URBAN REGENERATION MODEL

A practical toolkit to transform your city into a smart and sustainable ecosystem
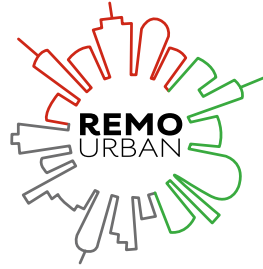
REMO URBAN

All the public resources of the REMOURBAN project, including the Urban Regeneration Model, are available on **www.remourban.eu**.

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The **Urban Regeneration Model** (URM) by **REMOURBAN** is a methodological guide to technical and non-technical innovations (such as citizen and stakeholder involvement, management and governance, business models, financial instruments) for making cities smarter and more sustainable.
It was developed by 22 multidisciplinary partners of the Smart City project REMOURBAN and demonstrated in three cities, Valladolid (Spain), Nottingham (United Kingdom) and Tepebaşi/ Eskişehir (Turkey).

The Urban Regeneration Model stands out from existing urban planning methodologies: it features **integrated decision-support tools** to help implement each step of the methodology.

This easy-to-use guide summarises the key features of the Urban Regeneration Model. It is intended for **public authorities and governments** seeking to make cities **smarter and more sustainable**. You will find information about:
- identifying your goals
- checking progress
- streamlining procedures
- finding new solutions and pioneering financial mechanisms
- ensuring bankability of technical innovations
- working effectively with other city stakeholders.

The model is now available to help you in working towards the European Green Deal's goal to **make Europe climate-neutral by 2050**.

1. REMOURBAN IN A NUTSHELL

REMOURBAN is a five-year project funded under the EU's Horizon 2020 programme. Since its kick-off in 2015, the project has developed a holistic model combining energy, mobility and ICT.

The aim is to improve energy efficiency, increase the use of renewables, and reduce consumption and especially CO_2 emissions in urban areas. In this model, citizens are given an active role.

The model was implemented and validated between 2015 and 2019 in three Lighthouse cities: Valladolid (Spain), Nottingham (UK) and Tepebaşi/Eskişehir (Turkey).

Parallel to this follower cities Seraing (Belgium) and Miskolc (Hungary) tested its replicability. To do this, REMOURBAN brought together 22 partners from 7 countries: researchers, building manufacturers, district owners, public authorities, industrial partners, SMEs, dissemination and exploitation experts, and investors.

LIGHTHOUSE CITIES

FOLLOWER CITIES

NOTTINGHAM

SERAING

MISKOLC

VALLADOLID

TEPEBAŞI

2. THE URBAN REGENERATION MODEL

VALLADOLID

PRIORITY AREAS

Sustainable Districts & Built Environment

Sustainable Urban Mobility

Integrated Infrastructure and Processes

Strategy design

Actions design

Implementation

Assessment

MANAGEMENT

EVALUATION

FINANCE

FRAMEWORKS

PHASES

The Urban Regeneration Model has been developed to help you, as local authorities and town planners, to draw up a roadmap for making your towns and cities smarter and more sustainable. It serves as a guide to help you identify your goals, check progress, streamline procedures, find new solutions and use new business models for city renovation.

The model – including its decision-making process – has been tried, tested and fine-tuned in real-life conditions. It is a 3D model consisting of **four phases of the decision-making process** (Strategy design, Actions design, Implementation plan, Assessment) **across three key priority areas** (Sustainable Buildings and Districts, Sustainable Urban Mobility, Integrated Infrastructures and processes) and **three key frameworks** (City Transformation Management, Evaluation, Financing).

3. SUPPORTING TOOLS

The following tools will help you implement the Urban Regeneration Model:

RISC – Replication Information System for Cities is a repository of Smart City Technology Packages. These store all the technical and non-technical information about the REMOURBAN interventions for use by other cities. This information comes in the form of actionable groups of solutions designed to help you make informed decisions relating to technology, cost, time, resources, and risk.

Stile – SmarTness and SustaInabiLity Evaluation helps you assess and analyse the results from the urban regeneration interventions in energy, urban mobility, ICT and non-technical actions. The tool uses variables monitored at city level in order to indicate how smart and sustainable a city has become after intervention.

CIM – Cost Implementation Model provides you with information about the costs involved in renovating cities the smart way. This financial information completes the data collected for each of the Smart City Technology Packages available in RISC.

Yoopi! – This tool can help you select the most suitable Smart Cities Technology Packages.
It combines cities' demand sides with their supply sides to deliver a set of adapted strategies. Furthermore, Yoopi! integrates the Cluster Identification Tool (CIT) which can help you make an initial assessment of priority areas for your strategy according the cluster your city belongs to. The CIT is included as one the steps of the Strategy Design Methodology that supports the first phase of the Urban Regeneration Model.

