projects for Common Interests
<b>PCP</b>	Pre-commercial Procurement
<b>PF4EE</b>	Private Finance for Energy Efficiency
<b>PHEV</b>	Plug-in Hybrid Electric Vehicle
<b>PMT</b>	Project Management Team
<b>PPI</b>	Public Procurement of Innovative solutions
<b>PPP</b>	Public Private Partnership
<b>PRM</b>	Project Risk Management
<b>PSC</b>	Public Sector Comparator
<b>RE</b>	Renewable Energy
<b>REMOURBAN</b>	REgeneration MOdel for accelerating the smart URBAN transformation
<b>RIA</b>	Research and Innovation Actions
<b>RISC</b>	Replication Information System for Cities
<b>SCTP</b>	Smart City Technology Package
<b>TA</b>	Technical Assistance
<b>TIF</b>	Tax Increment Financing
<b>TP</b>	Technology Package
<b>TPF</b>	Third Party Financing
<b>TU</b>	Technology Unit
<b>UDF</b>	Urban Development Funds
<b>VfM</b>	Value for Money
<b>WBS</b>	Work Breakdown Structure

## Executive Summary

The main objective of REMOURBAN project is to deliver a replicable urban regeneration model based on innovative combination of technologies and methodologies demonstrated in the three lighthouse cities<sup>1</sup> of the project. This main targeted output of the project is aimed at showing the pathway, or in other words the 'right direction' as a lighthouse does, to cities of Europe (and beyond) towards becoming more sustainable, more attractive and more liveable places upgraded through the deployment of smart solutions and services.

Smart urban transformation is deemed to improve resource-efficiency of a city's operation from many aspects, hence contributing to its competitiveness – and, in smart economies, there is additional job creation too, as well as a great number of multilateral benefits harvested by different actors of urban environment.

Consequently, the REMOURBAN approach is not limited to technologies only, but co-focuses on developing comprehensive methodologies too – taking into account i.e. innovative financing models and mechanisms, policies, urban planning strategies, non-technical barriers, technical actors and social engagement.

In order to ensure the adaptability of a complex urban regeneration model being developed within REMOURBAN, replicability is key, as underlined above. Within the project, WP5 is dedicated specifically to replication issues which have, by this document, arrived to the second stage<sup>2</sup>. In this stage, a model has been developed with the aim to facilitate follower (incl. external interested, see Figure 1) cities to assess the replicability/adaptability of REMOURBAN solutions to their own environment. In line with this objective, it is important to foster an easier identification of appropriate links among REMOURBAN solutions and real possibilities of interested cities.

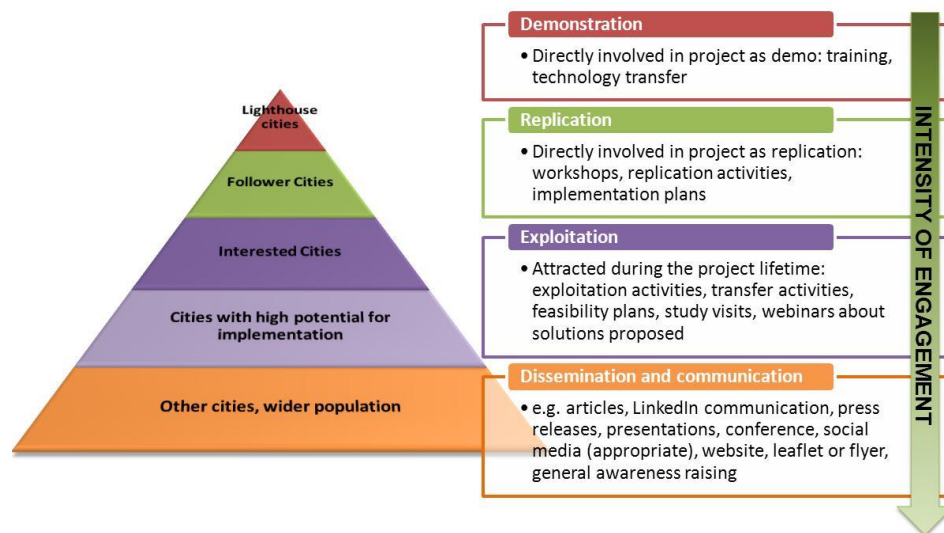


Figure 1: REMOURBAN scale-up approach for demonstration, replication, exploitation and dissemination

<sup>1</sup> Valladolid (ES), Nottingham (UK), Tepebasi (TR)

<sup>2</sup> The output of the first stage was D5.1 Characterization report of European cities

Therefore, even if the unrefined ‘regeneration model’ of the project has not been delivered so far<sup>3</sup>, and the content of the interconnected technology units (so called Smart City Technology Packages SCTPs) are under development, this document already presents how replicability-aimed solutions can be connected to existing needs and development priorities of a city.

The replicability framework is presented in Chapter 2. The two sides to be connected are the ‘supply’ and the ‘demand’ sides, where supply covers the basket of technologies and methodologies applied within the project in an innovative manner; demand side identifies the interested (potential replicator) cities in need of identifying/matching relevant development priorities through city characterization and the design of specific integrated strategies and implementation plans. As Figure 2 shows, ‘supply’ can be connected to the ‘demand’ through two ways of linkage. According to the REMOURBAN approach, the replication of methods and processes can lead to long-term strategic plans at a city level, the implementation of which can be based on, or benefit from technical solutions listed in Table 17: First set of technologies to be covered by the SCTPs(in units and packages).

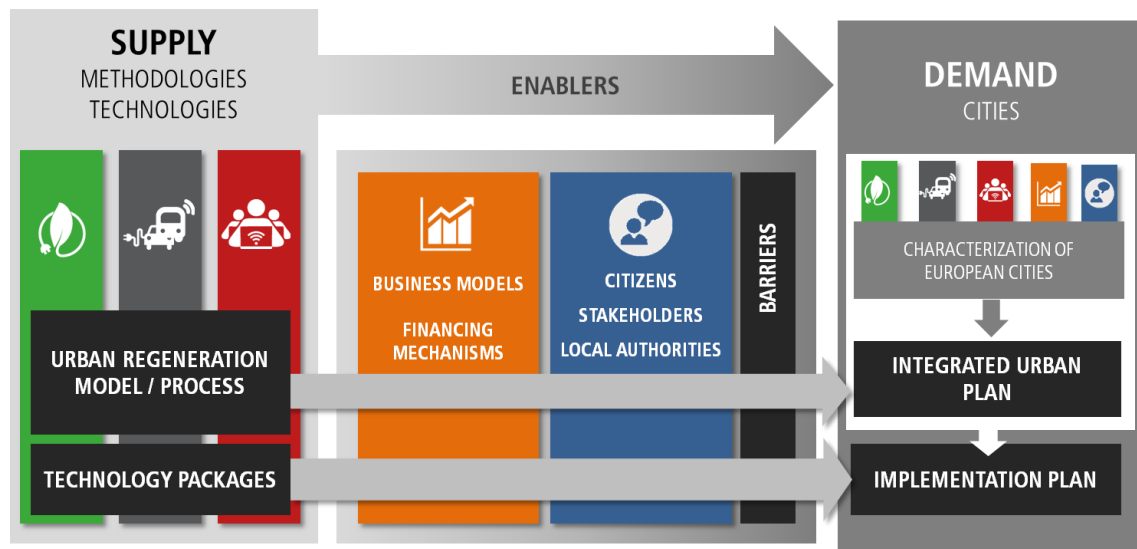


Figure 2: Overall REMOURBAN replicability strategy

In Chapter 3 the strategic approach for evaluation of the replication potential is presented together with the steps towards developing replication plans. For the latter, it is essential to identify the current baseline of the city (through indicators proposed in section 3.2.1) based on physical, social, strategic, financial and technical (energy, mobility, ICT) characteristics.

The cluster where the city ‘belongs to’ and the suggested strategic priorities can be identified through the current baseline and the principles set in section 4.2.2.

Regarding the ‘supply’ of technologies and their associated components, this document introduces different templates for technology units (TU), Smart City Technology Packages (SCTPs), socio-technical units (STUs), and operation models (OMs). In the end of the day, SCTPs and OMs are likely to claim for the highest attention of potential replicators due to their high degree of comprehensiveness, taking into account information on direct and diffused benefits, preconditions, barriers and success indicators, roles of stakeholders, hints and tips on suggested communication practices incl. effective ways of citizen engagement. The fulfilment of

<sup>3</sup> Expected by June 2017

these templates (found in Chapter 5) with proper information has been started already, and should become available soon for Task 5.3 too, where the applicability of the model will be tested by follower cities (and some interested ones as planned).

Chapter 6 encounters those smart city enabling actors that have key roles in accelerating smart urban transformation, such as: financial, political, social, technical players. Here a wide range of smart city funding opportunities are presented (section 6.1 and Annexes 2-5.) together with serving advices for exploiting financial opportunities to the highest extent possible. Section 6.2 includes solutions to enable governmental/political players supporting smartification activities. Dipping from WP6<sup>4</sup> framework, experiences and plans, helpful guidelines are presented in Section 6.3. for effectively engage citizens into development projects and 6.4 is dedicated to present the REMOURBAN approach in brief for enabling technical players. Although SCTP templates will contain specific information on respective barriers and success factors of implementation, section 6.5 reports about ways to overcome those barriers that might have blocking effects against city/district regeneration.

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<sup>4</sup> REMOURBAN work package dedicated to communication and dissemination



# 1 Introduction

## 1.1 Purpose and target group

The main **purpose** of this deliverable is develop a model to assess the replication potential of solutions demonstrated within REMOURBAN to other cities that are willing to implement innovative smart solutions combined to 'classic' ones in order to promote urban sustainability and increase quality of life for citizens. An important aim of this document, developed in the framework of WP5 dedicated to *replication*, is to assist cities, in particular the ones classified as second tier, in identifying those interventions that are deemed to be the most suitable in terms of responding to the local challenges on an affordable manner without running into social rejection.

Therefore, this document pays particular attention to:

- Describing the features of the 'supply' side by introducing the list of interventions (i.e.: technologies in the area of sustainable energy, mobility and ICT and also methodologies developed for accelerating the urban transformation through smart means) demonstrated in the Lighthouse Cities within the project and a methodology for how to offer the solutions through well-equipped packages that are as 'easy to handle' as possible;
- Characterizing the demand represented by cities/districts, according to physical, social, strategic, financial, and technical (energy, mobility and ICT as above) features; cities should be enabled to assess the respective replication potential through identifying their current status, city cluster<sup>5</sup>, respective proposals for strategies, priorities and technologies;
- The enablers of smart urban transformation with regards to financial, political, social and technical players as well as solutions the application of which can effectively contribute to elimination of non-technical barriers.

The **target group** of this document embraces a wide range of interested actors: starting from REMOURBAN ('contracted') follower cities, it addresses other 'external' cities having interest in potentially replicating the demonstrated solutions, city administration professionals, strategy builders, city planners, as well as financial players incl. intermediaries and local fund raiser experts, to even the final end-beneficiaries of urban regeneration projects/programmes themselves: the citizens to whom this document is also publicly available.

## 1.2 Contribution of partners

The following Table 1 depicts the main contributions from participant partners in the development of this deliverable.

Table 1: Contributions of partners

Participant's short name	Contributions
CAR	Content of section 2, 6.4 and global contributions as project coordinator
NCC	Content of section 3.1

<sup>5</sup> One of the 5 city clusters, see section 4.2



TEP	Content of section 6.5, technical review of the document
VAL	Content of section 6.5
IBE	Content of section 3.2.1, technical review of the document
NTU	Content of section 6.2, contribution to 3.1, Annexes 7-9, grammatical proof-reading of the document
YOU	Content of section 6.3 and Annex 6
SEZ	Content of section 4.4 and 5.2
SER	Content of section 3, section 4 (4.1-4.3) and global contributions as a work package leader.
MIS	Content of section 1, 7, 8 and global contributions as a work package leader
VER	Content of section 6.1 and Annexes 1-5

### 1.3 Relation to other activities in the project

The following Table 2 depicts the main relationship of this deliverable to other activities (or deliverables) developed within the REMOURBAN Project and that should be considered along with this document for further understanding of its contents.

Table 2: Relation to other activities in the project

Deliverable number	Description
D1.1-D1.6	Innovations on Energy
D1.7 and D1.10	Innovations on Mobility (M12)
D1.8, D1.9, D1.11 and D1.12	Innovations on ICT (M12)
D1.13	Non-technical barriers which affect the large scale interventions and in general, the city transformation, solutions and best practices found in this deliverable can part of the model for analysing the replication potential (M18)
D1.15	Smart City Strategy implementation plan will allow to know the key factors and the guidelines to develop urban integrated plans (M24)
D1.16	This report provides innovative citizen engagement strategies/engagement model to be considered in the model for replication potential (M12)
D1.17	This deliverable deals with innovative business models and financial schemes which can be taken into account in the model for replication potential (M18)
D1.18	This deliverable compiles innovative PPP solutions and approaches which can be useful for defining the model for replication potential (M18)

D1.19 / D1.20	These deliverables provide the overall description of the Urban Regeneration Model which allows the transformation of urban areas into smarter places. Replication potential model will be aligned with the main pillars of the urban regeneration model (M30)
D2.1	Key performance indicators identified will be considered in the model for replication potential (M19)
D3.4 - D3.5	City audits: Seraing and Miskolc (M10)
D3.6 - D3.8	Technical definition of the Valladolid, Nottingham and Tepebasi demo sites (M12)
D3.9 – D3.11	Financial plan of the Valladolid, Nottingham and Tepebasi demo sites (M14)
D3.15	Citizen engagement strategies will be considered for the model for replication potential (M8)
D5.1	This deliverable is the starting point for defining the model for replication potential since it includes the typologies of cities defined and the KPIs used for their characterization (M12)
D5.3	The replication potential model defined in this deliverable will be tested in D5.3 - Evaluation report on the replication potential of the follower cities (M32)
D5.4	A replicability plan for each follower city will be developed in D5.4 (M55), as a subsequent action of this deliverable 5.2 and the next D5.3.
D5.5	Integrated urban plan for each REMOURBAN city will be developed in D5.5 (M55). The present deliverable will be used as a basis.
D7.1	Matrix of project results with potential for exploitation (M9)
D7.2	Results of the market analysis will be taken into account in the model for replication potential (M15)
D7.3	Dissemination Cascade plan (M13). The dissemination cascade plan links all project activities with the specific focus on replication, exploitation and dissemination/communication.

## 2 Replicability framework

A model for the evaluation of the replication potential of technologies and methodologies is developed in this deliverable. In this section, the replicability framework to be developed in WP5 is described, specifically the scope of the model for evaluating the replication potential.

The analysis performed in the characterisation of European Cities (D5.1) represents the demand side for urban transformation strategies. This demand has to be connected with the supply side, which is able to provide effective methods, processes, and technology packages to transform the city into a more sustainable and smarter ecosystem. For this, it has to be linked through proper enablers that make its implementation possible, mainly focused on the finance and governance aspects, which are able to lead the transformation approach. This necessarily needs to be accompanied by an in-depth analysis of the existing barriers that hinder the effective implementation of both the methods and technologies.

This replicability framework is dealing with this connection through integrating all the pieces of the Sustainable Urban Regeneration Model in a single approach, establishing two ways of linkage that leads to the definition of Integrated Urban Plans (IUPs) for the cities and the related Implementation Plans. Thus, the replication of methods and processes can lead to these strategic plans at a city level, which should establish the long-term approaches needed in the city to ensure the effectiveness of the transformation strategy, while the implementation of the technical solutions can catalyse the integrated city plan into real interventions leading to achieve the macro-level objectives.

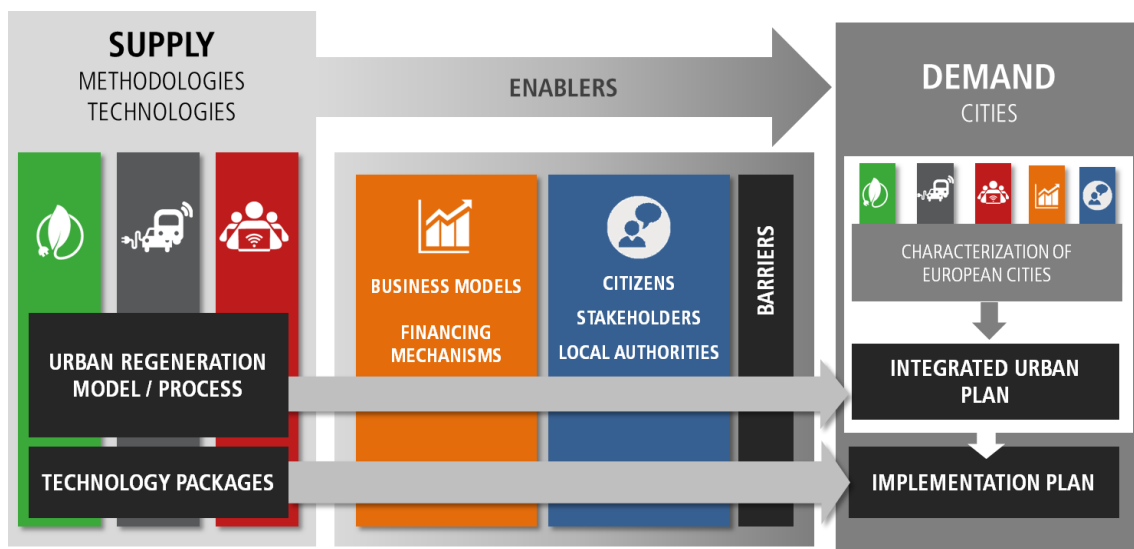


Figure 3: Overall REMOURBAN replicability strategy

### 2.1 Connecting the dots from smart city ‘supply’ to city ‘demands’

The REMOURBAN replicability strategy developed in this deliverable aims to describe along the report each of the city sides (demand and supply, see below) in order to provide guidelines to the cities willing to replicate the Urban Regeneration Model and the technological solutions developed in REMOURBAN. For a better understanding of this strategy, each of the dots of the supply and demand is introduced in this section, as mentioned in Figure 3.

The model for the evaluation of the replication potential is based on analyzing the willingness for the implementation of technological solutions and methodologies developed in REMOURBAN

project (supply side) to cover the priorities of European cities (demand side) through the analysis of the existing enablers and barriers. Furthermore, the model allows designing the processes to lead cities to achieve their sustainable development goals.

The **Demand side** consists of the identification of the city priorities through the methods defined in REMOURBAN for city characterization and the design of plans for driving cities towards the sustainability.

The methods elaborated in REMOURBAN for making the diagnosis of cities are based on representative indicators for evaluating the features of the cities in the domains: management, finance, energy, mobility and ICTs and will contribute to identify goals and most suitable technologies and actions to be implemented in the areas of energy, environment, economy and social in the pillars of buildings, mobility and ICT.

Connecting demand and supply sides of a city involves to analyze the enablers and non-technical barriers that affect the process of transition of cities towards the sustainability and specifically the boundaries for the implementation of technological solutions. This process of transforming cities into smart and sustainable cities is complex and the success will be conditioned to have the proper enablers which allow to overcome the existing barriers. The deployment of proper business models and financing mechanisms for affording the high upfront investment of interventions is required, but also to face a complicated process to involve local authorities, stakeholders and citizens. Nowadays the engagement of policy actors (local administration, city planners and politicians), companies (service providers in public transport, energy infrastructure), and community representatives (citizens, households) is a challenge given the initial opposition towards this type of initiative due to the lack of knowledge and expertise in this type of projects.

Since each technological solution has specific requirements (enablers) and difficulties (barriers), we propose to evaluate each solution of the Smart City Technology Package (SCTP) independently for a posterior connection with the city needs and the expected goals to be achieved in the city.

The joint previous information will be very relevant for the design of integrated urban plans, which coordinate the policies, actions and projects to be implemented in the city. In particular, the urban regeneration model can provide support to decision makers, investors and policy makers, whereas, the technology solutions analysis can perform a specific plan which includes the most suitable technology packages in the selected area. This implementation plan covers the analysis of cost-effectiveness of the available technology solutions (e.g. potential energy and economic savings to be achieved), the technical definition of the intervention, the design of the financial plan and the necessary administrative license and permits. As a result, a more ambitious goal can be achieved in the cities at the end of this accurate analysis.

The **Supply side** covers the main features of the technologies analyzed in REMOURBAN for the three pillars on which the project is based: energy, mobility and integrated infrastructures as well as the methodologies developed for accelerating the urban transformation of the cities towards the smart city concept.

The technology package analyzed in REMOURBAN is splitted as follows:

- Energy pillar: building envelope retrofitting, renewable heating and cooling, distributed energy generation, monitoring tools for energy efficiency, electricity distribution and advanced building energy management systems.
- Sustainable mobility: alternative fuel vehicles (Fully Electric Vehicles – FEV and Plug-in Hybrid Electric Vehicles - PHEV), public recharging infrastructure for Electric Vehicles and renewed transport infrastructures.

- Integrated infrastructures: smart grid connectivity, city information platforms, ICT services for the city, optimized traffic flows and multi-modal transport solutions.

On the other hand, the Urban Regeneration Model to be developed in REMOURBAN describes the holistic process for urban transformation with a joint approach in the fields of Sustainable Buildings and Districts, Sustainable Urban Mobility, and Integrated Infrastructures and Processes. This model provides solutions in both technical and non-technical fields addressing the temporal goals, the main smart city enablers within the transformation process – towards a more sustainable and smarter environment – and innovations in the priority actions of energy, mobility and ICTs.



## 3 Evaluating the replication potential and developing a replication plan

### 3.1 Strategic approach

The combined pressures of severe budget reductions, an aging population and environmental issues make radical innovation an imperative for local authorities (LAs) in Europe. The EU Smart Cities agenda offers new horizons for innovation, however research based on empirical evidence within LAs<sup>6</sup> demonstrates that two most important leadership actions that encourage innovation were: (i) to agree a clear strategic direction and innovation priorities; and (ii) to lead for innovation, particularly convincingly communicating the agreed innovation priorities.

The research carried out by Munroe stresses that local government leaders should be fostering an organizational culture that encourages innovation; devoting sufficient time and resources to developing the priority innovations and they should be building effective cross-council working on major innovations.

For replication of smart city technologies from the lighthouse cities, leadership is key. In REMOURBAN a six stage management model for replication is proposed, as shown in Figure 3. These stages include:

1. Develop a clear political vision and innovation priorities;
2. Develop a clear Smart City Strategy and road map;
3. Develop appropriate financial models;
4. Develop an innovative organisation structure and governance;
5. Replicating / implementing technology projects (SCTPs);
6. Review and update of strategy.

These are explained in the sections below. A summary of the six stages with more detail is provided in Figure 4 below.

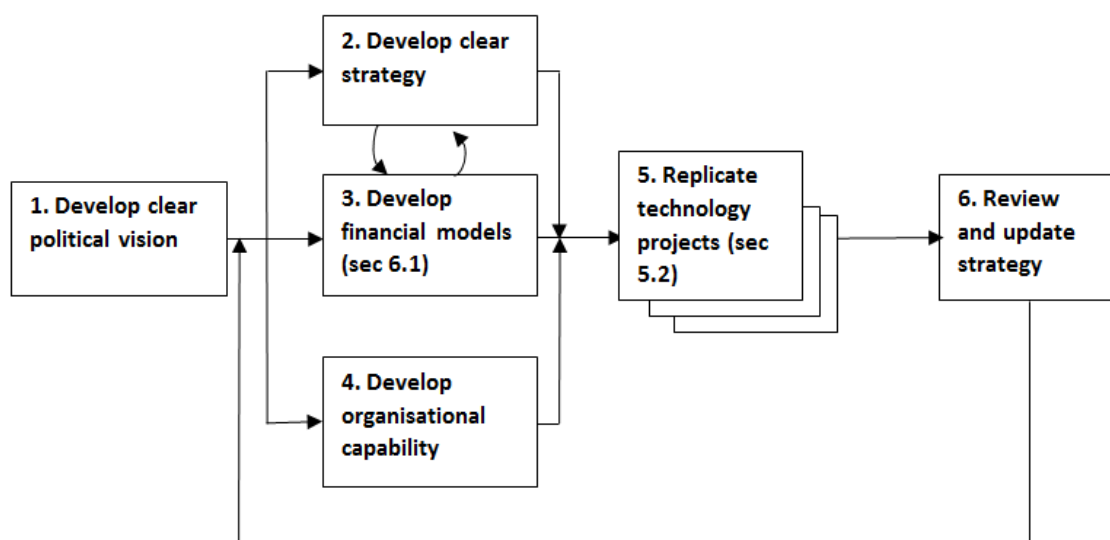


Figure 4: Model for L.A. replication

<sup>6</sup> Munro, 2015

The table below presents a summary of the replication steps.

Table 3: Summary of replication steps

Summary of replication steps	
<b>1- Develop a clear political vision and innovation priorities</b>	<ul style="list-style-type: none"> <li>a. Ensure the vision for smart cities is integrated with core city strategies</li> <li>b. Obtain senior management commitment               <ul style="list-style-type: none"> <li>i. Leadership is critical</li> </ul> </li> <li>c. Commitment across organisational boundaries</li> <li>d. Identify your current position and required technologies               <ul style="list-style-type: none"> <li>i. What is the city's power level and flexibility to develop solutions</li> <li>ii. Identify innovative technologies which suite your city</li> </ul> </li> </ul>
<b>2- Develop a clear Smart City strategy and road map</b>	<ul style="list-style-type: none"> <li>a. Identify current base line</li> <li>b. Prioritise solutions</li> <li>c. Assess business and financial needs               <ul style="list-style-type: none"> <li>i. Develop new financial mechanisms as necessary</li> </ul> </li> <li>d. Consult with key city stakeholders</li> <li>e. Develop strategies for community engagement and mobilisation</li> </ul>
<b>3- Develop appropriate financial models</b>	
<b>4- Develop innovative organisational and governance capability</b>	<ul style="list-style-type: none"> <li>a. Innovative procurement</li> <li>b. Organisational structures               <ul style="list-style-type: none"> <li>i. Organisational development and maturity models</li> </ul> </li> <li>c. Training</li> <li>d. Relevant knowledge base</li> </ul>
<b>5- Replicating/implementing technological projects</b>	<ul style="list-style-type: none"> <li>a. Section 3.3</li> </ul>
<b>6- Reviewing and updating strategy</b>	<ul style="list-style-type: none"> <li>a. Periodic reviews of strategy</li> <li>b. Organisational innovative capability</li> </ul>
Project success	

### 3.1.1 Develop a clear political vision and innovation priorities

#### Commitment

There is a need for a united leadership approach to major innovations such as Smart Cities. Chief Executive Officers (CEOs) must embrace the smart cities agenda and obtain senior management commitment and ensure the vision for smart cities is integrated with core city strategies.

Several recent studies (for example Kanter, 2006; Alimo-Metcalfe and Alban-Metcalfe, 2008) emphasize the importance of 'ambidextrous leadership', where leaders balance their efforts between running current operations effectively and creating innovations to ensure future success. Collins and Hansen (2011) conclude that the most successful organizational leaders in fast-changing environments were 'not more risk-taking, more bold, more visionary and more creative' than their comparators. Instead, they 'built on proven foundations' and were 'more disciplined, more empirical and more paranoid'. They suggest that the companies that enjoyed more long-term success innovated, but they were not necessarily more innovative than their competitors. Instead, they had 'the ability to scale innovation and to blend creativity with discipline'<sup>7</sup>.

#### Scoping

In addition to commitment, the senior managers need to scope the extent of their replication activities. Depending on the balance of power between national and local government, the cities in each country have different levels of influence on their destiny (see Annex 7.) Based on the city's power level and flexibility, the approach which senior management will take will be different. They need to identify the scope of their influence and whether they will mobilise on a city or city/region basis.

#### Overcoming silos

Smart cities requires integrated high level strategies, which are aligned. Senior management need to align the strategies at regular intervals ensuring a unified vision for the city.

### 3.1.2 Develop a clear strategy and road map

#### Develop base line

For low carbon initiatives, each city needs to identify its current base line and carbon footprint for benchmarking. This has been conducted in all REMOURBAN lighthouse and follower cities<sup>8</sup> at the start of the project.

#### Prioritise solutions

Each city has to be very selective in identifying a few key priority areas for innovation in energy, transport and ICT. There is evidence that selecting too many priorities is counter-productive. Section 4.4 of this document provides guidelines on how to compare various alternative technological solutions and assess their viability. Based on these guidelines and the city's vision, a strategic road map for technological innovation can be developed.

#### Consult key city stakeholders

These include relevant social housing associations, transport and energy partners, etc. They add value and refine the prioritisation process and must be systematically included in the discussions while developing a strategy.

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<sup>7</sup> Munro, 2015

<sup>8</sup> within REMOURBAN City Audits (D3.1-D3.5)



### Targeted community engagement for priorities

Once the technology priorities are identified, the city has to develop a high level strategy for community engagement and mobilisation. Very often community engagement is an after-thought and is reduced to marketing campaigns, informing the communities about upcoming changes. In a smart city journey, collaboration with communities is part of the transformation process and requires strategic drivers.

### 3.1.3 Develop appropriate financial models

#### Financial model and feasibility

A city needs to develop financial models and feasibility studies for each of the technological priorities. This process can assist in the selection of priorities and needs to happen in iteration with the strategy development process.

#### Obtain training and consultation for financial instruments

Extensive innovative financial models have been explored in section 4.1. One major challenge is that the EU cities often do not have the 'know-how' on how to use all these new innovative financial instruments. Therefore, cities may need advice and support. It is also important to train the staff in these innovative models.

### 3.1.4 Develop innovative organisational and governance capability

#### Rethink the organisational structures

Smart Cities introduces an environment of continuous change in LAs. Often the organisational structures of LAs are inflexible and developed for historic reasons. These structures can act as a barrier to innovations, which are defined as changes to services or products or ways of working or organisational arrangement or democratic approaches that are both:

- New to the council and
- Deliver additional value for its residents, service users and/or local businesses.

Annex 8 provides structure for LAs' organisational innovation, which was proposed by Munro (2015).

#### Perform a gap analysis of current organisational capability

For process improvement, normally organisations evaluate their current capabilities through a gap analysis and develop targeted improvements for maturity. Different approaches and management models can be used for this purpose.

One approach which has been used widely is the capability maturity model (CMM), which was created by the Software Engineering Institute (SEI) located at Carnegie Mellon University in USA (SEI, 2015). Adaptations of this model have been used in different types of organisations. In particular in LAs, CMMs have been used for improving e-government and in REMOURBAN this model was used to evaluate the community engagement of a LA in the energy agenda. This approach may prove useful in the replication process. Annex 9 describes CMM and provides some further reading for exploration.

#### Innovative procurement

The technological innovations will require a new breed of procurement and supply chain. Often LAs will co-develop the solutions with their supply chain partners over several years. In this new environment, the existing rigid and prescriptive procurement approaches will become obsolete. The REMOURBAN project has developed innovative procurement best practices in D1.13 and D1.14 which can provide guidelines for other cities.

## Training and knowledge acquisition

Depending on the technological priorities, relevant training has to be provided.

### 3.1.5 Replicating/implementing technological projects

This stage is about implementing the technological priorities and the strategy. These are called Smart City Technology Packages (SCTPs) for replication. Section 5.2 has extensive guidelines on how to conduct this technological process systematically including the technologies to be covered by the SCTPs. The guidelines are produced on how the SCTPs can be developed in three sectors: energy, sustainable mobility and integrated infrastructure. The SCTPs may help in effective decision-making on the technology to be replicated and implemented for Smart City implementation. It may also help cities in mitigating risks associated with technological innovations.

### 3.1.6 Reviewing and updating strategy

In a fast changing environment, strategies need to remain dynamic and flexible. There needs to be periodic reviews and update of the strategy by senior management to learn lessons. This process will allow identifying areas where strategies need to be modified and adjusted. The strategies need to evolve systematically and in a planned manner to maintain relevancy and effectiveness. The process of review and update needs to be embedded in all of the strategies.

The following Figure 5 shows the REMOURBAN Replication Potential Model and its relation with the above section 3.1 (Figure 4).

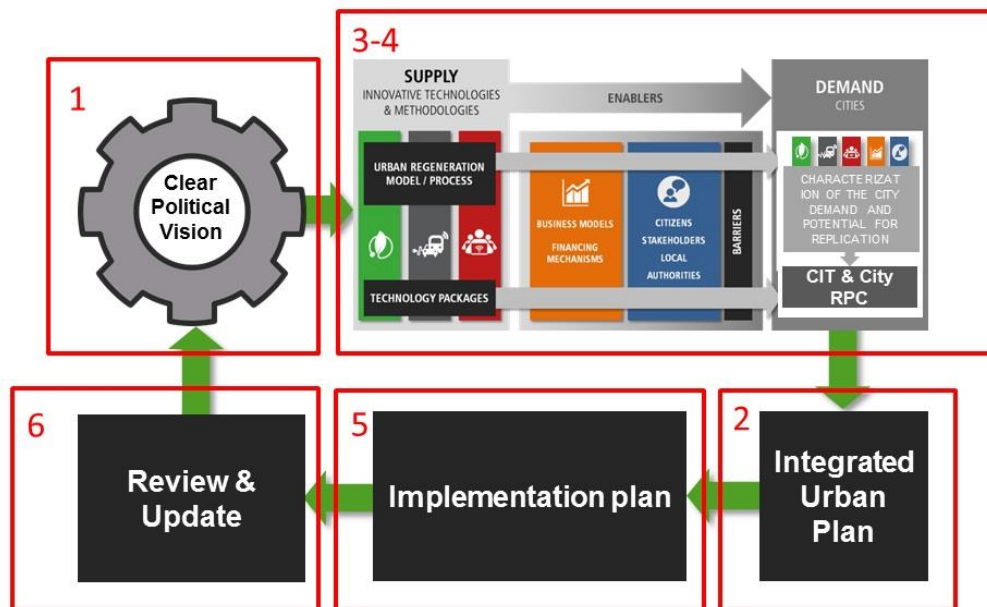


Figure 5: REMOURBAN Replication Potential Model in relation with sub-sections of section 3.1

The future deliverables D5.4: Replicability plan for each follower city and D5.5: Integrated urban plan for each REMOURBAN City will enable to dig deeper into the direction of developing the replicability plan and refine the model of replication.

## 3.2 Identification of current baseline and prioritisation of solutions

The following sections present the REMOURBAN approach to assist cities in defining a clear strategy and prioritising solutions.

The first step of this process is to perform a city diagnosis which is based on representative indicators as indicated in section 3.2.1 below.

Taking into account the diagnosis process, a methodology has been developed in order to assist cities in identifying their priorities and is presented in section 3.2.2 below. This methodology is based on “interval values” identified within the cluster analysis developed in D5.1 and a tool for assisting the cluster identification is proposed. A summary of the process for cities willing to identify their potential for replication is provided in section 3.2.3.

### 3.2.1 Indicators to assess the current baseline

As described in the Replicability Framework in section 2 above, the demand side of the model for the evaluation of the replication potential consists of the identification of the city's priorities through the methods defined in the characterisation of European Cities (D5.1) and the design of plans for driving cities towards sustainability.

The methods elaborated in REMOURBAN for carrying out the diagnosis of cities are based on representative indicators for evaluating the features of the cities' domains:

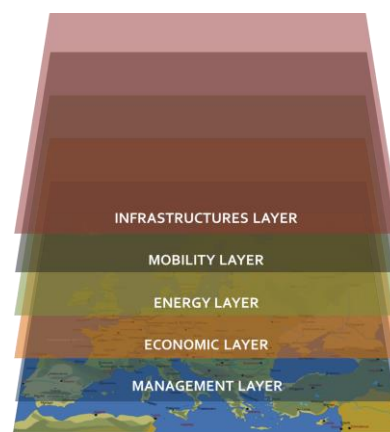


Figure 6: Characterisation layers

- **Management:** including physical characteristics, people, governance and city strategies
- **Economic/Finance:** including the definition of the city economy
- **Energy:** covering the evaluation of the built environment
- **Mobility:** addressing the urban transportation indicators
- **Infrastructures:** includes the analysis of existing infrastructures and the integration potential through ICT actions

The analysis performed in the Characterization of European cities characterised a sample of 41 middle-size European cities. As a result, different typologies of cities for each layer analysed in the application domain were defined and characterised.

Further to the layer-by-layer analysis, a second analysis was performed applying a clustering approach for characterising the cities in a global analysis in which all the indicators were considered. Contrary to the outcomes obtained in the analysis by layers in the global evaluation, cities have been grouped into regions with a clear correlation with their location.

Intervals/values for the clusters have been identified for each of the indicators from the global characterisation performed in D5.1.

The following tables include the final set of indicators which define the analysis performed in the characterisation of European Cities (D5.1) and the interval values of each of the final indicators chosen in each application layer.

- **Management Features**

**Table 4: Final set of indicators for Physical Characteristics**

INDICATOR	KPI ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
Population density	MG_PC1	Total city population / Land area city	inhab./k m <sup>2</sup>	Population per unit area in the city	Cluster 1: >3000 Cluster 2: 2000<2500 Cluster 3: <1600 Cluster 4: 2500<3000 Cluster 5: 1600<2000
Population	MG_PC2	-	inhab.	Total number of persons inhabiting a city	Cluster 1: 300.000<350.000 Cluster 2: >350.000 Cluster 3: <150.000 Cluster 4: >350.000 Cluster 5: 150.000<300.000
Area	MG_PC3	-	km <sup>2</sup>	Land area city	Cluster 1: 160<175 Cluster 2: 135<150 Cluster 3: <135 Cluster 4: >175 Cluster 5: 150<160
Elevation	MG_PC4	-	m	Altitude of a city above sea level	Cluster 1: 100<150 Cluster 2: 50<100 Cluster 3: 50<100 Cluster 4: <50 Cluster 5: >150

**Table 5: Final set of indicators for People**

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
Population dependency ratio	MG_P1	(Population <14 + Population >64) / Population	%	Population of children and senior citizen in relation to the adults population	Cluster 1: 31,5<32 Cluster 2: >32 Cluster 3: 31,2<31,5

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
		of adults) x 100			Cluster 4: <30 Cluster 5: 30<31,2
Annual population change	MG_P2	Total population / Total population x 100	%	Change in the number of inhabitants in the last year	Cluster 1: Lost Cluster 2: Gain Cluster 3: Lost Cluster 4: Gain Cluster 5: Gain
Foreigners as a proportion of population	MG_P3	Number of foreigners living in city / total city population	%	Population of foreigners in relation to the city population	Cluster 1: 6<8 Cluster 2: 8<10 Cluster 3: <4 Cluster 4: 4<6 Cluster 5: >10
Students in higher education	MG_P4		Number of students	Number of students in higher education (ISCED Level 5-6)	Cluster 1: 30.000<35.000 Cluster 2: >35.000 Cluster 3: <15.000 Cluster 4: 30.000<35.000 Cluster 5: 15.000<30.000
Youth unemployment rate	MG_P5	100 x Total number of unemployed youth / youth labour force	%	The unemployment rate is defined as the number of unemployed youth (typically 15-24 years) divided by the youth labour force	Cluster 1: >50 Cluster 2: 20<50 Cluster 3: 20<50 Cluster 4: <15 Cluster 5: 15<20
Number of public libraries	MG_P6	Number of public libraries per 10,000 inhabitants	Number of libraries	Number of public libraries as an indicator of the level of education of the population.	Cluster 1: <0,5 Cluster 2: 0,5<1 Cluster 3: >1 Cluster 4: <0,5 Cluster 5: >1
Median population age	MG_P7	-	Years	Median age is the age that divides a population into two numerically equal groups	Cluster 1: 40<42 Cluster 2: >=42 Cluster 3: 36<=39 Cluster 4: 24,5<=35 Cluster 5: 36<=39
Voter turnout in last municipal election	MG_P8	Number of persons that voted in the last municipal	%	Voter participation level	Cluster 1: 60<62 Cluster 2: 62<70 Cluster 3: 52<60 Cluster 4: <52

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
		election / Total city population eligible to vote x 100			Cluster 5: >70
Percentage of the city's solid waste that is recycled	MG_P9	100 x Total amount of city's solid waste that is recycled in tonnes	%	Recycled materials shall denote those materials diverted from the waste stream, recovered and processed into new products following local government permits and regulations	Cluster 1: <30 Cluster 2: 40<45 Cluster 3: 30<40 Cluster 4: 40<45 Cluster 5: >45

Table 6: Final set of indicators for Governance &amp; Smart City Strategies

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	VALUES
Existence of local sustainability plans	MG_G1	-	YES/NO	Is there any specific sustainability plan in the city?	Cluster 1: No Cluster 2: No Cluster 3: Yes
Existence of Smart City strategies	MG_G2	-	YES/NO	Is there any specific smart city strategy in the city?	Cluster 1: Yes Cluster 2: Yes Cluster 3: Yes
Existence of an Agenda 21	MG_G3	-	YES/NO	Has the city elaborated an Agenda 21?	Cluster 1: Yes Cluster 2: Yes Cluster 3: Yes
Signature of Covenant of Mayors	MG_G4	-	YES/NO	Has the city signed the Covenant of Mayors?	Cluster 1: No Cluster 2: No Cluster 3: Yes
Mobility Plan	MG_G5	-	YES/NO	Does the city have a smart mobility plan?	Cluster 1: No Cluster 2: Yes Cluster 3: Yes
ICT citizen oriented platforms	MG_G6	-	YES/NO	Is there any public ICT global platform available for citizens offering general information about the city?	Cluster 1: Yes Cluster 2: Yes Cluster 3: Yes

- **Economic/Financial Features**

Table 7: Final set of indicators for Finance characterisation

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
GDP per inhabitant	FI1	Gross Domestic Product at market prices/ total city population	M€/inh	It is a measure of the economic activity of a city and it is defined as the total value of all the goods and services produced by a city in a particular year, divided by the number of people living there:	Cluster 1: 50<100 Cluster 2: 120<130 Cluster 3: >50 Cluster 4: >130 Cluster 5: 100<120
Average disposable income	FI2	Gross Domestic Product at market prices/ total city population	€/inh	The amount of money that households have available for spending and saving after income taxes have been accounted for	Cluster 1: 10000<15000 Cluster 2: 17000<19000 Cluster 3: <10000 Cluster 4: 15000<17000 Cluster 5: >19000
City unemployment rate	FI3	Number of citizens unemployed / Total labour force x 100	%	Unemployed citizens in relation to employed and unemployed who are legally eligible to work	Cluster 1: <10 Cluster 2: 9,5<10 Cluster 3: 9,5<10 Cluster 4: 7,5<8 Cluster 5: 8<9,5
Proportion of working age population with higher education	FI4	-	%	Proportion of working age population qualified at level 5 or 6 ISCED	Cluster 1: 28<30 Cluster 2: 26<28 Cluster 3: <26 Cluster 4: >40 Cluster 5: 30<40
GDP per inhabitant in PPS	FI5	-	M€/inh	GDP per capita at current market prices in Purchasing Power Standards (PPS). It is a common currency that eliminates the differences in price levels between countries	Cluster 1: 15000<25000 Cluster 2: >30000 Cluster 3: <15000 Cluster 4: >30000 Cluster 5: 25000<30000

- Energy Features

Table 8: Final set of indicators for Energy characterization

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
Share of electricity in final energy consumption in households	EN1	-	%	Energy derived from electricity related to the final energy in households	Cluster 1: >40 Cluster 2: <25 Cluster 3: 25<27 Cluster 4: 35<40 Cluster 5: 27<35
Share of gas in final energy consumption in households	EN2	-	%	Energy derived from gas related to the final energy in households	Cluster 1: <18 Cluster 2: >35 Cluster 3: 18<25 Cluster 4: 30<35 Cluster 5: 25<30
Share of Renewable Energies in final energy consumption in households	EN3	-	%	Energy derived from energy renewable sources related to the final energy in households	Cluster 1: 20<25 Cluster 2: 15<20 Cluster 3: >25 Cluster 4: <12 Cluster 5: 12<15
Final energy consumption per inhabitant	EN4	-	MWh/inh	It covers consumption of private households, commerce, public administration, services, agriculture and fisheries	Cluster 1: <5 Cluster 2: 5<7 Cluster 3: >9 Cluster 4: 8<9 Cluster 5: 7<8
Greenhouse Gas (GHG) emissions per inhabitant	EN5	1000 tonnes of CO <sub>2</sub> eq / Total National Population	Mton CO <sub>2</sub> eq/Million of inhabitant	GHG emissions from buildings (residential and public)	Cluster 1: <1300 Cluster 2: 1400<1500 Cluster 3: >2000 Cluster 4: 1500<2000 Cluster 5: 1300<1400



- **Mobility Features**

Table 9: Final set of indicators for Mobility characterization

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
Private car ratio	MO1	Total number of private cars x 1000 inhabitants/population	Number of cars / 1000 inhabitants	Total number of private cars (excluding automobiles, trucks and vans used for the delivery of goods and services by commercial enterprises), related to the total number of inhabitants	Cluster 1: 425<470 Cluster 2: >470 Cluster 3: 375<400 Cluster 4: <375 Cluster 5: 400<425
People killed in road accidents (per 10000 population)	MO2	People killed in road accidents x 10000 inhabitants/population	People killed in road accidents/ 1000 inhabitants	People killed in road accidents	Cluster 1: 0,35<0,5 Cluster 2: 0,25<0,35 Cluster 3: >0,5 Cluster 4: <0,25 Cluster 5: <0,25
Modal Split. Use of private motor vehicle	MO3	-	%	Percentage of trips using a private motor vehicle as type of transportation	Cluster 1: 30<49 Cluster 2: >55 Cluster 3: <30 Cluster 4: 49<55 Cluster 5: 49<55
Modal Split. Walk	MO4	-	%	Percentage of trips walking as type of transportation	Cluster 1: 25<30 Cluster 2: 20<21 Cluster 3: <20 Cluster 4: >30 Cluster 5: 21<25
Modal Split. Bike	MO5	-	%	Percentage of trips using a bike as type of transportation	Cluster 1: <3 Cluster 2: 5<11 Cluster 3: 3<5 Cluster 4: 11<15 Cluster 5: >15
Modal Split. Passenger	MO6	-	%	Percentage share of each mode of	Cluster 1: 20<30

transport				transport in total inland transport, expressed in passenger-kilometers (pkm)	Cluster 2: 15<20 Cluster 3: 15<20 Cluster 4: <15 Cluster 5: >30
Percentage of Electrical Vehicle (EV)	MO7	Total number of all type EV Total number vehicles	%	Number of electric vehicles related to total number of vehicles	Cluster 1: <0,2 Cluster 2: 0,2<0,5 Cluster 3: 0,5<0,8 Cluster 4: >2 Cluster 5: 0,8<2
GHG emissions per capita from transportation	MO8	Annual Tonnes of CO <sub>2</sub> eq / Total City Population	Annual tonnes CO <sub>2</sub> eq / Hab.	According to the Global Protocol for Community Scale GHG Emissions (GPC)	Cluster 1: 1,5<2 Cluster 2: 2<2,1 Cluster 3: <1,5 Cluster 4: >2,2 Cluster 5: 2,1<2,2

- **Infrastructures Features**

Table 10: Final set of indicators for Infrastructures characterization

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
Smartphone penetration	IN1	Number of smartphones / Total mobile phones	%	Number of smartphones in relation to total mobile phones	Cluster 1: 45<47,5 Cluster 2: 40<45 Cluster 3: <40 Cluster 4: >50 Cluster 5: 47,5<50
Fixed wired internet subscriptions	IN2	Number of fixed wired internet subscriptions/ Total Country Population	%	Percentage of a country's population which have fixed wired internet subscription	Cluster 1: <25 Cluster 2: 25<30 Cluster 3: <25 Cluster 4: >35 Cluster 5: 30<35
Broadband internet subscriptions: Mobile-	IN3	% of a country's population that are subscribers to a public	%	Number of subscriptions to a public mobile telephone service.	Cluster 1: 46<47 Cluster 2:

INDICATOR	KPI_ID	FORMULA	UNIT	DESCRIPTION	INTERVAL VALUES
Cellular		mobile telephone service		High - speed access to the public internet	47<50 Cluster 3: <46 Cluster 4: >75 Cluster 5: 50<75
Percentage of internet users	IN4	Number of people having access to Internet at home. This indicator does not record use, or frequency of use, but only access	%	Number of people having access to Internet at home. This indicator does not record use, or frequency of use, but only access	Cluster 1: <68 Cluster 2: 70<80 Cluster 3: 68<70 Cluster 4: >90 Cluster 5: 80<90

The indicators presented above represent the basis of the identification of the current baseline and contribute to identify which are the adverse conditions and potential features of these cities by each domain (energy, mobility, ICT) and enablers (people, governance and finance).

