Making City

the PED concept
stakeholder & citizen engagement
business models & finance



THE MAKING-CITY TOOLKIT

transforming cities with Positive Energy Districts

THE MAKING-CITY TOOLKIT

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INTRODUCTION



Welcome, PED hero! The **MAKING-CITY Toolkit** is your essential guide to transforming urban areas into **Positive Energy Districts (PEDs**). This toolkit, based on the extensive learnings from the MAKING-CITY project—a Horizon 2020 initiative (2019-2024) coordinated by the CARTIF Foundation—serves as a starting point to initiate a PED in your city.

A PED is an urban area with a positive annual energy balance, meaning it produces more energy than it consumes. This concept focuses on integrating renewable energy sources and optimizing energy efficiency to create sustainable environments.

This toolkit is designed for anyone interested in learning more about PEDs or starting one in their city, including citizens, city officials, and private sector actors. It covers three key areas:

- **The PED concept:** Gain a solid foundation on what a PED is and how it functions.
- **Stakeholder and citizen engagement:** Learn how to effectively involve various stakeholders and citizens in your PED project.
- **Business models and finance:** Discover business models and financial tools to support your PED initiatives.

Each section includes informative text, and concludes with three special features:

- **Toolbox:** Practical tools and actionable steps.
- **Secret Files:** Links to MAKING-CITY deliverables for deeper insights.
- **Going Further:** Additional resources from other PED projects for expanded learning.





While technical solutions are not the main focus of the toolkit, we have included an annex that compiles relevant information for those who wish to explore the technical aspects in greater detail. This section offers resources on PED design methodologies, energy storage systems, and tools for calculating energy balances—key technical components essential for the successful implementation of PEDs.

To further assist you, **the PED Hero Assistant, an AI Chatbot**, is here to answer your questions and provide detailed guidance. Whether you need advice on stakeholder engagement or insights into financial planning, the Chatbot supports you like an expert advisor, helping you navigate the complexities of creating a PED.

The Chatbot can respond to questions in multiple languages, allowing you to interact in your preferred language.

You can read this toolkit in any order that suits your needs. For more detailed information, refer to the project deliverables linked throughout the toolkit. Additionally, a map of lighthouse and follower cities is included to illustrate the project's scope and reach.

As a PED superhero, you'll use these resources to engage your community, develop innovative solutions, and guide your city towards a sustainable, energy-positive future. Let's embark on this transformative journey together!





ABOUT MAKING-CITY

Coordinated by the **CARTIF Foundation**, MAKING-CITY is a 72-month **Horizon 2020 project** launched in December 2018. It aims to address and demonstrate the urban energy system transformation towards smart and low-carbon cities, based on the Positive Energy District concept. The PED operational models developed in MAKING-CITY will help European and other cities around the world to adopt a long-term City Vision 2050 for energy transition and sustainable urbanisation whilst turning citizens into actors of this transformation.

The PED concept was tested and validated in two Lighthouse cities: **Groningen** (Netherlands) and **Oulu** (Finland). It was then replicated to various stages in six Follower cities: **Bassano del Grappa** (Italy), **Kadiköy** (Turkey), **León** (Spain), **Lublin** (Poland), **Trenčín** (Slovakia), and **Vidin** (Bulgaria). The technologies selected to be implemented in the project are mature or already on the market. The PED concept appears as a step beyond the current European building regulations by bringing major structural, societal, economical and technological changes in the cities.

Explore the factsheets of our eight project cities to learn about their current progress, 2050 decarbonisation targets, and detailed implementation strategies for Positive Energy Districts developed through the MAKING CITY project.

The MAKING-CITY consortium brings together expertise from 34 partners: 9 city councils, 5 universities, 4 research centres, 4 clusters and foundations, 4 rental housing administrators, 4 SMEs, 3 energy companies, and one construction firm.



ACRONYMS

AI: Artificial Intelligence
BMC: Business Model Canvas
COP21: 21st Conference of the Parties
DSO: Distribution System Operator
EIP-SCC: European Innovation Partnership on Smart Cities and Communities
EV: Electric Vehicle
FWC: Framework Contract
GIS: Geographic Information System
CT: Information and Communication Technology
MC: Multi-Criteria
MCDA: Multi-Criteria Decision Analysis
PED: Positive Energy District
PEB: Positive Energy Block
PPP: Public-Private Partnership
PV: Photovoltaic
RES: Renewable Energy Sources
SCC: Smart Cities and Communities



GLOSSARY

AI (Artificial Intelligence): Technology enabling machines to mimic human intelligence processes such as learning, reasoning, and problem-solving.

BMC (Business Model Canvas): A strategic management tool for developing new business models and documenting existing ones.

COP21 (21st Conference of the Parties): The 2015 United Nations Climate Change Conference where the Paris Agreement was adopted.

Cultural Probe Technique: A method involving giving residents diaries or postcards with specific tasks to gather insights about their feelings and environment.

DSO (Distribution System Operator): An entity responsible for operating, maintaining, and developing the distribution network for electricity.

EIP-SCC (European Innovation Partnership on Smart Cities and Communities): A European initiative promoting the development of smart and sustainable cities.

Equity Financing: Involves becoming a financial stakeholder in an unlisted company with the aim of fostering its growth, typically through the issuance of new shares.

EV (Electric Vehicle): A vehicle powered by electric motors using energy stored in rechargeable batteries.

Framework Contract (FWC): An agreement for the provision of goods, services, or works under set conditions for a specific period.

GIS (Geographic Information System): A system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

ICT (Information and Communication Technology): Technology used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions.

MCDA (Multi-Criteria Decision Analysis): A process for making decisions in the presence of multiple, usually conflicting criteria.

PED (Positive Energy District): An urban area that produces more energy than it consumes on an annual basis through the use of renewable energy sources and high energy efficiency.

PEB (Positive Energy Block): A smaller unit within a PED that aims for a positive energy balance.

PPP (Public-Private Partnership): A cooperative arrangement between public and private sectors for the provision of public assets or services.
PV (Photovoltaic): Technology that converts sunlight directly into electricity using semiconductors.

RES (Renewable Energy Sources): Energy sources that are replenished naturally, such as sunlight, wind, rain, tides, waves, and geothermal heat.

SCC (Smart Cities and Communities): Cities that use digital technology to enhance performance and wellbeing, reduce costs and resource consumption, and engage more effectively with their citizens.

Social Opportunity Map: A map that outlines the social structure of a district, including initiatives, pioneering residents and organizations, collaborations, and communication networks among citizens.

Thermal Camera Walk: An activity where residents use a thermal-imaging camera, guided by a professional energy coach, to identify heat leaks in their homes.

PART 1:
THE PED CONCEPT

WHAT IS A PED?

As the energy hero of your city, you're tasked with the mission to design and implement a PED. In this role, you will transform diverse buildings and public spaces into a collaborative force that generates more energy than it consumes.

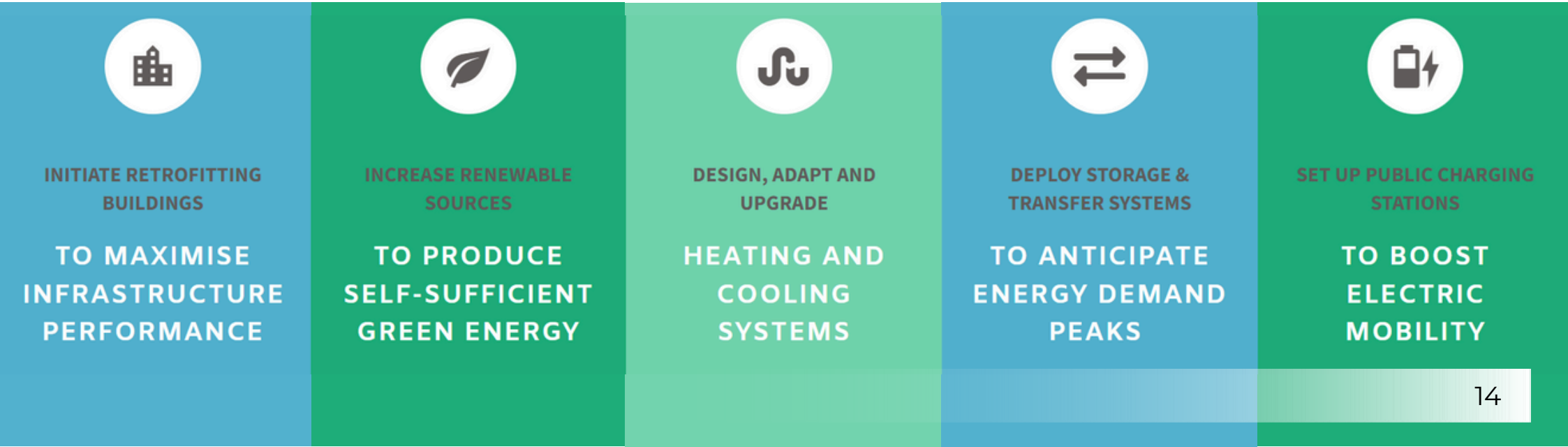
With a PED, you can ensure that your city not only meets its own energy needs but also supports its neighbors, drastically reducing CO_2 emissions. Step into your role as the energy hero and create a sustainable legacy for your city!