4. PRIORITY AREAS

Impacts achieved

SUPPORTING TOOL: **RISC**

Sustainable Districts & Built Environment

Sustainable Urban Mobility

Integrated Infrastructure and Processes

Strategy design
Actions design
Implementation
Assessment

MANAGEMENT

EVALUATION
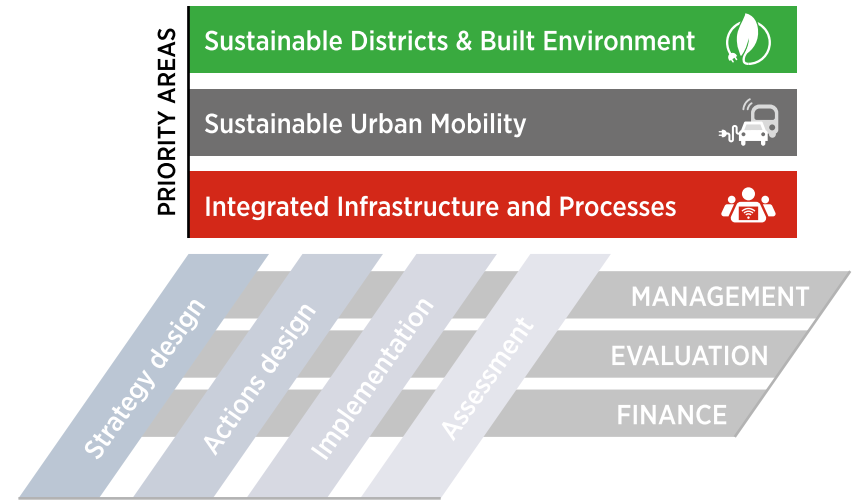
FINANCE

CITIZENS INVOLVED

15,000

SUSTAINABLE DISTRICTS & BUILT ENVIRONMENT

- District retrofitting
- Electric distributed generation
- District heating and cooling
- Advanced management systems for homes, buildings and districts

-34% Energy consumption

-50% CO_2 emissions

SUSTAINABLE URBAN MOBILITY

- Electric vehicles and bikes for public transportation
- Recharging infrastructure for electric vehicle
- Clean logistics and last mile delivery
- Car sharing

-5.1 Energy consumption

-5% CO_2 emissions

INTEGRATED INFRASTRUCTURE AND PROCESSES

- Open up intelligence in urban transport systems
- P2P transport information
- City information platform
- Energy and transport maps in real time

1927 variables collected in the central platform

5. FRAMEWORKS

City transformation

Sustainable Districts & Built Environment

Sustainable Urban Mobility

Integrated Infrastructure and Processes

MANAGEMENT

EVALUATION

FINANCE

FRAMEWORKS

Strategy design · Actions design · Implementation · Assessment
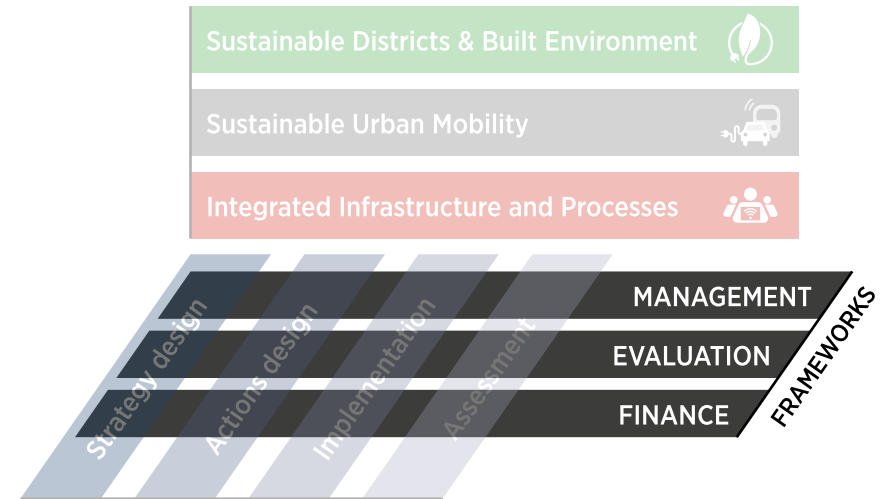
MANAGEMENT

The Urban Regeneration Model's innovation lies in its use of "**Transformative Alliances**". These are coalitions of interest represented by different stakeholders working in the three priority areas – energy, mobility, ICT –) and also in other areas related to urbanism such as the environment, health, safety, waste, wellbeing.

A **Smart Urban Transformation Council** (SUTC) oversees the whole scheme. It is made up of city leaders from administration, science, culture, etc. A **Coordination Committee** (CoCo) coordinates each main theme. These management bodies are responsible for setting out a shared vision (SUTC), drawing up strategies and setting milestones. They organise programmes and projects (CoCo) and implement project interventions (Transformative Alliances). An efficient city transformation management framework should include:
• political commitment;
• a flexible and adaptable management structure;
• a leading role of local government and governance processes;
• public participation and citizen engagement strategies.

EVALUATION SUPPORTING TOOL: **STILE**

The model provides for two levels of evaluation:
• **City Level**, to assess both sustainability and smartness of the city as a whole. The framework establishes a **Sustainability Index** (Su) to evaluate sustainability of cities and a **Smartness Index** (Sm) to measure the technological advance in the main areas of interest to the cities;
• **Project Level**, to clearly identify the impact of the technologies and solutions implemented on the three key priority areas. The Demo Site Index measures areas of intervention: district and buildings, urban mobility, ICT integrated infrastructures and non-technical actions.

The evaluation framework supports the model through all the phases.
In **Phase I**, the framework provides the supporting mechanisms and tools for the characterisation of the sustainability and smartness of the city towards a long-term vision.
In **Phase II**, the framework provides the means to assess every design scenario and assist city managers in identifying the scenarios that best achieve the city targets.
In **Phase III**, evaluation protocols and indicators are defined as the supporting mechanisms for successful implementation.
In **Phase IV**, after the implementation of technologies and solutions, the results and impacts are assessed.

> **To develop lasting models, you need economically sound methods and a new mind-set, especially when public spending is being cut.**

FINANCE

The Urban Regeneration Model considers the **public and private sectors as complementary and necessary**, offering the skills and investment opportunities.