The analysis of the city's baseline will contribute to identify goals for urban transformation strategies in the areas of energy, environment, economy and social in the pillar of buildings, mobility and ICT.

### 3.2.2 Methodology for the evaluation

The indicators collected in 3.2.1 are addressing the baseline of the city, and serve as starting point for the evaluation of replication potential of smart technologies for a city.

Starting from these indicators, a tool is developed to identify the city demand (named CIT for Cluster Identification Tool - 1). It allows to identify 'membership' of a city to one of the five clusters of EU cities (City characterization carried out within D5.1), which will then allow to identify its related priorities (2) in terms of smart city strategy. The methodology for the identification of the relevant city cluster is presented in section 4.2.2.

Based on the identification of these priorities, the demand of a city will then be linked with the supply, i.e. the smart cities technology packages (SCTPs - 3), described in section 5.24.4 of this document. These SCTPs are compiled in a database (REMOURBAN RISC – Replication Information System for Cities - 4). This database will include, in a first period, the SCTPs demonstrated within REMOURBAN. However, in the future, there is a potential to include additional SCTPs from other SCC projects that may hence become centralised in one comprehensive database.

As a supplementary decision support tool, REMOURBAN sets up "Yoopi!" (5), which helps analyzing the sociopolitical, financial and technical features of a specific Sctp. Yoopi helps cities choose the top priority SCTPs for on-site implementation.

### 3.2.3 Explanation of the proposed replication process for interested cities

The different steps of the replication methodology are explained below:

1. The **CIT** (Cluster Identification Tool<sup>9</sup>) helps interested cities (via their representatives) to identify how they relate to the city clusters identified over the characterization of European cities (D5.1). The CIT helps defining to which cluster the city belongs (see section 4.2.2 for more detailed information about CIT). Cities are invited to collect the 41 indicators listed in section 3.2.1 and to evaluate the corresponding intervals/values proposed in the tool. This tool then automatically calculates to which cluster the city belongs/is closest (when 75% of the intervals correspond to one of the clusters). This tool is elaborated through an excel file at the moment but may be further developed in an online application tool.
2. The second step of our replication model is dedicated to assist cities to identify priorities, based on the chosen cluster. The definition of priorities will be further explored in section 4.3.
3. The third step towards replication is to determine which SCTPs are most suitable for the city, depending on its cluster and priorities. SCTPs are explained in section 5.2.
4. The **REMOURBAN RISC**, stands for Replication Information System for Cities, should centralise all data regarding any financial, technical and socio-political related issues regarding any potential implementation in a city, within a centralized, server based and online relational database system. All technical SCTPs but also the financial database to be established by the financial leader (VER) should converge to the RISC. Based on the RISC, the “engine” of the replication process, the “Yoopi” acts as a very intuitive user-friendly interface to transform the city demand and connect it with the supply, helping to overcome any barrier through all enablers, and assist the city in moving forward from the "theoretical" stage of their integrated urban plan to the practical phases of implementing the actions in projects on the field.

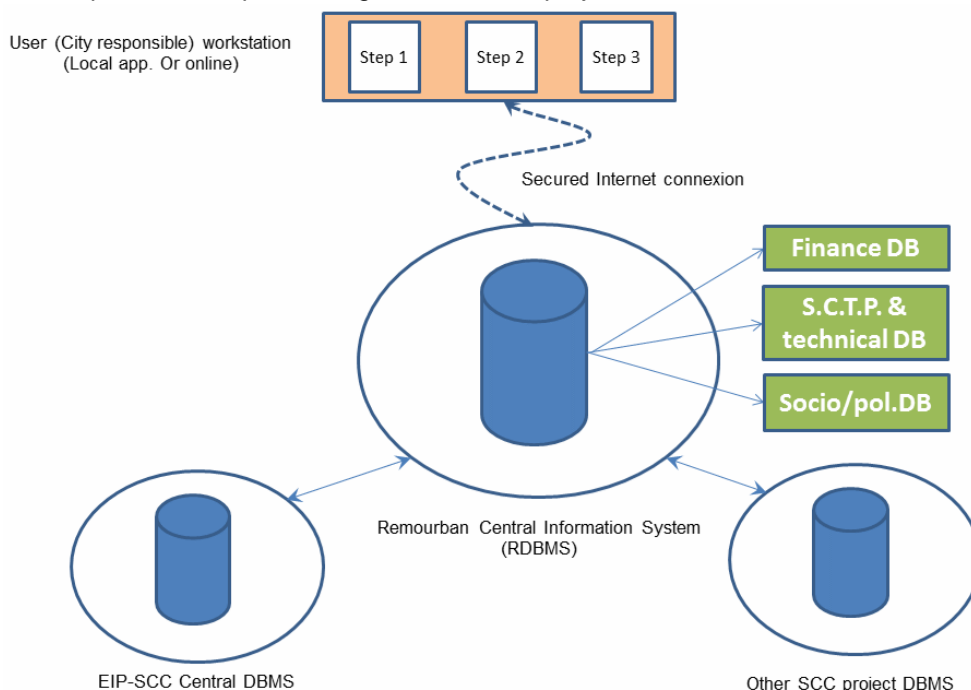


Figure 7: REMOURBAN R.I.S.C. Replication Information System for Cities

<sup>9</sup> See Annex1 for further details

What is crucial in this proposed process is the collection of data within the RISC to continuously update and feed in the database of SCTPs and improve the list of all interventions implemented in different cities with their benefits and drawbacks, including the financial figures to help refine future budget reviews. Such a centralised database is soon to become an extremely valuable tool and deliverable of the project, as a living information system for smarter cities of tomorrow.

The RISC should help cities mitigate risks in the implementation of their integrated urban plan.

Such a centralised database system for SCC does not exist today and would be a major outcome of REMOURBAN and a great advance for the European market for Smart Cities, in the frame of the EIP-SCC and the "Cross H2020 SCC projects network" initiative recently launched.

5. Yoopi! comes as a complementary tool to further prioritize the most suitable SCTPs to implement in the cities which use to REMOURBAN replication model. For this matter, cities are invited to talk about their technical skills and the status of their strategic plan for sustainable urban development, as well as specify which actions were eventually already undertaken by the city. The tool is thus used as an inventory of the city status (a simplified city audit), enabling the city to summarize what has already been done. The tool becomes a decision support tool to develop or adjust the city medium-term development strategy. This is the goal of what we call "**Yoopi**" (U.P. stands for urban plan) based on all the SCTPs describing technical, financial, and socio-political barriers and possible solutions in each domain, in direct relation with the citizen. Those priority SCTPs are those circled in red in Figure 8, i.e. the SCPTs which bring together and overcome the financial, socio-political and technical barriers.

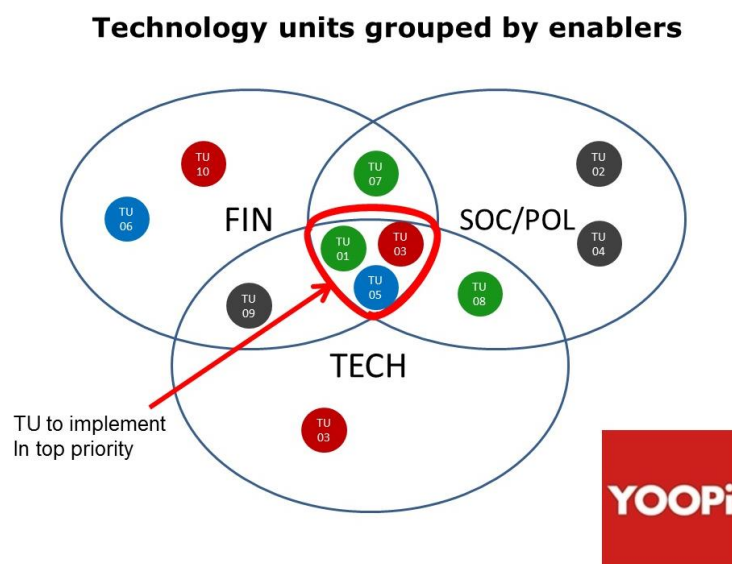


Figure 8: Yoopi ! (U.P. stands for Integrated Urban Plan)

Intuitive user-friendly interface is set up to transform the city demand and connect it with the supply, helping to overcome any barrier through all enablers, to assist the city in developing its integrated urban plan and implementation plan.

## 4 Analysing the city demand

The objective of this section is to better understand what the demand may be in European cities and how to assist them in the general process of developing smart and sustainable urban plans for their city.

The first step is to introduce the stages for making the city demand analysis. This should start with the city diagnosis, which leads to defining the integrated urban plan (strategic plan) and eventually leading to developing specific implementation plans.

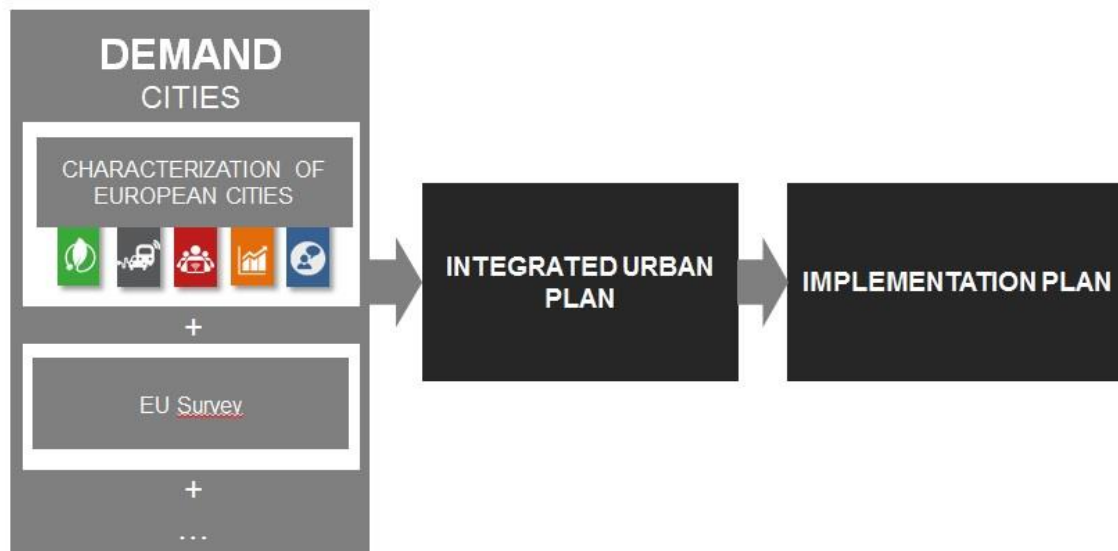


Figure 9: City demand analysis stages

As described above, the first deliverable of the Work Package 5 (WP5) on replicability, the Characterization of European cities by zone<sup>10</sup> is the starting point of the city demand analysis. This report is the result of the selection of a set of indicators for each of the domains identified. As a result of this characterization report, 5 groups of cities have been identified with specific criteria identified for each cluster in relation with each of the technical and non-technical application domains.

Through this city characterization, the needs of the cities will be better identified, also contributing to the development of a medium/long term integrated strategic plan (integrated urban plan) to become smarter and more sustainable, and turn this strategic plan into actual implementations to achieve the goals (implementation plan).

An integrated urban plan may be defined as a global strategic plan of the city, integrating all existing plans and master plans into a single approach to help the city becoming smarter and more sustainable at medium/long term. At a strategic level, the REMOURBAN urban regeneration model will help establish such an integrated urban plan, thanks to the different socio-political, technical and especially financial enablers, overcoming the barriers (if any).

Then, implementation plans can be set up to implement actions based on the technology packages in order to achieve the proposed goals defined in integrated urban plans.

<sup>10</sup> Source: REMOURBAN Deliverable 5.1: Characterization report of European cities– December 2015. Available over the Deliverables page of the REMOURBAN website (<http://www.remourban.eu/Technical-Insights/Deliverables/Deliverables.kl>)

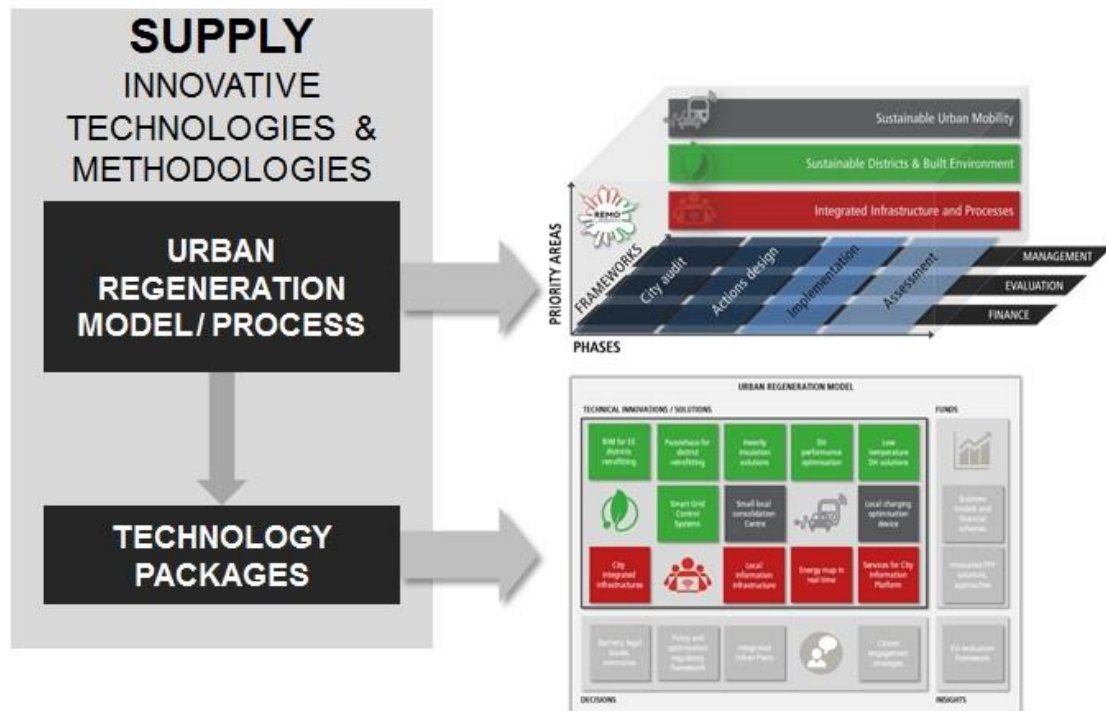


Figure 10: Technologies and methodologies to drive integrated urban plans

#### 4.1 Analysing the cities' demand for replication

The aforementioned European cities characterization report will serve as basis for the evaluation of the replication readiness and potential. This report covers the characterization of **41 middle-sized cities of 18 countries** in Europe<sup>11</sup>, based on a total of **41 key indicators**, both in technical and non-technical application domains:

- Technical domains: 8 in mobility, 5 for Energy and 4 in ICT.
- Non-technical domains: 4 in physical characteristics, 9 in people and social characteristics, 6 in governance and smart city strategies, 5 in finance.

As a conclusion to the European cities characterization, five geographic areas have been detected in Europe as a result of applying a procedure for characterizing the cities in a global analysis in which all the indicators are considered. Thus, five clusters were identified corresponding with cities located in the North, Centre, South, East and Scandinavian countries.

It is important to mention that, as shown in the European cities characterization report, the clustering by layer provides different results than when all the indicators are considered together.

The methodology for cities to identify which cluster they belong to is further explained in section 4.2.2.

<sup>11</sup> See section 3.2.2 "Final list of selected cities" of Deliverable 5.1: Characterization report of European cities – December 2015

## 4.2 Urban regeneration model adaptation to the cities' typologies

How can the urban regeneration model fit with the cities' clusters typologies and assist the city planners and decision makers in setting up (or improving) their strategic integrated sustainable urban plan? How can a city identify to which cluster it belongs to, and what does it mean having a 'green' in a specific field? This is what this section aims to establish.

### 4.2.1 Outcomes from the cities' characterisation

As explained above in section 4.1, the results and outcomes of the characterisation of European cities per zone established in deliverable 5.1<sup>12</sup> enabled to identify five main clusters. Below is the map of the five clusters and the main cities typologies and characteristics of each cluster.

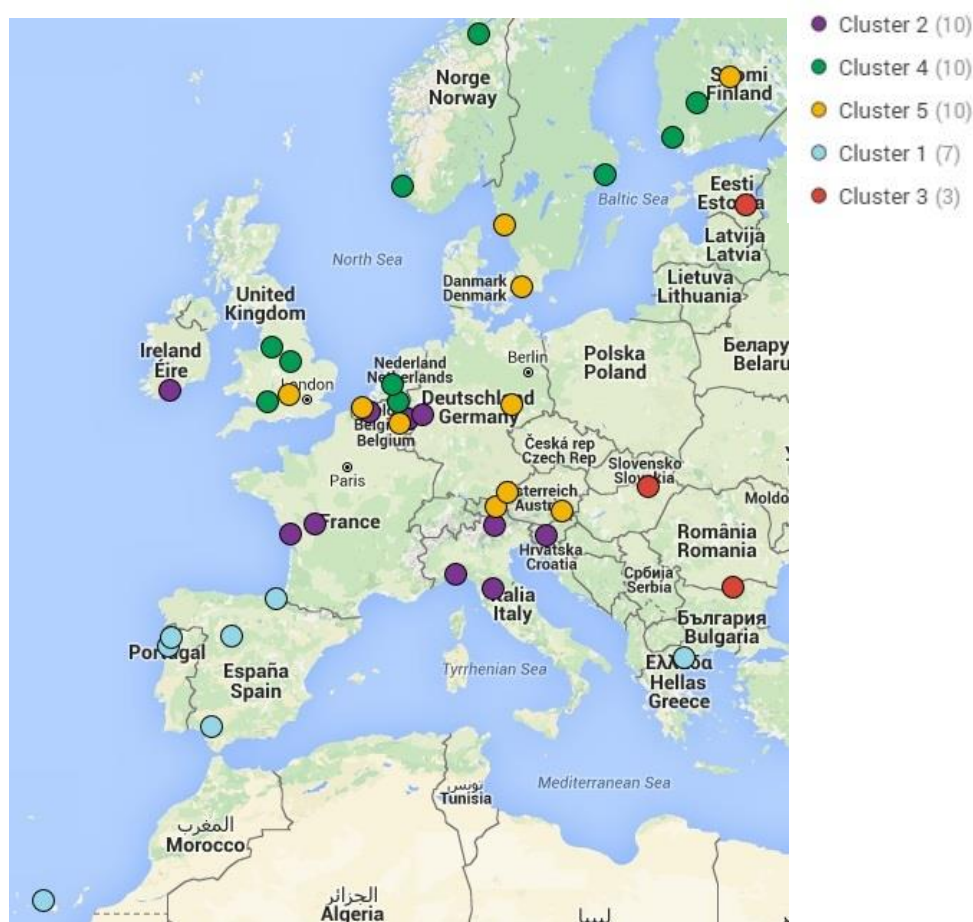


Figure 11: Map of the European Cities characterized and the five identified clusters<sup>13</sup>

The table below shows the results of the characterization report of European cities (D5.1). As a result of representing the best and worst values in green and red colours respectively, Table 11 is obtained. Intermediate values are shown in orange.

<sup>12</sup> Please refer to D5.1 - Characterisation of European cities per zone available over the Remourban website (Download section - <http://www.remourban.eu/Technical-Insights/Deliverables/Deliverables.kl>)

<sup>13</sup> Source : REMOURBAN Deliverable 5.1: Characterization report of European cities - Chapter 10 – December 2015



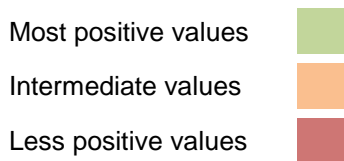


Table 11: Characterization of European Cities by layers<sup>14</sup>

	People	Governance	Finance	Mobility	Energy	Infrastructures
Cluster 1						
Cluster 2						
Cluster 3						
Cluster 4						
Cluster 5						

The following tables summarize the main characteristics of each cluster for each layer, as per the characterisation report.

Table 12: Characterization of European Cities belonging to Cluster 1

Cluster 1 (South)	Descriptions
<b>People</b>	(-) Cities which lost population. High youth unemployment ratio. Low recycling ratio (+) High ratio of population with higher education
<b>Governance</b>	Cities which have developed a large number of plans and strategies for a sustainable urban model
<b>Finance</b>	High ratio of unemployment, bad position in GDP and disposable income
<b>Mobility</b>	Modal split: private motor vehicles. Scarce use of bike or electric vehicles. High private car ratio

<sup>14</sup> Source : REMOURBAN Deliverable 5.1: Characterization report of European cities - Chapter 10 – December 2015

<b>Energy</b>	Cities with low energy consumption in households and good position in use of RES. Electricity as main final energy consumption. Low GHG emissions.
<b>Infrastructure</b>	Low number of internet users. Intermediate position in smartphone use.

Table 13: Characterization of European Cities belonging to Cluster 2

Cluster 2 (Centre)	Descriptions
<b>People</b>	Cities which gain population. High ratio of population with higher education Also, cities with aging population
<b>Governance</b>	Cities which have developed a large number of plans and strategies for a sustainable urban model
<b>Finance</b>	Good position in GDP and disposable income
<b>Mobility</b>	Cities with highest private car ratio. Predominance of car in the modal split.
<b>Energy</b>	Cities with low energy consumption in households and intermediate position in use of RES. Natural gas as main final energy consumption.
<b>Infrastructure</b>	Intermediate position in use of internet and smartphone

Table 14: Characterization of European Cities belonging to Cluster 3

Cluster 3 (East)	Descriptions
<b>People</b>	Cities which lost population. Low ratio of population with higher education. Low voter ratio
<b>Governance</b>	Cities which have developed some plans and strategies for a sustainable urban model
<b>Finance</b>	Bad position in GDP and disposable income. Intermediate unemployment ratio. Low proportion of working age population with higher education
<b>Mobility</b>	Predominance of walking as type of transportation. Scarce use of car, but high frequency of accidents
<b>Energy</b>	Cities with low energy consumption in households and good position in use of RES.
<b>Infrastructure</b>	Bad position in use of internet, mobiles or smartphone

Table 15: Characterization of European Cities belonging to Cluster 4

Cluster 4 (Scandinavia)	Descriptions
<b>People</b>	Cities which gain population. Low youth unemployment. Low voter ratio. Less aging population
<b>Governance</b>	Cities which have developed a large number of plans and strategies for a sustainable urban model
<b>Finance</b>	Good position in GDP and intermediate disposable income. Low unemployment ratio. High proportion of working age population with higher education
<b>Mobility</b>	Cities with lowest private car ratio and intermediate use of private car. Intermediate share of bike and walking. Good position in use of Electrical Vehicle
<b>Energy</b>	Cities with higher energy consumption in households and worst position in use of RES. Prevalence of natural gas as fuel
<b>Infrastructure</b>	Good position in use of internet, mobiles or smartphone

Table 16: Characterization of European Cities belonging to Cluster 5

Cluster 5 (Scandinavia + North)	Descriptions
<b>People</b>	Cities which gain population. Low youth unemployment. High voter and recycling ratio. Less aging population
<b>Governance</b>	Most cities have developed some plans and strategies for a sustainable urban model. Three cities with a few plans and strategies (Agenda 21, Smart Cities Strategy)
<b>Finance</b>	Intermediate position in GDP and good disposable income.
<b>Mobility</b>	Cities with highest bike ratio and intermediate use of private car. Scarce practice of walking. Intermediate position in car purchase. Low GHG emissions
<b>Energy</b>	Cities with intermediate energy consumption in households and bad position in use of RES. Similar share of natural gas and electricity in the final energy consumption
<b>Infrastructure</b>	Intermediate position in use of internet, mobiles or smartphone

From the tables above, a city can already start identifying in which fields need strategic priority, which areas demand for improvements in order to achieve urban sustainability through neighbourhood/district/city smartification (see section 4.3).

## 4.2.2 Identification of the cities' cluster

In D5.1, 41 European middle sized cities have been characterized through 41 indicators. Proceeding to a similar characterisation for each European city is unrealistic and many cities will not have the resources to dedicate in such analysis. Therefore, a specific tool will be designed based on the indicators selected from this report.

So how to identify what the demand is in cities, and for the one wishing to take such a path, how can REMOURBAN help them in identifying where to start from and what to do?

A good starting point would be to compare the situation of the candidate city with the five clusters of our European cities characterisation, and try to identify what cluster they refer to or could be compared with. Our objective is to define what "belonging or referring to a cluster" mean and what implications this may have on assisting cities in improving their vision of their future integrated urban plan for a smarter city.

The proposal is to do it over an interactive tool (that could become later a Web-enabled platform in relation with the REMOURBAN website), where any European city wishing to be assisted in the implementation or optimization of its integrated urban plan will have the possibility to answer a set of questions. Below is a proposed process to set up this tool, summarized in Figure 12, showing the step by step process.

After identifying them, the city will have the choice among the five levels of applications domains covered by the city characterization process, to select which of the applications domains they are wishing to improve. Each city being different from other, it may be that a city has already invested significant efforts in one area, and prefers to focus its resources in another sector. In any case, the tool will need the city to provide information for all the layers and application domains as this will help better characterizing the city and make the selection of the cluster more accurate.

The list of proposed indicators (KPIs) used for the characterization in each application domain is proposed in order to make it easier for a city's representatives/professional to understand the right interpretation of specific KPIs. The city needs to gather the data addressing each relevant indicator.

Then, the data provided for the selected indicators are further analysed through the use of specific algorithms. If the included data are consistent and complete, it will give the cluster, as an output at this stage, to which the city is referring (or 'belongs to'). For example, a city located in Northern Europe may not refer to cluster 4 anticipated at the beginning (in line with D5.1), but be closer to another cluster the features of which better fit to the city's real characteristics.

As it will be very unlikely that cities match exactly all the same criteria as the ones of the D5.1 clusters, a threshold (interval) can be set up, beyond which a city can be considered as part of the cluster. For instance, if a city matches more than 75% of the criteria of the cluster, it is considered as part of that cluster. As the dotted red lines are showing in Figure 12 below, the tool may request some additional information to the city (more indicators, more complete or relevant data, etc.) in order for the solution to provide the best possible result as cluster identification.

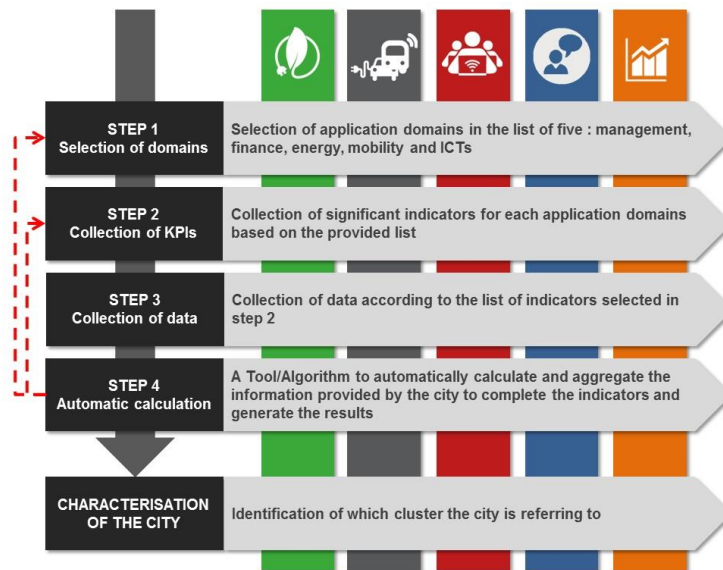


Figure 12: Process for the cluster identification to which the city refers

To simplify data gathering and accelerate the encoding of responses, a set of intervals will be defined for the questions (when applicable). The list of intervals will be defined based on the data gathered for each cluster in the characterisation report. Each list of intervals is proposed as dropped-down list to answer the questions (see Tables 4 to 10).

As a background task, a conversion table will compare the value selected for each question with the thresholds values of the characterisation report, and return the corresponding value of cluster.

A summary table in the tool provides the total of occurrences of each cluster linkage. The highest number in this summary table is the reference cluster for that city.

At first, a simple excel table should suffice for such an analysis.

The tool and process will also be further analysed in the frame of the next task 5.3 of this work package (due by M32), in preparation of the testing of the replication potential in follower and other European Cities.

The process of identifying the indicators and gathering the data should be as simple as possible, in order to avoid that cities lose their motivation to use this tool. In the characterization of European cities (D5.1), some indicators are rather complex to understand and gather the data for. As mentioned above, further studies will have to be carried out to specify whether the 41 indicators used for the characterization report are all required or if only a selection of them will suffice to proceed to this cluster identification. In the first phase, only a selection of indicators has been taken into account for the cluster identification tool.

Further studies will have to be done to simplify the data gathering, especially for the qualitative data. To simplify the data processing, the most important criteria/indicators may be defined through interval values.

The proposed Excel sheet to be used as a tool for the cluster identification is to be found in the Annex 1. A screenshot of the tool is found below (Figure 13):

DOMAIN	INDICATOR	# QUESTION	UNIT	INPUT VALUE
Population	MG_P2	1 Did your city gain or lose population within the last year?	%	gain
	MP_P7	2 What is the median population age?	Years	36<=39
	MG_P1	3 Is the population aging? (what is the population dependency ration?	%	31,2<31,5
	MG_P8	4 What is the voter turnout ratio?	%	>70
	FI4	5 Proportion of working age population with higher education?	%	26<28
	MG_P5	6 What is the youth unemployment ratio?	%	<15
Governance	MG_G1	7 Is there any specific sustainability plan in the city ?	YES/NO	YES
	MG_G2	7 Is there any specific Smart Cities strategy in the city ?	YES/NO	NO

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Number of linkage:	4	6	5	3	9

Figure 13: Screenshot from CIT (Cluster Identification Tool)

### 4.3 Transforming the ‘demand’ into the city priorities as basis for an Integrated Urban Plan

This section describes what general priorities derive for each cluster of cities specified in the characterization of cities (typology). It can be analysed how the demand can be translated into city priorities (or priority working fields and actions to be implemented in the city). These priorities will serve as basis for the definition of an Integrated Urban Plan (IUP) for the city and the selection of the best suited Smart Cities Technology Packages (SCTP).

From the previous sections and the identification of which cluster a city can be related to, it becomes possible to associate the city with a set of predefined characteristics, and (from it) a set of ‘default basket’ of proposed solutions.



Figure 14: From the Integrated Urban Plan to the Implementation Plans

As a starting point, attention is drawn on the results presented in this section, which suffer from two major pitfalls. First, the general needs (or in other words: priority areas require special attention) of the cities from each of the five clusters identified in the characterization process are determined, following the global cluster analysis (vs. by layers or topics – energy, ICT, governance, etc.). As a matter of fact, the global priorities do not take into consideration the specific features of every EU city, which shall use the replication model. As a consequence, some inconsistencies may remain, i.e. a city’s actual priorities (as identified in one of the five clusters) may not match the priorities and recommended /actions presented below. Second, the

next developments of the replication model will be considered to include and adapt the global priorities through a layer (by topic) analysis, as opposed to the global cluster analysis and priorities exposed in this report. This will allow specifying the needs of the cities for each sector considered (forthcoming report D5.3) and providing additional information for interested cities, which will use the REMOURBAN model.

### Cluster 1

Cities that belong to cluster 1 are mostly defined by characteristics identified in Table 12 which can be classified in six topics:

Based on these results, it is possible to identify the related priorities of a city belonging to that cluster, and to provide some recommendations regarding the strategy to adopt, in terms of sustainable urban development. These are provided below:

The loss of population, the high rate of unemployment and the bad financial position of the city (low GDP, low disposable incomes) clearly identify the priorities to develop economic activity, in order to boost employment (especially youth employment), dynamize the local economy, bring funds to local stakeholders as well as improve richness of the territory. As these cities present a high ratio of population with high education, there is a good potential for highly qualified job opportunities and a potential to attract high skilled companies.

Mobility seems to be the most critical technical aspect to focus on. There is a presumable need to improve modal split and shift from private cars towards bike, walking and public transportation. The high proportion of private cars can be responsible for traffic jams, urban congestion, and bad air quality. The cities from this cluster should consider giving priority to reduce the share of private cars in the mobility mix and promote the use of public transportation, shared car systems and soft transport modes. The proportion of e-vehicles being very small, there is also a priority to develop this aspect of mobility.

The second priority seems to be the IT infrastructures, with a presumable need to improve the share of people connected to internet in the city and improve the smartphone penetration among the population.

Regarding the energy field, the cities of this cluster seem to present already a good position, with low energy consumption and related low GHG emissions. If the city is already producing a good ratio in renewable energy, it can aim to become a fully independent energy producer. As electricity is the main energy carrier, the priority should be to focus on renewable energy on this carrier, but also to work on the optimization and efficiency of the electricity use.

In terms of strategy, the city seems to have good long term urban planning perspectives, which can support the development and improvements of its economic status, but also favor these actions related to mobility, ICT and energy. An extra field needs some improvement, the waste sector where the recycling ratio seems worthy to be improved and where smart technologies can also play a role.

### Cluster 2

Cities that belong to cluster 2 are mostly defined by characteristics identified in Table 13. The related priorities and recommendations for the cities belonging to this cluster 2 are the followings:

Although these cities have gained population, it is an ageing population. To face these challenges, the general priorities are three-fold: the city shall develop smart services to serve older people, to sensitize/train them to the use of IT technologies, to make them more connected users and to make use of IT solutions to improve their daily life. The city needs to

attract young people as citizens and to provide more efficient services to face the growth of the population.

With a good position in disposable incomes, GDP and a high ratio of population with higher education, these cities have potential for highly qualified job opportunities and to attract high skilled companies.

Regarding strategies, the cities show good sustainable strategies, meaning good long term urban planning perspectives. The main concerns, in terms of planning, should be focused on mobility, as these cluster 2 cities have the highest ratio of private cars and the car is predominant in modal split. The city should focus on the reduction of traffic jams, congestions and car pollution. There is a crucial priority to make the modal split evolve towards bike, walking and public transportation. In terms of existing car share, the city shall develop e-mobility, but also systems of car sharing.

Regarding energy, priority should be put on improving the share of renewable energy in the local energy production, but also to diversify the RES.

Finally, there is also a place for improvement in ICT area, including the development of ICT infrastructures, networks, and giving priority for the establishment of ICT platforms integrating various public (e-government) services for citizens.

With its good position regarding GDP and disposable incomes, the city shows good economic resources to invest in smart urban solutions.

### Cluster 3

Cities that belong to cluster 3 are mostly defined by characteristics identified in Table 14.

Recommendations on priorities for the cities belonging to cluster 3 are the followings:

The cities belonging to this cluster have clearly identified problems in the fields of 'people', 'finance' and 'ITC infrastructures'. They however can pretend good results in terms of mobility and energy.

These cities, which have lost population, need to develop a strong and attractive political vision to attract new citizens. This can be done, in particular, by improving the development of strategic plans toward sustainability and smartness. Improvement can also be done regarding the skills of the population, which shall be developed and improved, to reach a smarter development of the city. This can be done by developing access to education and training, by providing training on e-skills, among others. The development of education will also have an impact on finance. The improvement of finance (GDP, disposable income, unemployment rate etc.) can also be fostered by developing economic activity, which will boost local employment. The city's priority is to attract companies requiring low skills profiles, but also develop an industrial/company network which can develop local creativity and innovation.

As the voter turnout seems to be low, the population needs to feel concerned and interested by policies and by the future of the city. It can be recommended to develop contact between citizens and the municipality, support citizen engagement initiatives through ICT or other solutions and develop participatory decision-making process.

Improvements are also suggested in the area of ICT infrastructures. Such improvements may include development of ICT infrastructures, networks, and platforms integrating various public services for citizens on the way towards e-governance.

In terms of mobility, the city, which is facing high frequency of accidents, shall improve road safety, by developing better technological instruments related to smart mobility and smart road infrastructures, but also develop citizen information, sensitization and training about safety,



using ICT tools and media. As modal split seems to be focused on walking, the city should consider giving priority to strengthening urban environment on a way that makes it more pleasant and enjoyable for walkers. It can also develop bike use and other soft transport modes.

#### Cluster 4

Cities that belong to cluster 3 are mostly defined by characteristics identified in Table 15.

Recommendations on priorities for the cities belonging to this cluster 4 are the followings:

Cities of this cluster show good positions in the fields of governance, finance and IT infrastructures. However, energy field is more crucial to develop due to high energy consumption in households and low use of renewable energy (RE). The cities of this cluster may reduce energy consumption by putting in place energy efficiency measures and to improve RE production for households, but also for sustainable mobility (e-mobility).

In mobility, the share of bike and walking in modal split can be reinforced.

Regarding people, these cities can improve the voter turnout by developing concern of citizens for policy and the future of the city, support citizen engagement initiatives through ICT or other solutions and develop participatory decision-making process. With good infrastructure and use of IT network and tools by the population, these initiatives can be better supported. E-government can also be developed in cities.

#### Cluster 5

Cities that belong to cluster 5 are mostly defined by characteristics identified in Table 16.

The related priorities and recommendations for the cities belonging to this cluster 5 are the followings:

Cities of cluster 5 face challenges in the energy field with a priority to reinforce energy efficiency measures in households and to develop the share of renewable energy.

Improvements can also be done in governance, mobility and ICT. For the first one, it means that the cities show some existing strategies and plans, but these can be developed and improved further. Regarding mobility, the modal split is already in good position; however, the share attributed to walking can be developed by securing pedestrian infrastructures and strengthening the urban environment to make it pleasant and enjoyable for walkers. With an intermediate use of private cars, developing infrastructures for e-mobility can be a good recommendation to improve sustainable mobility.

Finally, for ICT, as in most of the clusters identified, there is a priority to improve the number of people connected to internet to increase the level of smartphone penetration among the population and to improve ICT network infrastructures. This can be fostered by younger population with more new ICT technologies.

## 4.4 Transforming the Integrated Urban Plan into specific Smart City Technology Packages (SCTP) Implementation Plans

The catalogue of SCTP (named in the methodology presented in section 3.2.2 and described in 4.4) should enable stakeholders and relevant (groups of) persons empowered with the preparation of specific implementation plans of a city or district interested in the improvement of a specific area to choose the right technology packages for their case and to easily set it in place for their purpose. For example, in REMOURBAN, the partners responsible for the replication should use the existing catalogue of SCTP to choose the right technology packages to replicate in the follower cities, Miskolc and Seraing.

This part presents the different steps from the selection of the suitable SCTP to its implementation as summarized in Figure 15 below.