A Positive Energy District is defined by MAKING-CITY project as **an urban area with clear boundaries, consisting of buildings of different types—new, retrofitted, or mixed-use—and public spaces, where the total annual energy balance is positive.**

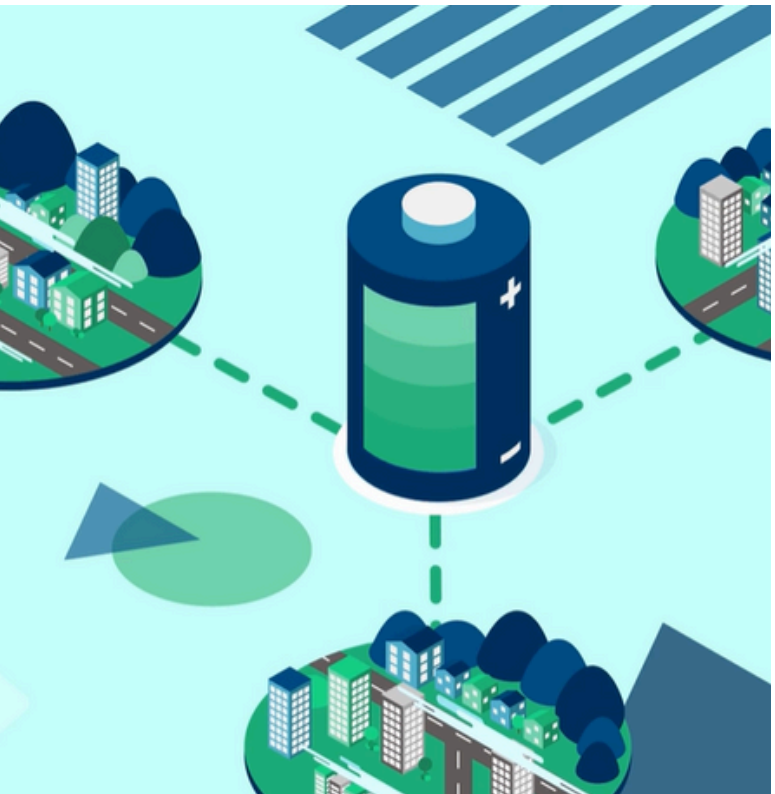
This means that the district produces more energy than it consumes, allowing any surplus to be shared with other areas. The energy balance is calculated by subtracting the energy supplied from outside the district from the energy delivered within it.

The concept of PEDs goes beyond net-zero energy districts by aiming for a positive energy balance, leveraging intensive use of renewable energy sources (RES) and high efficiency to achieve significant reductions in CO2 emissions.

The MAKING-CITY project envisions that the successful implementation and scaling up of PEDs can accelerate the energy transition process due to the ambitious and comprehensive nature of the approach.







PEDs encompass various practical applications, including:

- retrofitting buildings to enhance performance and efficiency,
- increasing the deployment of renewable energy sources to achieve self-sufficiency,
- upgrading heating and cooling systems,
- deploying storage and transfer systems to manage energy demand peaks, and
- setting up public charging stations to support electric mobility.

Furthermore, a PED is not solely focused on energy aspects. It also emphasizes the importance of stakeholder interactions, societal innovation, social entrepreneurship, and citizen participation. These elements play a crucial role in fostering the deployment of PEDs within an integrated urban transformation process.

The advantages of PEDs are numerous. They contribute to a significant reduction in CO2 emissions, improve urban living conditions through sustainable and efficient energy solutions, and act as catalysts for urban renewal. By doing so, PEDs help cities achieve global sustainability targets, such as those set by COP21, fostering a more sustainable and resilient urban future.

TOOLBOX

GamePED is an innovative workshop game designed to help participants create PEDs in urban settings. Developed by Demir Energy, the game guides players through technological, social, economic, environmental, and legal considerations in PED design.

GamePED facilitates the identification of city needs, selection of technical solutions, and analysis of barriers and enablers. It serves as a valuable tool for learning about PEDs and engaging different stakeholders, including city planners, policymakers, and community members.

Chatbot prompt: What are the benefits and drawbacks of a PED?

SECRET FILES

- D4.1 Methodology and guidelines for PED design
- The PED concept in Groningen
- The PED concept in Oulu

GOING FURTHER

Created within the ATELIER project, the **PED Start Guide** is a short e-learning module. This introductory course features insights from nine experts across various PED aspects, and provides a foundational understanding of energy-positive urban solutions.

IS YOUR CITY READY?

Every superhero needs a well-prepared city to succeed in their mission. Before embarking on the quest to establish a PED, it is essential to determine if your city is ready for this transformative step. Assessing the technical, economic, political, and socio-cultural conditions in your city will help you understand if PEDs are applicable.

Are you ready to see if your city has what it takes to become an energy-positive powerhouse? Let's find out!

Before embarking on the journey to establish a PED, it’s crucial to assess whether your city is prepared for this transformation. This involves evaluating various aspects such as economic conditions, technical infrastructure, political frameworks, and socio-cultural dynamics. By understanding these foundational elements, cities can identify their strengths and areas for improvement, ensuring a successful transition to a more sustainable and energy-efficient future. Let's explore these key readiness factors to see if your city is equipped to become a leader in the energy transition.

Economic conditions: Consider whether your city has financial mechanisms to reduce the costs of innovative materials while maximizing multiple benefits. Are grants available from the European Commission or other mechanisms, including tax reductions? Evaluate the status of ongoing or established collaborations on Public Private Partnerships among key stakeholders. What is the level of energy market concentration, and how involved are gatekeeper actors like Distribution System Operators (DSOs) and prosumers?

Technical conditions: Assess recent technological improvements for on-site renewable energy sources (RES) production in your city. Are there innovative, integrated, prefabricated packages available for building envelopes, and what is the current energy efficiency of the building stock? Evaluate the penetration of storage systems and the e-mobility market. Is your grid stable, and have







there been improvements to infrastructure? Have you identified and defined adequate PED system boundaries?

Political conditions: Consider if your city benefits from improved local and national policy frameworks, including incentives, regulations, and sanctions that support energy transitions. Are there integrated urban energy strategies and plans in place at the district or city scale? Reflect on the cooperation and support between national, regional, and local entities, and the adoption of cross-sectoral approaches. How comprehensive is the public procurement of innovations? Does your city possess high internal capacities to support the energy transition, along with strong local political commitment?

Socio-cultural conditions: Are energy communities and prosumers active in your city, fostering a culture of energy collaboration and democracy? How engaged and aware are citizens on sustainable energy issues, and is there significant social trust from a bottom-up perspective? Evaluate the acceptance of decision-makers from a top-down perspective. How are privacy concerns managed, and how favorable are the privacy protection regulations? Consider the inclusivity of your city regarding disadvantaged groups, and how well their needs are addressed.

TOOLBOX

The **PEDtool** assesses your city's readiness to develop a PED. With data for over 6,000 European cities, PEDTool offers a streamlined, three-level evaluation process.