Local authorities have the capacity to carry out large projects, often driven by public opinion and citizen wellbeing. However, they also have budgetary constraints. Private entities – commercial, technical and industrial partners – have the technical and, in some cases, financial capacity to meet the resource requirements for interventions. However, these investments need to be attractive and pro-

vide a good return. By joining forces, **both sectors can achieve goals that would be difficult to achieve individually**. We have selected four different innovative financing schemes that you could use to replicate smart interventions:

• Public Private Partnerships
• Green Bonds financing
• Crowdfunding for public entities
• ESCo model

Beyond these, an array of services and financing provided by European bodies, such as the European Investment Bank (EIB) are available for public entities.

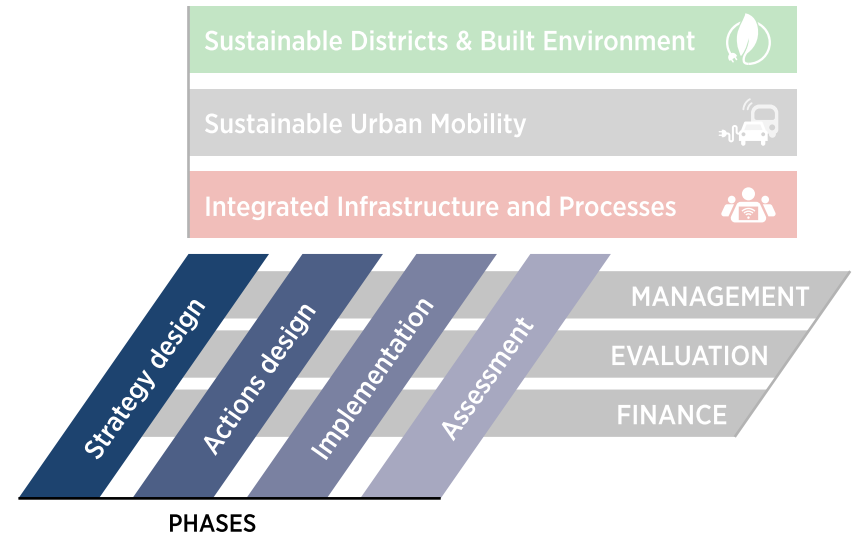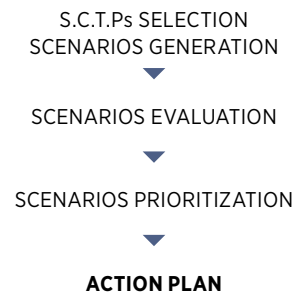**MISKOLC**

6. PHASES

PHASES

STRATEGY DESIGN

Phase I mainly covers the demand side helping cities identify their smart needs, priorities and objectives. It supports the evaluation of the city current conditions and strategic goals, which are then transformed into the city strategy through the Integrated Urban Plan.

DATA COLLECTION
▼
CITY DIAGNOSIS
▼
DEMAND: CITY NEEDS AND GOALS
▼
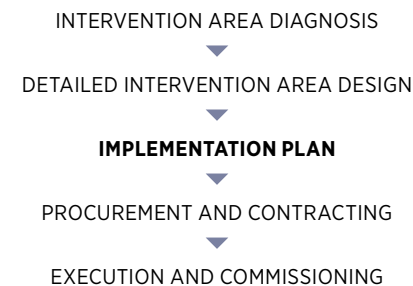STRATEGIC GOALS
▼
INTEGRATED URBAN PLAN

ACTIONS DESIGN

Phase II covers the development of the Action Plan, in which the strategies or group of actions selected to achieve the Strategic Goals defined during Phase I are allocated. In this phase policy makers and stakeholders will help in decision-making in the optimal scenarios through the evaluation framework.

S.C.T.Ps SELECTION
SCENARIOS GENERATION
▼
SCENARIOS EVALUATION
▼
SCENARIOS PRIORITIZATION
▼
ACTION PLAN

IMPLEMENTATION

Phase III covers the implementation of the works as defined by the Action Plan. It ranges from the commissioning of the works to their validation as practical outcomes.

INTERVENTION AREA DIAGNOSIS
▼
DETAILED INTERVENTION AREA DESIGN
▼
IMPLEMENTATION PLAN
▼
PROCUREMENT AND CONTRACTING
▼
EXECUTION AND COMMISSIONING

ASSESSMENT

Phase IV involves assessing the impact of Integrated Urban Plan through the previous phases. Selected methodologies can check attainment of CO_2 reduction, energy savings and environmental quality targets as set out in the Integrated Urban Plan.

MONITORING AND ENERGY PERFORMANCE
▼
EVALUATION OF SUSTAINABILITY AND SMARTNESS
▼
STRATEGY VALIDATION

6.1. STRATEGY DESIGN

OBJECTIVES

Implement a set of integrated existing methods & tools to evaluate the current conditions in a given city through a set of indicators. Identify strategic goals to form the City Strategy.

INPUTS

- Data collected
- Existing city plans

OUTPUTS

- Smartness and Sustainability characterisation
- City Demand (needs and goals)
- Strategic goals of the city
- Integrated Urban Plan (IUP)

MANAGEMENT

Local government is the driving force in this phrase that requires a flexible and forward-looking approach. The **Smart Urban Transformation Council** (SUTC) and the **Coordination Committees**, which manage the 3 priority areas, play an essential role in creating the synergy needed for designing an Integrated Urban Plan.