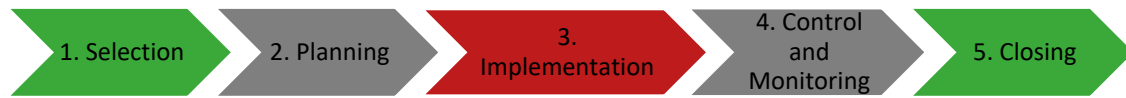


Figure 15: Steps for the implementation of the SCTPs

#### 4.4.1 Selection process

a. Before all:

- The authority should prepare a Project Charter which describes the projects (scope, background, expected profits, risks). This first document will be given by a representative of the entity to the Project Manager or Project Management Team (PMT) selected.
- The PMT is empowered through the Project Charter of the organisation for the project and ideally of its implementation. The PMT should respect the following processes and ensure that they are respected. In the best case, the PMT should be able to choose and select the necessary resources (Human and other) for the accomplishment of the project.
- The PMT shall read, understand and complete this document with the authority. The authority should ensure that the PMT understood different social aspects behind the projects well. As both parties (PMT and authority) approve the terms written on the document, they should sign it.

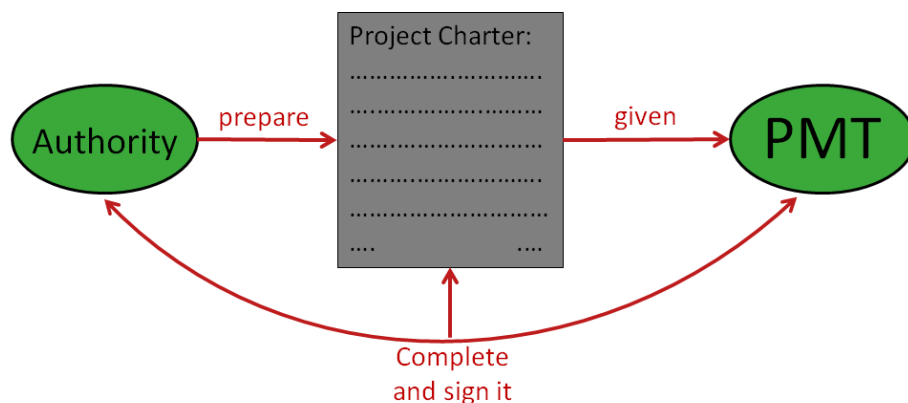


Figure 16: Preparation of the project charter

b. Assessment at the district or city level:

- Using the different data collected (onsite interviews with the city administration, the municipal companies or transport companies, the Energy Service Companies, the universities or research centres, the major local associations, the industry representatives and some institutions responsible for the business development, some existing reports, the internet), the PMT should characterize this city or district (see D5.1 “Characterization of European Cities D5.1” Chapter 5) and define its priorities (see section 4.3).
- The list of priorities enables the PMT to define the different focuses to be set to improve the situation of the city or the district.
- In line with these focuses, the PMT should also define some clear goals, missions and vision with the authority. This vision should cover the different aspects

(environmental, social, and economic). This will give the possibility to the different stakeholders to identify and gather their will to achieve the project.

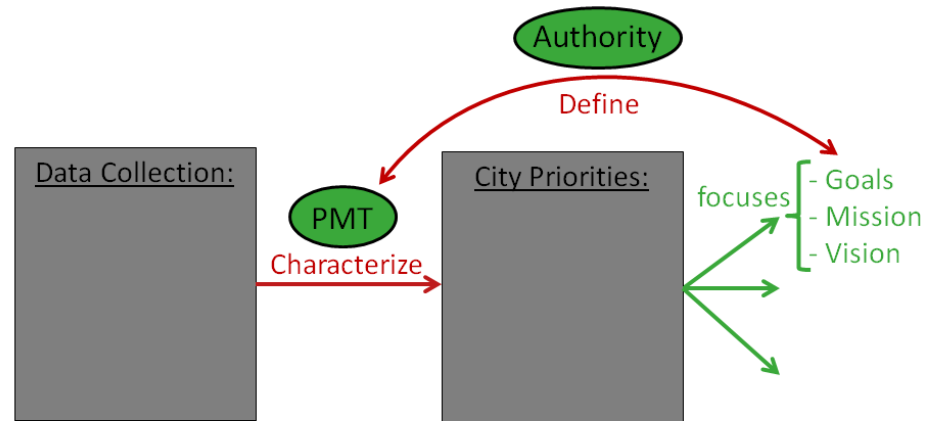


Figure 17: Assessment at the district or city level

c. Preparation for the selection of the suitable SCTP:

- The PMT shall select the different technology packages related to the priorities and their focuses to be tackled for the improvement of the city and prepare an appropriate comparison table of different SCTPs. (see Figure 18)
- The PMT shall, with the help of the authority, define the selection Board (this should be made up with some representative of the major stakeholders (Politicians, Business Development Institutions, Associations of Citizen, Research Centres or Universities, Civil Engineering companies, transport companies and energy companies)).

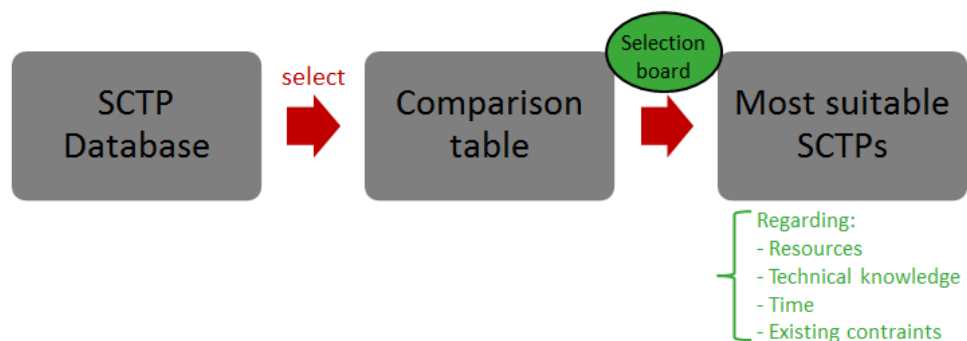


Figure 18: Selection of the most suitable SCTPs

d. Selection:

- After having read the comparison table and if necessary, the different SCTP mentioned, the Board shall select the most suitable SCTP (according to the resources available, the technical knowledge, the time and the other existing constraints).
- The members of the selection board should offer their availability to help the PMT to set up the project.

e. Update the documents:

- Following this selection, the PM shall update the SCTP (containing the information of its last implementation probably in another city) to fit with the case (the one the PMT is working for).
- The PMT shall update the Project Charter.
- The PMT will then ask for feedback (meeting could take place, transmission of archives etc.) from the entity, which wrote these SCTP.
- A thoroughly fulfilled Stakeholder Register shall also be prepared by the PMT at this stage. This document should present the expectations, the background knowledge and the means to communicate with each stakeholder for the project. This document should be linked to strategies in order to improve the interest and opinion of the stakeholders regarding the project.

These last tasks enable the PMT to start the planning phase.

#### 4.4.2 Planning

- First, the Project Manager should write a Project Management Plan to present the structure of the project and how it will be implemented.
- Then, reusing the SCTP, the PMT will develop the Work Breakdown Structure (WBS) of the project (subdivide the project into sub-projects, parts, sub-parts to well defined tasks in term of duration, resources, costs).
- Using the Work Breakdown Structure (WBS), PM will plan different steps and project tasks.
- PM will then prepare some plans (Budget and Risks Management Plan) regarding the risks and costs estimated. He/She can then follow, prevent and mitigate these risks.
- Develop the Human Resources (HR) Plan (Size of the team, Profiles, Formations, awards, etc.)
- Define the Quality Management Plan (document presenting the degree of quality to be reached, the limits of acceptance, unacceptable, partially acceptable, etc.), the processes insuring the quality and giving the possibility to change the scope or a quality criterium.
- Prepare the Monitoring and Controlling Plan (this document presents the indicators to be followed during the project, the description of the controls to be done (i.e. type, place, and frequency), the communication to be done on these results and the process in case of non compliance, etc).
- The Communication Management Plan will define the type and frequency of the communication to each stakeholder.

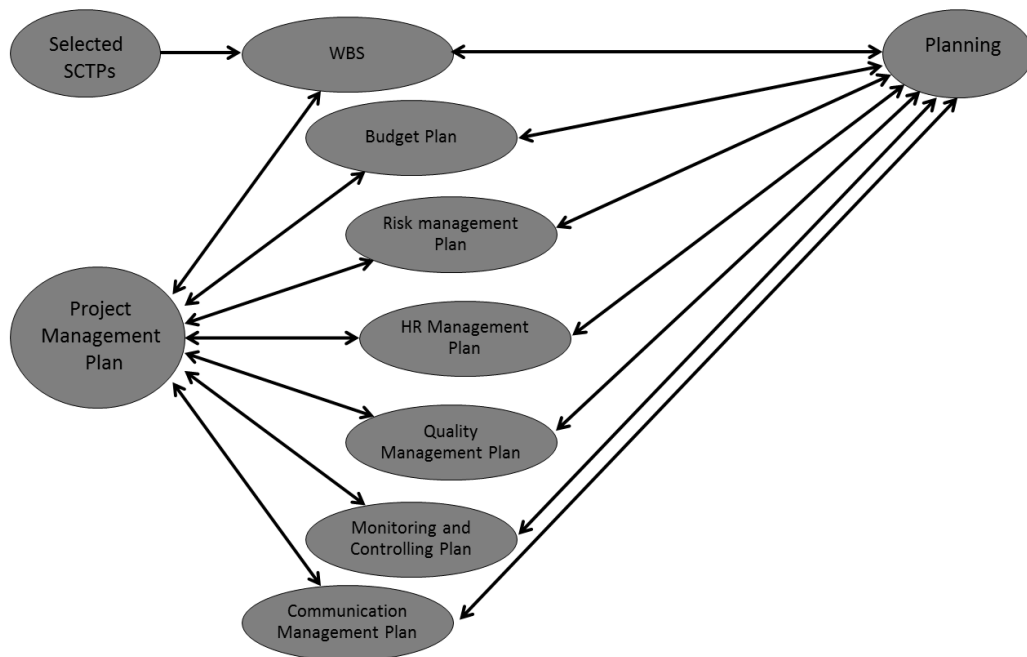


Figure 19: Planning phase

During this phase, the PMT shall discuss with the different stakeholders to prepare the documents.

#### 4.4.3 Implementation

- The PMT and his/her team should reuse and update the different documents prepared for the execution of the project.
- A very important part of this work will be to communicate effectively to keep the support of all the stakeholders for a better achievement.

The support of the stakeholders should be managed through effective communication and the realisation of different events celebrating the completion of different project steps.

#### 4.4.4 Control and Monitoring

- To respond to the planning process and reach the expected results, different measures planned in the Monitoring and Controlling Plan have to be carefully followed.
- This will also enable the project team to collect the information or indicators necessary to present the results of the project. This information is important for the next selection phase or for the future exploitation.

#### 4.4.5 Closing

- The project team should control that all the different documents are correctly updated and completed. It should also make sure that this information are sustainably archived and accessible.

All the documents, results, etc. regarding each project should be collected in a European database centralising the information of all the different projects using these SCTP.

The SCTPs shall be available as fact sheets, both as a text (summary/overview) and as power point slides, to be easily used and diffused in various media.

## 5 Supply analysis

This section details the Urban Regeneration Model developed in REMOURBAN, which covers the process of transformation of cities as well as the technological solutions analysed and implemented in the lighthouse cities of the project. This will refer them as Smart City Technology packages (SCTP).

As depicted in the following sections, the Smart City Technology Packages consider both innovative technologies developed within the framework of the project (and therefore closely linked to the analysis of its potential market and roadmap for exploitation) and those well-known technologies that will be implemented in the lighthouse cities for the demonstration of the benefits linked the technology itself, the combination of technologies or the innovation in their associated operational model.

### 5.1 The Urban Regeneration Model as a driver to define the city transformation strategy and generate an Integrated Urban Plan

The Urban Regeneration Model defines a holistic process for urban transformation and in order to ensure this holistic city transformation, it is necessary to design multi-sectorial actions that allow achieving more ambitious goals. Most opportunities for city transformation are in energy, mobility and ICT sectors. In fact, it is in the common zone in which these three sectors could act jointly where it is possible to find relevant impact. For this reason, the urban regeneration model defines a holistic process for urban transformation with a joint approach in these fields. The model provides solutions addressing the temporal goals, the main smart city enablers within the transformation process and innovations in the priority actions of energy, mobility and ICTs.

These are the main fields where this urban regeneration model is focused:

- **Urban districts and built environment:** Energy sector, considering the energy supply, distribution and use (mainly in buildings) has significant impact on the city sustainability. A set of actions focused on increasing the overall energy efficiency of a residential district will be developed encompassing the retrofitting of a residential area towards a low energy district, the installation and connection of the heating and cooling systems to a centralized one with a high ratio of generation with renewable energy and the use of advanced building energy management systems to automatically monitor and control the main facilities, devices and services at a district level.
- **Urban transport:** Mobility sector has a very important impact on quality of life; some sustainability mobility actions will be carried out in order to create a new culture of urban transport. In this field, the use of cleaner vehicles will be promoted and clean power for transport will be improved using electric, plug-in hybrid vehicles and charging infrastructure. The logistics supply chain inside cities (last mile delivery) will be enhanced and alliances that use open data will be supported to ease the deployment of demand-responsive and integrated mobility services which help minimize energy consumption.
- **Integrated infrastructures and processes:** By taking advantage from the ICT sector that is fully integrated in cities, a platform to integrate information and deploying added value services for the grid management and traffic systems will be deployed.

ICT sector will enable the deployment of integration strategies of the urban infrastructures with a variety of targets, for instance empowering people to interact with infrastructures, enabling people to become a sensor within overall city infrastructure

systems through mobile devices as ubiquitous means, enabling business cases based on the integration of a city's network infrastructures.

In the project, each city will use its own Local ICT platform with the main goal of monitoring all the devices existing in the city for the project and a Global ICT platform will be used to consolidate the data from these local ICT platforms. Due to the key goal of the REMOURBAN project being its replicability to other cities, a platform with a common model is needed which defines and manages a set of parameters and indicators for assessing the success of the project. This platform is the city integrated infrastructure and this city integrated infrastructure will be created and deployed in the Global ICT platform.

As it can be seen in the scheme of this urban regeneration model, it covers the four main phases of the city transformation process, which are linked to the specific actions described above and the smart city enablers. These main phases are:

- **City audit** is the first phase of this model, aiming at implementing a set of integrated existing methods and tools that can support the evaluation of the current conditions of the cities in which the Sustainable Urban Regeneration Model will be implemented.
- **Actions design.** The objective of this second phase is the definition of the specific interventions or actions that will be undertaken in the city. After the analysis of the information collected in the first phase, a solution will be proposed according to the expectations about energy savings and costs. This is a decision-making process.
- **Implementation.** The actions designed in the second phase will be implemented and commissioned, covering all fields involved in this urban transformation. In this phase, the deployment of the monitoring program will be key to allow gathering the necessary information for assessing the impact of the intervention in the following phase.
- **Assessment.** This last phase is in charge of assessing the impact of the interventions following evaluation protocols and using the information gathered during the implementation phase. For this evaluation, the most appropriate KPIs will be selected in order to assess the sustainability and the smartness and some specific parameters as the energy consumption, CO<sub>2</sub> emissions reduction, reduction of the journey delays, even the social acceptance of the final users and citizens.

Finally, the Urban Regeneration Model takes into account the urban transformation enablers that are described below:

- **Management framework for the urban regeneration.** It is necessary to optimise the current regulatory framework developing new forms of smart city policies and regulations or optimizing the existing documents. Moreover, a strategy will be developed for innovative public procurement procedures.

Aspects such as human and social capital, equity, diversity, accessibility, safety, health or quality of housing and the built environment will be taken into account. These will be considered when defining city transformation strategies and designing specific actions, as well as when assessing the achievement of goals at the end of the process.

Development of new strategies for supporting the transition to smart cities, integrating existing urban plans and redefining them in a common and unique sustainable urban plan (mobility, energy, ICT), that would implement a holistic strategy with the objective to transform the city and make it smarter.

- **Evaluating the urban regeneration.** An evaluation framework is defined in order to assess the sustainability and smartness of demonstration cities involved in the

REMOURBAN project. This framework allows estimating the effect of the urban regeneration model and the intervention plans for the demonstration cities.

Monitoring and evaluation procedures allow quantifying the actual impact of the renovations in order to reduce investment risks, improve the benefits perception and support the replicability.

- **Financing the urban regeneration.** Understanding the current status of the city's economic ecosystem is essential to find out suitable economic models for the city transformation, in which a combination of innovative schemes of Public Private Partnerships can be drivers for the implementation of the model.

Smart cities require large amounts of investment to be realised and capital invested in this sector will likely grow every year for decades. Several financial instruments are necessary in order to support these investments. Some financial schemes are already available to stimulate investments in smart cities and, more generally, energy efficiency projects.

In this field, innovative financial schemes and business plans for each of the pillars of the project will be developed in order to ensure that most of the possible interventions can be feasible.

The Urban Regeneration Model will be validated in two phases:

The first one will consist of a large scale demonstration, in the three lighthouse cities, of the potential that offers the proposed model for urban regeneration to deploy integral actions in the areas where energy, mobility and ICT sectors are intimately linked. Moreover, a financial and feasibility plan is being developed in order to guarantee the investments and the return of them.

The lighthouse cities also commit to the deployment of a powerful monitoring system in order to gather the necessary variables for the evaluation procedure that is being designed. Further to the technical actions, these interventions will include a relevant citizen engagement activity for maximizing the impact and achieve a wider validation.

The second phase will consist of ensuring the model replicability. A first replication stage will be tested in the follower cities of Seraing (Belgium) and Miskolc (Hungary); but also a wider replicability plan for European Cities is being defined and will be validated.

The replicability framework is dealing with this connection through integrating all parts of the Sustainable Urban Regeneration Model in a single approach, establishing two ways of linkage that lead to the definition of Integrated Urban Plans for the cities and the related Implementation Plans. Thus, the replication of methods and processes can lead to these strategic plans at city level which should establish the long-term approaches needed in the city to ensure the effectiveness of the transformation strategy, while the implementation of the technical solutions can catalyse the integrated city plan into real interventions leading to achieve the macro-level objectives.

## 5.2 Smart City Technology Packages

This chapter provides the description on how the Smart City Technology Packages (SCTPs) will be set up for the aim of replication. The SCTPs are independent implementable groups of solutions which contain technologies that have been analysed and implemented in REMOURBAN and have replication potential. The objective of the SCTPs is to provide a catalogue of all REMOURBAN technologies which can be replicated to other cities.



Table 17 below shows how the technology packages relate to the technical innovations developed in REMOURBAN.

Within REMOURBAN, a whole bundle of technical innovations and solutions have been developed, which are grouped according to the three sectors:

- Energy
- Sustainable mobility
- Integrated infrastructure

See the Table 17 below for a first set of technologies to be covered by the SCTPs:

**Table 17: First set of technologies to be covered by the SCTPs**







Technical Domain	Division	SCTP		Technology units
Energy	Passive energy intervention	TP_ENEP1	Building envelope retrofitting	Laser scanning EnergieSprong Solution Glazing Room in the Roof Internal Insulation External insulation Heavily insulation solutions Offsite manufacture insulation
		TP_ENEP2	Ventilation and infiltration	Ventilation Air tightness
		TP_ENEP2	Lighting optimisation	LED Lighting
	Active energy intervention	TP_ENEA1	Electric distributed generation	PV facilities building integration Battery Community energy structure Combined Heat and Power Generation
		TP_ENEA2	District heating and cooling	Local distribution Skirting heating Solar thermal facilities DWH Biomass DH performance optimisation Thermal Storage Variable flow pumps Heat exchange substations Low temperature DH






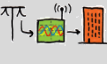


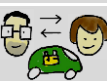
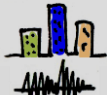
Technical Domain	Division	SCTP	Technology units
			<p>solutions</p> <p>Multisource DH solutions (biomass, natural gas, solar thermal and PV, CHP)</p>
	Energy management	TP_ENEM1	<p>Smart grid</p> <p>Micro Grid (renewables, storage, demand side management)</p> <p>Smart grid control systems</p>
		TP_ENEM2	<p>Advanced Building Energy Management System (BEMS) at district level (DEMS)</p> <p>Advanced controlling (generation and distribution) of district heating and building comfort controllers</p> <p>Energy and comfort temperature management per dwelling</p> <p>Individual billing</p> <p>Assisted living (alerts/alarms)</p>
		TP_ENEM3	<p>Monitoring tools for energy</p> <p>ICT Platform regarding energy</p> <p>Smart energy metering (district, building dwelling)</p> <p>Simulation models</p> <p>Energy mapping tool</p>
Sustainable Mobility	Electric	TP_SUSE1	<p>Vehicles</p> <p>Electric cars</p> <p>Electrical buses</p> <p>Electrical bicycles</p>
		TP_SUSE2	<p>Recharging infrastructure for EV</p> <p>Charging points of different technologies (DC/AC)</p> <p>Local charging optimisation device</p> <p>Charging point back-end system</p>
		TP_SUSE3	<p>Further clean logistics</p> <p>Last mile delivery network</p> <p>Urban consolidation centre</p>
	Optimization	TP_SUSO1	<p>Promote use of cleaner Vehicles</p> <p>Free parking for EV</p> <p>Taxes reduction</p> <p>Special lanes</p> <p>Smart phone App</p>

Technical Domain	Division	SCTP	Technology units
			Knowledge/Experience sharing portal
		TP_SUSO2	Foster seamless door-to-door multi-modality Ticketing, smartcard, smart phone
		TP_SUSO3	Open up intelligence in urban transport systems Smart phone as an Aid to mobility EV Monitoring
		TP_SUSO4	P2P transport information Car sharing (EV, internal combustion car or hybrid)
Integrated Infrastructure	Information services	TP_INF11	City information platforms Local information infrastructure
			Service for city information platform
			Personal information API
	Global	TP_INFG1	Optimized cross cutting (Energy, Mobility and Integrated Infrastructure) small sustainable centres Small local consolidation centre
			TP_INFG2
	Simulation	TP_INFS1	Citizen Engagement CO <sub>2</sub> consumption app Trainings
		TP_INFS2	Multi-functions simulator Integrated infrastructure City Model

Table 18 below shows how these technology packages will be implemented and demonstrated into the REMOURBAN lighthouse cities:

Table 18: Smart city technologies implemented in lighthouse cities

Lighthouse city		Valladolid (ES)	Nottingham (UK)	Tepebasi (TK)
Energy savings		50%	50%	53%
Emissions avoided		80%	26%	63%
Citizens involved		5,700	8,100	6,000
LOW ENERGY DISTRICTS		<b>District scale retrofitting</b> 24.700 m <sup>2</sup> district retrofitting 398 dwellings 1000 residents 50% energy savings	28.318 m <sup>2</sup> district retrofitting 411 dwellings 1600 residents 35% energy savings	10.570 m <sup>2</sup> district retrofitting 57 dwellings 400 resident's sensitivity control 60% energy savings
		<b>Renewable heating and cooling</b> Biomass district heating	Connection with city scale district heating (90% renewables and waste heat)	Water sourced heat pump for H&C and Biomass heating plant. Solar thermal for DHW
		<b>Electricity distributed generation</b> PV panels on façade (64 kWp)	CHP PV panels on roof (75 kWp)	BIPV panel on roofs (100 kWp) and Carport Canopy (50 kW) Energy monitoring and control system
		<b>Advanced BEMS at district level</b> Advanced controlling of district heating and building comfort controllers	Advanced controlling of district heating and building comfort controllers	Energy monitoring and control system (automatic control, occupancy control, CO <sub>2</sub> sensors, comfort controllers)
		<b>Monitoring tools for energy</b> ICT platform for energy performance monitoring	Advanced monitoring including user behaviour	Advanced monitoring and energy performance viewing ICT platform
SUSTAINABLE MOBILITY		<b>Improve clean power for transport: vehicles</b> 20 FEV taxis 3 e-Buses 2 FEV fleet 20 FEV private	NET* Tram 50 e-Buses existing 2 tourist link e-Buses	50 e-bikes 4 e-Buses 22 EHV
		<b>Improve clean power for transport: infrastructure</b> 4 Charging Points for taxis 1 Fast Charging for taxis 4 Fast Charging for e-Buses 34 Charging Points upgraded	Recharging burning city's waste 2 FC PV panels	15 e-bike charging stations 2 EV charging stations

		<b>Foster seamless door-to-door multi-modality in urban transport</b>	Ticketing system shared among users from buses, bicycles & car-sharing fleet	City-card tourist smartcard	Ticketing, Smartcard, Smart Debit Card
		<b>Further clean logistics</b>	5 FEV Last Mile of Delivery in CYLOG	Last mile delivery network 3 electrical vehicles	
		<b>Open up intelligence in urban transport systems</b>	Smart phone app as an aid to mobility		Smart phone app mobility: Info. interface to bike system
		<b>Promote use of cleaner vehicles</b>	Free parking EV Taxes reduction Special lanes		Integrated bike rental system Free parking for EV
<b>INTEGRATED INFRASTRUCTURES</b>		<b>City Information Platform</b>	City Information Platform	Integrated Infrastructures City Model	Smart City Monitoring Portal
		<b>Shared infrastructure planning</b>	Access to district smart metering infrastructure	Access to district smart metering infrastructure	Energy data monitoring infrastructure access via SCMP
		<b>Transforming the energy chain</b>		Energy control at home (app)	Micro grid: renewables, storage, demand side management
		<b>Intelligent multi-modal transport solutions</b>	Smart phone apps	Crowd-sourcing data connection (smart meter, traffic model)	Smart phone apps. (Info interface bike rental system, availability, location, social media promotion)
		<b>P2P transport information</b>	Car Sharing municipality fleet (Sustainable mobility priority area)		
		<b>Adverse events</b>			Link Smart grid with Earthquake sensor for emergency scenarios

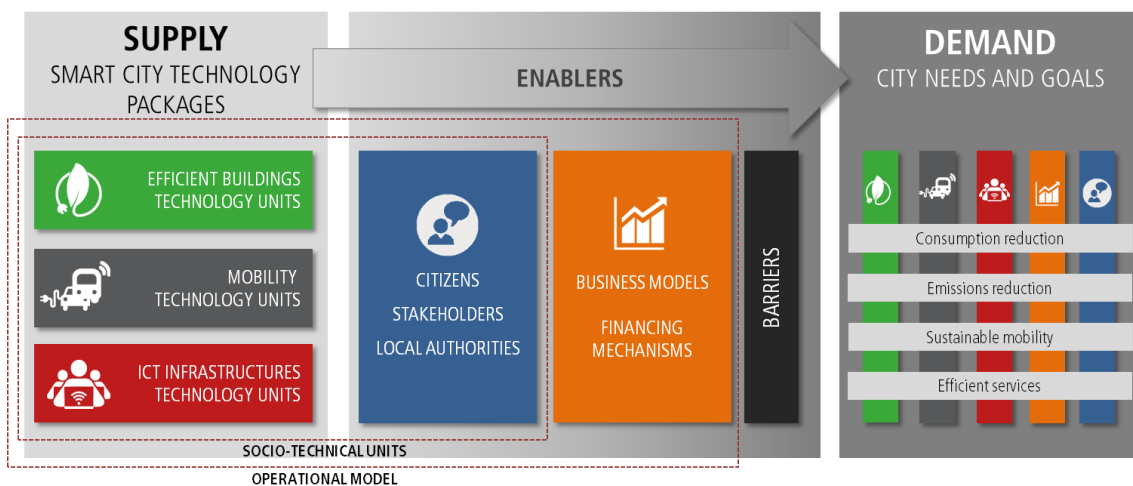
The interested cities will have the opportunity to:

- Access these SCTPs,
- Gather information about:
  - The different technologies;
  - Their replication potential;
  - How to implement these technologies.

These SCTPs give the possibility to any entity to take an easier decision on the technology to be implemented in order to fulfil the specific target within the City Implementation Plan. They also give the main information to the most important stakeholders, some major parameters (cost, time and resources), the scope of the project, that have to be taken into account, the risks (barriers or problems) that have to be overcome and the indicators to be controlled to implement these technologies to name only some.

The SCTPs for smart cities should be implemented by market measures by innovative financial schemes, business models and public procurement. However, nowadays these solutions are performed in cities through funded projects due to the companies' perception of high risk when investing in innovative energy solutions and the large volume of investment required. Therefore, for expanded smart projects, it is needed to attract future investor given the limited capacity of public sector for funding a large number of projects.

### 5.2.1 Content of the Smart City Technology Packages



**Figure 20: Definition of technology units, socio-technical units and associated operational models**

Figure 20 above presents the structure of the SCTPs which are sets of complete replicable solutions accompanied by information necessary for planning their deployment/replication at city or district scale. This accompanying information includes, inter alia, benefits, stakeholders, reason and barriers for implementation, supporting factors, possible improvements and source of supplementary information. It is made up with an Operational Model presenting some more operational and financial information and some indicators, communication, key elements of social acceptance and preconditions. Inside of this, some socio-technical units (incl. more detailed information covering units and their need for sociological support from stakeholders, end-users, associations) and technical units (with more detailed information regarding technical units of the Sctp) are found.

The templates shown below describe:

- The Smart City Technology Package (Sctp),
- with its operational model presenting some more detailed information,


- and then their structuring parts made of:
  - o its sociotechnical units
  - o and the technical units

In order to foster the alignment of the replication measures implemented paralelly by all smart city projects supported by the European Commission within Horizon 2020 programme, templates developed by Triangulum project are hereby adopted to the REMOURBAN project. A wide range of combined measures to be collected from all SCC projects also offer the possibility to catalogue, compare and benefit from smart solutions deployed by other smart city projects, besides REMOURBAN.

#### 5.2.1.1 Smart City Technology Packages

Considering the goals of the SCTP mentioned in the 3.2.2, the SCTP fact sheets present the following content:

- A short description of the SCTP
- The previous implementation and state
- The benefits obtained
- The main stakeholders
- Its background (reasons and success factors)
- Some possible improvements
- The barriers
- Some other projects using it



<b>SCTP</b>	<b>SCTP(NrX Name of Smart City Technology Package)</b>		
Sector	Energy / Mobility / ICT		
LH-City	Valladolid/Nottingham/Tepebasi		
District	XY		

*Add Key Visual*

**Short Description of SCTP\***

**State of Implementation**

Dissemination level of SCTP		
public	Yes	No

in case of "no" please indicate below the persons' name and e-mail address of the project partner organisation that should get contacted to clarify the intellectual property

Benefits (please mark)										
Reduction of carbon emissions	Use of renewable energy sources	Reduction of primary energy consumption	Secure and stable energy	Improve traffic flow	Improved Data availability	Better use of data	Increase citizens engagement	Increased comfort	Behavioural change	Improve competitiveness
Knowledge dissemination	cost effective solutions	Creation of jobs	Market deployment	Meet Local Sustainability targets						

**Benefits (please add)**

Stakeholders	Function	Name(s) - please indicate if possible
A1	Owner	
A2	Technology Provider(s)	
A3	Operator	
A4	User(s)	
A5	(External) Investor	
A6	Other Actors	

Local factors / reasons for implementing	Supportive and determining factors	Possible improvement
<small>Please shortly describe, which local factors (in your city or country) are crucial in order for this SCTP* to be implemented.</small>	<small>Please shortly describe, which other important factors are supporting or determining the SCTP*.</small>	<small>Please present some ideas to improve this SCTP* or list impact.</small>

**Barriers**

Please shortly describe the main barriers that you are encountering when implementing this SCTP\*.

**Other Projects using the same SCTP**

Please mention the name of the projects implementing a similar SCTP\* (to your knowledge). Please write a brief description.

The information collected on this SCTP will NOT be forwarded to any party outside the project consortium without prior permission by the project partners involved.

\* SCTP: Smart City Technology Package

Figure 21: Smart City Technology Package (SCTP)

### 5.2.1.2 Operational model

Inside the SCTP, some independent operational models can be characterized with their:

- Responsible persons and his/her role
- Major parameters (cost, time, extent, etc.)
- Operational description
- The subdivision of this module in its technical or socio-technical units
- Its benefits and beneficiaries



- Success indicators
- Preconditions
- Communication Plan defined
- Citizen satisfaction regarding this model



<b>Model</b>	<b>SCTP(NrX) -M(NrY)</b>	<b>Name</b>	
<b>Sector</b>	Energy / Mobility / ICT		
<b>LH-City</b>	Valladolid/Nottingham/Tepebasi		

Person/Orga in charge  Responsibilities

Additional module cost\*  Euro

Overall module cost  Euro Extent  /m<sup>2</sup>./inh,...

**Operational Model for SCTP**

Identifier	Socio-technical units	Comments/Details
T1		
T2		
T3		
T4		
T5		

Direct Benefits ( complete module)	Main Beneficiaries

Additional & Diffused Benefits	Main Beneficiaries

**Success Indicators**

Identifier	Impact Description	Indicator	Quantifiable Unit	Value	Comments/Details
I1					
I2					
I3					
I4					
I5					
I6					
I7					

**Important Preconditions & Prerequisites**

Identifier	Sector	Description	Reason/affected unit	Example	Comments/Details

**Communication Plan**

Please enumerate the different communication tools or supports (with the target group) used for this module.

**Citizen acceptance**

Please describe the way the citizen received this module (rejected, rather negatively, without reaction, rather positively and enthusiastic).

\* not including technology unit costs

Figure 22: Operational model to the SCTP

### 5.2.1.3 Defining socio-technical units for the technology packages

Given the diversity of barriers which affect technological solutions, in order to facilitate the implementation of smart projects, it is required to split the SCTPs into socio-technical units and analyse the options and solutions for each of these units. Thus, each unit block (supply) should interconnect with the city's goal (demand) through an analysis process of the enablers financial mechanisms, beneficiaries and stakeholders affected and (non-technological barriers).



Sociotechnical Unit	
SCTP(NrX) -M(NrY) ST1	Name
Life span	<input type="text"/> Years
Implementation duration	<input type="text"/> Years
Life cycle cost	<input type="text"/> Euro
Share of public/external funds	<input type="text"/> %
Input/Output Parameters	<input style="width: 100%;" type="text"/>
Standards & Technical Details	
IT-Interfaces	
Service & Business Model	

Actor		Cost		Benefit		Simple payback time	Comments /Details
Identifier	Function	Name	Investment	Annual Running Cost	Annual income/saving		
A1	Owner						
A2	Technology Provider						
A3	Operator						
A4	User						
A5	External Investor						
A6	Other Actors						
<b>Total Sum</b>							

Success Indicators					
Identifier	Impact Description	Indicator	Quantifiable Unit	Value	Comments/Details

Barriers
<i>Please shortly describe the main barriers that you are encountering when implementing this unit.</i>

Citizen acceptance
<i>Please describe the way the citizen received this module (rejected, rather negatively, without reaction, rather positively and enthusiastic).</i>

Other Projects using the same sociotechnical
<i>Please mention the name of the projects implementing a similar unit (to your knowledge). Please write a brief description.</i>


Possible improvement
<i>Please present some ideas to improve the impact of this unit.</i>

Figure 23: Smart city socio-technical units

The Socio-Technical contains the Stakeholder, the Business Models but also the technical units that entails:

- Person or Organisation in Charge and her/his responsibilities
- Size and experience of the company with this type of technology
- Standard and technical details
- The links to this unit and its documentation
- Its goal and Business Plan
- The stakeholders, costs and benefits
- Success indicators
- The barriers
- Citizen satisfaction regarding this Operational Model

- Some other projects using it
- Some possible improvements



Technical Unit	
SCTP(NrX) -M(NrY) T2	Name
Person/Orga in charge	Responsibilities
Type of the company	Experience of the company with this Unit
Life span	Implementation duration
Life cycle cost	Share of public/external funds
Input/Output Parameters	
Standards & Technical Details	
IT-Interfaces	
Service & Business Model	
Business Plan	
Please shortly explain the Business Plan (investment steps, payback steps, rates...).	

Actor		Cost		Benefit		Simple payback time	Comments /Details
Identifier	Function	Name	Investment	Annual Running Cost	Annual income/saving		
A1	Owner						
A2	Technology Provider						
A3	Operator						
A4	User						
A5	External Investor						
A6	Other Actors						
<b>Total Sum</b>							

Success Indicators					
Identifier	Impact Description	Indicator	Quantifiable Unit	Value	Comments/Details

Barriers
Please shortly describe the main barriers that you are encountering when implementing this unit.

Citizen acceptance
Please describe the way the citizen received this module (rejected, rather negatively, without reaction, rather positively and enthusiastic).

Other Projects using the same solution
Please mention the name of the projects implementing a similar unit (to your knowledge). Please write a brief description.

Possible improvement
Please present some ideas to improve the impact of this unit.

Figure 24: Technical unit

### 5.2.2 Evaluating the benefits of combined technology packages

The structure and the synthesis of these SCTPs give the possibility to combine some of them. For this combination or choice, some important factors have to be taken into account for success of the project:

- Socio-economic governance
- Pre-existing structures

- Type of buildings

Table 19 below shows the comparison between the settings of two SCTP consecutively or simultaneously:

**Table 19: Comparison of consecutive and simultaneous projects**

	Consecutive projects	Simultaneous projects
Negotiation Phase	2 contracts have to be treated	All-in-one solution possible (time for the analysis and the selection of the offer would be reduced)
Project Management (Selection, Planning, Closing)	Need to be repeated	The same Project Management tools and documents will be used for both projects, this way preventing to repeat their preparation.
Works on the infrastructure	For each project	Some tasks could be done together (ex. Works on the road for the E-Mobility that could be reused for the internet cable for the infrastructure).
Disturbance for the citizens	For each project	
Control Phase	2 controls have to be done. One for each project.	The controls can be realised at the same time for both project and certified by authorities.
Interferences Adjustment	The 2 <sup>nd</sup> project should measure its interferences on the 1 <sup>st</sup> and adapt without having the possibility to change the parameter of the 2 <sup>nd</sup> .	Tests and adjustments are done together with the experts of both projects and the possibility to change the parameters of both if necessary.
Delays	The first project has to be closed before the beginning of the 2 <sup>nd</sup> .	Some tasks could be delayed but the management of the resources could reduce the impact of delays thanks to the other tasks.

In order to accelerate the improvement of the sustainability and the quality of life of an area/district, combinatorial approach offers many advantages. This approach and its results will be practically demonstrated and verified during the REMOURBAN project.

These different benefits vary from a one way of combining SCTPs to another. The benefits should be assessed and taken into account during the selection process.

These benefits have to be monitored during the project and controlled at the end of the project. They should be presented to the potential organisations wanting to replicate.

The constitution of these SCTPs facilitates gathering information regarding comparable projects. It enables the evaluation of their achievements and benefits, also when they are combined.

### 5.2.3 Evaluating the market implementation potential of the innovative technologies

The market analysis done in REMOURBAN will analyse the market implementation potential of a selection of the most innovative technologies that can be considered as a product or a service or a methodology.

The market analysis will be based on the results of the following exploitation workshops that are held with the project partners during various partner meetings, which enable to achieve the following goals:

**Table 20: Workshops on exploitation activities**

Workshop number	Content and outcome of workshop	Next step
1 <sup>st</sup>	Identification of exploitable results (product, service, methodology)	<p>Selection of exploitable results for market analysis</p> <p>The selection is made based on the level of relevance of the exploitable results for the partners and the project</p>
2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• Full characterization of exploitable results (ER)</li> <li>• Definition of the Unique Selling Proposition (USP)</li> <li>• Linking user groups to these products ... e.g. building owners, construction companies or policy makers</li> </ul>	Market analysis
3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Setting up a road map for exploitation (first market overview, def. of targeted market segments, full characterization of potential customers, etc.)</li> <li>• Recommendations for long term direct and indirect exploitation and market deployment activities</li> </ul>	Market analysis

## 6 Connecting the smart city enabling actors and cross-cutting issues towards ensuring the smart and sustainable city transformation

The realization of a smart city project is possible when a synergy between social/political, financial and technical players is established.

The decision makers are generally the social/political players who, based on a socio-economic context analysis, establish priorities for the necessary interventions for developing a smart city, setting several goals that can be reached by specific technical interventions that could be traditional and innovative.

The decision making process is up to the social/political players, mainly the Municipalities, who, together with the advice of technical and financial players, make a first feasibility analysis of the projects to be implemented. The following Figure 25 is illustrating the main actors of the decision making process.

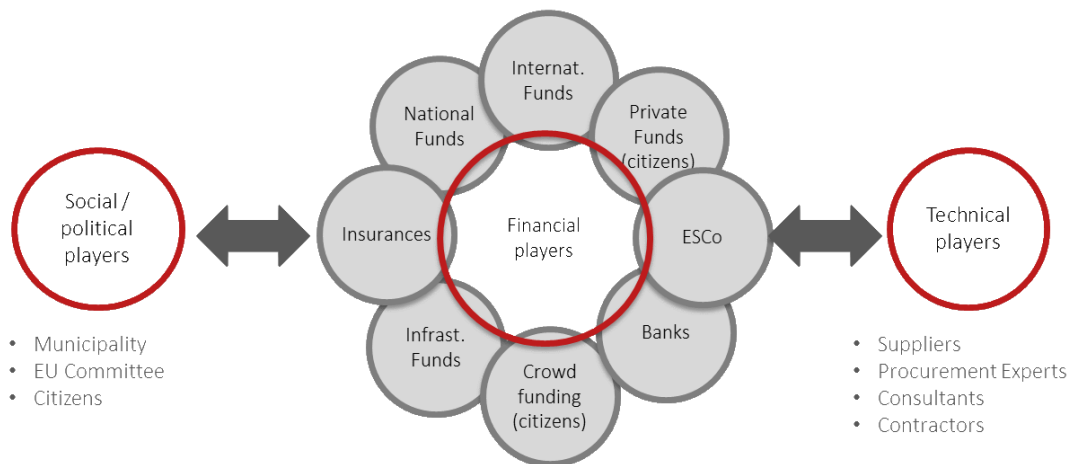


Figure 25: Players involved

The synergy between those players is possible when the whole process for the smart city projects implementation is consistent and the role and responsibilities of each player are clearly defined. The following table summarizes this concept.

### 6.1 Financial players as drivers for smart city solutions

For the future replicability of the smart city interventions, it is fundamental that financial resources and instruments are very clear and available to the Municipality, citizens and contractors.

For this reason, the scope of Section 6.1.1 is mapping all funds and instruments available for interventions such as energy efficiency projects mobility and ICT that are available to date. Hence, it is important to be aware of the available financing not issued by the EU financial programmes to easily replicate the interventions of REMOURBAN project in other cities that aim to become smart.

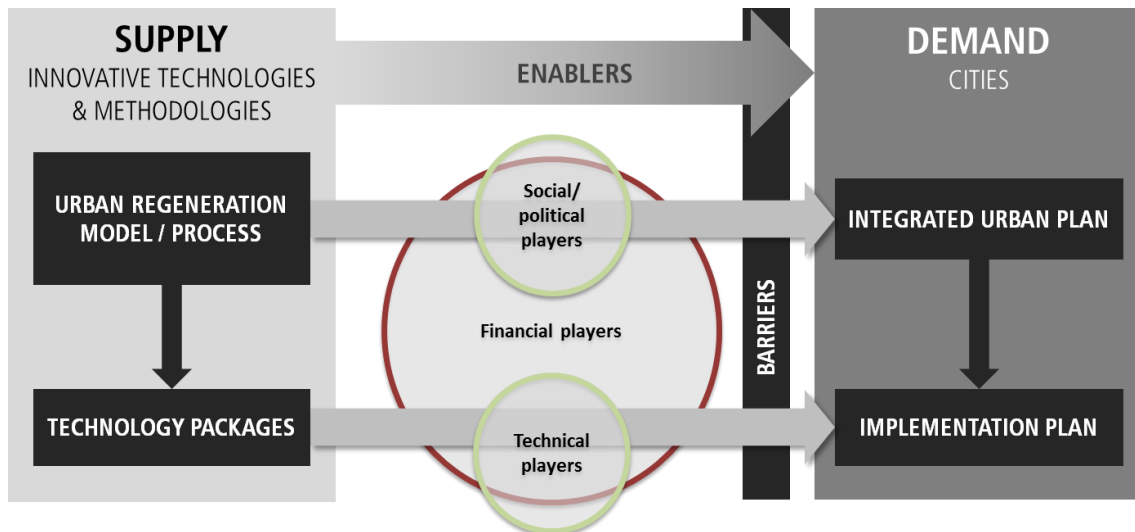


Figure 26: Connecting the 'supply' side with the 'demand' side – focusing on financial players

### 6.1.1 Mapping of financing opportunities for smart cities

Traditionally, a lot of energy and transport infrastructure has been financed directly from public funds. There is, however, a need to better use the limited public financial resources and change the model for financing new 'smarter' infrastructures.