Begin with a pre-evaluation for a preliminary assessment at the country and city level. Refine this assessment by answering 10 targeted questions designed for municipal officials, identifying specific readiness areas and providing solutions if needed.

Chatbot prompt: Can you guide me through the process of evaluating my city's readiness for implementing a PED?

SECRET FILES

- D4.3 Analysis of FWC candidate areas to become a PED

GOING FURTHER

The **We-Energy Game** is a serious game that simulates placing sustainable energy sources on a local map, promoting discussion on the energy transition. Developed from Dr. Frank Pierie's research at Hanze University, it encourages players to collaborate across different roles to achieve energy goals, raising awareness about sustainability challenges and PEDs.

SELECT YOUR PED AREA

Every superhero's mission starts with finding the perfect base of operations. In our quest to create a PEDs, pinpointing the ideal area is equally crucial.

With our GIS-based multicriteria assessment method, you'll gain the superpower to identify the best locations for energy-positive developments. Are you ready to unlock your city's true potential? Let's begin this heroic journey together!





Each category is comprised of sub-categories. For the full list, refer to D4.3 Analysis of FWC candidate areas to become a PED

PED ANALYTICAL COMPONENTS

Collecting GIS-based spatial data on the six PED analytical components is vital for accurately defining efficient PED boundaries within cities. This approach integrates local energy production and digitalization into urban planning, with a strong emphasis on energy sustainability across all levels, from the entire city down to individual buildings. The six categories are:

- **Resource availability:** This includes the existing and potential investment zones for solar, wind, geothermal, biomass and waste heat;
- **Urban macroform:** Derived from city plans and strategies, this includes new development, retrofitting, and reuse/transformation areas;
- **Land usage context:** Residential, commercial, industrial, and public administration areas, among others;
- **Technical-physical infrastructure:** This covers energy and e-mobility structures, district heating, and off-grid systems;
- **Virtual infrastructure:** Potential smart grid applications and virtual power plants;
- **Social structure:** Socio-economic and socio-cultural context, human behavior on energy consumption, and investment.

MULTI-CRITERIA DECISION ANALYSIS

The Multi-Criteria Decision Analysis questionnaire is essential for evaluating the various factors that influence the successful implementation of a PED. It considers renewable resource potential, economic opportunities, legal enablers and barriers, social context, and urban planning aspects. Environmental considerations are also integrated to provide a holistic view of the city's context.

Each category and sub-category are analyzed based on criteria such as **economic, social, technical, environmental, legal, and spatial factors.**

The MCDA questionnaire serves multiple functions: it standardizes the geoprocessing analysis, ensures consistent criteria application, aids in selecting relevant PED analytical components, and provides reclassification scores.

Additionally, it informs prioritization, helping cities identify strengths and weaknesses in becoming energy-positive.

By highlighting potential legal or infrastructural challenges, the MCDA questionnaire is a valuable tool for cities aiming to transition towards sustainable urban development.

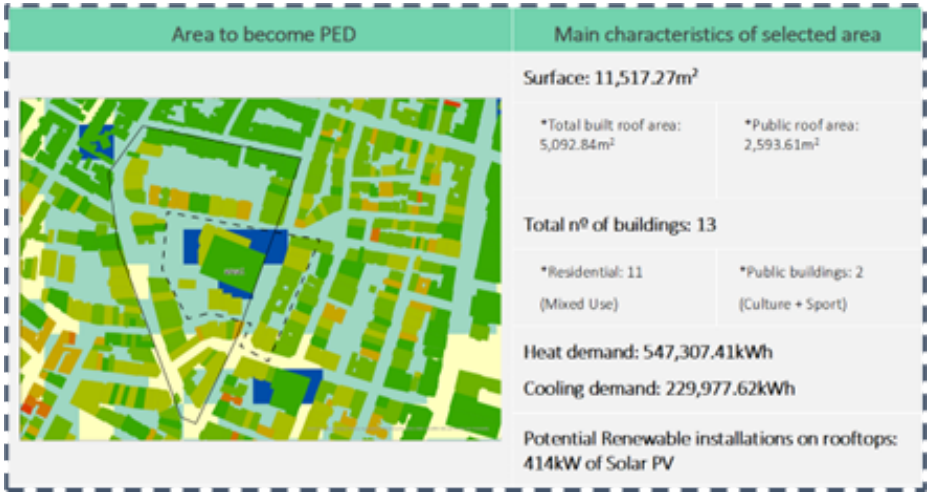
The list of criteria was developed as part of the MAKING-CITY project. It is important to continuously update these criteria to incorporate the latest technological advancements. Additionally, it is recommended that the questionnaire be completed by experts from diverse knowledge and experience backgrounds.



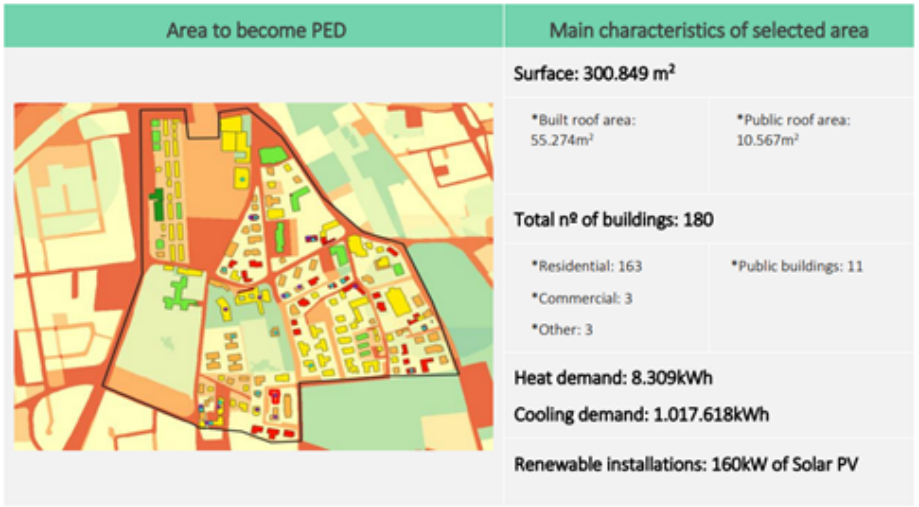
GIS-BASED OVERLAY ANALYSIS

The final step in the PED analytical process involves GIS-based overlay analysis, a crucial methodology for optimal site selection and suitability modeling. This technique applies a common scale of values to diverse and dissimilar inputs, enabling a comprehensive and integrated analysis of the spatial PED analytical components. By considering multiple factors with varying characteristics, overlay analysis helps identify the most suitable locations for PEDs.

Overlay analysis is essential for evaluating various aspects such as resource availability, urban macroform, land usage, technical infrastructure, and social structures. This method allows for a thorough assessment of potential sites, ensuring that all relevant environmental, economic, and social factors are taken into account in the planning and implementation of PEDs.



PED area selected in Kadıköy



PED area selected in Bassano Del Grappa

TOOLBOX

ArcGIS and **QGIS** are essential tools in GIS-based analysis. ArcGIS is a powerful software with extensive functionalities, including semi-automatic analysis capabilities. It is widely used for its robust features but requires a costly private license.

In contrast, QGIS is an open-source, free software option, offering a more limited range of functionalities. Despite this, QGIS remains valuable for conducting essential GIS analyses, particularly in contexts where budget constraints are a concern.

Chatbot prompt: How can I conduct a multicriteria decision analysis of my potential PED location?

SECRET FILES

- D4.3 Analysis of FWC candidate areas to become a PED
- A GIS-Based Multicriteria Assessment for Identification of Positive Energy Districts Boundary in Cities

GOING FURTHER

The **Positive Energy Districts Solution Booklet**, by the Smart Cities Marketplace, states that defining PED boundaries is vital for achieving a positive energy balance. These boundaries, whether geographical or virtual, connect to a smart grid and are influenced by the broader energy system context and upscaling strategies. They are flexible and can adapt over time, balancing local and external energy exchanges.