GUIDELINES

Governance and stakeholders engagement: procedures and coordination involving governance and stakeholders and the design and implementation of a citizen engagement strategy.

Data collection: collecting, organising and assessing data according to specific procedures.

City Diagnosis: calculating a baseline, and identifying and ranking the city's needs.

Supporting tools: YOOPI! to support cities in pre-evaluating the key working areas for the city strategy and SmarTness and SustaInabiLity Evaluation Tool (STILE) to characterise current city diagnosis vs. a smart sustainable city.

Strategic goals of the city: a city's long-term vision and objectives are established from the city diagnosis, a SWOT analysis and the citizen participation strategy. Priority, needs, scope and Smartness and Sustainability targets are set out.

The **Integrated Urban Plan** is the key output in this phase. It sets short and long-term goals and measures based on City Level indicators.

Strategy design scheme

The strategy design phase involves assessing the current state of a city using established means and indicators, and identifying strategic goals. It generally focuses on the demand side of the model, thus helping cities to identify th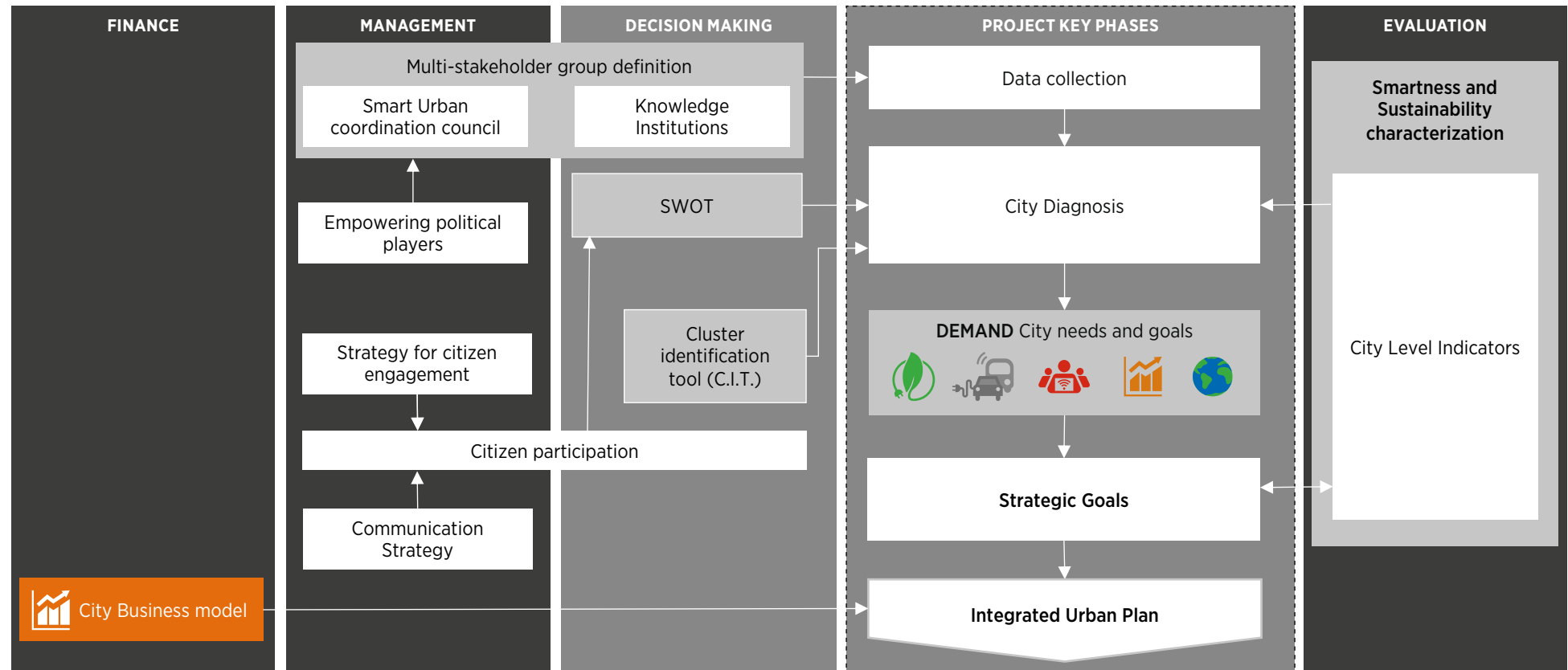eir core and smart needs, priorities and objectives. The final output of this phase is the Integrated Urban Plan. Strategy design includes the following steps:

- The **management** and **decision-making** phases involve: setting up a governance structure represented by a Smart Urban Transformation Council and a Co-ordination Committee for each main priority (energy, mobility and ICT); establishing strategic goals; setting out a stakeholder and citizen engagement strategy; identifying city priorities and needs through the Cluster Identification Tool (CIT), designing a questionnaire and conducting SWOT analysis from which the decision-making process can be launched.
- The **City Diagnosis** phase involves establishing a Smartness and Sustainability baseline; identifying challenges, needs and priorities; and defining the scope of the main areas for intervention.
- **Strategic Goals** are set out as Smartness and Sustainability objectives and KPIs to be achieved by the urban regeneration model.

6.2. ACTIONS DESIGN

OBJECTIVES

Develop the Action Plan presenting the strategies or group of actions selected to achieve the Strategic Objectives set out during Phase I.