This requires the funding model to realize a smart city shift from the use of 'traditional' tools such as public (e.g. municipal, regional, national) resources to contractual models of Public Private Partnership (PPP), which is able to attract private capital.

In general, the smart city scenario imposes a dynamic organizational model whereby five major types of stakeholders are essential:

- **Promoter bodies**, which promote the implementation of smart initiatives (infrastructures, new services, etc.). These bodies can be national authorities, administrative bodies, government agencies, large private investors, etc.
- **Achieving bodies**, which are in charge of physically building infrastructures and smart services and of ensuring durable efficiency. These entities can be businesses, construction companies, etc.
- **Financial institutions** whose task is to aggregate flows of investment by private capital, through PPP mechanisms. These entities can be banks, foundations, capital management bodies, large private investors, etc.
- **Certification authorities** that are able to evaluate the effectiveness of smart initiatives, to certify and protect sensitive data and investors' information. These bodies can be scientific institutes, consortium companies, financial certification companies, etc.
- **Guarantor bodies** that, through systems of insurance policies, provide coverage of private investments made through PPP mechanisms. These bodies can be insurance agencies, national banks, international banks, capitals management bodies, foundations, managers of programmes and/or national and European investment funds and so on.

Moreover, the smart city system imposes a threefold need:

- To create mechanisms of private investment incentive and aggregation.
- To identify criteria aimed at determining the level of priority and feasibility/sustainability of the smart initiatives, able to verify the bankability and the cost/benefit ratio with respect to the real priorities in the area.

- To protect the security of investment through the implementation of security mechanisms and data quality certification.

Thus, the transformation of cities into smart cities requires continuous innovation and investments. In fact, there are a number of financing mechanisms that can be used for specific needs, depending on the nature of the investment, e.g. the level of maturity, the size and the time to financial recovery. Thus, it is important to be aware of all available funds, financial instruments and dedicated EU programs. The focus of this analysis is on energy efficiency, mobility, ICT sectors and respective technical interventions that are supported by EU, all public and private entities, and countries’ representatives of the smart cities. Those financial resources and instruments are summarized in Table 21:

Table 21: Financing Instruments

EU Instruments				Financing Schemes and Instruments
Programmes for direct funding	Structural Funds	EIB Instruments	Financial Institutions Instruments	
<ul style="list-style-type: none"> <li>• COSME</li> <li>• HORIZON 2020</li> <li>• LIFE</li> <li>• INTERREG</li> <li>• Connecting Europe Facility program (CEF)</li> </ul>	<ul style="list-style-type: none"> <li>• European Social Fund (ESF)</li> <li>• European Regional Development Fund (ERDF)</li> <li>• Cohesion Fund (CF)</li> </ul>	<ul style="list-style-type: none"> <li>• ELENA</li> <li>• JESSICA</li> <li>• JEREMIE</li> <li>• JASMINE</li> <li>• JASPERS</li> <li>• MARGUERITE</li> </ul>	<ul style="list-style-type: none"> <li>• European Fund for Strategic Investments</li> <li>• EIB Municipal Framework Loans</li> <li>• DEEP GREEN</li> <li>• European Energy Efficiency Fund</li> <li>• Integrated territorial investments (ITI)</li> <li>• Urban Development Fund (UDF)</li> </ul>	<ul style="list-style-type: none"> <li>• Green Bond</li> <li>• Energy Performance Contracting (EPC)</li> <li>• Public-private partnership</li> <li>• Alternative finance (Crowd-funding, Soft loans, guarantees, Revolving Loan fund, On Bill Financing and Peer-to-Peer)</li> </ul>

### 6.1.1.1 EU instruments

For the implementation of smart city projects, the EU financial resources to be taken into account are not just the funds for urban development, but also those funds dedicated to the support of SMEs or to the development of human capital.

As a matter of fact, the EU provides funding in the form of loans and grants for a broad range of projects and programmes covering several areas such as education, health, consumer protection, environmental protection and humanitarian aid. Funding is managed according to strict rules, which help to ensure that there is tight control over how funds are used and that funds are spent in a transparent and accountable manner. EU funding is complex, since there are many different types of programmes managed by different bodies. Over 76% of the EU budget is managed by the Member States.

According to their characteristics, it is possible to subdivide the various instruments into four distinct groups, as in Table 22:



Table 22: EU financial instruments

Programmes for direct funding	Structural funds	EIB instruments	Financial Institutions Instruments
<ul style="list-style-type: none"> <li>• COSME</li> <li>• HORIZON 2020</li> <li>• LIFE</li> <li>• INTERREG</li> <li>• Connecting Europe Facility program</li> </ul>	<ul style="list-style-type: none"> <li>• European Social Fund (ESF)</li> <li>• European Regional Development Fund (ERDF)</li> <li>• Cohesion Fund (CF)</li> </ul>	<ul style="list-style-type: none"> <li>• ELENA</li> <li>• JESSICA</li> <li>• JEREMIE</li> <li>• JASMINE</li> <li>• JASPERS</li> <li>• MARGUERITE</li> </ul>	<ul style="list-style-type: none"> <li>• European Fund for Strategic Investments</li> <li>• EIB Municipal Framework Loans</li> <li>• DEEP GREEN</li> <li>• European Energy Efficiency Fund</li> <li>• Integrated Territorial investments (ITI)</li> <li>• Urban Development Fund (UDF)</li> </ul>

#### 6.1.1.1.1 Programmes for direct funding

The European Union supports entrepreneurs and businesses with a wide range of EU programmes providing financing through local financial institutions.

Funding is available for start-ups, entrepreneurs and companies. A wide range of financing is available through loans, guarantees, and equity funds and other. These programmes for direct funding are presented in the form of information summary tables in Annex 2.

#### 6.1.1.1.2 Structural funds

The Structural Funds and the Cohesion Fund are financial tools set up to implement the regional policy of the European Union. They aim to reduce regional disparities in income, wealth and opportunities. Europe's poorer regions receive most of the support, but all European regions are eligible for funding under the policy's various funds and programmes.

The Structural Funds and the Cohesion Fund make up one of the largest items of the budget of the European Union. It is up to the European Parliament and the Council of the European Union to define the tasks, priority objectives and the organisation of the Structural Funds (the Regional Policy framework), through the ordinary legislative procedure and consulting the Economic and Social Committee and the Committee of the Regions (leading to the publication of Regulations).

With a budget of 454 billion euro for the period 2014-2020, the European Structural and Investment Funds (ESI funds) are the main instruments of the EU's investment policy. By 2023, the ESI funds will provide a critical mass of investments in the main EU priority areas, to meet the needs of the real economy by encouraging the creation of jobs and returning the European economy to grow sustainably.

The EU countries are committed to:

- Support more than 2 million businesses through funds to increase the competitiveness, develop products, find new markets and create new jobs
- Invest in infrastructure in areas such as broadband, IT and telecommunications, and water supply. This will help the EU countries - especially the least developed ones - to improve the living conditions of citizens and to make them more competitive business environment
- Use the funds to invest in the skills and adaptability of the European labour force, offering to tens of millions of people, including young people, refugees and legal immigrants, the opportunity to train, retrain or start new businesses.

Further information on Structural Funds are presented in Annex 3.

#### 6.1.1.1.3 EIB instruments

Financial instruments represent a resource-efficient way of deploying cohesion policy in pursuit of the Europe 2020 Strategy objectives. Targeting projects with potential economic viability, financial instruments provide support for investments through loans, guarantees, equity and other risk-bearing mechanisms, possibly combined with technical support, interest rate subsidies or guarantee fee subsidies within the same operation.

The European Investment Bank is a financial institution owned by the 27 EU countries that finance projects mainly within the EU itself, pursuing the six priority objectives:

- Cohesion and convergence;
- Support for SMEs;
- Environmental sustainability;
- Implementation of the initiative 'Innovation 2010';
- Development of trans-European transport networks and energy;
- Sustainable, competitive and secure.

The EIB can act in several ways, by providing credit, technical assistance, guarantees or venture capital.

In agreement with the EC, a set of financial instruments have been introduced with the aim of encouraging leverage through private investment for projects, despite having a high socio-economic value. These are not attractive to excessive risk profile and are time-consuming for the investment or there can be other failures of the market return. Among these tools, those applicable to the financing of smart city initiatives are presented in Annex 4.

#### 6.1.1.1.4 Financial Institutions Instruments

Under this financial pillar, six instruments were mapped. The instruments are, namely:

- European Fund for Strategic Investments
- EIB Municipal Framework Loans
- DEEP Green
- European Energy Efficiency Fund
- Integrated Territorial Investment
- Urban Development Fund

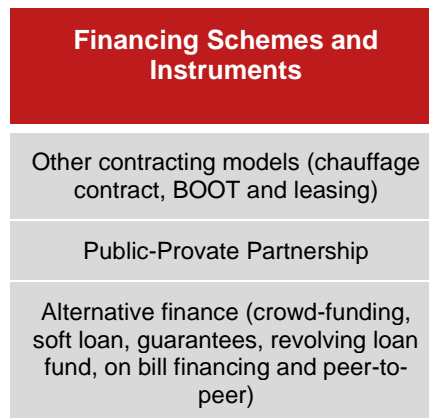
All of these instruments are presented with some relevant specific details in Annex 5.

#### 6.1.1.2 Financing Schemes and Instruments

It is also important to summarize the financial schemes not necessarily connected to the EU that are listed in Table 23 below.

**Table 23: Financing Schemes and Instruments**

Financing Schemes and Instruments
Green Bond
Energy Performance Contracting



### 6.1.1.2.1 Green Bond

A green bond is a fixed-income financial instrument for raising capital through the debt capital market. In its simplest form, the bond issuer raises a fixed amount of capital from investors over a set period of time, repaying the capital when the bond matures and paying an agreed amount of interest (coupons) along the way.

The key difference between a 'green' bond and a regular bond is that the issuer publicly states it is raising capital to fund 'green' projects, assets or business activities with an environmental benefit, such as renewable energy, low carbon transport or forestry projects. Bonds can also be used to fund projects with a social or community benefit such as improving healthcare or social services, and these are typically known as 'social' or 'social impact' bonds.

The labelled green bond market tripled in size between 2013 and 2014, with US\$37 billion issued in 2014. Historically, supranational organizations such as the European Investment Bank and the World Bank, along with governments, have been the most prolific issuers of green bonds, accounting for all labelled issues between 2007 and 2012.

However, there has since been a sharp rise in the number of corporate green bonds issued. In 2014, bonds issued by corporations in the energy and utilities, consumer goods, and real estate sectors accounted for one third of the market. Substantial further growth is predicted and it is forecast that in 2015 the value of green bonds issued will reach US\$100 billion. Historically, issuance size has varied, ranging from \$10 million USD up to \$1.75 billion.

Any organization with bonding authority may issue green bonds.

The Green Bond Principles (GBP) are voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the Green Bond market by clarifying the approach for issuance of a Green Bond. The GBP have four core components:

#### 1. Use of Proceeds

The GBP explicitly recognize several broad categories of eligibility for Green Projects aiming to address key areas of concern such as climate change, natural resources depletion, loss of biodiversity and/or pollution control. The list is intended to be indicative and capture the most commonly used types of projects supported or expected to be supported by the Green Bond market. These categories, listed in no specific order, include, but are not limited to:

- Renewable energy;
- Energy efficiency;

- Pollution prevention and control;
- Sustainable management of living natural resources;
- Terrestrial and aquatic biodiversity conservation;
- Clean transportation;
- Sustainable water management;
- Climate change adaptation;
- Eco-efficient products, production technologies and processes.

## 2. Process for Project Evaluation and Selection

The issuer of a Green Bond should outline:

- A process to determine how the projects fit within the eligible Green Projects categories identified above;
- The related eligibility criteria;
- The environmental sustainability objectives.

The GBP encourage a high level of transparency and recommend that an issuer's process for project evaluation and selection be supplemented by an external review.

In addition to information disclosed by an issuer on its Green Bond process, criteria and external reviews, Green Bond investors may also take into consideration the quality of the issuer's overall profile and performance regarding environmental sustainability.

## 3. Management of Proceeds

The net proceeds of Green Bonds should be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the issuer in an appropriate manner and attested by a formal internal process linked to the issuer's lending and investment operations for Green Projects. As long as the Green Bonds are outstanding, the balance of the tracked proceeds should be periodically adjusted to match allocations to eligible Green Projects made during that period. The issuer should make known to investors the intended types of temporary placement for the balance of unallocated proceeds.

The GBP encourage a high level of transparency and recommend that an issuer's management of proceeds to be supplemented by the use of an auditor, or other third party, to verify the internal tracking method and the allocation of funds from the Green Bond proceeds.

## 4. Reporting

Issuers should make, and keep, readily available up to date information on the use of proceeds to be renewed annually until full allocation, and as necessary thereafter in the event of new developments. This should include a list of the projects to which Green Bond proceeds have been allocated, as well as a brief description of the projects and the amounts allocated, and their expected impact. Where confidentiality agreements, competitive considerations, or a large number of underlying projects limit the amount of detail that can be made available, the GBP recommend that information is presented in generic terms or on an aggregated portfolio basis. Transparency is of particular value in communicating the expected impact of projects. The GBP recommend the use of qualitative performance indicators and, where feasible, quantitative performance measures with the key underlying methodology and/or assumptions used in the

quantitative determination. Issuers with the ability to monitor achieved impacts are encouraged to include those in their regular reporting.

Green bond issuance is starting to become more common in some European regions (i.e. France and UK) as shown in Figure 27.



Figure 27: Green bonds issuance in European countries

#### 6.1.1.2.2 Energy Performance Contracting (EPC)

Energy Performance Contracting (EPC) is a form of ‘creative financing’ for capital improvement, which allows funding energy upgrades from cost reductions. Under an EPC arrangement, an external organisation implements a project through an energy service contract (ESCO) to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including the costs of the investment. Essentially the ESCO will not receive its payment unless the project delivers energy savings as expected.

This approach is based on the transfer of technical risks from the client to the ESCO based on performance guarantees given by the ESCO. In EPC, ESCO remuneration is based on demonstrated performance; a measure of performance is the level of energy savings or energy service. EPC is a means to deliver infrastructure improvements to facilities that lack energy engineering skills, manpower or management time, capital funding, understanding of risk, or technology information. Cash-poor, yet creditworthy customers are therefore good potential clients for EPC.

Moreover, the following figures (Figure 31 and Figure 32) explain the relationships and risk allocations among the ESCO, customer and lender in the two major performance-contracting models:

- Shared savings, the cost savings are splitted for a pre-determined length of time in accordance with a pre-arranged percentage: there is no ‘standard’ split as this depends on the cost of the project, the length of the contract and the risks taken by the ESCO and the consumer (Figure 31);

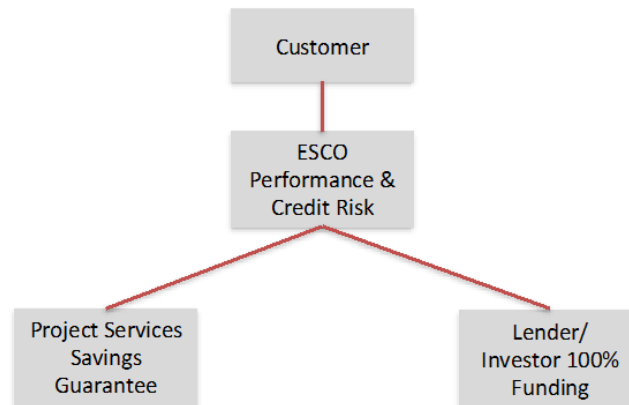


Figure 28: Shared savings

- Guaranteed savings, the ESCO guarantees a certain level of energy savings and in this way, shields the client from any performance risk (Figure 29).

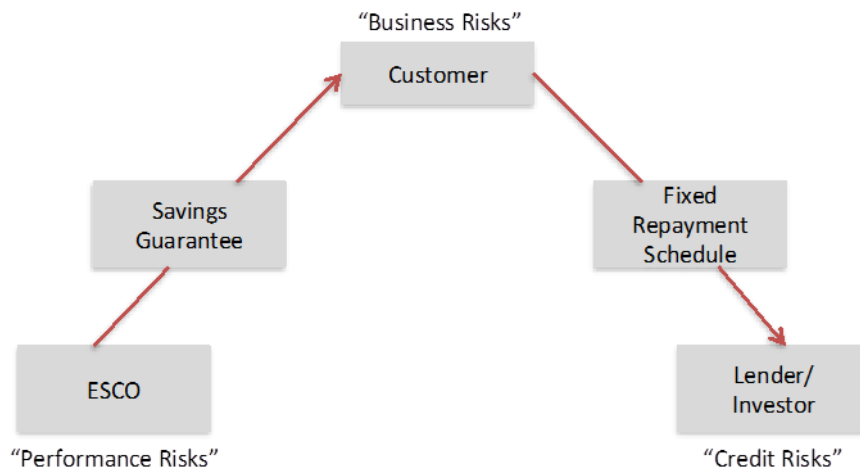


Figure 29: Guaranteed savings

An important difference between guaranteed and shared savings models is that in the former case the performance guarantee is the level of energy saved, while in the latter, this is the cost of energy saved.

Under a guaranteed savings contract, the ESCO takes over the entire performance and design risk. For this reason, it is unlikely to be willing to further assume credit risk. Consequently, guaranteed savings contracts rarely go along with TPF with ESCO borrowing (CTI 2003). The customers are financed directly by banks or by a financing agency; an advantage of this model is that financial institutions are better equipped to assess and handle customer's credit risk than ESCOs. The customer repays the loan and assumes the investment repayment risk. If the savings are not enough to cover debt service, then the ESCO has to cover the difference. If savings exceed the guaranteed level, then the customer pays an agreed percentage of the savings to the ESCO. Usually the contract also contains a proviso that the guarantee is only good, i.e. the value of the energy saved will be enough to meet the customer debt obligation, provided that the price of energy does not go below a stipulated floor price. A variation of guaranteed savings contracts are paid from savings contracts, whereby the payment schedule is based on the level of savings: the more the savings, the quicker the repayment.

The guaranteed savings scheme is likely to function properly only in countries with a well-established banking structure, high degree of familiarity with project financing and sufficient technical expertise, also within the banking sector, to understand energy-efficiency projects. The

guaranteed savings concept is difficult to use in introducing the ESCO concept in developing markets because it requires customers to assume investment repayment risk. However, it fosters long-term growth of ESCO and finance industries: newly-established ESCOs with no credit history and limited own resources would be unable to invest in the project they recommend and may only enter the market if they guarantee the savings and the client secures the financing on its own. In the US, the guaranteed savings model evolved from the shared savings model in response to drop in interest in fuel savings and attempt of ESCOs to make value-based offerings for cost – rather than energy – savings.

Conversely, under a shared savings, the client takes over some performance risk; hence it will try to avoid assuming any credit risk. This is why a shared savings contract is more likely to be linked with TPF or with a mixed scheme with financing coming from the client and the ESCO whereby the ESCO repays the loan and takes over the credit risk. The ESCO therefore assumes both performance and the underlying customer credit risk – if the customer goes out of business, the revenue stream from the project will stop, putting the ESCO at risk. In addition, such contractual arrangement may give rise to leveraging problems for ESCOs, because ESCOs become too indebted and at some point, financial institutions may refuse lending to an ESCO due to high debt ratio. In effect, the ESCO collateralizes the loan with anticipated savings payments from the customer, based on a share of the energy cost savings. The financing in this case goes off the customer's balance sheet.

A situation where savings exceed expectations should be taken into account in a shared savings contract. This setting may create an adversarial relationship between the ESCO and customer, whereby the ESCO may attempt to 'lowball' the savings estimate and then receive more from the 'excess savings'.

Furthermore, to avoid the risk of energy price changes, it is possible to stipulate a single energy price in the contract. In this situation, the customer and the ESCO agree on the value of the service upfront and neither side gains from changes in energy prices: if the actual prices are lower than the stipulated floor value, then the consumer has a windfall profit, which compensates the lower return of the project. Conversely, if the actual prices are higher than the stipulated ceiling, then the return on the project is higher than projected, but the consumer pays no more for the project. This variation sets performance in physical terms with fixed energy prices, which makes the approach resemble guaranteed savings approach.

The shared savings concept is a good introductory model in developing markets because customers assume no financial risk. From ESCO's perspective, the shared savings approach has the added value of the financing service. However, this model tends to create barriers for small companies; small ESCOs that implement projects based on shared savings rapidly become too highly leveraged and unable to contract further debt for subsequent projects. Shared savings concept therefore may limit long-term market growth and competition between ESCOs and between financing institutions: for instance, small and/or new ESCOs with no previous experience in borrowing and few own resources are unlikely to enter the market if such agreements dominate. It focuses the attention on projects with short payback times ('cream skimming').

Another variation is the 'first out' approach whereby the ESCO is paid 100% of the energy savings until the project costs – including the ESCO profit – are fully paid. The exact duration of the contract will actually depend on the level of savings achieved: the greater the savings, the shorter the contract.

In conclusion, Figure 30 below shows the European overview of the ESCO market:

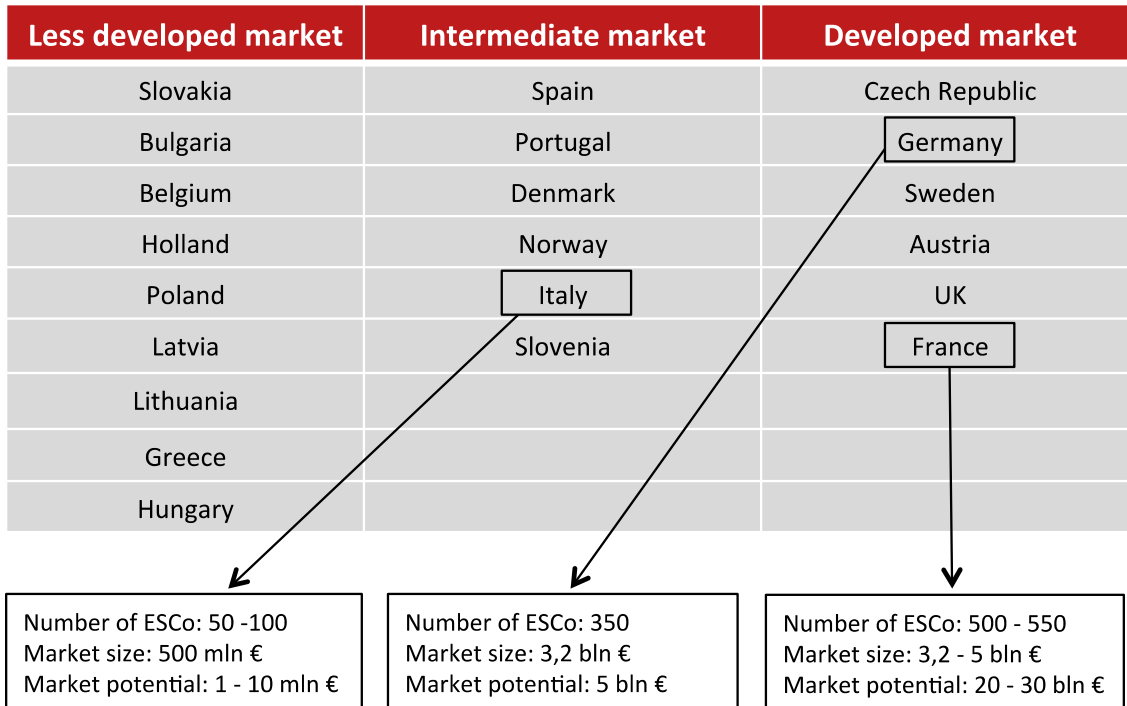


Figure 30: ESCO Market

### 6.1.1.2.3 Other contracting models

While there are numerous ways to structure a contract and hence any attempt to be comprehensive in describing EPC variations is doomed, other contractual arrangements deserve attention. Here the ‘chauffage’ contract, the ‘first-out’, the Build-Own-Operate-Transfer (BOOT) contract and leasing contract are described.

#### Chauffage contract

A very frequently used type of contract in Europe is the ‘**chauffage**’ contract, where an ESCO takes over complete responsibility for the provision of an agreed set of energy services (e.g. space heat, lighting, motive power, etc.) to the client. This arrangement is an extreme form of energy management outsourcing. Where the energy supply market is competitive, the ESCO in a chauffage arrangement also takes over full responsibility for fuel/electricity purchasing. The fee paid by the client under a chauffage arrangement is calculated on the basis of its existing energy bill minus a percentage saving (often in the range of 5-10 %). Thus, the client is guaranteed an immediate saving relative to its current bill. The ESCO takes on the responsibility for providing the agreed level of energy service for lower than the current bill or for providing improved level of service for the same bill. The more efficiently and cheaply it can do this, the greater its earnings: chauffage contracts give the strongest incentive to ESCOs to provide services in an efficient way.

Such contracts may have an element of shared savings in addition to the guaranteed savings element to provide incentive for the customer. For instance, all savings up to an agreed figure would go to the ESCO to repay project costs and return on capital; this figure will be shared between the ESCO and the customer.

Chauffage contracts are typically very long (20-30 years) and the ESCO provides all the associated maintenance and operation during the contract. Chauffage contracts are very useful where the customer wants to outsource facility services and investment.



### BOOT contract

A **BOOT** model may involve an ESCO designing, building, financing, owning and operating the equipment for a defined period of time and then transferring this ownership across to the client. This model resembles a special purpose enterprise created for a particular project. Clients enter into long term supply contracts with the BOOT operator and are charged accordingly for the service delivered. The service charge includes capital and operating cost recovery and project profit. BOOT schemes are becoming an increasingly popular means of financing CHP projects in Europe. Figure 31 shows the relationships between parties in a BOOT contract.

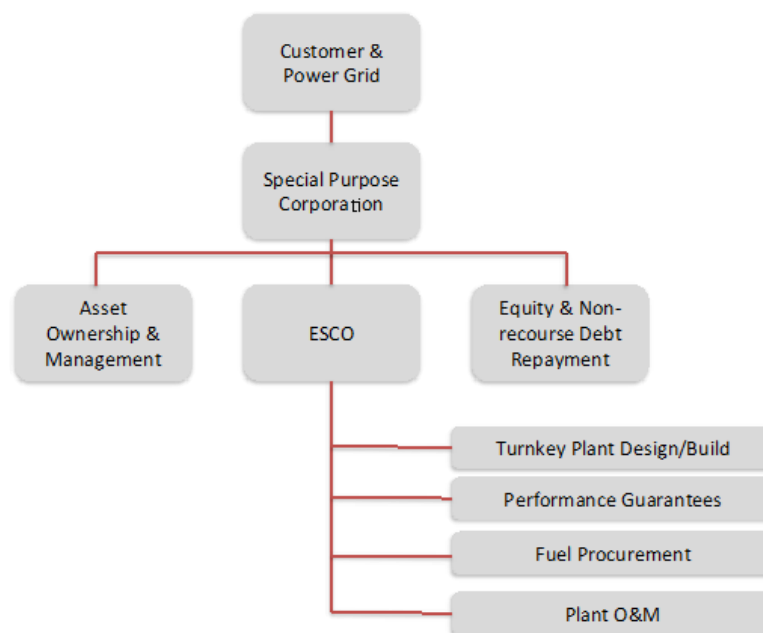


Figure 31: Build-Own-Operate-Transfer (BOOT) model<sup>15</sup>

#### ➤ **Leasing contract**

**Leasing** can be an attractive alternative to borrowing because the lease payments tend to be lower than the loan payments. It is commonly used for industrial equipment. The lessee makes payments of principal and interest; the frequency of payments depends on the contract. The stream of income from the cost savings covers the lease payment. The ESCO can bid out and arrange an equipment lease-purchase agreement with a financing institution. If the ESCO is not affiliated to an equipment manufacturer or supplier, it can bid out, make suppliers competitive analysis and arrange the equipment. There are two major types of leases: capital and operating. Capital leases are instalment purchases of equipment. In a capital lease, the client (lessee) owns and depreciates the equipment and may benefit from associated tax benefits. A capital asset and associated liability appears on the balance sheet. In operating lease, the owner of the asset (lessor – the ESCO) owns the equipment and essentially rents it to the lessee for a fixed monthly fee; this is off-balance sheet financing source. It shifts the risk from the lessee to the lessor, but tends to be more expensive to the lessor. Unlike in capital lease, the lessor claims any tax benefits associated with the depreciation of the equipment. The non-appropriation clause means that the financing is not seen as debt.

<sup>15</sup> Source: Dreessen 2003

### 6.1.1.2.4 Public Private Partnership (PPP)

A public-private partnership (PPP, 3P or P3) is a government service or private business venture that is funded and operated through a partnership of government and one or more private sector companies.

PPP involves a contract between a public sector authority and a private party, in which the private party provides a public service or project and assumes substantial financial, technical and operational risk in the project. As a matter of fact, the PPP contracts are characterized by:

- Long-term contract between the PA and one or more private companies;
- Transfer to the private sector of some risks;
- Performance specification of the project outputs, rather than inputs of the design;
- Use of private funding (often in the form of project financing);
- Private payments by service users, the PA, or both. It is distinguished in this way between ‘hot’ investments, with inherent ability to generate income, ‘warm’, characterized by the need to apply for a public contribution, or ‘cold’, where the private sector provides services exclusively paid by a fee or rate shadow of the PA.

In general, devices which require a partnership between public and private sectors require that the PA plays not only the role of the buyer, but goes beyond, by assuming the most comprehensive task of project manager. This requires the acquisition of a range of skills such as the ability to assess ex-ante the efficiency and convenience of the tools, structure transactions and negotiate the best solutions with private operators.

For the launching of PPP operations, the approval of a feasibility study (FS) and/or preliminary draft is sufficient condition for entering public work list annually. The FS, which aims at transforming a project idea into concrete investment proposals, depends on an analysis of the context and from an assessment of economic and financial feasibility of the intervention.

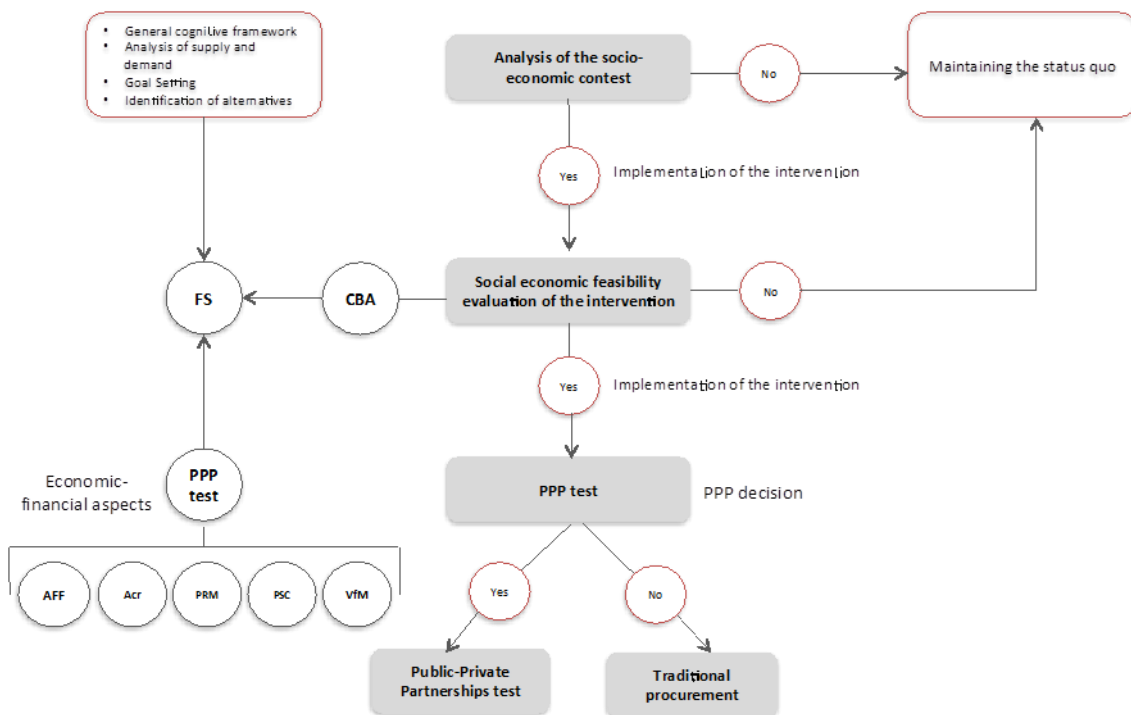


Figure 32: Decision process from PA to PPP

Hence, a cost-benefit analysis is necessary to evaluate the advisability, according to the objectives to achieve. The PA decision-making process concerning the choice between PPP and traditional procurement is then ultimately linked to a series of analyses defined PPP test (.). These include: the Financial Feasibility Analysis (FFA), which examines the economic and financial balance of the investments and the resulting attractiveness of the market; the assessment of resources adequacy (Ara), to determine the optimal amount of public funding to ensure the project to achieve financial viability; Project Risk Management (PRM), which then will cover the entire life cycle of the project; and the Public Sector Comparator (PSC), through which quantifies the Value for Money (VfM) of the project, through the monetary comparison between the hypothesis of creation / management direct form with the PPP.

PPP allows you to build contracts based on the type of project you want to accomplish and taking the actors involved into account. In a PPP, the following element may be included (as a whole or in part):

- Design (Design, D);
- Financing (Finance, F);
- Construction or renovation (Build, B);
- Management and maintenance (Operations and Maintenance, O&M or simply Operate, OR).

These, combined together, give rise to a series of models, some of which are listed below in order of increasing responsibility for the private sector:

- **Traditional procurement:** the public sector can contract out the private design and construction of the work, in exchange for the agreed remuneration;
- **Build-Operate-Transfer (BOT):** implies a concession agreement between the public and private sectors regarding the stages of design, construction and management of the work. It is also known as a turnkey contract. The advantage is to aggregate the various functions under a single entity;
- **Design-Build-Finance-Operate (DBFO):** compared to the BOT, contractor takes the risk of financing the work till the end of the contract;

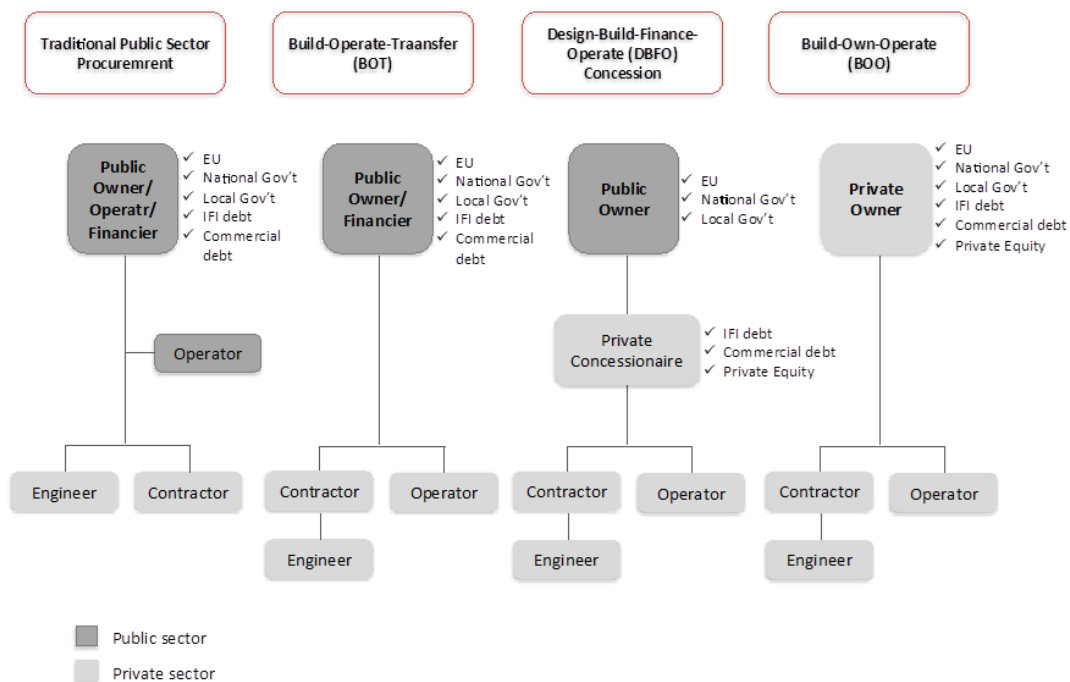


Figure 33: PPP Models

- **Build-Own-Operate (BOO)**: compared to DBFO, ownership of the work at the end of the contract remains to the private sector. It is usually used when the physical life of the object of the contract coincides with the concession period.

With regard to the procedure, the EU legislation provides four types of custody:

- The **open procedure** provided the broadest scope for competition as any entity can tender for the contract. Any entity interested in the contract was invited to tender through an OJEU notice in order to ensure maximum competition.
- The **restricted procedure** was used for quite straightforward public sector procurements where many suppliers may be able to meet the requirements of the tender. The advantage of this procedure over the open procedure was that it enabled the public sector buyer to limit the number of suppliers that were invited to tender.
- The **negotiated procedure** was used for procuring more complex requirements but could only be used in exceptional circumstances. Public sector buyers must be in a position to justify their decision to use this procedure. The number of suppliers invited to tender could be limited but, in contrast to the restricted procedure, the public sector buyer was permitted to negotiate the tenders offered by bidders.
- The **competitive dialogue** procedure was usually used for 'particularly complex' supplies, services and works contracts where the best solution is not pre-known. This procedure was often available for procuring PPP contracts. The number of suppliers invited to tender could be limited and the procedure gave the public sector buyer the opportunity to engage in dialogue with bidders on proposed solutions before inviting final tenders.

Moreover, the allocation of risk as to who is better able to manage them is the basis of success a PPP project. The main types of risk to which the project is exposed can be grouped into five categories:

- Construction;
- Management and maintenance;
- Demand;
- Financial;
- Context (political, country and so on).

In general, the first two categories of risk are in private actor load, since the construction and, often, management falls among its tasks. Similarly, the banking operator is the most appropriate person to manage financial risks, as well as a public actor competing those of context. The question of risk of, finally, is often the most complex and requires allocating joint responsibility of both.

In order to transfer part of the private operator risks, it is necessary that the grantor does not behave only as a contractor, but acquire a set of skills related to the analysis of the ex ante study of technical, economic and financial feasibility, to understand the necessary level of involvement of the private operator, and ex-post monitoring and evaluation of the level of services and benefits provided. This becomes more important, but difficult in highly innovative initiatives such as those regarding the smart city.

The success of the project therefore is based on a system of real-type guarantees or contractual, which together define the so-called security package, which is negotiated before disbursement of the loan and is the most complex aspect of any operation of PPP. This is evidenced by the fact that the inadequacy of contracts gives rise to many disputes and is the leading cause of failure of funded projects. Standardization of contracts needs to be established between the various actors, related to the different design areas, as already happened in the UK.

Governments can encourage the private sector to participate in the funding of programs or PPP projects through the use of government guarantees, which can be driven by several reasons:

- Financial considerations, to lever additional private funding sources, ensuring the execution of the investment without advance public spending or taking advantage of new sources of funding such as the bond market;
- Evaluations linked to the risks of the project;
- Political considerations such as increasing confidence in the PPP market, accelerate the realization of investments, or protect their credibility.

The use of government guarantees should be made with particular caution, because it can alter the allocation of risks, which may affect the Value-for-Money project. It could also create moral hazard. Thus, a reduction in the incentives industry private to ensure a good performance because of the presence of guarantees.

In conclusion, Figure 34 below shows the European PPP market, identifying UK, Turkey and France as the top three countries that apply PPP models.

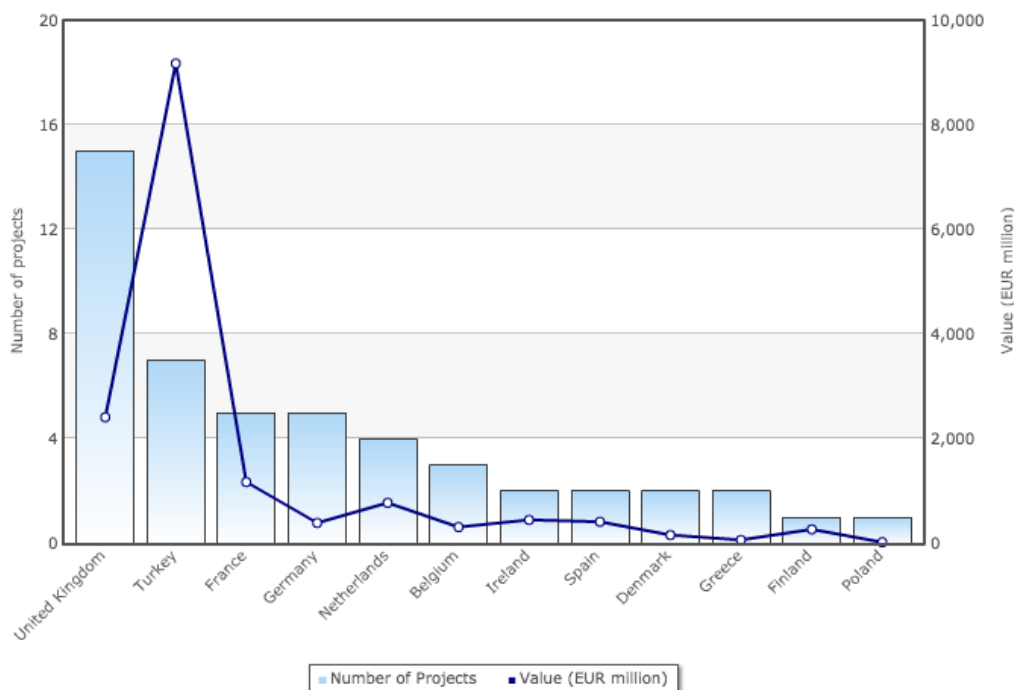


Figure 34: European PPP market in 2015 by country – Number and value of projects

#### 6.1.1.2.5 Alternative Finance

There are several instruments of 'alternative finance' that could be applied into a PPP for smart city projects. In 2015, the total European online alternative finance market, which includes crowdfunding, peer-to-peer lending and other activities, grew by 92% to reach €5,431m. Excluding the United Kingdom, the largest market by a considerable margin, the European online alternative finance industry grew 72% from €594m in 2014 to €1,019m in 2015. Although the absolute year-on-year growth rate slowed by 10% (the growth rate between 2013-14 was 82%), the industry is sustaining momentum with substantive expansion in transaction volumes recorded across almost all online alternative finance models. Looking beyond the total market size, highlights from the report include the following:

- **France, Germany and the Netherlands are the top three countries for online alternative finance by market volume in Europe**, excluding the United Kingdom. The

French market reached €319m in 2015, followed by Germany (€249m), the Netherlands (€111m), Finland (€64m), Spain (€50m), Belgium (€37m) and Italy (€32m). The Nordic countries collectively pulled in €104m, while Central and Eastern European countries registered a total of €89m. The UK still dominated the European online alternative finance landscape, increasing its overall market share of Europe to 81% in 2015 with €4,412m.