PART 2: STAKEHOLDER & CITIZEN ENGAGEMENT

CONDUCT A STAKEHOLDER MAPPING

Stakeholder mapping is crucial for building your team as you begin your PED project, and allows you to identify individuals, groups, and organisations with varying levels of interest, influence, and decision-making authority.

Think of each stakeholder as having unique superpowers. Mapping them helps uncover these powers, allowing you to find the ideal sidekicks to join your PED project.

Together, you'll create an unstoppable team ready to tackle energy transition challenges and build a sustainable future for your district!

KEY USES FOR STAKEHOLDER MAPPING

Engagement and collaboration: Identify and engage relevant stakeholders, fostering collaboration and building relationships for effective involvement in the energy transition.

Communication and messaging: Develop targeted communication strategies by understanding stakeholder interests and concerns, increasing support and participation in the initiative.

Decision-making and prioritisation: Prioritise stakeholders based on interest and power to allocate resources effectively, ensuring project success.

Conflict resolution: Identify conflicts early and proactively address them, fostering dialogue and consensus-building for a smooth transition.

Partnerships and resource mobilization: Identify potential partners and resources to strengthen the project through collaboration and resource sharing.

Business models development: Tailor value propositions and business models to meet the needs, interests, and contributions of stakeholders to the PED.



A DIVERSITY OF STAKEHOLDERS

Each stakeholder has varying levels of influence and decision-making authority within the PED project.

01 The **City** serves as the central force in decision-making and implementation within PEDs. Through collaboration with contractors, the City undertakes planning, design, optimization, and monitoring of energy flows, along with citizen engagement initiatives.

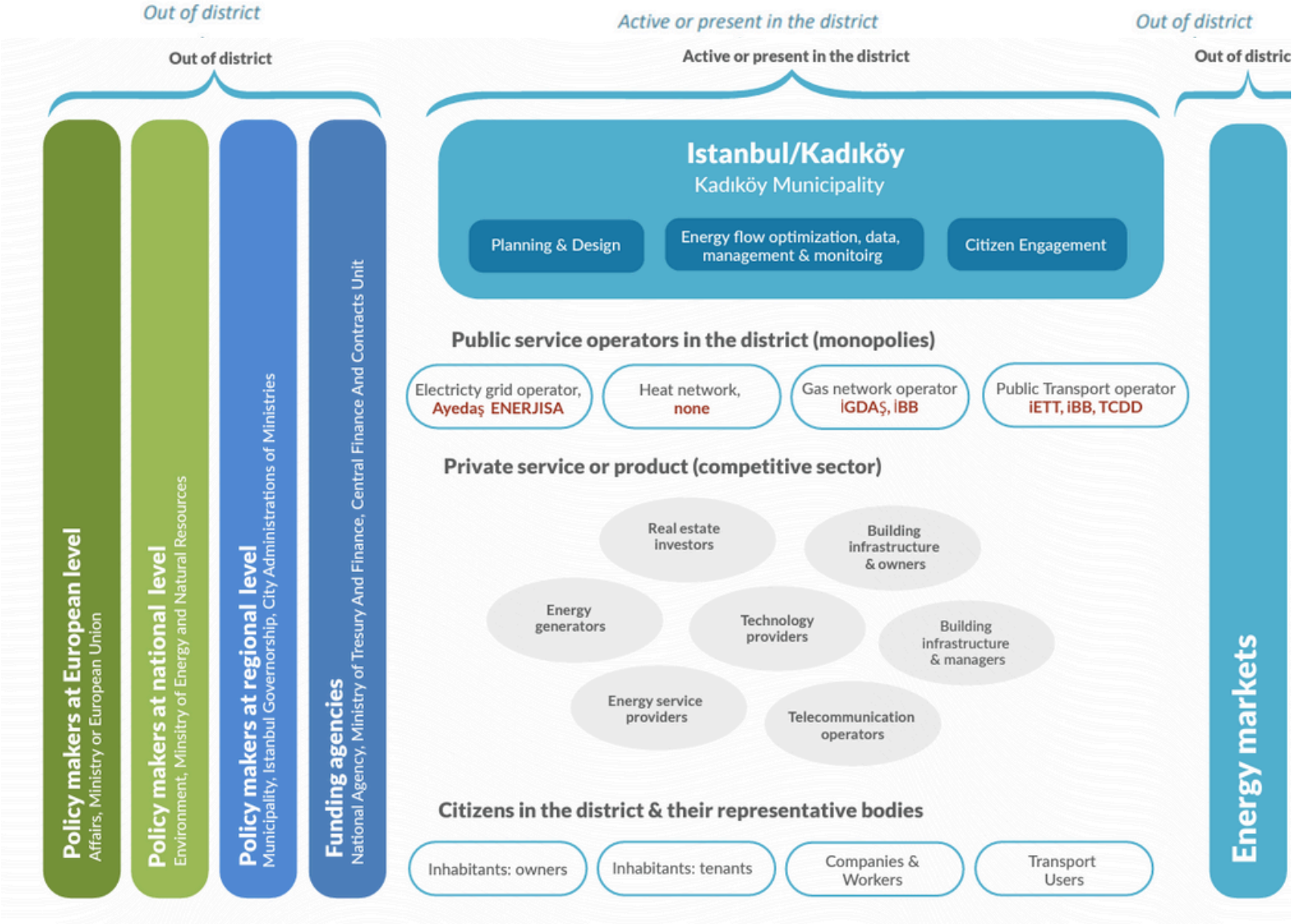
02 **Public service operators** play pivotal roles in PEDs, influenced by technological choices and available energy sources. These operators encompass electricity grid, heat network, gas network, and public transport operators.

03 **Private sector service and product providers** wield significant influence in PEDs. From real estate investors to technology providers, these entities include building and infrastructure owners, managers, energy service providers, generators, and telecommunication operators.

04 **Citizens**, whether as individuals or represented by bodies, are integral to PEDs. Active or passive, they include inhabitants/owners, inhabitants/tenants, companies, workers, and transport users.

In addition, consider stakeholders beyond the district's boundaries who still hold sway: policymakers at European, national, and regional levels, funding agencies, and players in energy markets

STAKEHOLDER MAPPING



Take a look at Kadiköy's stakeholder mapping.





While stakeholder mapping should be done early on in the project, it is an ongoing process.

As your PED evolves, new stakeholders may emerge, and existing stakeholders' interests and influence may change. Regularly review and update your stakeholder mapping to ensure it remains relevant and inclusive.

HOW TO CONDUCT A STAKEHOLDER MAPPING

01 **Define purpose:** Clarify why you're mapping stakeholders. Whether to understand interests, assess influence, or find collaborators, defining your goal focuses efforts and information gathering.

02 **Identify categories:** Recognize which stakeholder groups are relevant to your PED. These could include residents, businesses, government agencies, and energy providers.

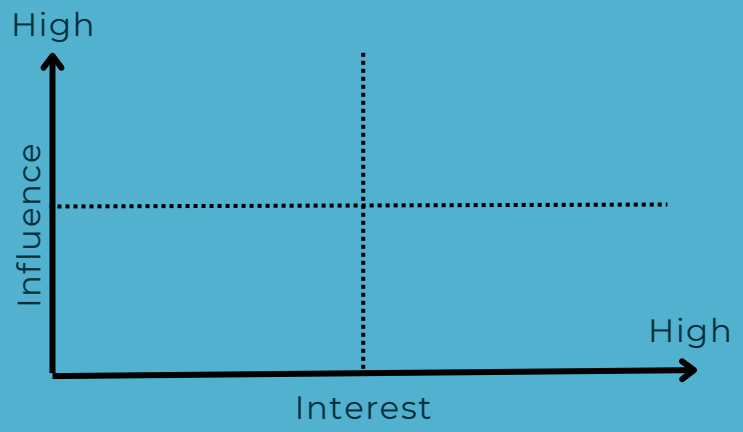
03 **Gather information:** Collect data on each stakeholder category. Utilise research, interviews, or existing databases to understand their roles, interests, and potential contributions to the PED. Assess their influence, resources, and expertise.

04 **Analyse and prioritise:** Focus engagement efforts on key stakeholders, while still considering the needs of others. Strive to find a balance.