INPUTS

- Smartness and Sustainability characterisation
- City Demand (needs and goals)
- Strategic goals of the city
- Integrated Urban Plan

OUTPUTS

- Selected Scenario
- Action Plan

MANAGEMENT

Coordination Committees will be the driving force while local authorities' involvement in these committees is crucial in terms of political commitment and decision-making.
Knowledge institutions, universities, and technical experts act as technical advisors in selecting different technologies for "Smart City Technology Packages" (SCTPs).
Transformative Alliances also play an important role in the decision-making process. Citizens need to be engaged in this process to ensure acceptance and commitment.

GUIDELINES

Establishing scenarios:
- identifying possibly suitable SCTPs
- establishing operational models including socio-technical information
- establishing scenarios where operational models are combined and evaluated in the next stage for their ranking

Evaluating scenarios: identifying the best combination of SCTPs via a multi-criteria approach. Data collection, analysis and calculation of indicators are the main activities of this phase.

Ranking scenarios: according to the weight assigned to each criterion of the Demo Site Index. The evaluation framework provides the mechanisms to evaluate the specific design alternatives and the tools to calculate the project level indicators. It also supports cities in changing criteria and weighting for each indicator and measurable objective.

The **Action Plan** is the main result of this phase. It contains an in-depth presentation of the selected scenario to guide the implementation plan and design development to be carried out in the next phase.
Supporting tool: YOOPI! proposes the most suitable SCTPs.

Actions design scheme

The main objective of this phase is to develop the Action Plan, in which the strategies or group of actions selected to achieve the Strategic Objectives set out during Phase I will be allocated. During this phase it is necessary to integrate both stakeholder needs and existing urban plans (mobility, energy, digital, social,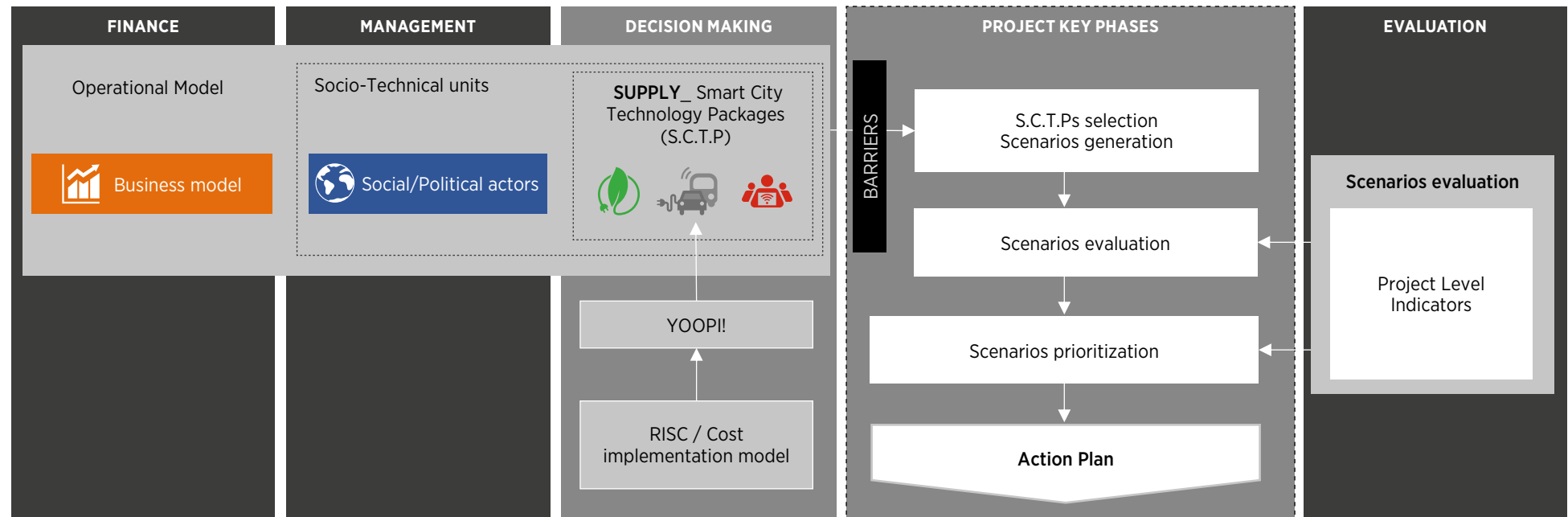 innovation, etc.), by establishing a decision-making procedure for selecting the suitable scenario. At the end, the optimal scenario should be composed by a set of operational models to address the three priority areas: Energy-efficient buildings, sustainable mobility and ICT infrastructures. This scenario will be the best possible for the city. Decision makers and stakeholders participate in the scenario evaluation process.

In fact, the evaluation framework continues supporting cities on the decision-making process in order to determine the effect of different scenarios.

The four steps of this phase cover:
• **Establishing possible scenarios**, by identifying the Smart City Technology Packages available through the RISC tool and analysing socio-political, financial and technical features via YOOPi!.
• **Evaluating scenarios** in order to identify the best combination of Smart City Technology Packages (SCTP) via a detailed multi-criteria evaluation.
• In the **Scenario ranking** stage, scenarios are evaluated according to the weight assigned to each criterion of the Demo Site Index. The STILE tool can be used in this phase.
• The **Action Plan** is the main result of the phase. The plan will guide the implementation plan and design development to be carried out in the next phase.

6.3.
IMPLEMENTATION

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OBJECTIVES

Implement the interventions for a sustainable and smart city as described in the Action Plan (phase II).

INPUTS

- Integrated Urban Plan
- Selected Scenario
- Action Plan

OUTPUTS

- Implementation plans
- Strategy Implemented

MANAGEMENT

Political Commitment: necessary involvement of major political groups, including the mayor, other high-level politicians, different stakeholders and the citizens in preparing the implementation plan.