- **Estonia ranked first for alternative finance volume per capita with €24** followed by Finland (€12) and Monaco (€10) outside of the United Kingdom. Estonia was also ranked first by market volume per capita in 2014 (€17). This year, Latvia (€7.68) and the Netherlands (€6.53) ranked 4th and 5th respectively, replacing Sweden and France in the top five.

Alternative finance market includes not only the following instruments of financial market:

- **Soft loans, loan guarantees and portfolio guarantees.** Soft loan schemes (below market rates and longer payback periods) and loan guarantees (buffer by first losses of non-payment) are mechanisms whereby public funding facilitates/triggers investments in EPC. Portfolio guarantees for ESCOs reduces the risks of payment delays, so reduces the overall costs of financing (solid protection from later payments).
- **Revolving Loan fund.** A revolving loan fund is a source of money from which loans are made for multiple sustainable energy projects. Revolving funds can provide loans for projects that do not have access to other types of loans from financial institutions, or can provide loans at a below-market rate of interest (soft loans). This counts as an example of financial instruments using ESIF.
- **Cooperatives, Citizen based financing and Crowd funding platforms.** A crowd-funding platform pools resources of different actors, utilizing most of the time an internet-based platform. This can happen in combination with energy cooperatives, which are business models based on shared ownership and democratic decision-making procedures.
- **On Bill Financing.** Energy suppliers collect the repayment of a loan through energy bills. It leverages the relationship, which exists between a utility and its customer in order to facilitate access to funding for sustainable energy investments.
- **Peer-to-peer (P2P) lending:** Peer-to-peer lending (P2P) is a method of debt financing that enables individuals to borrow and lend money without the use of an official financial institution as an intermediary. Peer-to-peer lending removes the middleman from the process, but it also involves more time, effort and risk than the general brick-and-mortar lending scenarios. The advantage to the lenders is that the loans generate income in the form of interest, which can often exceed the amount interest that can be earned by traditional means (such as from saving accounts and CDs). Plus P2P loans give borrowers access to financing that they may not have otherwise gotten approval for by standard financial intermediaries. The method is not without its disadvantages as the lender has very little assurance that the borrower, who traditional financial intermediaries may have rejected due to a high likelihood of defaults, will repay their loan. Furthermore, depending on the lending system employed, in order to compensate lenders for the risk that they are taking, the amount of interest charged for P2P loans may be higher than traditional prime loans. A lender stands for an entity that lends money to individuals rather than institutions. Banks, credit unions, savings and loans institutions, and mortgage bankers are all examples of retail lenders. Retail lenders are used generally for lending money for mortgages, auto loans and consumer-finance loans.



### 6.1.2 Advices and conclusions

One of the main barriers of the development of smart city projects is the lack of funding resources and the difficult management of available funds internally to the Municipality.

The main scope of this section is identifying the key instruments that allow Municipalities to facilitate the implementation of smart cities interventions as well as the replication of previous experiences in this field.

In the previous paragraphs, an up-to-date funds' mapping including all available funds for smart cities projects (with a focus on energy efficiency, mobility and ICT interventions) has been illustrated and this is including an overview of the main financial instruments that are available and currently in use.

In addition to this, the following list is illustrating a series of improvements that can be integral part of the strategy for strengthening the Municipalities' capability of carrying out smart cities project and finding financial resources:

1. **Capacity building:** aiming to improve the capacity of the Municipality to manage and require funds as well as to use innovative financial schemes. This can be carried out by the introduction of a Fund Management Department and by a continuous training for the employees of the financial department.
2. **Fund Management Department (at municipality level):** one expert (or a team of experts) personnel of the Municipality in charge of:
  - Management and control of funds available to the Municipality for smart city projects;
  - Monitoring of available funds and financing instruments for smart city projects to be used for planned future interventions (such as European and national financing programmes, private banks financing initiatives, and others);
  - Good knowledge of the procedures, regulations and eligibility criteria for the funds request;
  - Management of the expressions of interests' and preparation of proposals preparation;
  - Financial monitoring and control of the project implementation from launching to completion

The introduction of these qualified personnel internal to the Municipality will allow to:

- Have centralized control and management of the financing system;
  - Avoid that available funds to the Municipality won't be spent;
  - Be continuously informed about financing opportunities (at national, European and international level).
3. **Smart City Platform:** platform at national level gathering all multi-sectorial smart city projects (such as energy efficiency, mobility, ICT and others). It is important that this national platform specifies:
    - Location, start and end date, project description, project manager;
    - Project cost;
    - Sector and type of intervention and respective technical solutions;
    - Stakeholders, consultants, contractors and other key players;

- Financial resources and financing method;
- Project impact indexes: environmental, social, economical and others;
- Replication indicators: population, climate, economic value, type of intervention, and others;
- Others data facilitating the replication of the project.

The use of the Smart City Platform will:

- Give a general overview of the smart city development all over the country;
- Facilitate the interaction between Municipalities that can learn best practices and innovative solutions (technical and financial) from each other;
- Facilitate the replication of a smart city project;
- Reduce the failure of projects;
- Have strong social impact keeping citizens informed about the development, of a smart city grid at national level.

In line with these inputs, the deliverable 1.17, in chapter 5, describes the possible innovative financial schemes that could be used to develop and increase the growth of smart city projects in Europe, thus they are:

- Public Private Partnership;
- TIF (Tax Increment Financing);
- Green Bonds.

## 6.2 Empowering the political players as facilitators of smart city innovation

Strong leadership is identified as one of the key criteria towards a successful smart city approach by the European Commission and other major institutions. At a strategic level, the political players are enablers to connect the supply and the demand, from the urban regeneration model to an integrated urban plan for their district/city/region. This is shown clearly in Figure 35, with political players having a key role in ensuring that barriers are overcome to achieve the objectives of smart city innovation.

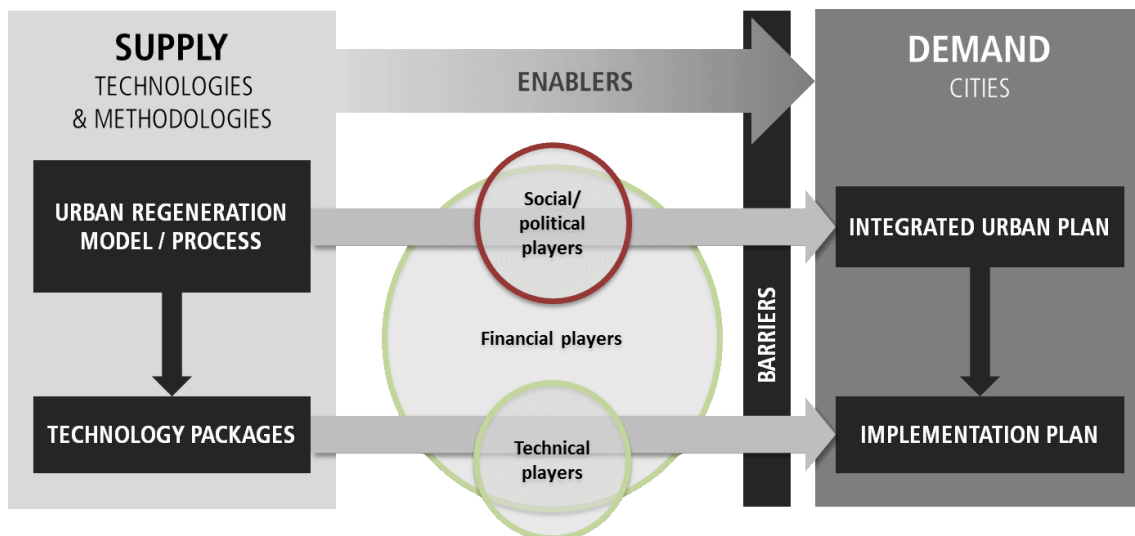


Figure 35: Social and political players as enablers to connect supply and demand

In this section, the barriers to the implementation of smart city innovation in REMOURBAN lighthouse cities (identified in D1.14 and D1.16) are analysed and picked out those which are



most common across the cities. These are then aligned to the solutions which have been identified in D1.14, D1.16, and through interviews with Nottingham, Tepebasi and Valladolid, and assessed how these solutions would address the most common barriers. This is explored in Section 6.2.1 below.

Section 6.2.2 considers which of the proposed solutions would have the most impact and how political players can act as facilitators by ensuring those actions take place in cities. Section 6.2.3 then discusses how to empower the political players to act.

### 6.2.1 High impact solutions for political players to pursue

Political players are in control of policy and legal changes in cities as well as providing leadership at local, national or supernational levels. Considering this, alongside the most frequent solutions found in Table 27 some key high impact solutions for political players to promote smart city innovation are:

1. Clear leadership commitment to change
2. Policies to encourage exchange of knowledge
3. Stable policies for smart cities
4. Stable governance
5. Policies to encourage innovative procurement
6. Legal changes to overcome barriers to community energy

#### 1. Clear leadership commitment to change

Political players can drive change through high level messages on the importance of the smart cities agenda, and by commissioning and requiring strategies and actions by their municipalities on the areas of most importance to them. This can overcome barriers to ownership and poor communication where different departments are involved and a lack of adaptation and flexibility of the cities to changes, growth and new challenges.

#### 2. Policies to encourage exchange of knowledge

A key barrier which was repeatedly mentioned was shortages in capacity, skills and knowledge, or a barrier caused by existing procedures causing delays or inflexibility. With strong leadership identifying prioritisation of smart cities aspects and related issues such as innovative procurement and sharing of knowledge between cities which have found success in relevant areas could help overcome these barriers as existing staff are trained and new staff recruited. This needs dedicated financial resources. There are some finance mechanisms already available to support knowledge sharing and capacity building such as the EU Interreg programme.

#### 3. Stable policies for smart cities

Ineffective policy was highlighted as causing issues, such as contradictions where one policy prevented another from being successful, or where policies were changed part way through implementation of a project, damaging business case. This can lead to mistrust and risk aversion by both public and private sector in making investment decisions and pursuing innovative approaches that rely on existing policies. By creating stability, municipalities and the private sector are in a better position to properly understand the problems they are trying to fix and are more likely to take a risk on innovative approaches for smart cities.

Solutions which ensure policies are considered more stable include building investment programmes or other supportive policies into long term legislation and forging agreement by all major political parties, to avoid the cycle of changes with elections.

#### 4. Stable governance

In D1.14, there was discussion of changes to the responsibilities for elements of smart city work between local, regional and national bodies. This constant change caused issues with skills and capacity, and inevitably would delay the implementation of smart cities solutions. Setting new power arrangements into legislation, and providing sufficient powers to effect smart city changes (such as powers around financing, flexible procurement etc.) would be helpful to overcome this. Through political engagement, the coordination of national through to local policies can also ensure that policies are made in a way which is deliverable.

#### 5. Policies to encourage innovative procurement

Barriers identified such as homes which are difficult to treat, and delays in public procurement processes, call for a different approach to procuring smart cities activities. Innovative procurement is explored in detail in D1.14 – optimising outcomes. Specifically the need to look at innovative procurement as a range of challenges seeking solutions from the market and, in some cases, to procure levels of guaranteed performance – e.g. % of energy savings – by enabling the private sector to collaborate and work with the public sector in order to optimise the outcomes rather than simply secure the least expensive outcome.

#### 6. Legal changes

Making legal changes can overcome barriers to community energy, such as rules around mass purchasing of electricity. However, legal changes can also help to overcome barriers by, for example, introducing regulatory changes to reduce emissions in vehicles, require the rollout of IT solutions, or improve the efficiency of homes.

##### 6.2.2 Empowering political players

To enable replicability of the REMOURBAN model, empowering political players to take these 6 most important actions can be aided by aligning smart cities objectives with those of most political importance in each of the main cities. The cluster identification tool in D5.1 can be used to identify what those issues of critical importance are. For example, in a city where the cluster identifies tackling poverty as a strategic priority by political players, then the actions above can be adjusted to ensure they meet that target too throughout the process, such as:

- Clear leadership to tackle poverty through smart measures.
- Proposing measures which target those in greatest poverty, such as energy efficiency of houses of those in fuel poverty, enabling mobility of people between poor areas and those with available employment through improved low cost public transport.
- Empowering poor communities to improve their areas through education, training, volunteering programmes, and technical interventions which help people in poverty to better manage their health and their energy bills and make an area more liveable.

In this way, integration of smart city innovation in councils' core services can serve dual objectives in cities and empower political players to act.

### 6.3 Empowering the citizens as key players in the city regeneration process

Engagement is an action directed to empower citizens and stakeholders as drivers of change to the urban environment, ensuring that citizens and local stakeholders are informed, motivated to become active actors of the city they live and shape the community's future. Citizen engagement can include efforts to directly address an issue, work with others in a community to solve a problem or interact with the Municipality.

### 6.3.1 The REMOURBAN citizen engagement framework

The REMOURBAN strategy for citizen engagement has been developed in the framework of WP1 and clustered local initiatives carried out in the REMOURBAN cities in a 3-level diagram showing a progressive level of citizens' involvement in the decision-making process. This clustering exercise of the actual level of engagement of REMOURBAN cities is relevant since it allows assessing the framework conditions within which local actions can be designed and carried out through the Local correspondents.



Figure 36: REMOURBAN strategy for citizen engagement – overview

These three levels are representative of an increasing level of citizen engagement. The aim of this structure is to clarify the objectives of practices and to acknowledge cities upon the level of citizen engagement they are at the different stages of the project.

Simple criteria have been used to classify practices:

1. In the “*Inform and consult*” category, effective “one-way” communication practices are considered: provision of balanced and objective information to citizens, to understand the problem, opportunities and solutions and consultation of opinions.
2. “*Include and collaborate*” category implies “2-way” communication and the consideration of the results of consultation.
3. When the objective is to really “*Empower and co-create*”, practices should demonstrate that power is shared about at some stage of the project.

A mapping of current practices in three lighthouse and two follower cities of REMOURBAN was carried out in the framework of the REMOURBAN City Audits, providing a preliminary assessment of the current activities to engage with citizens. In addition to the City Audits reports, D3.15 reports on citizen engagement strategies for each city and analyses the complexity of this issue, taking into account the local context citizen engagement practices, but also the underlying management, evaluation and financial aspects. The main finding of D3.15 relies on the assessment of the following key issues in a view to implement a sound proposal and set of actions:

- **What? (Actions: energy, mobility, ICTs)** What key priority areas is the message for? What is that message? (e.g. your buildings will be retrofitted, you will pay xx€, you will save xx€ and buildings will look like this; or, the city will implement a new e-bus line). Is this negotiable? Are citizens going to be engaged or just informed?
- **When? (Temporal goals)** Will citizens be engaged from the auditing phase? Will their opinions be considered during the design? And during the assessment, will they be asked for the social acceptance and spread the word about the results?

- **Who and how? (Management)** Who sends the message, who the message intended for and how is it transmitted? Communication channels, methods and tools to be selected and deployed appropriately (e.g. the Municipality launches a digital survey to the inhabitants to collect their needs regarding public transport).
- **What are the benefits? (Evaluation)** Has the communication been efficient? Which benefits have been generated by the strategy? Have citizens participated in a collaborative manner? Have they actually been engaged?
- **Which are the resources? (Finance)** What is the cost (not only economic, also in terms of efforts) of implementing the strategy?

The following set of tables provides an overview of the contents associated to the REMOURBAN citizen engagement strategies shaped in D3.15.

Table 24: The scope of citizen engagement – WHAT?

The SCOPE of Citizen Engagement (WHAT?)	
Lighthouse cities	Followers cities
The scope is focused on a specific audience (demo-level) being engaged on a specific set of options (often) with an action required	The scope is broader – concerning a set of districts or even the city as a whole in preparation for urban transformation

Table 25: Citizen engagement temporal goals – WHEN?

Temporal goals of Citizen Engagement (WHEN?)			
Lighthouse cities		Followers cities	
Timing	Objectives	Timing	Objectives
<b>At the beginning of the project/intervention</b>	Reach 100% of all residents with information of planned works  Achieve a 40% acknowledgement rate in-person, online or by returned surveys  Run 5% in-depth survey sample  Interact face-to-face with >50% of residents directly concerned by intervention works	Before the existence of the REMOURBAN model	Targeted information & communication campaign in prospective transformation districts  Run a community consultation process targeting 2000 people on future vision and works  Survey 5% of residents in-depth about city transformation objectives, concerns, hopes...
<b>During the project/intervention</b>	Hold at least 5 collective meetings with residents  Survey 5% of residents in-depth  Maintain at least 3 channels for on-going feedback and complaints (social	During implementation or replication of the REMOURBAN model	Quarterly reports on social & mass media sentiment about interventions (local) and smart (city-wide) development  Maintain at least 3 channels for on-going

	media, post, in-person) Quarterly reports on social & mass media sentiment about interventions (local) and smart (city-wide) development Hold 2 crowd-source solution sessions		feedback and complaints (social media, post, in-person)
<b>After the project/intervention: testing and usage phase of interventions</b>	Survey 5% of residents in-depth Conduct & final social & mass media sentiment report with an assessment over time	Design and implementation of interventions	

In view of identifying the “Who and How” component of the citizen engagement strategy and maximising the REMOURBAN methodological approach to be further replicated in other cities, the starting point is the design of a local, impact-oriented communication and dissemination strategy. The REMOURBAN Secretariat, in collaboration with the Local correspondent of each REMOURBAN city, designed the aforementioned strategy, including:

- Local key messages, aimed at bringing project’s technical objectives closer to citizens and local stakeholders as well as at stimulating a reaction in the audience;
- Local targets, segmented in the REMOURBAN actions sectors (ICT, Energy, Mobility);
- Local communication targets, distinguishing between city-level (which can be involved for replication purposes) and intervention area (which are at the core of the project and that can be involved for local communication and engagement actions) targets;
- Local dissemination and communication tools (such as, local TV and magazines, e-newsletters and radios) and channels (including, local websites, social media channels but also dedicated municipality offices);
- Local events, which can be an opportunity for the local correspondents to engage with the intervention-area citizens as well as to disseminate city-level targets and achievements of the project for replication purposes.

The REMOURBAN model for replication potential shall take into account this communication, dissemination and engagement oriented methodological approach, as a base to design a tailored local Dissemination, Communication and Engagement (D&C&E) strategy in other cities. Specifically associated to **local dissemination** and in addition to the main stakeholders categories identified within D6.1, the Local Desk mapped local dissemination stakeholders and the area of interest for them (ICT, Mobility Energy).

**Communication activities** differ from dissemination involving professional and technological knowledge transfer as they aim to a larger public (the citizens and stakeholders at large); they complement dissemination measures as they add public value to the achievements of the project by transforming the sometimes complex scientific and technological results into resources focusing on a few key headlines outlining the project’s results.

In the implementation of local citizen engagement actions, the Local Desk will be responsible to carry out communication activities aiming at citizens’ engagement and empowerment, with two major objectives: engaging citizens in the city transformation process and fostering the benefits of the city transformation to citizens.

In Annex 6, it is presented segmentation work carried out by the Local Desks, distinguishing between the targets in the REMOURBAN intervention area and the audience at city-level (Tables 48-54).

### Overview of D&C tools of REMOURBAN cities

Depending on the way the Municipality is used to interact with the citizens and in view of tailoring REMOURBAN messages and concepts to the local target, the Local Desk will either use existing tools and channels or develop new ones to meet the purpose. This is presented in Annex 6 on Tables 55-63.

### 6.3.2 Evaluation of citizen engagement benefits

Citizen engagement success treads the line between key performance and key behaviour indicators anchored deep in a community's social fabric. In practical terms, measures in audience size, interaction, participation and satisfaction must be deployed to reflect the scope and objectives of the specific initiative.

In the framework of the REMOURBAN synergies between the REMOURBAN Secretariat and the Local Correspondent, the dissemination & communication (D&C) strategy implementation is based upon content that it is to be communicated and disseminated towards selected target groups: youris.com will associate the former with specific D&C product formats, channels and tools in view of maximising content outreach and reach the expected impacts. The following scheme highlights content centrality in the framework of an impact-oriented outreach and monitoring approach and methodology.

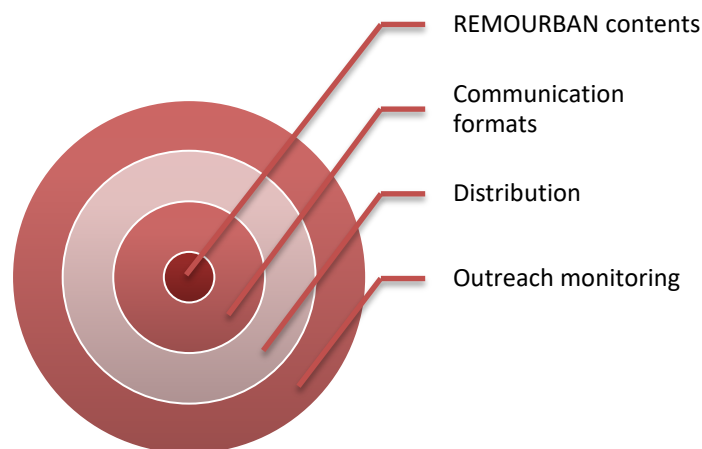


Figure 37: Impact-oriented approach

Local D&C activities and social media campaigns and animation will aim at establishing and engaging with specific REMOURBAN communities and at maximising contents outreach and impacts both at global and local/regional/national level. The REMOURBAN Secretariat has designed an impact-driven campaign methodology enabling to increase content outreach and community engagement by establishing a virtuous connection among # copy, event level and topic. The following image provides an overview of impact-driven community engagement campaigns:

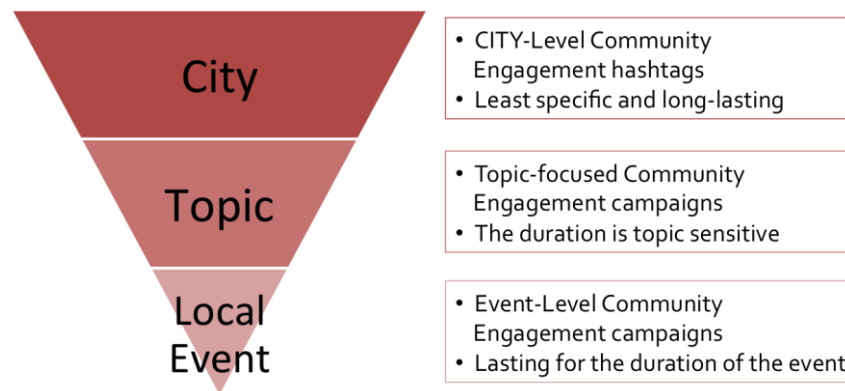


Figure 38: Overview of impact-driven community engagement campaigns

The community engagement campaigns will be executed in coordination with task 6.5.3. The channels, tools and formats that will be employed for this scope are featured in D6.1, Dissemination and Communication plan, also merging contents developed within each Local Dissemination, Communication and Engagement plan co-designed by youris.com and the local correspondent of each REMOURBAN city.

Monitoring data covering the channels directly managed by the project via WP6 leader (YOU) are collected with the most up-to-date instruments, like Google Analytics, Twitter Analytics and NUVI®. However, the mere number of web visitors and social media and interactions is however not sufficiently significant if they are not put into a broader context, which is able to make all of these data comparable according to a unique measurement indicator/metric. The **Community Engagement Index (CEI)** will help to qualify, in a quantitative way, the actual engagement of a community into the content delivered online and through social media by the REMOURBAN project.

Other indicators, such as the **Viral Coefficient** measuring the width of the spread of content on Twitter, will be calculated, and will serve as additional quantitative indicator of the actual engagement of the REMOURBAN community. In view of meeting this objective, specific local social media campaigns will be carried out through the design of dedicated hashtags #, enabling to monitor the reach, spread and community engagement of dedicated local events on social media. In the following paragraph, the quantitative results of a local pilot campaign held in relation with a local event in Valladolid are reported.

The execution of the above mentioned community engagement and local communication and dissemination activities relies on the process designed by the REMOURBAN project, which foresees a continuous flow of content exchange and strategy design by the Secretariat with the Local correspondents for execution and reporting. The role of the Local Desk is described in details in D6.1 and the following picture provides an overview of the adopted content management methodology at local level, being the base for the implementation of local D&C&E actions at local level by the Local Correspondents.

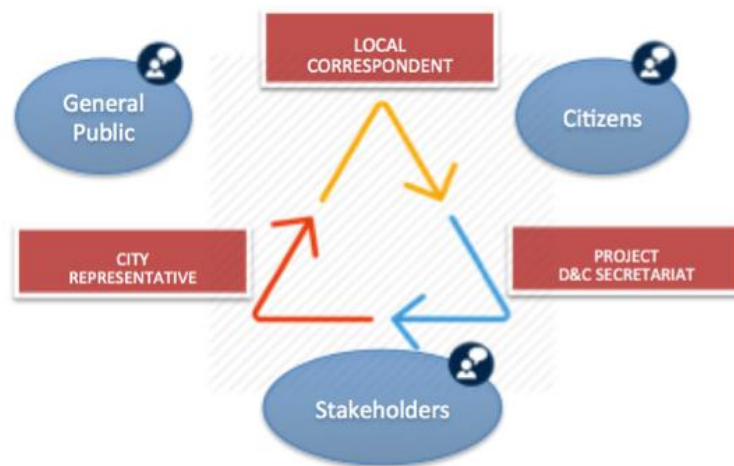


Figure 39: REMOURBAN D&C management at local level

### 6.3.3 Local D&C&E actions process design

In view of designing a tailored local D&C&E strategy, the REMOURBAN Secretariat held several workshops with the local correspondents throughout the Project execution. The implementation of this methodology is vital to design a collaborative (and not top-down) local D&C&E strategy, assessing the local framework with local correspondents and designing a strategy that aims at maximising already established local D&C&E channels and tools, through the adoption of an impact-oriented approach, whose objective is to maximise interest and stimulate community interaction with REMOURBAN contents.

The way towards the design of the aforementioned co-designed local D&C&E strategy went through the following steps:

- *Local desk set up (M9)*: the Local Desk are composed of a Local Correspondent (identified by each REMOURBAN City) and, at least, one representative per each City with the objective of facilitating the deployment of the citizens' and stakeholders' engagement strategy at local level in a very effective and customised way as well as facilitating local content sharing towards European audiences (by interfacing with the REMOURBAN Secretariat) and assuring local dissemination of REMOURBAN achievements.
- *Local desk workshop during the 2nd Project meeting (Nottingham)*: this first workshop has been conceived as the opportunity to kick-off the collaboration between the Local Desks and the REMOURBAN Secretariat, defining the methodology and assessing preliminary cities' D&C&E tools and channels to be exploited when designing the local D&C&E strategy.
- *Local desk workshop during the 3rd Project meeting (Brussels)*: this second workshop aimed at providing an operational guide for the Local Desk to share updates with the REMOURBAN Secretariat in view of producing D&C formats for EU dissemination and vice-versa, for the Secretariat to provide contents to be disseminated locally by the Local Desks. A presentation of the tools and channels (such as, Local Mini websites and social media channels) to be released by the Secretariat for the use of the Local Desks was given, highlighting the scope of each of them. Finally, this workshop has been the occasion of planning the next months' activities, including forthcoming publications, events and other D&C formats to be assessed and exploited for community engagement purposes.



- *Release of local D&C&E plans:* from the coordination between the REMOURBAN Secretariat and the Local Correspondents of each REMOURBAN cities, one Local D&C&E plan per each city has been designed. This plan includes local level key messages, targets, tools and channels which are at the core of the local D&C&E strategy implementation by the Local Correspondents, also making use of the tools and channels developed by the REMOURBAN Secretariat for the purpose (including, the REMOURBAN mini websites and dedicated social media channels).
- *Release of mini websites:* each REMOURBAN city provided the REMOURBAN Secretariat with dedicated contents in local language featuring REMOURBAN actions in their own cities for dissemination towards citizens and local stakeholders. The mini websites include customised contents to meet the information needs of local stakeholders and citizens: to provide an example, the mini website dedicated to the Valladolid Lighthouse city has been designed to include “frequently asked questions” and a local brochure, providing local tenants with information regarding the benefits they’ll experience through the adoption of the REMOURBAN regeneration model.
- *Designing a framework for community engagement campaigns:* the REMOURBAN Secretariat provides D&C tools, channels and guidelines for the Local correspondents to implement local community engagement campaigns, enabling to assess the community engagement level and the outreach of campaigns on social media channels.

Figure 40 provides an overview of the process described above towards the results of evaluation of local D&C&E actions.

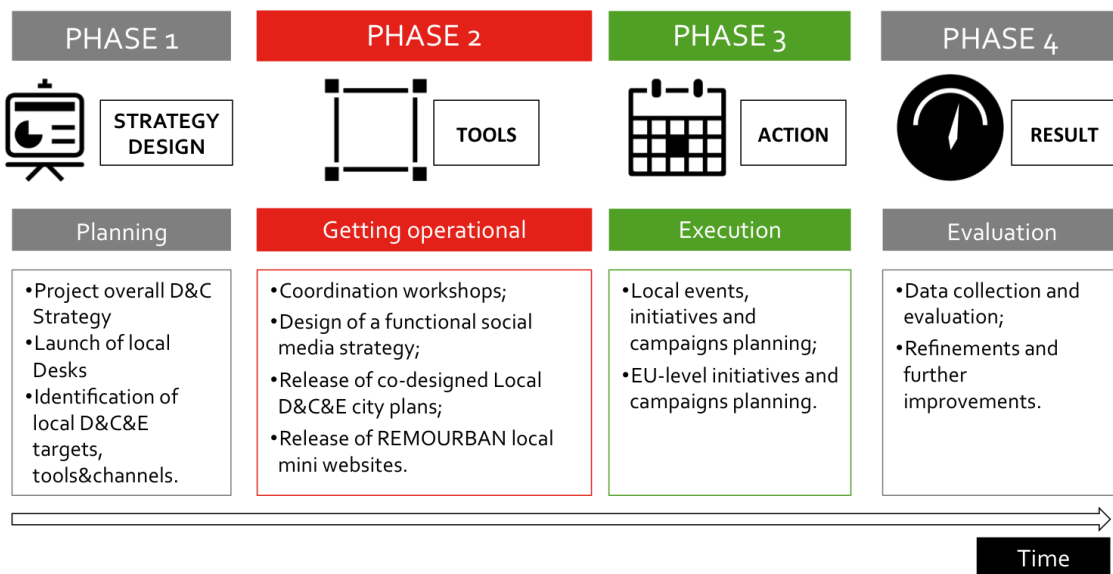


Figure 40: Impact-oriented Local D&C&E actions evaluations

- *Pilot result:* the following table provides the result of an impact-oriented community engagement campaign, which has been carried out in the framework of the local presentation of Valladolid e-vehicles on July 19th 2016. These results have been gathered through the monitoring of the #SmartValladolid campaign.

Table 26: #SmartValladolid community engagement campaign results

Campaing Date	REMOURBAN City	#	Mentions	Reach	Spread	Viral Coefficient
19/07/2016	Valladolid	#SmartValladolid	98	6,377	79,611	12,5



Figure 41: Valladolid e-vehicles presentation

### 6.4 Empowering the technical players as key players in the city regeneration process

Technical players are enablers to connect the supply and demand, from the urban regeneration model to an integrated urban plan for their city/region.

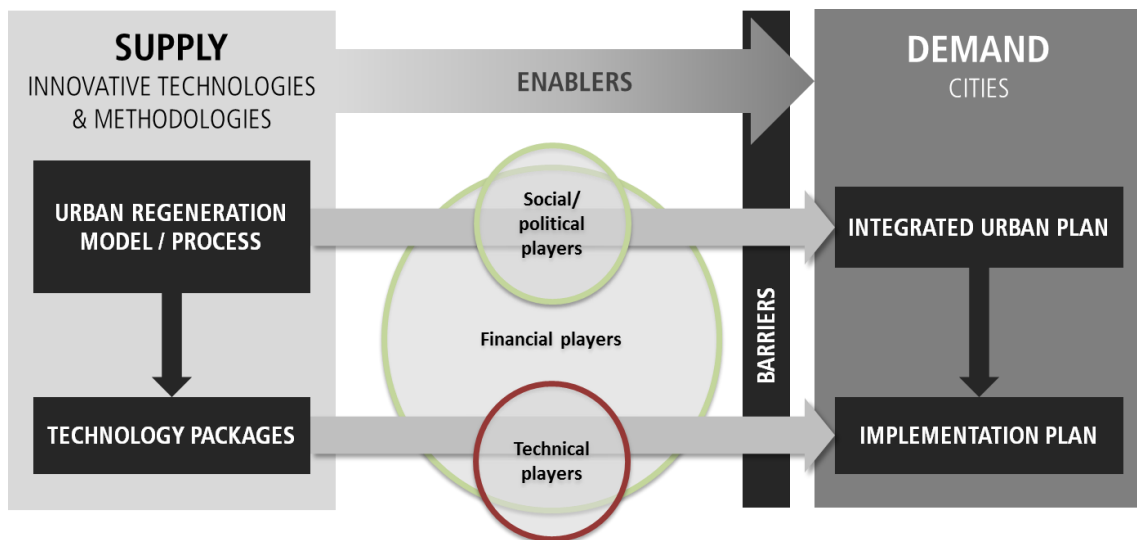


Figure 42: Technical players are enablers to connect the supply and demand, from the urban regeneration model to an integrated urban plan for their city/region.

This group consists of industrial players (such as suppliers, procurement experts, consultants and contractors) which require to be strengthened through appropriate financial model (as well as the other main actors which represent the replication model: political players and citizens) in order to make the creation of new business opportunities and a real market for smart city

technologies possible. Furthermore, all these groups, as it has been mentioned before, must be involved in a decision making support procedure, which covers the means to empower the industry side players, the local authorities and social players.

In the framework of the Urban Regeneration Model (D1.19), this procedure will be designed as well as the tools for the selection, design and implementation of mentioned technology solutions which lead to the following objectives:

- Definition of city goals through the use of KPIs.
- Formulation of possible scenarios with smart city technology packages.

The selection of final scenarios should have big impact in terms of well being and sustainability.

## 6.5 Overcoming the barriers that block the city transformation

Important barriers have been encountered and addressed in D1.13<sup>16</sup>. A large part of this paper has been devoted to provide solutions to the barriers identified by the project partners. Here a brief outline is provided on the suggested approaches and practices overcome those overcome those barriers that block city transformation.

**Regarding mobility interventions, cities are developing tools that can help to a more sustainable transport.** The most recurrent solutions are those related to economic or financial issues. We must not forget that the citizen's pocket is not the only but one of the most powerful arguments for changing habits and behaviors and ultimately to transform the city. Solutions as the deductions or exemption on municipal taxes are revealed as good examples for overcoming barriers to that transformation; free parking, free recharge for the electric vehicles (EV) are other interesting tools. The creation of incentives like the "EV special badge" for free parking in urban "payment areas" or in "park and ride areas" an increase of parking duration granted to EVs owners or special itineraries for a special category of vehicles called VELID (Electric Vehicle of Limited Dimensions) that share only with the bus, motorbikes and taxis are very effective measures to encourage the change.

**Energy refurbishment of buildings** is perhaps one of the most important issues of the cities transformation and it begins to be a priority for the urban planning strategies. The analysis done identified different stakeholders/ facilitators groups whose *voices* are essential to take forward these initiatives. There are also other elements that should not be lost in order to succeed in the changes:

- Political willingness: awareness about the need to refurbish with environment parameters and energy saving.
- The necessity for collaborative relationships between different actors (trade unions, political, financial, energy experts, procurement experts, technical services of local authorities, etc.)
- Expert teams (architects, engineers, etc.) always providing technical support to local authorities.
- Diversification of the risk for financing and get more attractive financing conditions. It has been largely proved that this kind of intervention involves, among others, high investment, up-front costs and there is no long term guarantee for heat and electricity prices and long payback period.

The risks must be shared between the public and private sectors. The public-private consortium *formula* has been revealed as one of the most effective mechanisms to achieve the *miracle*. In

<sup>16</sup> REMOURBAN D1.13: Report on non-technical barriers and legal and normative issues

particular, these agreements allow to the SMEs to access to public contracts, introduce flexibility in procedures, reduce the administrative burden on business, etc.

The possibility of creating consortiums between the cities and associations as well as private sectors, responding to the convergence between the municipal bodies and private interests can solve the shortcomings presented from the point of view of projects' concept, funding and management. This formula can contribute powerfully to the all actors' engagement.

Externalization of investment costs and risks through innovative contracting or service models is also a good way to overcome some barriers. In such a case, the external operator takes care of planning, installation and operation of the smart energy network.

Finally, it is important to mention that a real transformation comes when the city takes massive advantage of **information and communication technology (ICT)** and the ICT solutions are able to integrate physical infrastructures from utilities, transport network, etc. to the city services. The deployment of ICT Networks is hampered by the complexity of how the cities are operated, financed, regulated and planned. Also because of the "vendor lock-in" solutions that private companies propose to customer- in this case the Municipalities- dependents on a vendor for products and services, are unable to use another vendor without substantial switching costs. The current trend and the most effective way to overcome this barrier are the Open Source solutions. Interoperable systems are equally essential in order to have an increase of the services' efficiency and an effective transformation that enhance the citizens' quality of life. Sufficient awareness throughout those handling, using and interpreting the data is required via adequate training, but it is through installing measures to protect data assets and identifying that the barriers identified in this deliverable are met (For more information, see Ethical requirements developed within WP9, in particular, the part relating to data protection and ICT).

**Governance** is an important factor exposed to barriers impeding the implementation of sustainable mobility, energy and ICT measures. In this sense, the project partnership has identified a considerable number of crosscutting barriers limiting (in non-neglected cases) a proper implementation on low energy districts, mobility or ICT. This is partly a marketing problem as something with very real benefits should be able to sell itself as a good low energy project to consider given the outcomes are relatively easy to put into kWh savings. The clarity and acceptability of risk is where political stakeholders feel less at ease, particularly with public funding being involved. Trials and industry-led mechanisms to increase confidence of decision makers - De-risking interventions by academic and industry-supported trials and having a housing provider management receptive to being a test bed of solutions goes much of the way to alleviating this unease. The emergence of long term guarantees in terms of performance of solutions is one response that has already opened the door to wider adoption of low energy solutions such as deep retrofitting of homes.

The lack of appropriate **skills for municipal staff** is also seen as a potential barrier as new technologies may stretch the ability of existing maintenance resource to deal with keeping these solutions working. The staff, including planners, district level regeneration management and economic development teams often, have yet to have the training in how to successfully bring about a transition to low energy for an urban area. The collaboration of industry and academic bodies to catalyse the learning processes within local authorities has produced effective dissemination of new ideas across fast paced areas of change such as healthcare and low energy should be no different. As part of any district level intervention there must be a realistic training programme of ideally local skill development to look after the infrastructure and equipment that is being installed. In most places the market will respond to this knowledge gap itself but particularly if there are technologies being replaced then re-training the staff on the newer solution maintenance is the most preferable option all round.

Siloed departments, or '**silo-working**', in local authorities can be also seen as a barrier. There is a need for project tools and joint work spaces in order to bring coherence to interaction between staff that rarely work together but there requires an enabling structure in the management of projects that facilitates this joined-up working. Clarity of contribution and accountability of effort is obviously important. If departments' contributions were set out and their distribution of efforts was clarified then staff and management in particular would feel less aggrieved that certain projects draw on resources that are likely already stretched.

Lack of **inspiring examples** is one of the soft barriers to which REMOURBAN is emphatically aimed at responding. Concerning low energy issues, there is often a lot of media attention on where projects have achieved significant savings and a very well established pipeline of outlets for disseminating these successes if people knew where to look. The establishment of focussed interest areas under Low Energy banner where these best practices and case studies can be shared succinctly and accurately is missing in most cases. A solution is to create posts that carry out this work and feed into the training of staff as mentioned earlier.

It is rare that like-for-like replacement for **procurement** within low energy is a simple task to tender for or to evaluate once options are available. The procurement innovations within REMOURBAN bring several contractors to progressive levels and allowing shared IP and supporting SMEs all can play parts in facilitating effective solutions being found. Some of the solutions proposed:

- Accelerator programmes can be launched in order to bridge the gap in product development where many solution-providers fail can be integrated into support mechanisms from 3 required. In Nottingham there are regional energy technology development centres and accelerator programmes between universities whose goals include assisting promising technology owners with successful courting of procurement tenders.
- Frameworks for housing providers to procure low energy solutions may formalise and speed up the process and provide an element of due diligence and assurance that make higher management more comfortable about gaining value for money. These framework developers in the UK are often independent of industry and housing and not for profit. Across other low energy and de-carbonising district level interventions the establishment of entities that share risk and cost such as the Val Market Association in Valladolid can encourage SMEs to engage more actively as solution providers and help mechanisms such as PPPs.
- Community ownership of low energy solutions or even group approaches to energy market transactions are other solutions that can side-step slower moving decision-making processes or restrictions that exist within local authorities' procurement apparatuses. Spain's Horizontal Property Act adds other potential complications to communal area decisions unless unanimity is reached. Within this sort of legislation it might be that solutions have to be so clearly of health, financial and social benefit to be hard to turn down before they are able to be widely taken up. In Nottingham there has been a significant uptake of solutions that improve aesthetics and savings be neighbourhoods and neighbours that see it working next door. Marketing again is a scalability tool in this situation to generate interest at district level in reaching certain standards because others have nearby first.

**Energy network connections and charges** can also be seen as barriers. Solar PV self-consumption and transmission charging can put off solution providers that see profitability being undermined. According to the proposed solution, clarity in the projected NPV calculations of all outgoings and reliability on the government and energy regulators to not make retrospective alterations gives more confidence to investors. Decentralised infrastructure development via



private wire connections and mini-grids are likely to prove more popular if the barriers to grid-based participation of renewable energy producers are high.

Table 27 below includes a number of additional barriers and solutions to implement smart city measures.



Table 27: Barriers and possible solutions to implement smart city strategies

Barriers	Policy recommendations	Behavioural and underpinning actions	Policy change catalysts	Financial mechanisms	Other Interview recommendations
Change in power – institutional change	Legislating for increased local authority and local government power	Loosening criteria for local government borrowing	EU membership and urbanisation	Adjust funding to match city priorities	Engagement of political leaders with smart cities innovation  Increased transparency in local government via higher local stakeholder participation in critical decision-making
Ineffective policy making and different policies competing	New tender models	Development of long term vision with cross party buy-in to create policy certainty	Cuts in public funding leading to a focus on triple bottom line	EPCs, Public-private partnerships or cross-national policies such as EU grants	Coordination of national to local authorities to ensure proper understanding of issues
Hard to treat homes	New tender models and licensing procedures,  Increase feasibility via long-term government financial guarantees	Policies not just focused on cheapest option	Innovative procurement	Grants and innovation programmes	Pilots, working with planners and construction companies for innovative solutions
Delays in public procurement processes	Collaborative framework models encourage shared experience and innovation	Strict performance requirements and adequate audits	Innovative and flexible procurement procedures	EPCs, Financial reward mechanisms for high performing officials and projects	Training of municipal staff in innovative procurement with lower burden on businesses,  Knowledge exchange between cities,  Provision of support to SMEs in making applications,  Feedback system between businesses,

					citizens and public authorities, Publicly transparent processes and evaluation
Several departments involved	Streamline where possible	Governance arrangements to optimise project working	Leadership commitment to change		Structured governance and communication between departments, Use best-practice and expert opinion on the topic
Lack of adaptation and flexibility of the cities to changes, growth and new challenges	Champion “triple bottom line” benefits of smart cities  introduction of more flexible processes for recruitment such as negotiated procedures where innovation is needed	Earmark areas for development of sub-city smart city demonstration areas	Leadership commitment to change	Special government funds earmarked for integrated smart city development strategies	Training of staff on innovative procurement, Encourage friendly competition between cities.  Increase cooperation between private and public sectors
Knowledge and understanding gaps	Increase local government capacity through international programmes	Training of officials, Use of expertise from other cities,  ICT platforms for innovative proposals,  Use of expertise from private sector	Strong local and central government leadership	Knowledge exchange mechanisms such as Interreg, or EIB Bank mechanisms	Increase cooperation with private sector
Legal barriers to community energy purchase	Encourage central government policies to support community energy	Bring together local government champions for municipality driven community energy initiatives	Strong local government leadership and collective action	International and national Renewable energy and energy efficiency funding	New legislation tabled to overcome barriers,  Enable expansion and sharing of experience from existing community energy schemes.