05 **Tailor communication:** Develop tailored communication strategies for each stakeholder category. Account for preferred channels, interests, and potential barriers to engagement.

TOOLBOX

The **stakeholder analysis matrix** provides a structured approach to identify, categorise, and prioritise stakeholders based on various indicators. Examples of indicators include influence, interest, urgency, risk tolerance, expertise, dependency...



Chatbot prompt: What tools and methodologies can be used for stakeholder mapping?

SECRET FILES

- D6.1 Ecosystem analysis for Positive Energy Districts
- Kadiköy factsheet

GOING FURTHER

This report outlines the citizen and stakeholder engagement strategies for ATELIER's Lighthouse Cities, Amsterdam and Bilbao. It provides a theoretical framework on participation and engagement within the energy community, emphasizing the significance of concepts like energy citizenship and energy communities.

MAP THE SOCIAL CHARACTER OF A DISTRICT

Understanding the social character of a district is a vital component of developing a successful PED. This goes beyond merely conducting a technical mapping of infrastructure and potential energy outputs; it involves a deep dive into the social dynamics and fabric of the community. A PED is about energy, but also the well-being and empowerment of citizens.

Like how a superhero understands their allies' strengths and weaknesses, this process helps us grasp the unique needs, aspirations, and challenges of the residents.

MAP THE SOCIAL CHARACTER

01

Conduct a social-cultural analysis

Begin by delving into the heart of your district's social fabric. Gather essential social data, including income, education, age demographics, and more. This initial step lays the groundwork for crafting tailored communication approaches that resonate with diverse groups of citizens.

Dive deeper through interviews and focus groups to better understand residents' level of knowledge on climate neutrality and motivation to be part of a PED.

How did Groningen engage citizens in the energy transition? Read more in our "Energy Transition as a Social Process" magazine.

02

Explore the wishes, demands and needs of citizens in the district

Identify the citizens' hopes and aspirations through conversations with the citizens about the energy transition and the aspirations for their community. This can take place in informal, casual settings, as well as facilitated meetings or through surveys.

Create detailed notes of these conversations to develop a program that is aligned with the needs and aspirations of citizens. This program will guide the development of effective transition strategies and foster citizen engagement in the process.





03

Identify energy types

Based on insights gained from conversations with citizens, categorize them into distinct energy types. Recognize that not every citizen shares the same motivations, attitudes, or capacities to contribute to the transition. Therefore, customizing approaches is essential to effectively involve diverse individuals in the transition.

Energy types serve as the foundation for personalized communication, products, and services. They can be further developed into energy personas, fictional representations of citizens with unique characteristics and needs.

04

Social district structure

Dive into the social fabric of the district to pinpoint entry points and kickstart the transition process. Understanding the social structure provides invaluable insights into where and how to initiate change within the community.

Create a social opportunity map that outlines the social structure of the district, mapping the initiatives, pioneering residents and organizations, collaborations, and communication networks among citizens, as well as promising locations in the district for a PED.

By following these steps, you can effectively map the social character of a district and gain valuable insights into the needs and aspirations of its residents.

TOOLBOX

The **cultural probe** technique involves giving residents diaries or postcards with specific tasks, like answering questions about their feelings and home at a set time each day. Additionally, residents can be asked to take photos of places they like and dislike in their environment or describe in one sentence what they appreciate about their living area and wish to carry forward into the future.

Learn more about different participation and communication strategies housing corporations can use, as compiled in the **POCITYF** project.

Chatbot prompt: Why is it important to consider the social aspects when planning a PED?

SECRET FILES

- D4.1 Methodology and guidelines for PED design
- Energy citizenship in new energy concepts
- Towards energy citizenship for a just and inclusive transition
- Energy transition as a social process

GOING FURTHER

Community mapping crowd-sources ideas from local people, allowing them to share information by selecting places on a common map.

The +CityxChange project developed a **mapping tool** for Limerick residents to share ideas on the energy transition.



ENGAGE CITIZENS

PEDs must be planned and designed not only technically but also economically and socially aligned with a participative perspective.

Engaging citizens in your PED project is crucial for its success. Citizen engagement is not just a one-time activity but an ongoing process that should span the entire lifecycle of the project. They just may be your strongest allies!

HOW TO ENGAGE CITIZENS

The importance of citizen engagement and collaboration cannot be overstated. One effective approach is to **collaborate with pioneering citizens, businesses, or organizations** within the district. Experience shows that citizens are more inclined to listen to and trust their neighbors than an organization they perceive to have different or conflicting interests. These pioneers can act as ambassadors, sharing their experiences, thereby increasing awareness and enthusiasm in the district.

In Oulu, a key challenge is to create a shared vision of the future that residents can recognize and value. To address this, the City of Oulu utilizes **community bridges and forums** that are open to everyone. Typically, a resident chairs these activities, allowing people to participate and interact with public actors and each other. This involvement ensures that residents are included in the planning and decision-making processes concerning their residential area and services.

Project partners in Groningen developed the **Unified Citizen Engagement Approach** (UCEA), a design-oriented framework for citizen engagement in the energy transition. This framework combines the perspectives of citizens, the municipality, and various initiatives, fostering a more inclusive and comprehensive approach to engagement.







FIVE PHASES OF UCEA

01 **Discovering:** gathering insights on issues within the district, establishing first contact between actors, forming a core team with a shared vision.

02 **Initiating action:** raising awareness, discussing different ideas and scenarios publicly, collaboratively deciding on an approach.

03 **Exploring and analysing:** exploring (collective) possibilities, choosing one or several solutions supported by relevant stakeholders.

04 **Execution, planning and implementing:** formulating an execution plan, implementing the chosen solution(s).

05 **Exploiting and sustaining:** project management and maintenance, implementing business models, evaluation,, realisation of the specific project goals, and overall increase of citizen well-being.

The framework is designed to be flexible, allowing for various 'routes' that need not be followed in a specific order. Users can move back and forth between activities or create a custom path, with the framework accommodating simultaneous activities as needed based on local context.

TOOLBOX

A **thermal camera walk** involves residents using a thermal-imaging camera, guided by a professional energy coach, to identify heat leaks in their homes. This activity has successfully engaged around 500 Groningen residents, fostering community discussions on energy conservation.

A brief training session equips participants with the knowledge to use the camera correctly. Collaborating with neighbors makes the process more enjoyable and effective. Similar house types allow for better identification of issues, and shared insights,

Chatbot prompt: How can I organize a participatory workshop with citizens?

SECRET FILES

- The Unified Citizen Engagement Approach
- Energy citizenship in new energy concepts
- Citizen engagement strategies webinar

GOING FURTHER

Developed within the +CityxChange project, **Limerick's Citizen Innovation Lab** is a collaborative space where people shape a sustainable future for the city. Aligned with Limerick's goal of becoming climate-neutral by 2050, the Lab facilitates engagement and experimentation and includes a Citizens' Observatory, Engagement Hub, digital platform, and events program.