The **Design team** is composed of engineers and architects who plan and implement the interventions. The **contractor** is responsible for the site management. Implementation plans are prepared according to the vision and goals of the **local government**, which should be involved to ensure goals are achieved.

Financial institutions: Projects of this kind may be eligible for institutional grants. In such cases, financial institutions may appoint a certifier to ensure that the works are carried out according to grant criteria.

GUIDELINES

Diagnosis: an in-depth analysis of the current situation of the areas of intervention (from a technical, financial, social point of view) is necessary for calculating the baseline situation and identifying risks to successful implementation or outcomes.

Design: Once the interventions have been selected, technical specifications need to be drawn up for design purposes.

Implementation Plan: The execution works need to be listed and planned.

Procurement and contracting: The licences and permits needed for the works (identified during the diagnosis phase) must be applied for before or during implementation. Service providers are selected at this stage as identified in the technical specifications of the design phase II.

Execution and commissioning are crucial for checking if the interventions are being implemented according to plan. Checks need to be well organised and supervised during and after the implementation.
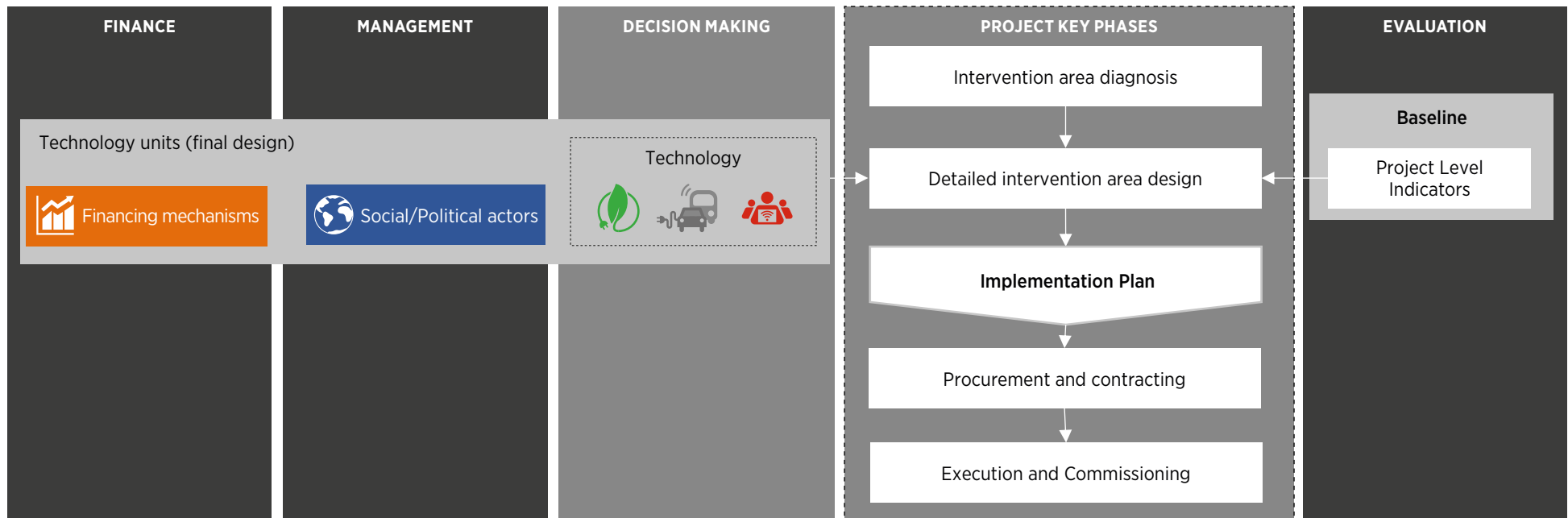
Implementation scheme

During this phase, the interventions set out in the Action Plan are carried out. This phase ranges from commissioning to validation of the works completed.