## 7 Future work: links to upcoming tasks

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This model for replication potential will be tested in the framework of the following Task 5.3 within WP5 which is also dedicated to assess the replication potential of the REMOURBAN follower cities (Seraing and Miskolc). Testers will be primarily these follower cities, as well as some additional cities, identified under Task 5.1, will be asked to join the testing phase with the aim to check the appropriateness of the model. Follower and external cities will provide feedback on their perceptions regarding the usability of the model together with their possible needs for improving it. On the basis of the proposals for adaptations gathered by the end of the testing phase, the model will be refined, if needed, and finalized by autumn 2017.

The refined model will serve as a basis for the replication plans to be developed withing Task 5.4 for both REMOURBAN follower cities.

Concerning SCTPs (together with TUs, STUs and OMs), the templates included in this document certainly need to be filled in with information in order to enable testability of the model. SCTPs are planned to be stored in a database and will be updated whenever new information relevant to particular SCTPs is acquired. This database will enable obtaining statistics on, and a global overview of how specific solutions are planned, implemented, operated and how they are perceived by citizens.

For interested cities, specific features of SCTPs will be generally made available, but to a limited extent, foreshadowing one-on-one exchanges among real replicators and 'owners' of SCTPs when it comes to deep analysis of technology packages in order to use them for developing implementation plans.

It is considered that SCTPs with general content will be made publicly available e.g. on the project website with a potential to include information on other smart solutions carried out in smart city projects running in parallel to REMOURBAN, using the same (or similar) format for dissemination purposes.

## 8 Conclusions

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The concept of this document has emerged from the need of cities to obtain a comprehensive methodology that is able to guide them towards delivering replication plans for smart solutions in their urban environment.

The model presented in this document embraces, on one hand, an identification tool for concluding to a pre-defined city cluster, recommendations for which priorities to concentrate on and which solutions to prioritize, guidelines for capacity building and strategy development. On the other, it proposes technology packages to use them in order to facilitate the translation of high level strategic plans to implementation plans, and also deals with those enablers that have key roles in bridging over the gap among the 'demand' for smart solutions to their 'supply'. Such enablers include financial solutions, empowerment of political actors, technical players and citizens, as well as the way to overcome barriers.

However, as it is set in section 7, this model is still to be tested within the next Task 5.3 of the project as a must-to accomplish activity, in order for the (potentially refined) model to stand the test of reality in the long run. The usability and appropriateness of the model will be tested by REMOURBAN follower cities and some interested ones in the following 10 months.

Further conclusions are to be based on the experiences gained/gathered during the testing phase when it becomes possible to report on the real applicability of the model for different cities in Europe.

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## 10 Annexes

### Annex 1: Proposal for the cluster identification tool

The Excel sheet proposed as cluster identification tool<sup>17</sup> is presented hereby.

Step 1: This first sheet includes a set of questions to be answered by the interested city, in order to assist them in defining which cluster (out of the 5 clusters of D5.1) they relates to. The city representative needs to gather the data to feed in this survey. Each question refers to one indicator used in D5.1 for each of the 6 fields (3 non-technical and 3 technical). Each answer has to be selected over the list proposed in the "Input value" field. All the analysis of the answers is automatic to provide, at the end, the related cluster (see step 3).

DOMAIN	INDICATOR	QUESTION	UNIT	INPUT VALUE	Description
Physical char.	MG_PC1	What is the population density of the city ?	Inh./km <sup>2</sup>		Population per unit area in the city
	MG_PC2	What is the city population ?	Inhabitants		Total number of persons inhabiting a city
	MG_PC3	What is the city area ?	km <sup>2</sup>		Land area city
	MG_PC4	What is the city elevation ?	m		Altitude of a city above sea level
Population	MG_P1	Is the population aging? (what is the population dependancy ratio?)	%		Population of children and senior citizen in relation to the adults population
	MG_P2	Did your city gain or lose population within the last year?	%		Change in the number of inhabitants in the last year
	MG_P3	What is the number of foreigners living in city / total city population ?	%		Population of foreigners in relation to the city population
	MG_P4	What is the number of students in higher education ?	Number		Number of students in higher education (ISCED Level 5-6)
	MG_P5	What is the youth unemployment ratio?	%		The unemployment rate is defined as the number of unemployed youth (typically 15-24 years) divided by the youth labour force
	MG_P6	How many public libraries are in your city per 10.000 inhabitants ?	Number		Number of public libraries as indicator of the level of education of the population.
	MP_P7	What is the median population age?	Years		Median age is the age that divides a population into two numerically equal groups
	MG_P8	What is the voter turnout ratio?	%		Voter participation level
	MG_P9	What is the recycling ratio for solid waste?	%		Percentage of the city's solid waste that it is recycled
	FI4	Proportion of working age population with higher education?	%		Proportion of working age population qualified at level 5 or 6 ISCED
Governance	MG_G1	Is there any specific sustainability plan in the city ?	YES/NO		Is there any specific sustainability plan in the city?
	MG_G2	Is there any specific Smart Cities strategy in the city ?	YES/NO		Is there any specific Smart Cities strategy in the city?
	MG_G3	Has the city elaborated an Agenda 21 ?	YES/NO		Has the city elaborated an Agenda 21?
	MG_G4	Has the city signed the Covenant of Mayors ?	YES/NO		Has the city signed the Covenant of Mayors?
	MG_G5	Does the city have a smart mobility plan ?	YES/NO		Does the city have a smart mobility plan?
	MG_G6	Is there any public ICT global platform available for citizen ?	YES/NO		Is there any public ICT global platform available for citizen offering general information about the city?

<sup>17</sup> Please refer to section 4.2.2 above for further details.



Finance	FI1	What is the GDP per inhabitant?	M€/inhabitant	It is a measure for the economic activity of a city and it is defined as the value of all goods and services produced less the value of any goods or services used in their creation
	FI2	What are the average disposable incomes of inhabitants ?	€/inhabitant	The amount of money that households have available for spending and saving after income taxes have been accounted for
	FI3	What is the ratio of unemployment?	%	Unemployed citizens in relation to employed and unemployed who are legally eligible to work
	FI4	(See section population above)		
	FI5	GDP per inhabitant in PPS	M€/inhabitant	GDP per capita at current market prices in Purchasing Power Standards (PPS). It is a common currency that eliminates the differences in price levels between countries
Energy	EN1	Share of electricity in final energy consumptions in households ?	%	Energy derived from electricity related to the final energy in households
	EN2	Share of gas in final energy consumptions in households ?	%	Energy derived from gas related to the final energy in households
	EN3	What is the percentage of RES in final energy consumption in households?	%	Energy derived from energy renewable sources related to the final energy in households
	EN4	What is the average final energy consumption per inhabitant?	MWh/inh	It covers consumption of private households, commerce, public administration, services, agriculture and fisheries
	EN5	What is the average amount of GHG emissions per inhabitant?	Mton CO <sub>2</sub> eq/Million of inhabitant	GHG emissions from buildings (residential and public)
Mobility	MO1	What is the ratio of private car use?	Number/1000 inh.	Total number of private cars (excluding automobiles, trucks and vans used for the delivery of goods and services by commercial enterprises), related to the total number of inhabitants
	MO2	What is the frequency of accidents?	killed in road accidents/1000 inh.	People killed in road accidents
	MO3	What is the car ratio in modal split?	%	Percentage of trips using a private motor vehicle as type of transportation
	MO4	What is the walking ratio?	%	Percentage of trips walking as type of transportation
	MO5	What is the bike ratio?	%	Percentage of trips using a bike as type of transportation
	MO6	Percentage of people using different type of transport including public one ?	%	Percentage share of each mode of transport in total inland transport
	MO7	What is the ratio of electric vehicles among the vehicle fleet?	%	Number of electric vehicles related to total number of vehicles
	MO8	What is the GHG emissions per capita from transportation	Annual tonnes CO <sub>2</sub> eq / Hab.	Annual Tonnes of CO <sub>2</sub> eq / Total City Population
ICT	IN1	What is the proportion of smartphone	%	Number of smartphones in relation to total mobile phones
	IN2	Percentage of fixed wired internet subscriptions / total country population ?	%	Percentage of a country's population which have fixed wired internet subscription
	IN3	What is the proportion of or mobile use?	%	Number of subscriptions to a public mobile telephone service. High- speed access to the public internet
	IN4	What is the number (ratio?) of internet users?	%	Number of people who has access to Internet at home. This indicator does not record use, or frequency of use, but only access



Step 2 : the results of the interpretation of values specified by the city according to the survey (step 1). These results are the cluster number to which can relate these answers. There can be several potential numbers of clusters.

INDICATOR	QUESTION	City results (Automatically calculated)
MG_PC1	What is the population density of the city ?	#N/A
MG_PC2	What is the city population ?	#N/A
MG_PC3	What is the city area ?	#N/A
MG_PC4	What is the city elevation ?	#N/A
MG_P1	Is the population aging? (what is the population dependency ratio?)	#N/A
MG_P2	Did your city gain or lose population within the last year?	#N/A
MG_P3	What is the number of foreigners living in city / total city population ?	#N/A
MG_P4	What is the number of students in higher education ?	#N/A
MG_P5	What is the youth unemployment ratio?	#N/A
MG_P6	How many public libraries are in your city ?	#N/A
MP_P7	What is the median population age?	#N/A
MG_P8	What is the voter turnout ratio?	#N/A
MG_P9	What is the recycling ratio for solid waste?	#N/A
FI4	Proportion of working age population with higher education?	#N/A
MG_G1	Is there any specific sustainability plan in the city ?	#N/A
MG_G2	Is there any specific Smart Cities strategy in the city ?	#N/A
MG_G3	Has the city elaborated an Agenda 21 ?	#N/A
MG_G4	Has the city signed the Covenant of Mayors ?	#N/A
MG_G5	Does the city have a smart mobility plan ?	#N/A
MG-G6	Is there any public ICT global platform available for citizen ?	#N/A
FI1	What is the GDP per inhabitant?	#N/A
FI2	What are the average disposable incomes of inhabitants ?	#N/A
FI3	What is the ratio of unemployment?	#N/A
FI4	(See above)	#N/A
FI5	GDP per inhabitant in PPS	#N/A
EN1	Share of electricity in final energy consumptions in households ?	#N/A
EN2	Share of gas in final energy consumptions in households ?	#N/A
EN3	What is the percentage of RES in final energy consumption in households?	#N/A
EN4	What is the average final energy consumption per inhabitant?	#N/A
EN5	What is the average amount of GHG emissions per inhabitant?	#N/A
MO1	What is the ratio of private car use?	#N/A
MO2	What is the frequency of accidents?	#N/A
MO3	What is the car ratio in modal split?	#N/A
MO4	What is the walking ratio?	#N/A
MO5	What is the bike ratio?	#N/A
MO6	Modal Split. Passenger transport	#N/A
MO7	What is the ratio of electric vehicles among the vehicle fleet?	#N/A
MO8	What is the GHG emissions per capita from transportation	#N/A
IN1	What is the proportion of smartphone	#N/A
IN2	Percentage of fixed wired internet subscriptions / total country population ?	#N/A
IN3	What is the proportion of or mobile use?	#N/A
IN4	What is the number (ratio?) of internet users?	#N/A

Step 3 : The final cluster identification is provided in this last step. One out of the 5 clusters is defined, based on the highest number of answers provided for one cluster (see example below).

	A	B	C	D	E	F
1	The following table shows the global reference to the clusters defined in D5.1					
2						
3		Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
4	Global linkage:	0	0	0	0	0
5						


	A	B	C	D	E	F
1	The following table shows the global reference to the clusters defined in D5.1					
2						
3		Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
4	Global linkage:	9	15	11	8	6
5						

answer : cluster 2



## Annex 2: Summary tables on programmes for direct funding


Table 28: COSME program

Acronym	Description
Program	 <b>COSME (Programme for the Competitiveness of Enterprises and SMEs)</b>
Kinds of available funds	<ul style="list-style-type: none"> <li>• The Loan Guarantee Facility (LGF);</li> <li>• The Equity Facility for Growth (EFG).</li> </ul>
Financial plan	<p>COSME has a budget of over €1.3 billion to fund these financial instruments that facilitate access to loans and equity finance for SMEs where market gaps have been identified.</p> <p>Thanks to this instrument, it will be possible to mobilise up to €25 billion in financing from financial intermediaries via leverage effects. The European Investment Fund (EIF) in cooperation manages the financial instruments with financial intermediaries in EU countries.</p>
Financing Criteria	<ul style="list-style-type: none"> <li>• The Loan Guarantee Facility (LGF): part of the COSME budget will fund guarantees and counter-guarantees for financial intermediaries (e.g. guarantee organisations, banks, leasing companies) to help them provide more loan and lease finance to SMEs. This facility will also include the securitisation of SME debt-finance portfolios. By sharing the risk, the COSME guarantees will allow financial intermediaries to expand the range of SMEs and types of financial transactions they can support. It is expected that up to 330.000 SMEs will receive loans backed by COSME guarantees, with the total value of lending reaching up to €21 billion.</li> <li>• The Equity Facility for Growth (EFG): part of the COSME budget will be dedicated to investments in risk-capital funds that provide venture capital and mezzanine finance for expansion and growth-stage SMEs, in particular those operating across borders. Fund managers working on a commercial basis will ensure that investments are focused on SMEs with the greatest growth potential. It is expected that some 500 firms will receive equity financing through the programme, with overall investment reaching up to €4 billion. It is also anticipated that further finance will be attracted through co-investments from other public and private sources.</li> </ul>
Objectives	<p>Programme aims to support entrepreneurs and SMEs in the consolidation or in starting start-ups.</p> <p>The program:</p> <ul style="list-style-type: none"> <li>• facilitate access to finance for SMEs through dedicated financial instruments and suitable for the various stages of their life cycle;</li> <li>• build a network of business (Enterprise Europe Network), with the aim to connect more than 600 organizations from 60 countries;</li> <li>• encourage transnational networks of communication (Entrepreneurship Support), exchanging best practice and expand business activities;</li> <li>• create an environment conducive to the emergence of new business and growth;</li> <li>• increase sustainable competitiveness among European firms;</li> <li>• promote the internationalization of small businesses, supporting the expansion of its business in European and extra-European markets.</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>• Ensure continuity with the initiatives and actions already undertaken under the Entrepreneurship and Innovation Programme (EIP), such as the Enterprise Europe Network, based on the results and lessons learned;</li> <li>• Give continuity to many positive aspects of the EIP, simplifying the</li> </ul>




	<p>management of the program to make it easier for entrepreneurs and small businesses to benefit;</p> <ul style="list-style-type: none"> <li>• It supports, complement and help coordinate the actions of the EU Member States. COSME specifically address cross-border issues that can be most efficiently tackled at European level;</li> <li>• Actions to improve access to finance for SMEs;</li> <li>• Actions to improve access to markets;</li> <li>• Actions to improve the framework conditions for competitiveness and sustainability of Union enterprises, in particular SMEs;</li> <li>• Actions to promote entrepreneurship.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Entrepreneurs, especially SMEs, which benefit from easier access to finance their businesses;</li> <li>• Individuals wishing to go it alone and must cope with the difficulties linked to the creation or development of their business;</li> <li>• Member State authorities that receive better care in their efforts to prepare and implement effective policy reform.</li> </ul>
<b>Criteria of eligibility</b>	<ul style="list-style-type: none"> <li>• Businesses or related organisations (business associations, business support providers, consultants, etc.), running projects that further the interests of the EU or contribute to the implementation of an EU programme or policy;</li> <li>• Projects should have a transnational character, be well thought out and offer added value;</li> <li>• Detailed criteria for eligibility are specified in the call for proposals.</li> </ul>
<b>Website of reference for calls</b>	<a href="https://ec.europa.eu/easme/en/cosme">https://ec.europa.eu/easme/en/cosme</a>

Table 29: LIFE program

Acronym	Description
<b>Program</b>	 <b>LIFE</b>
<b>Kinds of available funds</b>	<ul style="list-style-type: none"> <li>• Projects (at least 81% of the budget): Action grants for both traditional projects and new types of projects: integrated Projects, technical assistance projects for IPs, capacity building projects and preparatory projects Possibility to make contributions to innovative financial instruments to finance projects;</li> <li>• Operating grants and Other types of funding (cannot exceed 19% of ENV sub-programme budget), Operating Grants (NGOs, IMPEL) - no earmarking but about 3% of the Programme - 70% co-financing rate;</li> <li>• Other types of funding - public procurement (e.g., studies, conferences, service contracts, technical assistance for the monitoring of LIFE, etc.) - no earmarking but about 15% of the Programme.</li> </ul>
<b>Financial plan</b>	<p>The financial framework for the implementation of the program amounts to 3.456.655.000 euro, divided as follows between:</p> <ul style="list-style-type: none"> <li>• the Sub-Environment 2.592.491.250 euro;</li> <li>• the Sub-program for Climate Action 864.163.750 euro.</li> </ul>
<b>Financing Criteria</b>	<ul style="list-style-type: none"> <li>• Traditional Nature and Biodiversity Projects: 60% co-financing but 75% for projects targeting priority habitats &amp; species;</li> <li>• Integrated projects, preparatory projects and technical assistance projects: 60% co-financing;</li> <li>• Capacity building projects: 100% co-financing;</li> <li>• All other projects, i.e., traditional projects under the sub-programme of Climate Action and traditional projects under priorities Environment and Resources Efficiency and Environment Governance and information Projects in the sub-programme for Environment:</li> </ul>

	<ul style="list-style-type: none"> <li>- 60% co-financing during the first multiannual work programme (2014-2017);</li> <li>- 55% co-financing during the second multiannual work programme (2018-2020).</li> </ul>
<b>Objectives</b>	<p>The LIFE programme is the EU's funding instrument for the environment and climate action. The general objective of LIFE is:</p> <ul style="list-style-type: none"> <li>To contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value.</li> </ul>
<b>Type of Projects</b>	<p>At least 81% of the budget for the Programme (approx. €2,800 million):</p> <ul style="list-style-type: none"> <li>Traditional projects: best practice, innovation and demonstration projects, as well as dissemination/information projects and governance projects (similar to LIFE+);</li> <li>Integrated projects: projects aiming at the implementation on a large territorial scale plans and strategies required by EU legislation in the areas of nature, water, waste, air;</li> <li>Preparatory projects: projects identified by the Commission to support specific needs for the implementation and development of EU environmental or climate policy and legislation;</li> <li>Capacity building projects: financial support to the activities required to build the capacity of Member States with a view to enabling their more effective participation in LIFE.</li> </ul>
<b>Focus Areas</b>	<ul style="list-style-type: none"> <li>Environment &amp; Resource Efficiency;</li> <li>Nature &amp; Biodiversity;</li> <li>Environmental Governance &amp; Information;</li> <li>Climate Change Mitigation;</li> <li>Climate Change Adaptation;</li> <li>Climate Change Governance &amp; Information.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>Organizations;</li> <li>Individuals;</li> <li>Public and / or private institutions.</li> </ul>
<b>Criteria of eligibility</b>	<ul style="list-style-type: none"> <li>Member States eligibility for the first multiannual work programme period is based on a combination of GDP per capita and performance in LIFE+: 15 Member States qualify for capacity building in the first multiannual work programme: BG, CY, CZ, EE, EL, HU, LT, LV, MT, POL, PT, RO, SI, SK and HR;</li> <li>Member States eligibility for the second multiannual work programme period is only based on performance: <ul style="list-style-type: none"> <li>low average absorption level for the years 2014-2016;</li> <li>average absorption level for the years 2014-2016 has increased compared to the years 2010, 2011 and 2012.</li> </ul> </li> <li>Exclusion criteria in all cases: a Member State shall be ineligible for funding for capacity building projects if its GDP per capita in 2012 is above 105 % of the Union average.</li> </ul>
<b>Website of reference for calls</b>	<a href="http://ec.europa.eu/environment/life/project/Projects/index.cfm">http://ec.europa.eu/environment/life/project/Projects/index.cfm</a>

Table 30: HORIZON program

Acronym	Description
Program	 <b>Horizon 2020</b>
Kinds of available funds	Grants


<b>Financial plan</b>	<p>The program should include a total budget of around € 78-80 bn, in order to be financed:</p> <ul style="list-style-type: none"> <li>• with grants up to 100% of the research and technological development;</li> <li>• up to 70% of the activities closer to the market.</li> </ul> <p>It will also be introduced only one method of calculation of indirect costs, which should be between 20% and 25% of the total direct costs.</p> <p>This is more than 60 calls that cover the three pillars of the program and for which they have been allocated a total of around € 15 billion for the 2014-2015 biennium.</p> <p>The first calls for 2014 absorb a good portion of these resources, ie € 7.8 billion, distributed as follows:</p> <ul style="list-style-type: none"> <li>• Scientific excellence Pillar: € 3 billion - of which about 1.7 has been allocated by the European Research Council to support high-level researchers - and € 800 million for research grants Marie Skłodowska-Curie directed at young researchers;</li> <li>• Industrial Leadership Pillar: € 1.8 billion, to support key sectors such as ICT, nanotechnology, robotics, biotechnology and space research;</li> <li>• Society Challenges Pillar: € 2.8 billion, to support innovative projects in the framework of the seven priority areas, such as health; agriculture, maritime research and the bio-economy; energy; transport; climate action, environment, efficiency in terms of resources and raw materials; innovative and inclusive societies; safety.</li> </ul>
<b>Funding Criteria</b>	<ul style="list-style-type: none"> <li>• For research and development projects, the proportion of funding will be 100%;</li> <li>• For close-to-market projects, the percentage of funding will vary depending on the recipient: for non-profit organizations, it will be 100%, while for industries and SMEs, it will be 70%;</li> <li>• The time required for the disbursement of the grant funding is 8 months - five months for the Commission to inform applicants of the grant, and 3 months for the negotiation and signing of the Grant Agreement. Exemptions are provided for the ERC projects;</li> <li>• The method of calculation of indirect costs is the same for all the grant funding and activities types of applicants (25% of direct costs excluding subcontracts and third-party).</li> </ul>
<b>Objectives</b>	<p>Horizon 2020 aims to create a European Research Area, by mobilizing private investment in some sectors considered crucial to competitiveness. It aims to bring together the three elements of the value chain, Research, Development and Innovation.</p> <p>The goals are:</p> <ul style="list-style-type: none"> <li>• to produces world-class science;</li> <li>• to remove barriers to innovation and make it easier for the public and private sectors to work together in delivering innovation.</li> </ul> <p>The specific goals of the three pillars are respectively:</p> <ul style="list-style-type: none"> <li>• Science Excellence, which for Horizon 2020 is the foundation for technological development, employment opportunities and social well-being of the future. For this, the program aims to give birth, to attract and retain new talent;</li> <li>• Industrial Leadership, focused on the development of key technologies such as ICT, nanotechnology and so on, but it needs private investment in their R &amp; D phases, as well as a growing number of innovative SMEs are able to create jobs and growth;</li> <li>• Societal Challenges, based on the assumption that the Europe 2020 objectives cannot be achieved without an innovation based on a multidisciplinary approach.</li> </ul>
<b>Kind of assistance</b>	<p>Horizon 2020 was created to implement the EU's growth strategy for the next decade, the so-called Europe 2020, that Europe should be smart, sustainable and inclusive. These three priorities should help the Union and the Member States to achieve high levels of employment, productivity and social cohesion.</p>

	<p>Concretely, the Union has set five ambitious objectives to be achieved by 2020:</p> <ul style="list-style-type: none"> <li>• occupation;</li> <li>• innovation;</li> <li>• instruction;</li> <li>• social inclusion;</li> <li>• climate/energy.</li> </ul>
<p><b>Focus Areas</b></p>	<ul style="list-style-type: none"> <li>• Public/private building stocks;</li> <li>• Public lighting, district heating and cooling networks;</li> <li>• Urban transport (fleets, e-mobility, modal changes) in urban/sub-urban agglomerations;</li> <li>• Energy efficiency in industries and services;</li> <li>• Investments in RES are eligible in combination with EE gains.</li> </ul>
<p><b>Beneficiaries</b></p>	<p>Legal entity, university or research centre established:</p> <ul style="list-style-type: none"> <li>• In one of the 28 EU Member States;</li> <li>• In one of the EFTA/EEA countries (Norway, Iceland and Liechtenstein);</li> <li>• In one of the acceding countries, candidate countries and potential candidates, in accordance with the general principles and general conditions for the participation of those countries in Union programs established in the respective Framework Agreement and by decisions of association councils or similar agreements;</li> <li>• In one of the selected third countries that meet the following criteria:             <ul style="list-style-type: none"> <li>- to have good skills in science, technology and innovation;</li> <li>- to have a good track record of participation in EU programs in the field of research and innovation;</li> <li>- to have close economic and geographical links with the EU.</li> </ul> </li> <li>• Countries ICPC (International Cooperation Partner Countries);</li> <li>• International organizations of European interest;</li> <li>• International organizations and entities established in third countries only if required by ICPC WP/Bilateral Agreement or if essential for the action.</li> </ul>
<p><b>Criteria of Eligibility</b></p>	<p>All proposals must comply with the eligibility conditions set out in the Rules for Participation Regulation No 1290/2013. Furthermore, for actions under this Work Programme proposals/prize applications must comply with the eligibility conditions set out in this Annex, unless they are supplemented or modified in the call conditions. A proposal/application will only be considered eligible if:</p> <ul style="list-style-type: none"> <li>• its content corresponds, wholly or in part, to the topic/contest description for which it is submitted;</li> <li>• it complies with the eligibility conditions for participation set out in the table below, depending on the type of action:             <ul style="list-style-type: none"> <li>- <b>Research &amp; Innovation Actions (RIA) and Innovation actions (IA):</b> At least three legal entities. Each of the three must be established in a different EU Member State or Horizon 2020 associated country. All three legal entities must be independent of each other;</li> <li>- <b>Coordination &amp; Support Actions (CSA):</b> At least one legal entity established in an EU Member State or Horizon 2020 associated country;</li> <li>- <b>SME instrument actions:</b> At least one SME. Only applications from for-profit SMEs established in EU Member States or Horizon 2020 associated countries. No concurrent submission or implementation with another SME instrument phase 1 or phase 2 project;</li> <li>- <b>ERA-NET Cofund actions:</b> At least three legal entities. Each of the three must be established in a different EU Member State or Horizon 2020 associated country. All three legal entities must be independent of each other. Participants in ERA-NET Cofund actions must be 'research funders', i.e. legal entities owning or managing public research and innovation programmes;</li> <li>- <b>Precommercial Procurement (PCP) &amp; Public Procurement of Innovative solutions (PPI) actions:</b> At least three legal entities.</li> </ul> </li> </ul>




	<p>Each of the three must be established in a different EU Member State or Horizon 2020 associated country. All three legal entities must be independent of each other. Furthermore, there must be a minimum of two legal entities which are 'public procurers' 13 from two different EU Member States or Horizon 2020 associated countries. Both legal entities must be independent of each other;</p> <ul style="list-style-type: none"> <li>– <b>European Joint Programme (EJP) Cofund actions:</b> At least five legal entities. Each of the five must be established in a different EU Member State or Horizon 2020 associated country. All five legal entities must be independent of each other. Participants in EJP cofund actions and must be legal entities owning or mandated to manage national research and innovation programmes.</li> </ul>
<b>Website of reference for calls</b>	<a href="https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/master_calls.html">https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/master_calls.html</a>

Table 31: INTERREG V

Acronym	Description
<b>Program</b>	 <b>INTERREG: European Territorial Co-operation</b>
<b>Kinds of available funds</b>	Grants for projects aiming to enhance territorial cooperation in Europe
<b>Financial plan</b>	<p>The fifth programming period of Interreg has a budget of EUR 10.1 billion invested in 107 cooperation programmes between regions and territorial, social and economic partners, organized as follow:</p> <ul style="list-style-type: none"> <li>• 60 Cross-border – Interreg V-A, along 38 internal EU borders (ERDF contribution is EUR 6.6 billion) divided into: <ul style="list-style-type: none"> <li>– 12 IPA Cross-border: Instrument for Pre-Accession and European Neighborhood Instrument</li> <li>– 16 ENI Cross-border : International Cooperation and Development</li> </ul> </li> <li>• 15 Transnational – Interreg V-B, covering larger areas of co-operation such as the Baltic Sea, Alpine and Mediterranean regions. ERDF contribution: EUR 2.1 billion.</li> <li>• The interregional co-operation programme, INTERREG Europe, and 3 networking programmes (Urbact III, Interact III and ESPON) cover all 28 Member States of the EU. They provide a framework for exchanging experience between regional and local bodies in different countries. ERDF contribution: EUR 500 million.</li> </ul>
<b>Objectives</b>	<p>European Territorial Cooperation (ETC), better known as Interreg, is one of the two goals of cohesion policy and provides a framework for the implementation of joint actions and policy exchanges between national, regional and local actors from different Member States. The overarching objective of European Territorial Cooperation (ETC) is to promote a harmonious economic, social and territorial development of the Union as a whole. Interreg is built around three strands of cooperation:</p> <ul style="list-style-type: none"> <li>• cross-border (Interreg A);</li> <li>• transnational (Interreg B);</li> <li>• interregional (Interreg C).</li> </ul>
<b>Kind of assistance</b>	To create a smart, sustainable and inclusive Europe.
<b>Focus Areas</b>	<p>At least, 80% of the budget for each cooperation programme has to concentrate on a maximum of 4 thematic objectives among the eleven EU priorities:</p> <ul style="list-style-type: none"> <li>• Research and innovation;</li> <li>• Information and communication technologies;</li> </ul>

	<ul style="list-style-type: none"> <li>• Competitiveness of SMEs;</li> <li>• Low-carbon economy;</li> <li>• Combating climate change;</li> <li>• Environment and resource efficiency;</li> <li>• Sustainable transport;</li> <li>• Employment and mobility;</li> <li>• Social inclusion;</li> <li>• Better education, training;</li> <li>• Better public administration.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Research centres, Local and Regional authorities;</li> <li>• Corporations;</li> <li>• Training centres;</li> <li>• Administrations States;</li> <li>• SMEs;</li> <li>• Non-profit organisations.</li> </ul>
<b>Criteria of Eligibility</b>	<ul style="list-style-type: none"> <li>• Interreg has significantly been reshaped to achieve greater impact and an even more effective use of the investments. Key elements of the 2014-2020 reform are: <ul style="list-style-type: none"> <li>– Concentration;</li> <li>– Simplification;</li> <li>– Results orientation.</li> </ul> </li> <li>• Important to respect partnership principle &amp; multi-governance (Art. 5 Reg. 1303/2013);</li> <li>• Written confirmation of participants' agreement to the whole programme, including strategy, co-financing &amp; management and control structure (Art. 8&amp;9 Reg. 1299/2013).</li> </ul>
<b>Website of reference for calls</b>	<a href="http://www.interreg4c.eu/programme/2014-2020/">http://www.interreg4c.eu/programme/2014-2020/</a>

Table 32: Connecting Europe Facility program

Acronym	Description
<b>Program</b>	 <b>Connecting Europe Facility</b>
<b>Kinds of available funds</b>	<ul style="list-style-type: none"> <li>• Grants;</li> <li>• Guarantees;</li> <li>• Project bonds.</li> </ul>
<b>Financial plan</b>	<p>Since January 2014, INEA (Innovation and Networks Executive Agency) is the gateway to fund under the CEF. INEA implements most of the CEF programme budget, in total €27.4 billion out of €30.4 billion:</p> <ul style="list-style-type: none"> <li>• €22.4 billion for Transport;</li> <li>• €4.7 billion for Energy;</li> <li>• €0.3 billion for Telecom.</li> </ul>
<b>Objectives</b>	<p>The Connecting Europe Facility (CEF) is a key EU funding instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level. It supports the development of high performing, sustainable and efficiently interconnected trans-European networks in the fields of transport, energy and digital services. CEF investments fill the missing links in Europe's energy, transport and digital backbone.</p>
<b>Kind of assistance</b>	<p>The CEF benefits people across all Member States, as it makes travel easier and more sustainable, it enhances Europe's energy security while enabling wider use of renewables, and it facilitates cross-border interaction between public administrations, businesses and citizens.</p>

<b>Focus Areas</b>	<ul style="list-style-type: none"><li>• Transport;</li><li>• Energy;</li><li>• Environment;</li><li>• Innovation;</li><li>• Telecommunications.</li></ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"><li>• Research centres,</li><li>• Local and Regional authorities,</li><li>• Corporations,</li><li>• Administrations States,</li><li>• Development NGOs,</li><li>• SMEs,</li><li>• Universities</li></ul>
<b>Criteria of Eligibility</b>	To be eligible for financial support under the CEF, projects must be identified as Projects of Common Interest (PCI).
<b>Website of reference for calls</b>	<a href="https://ec.europa.eu/inea/en/connecting-europe-facility">https://ec.europa.eu/inea/en/connecting-europe-facility</a>

## Annex 3: Summary tables on structural funds

Table 33: European Social Fund (ESF)

Acronym	Description
Program	 <p><b>ESF (European Social Fund)</b></p>
Kinds of available funds	<ul style="list-style-type: none"> <li>Financial instruments: guarantees, loans, quasi-equity participation and other risk-bearing mechanisms, possibly with technical assistance and support;</li> <li>Indirect funding (e.g. loans, risk capital and seed funding);</li> <li>Grants.</li> </ul>
Financial plan	<p>The ESF will provide some €80 billion (in current prices) in funding to:</p> <ul style="list-style-type: none"> <li>train people and help them get into work;</li> <li>promote social inclusion;</li> <li>improve education &amp; training;</li> <li>improve the quality of public services in your country.</li> </ul>
Funding criteria	<p>The European Social Fund is designed and implemented in a partnership between the European Commission and national and regional authorities. This partnership also involves a wide range of other partners, such as NGOs and workers' organisations, in the design of the ESF strategy and monitoring of its implementation.</p> <p>Working in partnership is the best way to ensure that spending is as effective and efficient as possible and meets the needs of the region or community concerned. Two other important principles guide the functioning of the ESF:</p> <ul style="list-style-type: none"> <li><b>Co-financing</b> ensures ownership at national and regional level: ESF funding is always accompanied by public or private financing. Co-financing rates vary between 50% and 85% (95% in exceptional cases) of the total project costs depending on the relative wealth of the region.</li> <li><b>Shared management</b> allows for taking responsibility at the appropriate level: ESF guidelines are designed at European level through consultation with a wide variety of stakeholders, and Operational Programmes are negotiated between national authorities and the Commission. Implementation on the ground, through Operational Programmes. It is managed by the relevant authorities in each country.</li> </ul>
Objectives	<p>ESF aimed at supporting the European Employment Strategy and social integration. The ESF is Europe's main instrument for:</p> <ul style="list-style-type: none"> <li>supporting jobs;</li> <li>helping people get better jobs;</li> <li>ensuring fairer job opportunities for all EU citizens;</li> <li>promoting employment and supporting labour mobility;</li> <li>promoting social inclusion and combating poverty;</li> <li>invest in education, skills and lifelong learning;</li> <li>improving institutional capacity.</li> </ul>



<b>Kind of assistance</b>	<p>The European Commission and EU countries in partnership set the ESF's priorities and how it spends its resources. The priorities are:</p> <ul style="list-style-type: none"> <li>• to boost the adaptability of workers with new skills, and enterprises with new ways of working;</li> <li>• To focus on improving access to employment: by helping young people make the transition from school to work, or training less-skilled job-seekers to improve their job prospects. Indeed, vocational training and lifelong learning opportunities to give people new skills form a large part of many ESF projects;</li> <li>• To focus on helping people from disadvantaged groups to get jobs. This is part of enhancing 'social inclusion'.</li> </ul>
<b>Focus areas</b>	<ul style="list-style-type: none"> <li>• (Digital) Infrastructure development in transport &amp; energy;</li> <li>• Renewable energy;</li> <li>• Energy efficiency and energy interconnections;</li> <li>• Risk financing for SMEs and midcaps;</li> <li>• Education;</li> <li>• Health;</li> <li>• Environment and natural resources.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Individuals;</li> <li>• Companies;</li> <li>• Organisations.</li> </ul>
<b>Criteria of eligibility</b>	<p>All European regions can benefit from the support of ESF funds, but the following distinction is made in the funds allocation criteria:</p> <ul style="list-style-type: none"> <li>• Less developed regions: GDP per head below 75% of average EU27 GDP;</li> <li>• Transition regions: GDP per capita between 75% and 90% of the average GDP of the EU27;</li> <li>• More developed regions: GDP per capita above 90% of the average of the EU27 GDP.</li> </ul>
<b>Procedure to obtain the fund</b>	<ul style="list-style-type: none"> <li>• Organisations interested in ESF funding for a project should contact the ESF Managing Authority in their country or region. To find the relevant ESF contact address, visit the 'Support in your country' section;</li> <li>• Individuals interested in participating in ESF projects can find the relevant ESF contact address in their country in the 'Support in your country' section. National and regional ESF websites, as well as local employment services are also a good source of information on opportunities proposed by the ESF.</li> </ul>

Table 34: European Regional Development Fund (ERDF)

Acronym	Description
<b>Program</b>	 <p>ERDF (European Regional Development Fund)</p> <p>European Union European Regional Development Fund</p>
<b>Kinds of available funds</b>	<ul style="list-style-type: none"> <li>• Grants (co-financing);</li> <li>• Financial instruments: guarantees, loans, quasi-equity participation and other risk-bearing mechanisms, possibly with technical assistance support;</li> <li>• European Territorial Cooperation Programmes.</li> </ul>

<b>Financing criteria</b>	<p>Financing conditions depend on the location. Part-financing may be provided up to:</p> <ul style="list-style-type: none"> <li>• 20% for cross-border cooperation in NUTS III areas adjacent to the EU's border areas;</li> <li>• 20% for cross-border cooperation for operations including partners outside the area in question;</li> <li>• 10% for cross-border and transnational cooperation to cover expenditure on operations in non-EU countries, if these operations are for the benefit of regions within the EU.</li> </ul>
<b>Objectives</b>	<p>ERDF aimed at reducing the disparities among EU regions.</p> <p>The objective of the ERDF is to help reinforce economic and social cohesion by redressing regional imbalances. This is achieved by supporting the development and structural adjustment of regional economies, including the conversion of declining industrial regions. Moreover, at least 5% of the ERDF resources are set aside for this field, through 'integrated actions' managed by cities.</p> <p>Areas that are naturally disadvantaged from a geographical viewpoint (remote, mountainous or sparsely populated areas) benefit from special treatment.</p> <p>Lastly, the outermost areas also benefit from specific assistance from the ERDF to address possible disadvantages due to their remoteness.</p>
<b>Kind of assistance</b>	<p>The ERDF focuses its assistance on a number of thematic priorities reflecting the nature of the "Convergence", "Regional competitiveness and employment" and "European territorial cooperation" objectives. In particular, it contributes towards the financing of:</p> <ul style="list-style-type: none"> <li>• Investment which contributes to creating sustainable jobs;</li> <li>• Investment in infrastructure;</li> <li>• Measures which support regional and local development, including support and services for businesses, in particular small and medium-sized enterprises (SMEs);</li> <li>• Technical assistance.</li> </ul>
<b>Focus areas</b>	<ul style="list-style-type: none"> <li>• Research, development and innovation;</li> <li>• The improved access to and quality of ICT;</li> <li>• The low-carbon economy;</li> <li>• Support for SMEs;</li> <li>• Services of general economic interest;</li> <li>• The telecommunications infrastructure, transport and energy;</li> <li>• Efficient PA;</li> <li>• Health infrastructure, social and educational;</li> <li>• Sustainable urban development.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Local, regional and national authorities;</li> <li>• Social, cultural and educational institutions;</li> <li>• NGOs;</li> <li>• Companies, SMEs and associations.</li> </ul>
<b>Criteria of eligibility</b>	<p>All European regions can benefit from the support of ERDF fund, but the following distinction is made in the funds allocation criteria:</p> <ul style="list-style-type: none"> <li>• Less developed regions: GDP per head below 75% of average EU27 GDP;</li> <li>• Transition regions: GDP per capita between 75% and 90% of the average GDP of the EU27;</li> <li>• More developed regions: GDP per capita above 90% of the average of the EU27 GDP;</li> <li>• Lastly, the outermost areas also benefit from specific assistance from the ERDF to address possible disadvantages due to their remoteness.</li> </ul>

<b>Procedure to obtain the fund</b>	<ul style="list-style-type: none"> <li>• The program applies the principle of additionally, whereby funds can not replace those national or regional, but have to support them and added to them;</li> <li>• For a project to be selected, it must include beneficiaries in at least two countries which are acting jointly in at least two of these four fields: development, implementation, staffing and financing;</li> <li>• In the case of transnational cooperation, a programme may be implemented in a single Member State, provided it has been presented by at least two countries;</li> <li>• Networks for cooperation and exchange of experience must consist of at least three beneficiaries in at least three regions and at least two Member States, and these must be acting jointly in all four fields.</li> </ul> <p>The operational programme must contain the following information:</p> <ul style="list-style-type: none"> <li>• an analysis of the strengths and weaknesses of the area covered by the cooperation;</li> <li>• justification for the priorities selected;</li> <li>• information on the priorities and the specific objectives of each;</li> <li>• a breakdown of the spheres of assistance by category;</li> <li>• a financing plan;</li> <li>• implementing rules;</li> <li>• an indicative list of major projects.</li> </ul>
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Table 35: Cohesion fund

Acronym	Description
<b>Program</b>	 <b>Cohesion Fund</b>
<b>Kinds of available funds</b>	<ul style="list-style-type: none"> <li>• Grants (co-financing);</li> <li>• Financial instruments: guarantees, loans, (quasi-) equity participation and other risk-bearing mechanisms, possibly with technical assistance support;</li> <li>• Indirect funding (e.g. loans, risk capital and seed funding).</li> </ul>
<b>Financial plan</b>	<p>Total of € 63.4 billion to activities under the following categories:</p> <ul style="list-style-type: none"> <li>• <b>Trans-European transport networks</b>, notably priority projects of European interest as identified by the EU. The Cohesion Fund will support infrastructure projects under the Connecting Europe Facility;</li> <li>• <b>Environment</b>: here, the Cohesion Fund can also support projects related to energy or transport, as long as they clearly benefit the environment in terms of energy efficiency, use of renewable energy, developing rail transport, supporting intermodality, strengthening public transport, etc;</li> </ul>
<b>Funding criteria</b>	<ul style="list-style-type: none"> <li>• The maximum rate of aid for the investment projects granted by the Cohesion Fund amounts to 85% of public expenditures or other equivalent expenditures including expenditures by bodies whose activities are undertaken within an administrative or legal framework by virtue of which they may be deemed to be equivalent to public bodies (eligible expenditures);</li> <li>• Polish site must guarantee remaining funds from one or several sources. A project may not benefit both from the Cohesion Fund and structural funds;</li> <li>• The technical support may be financed at 100% of the total cost from the Cohesion Fund.</li> </ul>