PART 3: BUSINESS MODELS AND FINANCE

DEFINE THE VALUE PROPOSITIONS OF YOUR PED

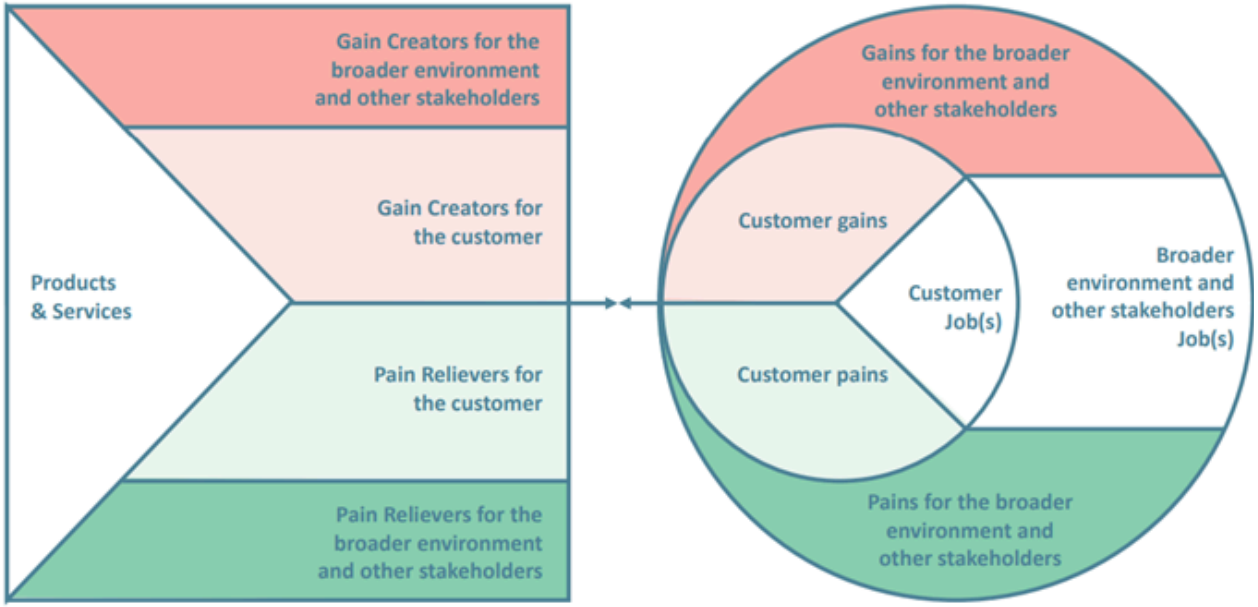
Understanding the needs and challenges of stakeholders is crucial for your PED project. Using Value Proposition Design modelling, you can create tailored value propositions that ensure your project delivers meaningful benefits and gains broad support from all involved.

Remember, dear superhero, effective stakeholder engagement is key—so engage, listen, and co-create value propositions together.

VALUE PROPOSITION

A value proposition articulates the **benefits a company delivers to its potential customers.** The Value Proposition Canvas, created by Alexander Osterwalder, visually illustrates the alignment between a company's offerings and customer needs.

In MAKING-CITY, the ad-hoc canvas builds on the Value Proposition Canvas by incorporating **additional layers to account for the broader environment and other stakeholders.**



Ad-hoc canvas for value proposition, customer analysis and impact analysis

The majority of Groningen citizens want to stop using gas that is extracted from the nearby gas fields and is causing local earthquakes.

The Municipality of Groningen aims to make the city energy neutral by 2035 and develop renewable energy sources. In the long run, the financially viable system would create a gain for the citizens: a decrease in energy bills.





01 **Identify the stakeholders directly involved and indirectly impacted by your PED project.**

Use the stakeholder mapping as a basis: consider stakeholders such as real estate investors, building and infrastructure managers, energy generators, technology providers, city and service providers, public service operators, policy makers, funding agencies, and more.

02 **Define the profile of these stakeholders by analyzing their jobs, needs, pains, and gains.**

- What are their current challenges and pain points?
- What are their desired outcomes and gains?
- How can your PED project address these needs and provide value?

Consider the specific context and objectives of your PED project to tailor the value propositions accordingly.

03 **Define the value proposition**

Sketch out the value proposition of the services or products developed for and by each stakeholder. Based on the insights gained from the stakeholder analysis, articulate how your PED project can meet their needs, solve their problems, and deliver value.

Consider the unique benefits and advantages your project offers, such as energy cost savings, improved comfort, reduced environmental impact, or enhanced reputation.

TOOLBOX

The value propositions of the PED project need to be co-created and based on stakeholder input. For Groningen and Oulu, a **questionnaire** was sent to PED project partners, followed by a **semi-structured interview.**

This process aimed to better understand stakeholder profiles (jobs and needs, pains and gains) and to inform the value proposition design for the services or products developed within the PED project.

Chatbot prompt: Provide the questionnaire used for value proposition design.

SECRET FILES

- D6.1 Ecosystem analysis for PEDs

GOING FURTHER

The RESPONSE project deliverable, **D5.1 Business Models Foreground & Preliminary Flows Assessment**, develops the Smart City Circular Business Model Canvas (S2CBMC) to guide value proposition design in smart cities, integrating circular economy principles and IoT data to align stakeholder needs with sustainable solutions.

BUSINESS MODELS

In a PED initiative, defining multiple business models for each product or service delivered by the various stakeholders is essential.

As the PED concept involves cooperation among diverse organizations and serving different users, tailored business models ensure effective coordination and alignment with overall project goals.





A business model explains **how an organization creates, captures, and delivers value**. The design of a new business model has as its final purpose the creation of business models that satisfy market needs that have not been met yet, introduce new technologies, new products or new services, improve or disrupt existing markets, or create new markets.

A PED is not an organisation as such, delivering products or services to customers or users. Rather, a PED is a concept built through the cooperation of several organisations, being them public (city, public service operators, etc.) or private (real estate investors, building managers, etc.). Therefore, business models for products or services delivered by each stakeholder involved in PEDs should be defined in such a way the PED concept works, is scalable and replicable, and delivers benefits to the city, the citizens and the environment.

Building on the value proposition (refer to the previous section), the business model details the activities the organisation takes to deliver the value proposition, the resources it requires, the means of communication with customers, as well as the cost structure and the revenue streams, including pricing.

The business model can also **take into account the social and environmental costs and benefits** generated by the organization.

The choice of business models for PED projects depends on the nature of the project, the stakeholders involved and the specific context.

For example, the business model for a district energy system is very project-specific. It needs to ensure that all of the players involved – including investors, owners, operators, utilities/suppliers, end-consumers and municipalities – can achieve financial returns, in addition to any wider economic benefits that they seek.

In the **“wholly public” model**, the public sector, in its role as local authority or public utility, has full ownership of the system, which gives it complete control of the project and makes it possible to deliver broader social objectives, such as environmental outcomes and the alleviation of fuel poverty through tariff control. The city takes on most of the risk associated with the investment.

The **public and private joint venture model** typically consists of the creation of a Special Purppose Vehicle, with ownership split between public and private sector. Risks can be shared between partner. In this model, both the private and public sectors provide equity. Debt is based on the project’s future cash flow but can be underwritten by either party. The presence of the public sector can mean that other sources of finance become available, such as grants, local authority debt and development bank loans.



TOOLBOX

The **Business Model Canvas** (BMC) as developed by Alexander Osterwalder is a tool to visualize and easily communicate a business model. The canvas can also be used to design new models.

The BMC consists of nine building blocks: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure.

Chatbot prompt: What common business models are used for PED projects?

SECRET FILES

- D6.1 Ecosystem analysis for PEDs
- D4.1 Methodology and guidelines for PED Design - Annex III Business model guidelines for PEDs
- A collaborative business model for local energy storage: the case of Groningen, the Netherlands

GOING FURTHER

Learn about **four emerging business models** adaptable to PED projects, developed within the framework of SPARCS.

FINANCIAL TOOLS

A PED initiative consists of a range of projects, such as building retrofitting, renewable energy production, public transport infrastructure, and setting up charging infrastructure for EV vehicles. Each project needs its own funding plan.

Carefully consider the financing requirements of your projects to determine the suitable financial models and providers in order to propel your mission forward.