The best solutions for a city are selected during the **diagnosis phase** according to financial, technical and regulatory factors. In the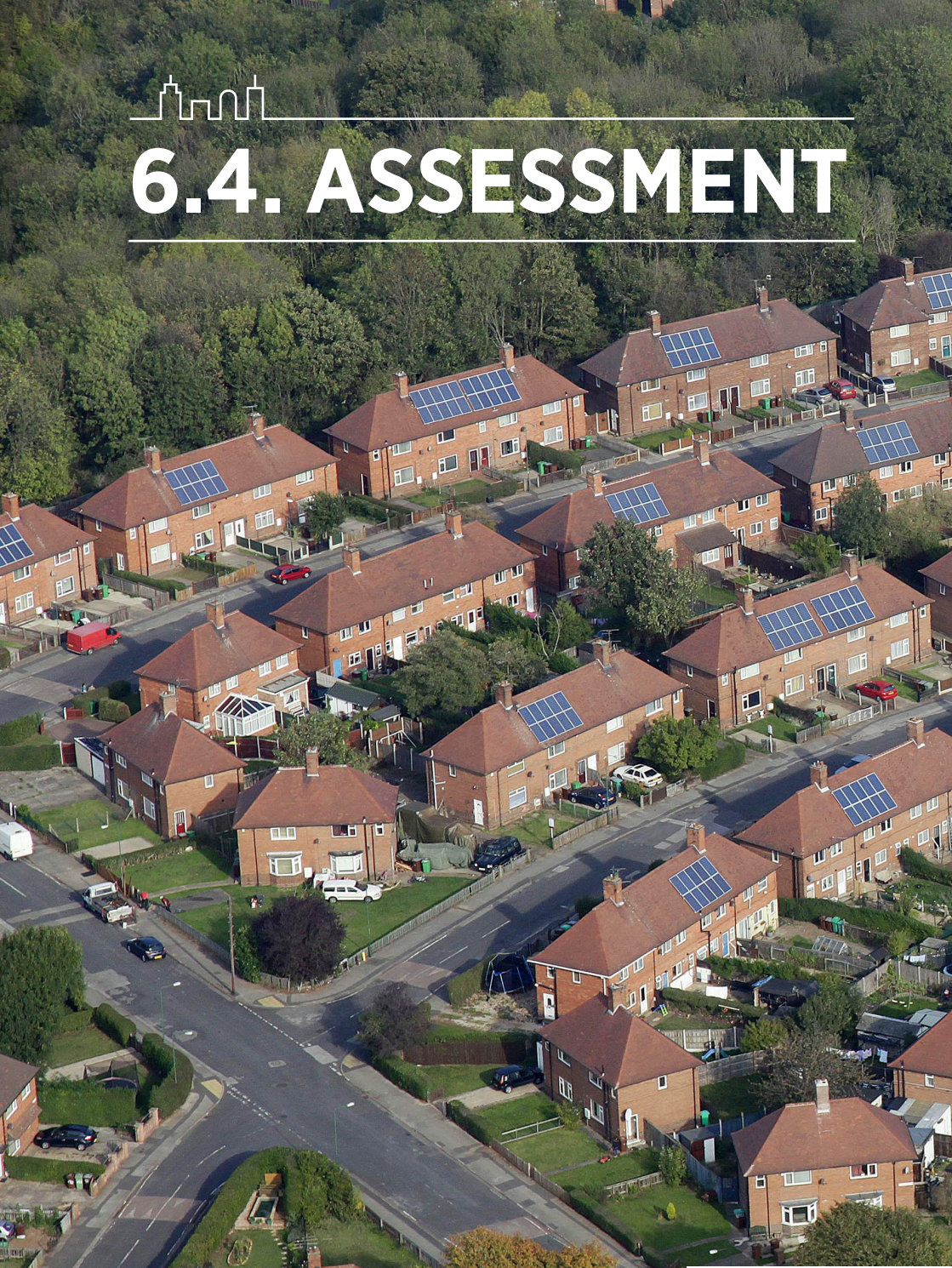 **design phase**, relevant stakeholders are approached and the procedures governing how to design the actions are established. The **implementation plan** should include provisions for planning and managing interventions, applying for licences and permits and organising procurement.

Ideally it should adopt a holistic approach in order to create synergies and opportunities for reducing cost and risk. The **procurement and contracting** and **execution and commissioning** phases take place according to the implement plan.

FINANCE	MANAGEMENT	DECISION MAKING	PROJECT KEY PHASES	EVALUATION
Technology units (final design)		Technology	Intervention area diagnosis	Baseline
Financing mechanisms	Social/Political actors		Detailed intervention area design	Project Level Indicators
			Implementation Plan	
			Procurement and contracting	
			Execution and Commissioning	

6.4. ASSESSMENT

OBJECTIVES

Set out the methodology to assess the impact of the Integrated Urban Plan (IUP) based on the previous stages of strategy design, action design and implementation. The selected methodologies will check attainment of emission reductions and environmental quality targets while demonstrating the impacts achieved.

INPUTS

Project level: Methodology to calculate the evaluation indicators at project level and monitoring/measurement strategy to collect the required data and to measure improvements
City level: Integrated Urban Plan, action plan, implementation plan and policy mandate on carbon reduction and technical report on energy savings compiled for the city as required by the central government

OUTPUTS

Project level: indicators at project level calculated and data integrated into the ICT platform and evaluation documents to show if targets have been met at project level
City level: Strategy evaluation, verified Action Plan, enhanced Implementation Plan, improved citizens' health and wellbeing, initiatives related to SMEs' innovation development

MANAGEMENT

In its leadership role, **central government** issues a political mandate and technical report on carbon reduction and energy savings targets to local authorities. The **Directorship** oversees the IUP and reports back to central government in the event of serious barriers to implementation. The Manager of Delivery reviews the actions implemented in energy, mobility and ICT and reports back to the Directorship if time or money are short. **Transformative alliances** in energy, mobility, and ICT are in charge of the actual implementation of the planned actions.

GUIDELINES

Monitoring and analysis of the overall performance, focusing on the KPI assessment at project level and closely related to the evaluation methods and tools developed in RE-MOURBAN.
Supporting tool: STILE enables cities to estimate the effectiveness of their implemented IUP in accelerating the cities' smart transformation process.
The **Strategy validation** is based on the assessment framework and enables local government to assess the IUP and its implementation at both project and city level.