<b>Objectives</b>	<p>Financial instruments can thus contribute to the achievement of the following objectives of the CF:</p> <ul style="list-style-type: none"> <li>• promoting the production, distribution and use of energy derived from renewable sources;</li> <li>• supporting energy efficiency and smart energy management;</li> <li>• investing in the waste sector and water sector;</li> <li>• improving the urban environment, including decontamination of brownfield sites;</li> <li>• supporting a multimodal Single European Transport Area;</li> <li>• developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems in order to promote sustainable regional and local mobility;</li> <li>• developing and upgrading comprehensive, high quality rail, river and sea transport, intermodal transport systems and their interoperability.</li> </ul>
<b>Kind of assistance</b>	<p>The assistance regards:</p> <ul style="list-style-type: none"> <li>• social disparities;</li> <li>• promote sustainable development.</li> </ul> <p>The financial assistance of the Cohesion Fund can be suspended by a Council decision (taken by qualified majority) if a Member State shows excessive public deficit and if it has not resolved the situation or has not taken the appropriate action to do so.</p>
<b>Focus areas</b>	<ul style="list-style-type: none"> <li>• Energy: use of renewable sources and efficiency;</li> <li>• Low carbon economy;</li> <li>• Climate change adaptation and risk prevention and management;</li> <li>• Environment protection and resource efficiency;</li> <li>• Sustainable transport;</li> <li>• Institutional capacity.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Local and regional authorities;</li> <li>• Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.</li> </ul>
<b>Criteria of eligibility</b>	<p>The Cohesion Fund is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90% of the EU average.</p>

## Annex 4: Summary tables on EIB Instruments

Table 36: ELENA fund

Acronym	Description
Program	<p><b>ELENA (European Local ENergy Assistance)</b></p> 
Kinds of available funds	<ul style="list-style-type: none"> <li>• Senior and junior loans;</li> <li>• Guarantees or equity participation.</li> </ul>
Financial plan	<p><b>Investment amount</b></p> <p>The program is on track to mobilize:</p> <ul style="list-style-type: none"> <li>• more than 1.6 billion Euro investments in the coming years;</li> <li>• 15 millions in the first year.</li> </ul> <p><b>Investment plan</b></p> <p>ELENA covers up to 90% of the technical support cost needed to prepare, implement and finance the investment programme, this could include:</p> <ul style="list-style-type: none"> <li>• feasibility and market studies;</li> <li>• programme structuring;</li> <li>• energy audits;</li> <li>• tendering procedure preparation.</li> </ul>
Funding criteria	<p>The general funding program provides the following as a percentage on the amount of investment expected:</p> <ul style="list-style-type: none"> <li>• 40% is paid at the beginning of the program;</li> <li>• 30% is paid after the approval of the interim report;</li> <li>• 30% is paid after approval of the final report.</li> </ul> <p>Ultimately, the project should not necessarily be excellent and innovative, as required under the Horizon 2020 program, but must offer tangible cost savings and consequently reduced environmental impact and must be sustainable over time.</p>
Objectives	<p>ELENA is part of the EIB's broader effort to support the EU's climate and energy policy objectives. This joint EIB-European Commission initiative helps local and regional authorities to prepare energy efficiency or renewable energy projects.</p> <p>Many EU cities and regions have already started to prepare the project initiatives in the energy field to tackle the challenges of climate change.</p> <p>Nevertheless, many of these governments encountered several difficulties of implementation; because they do not have the technical capacity to develop programs in these areas.</p> <p>For this reason, ELENA helps these governments to solve such problems by giving them the necessary assistance to develop investment programs and projects in the field of sustainable energy such as:</p> <ul style="list-style-type: none"> <li>• energy efficiency of existing public and private buildings;</li> <li>• sustainable construction;</li> <li>• efficient districts with heating networks;</li> <li>• cooling, sustainable mobility.</li> </ul> <p>This program aims:</p> <ul style="list-style-type: none"> <li>• to mobilize private investment in the public sector, according to the criteria of the common law of 'Third Party Financing' and 'Shared Saving Contract' that do not affect the 'Pact of internal stability, so as to overcome the current difficulty of borrowing by local authorities.</li> <li>• to develop a sustainable energy by assisting local governments in the development of investment programs in this sector.</li> <li>• to create high potential primarily related to energy efficiency and transport sector, the rational use of electricity and energy savings in homes, public buildings and public lighting.</li> </ul>

<b>Kind of assistance</b>	<p>Operations covered by the program:</p> <ul style="list-style-type: none"> <li>• Energy efficiency of public and private buildings (including private housing and public lighting);</li> <li>• Inclusion of renewable energy in buildings (photovoltaic panels, biomass plants, etc.);</li> <li>• Investments for the construction of district heating networks, etc.;</li> <li>• Increasing energy efficiency and integration of renewable energy sources in transport (energy-efficient buses - including buses with hybrid drive - electric propulsion or a low-carbon, corporate fleets, etc.).</li> </ul>
<b>Opportunities</b>	<p>The investment programs can:</p> <ul style="list-style-type: none"> <li>• affect the efficiency of buildings and street lighting systems, integration of renewable energy in buildings, renovation or installation of districts for district heating and electricity from renewable sources;</li> <li>• help the urban transport to achieve greater energy efficiency- as well as the introduction of efficient vehicles and increasing the proportion of energy from renewable sources in transport are eligible costs (eg hybrid vehicles).</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Local or regional authorities;</li> <li>• Other public bodies or groups of bodies in the countries participating in the IEE program (Intelligent Energy Europe): the 28 EU Member States, Norway, Iceland and Liechtenstein.</li> </ul>
<b>Criteria of eligibility</b>	<p>Binding criteria for admission to the program are:</p> <ul style="list-style-type: none"> <li>• The achievement of a 'leverage', a minimum of 25, which is the ratio of the total eligible costs of the investment factor and the total amount of technical assistance provided by the instrument ELENA;</li> <li>• The minimum size of 50 million euro. Smaller-scale projects are supported only if integrated in funding programs of larger scale. ELENA can be combined with other European or national funds, but not with other types of financing on the issues covered by it (providing technical assistance for the development of an investment program).</li> </ul>
<b>Procedure to obtain the fund</b>	<p><b>Duration</b> The approved project must not last more than three years.</p> <p><b>Presentation</b> Applications for funding do not have a precise deadline, as it is accepted until funds are all available, according to the principle: "first come is first served". For the first contact with officials responsible for the management of the ELENA program, you must submit at the outset that the EIB, a brief description of the investment program with the following information:</p> <ul style="list-style-type: none"> <li>• A brief exposition of the project, including what type of investment and the procedures for implementing the program;</li> <li>• The costs and the expected time period;</li> <li>• The cost, scope and needs to be covered through the technical assistance required.</li> </ul> <p><b>Final answer</b> Based on the information provided in this preliminary phase, the EIB evaluates the proposals against the selection criteria and the financial viability of the project. The entire procedure takes around three months. A positive assessment allows the project coordinator to prepare the true and proper application (via an application form) to be sent to the EIB. The latter, in turn submit the proposal to the European Commission for its approval. In case of a positive assessment by the European Commission, the beneficiary enters the negotiation phase with the EIB, on the basis of the proposal approved by the Commission. It defines the time, cost and mode of delivery of technical assistance and the arrangements for management, monitoring and reporting of the project.</p>

Table 37: JESSICA fund

Acronym	Description
<b>Program</b>	<b>JESSICA (Joint European Support for Sustainable Investment in City Areas)</b>
<b>Kinds of available funds</b>	<p>The JESSICA Urban Development Funds invest in urban projects, acquiring equity (venture capital) and/or by providing loans (debt capital).</p> <p>The new element of the JESSICA mechanism is in exchange for investing strategy of EU Funds:</p> <ul style="list-style-type: none"> <li>• Shift from grants to repayable sums;</li> <li>• Leverage;</li> <li>• Immediate availability without automatic disengagement;</li> <li>• Stronger integration with spatial planning.</li> </ul> <p>JESSICA acts as a catalyst capable of stimulating the collection of additional funding from public and private sources, to carry out urban projects that would not otherwise have the opportunity to start.</p>
<b>Financial plan</b>	<p>The EIB manages 18 funds operating participation in 9 Member States, for a total of about 1.8 billion Euro, managed through the agreements undertaken with the Member States' authorities.</p> <p>As for the Urban Development Funds (UDFs), 35 agreements were signed for the creation of FSU for a total of 1.2 billion Euros mobilized.</p>
<b>Funding criteria</b>	<p>The project funding will follow two procedures:</p> <ul style="list-style-type: none"> <li>• The first is that the authorities responsible for managing the funds at national level match an urban development fund from which to pay the funding for the implementation of projects;</li> <li>• In the second case, the managing authorities may themselves constitute an holding fund, with the participation of financial intermediaries, such as the EIB. This second mode will lead, according to the Community institutions, numerous benefits, including the adoption of management procedures less complex and can rely on highly experienced institutions in the sector.</li> </ul>
<b>Objectives</b>	<p>JESSICA is structured around a partnership between the European Commission, the European Investment Bank (EIB) and the Development Bank of the Council of Europe.</p> <p>The goal of the protocol is:</p> <ul style="list-style-type: none"> <li>• to support and ensure the rational European urban development, consistent, sustainable;</li> <li>• to increase employment.</li> </ul> <p>The planned method involves the incorporation of grants for retraining programs and urban development (including social housing), with loans and the banks' funding. National and regional authorities will also benefit, through Jessica, a concrete problem-solving option on the complex issues of the financing of development projects and urban regeneration.</p> <p>Jessica hopes to facilitate:</p> <ul style="list-style-type: none"> <li>• the design and implementation of development plans and urban renewal (paying special attention to the social housing sector);</li> <li>• the access to credit for actors that are involved in urban regeneration, through a combination of grants and loans.</li> </ul>
<b>Kind of assistance</b>	<p>The payable resources on the environment, through Jessica, are designed to support and encourage the following types of projects related to sustainable urban development:</p> <ul style="list-style-type: none"> <li>• urban infrastructure, including transport, water, waste water treatment, energy and other;</li> <li>• conversion of derelict industrial sites, including reclamation and decontamination;</li> </ul>

	<ul style="list-style-type: none"> <li>• improving energy efficiency;</li> <li>• sites and cultural heritage - for the purposes of tourism or other;</li> <li>• creation of new commercial space sectors SMEs, IT and / or R &amp; D;</li> <li>• university buildings - medical facilities, biotech and other specialized facilities.</li> </ul>
<b>Opportunities</b>	<p>The principal benefits are:</p> <ul style="list-style-type: none"> <li>• Recycling of funds – as long as JESSICA funds have been invested, by UDFs, in eligible project expenditure before the expiry date of the Structural Fund programming period (n+2, i.e. by the end of 2015) then any returns/receipts generated from that investment can be either retained by the UDFs or returned to Managing Authorities for reinvestment in new urban regeneration projects. For those Member States facing a prospect of reduced EU grant funding in the next programming period, JESSICA offers the opportunity to create a lasting legacy for the current funds;</li> <li>• Leverage – a significant implied advantage of JESSICA is its potential ability to engage the private sector, thereby leveraging both further investment and, perhaps more critically, competence in project implementation and management. Private sector investment can, in some instances, meet the requirements for the Member State's match-funding contribution (Regulations require that Member States make a contribution, alongside the Structural Funds, to their Operational Programmes. This percentage of "own funds" can be different in each Member State.). Despite the fact that JESSICA allows grant receipts to be "transformed" into repayable investment, they are not repayable to the European Commission and should therefore not be regarded as public sector debt;</li> <li>• Flexibility – JESSICA provides a flexible approach, both in terms of broader eligibility of expenditures and in the use of JESSICA funds by way of either equity, debt or guarantee investment;</li> <li>• Expertise and Creativity – Member States, Managing Authorities, cities and towns will benefit from expertise of the banking and private sector. JESSICA could also act as catalyst in urban areas to enhance the investment market and therefore complement other initiatives or sources of funding that may already exist in the Member State. Involvement of the private sector, however, will still need to take account of 'State Aid' rules.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Authorities of the Operational Programmes Management;</li> <li>• Other holders of common interests of member countries.</li> </ul>
<b>Criteria of eligibility</b>	<p>The following selection criteria shall be applicable:</p> <ul style="list-style-type: none"> <li>• Compliance with ORGANIC PROCESS RESEARCH &amp; DEVELOPMENT (OPRD) objectives. Since the financial resources allocated to the Fund are provided by OPRD, it is crucial that all Projects comply with the objectives of its Priority Axis 1 "Sustainable and Integrated Urban Development";</li> <li>• Contribution to OPRD quantitative outputs. Taking notice of the outputs under OPRD, the Fund will focus on projects that will facilitate the achievement of the target values of OPRD's Priority Axis 1 – number of projects improving the physical environment, attractiveness of the Cities and risk prevention, number of improved health, educational, cultural and social services facilities, and number of renewed, rehabilitated, renovated industrial zones;</li> <li>• Compliance with the Fund's objectives and other strategic documents. It is a key prerequisite that the supported Urban Projects contribute also to the achievement of the specific and overall Fund's objectives and are in line with the Fund priorities;</li> <li>• Being part of Integrated Plan / Municipal Plan for Development and other local strategies. According to the provisions laid down in the OPRD and taking into account that this is one of the key requirements of JESSICA instrument, it is essential the interventions implemented in the project to be included in spatial planning, namely Master Plans, Municipal Development Plans and / or District Development Plan;</li> </ul>



	<ul style="list-style-type: none"> <li>• Maturity of the Urban Projects. The Fund will prioritise Projects with completed feasibility studies and work design, economic analysis and financial model. This approach is based on the timing requirement with respect to the preparation of the entire set of documents needed for Project submission and implementation;</li> <li>• Revenue generating. All selected Projects need to be revenue generating in order to recover the investments provided. In addition, these shall have the capacity to raise financing for future Projects;</li> <li>• Financial covenants. In the process of analysing the Projects the following basic financial parameters shall be used – normal equity IRR, normal debt IRR, debt service coverage ratio, debt equity ratio, debt / EBITDA ratio, etc.;</li> <li>• Profitability. The projected profitability of Projects without Fund's support is expected to be lower than normally required by the market so that with typical forms of financing the Projects could not have been realized.</li> </ul>
<b>Procedure to obtain the fund</b>	<p>Project preparation support including:</p> <ul style="list-style-type: none"> <li>• Upstream project screening to assess their viability and suitability for EU grant finance;</li> <li>• Project development from pre-feasibility and feasibility stages through to final grant application;</li> <li>• Pre-feasibility: comments and guidance on master plans; assistance in developing project concepts vis-à-vis EU regulations and in the preparation of the ToR for the beneficiary to select consultants;</li> <li>• Feasibility stage: methodological review of the feasibility study and recommendations for adjustment; review of intermediate and final deliverables and recommendations for improvement;</li> </ul> <p>Application stage: review of the draft application form and the annexes before submission to DG Regional and Urban Policy.</p>

Table 38: JASMINE fund

Acronym	Description
<b>Program</b>	<b>JASMINE (Joint European Resources for Micro to Medium Enterprises)</b>
<b>Kinds of available funds</b>	Grants
<b>Financial plan</b>	Global budget: 50 million Euro
<b>Objectives</b>	<p>JASMINE is a joint initiative of the Commission, the European Investment Bank (EIB) and European Investment Fund (EIF).</p> <p>This action in the field of microcredit is being developed in the framework of JEREMIE and the Communication on microcredit.</p> <p>Its objective is to facilitate access to microcredit lending for those micro-enterprises and micro-entrepreneurs who do not have access to traditional banking services through different actions:</p> <ul style="list-style-type: none"> <li>• Disseminate good practice in the EU as regards microcredit lending;</li> <li>• Support the development of microcredit providers active in the European Union in various fields such as institutional governance, information systems, risk management and strategic planning (capacity building);</li> <li>• Help these intermediaries become sustainable and viable operators on commercial terms.</li> </ul>
<b>Kind of assistance</b>	<p>The JASMINE Technical Assistance targets the following types of Microcredit Providers, active in the European Union:</p> <ul style="list-style-type: none"> <li>• Non bank financial institutions: <ul style="list-style-type: none"> <li>- Greenfield MFIs willing to improve their internal processes through an independent assessment of their institution and</li> </ul> </li> </ul>

	<p>tailored trainings to the staff;</p> <ul style="list-style-type: none"> <li>- Mature MFIs willing to increase the quality of their operations through an assessment report or a rating report likely to facilitate fundraising and tailored consulting services to the staff and the management team;</li> <li>• Licensed Banks: licensed banks never rated by specialised microfinance rating agencies, providing microcredit products and willing to receive an independent opinion on their microcredit operations by specialized European microcredit rating agencies as well as tailored coaching to increase the staff knowledge in microfinance.</li> </ul>
<p><b>Focus areas</b></p>	<ul style="list-style-type: none"> <li>• Local development;</li> <li>• Economy – Finances.</li> </ul>
<p><b>Beneficiaries</b></p>	<ul style="list-style-type: none"> <li>• Micro-finance Institutions;</li> <li>• Non bank financial institutions;</li> <li>• Licensed Banks.</li> </ul>
<p><b>Criteria of eligibility</b></p>	<p>The following selection criteria shall be applicable:</p> <ul style="list-style-type: none"> <li>• Compliance with ORGANIC PROCESS RESEARCH &amp; DEVELOPMENT (OPRD) objectives. Since the financial resources allocated to the Fund are provided by OPRD, it is crucial that all Projects comply with the objectives of its Priority Axis 1 “Sustainable and Integrated Urban Development”;</li> <li>• Contribution to OPRD quantitative outputs. Taking notice of the outputs under OPRD, the Fund will focus on projects that will facilitate the achievement of the target values of OPRD’s Priority Axis 1 – number of projects improving the physical environment, attractiveness of the Cities and risk prevention, number of improved health, educational, cultural and social services facilities, and number of renewed, rehabilitated, renovated industrial zones;</li> <li>• Compliance with the Fund’s objectives and other strategic documents. It is a key prerequisite that the supported Urban Projects also contribute to the achievement of the specific and overall Fund’s objectives, which are in line with the Fund priorities;</li> <li>• Being part of Integrated Plan/Municipal Plan for Development and other local strategies. According to the provisions laid down in the OPRD and taking into account that this is one of the key requirements of JESSICA instrument, it is essential the interventions implemented in the project to be included in spatial planning, namely Master Plans, Municipal Development Plans and/or District Development Plan;</li> <li>• Maturity of the Urban Projects. The Fund will prioritise Projects with completed feasibility studies, work design, economic analysis and financial model. This approach is based on the timing requirement with respect to preparation of the entire set of documents needed for Project submission and implementation;</li> <li>• Revenue generation. All selected Projects need to generate revenue in order to recover the investments provided. In addition, these shall have the capacity to raise financing for future Projects;</li> <li>• Financial covenants. In the process of analysing the Projects, the following basic financial parameters shall be used – normal equity IRR, normal debt IRR, debt service coverage ratio, debt equity ratio, debt / EBITDA ratio, etc.;</li> <li>• Profitability. The projected profitability of Projects without Fund’s support is expected to be lower than normally required by the market so that with typical forms of financing the Projects could not have been realized.</li> </ul>
<p><b>Procedure to obtain the fund</b></p>	<p>Project preparation support including:</p> <ul style="list-style-type: none"> <li>• Upstream project screening to assess their viability and suitability for EU grant finance;</li> <li>• Project development from pre-feasibility and feasibility stages through to final grant application;</li> <li>• Pre-feasibility: comments and guidance on master plans; assistance in developing project concepts vis-à-vis EU regulations and in the</li> </ul>



- preparation of the ToR for the beneficiary to select consultants;
  - Feasibility stage: methodological review of the feasibility study and recommendations for adjustment; review of intermediate and final deliverables and recommendations for improvement;
- Application stage: review of the draft application form and the annexes before submission to DG Regional and Urban Policy.

Table 39: JEREMIE fund

Acronym	Description
<b>Program</b>	<b>JEREMIE (Joint European Resources for Micro to Medium Enterprises)</b>
<b>Kinds of available funds</b>	<p>The JEREMIE Holding Fund can provide SME-focused financial instruments including:</p> <ul style="list-style-type: none"> <li>guarantees, co-guarantees and counter-guarantees, equity guarantees;</li> <li>(micro) loans;</li> <li>securitisation;</li> <li>venture capital;</li> <li>Business Angel Matching Funds;</li> <li>investments in Technology Transfer funds to Financial Intermediaries.</li> </ul> <p>These Financial Intermediaries provide SMEs (the final beneficiaries) with loans and equity participation. JEREMIE will not provide any grants to SMEs.</p>
<b>Financial plan</b>	<ul style="list-style-type: none"> <li>At the end of 2015, EIF managed 13 JEREMIE holding funds for a total of EUR 1.1bn, involving 50 financial intermediaries and resulting in 84 transactions;</li> <li>In the course of 2015, additional commitments were made to the holding funds in Romania (EUR 75m) and Slovakia (EUR 40m) with the implementation period of the financial instruments being extended into 2016;</li> <li>Given the revolving nature of financial instruments, several Member States and regions have entrusted the management of reflows from initial JEREMIE investments to EIF. Accordingly, EIF will redeploy these legacy funds in the respective markets through existing and new financial instruments targeting the support of SME access to finance.</li> </ul>
<b>Funding criteria</b>	<p>The Holding Fund develops an Investment Strategy prior to the signature of a JEREMIE Funding Agreement between the EIF and a national/regional government of a EU Member State. The national/regional counterpart transfers the funds allocated to JEREMIE to a JEREMIE bank account, a call for expression of interest is launched and Financial Intermediaries are selected based on a due diligence process. The decision is taken with the involvement of the Investment Board.</p>
<b>Objectives</b>	<p>JEREMIE, a joint initiative of the EC, the European Investment Fund (EIF) and the EIB, promotes the use of financial engineering instruments to improve access to credit for SMEs through the Structural funds.</p> <p>The JEREMIE objectives are manifold and include:</p> <ul style="list-style-type: none"> <li>the creation of new businesses;</li> <li>the expansion of existing ones;</li> <li>access to investment capital to modernize its operations;</li> <li>the technological upgrading of production facilities.</li> </ul> <p>JEREMIE offered EU Member States, through their national or regional Managing Authorities, the opportunity to use part of their EU Structural Funds to finance SMEs in a more efficient and sustainable way.</p> <p>To continue to support SMEs and Managing Authorities, EIF is proposing to extend existing JEREMIE agreements.</p>

<b>Kind of assistance</b>	<p>The initiative is aimed to financial intermediaries and not directly to SMEs. Selected investments must generate returns that can both repay investors, both to allow reinvestment in the business, so that a budget can be used several times, fueling virtuous cycles of public funds. In addition, this also allows you to mobilize the financial sector, increasing the resources used to provide assistance to a larger number of projects.</p> <p>These funds can be used to finance:</p> <ul style="list-style-type: none"> <li>• the creation of new businesses or expanding existing ones;</li> <li>• access to invest capital for businesses (especially SMEs) in order to modernize and diversify their activities, develop new products, secure and expand market access;</li> <li>• Research and development oriented companies, technology transfer, innovation and entrepreneurship;</li> <li>• technological modernization of production structures in order to achieve the objectives of low-carbon economies;</li> <li>• productive investments which create and safeguard sustainable jobs.</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>• Sustainability: financial engineering instruments are based on the provision of repayable assistance from the structural funds to investments which should generate returns and pay back to investors. This is a more sustainable alternative than the traditional support through allocation of funds;</li> <li>• Leverage: combining structural funds with other existing funding sources, JEREMIE increases the resources that can be used to provide assistance to a larger number of projects;</li> <li>• Flexibility: JEREMIE offers flexibility, both in terms of structures and use of funds that may be granted in the form of shares, debt securities or guarantees, according to the specific needs of different countries and different regions;</li> <li>• Skills: JEREMIE allows managing authorities of structural funds, cities and municipalities to interact with the private sector and banking. This encourages investment and technical and financial capacity of implementation and project management;</li> <li>• Partnerships: JEREMIE is the result of a partnership between the Commission, the EIB and the CEB. It acts as a important catalyst for initiating partnerships between countries, regions, cities, EIB, CEB, other banks, investors, etc., in order to address the problems affecting urban areas.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• SMEs;</li> <li>• Banks;</li> <li>• Investment Funds.</li> </ul>
<b>Criteria of eligibility</b>	<p>The following selection criteria shall be applicable:</p> <ul style="list-style-type: none"> <li>• Compliance with ORGANIC PROCESS RESEARCH &amp; DEVELOPMENT (OPRD) objectives. Since the financial resources allocated to the Fund are provided by OPRD, it is crucial that all Projects comply with the objectives of its Priority Axis 1 “Sustainable and Integrated Urban Development”;</li> <li>• Contribution to OPRD quantitative outputs. Taking notice of the outputs under OPRD, the Fund will focus on projects that will facilitate the achievement of the target values of OPRD’s Priority Axis 1 – number of projects improving the physical environment, attractiveness of the Cities and risk prevention, number of improved health, educational, cultural and social services facilities, and number of renewed, rehabilitated, renovated industrial zones;</li> <li>• Compliance with the Fund’s objectives and other strategic documents. It is a key prerequisite that the supported Urban Projects also contribute to the achievement of the specific and overall Fund’s objectives and are in line with the Fund priorities;</li> <li>• Being part of Integrated Plan/Municipal Plan for Development and other local strategies. According to the provisions laid down in the OPRD and taking into account that this is one of the key requirements of JESSICA instrument, it is essential the interventions implemented in</li> </ul>

	<p>the project to be included in spatial planning, namely Master Plans, Municipal Development Plans and / or District Development Plan;</p> <ul style="list-style-type: none"> <li>• Maturity of the Urban Projects. The Fund will prioritise Projects with completed feasibility studies and work design, economic analysis and financial model. This approach is based on the timing requirement with respect to the preparation of the entire set of documents needed for Project submission and implementation;</li> <li>• Revenue generation. All selected Projects need to be revenue generating in order to recover the investments provided. In addition, these shall have the capacity to raise financing for future Projects;</li> <li>• Financial covenants. In the process of analysing the Projects, the following basic financial parameters shall be used – normal equity IRR, normal debt IRR, debt service coverage ratio, debt equity ratio, debt / EBITDA ratio, etc.;</li> <li>• Profitability. The projected profitability of Projects without Fund's support is expected to be lower than normally required by the market so that with typical forms of financing the Projects could not have been realized.</li> </ul>
<b>Procedure to obtain the fund</b>	<p>Project preparation support including:</p> <ul style="list-style-type: none"> <li>• Upstream project screening to assess their viability and suitability for EU grant finance;</li> <li>• Project development from pre-feasibility and feasibility stages through to final grant application;</li> <li>• Pre-feasibility: comments and guidance on master plans; assistance in developing project concepts vis-à-vis EU regulations and in the preparation of the ToR for the beneficiary to select consultants;</li> <li>• Feasibility stage: methodological review of the feasibility study and recommendations for adjustment; review of intermediate and final deliverables and recommendations for improvement;</li> <li>• Application stage: review of the draft application form and the annexes before submission to DG Regional and Urban Policy.</li> </ul>


Table 40: JASPERS fund

Acronym	Description
<b>Program</b>	 <p><b>JASPERS (Joint Assistance to Support Projects in European Regions)</b></p>
<b>Kinds of available funds</b>	Grants
<b>Financial plan</b>	JASPERS focuses on large projects with total costs exceeding EUR 50 million (except transport) for environmental projects and EUR 75 million for transport or other sectors. However, there is flexibility about these thresholds in the case of small countries or where projects serve as pilot actions to establish best practice.
<b>Objectives</b>	<p>JASPERS is a technical assistance partnership managed by the EIB and co-sponsored by the European Commission (DG Regional and Urban Policy) and the European Bank for Reconstruction and Development (EBRD).</p> <p>It is an important instrument of the EU Cohesion Policy created for the twelve EU countries, which joined the EU in 2004 and 2007. It offers Member States the support they need to prepare high quality major projects, which will be co-financed by EU funds.</p>

<p><b>Kind of assistance</b></p>	<p>JASPERS' assistance may cover:</p> <ul style="list-style-type: none"> <li>• Project preparation support, from identification to submission of the request for EU grant finance;</li> <li>• Independent Quality Review of projects;</li> <li>• Post-submission appraisal function for all major projects submitted directly to the EU Commission;</li> <li>• Horizontal assignments and strategic support;</li> <li>• Capacity building, including a Competence Centre;</li> <li>• Implementation support;</li> <li>• Connecting Europe Facility projects, mainly in the rail and road sectors;</li> <li>• European Investment Advisory Hub (EIAH) through the screening and handling of requests</li> </ul>
<p><b>Opportunities</b></p>	<p>JASPERS targets assistance on infrastructure projects, which are, defined as 'major' projects in the Common provisions Regulation - for example, roads, rail, water, waste, energy and urban transport projects. In the case of small countries where there will not be many projects of this size, JASPERS concentrates on the largest projects. Potential beneficiaries should contact the Managing Authority responsible for coordinating EU Structural Funds in their country for information.</p>
<p><b>Beneficiaries</b></p>	<ul style="list-style-type: none"> <li>• 16 EU Member States (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, France, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia);</li> <li>• Three Accession countries (the Former Yugoslav Republic of Macedonia, Montenegro and Serbia);</li> <li>• Local, regional, national authorities or other entities with public interest.</li> </ul> <p>JASPERS' project preparation support may be made available to other EU countries benefitting from EU Structural and Cohesion Funds, if there is demand and resources made available.</p>
<p><b>Criteria of eligibility</b></p>	<ul style="list-style-type: none"> <li>• Up to 100% of eligible support;</li> <li>• JASPERS' advisory support may be extended to other Member States who request it, depending on the availability of additional resources and with the agreement of JASPERS' Steering Committee. Priority will be given to less developed and transitional regions;</li> <li>• JASPERS project preparation support is also available for countries receiving assistance from IPA (Instrument for Pre-Accession Assistance);</li> <li>• JASPERS' assistance is not limited to individual projects, but is also available for horizontal assignments that cover more than one country, sector, project;</li> <li>• JASPERS' support at IQR level is accessible to all countries having projects eligible to EU Cohesion Policy;</li> <li>• The JASPERS Networking Platform is open to relevant authorities from all EU Member States (EU 28), as well as pre-accession Countries.</li> </ul>
<p><b>Procedure to obtain the fund</b></p>	<p>Project preparation support including:</p> <ul style="list-style-type: none"> <li>• Upstream project screening to assess their viability and suitability for EU grant finance;</li> <li>• Project development from pre-feasibility and feasibility stages through to final grant application;</li> <li>• Pre-feasibility: comments and guidance on master plans; assistance in developing project concepts vis-à-vis EU regulations and in the preparation of the ToR for the beneficiary to select consultants;</li> <li>• Feasibility stage: methodological review of the feasibility study and recommendations for adjustment; review of intermediate and final deliverables and recommendations for improvement;</li> <li>• Application stage: review of the draft application form and the annexes before submission to DG Regional and Urban Policy.</li> </ul>



Table 41: Marguerite fund


Acronym	Description
<b>Program</b>	 <b>Marguerite fund</b> <b>Marguerite</b>
<b>Kinds of available funds</b>	Grants
<b>Financial plan</b>	<p>The target volume of the Fund is EUR 1.5 billion, of which the six Core Sponsors have contributed EUR 600 million in equal portions at the beginning of an initial closing period which started on December 3, 2009 and ended March 3, 2010. During this initial closing, a number of additional investors have joined the Fund: the Bank of Valletta, the Caixa Geral de Depósitos and the European Commission. This brings total initial close commitments to over EUR 700 million. In subsequent fund-raising rounds, other institutional investors, both private and public may join the fund.</p> <p>In parallel to the equity commitment, the Core Sponsors and other institutions have also established a EUR 5 billion debt financing initiative, so that, in addition to the equity investment made by the Fund, these projects could in principle also be supported with debt capital at the level of the individual projects.</p> <p>The Fund will target that at least 65% of the Fund are invested in greenfield projects.</p> <p>The idea is to have a balanced portfolio, in terms of both geographical and sectorial distribution:</p> <ul style="list-style-type: none"> <li>• No more than 20% of the Total Commitments should be invested in investments located in one single EU country;</li> <li>• The fund should be invested in Transport Sectors for 30% to 40%, in the Energy Sector for 25%-35% and in the Renewable Energies Sectors for 35%-45% of the Total Commitments.</li> </ul>
<b>Objectives</b>	<p>The Marguerite Fund (2020 European Fund for Energy, Climate Change and Infrastructure) is a pan-European equity fund that acts as a catalyst for key investments in renewables, energy and transport.</p> <p>It combines a market-based principle of return to investors with the pursuit of public policy objectives. Launched in 2010, with the backing of six major European financial institutions (namely the EIB, Caisse des Dépôts et Consignations, Cassa Depositi e Prestiti, Instituto de Crédito Oficial, Kreditanstalt für Wiederaufbau, PKO Bank Polski), it makes capital-intensive infrastructure investments.</p>
<b>Kind of assistance</b>	<p>The Fund should serve as a model for the establishment of other similar funds in the EU wishing to combine a market-based principle of return to investors with the pursuit of public policy objectives.</p>
<b>Focus areas</b>	<ul style="list-style-type: none"> <li>• Transport;</li> <li>• Energy;</li> <li>• Environment;</li> <li>• Economy – Finances.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Local and Regional authorities;</li> <li>• Corporations;</li> <li>• Administrations States;</li> <li>• Agencies Chambers;</li> <li>• SMEs;</li> <li>• Banks;</li> <li>• Investment Funds.</li> </ul>

<p><b>Criteria of eligibility</b></p>	<ul style="list-style-type: none"> <li>• There are no restrictions to the admission of new investors (exception: no natural persons), although investors are expected to have adequate solvency and a long-term investor philosophy;</li> <li>• The minimum amount that an investor in Marguerite has to invest in equity to be a member is equal to EUR 20 million;</li> <li>• Promoters do not have to be European, but the investments have to be located in EU 27.</li> </ul> <p>The Marguerite fund will be consistent with the specificities of Long Term Investment on several points:</p> <ul style="list-style-type: none"> <li>• on the governance: good balance between the interests of the investors and the autonomy of the advisory team;</li> <li>• on the long term perspective of the Fund: stable for 20 years, no Core Sponsor may transfer its shares during a period of 10 years (lock-up period);</li> <li>• on the advisory team’s incentives and remuneration scheme: performance based incentives with a long term perspective;</li> <li>• on the investment objective: the Fund is to focus on infrastructure which is consistent with the EU long-term strategic policies: enhancing transport and energy networks in Europe, mitigating climate change, enhancing energy security;</li> <li>• on the target return: the Fund’s investment objective is to generate a net internal rate of return of 10 to 14% over the life of the fund.</li> </ul>
<p><b>Procedure to obtain the fund</b></p>	<p>Project preparation support including:</p> <ul style="list-style-type: none"> <li>• Upstream project screening to assess their viability and suitability for EU grant finance;</li> <li>• Project development from pre-feasibility and feasibility stages through to final grant application;</li> <li>• Pre-feasibility: comments and guidance on master plans; assistance in developing project concepts vis-à-vis EU regulations and in the preparation of the ToR for the beneficiary to select consultants;</li> <li>• Feasibility stage: methodological review of the feasibility study and recommendations for adjustment; review of intermediate and final deliverables and recommendations for improvement;</li> <li>• Application stage: review of the draft application form and the annexes before submission to DG Regional and Urban Policy.</li> </ul>



## Annex 5: Summary tables on financial institutions instruments

Table 42: European Fund for Strategic Investments (EFSI)

Acronym	Description
Program	 <p><b>European Fund for Strategic Investments (EFSI)</b></p>
Kinds of available funds	Guarantee
Financial plan	<ul style="list-style-type: none"> <li>EFSI should unlock additional investment of at least EUR 315bn over a three years period;</li> <li>EFSI is a EUR 16 billion guarantee from the EU budget, complemented by a EUR 5 billion allocation of the EIB's own capital;</li> <li>EFSI has been integrated into the EIB Group and projects supported by EFSI are subject to the normal EIB project cycle and governance.</li> </ul>
Objectives	EFSI is an initiative launched jointly by the EIB Group - European Investment Bank and European Investment Fund - and the European Commission to help overcome the current investment gap in the EU by mobilising private financing for strategic investments. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around Europe to ensure that money reaches the real economy.
Kind of assistance	<p>With EFSI support, the EIB Group will provide funding for economically viable projects where it adds value, including projects with a higher risk profile than ordinary EIB activities. It will focus on sectors of key importance where the EIB Group has proven expertise and the capacity to deliver a positive impact on the European economy, including:</p> <ul style="list-style-type: none"> <li>Strategic infrastructure including digital, transport and energy</li> <li>Education;</li> <li>Research, development and innovation;</li> <li>Expansion of renewable energy;</li> <li>Resource efficiency Support for smaller businesses and midcap companies.</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>(Digital) Infrastructure development in transport &amp; energy;</li> <li>Renewable energy;</li> <li>Energy efficiency and energy INTERCONNECTIONS;</li> <li>Risk financing for SMEs and midcaps;</li> <li>Education;</li> <li>Health;</li> <li>Environment and natural resources.</li> </ul>
Beneficiaries	<ul style="list-style-type: none"> <li>EU-28 +AL, IS, IL, FYROM, ME, RS TR, NO, CH, KS;</li> <li>Public sector;</li> <li>Entities of all sizes, including utilities, special purpose vehicles or project companies, SMEs (up to 250 employees), midcaps (up to 3.000 employees);</li> <li>National promotional banks or others intermediate banks;</li> <li>Funds and any other form of collective investment vehicles, Investment platforms.</li> </ul>

<b>Criteria of eligibility</b>	<p>No restriction on the eligible project size, however, to benefit from EFSI support need to go through the standard EIB due diligence as well as an assessment by the EFSI Investment Committee to decide whether they are eligible for backing under the EU guarantee.</p> <p>In particular, projects need to be:</p> <ul style="list-style-type: none"> <li>• Economically and technically sound;</li> <li>• Match the eligible sectors;</li> <li>• Contributing to EU objectives and to sustainable growth and employment;</li> <li>• Mature enough to be bankable;</li> <li>• Priced in a manner commensurate with the risk taken;</li> </ul>
<b>Procedure to obtain the fund</b>	<p>Project promoters should follow the usual EIB loan application procedures. SMEs and Midcaps interested in EFSI transactions financed via the EIF should refer to information on EIF financial intermediaries.</p> <p>Financial institutions seeking to apply for EFSI resources should refer to the EIF directly.</p>

Table 43: EIB Municipal Framework Loans

Acronym	Description
<b>Program</b>	<b>EIB Municipal Framework Loans</b>
<b>Kinds of available funds</b>	Loans
<b>Financial plan</b>	< €50 million
<b>Objectives</b>	The proposed framework loan is directed at financing sub-projects of limited scale in the fields of urban renewal and rehabilitation including communal infrastructure, public utilities, local roads, social housing and related community facilities.
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Local/regional authorities &gt; 75,000 inhabitant;</li> <li>• EU-28 &amp; other countries (e.g. TR, ME, UA).</li> </ul>
<b>Criteria of eligibility</b>	<p>Loan for a programme of investments (3-5 years), not completely prepared at the time of signing.</p> <p>The EIB finances projects in most sectors. To be eligible, projects must contribute to EU economic policy objectives, such as:</p> <ul style="list-style-type: none"> <li>• Urban roads and public transport;</li> <li>• Water and sewerage;</li> <li>• Solid waste;</li> <li>• Education;</li> <li>• Health facilities;</li> <li>• Social housing;</li> <li>• Public buildings;</li> <li>• Energy (e.g. EE in public buildings);</li> <li>• Cultural and sports facilities.</li> </ul>
<b>Procedure to obtain the fund</b>	<p>No special formalities are involved for the submission of applications to the EIB for individual loans. Project promoters are required simply to provide the Bank's Operations Directorate with a detailed description of their capital investment together with the prospective financing arrangements.</p> <p>Initial contacts to discuss a proposed project can be in any form, by telephone, fax, e-mail or letter. The project promoter should provide sufficient information to allow the EIB to assess whether the project adheres to EIB lending objectives and has a well-developed business plan.</p>

**Special Case:** Projects under EUR 25 million.

For projects where the total cost is under EUR 25 million, the EIB provides intermediated loans (credit lines) to local, regional and national banks.

The lending decision for EIB loans via credit lines remains with the financial intermediary. Promoters interested in EIB financing for projects under EUR 25 million should contact the banks and other intermediaries involved directly with a detailed description of their capital investment together with the prospective financing arrangements.

The EIB also provides direct loans for midcap companies (with up to 3.000 employees) where the loan volume requested is between EUR 7.5m and EUR 25m.