FINANCIAL MODELS

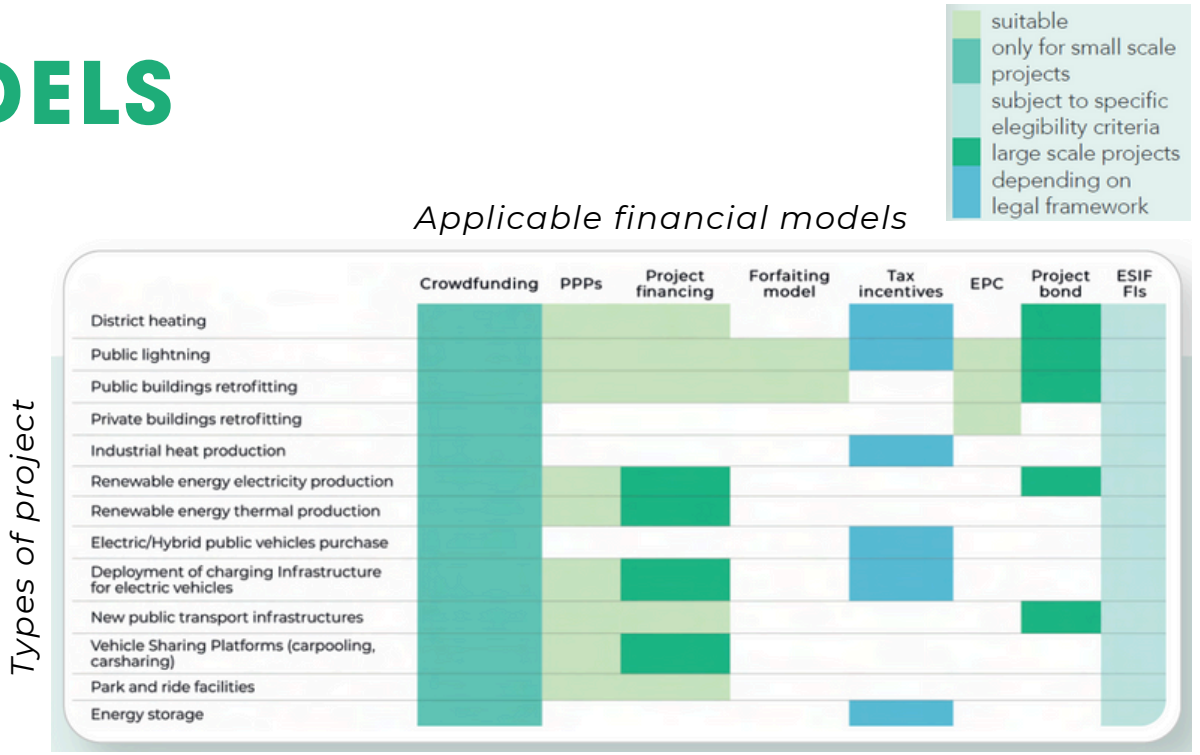
The selection of financial models is contingent upon several factors including project scale and legal framework. A few examples of models:

A **direct loan** is tailored for companies boasting a solid credit history and mature business lines, and is relevant in projects with significant upfront costs.

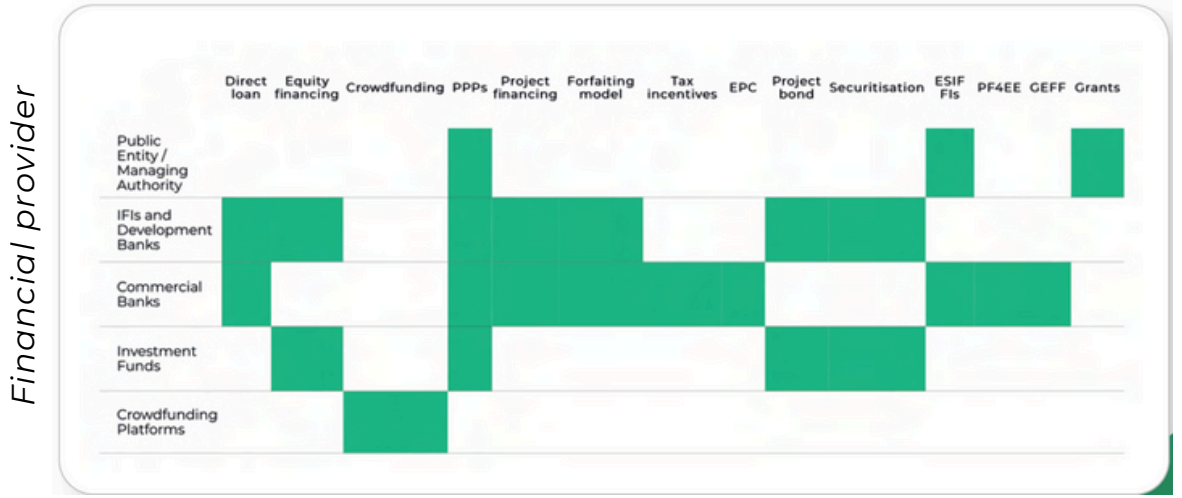
Equity financing involves becoming a financial stakeholder in an unlisted company with the aim of fostering its growth. Funds are raised via the issuance of new shares or the increase of the nominal value of existing shares.

A **public-private partnership (PPP)** is a framework for collaboration in the establishment and/or administration of public assets or projects of public interest, and is ideally suited for initiatives capable of generating revenue streams.

Applicable financial models



Applicable financial models

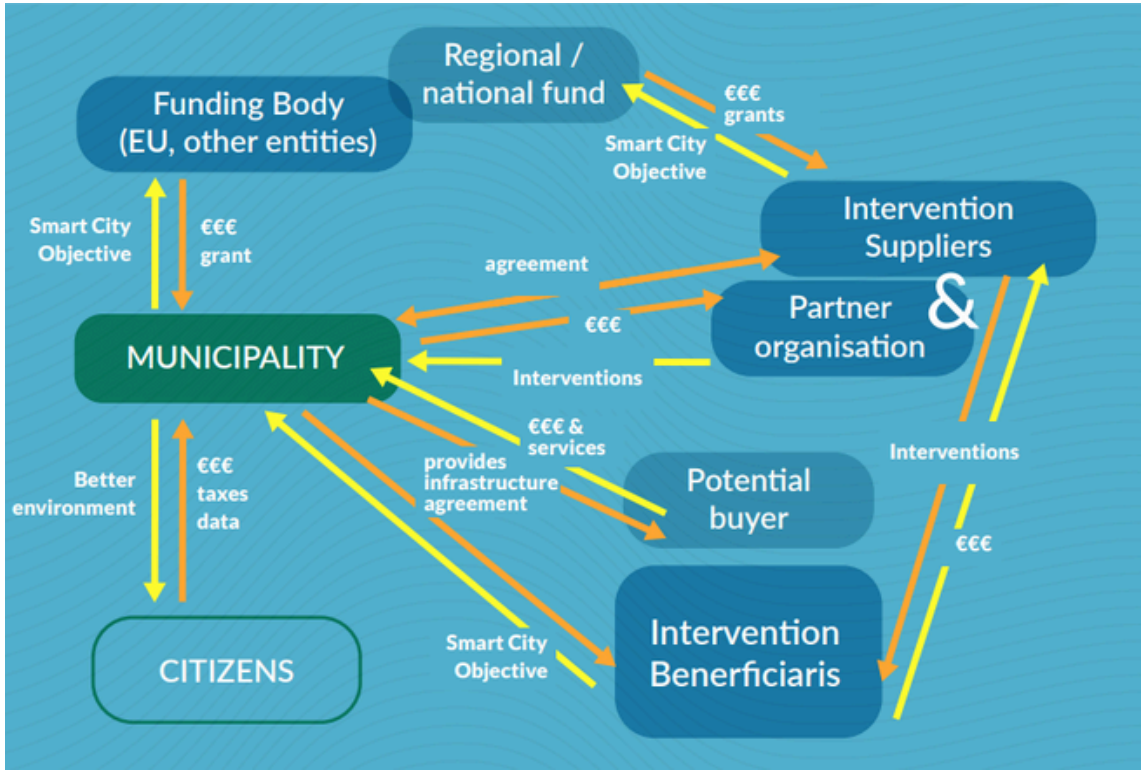






LEÓN'S PED

For its PED project, León has undertaken various initiatives, including district heating, retrofitting public and private buildings, and producing renewable energy. This approach is supported by a diverse mix of financing sources such as direct loans, public-private partnerships, and crowdfunding. The PED project in León sees a collaboration of different stakeholders working together.



TOOLBOX

The MAKING-CITY **financial toolbox** helps cities that wish to replicate MAKING-CITY solutions identify relevant financial models and providers.

Cities require funding to invest in new infrastructure by procuring solutions from providers, while providers need to invest in product and service development, as well as in skills and personnel. The toolbox addresses both types of investments.

Chatbot prompt: What financial providers can be involved in PED projects?