Assessment scheme

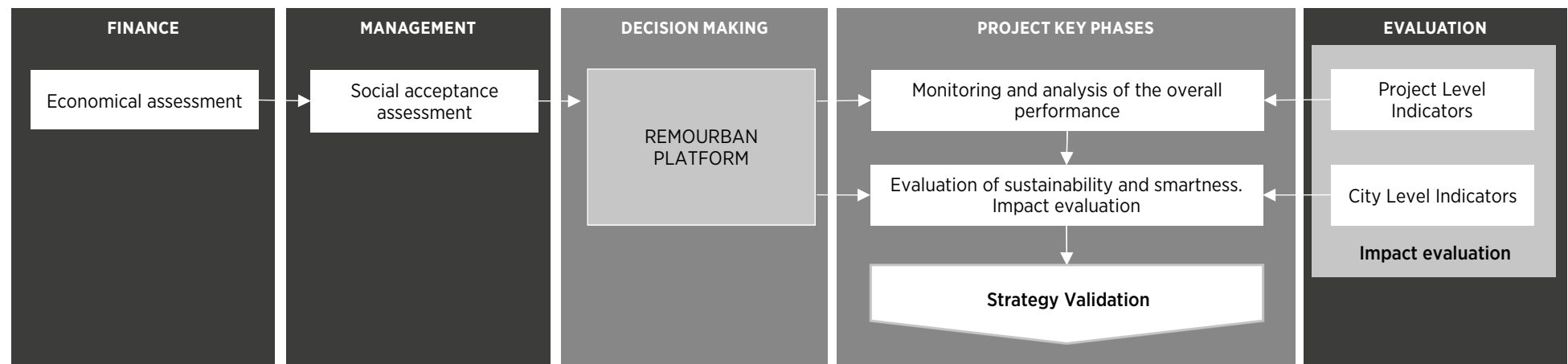The three pillars of the assessment phase cover:

- The **monitoring and analysis of the overall performance**. The Demo Site Index will assist in the evaluation of both impacts and progress of the overall project and areas of intervention.
- The **evaluation of sustainability and smartness**, assisting cities to estimate the effectiveness of their implemented Integrated Urban Plans in accelerating the process of cities' transformation towards smarter and more sustainable places. The impact of the actions can be assessed by calculating and then later comparing the Smartness (Sm) and Sustainability (Su) indexes and sub-indexes before and after the specific interventions have been implemented.
- The **strategy validation**, based on the assessment framework, takes the perspective of local government to assess the Integrated Urban Plan and its implementation at both project and city levels. The Directorship of the local government is responsible for the validation. In particular, the assessment at city level should compare the Smartness (Sm) and the Sustainability (Su) index values set out in Phase I. The Integrated Urban Plan is validated before, during and after implementation. Validation of the Integrated Urban Plan is an ongoing process, taking place before, during and after implementation.

FINANCE	MANAGEMENT	DECISION MAKING	PROJECT KEY PHASES	EVALUATION
Economical assessment	Social acceptance assessment	REMOURBAN PLATFORM	Monitoring and analysis of the overall performance / Evaluation of sustainability and smartness. Impact evaluation / **Strategy Validation**	Project Level Indicators / City Level Indicators / **Impact evaluation**

7. REPLICATION

Short list of recommendations

This selection of recommendations was collected by the REMOURBAN Lighthouse cities during the implementation of the project.

LEGEND: ✅ Advice   ⚠️ Caution

NOTTINGHAM

✅ When it comes to residential buildings, you should engage with stakeholders before you preselect the SCTPs. Consider a backup option if the implementation phase fails.

✅ SCTPs concerning mobility should be integrated into the city's Urban Mobility strategy to avoid disrupting overall urban mobility. Non-technical/cultural and behavioural aspects regarding mobility should be considered.

⚠️ Don't close doors too early in the process. You don't need to be too selective when preselecting SCTPs as some may be discarded during the scenario-setting process.

SCENARIOS GENERATION PHASE

✅ Make sure you consider all local context information and data in order to produce the right outcomes for your ecosystem.

✅ Select a large set of technical, financial and social parameters for the evaluation in order to possess the key components before moving to the next phase (ranking scenarios).

⚠️ Consider from the beginning how the technical and financial KPIs are established and measured. Even if SCTPs are well selected and scenarios properly set, failure may arise from complicated implementation or data issues.

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PRIORITIZATION OF SCENARIOS

✅ For local authorities, you should rank scenarios with support from a representative group of experts. This will allow you to obtain various points of view and to choose the best scenario based on not just technical criteria but also on financial, legal and social aspects.

✅ Set clear overall goals for city regeneration. They will help you rank scenarios ((environmental goals, financial goals, social goals, etc.).

⚠️ You should consult stakeholders when you assess the scenario rankings. Social acceptance KPIs are harder to measure in comparison with energy KPIs or financial KPIs.

DEFINITION OF THE ACTION PLAN

✅ You should obtain a detailed and accurate characterisation of the city/district before you draw up the Action Plan.

✅ Clearly identify key stakeholders in for each phase of the Urban Regeneration Model. Social players and key administration policy officers should give feedback while the action is being drawn up.

⚠️ You should obtain the financial you need in order to draw up an action plan. Without a solid business plan, you will probably fail to reach the implementation phase.

SERAING

NON-TECHNICAL AREAS

✅ Consider the replication potential of the works in order to maximise impact across the city.

✅ It is important to keep every stakeholder in the loop. Not all of them have the same commitment at every stage. Sometimes it depends on the stakeholder's agenda and political context which can change rapidly.

⚠️ Citizen engagement and commitment is key to innovative urban transformation projects. A rapidly changing political landscape can undermine citizens' trust.

> **Our project's legacy is a proven and replicable model for use in towns and cities across Europe. We're proud of this Urban Regeneration Model and its ability to improve people's lives in urban areas. With REMOURBAN, we've transformed the ecosystems in the three lighthouse cities while enabling other cities to embark on their own smart and sustainable transformations. Our ultimate goal is already becoming reality.**

REMOURBAN Coordinator Miguel Á. García Fuentes CARTIF

**Regenerate your city with
REMOURBAN**

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