Table 44: DEEP GREEN Initiative

Acronym	Description
<b>Program</b>	<b>(DEEP GREEN initiative) PF4EE instrument</b>
<b>Kinds of available funds</b>	Loans
<b>Financial plan</b>	In the PF4EE (between local bank and e.g. local authority): <€5 million
<b>Funding criteria</b>	<ul style="list-style-type: none"> <li>• Maximum amount EUR 5 million and maximum tenor 20 years;</li> <li>• Fixed repayment schedule (no revolving loan), with a capped grace period.</li> </ul>
<b>Objectives</b>	<p>The purpose of the PF4EE Instrument is to provide access to adequate and affordable commercial financing for Eligible EE Investments targeted by schemes developed by Participating Countries to implement their National Energy Efficiency Action Plans (“NEEAPs”) or other programmes in line with EU Directives relating to Energy Efficiency.</p> <p>The two main objectives of the PF4EE Instrument are:</p> <ul style="list-style-type: none"> <li>• Making energy efficiency lending a more sustainable activity across European financial institutions by incentivising them to address the energy efficiency sector as a distinct market segment;</li> <li>• Increasing the availability of debt financing to Eligible EE Investments.</li> </ul>
<b>Kind of assistance</b>	<ul style="list-style-type: none"> <li>• Expert support to be provided would be defined individually for each Financial Intermediary, but with three objectives:                             <ul style="list-style-type: none"> <li>– ensuring the actual lending to Eligible EE Investments within the framework of the PF4EE Instrument takes place;</li> <li>– developing capacity to make energy efficiency lending sustainable within the concerned Financial Intermediary;</li> <li>– guaranteeing the correct reporting of the impact of the EE Investments supported by the PF4EE Instrument.</li> </ul> </li> <li>• The technical assistance will cover the following areas:                             <ul style="list-style-type: none"> <li>– Staff training on energy efficiency;</li> <li>– Development of energy efficiency products;</li> <li>– EE Loans portfolio development;</li> <li>– Appraisal of energy efficiency investments;</li> <li>– Risk analysis of individual projects and programmes;</li> <li>– Reporting on energy savings and CO2 emissions;</li> <li>– Energy audits.</li> </ul> </li> </ul>

<p><b>Opportunities</b></p>	<ul style="list-style-type: none"> <li>• Public/private building stocks;</li> <li>• Public lighting, district heating and cooling networks;</li> <li>• Urban transport (fleets, e-mobility, modal changes) in urban/sub-urban agglomerations;</li> <li>• Energy efficiency (investments in RES are eligible in combination with EE gains).</li> </ul>
<p><b>Beneficiaries</b></p>	<ul style="list-style-type: none"> <li>• Currently, only the PF4EE is operational and only in ES, CZ, and FR;</li> <li>• Local/regional authorities and public bodies;</li> <li>• Banks (Private Finance for Energy Efficiency, PF4EE);</li> <li>• ESCOs;</li> <li>• Utilities.</li> </ul>
<p><b>Criteria of eligibility</b></p>	<ul style="list-style-type: none"> <li>• Banks             <ul style="list-style-type: none"> <li>– Private sector financial institutions or public sector institutions that operate on market terms;</li> <li>– Sound financial standing and robust credit assessment systems.</li> </ul> </li> <li>• Investments             <ul style="list-style-type: none"> <li>– In line with Member State EE priorities;</li> <li>– In line with EU Directives;</li> <li>– In line with EIB EE eligibility criteria;</li> <li>– Eligible under an EE programme/scheme.</li> </ul> </li> <li>• Beneficiaries             <ul style="list-style-type: none"> <li>– Final Recipients targeted by Participating Countries’ NEEAP;</li> <li>– They may include natural persons, home-owner associations, enterprises, public institutions/bodies and any other legal entities undertaking Eligible EE Investments.</li> </ul> </li> </ul> <p>Financial institutions participating in the implementation of the PF4EE Instrument will be required, as a minimum, to comply with the following criteria:</p> <ul style="list-style-type: none"> <li>• to be duly authorised to carry out lending or leasing activities according to the applicable legislation and be established and operating in a Participating Country;</li> <li>• to demonstrate operational capacity to manage the PF4EE Instrument;</li> <li>• to demonstrate capacity to reach Final Recipients targeted by the relevant NEEAP priority and/or energy efficiency support scheme and/or EU Directives relating to energy efficiency within the Participating Country concerned;</li> <li>• to have sound financial standing with a stable long-term outlook;</li> <li>• to have robust credit risk assessment and rating policies, procedures and systems;</li> <li>• to be acceptable as an EIB counterparty in accordance with EIB’s internal policies;</li> <li>• to comply with relevant standards and applicable legislation on the prevention of money laundering, the fight against terrorism and tax fraud to which they may be subjected and shall not be established;</li> <li>• shall not maintain business relations with entities incorporated in any Non-Cooperating Jurisdiction.</li> </ul>

Table 45: European Energy Efficiency Fund

Acronym	Description	
Program		European Energy Efficiency Fund (EEEF)

<b>Kinds of available funds</b>	Loans, guarantees (forfeiting structure) and equity. Bankable projects. No grants.
<b>Financial plan</b>	<p>Between €5-25 million (smaller project size is possible, reviewed case by case)</p> <p><b>EEEEF capital</b></p> <ul style="list-style-type: none"> <li>• Initial capital of euro 265 M: <ul style="list-style-type: none"> <li>– European Commission: 125 M (initiator);</li> <li>– European Investment Bank: 75 M (founding investor);</li> <li>– Cassa Depositi e Prestiti: 60 M (founding investor);</li> <li>– Deutsche Bank: 5 M (investor and investment advisor);</li> <li>– Technical Assistance (TA) facility of EUR 20m provided by the European Commission</li> </ul> </li> </ul>
<b>Objectives</b>	<p>The European Energy Efficiency Fund (EEEEF) is an innovative public-private partnership dedicated to mitigating climate change through energy efficiency measures and the use of renewable energy in the member states of the European Union. It focuses on financing energy efficiency, small-scale renewable energy, and clean urban transport projects (at market rates) targeting municipal, local and regional authorities and public and private entities acting on behalf of those authorities.</p>
<b>Focus areas</b>	<p>Investments split into three project categories:</p> <ul style="list-style-type: none"> <li>• Energy Efficiency;</li> <li>• Renewable energy;</li> <li>• Clean Urban transport (all projects need to have a municipal commitment, such as in the Covenant of Mayors).</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• EU28;</li> <li>• Local regional authorities;</li> <li>• Public and private entities acting on their behalf (i.e. utilities, public transportation providers, social housing associations).</li> </ul>
<b>Criteria of eligibility</b>	<ul style="list-style-type: none"> <li>• Long maturity: flexible, up to 20 years for debt</li> <li>• Technical Assistance (TA): euro 20 M in total grant for project development phase, up to 90% of eligible costs. Linked with EEEF funding. Based on ELENA model.</li> <li>• Fast &amp; flexible procedures: no more than 6 months from pre-screening until financing</li> </ul> <p>Several eligibility criteria must be met:</p> <ul style="list-style-type: none"> <li>• General eligibility criteria such as: <ul style="list-style-type: none"> <li>– Municipal link;</li> <li>– Commitment of municipality to mitigate climate change (i.e. Covenant of Mayors initiative);</li> <li>– CO<sub>2</sub> emission savings of at least 20%;</li> <li>– Use of proven technologies;</li> </ul> </li> <li>• Furthermore, each technology may have its own specific eligibility criteria;</li> <li>• Projects shall be preferably between EUR 5 and 25 m / smaller project sizes reviewed case by case;</li> <li>• Alignment with relevant EU legislation.</li> </ul> <p>To reach its final beneficiaries, EEEF can pursue two types of investments: <b>Direct Investments</b></p> <p>These comprise projects from project developers, energy service companies (ESCOs), small scale renewable energy and energy efficiency service and supply companies that serve energy efficiency and renewable energy markets in the target countries.</p> <ul style="list-style-type: none"> <li>• Investments in energy efficiency and renewable energy projects in the range of €5m to €25m;</li> <li>• Investment instruments include senior debt, mezzanine</li> </ul>

	<p>instruments, leasing structures and forfeiting loans (in cooperation with industry partners);</p> <ul style="list-style-type: none"> <li>• Also possible are equity (co-)investments for renewable energy over the lifetime of projects or equity participation in special purpose vehicles, both in cooperation directly with municipalities, or with public and private entities acting on behalf of those authorities;</li> <li>• Debt investments can have a maturity of up to 15 years, equity investments can be adapted to the needs of various project phase;</li> <li>• The Fund can (co-)invest as part of a consortium and participate through risk sharing with a local bank.</li> </ul> <p><b>Investments into Financial Institutions</b></p> <p>These include investments in local commercial banks, leasing companies and other selected financial institutions that either finance or are committed to financing projects of the Final Beneficiaries meeting the eligibility criteria of EEEF.</p> <p>Selected partner financial institutions will receive debt instruments with a maturity of up to 15 years. These instruments include:</p> <ul style="list-style-type: none"> <li>• senior debt;</li> <li>• subordinated debt;</li> <li>• guarantees;</li> <li>• No equity investments in financial institutions;</li> <li>• Financial institutions onlend to the beneficiaries of the Fund meeting the eligibility criteria to finance energy efficiency and/or renewable energy projects.</li> </ul>
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Table 46: Integrated Territorial Investments (ITI)

Acronym	Description
<b>Program</b>	<b>Integrated Territorial Investments (ITI)</b>
<b>Kinds of available funds</b>	Grants, repayable assistance as well as financial instruments
<b>Financial plan</b>	N/A
<b>Funding criteria</b>	Depending on ESI funds and regions, but blending with local/regional/national other sources of funding is encouraged.
<b>Objective</b>	<p>Integrated territorial investments (ITI) allow EU Member States to combine investments from several priority axes of one or more Operational Programmes for the purposes of multi-dimensional and cross-sectorial intervention. The ability to trace the allocation of funds to the various investment priorities will however still be retained.</p> <p>As integrated territorial strategies are vital for the achievement of the smart, sustainable and inclusive Europe envisaged by the Europe 2020 Strategy, the Common Provisions Regulation introduces ITI as a key instrument for implementing such strategies. ITI provides a flexible mechanism for formulating integrated responses to diverse territorial needs, without losing the thematic focus through which cohesion policy is linked to the Europe 2020 Strategy.</p> <p>The key elements of an ITI are:</p> <ul style="list-style-type: none"> <li>• a designated territory and an integrated territorial development strategy;</li> <li>• a package of actions to be implemented;</li> <li>• governance arrangements to manage the ITI.</li> </ul>

<b>Focus areas</b>	<ul style="list-style-type: none"> <li>• Institutional capacity (multi-level governance, partnership building with local actors, monitoring and evaluation capacity);</li> <li>• Low carbon economy;</li> <li>• Climate change adaptation and risk prevention and management;</li> <li>• Environment protection and resource efficiency;</li> <li>• Sustainable transport.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>• Local and regional authorities;</li> <li>• Regional development bodies;</li> <li>• NGOs (cities, sub-regional and local bodies should at least have a substantial responsibility in the ITI);</li> <li>• BG, HR, CY, CZ, EE, EL, HU, LV, LT, MT, PL, PT, RO, SK and SL.</li> </ul>
<b>Criteria of eligibility</b>	<ul style="list-style-type: none"> <li>• Member States can predefine the priority types of urban areas that they consider should be eligible for ITIs.</li> <li>• They can allow all urban areas to be eligible, but define a list of selection criteria concerning the type of area, the quality of the strategy, and the quality of the partnership.</li> <li>• The appropriate geographical scale and the definition of the boundaries of intervention should correspond to the nature of the problem and strategy for dealing with it.</li> </ul>

Table 47: Urban Development Fund (UDF)

<b>Acronym</b>	<b>Description</b>
<b>Program</b>	<b>Urban Development Fund (UDF)</b>
<b>Kinds of available funds</b>	Financial instrument (revolving fund), which provides mainly loans, but also (quasi-) equity and guarantees.
<b>Financial plan</b>	<ul style="list-style-type: none"> <li>• Revolving UDF's can vary in mechanism and size, depending on the geographic basis and investment focus;</li> <li>• Co-financing and co-investment (from private-sector) is a requirement to access the ERDF resources from the OP. Different levels of co-financing at UDF-level or final beneficiary level (project level).</li> </ul>
<b>Objectives</b>	<p>It is possible for financial instruments to operate across all European Structural Funds sources and thematic priorities in the 2014-2020 programming period. An example of the type of financial instrument that could be developed is the Urban Development Fund (UDF). The UDF can invest in public-private partnerships and other integrated projects for sustainable urban development.</p> <p>The mode of action of the Urban Development Fund may be of various types:</p> <ul style="list-style-type: none"> <li>• Loans to individuals or SPV;</li> <li>• Investment in SPV;</li> <li>• Loans to local authorities.</li> </ul> <p>Moreover, the Urban Development Fund:</p> <ul style="list-style-type: none"> <li>• identifies the types of projects to be included in the project portfolio in accordance with the investment strategy defined by the Managing Authority;</li> <li>• deals with the analysis and management of procedural and authorization procedures and interaction with public private parties;</li> <li>• manages the pension expectations of the various stakeholders involved in the project;</li> <li>• puts in place the control and monitoring tools that include checks of documentation, reporting, monitoring visits and audit reports;</li> </ul>

	<ul style="list-style-type: none"> <li>invests resources in Urban Projects the features/eligibility of which are in line with JESSICA initiative</li> </ul>
<b>Focus areas</b>	<ul style="list-style-type: none"> <li>Urban infrastructure, transport, water/waste water, energy, etc.;</li> <li>Heritage or cultural sites, for tourism or other sustainable uses;</li> <li>Redevelopment of brownfield sites;</li> <li>Office space for SMEs, IT and/or R&amp;D sectors;</li> <li>University buildings, including medical, biotech and other specialised facilities and energy efficiency improvements.</li> </ul>
<b>Beneficiaries</b>	<ul style="list-style-type: none"> <li>Public authorities (local and regional authorities);</li> <li>Commercial financial institutions;</li> <li>Public agencies;</li> <li>Investment fund holders;</li> <li>Property developers;</li> <li>NGOs.</li> </ul>
<b>Criteria of eligibility</b>	<p>To be eligible for JESSICA funding, the UDF will need to demonstrate, amongst other things:</p> <ul style="list-style-type: none"> <li>sufficient competence and independence of management;</li> <li>a comprehensive business plan and budgets for undertaking qualifying projects;</li> <li>sound financial backing.</li> </ul> <p>A UDF can be a separate legal entity or be established as a "separate block of finance" within an existing financial institution. In such cases, JESSICA funds need to be separately accounted for and clearly segregated from the other assets of that financial institution.</p> <p>UDFs can be established at either a national, regional or local/city level in response to integrated urban development plans, project pipelines and investor interests.</p>



## Annex 6: Summary tables on stakeholder and citizen engagement in REMOURBAN cities

Table 48: Local stakeholder engagement in Nottingham – WHO?

Target	ICT	Energy	Mobility
William Booth	✓	✓	✓
St Stephen	✓	✓	✓
Green Theme Partnership	✓	✓	✓
Carbon Action News East Mids		✓	✓
Clean Tech Network		✓	✓

Table 49: Local stakeholder engagement in Valladolid – WHO?

Target	ICT	Energy	Mobility
Software developers association	✓	✓	✓
Professional audiences	✓	✓	✓
Trade Associations	✓		✓
Investors	✓	✓	✓
University Centre (lectures)	✓	✓	✓
Entrepreneurs	✓	✓	✓

Table 50: Local stakeholder engagement in Tepebasi – WHO?

Target	ICT	Energy	Mobility
Chambers of Commerce		✓	
Professional Engineers' Associations	✓	✓	✓
Fellow municipalities of Eskişehir			✓
Academia in Eskişehir	✓	✓	✓
Construction companies		✓	
Tenants		✓	

Table 51: Local stakeholder engagement plan in Seraing – WHO?

Target	ICT	Energy	Mobility
ERIGES – autonomous municipal company	✓	✓	✓
Civil servants of the city	✓	✓	✓
Sustainable development committee of Seraing members	✓	✓	✓
Neighbourhood committees	✓	✓	✓
Local companies/SMEs	✓	✓	✓
Local schools			
Local associations			
Energy, mobility and environment advisers - city of Seraing	✓	✓	✓
Local police			✓
Public social assistance center (energy desk)		✓	
Managers of social housing	✓	✓	
Technical offices (facility management) – city of Seraing	✓	✓	

Table 52: Local stakeholder engagement plan in Miskolc – WHO?

Target	ICT	Energy	Mobility
NOHAC – North Hungarian Automotive Cluster			✓
BOKIK – Chamber of Commerce and Industry of Borsod-Abaúj-Zemplén County	✓	✓	✓
IT cluster – regional cluster of IT companies	✓		
EMÁSZ – regional electricity service provider	✓	✓	
Bay Zoltán Nonprofit Ltd. Smart Systems Division	✓	✓	✓
University of Miskolc	✓	✓	✓
ÉMI Non-Profit Llc.– pertaining to building affairs; quality control; innovation		✓	✓
Municipality of Miskolc		✓	✓
Heads of relevant departments and thematic experts (Mayor's Office)	✓	✓	✓
Lechner Tudásközpont / Lechner Knowledge Center		✓	✓
MVK Zrt. / Miskolc local public transport service provider		✓	
MIHŐ Kft. / local district heating service provider		✓	
MIK Zrt. / local real estate management company / building affairs; quality control; innovation			

Table 53: Local communication targets in Nottingham and Valladolid – WHO?

Nottingham		Valladolid	
City level	Intervention area	City level	Intervention area
Meadows Ozone Energy Services (MOZES) Partnership Council	Renewal Trust STOP TRA Muslim Community Organisation Friends of Green's Mill Friends of Windmill park St Stephan's Church Alchemy Group Newark Crescent Women's Group	Joint Service Centres Trade Associations NGOs Neighbourhood Associations University Centre (students)	Owners' committee / assembly Taxi drivers Bus drivers

Table 54: Local communication targets in Tepebasi, Seraing and Miskolc – WHO?

Tepebasi		Seraing		Miskolc	
City level	Intervention area	City level	Intervention area	City level	Intervention area
Public Houses Tepebaşı Municipality Youth Centres (Volunteers for REMOURBAN)	Tenants'/Owners' committee/assembly	Citizens Neighbourhood committees of Seraing (13) Associations of shopkeepers Local associations (environment, cultural, social, education...) Local sports clubs Local business parks (SMEs): science business park, Boverie, Troque... Local industries Cultural center of Seraing Primary and secondary schools Civil servants of the new administrative town hall	Social buildings tenants Social buildings managers Technical and management staff of hospital Visitors at hospital 'bois de l'abbaye' Managers & Users of the sports hall and swimming pool Other citizens of the neighbourhood Children and teachers of primary schools (Ecole La Glandée Ecole les Bouleaux) and secondary school (athénée royal Air pur Seraing) Neighbourhood committee of 'bois de l'abbaye' (however currently reorganizing) Users of the neighbouring forest (walkers, joggers, horse riders...) Local shops (although very few): Florist, sandwich shop, chocolate shop, pharmacy, funerary; hairdresser, interior decoration shop, 2 bakeries, 1 restaurants and few cafes)	RECIK – regional civilian center foundation Home maintenance, Local housing association Dialog Egyesület / Dialog association Észak-Kelet Átjáró Kulturális és Tudományos Egyesület / North-East Passage Culture and Scientific Association Social and health care service providers	Civil society (city-wide area) Civil society (city-wide area) Civil society/district (intervention area) Civil society/district (intervention area) Society/other (city wide area; intervention area)



Table 55: D&amp;C tools of each REMOURBAN city – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
Websites Local Papers Local Radio Social Media Outdoor advertising Stay Connected – email service	Twitter <u><a href="#">@AyuntamientoVLL</a></u> <u><a href="#">@INNOLID</a></u> <u><a href="#">@VIVAvalladolid</a></u> Facebook Valladolid City Council VLDAdeLante VIVAvalladolid YouTube INNOLID Citizen Participation Portal 6 LED video screens AD campaigns Websites City events Green Vehicle & Fuel Congress Housing Fair Fair of Restoration and Heritage Management Newspapers and blogs	Public Houses (Neighbourhood houses of Tepebaşı Municipality) Tepebaşı Healthy City Council Tepebasi Municipality Youth Centers (Volunteers for REMOURBAN)	City Website Facebook City of Seraing Arebs LinkedIn City of Seraing Arebs Local Radio Panach'FM	Mass media Local TV, local weekly, local radio Outdoor advertising vehicle ads; passenger information LEDs LED walls in 'digital squares' Local websites REMOURBAN mini website; Facebook post and story generation Other offline Newsletters; Open mobile installations Other information material; Poster sessions Street actions (temporal information hubs, flashmobs) Personal: Residential forums School visits

Table 56: REMOURBAN cities e-Newsletters – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>• The Arrow – NCC</li> <li>• NCH tenant newsletter</li> <li>• Our Sneinton</li> </ul>	<ul style="list-style-type: none"> <li>• Newsletter Smart City Valladolid y Palencia</li> <li>• Valladolid Emprende</li> </ul>	<ul style="list-style-type: none"> <li>• Newspaper of Tepebaşı Municipality</li> </ul>	<ul style="list-style-type: none"> <li>• Vlan (Petite Gazette de Seraing) : a local, free newspaper (<a href="http://www.vlan.be/">http://www.vlan.be/</a>)</li> <li>• Cancan (15,000 copies in Seraing, free, all boxes)</li> <li>• 1 or 2 newsletters will be published per year, via “mail chimp” online tool. Probably at spring and/or autumn seasons, but linked to REMOURBAN official NL</li> </ul>	<ul style="list-style-type: none"> <li>• Newsletter (the one from REMOURBAN will be translated to Hungarian)</li> <li>• Newsletter of Miskolc Tourist Information and Marketing Agency, weekly (pdf), mostly (html)</li> </ul>



Table 57: REMOURBAN cities flyers and other D&amp;C tools - HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>• Outdoor Advertising – 7 lamppost banners on Sneinton Dale</li> <li>• Community noticeboards – Community Canters, Parks, Sneinton Market</li> <li>• Various locations for railing banners</li> </ul>	<ul style="list-style-type: none"> <li>• Shelters</li> <li>• Advertising on buses</li> </ul>	<ul style="list-style-type: none"> <li>• Newspaper of Tepebaşı Municipality</li> <li>• Web site of the project within the Tepebaşı Municipality website</li> <li>• Social Media Accounts (facebook and tweeter)</li> <li>• Promotion activities; Billboard, CLP, Brochure vb.</li> <li>• Local Media</li> </ul>	<ul style="list-style-type: none"> <li>• Brochures</li> </ul>	<ul style="list-style-type: none"> <li>• Outdoor advertising <ul style="list-style-type: none"> <li>• vehicle ads</li> <li>• passenger information system LED</li> <li>• LED walls in 4 digital squares in Miskolc</li> </ul> </li> <li>• Street actions (temporal information hubs, flashmobs)</li> <li>• Poster sessions (poster sessions are organized regularly at the City Hall)</li> <li>• Open mobile installations</li> </ul>

Table 58: REMOURBAN cities additional D&amp;C channels

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>• Stay Connected email service</li> <li>• The Arrow</li> <li>• The Nottingham Post</li> <li>• Our Sneinton Newsletter</li> </ul>	<ul style="list-style-type: none"> <li>• Municipal Citizen Office</li> <li>• Citizen Participation Portal</li> <li>• Living Lab</li> </ul>	<ul style="list-style-type: none"> <li>• Blue Desk</li> <li>• Public Houses (Neighbourhood houses of Tepebaşı Municipality)</li> <li>• Municipality youth centre</li> </ul>	<ul style="list-style-type: none"> <li>• Event information website : <a href="http://www.viaseraing.be/">http://www.viaseraing.be/</a></li> <li>• Local blog fed by a citizen : <a href="http://seraing.blogs.sudinfo.be/">http://seraing.blogs.sudinfo.be/</a></li> <li>• Contact network of Arebs at local and distric level</li> <li>• Decentralized townhalls of the city (6) + new administrative building and facility management building</li> </ul>	<ul style="list-style-type: none"> <li>• Open days in service providers (existing smart &amp; green locations)</li> <li>• Discussion forums linked to smart Café events</li> </ul>

Table 59: REMOURBAN cities websites – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>• <a href="http://www.nottinghamcity.gov.uk/">http://www.nottinghamcity.gov.uk/</a></li> <li>• <a href="http://www.nottenergy.com/">http://www.nottenergy.com/</a></li> <li>• <a href="http://www.nottinghamcityhomes.org.uk/">http://www.nottinghamcityhomes.org.uk/</a></li> <li>• <a href="http://www.investinnottingham.com/">http://www.investinnottingham.com/</a></li> <li>• <a href="http://www.growingnottingham.com/">http://www.growingnottingham.com/</a></li> <li>• <a href="http://www.d2n2growthhub.co.uk/">http://www.d2n2growthhub.co.uk/</a></li> <li>• <a href="http://www.onenottingham.org.uk/">http://www.onenottingham.org.uk/</a></li> <li>• <a href="http://sasie.co.uk/">http://sasie.co.uk/</a></li> <li>• <a href="http://www.wegocouriers.co.uk/">http://www.wegocouriers.co.uk/</a></li> <li>• <a href="http://www.sneinton-alchemy.com/">http://www.sneinton-alchemy.com/</a></li> <li>• <a href="http://www.ntu.ac.uk/">http://www.ntu.ac.uk/</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.valladolid.es/es">www.valladolid.es/es</a></li> <li>• <a href="http://www.valladolidadelante.es">www.valladolidadelante.es</a></li> <li>• <a href="http://www.valladolidemprende.es">www.valladolidemprende.es</a></li> <li>• <a href="http://www.smviva.com">www.smviva.com</a></li> </ul>	<ul style="list-style-type: none"> <li>• Tepebaşı Municipality Web page and REMOURBAN Local section in it</li> <li>• Tepebaşı Municipality newspaper</li> <li>• Live Blue Desk</li> </ul>	<ul style="list-style-type: none"> <li>• Website of the city of Seraing</li> <li>• Arebs website</li> </ul>	<p>Local websites</p> <ul style="list-style-type: none"> <li>• <a href="#">REMOURBAN _____ in Hungarian</a></li> <li>• <a href="http://www.miskolcholding.hu/remourban">http://www.miskolcholding.hu/remourban</a></li> <li>• <a href="http://miskolc.hu">miskolc.hu</a></li> <li>• <a href="http://minap.hu">minap.hu</a></li> <li>• <a href="http://mkvzrt.hu">mkvzrt.hu</a></li> </ul>



Table 60: REMOURBAN cities social media channels – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>• <a href="#">My Nottingham</a> and <a href="#">My Dales</a> Facebook pages</li> <li>• Nottingham City Council corporate channel Facebook, Twitter and YouTube</li> <li>• Nottingham City Council neighbourhood channels Dales and St Ann's Facebook and Twitter</li> <li>• NEP Facebook and Twitter</li> <li>• NCH Facebook and Twitter</li> <li>• Nottingham Trent University - @TrentUni</li> </ul>	<ul style="list-style-type: none"> <li>• Valladolid City Council Facebook</li> <li>• VLDAdeante Facebook</li> <li>• VIVAvalladolid Facebook</li> <li>• AyuntamientoVll Twitter</li> <li>• Innolid Twitter</li> <li>• Vivavalladolid Twitter</li> </ul>	<ul style="list-style-type: none"> <li>• Tepebaşı Municipality Web page and REMOURBAN Local section in it</li> <li>• Municipality Facebook</li> <li>• Mayor's Facebook</li> <li>• Municipality Twitter account</li> <li>• Mayor's Twitter account</li> </ul>	<ul style="list-style-type: none"> <li>• City of Seraing Facebook page</li> <li>• Arebs Facebook page</li> <li>• ERIGES Facebook page</li> <li>• LinkedIn groups: the first will be a closed group, dedicated to civil servants only and direct contributors of REMOURBAN project; The second group will be more open. It will be dedicated to any other stakeholders interested by the project and the smart cities issues</li> </ul>	<ul style="list-style-type: none"> <li>• Mayor's page <a href="https://www.facebook.com/kriza.akos.miskolc">https://www.facebook.com/kriza.akos.miskolc</a></li> <li>• Page of Miskolc Public Transportation Plc. <a href="https://www.facebook.com/mvkzrt">https://www.facebook.com/mvkzrt</a></li> <li>• Page of Miskolc Tourist Information and Marketing Agency <a href="https://www.facebook.com&gt;HelloMiskolc">https://www.facebook.com/HelloMiskolc</a></li> <li>• Page of Miskolc Tourist Information and Marketing Agency <a href="https://www.facebook.com/VisitMiskolc">https://www.facebook.com/VisitMiskolc</a></li> <li>• Page of Miskolc Communication Ltd. <a href="https://www.facebook.com/minapmiskolc">https://www.facebook.com/minapmiskolc</a></li> </ul>



Table 61: Local Newspapers, Radio, TV – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<p><b><u>Radio</u></b></p> <ul style="list-style-type: none"> <li>BBC Nottingham</li> <li>Capital FM</li> </ul> <p><b><u>TV</u></b></p> <ul style="list-style-type: none"> <li>BBC East Midlands</li> <li>Notts TV</li> <li>Central</li> </ul> <p><b><u>News and Mags</u></b></p> <ul style="list-style-type: none"> <li>Nottingham Post</li> <li>Nottingham in Focus</li> </ul>	<p><b><u>TV</u></b></p> <ul style="list-style-type: none"> <li>TV Castilla Y León</li> <li>El Alcade Responde</li> </ul> <p><b><u>Local Newspaper</u></b></p> <ul style="list-style-type: none"> <li>El Norte de Castilla</li> </ul>	<p><b><u>Newspapers:</u></b></p> <ul style="list-style-type: none"> <li>Anadolu</li> <li>Eskişehir</li> <li>Eskişehirce</li> <li>İki Eylül</li> <li>İstikbal</li> <li>Midas</li> <li>Milli İrade</li> <li>Sakarya</li> <li>Şehir</li> </ul> <p><b><u>E -newspaper</u></b></p> <ul style="list-style-type: none"> <li>Sonhaber</li> </ul> <p><b><u>Tv channels</u></b></p> <ul style="list-style-type: none"> <li>Es TV</li> <li>Kanal 26</li> </ul>	<p><b><u>Radio</u></b></p> <ul style="list-style-type: none"> <li>Panach'FM</li> </ul> <p><b><u>TV station</u></b></p> <ul style="list-style-type: none"> <li>“RTC Télé-Liège”</li> </ul> <p><b><u>Newspaper</u></b></p> <ul style="list-style-type: none"> <li>“Vlan/Seraing gazette”</li> <li>the city center of Seraing newspaper</li> </ul>	<p><b><u>Radio</u></b></p> <ul style="list-style-type: none"> <li>Rádió M (local)</li> </ul> <p><b><u>TV station</u></b></p> <ul style="list-style-type: none"> <li>Miskolci TV (local)</li> </ul> <p><b><u>Newspaper</u></b></p> <ul style="list-style-type: none"> <li>Miskolci Napló (local)</li> </ul>

Table 62: Local events – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>• Community Days of Action</li> <li>• Greener Housing Engagement Events</li> <li>• Robin Hood Energy Events</li> <li>• Library, Service Centre and leisure centre events</li> <li>• Sneinton Festival (2 week programme)</li> </ul>	<ul style="list-style-type: none"> <li>• European Mobility Week</li> <li>• Carr-free day</li> <li>• Presentation of ThyssenKrupp electric car fleet</li> <li>• Bici Metro app presentation</li> <li>• Workshops based on: Education for Sustainable Development. Pollution and means of transport.</li> <li>• An Informative Session about the Incentives to purchase EV and the charging points related infrastructure requirements will take place on the 24<sup>th</sup> of October (the date may vary slightly)</li> </ul>	NA	<ul style="list-style-type: none"> <li>• “Noon of companies”: june</li> <li>• Fieris-Feeries: October</li> <li>• Tour de France: July</li> <li>• Natura: July</li> <li>• Cercle de Wallonie</li> <li>• jogging science business park : June</li> <li>• “Seraing les bains”: mid July-mid August</li> <li>• Fêtes de Wallonie : September</li> <li>• Christmas market</li> <li>• fleas markets</li> <li>• weekly markets</li> <li>• Day of trees: November</li> </ul>	<ul style="list-style-type: none"> <li>• Residential forums</li> <li>• School visits</li> <li>• Open days in service providers (existing smart &amp; green locations)</li> <li>• Discussion forums linked to smart Café events</li> <li>• Setting up other public information point</li> </ul>

Table 63: Local Fairs and Conferences – HOW?

Nottingham	Valladolid	Tepebasi	Seraing	Miskolc
<ul style="list-style-type: none"> <li>Clean Tech Business Network</li> </ul>	<ul style="list-style-type: none"> <li>Smart City Expo World Congress</li> <li>I Congreso Ciudades Inteligentes / I Smart Cities Congress</li> <li>GreenCities &amp; Sostenibilidad</li> <li>HANNOVER MESSE</li> <li>Metropolitan Solutions</li> <li>Madrid EcoCity</li> <li>Congreso Vehículo y Combustible alternativos/ Green Vehicle &amp; Fuel Congress</li> <li>Salón de la Vivienda de Valladolid/ Housing Fair</li> <li>Bienal de la Restauración y Gestión del Patrimonio /</li> <li>Fair of Restoration and Heritage Management</li> </ul>	<ul style="list-style-type: none"> <li>International Terra Cotta Symposium (Uluslararası Pişmiş toprak Sempozyumu) <a href="http://www.tepebasi.bel.tr/pismis/pt9/eng/index.html">http://www.tepebasi.bel.tr/pismis/pt9/eng/index.html</a></li> <li>National Art Workshop (Ulusal Sanat Çalıştayı) <a href="http://www.tepebasi.bel.tr/calistay/index.asp">http://www.tepebasi.bel.tr/calistay/index.asp</a></li> <li>International Street festival (uluslararası sokak festivali) <a href="http://www.facebook.com/eskisehirsokakfestivali">www.facebook.com/eskisehirsokakfestivali</a></li> </ul>	<ul style="list-style-type: none"> <li>Webinars/events/conferences given by projects for which Seraing is community member (cityfied, citikeys)</li> <li>Events of networks dealing with sustainable management of cities, like, “Energy’cities”; “Manag’Energy”, “Covenant of Mayors”, “Polis network” will be followed</li> </ul>	<ul style="list-style-type: none"> <li>Automotive Hungary International Trade Exhibition for Automotive Industry Suppliers</li> <li>Conference on IT cloud solutions for smart cities</li> <li>STORMCLOUDS Partner Event</li> <li>Smart Café</li> </ul>



## Annex 7: City Power Levels

The State of the EU Cities Report (EU Regional Policy, 2007) argues that the degree of decentralisation in policy-making and delivery varies greatly between EU Member States and there is by no means a consensus on the most appropriate balance between central and local responsibility.

A complex range of factors and questions come into play when it comes to considering the most appropriate role for city governments including:

- **The territory and structure of city government** – Where do we draw city boundaries? How will the city territory relate to other levels of local government? Do we need to create government for the ‘city region’? Over what scale?
- **The resources of city government** – How will the city’s activities be financed? Can it raise finance? Should cities be able to raise their own taxes? If so, how much? Should public services be delivered directly by the city authority or delegated to other actors?
- **The responsibilities accorded to city government** – Which public sector tasks should the city administration (as opposed to other levels of government) deal with? How much freedom should they have to shape their own policies and initiatives? How do these relate to the roles of other levels of government?

The report (EU Regional Policy, 2007) seeks to assess the relative “power” of city governments between and within Member States. Measuring the “power” of cities in an effective manner presupposes both a clear definition of what is meant by “power” in this instance and adequate and appropriate information with which to measure this. Neither of these elements is readily available and the report does not claim to have found perfect solutions. However, their working definition of “power” in relation to city governments comprises of two components:

- The relative “weight” of city governments in the national governance system (resources and responsibilities of city government as a proportion of all public sector resources and responsibilities) and;
- The relative “flexibility” of city governments to influence their resources and the way they discharge their responsibilities (the level of autonomy they have over taxation or other income and in the focus and design of policy interventions).

Taking into account the key factors of territory, structure, resources and responsibilities mentioned previously, the report identifies four main areas where quantitative measurement is possible:

- 1. Size** – common sense and experience suggest that larger cities (and their governments) carry more weight in national political contexts than smaller cities – even if many other factors may have a greater impact on real city power.
- 2. Structure and status** – not all cities have the same governance structure and political status, even within the same country. Some may be city regions, others merely subdivisions of larger local or regional government entities;
- 3. Spending power** – the size of the budget and resources controlled by the city authority. This can be measured both in absolute terms and as a proportion of overall public spending in a particular country.
- 4. Control over income** – the ability to influence income levels, notably through local taxes and charges is widely seen as a key element of local government autonomy. When viewed alongside overall income and expenditure levels, the proportion of income obtained from local taxes provides a basic measure of local financial autonomy.



## Annex 8: LAs Innovation Framework



Figure 43: LAs innovation framework (Munro, 2015)

### KEY QUESTIONS

#### Central Focus

- Are citizens' and service users' priorities and aspirations central to the council's approach to innovation?

#### Key Drivers

- Are the council's political vision and priority areas for innovation clear?
- Are leaders and managers leading for innovation?
- Is the council taking a strategic approach to innovation?

#### Key Enablers

- Does the council's organisational culture promote innovation?
- Are cross-boundary approaches generating significant innovations?
- Are employees motivated and skilled for innovation?
- Does the council have effective and disciplined delivery mechanisms for innovations?

#### Are citizens' and service users' priorities and aspirations central to the council's approach to innovation?

For example, in the innovation priority areas, could the council do more to:

- Understand service users' aspirations, needs and priorities more deeply?
- Develop innovations with service users and other local residents to get their support and help change their expectations and behaviour?
- Unlock and develop more capacity for innovation within local communities?

#### Are the council's political vision and priority areas for innovation clear?

For example:

- Is the vision ambitious and inspiring, but attainable, in the unfolding strategic context?
- Have politicians agreed the innovation priority areas in the medium and longterm?

- Are politicians prepared for experimentation, considered risk taking and necessary failures?

#### **Are leaders and managers leading for innovation?**

For example, are leaders and managers:

- Trusted by managers and staff?
- Bold, forward-looking and united?
- Focusing enough time and effort on innovation?
- Convincing communicators, personally selling the need for innovation?
- Involving all key stakeholders, including middle managers, in discussing critical future issues and plans for innovations?
- Listening and responding to feedback, including from critics and mavericks?
- Devolving decision-making appropriately?
- Moving forward at a brisk, but sustainable pace?
- Persisting until innovations are delivered?

#### **Is the council taking a strategic approach to innovation?**

For example, does the council have:

- Clear plans and accountability for innovations and effective project leaders?
- Sufficient resources and time devoted to innovations?
- Innovation processes being given sufficient freedom to experiment (and not being held back by unnecessary bureaucratic barriers)?
- The flexibility to seize new opportunities and to adapt when experiments fail?
- The expertise to fully exploit the latest technologies?

#### **Does the council's organisational culture promote innovation?**

For example, is innovation promoted through:

- Leaders' and managers' everyday behaviours, practices and stories?
- Values, norms and working practices?
- Safeguarding time for reflection and creative thinking?
- Healthy debates that challenge and test accepted assumptions?
- Pro-actively looking elsewhere for fresh ideas, from other councils and other organisations (including those in other countries)?
- Celebrating innovations?

#### **Are cross-boundary approaches generating significant innovations?**

For example, is the council successfully delivering innovations through:

- Cross-council working?
- Partnerships with external organisations?
- Its commissioning and contract management arrangements?

### Are the council's employees motivated and skilled for innovation?

For example, does the council:

- Have enough employees with the attitudes and skills needed to deliver innovations?
- Encourage employees to develop better ways of doing things?
- Involve frontline employees in innovation processes?
- Recognise and reward employees for innovating?
- Respond to employees' concerns about innovations?
- Deal with job losses or role changes fairly?

### Does the council have effective, disciplined, delivery mechanisms for innovations?

For example, does the council have:

- Effective ways of tracking and delivering innovations?
- Sufficient innovation expertise to support the delivery of major innovations?
- A periodic and straightforward approach for evaluating and learning from successful and unsuccessful innovations? Clearly understanding what worked and what did not and mostly importantly, why?

### Example of an innovation process

1. Understand the key issues, underlying problems and the strategic context (including: politicians' views and ambitions; service users' and citizens' needs, priorities and aspirations).
2. Agree the outcomes you want to achieve.
3. Generate fresh ideas for tackling the issues, including by looking for successful innovations in other councils and other organisations (including those from other countries).
4. Select the most promising ideas, right for the organisation and the strategic context.
5. Test, prototype and evaluate these ideas. Learn from what does not work.
6. Choose the best idea(s) to implement.
7. Develop and implement the idea(s), addressing barriers, persisting, adapting and learning, until they work in practice.
8. Evaluate how successful the innovation has been, over time, against your ambitions.
9. Build on and spread successful innovations, learn from failures, and disseminate the ideas and learning to others.

For major innovations, involve politicians, senior managers, middle managers, frontline employees, service users, other local residents and partners at key stages in the process. In practice, innovation processes may move backward and forward between the different stages.

## Annex 9: Capability Maturity Model (CMM)

CMM provides a framework for continuous organisational improvements for maturity. It is important in REMOURBAN and LAs need to improve organisational structures and processes for Smart Cities' innovations. Maturity models appeared alongside the first quality management studies, where their use was an enormous step towards performance improvement approaches within organisations (Estampe et al., 2013). One of the best and most widespread models today is the Capability Maturity Model Integration (CMMI), which in five stages, provides sequence for improvement as well as a basis to assess the deployment maturity of specific projects or organizations. Originally, it was designed for services and engineering activities in business organisations. This model has since been tailored in a range of organisations, as its aim is to be adjustable to diverse needs and approaches. CMMI has been used in financial management, project management, information systems management and people management in organisations (Sharp, 2005). However, the use of such models in the public sector organisations such as local authorities (LAs), appears limited to e-government areas, rather than energy.

Several maturity models have recently been published on energy management of private sector organisations (Antunes et al., 2014; Introna et al., 2014; Ngai et al., 2013). In addition, Valeds et al. (2011) proposed a maturity model for developing e-government. Gill and Delahaye (2004) proposed a model of organisational capability (OC) based on three domains – the strategic intent, organisational structures and individual knowledge to maximize OC. Layne and Lee (2001) proposed a four stage growth model that focused on functionality and technical capability of e-government. Andersen and Henriksen (2006) extended the Layne and Lee model by using an activity and customer-centric approach and Chaffey (2010) applied OC models having six areas of governance to assess the maturity of digital-marketing. Based on dynamic capability perspective, Klievink and Janssen (2009) developed a five stage model for realizing joined-up government. Furthermore, Gwanhoo (2010) explored how to introduce open government principles of transparency, participation, and collaboration into this model, to take advantage of social media for public participation and engagement.

The benefits of these models can be multi-fold (Valdés et al., 2011), they:

- enable each public agency to identify its current state of maturity and capability in an integral (considering every necessary aspect) manner.
- enable each public agency to compare itself with other agencies evaluated with the same model.
- suggest feasible improvement roadmaps that public agencies can follow to improve their levels of capability and maturity.
- provide information about the public agencies' readiness to allow the government and policymakers to determine whether they are prepared to join the new national initiatives, and to define improvement programs in case they are not yet prepared.

The maturity levels provide an incremental qualitative improvement structure for organisations. The levels are based on a scale ranging from 1 to 5, as shown in Figure 6.3. Each level is defined by organisational 'key processes', which organisations must master and improve, before focusing on the next level.

**Level 1: Initial Capability-** The key organisational area is addressed reactively and individually on a case by case basis and there is evidence that it has been recognized and needs to be addressed.

**Level 2: Developing Capability-** A regular intuitive pattern is followed in addressing the key organisational area. Different people follow similar procedures to address the same tasks; however, there is neither formal training nor dissemination of procedures.

**Level 3: Defined Capability-** Procedures related to the key organisational area have been defined, documented, and communicated; they are not sophisticated, but rather correspond to the formalization of existing practices. There is formal training to support initiatives related to the key area.

**Level 4: Managed Capability-** It is possible to monitor and measure procedure fulfilment and compliance, and to take action when the key domain area appears to work ineffectively. And established standards and rules, related to the key area, are applied throughout the organisation.

**Level 5: Integrated Capability (Optimizing)-** Procedures related to the key organisational area have reached the level of best practices and continuous improvements are applied. The key area is optimized through the use of ICT and it works in an integrated manner with other related areas.

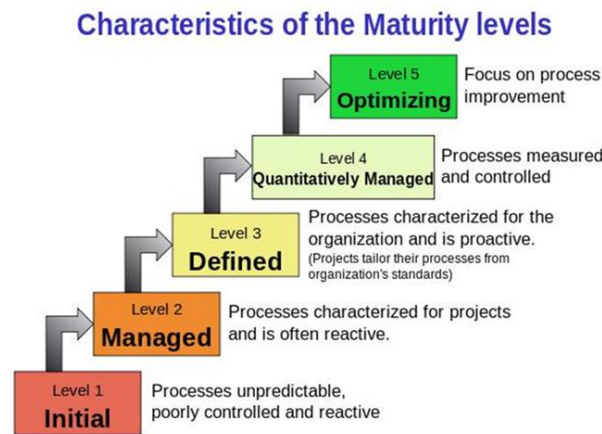


Figure 44: Characteristics of the maturity levels

In the maturity models, the effectiveness of each “key process” is evaluated through assessment of the following generic “process enablers” (adapted from Antunes et.al. 2014):

**Commit-** is the step that ensures management commitment to the change program (namely Smart Cities), creating an effective and manageable policy statement describing the program goals (namely developing Smart Cities innovation).

**Identify-** aims at discovering possible city wide benefits from the change program (e.g. reduction in fuel poverty; % of energy generated at the community level to assist carbon reduction targets and Smart Cities agenda etc).

**Plan-** describes an Action Plan consisting of activities that set objectives and targets, assigning responsibilities for each objective.

**Take action-** consists of actual effort directed towards the implementation of the Action Plan. Among other activities, this step consists of raising Smart Cities and energy awareness inside the organisation and among its key stakeholders and motivating them to participate in the process.

**Review-** aims at improving the Smart Cities effort by continuously monitoring and comparing energy and carbon performance, undertaking a complete review of targets and progress towards achieving them.