SECRET FILES

- D6.7 Financing solutions for cities and city suppliers (includes financial toolbox)
- León factsheet

GOING FURTHER

The SPARCs project deliverable, **D7.1 Business Models and Financing Mechanisms for Wide Uptake of Smart City Solutions**, guides smart city development in Positive Energy Districts, covering business model creation, economic feasibility, and innovative financing to help cities secure funding and scale solutions across Europe.

ANNEXES

ANNEX 1: REFERENCED DELIVERABLES AND SUPPORTING RESOURCES

Project	Category	Title
MAKING-CITY	Deliverable	D4.1 - Methodology and guidelines for PED design
MAKING-CITY	Deliverable	D4.3 Analysis of FWC candidate areas to become a PED
MAKING-CITY	Deliverable	D6.1 - Ecosystem analysis for Positive Energy Districts
MAKING-CITY	Deliverable	D6.7 - Financing solutions for cities and city suppliers
MAKING-CITY	Scientific article	A GIS-Based Multicriteria Assessment for Identification of Positive Energy Districts Boundary in Cities
MAKING-CITY	Scientific article	Energy citizenship in new energy concepts
MAKING-CITY	Scientific article	Towards energy citizenship for a just and inclusive transition

Project	Category	Title
MAKING-CITY	Scientific article	The Unified Citizen Engagement Approach
MAKING-CITY	Scientific article	A collaborative business model for local energy storage: the case of Groningen, the Netherlands
MAKING-CITY	Website article	The PED concept in Groningen
MAKING-CITY	Website article	The PED concept in Oulu
MAKING-CITY	Magazine	Energy transition as a social process
MAKING-CITY	Game	We-Energy Game
MAKING-CITY	Game	GamePED
MAKING-CITY	Tool	PEDtool

Project	Category	Title
MAKING-CITY	Webinar	Citizen engagement strategies
MAKING-CITY	Factsheets	Factsheets
+CityxChange	Webpage	Community Mapping Tool
+CityxChange	Webpage	Limerick's Citizen Innovation Lab
ATELIER	MOOC	PED Start Guide
ATELIER	Deliverable	D7.1 Citizen and Stakeholder Engagement Plans
RESPONSE	Deliverable	D5.1 Business Models Foreground & Preliminary Flows Assessment
Smart Cities Marketplace	Booklet	Positive Energy Districts Solution Booklet

Project	Category	Title
SPARCS	Deliverable	D7.1 Business Models and Financing Mechanisms for Wide Uptake of Smart City Solutions

ANNEX 2: TECHNICAL SOLUTIONS FOR POSITIVE ENERGY DISTRICTS

While **technical solutions** are not the primary focus of the MAKING-CITY Toolkit, they play a crucial role in the successful implementation of PEDs. For those who wish to explore the technical dimensions of PED deployment further, this section compiles essential deliverables and resources. These materials provide detailed guidance on critical technical aspects, including PED design methodologies, energy storage systems, and techniques for calculating energy balances.

Implementing PEDs can be complex, given the involvement of diverse stakeholders with varying needs and interests. As a result, **standardized solutions may not always suffice, and the ability to tailor technical approaches to the specific context of each project is vital.** Ensuring flexibility and customization in technical solutions is key to addressing these challenges effectively and ensuring the success of PEDs.

For more in-depth technical guidance, refer to the following resources:

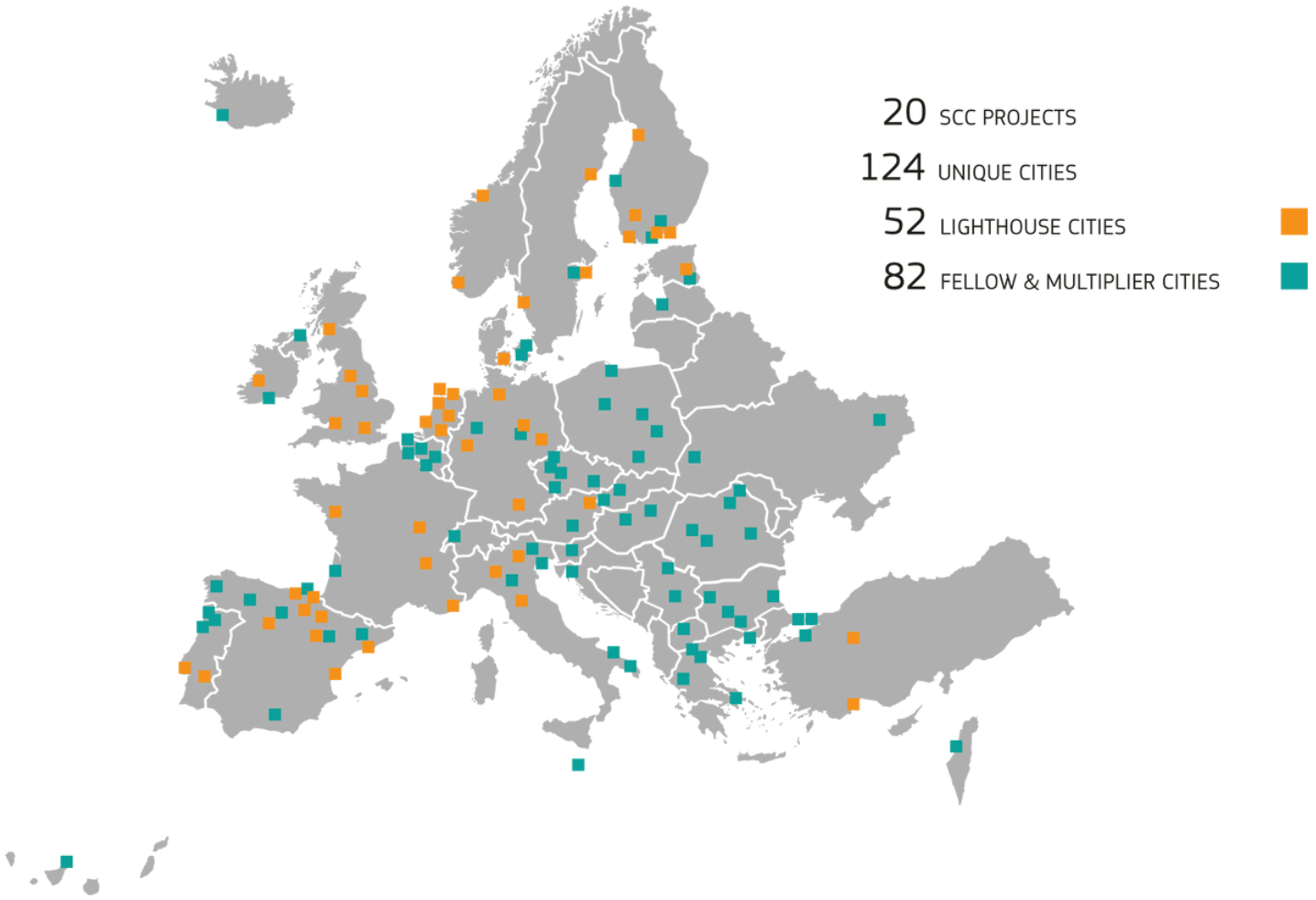
- D1.2 City Diagnosis Analysis of Existing City Plans
- D1.3 Tools for Modelling
- D2.1 Oulu PED Kaukovaino Interventions Detailed Design
- D3.1 Groningen PEDs (North, Southeast) Interventions Detailed Design
- D4.1 Methodology and Guidelines for PED Design (notably Annex I on Barriers/Enablers of the Solutions and Annex II on Spec Cards of Solutions)
- D4.2 Guidelines to Calculate Annual Energy Balance of PED
- D4.4 Technical Design of PED in Follower Cities

Additionally, to assist in navigating these technical aspects, please engage with the **PED Hero Assistant.**

SCALABLE CITIES

The MAKING-CITY project is part of Scalable Cities, an initiative by the European Commission aimed at creating a network of innovative, sustainable, and climate-neutral cities across Europe. Scalable Cities encompasses 124 unique cities involved in 20 Smart Cities and Communities (SCC) projects funded by Horizon 2020 and Horizon Europe.

These projects work with academia, industry, and associations to implement over 550 demonstrations of technological and social innovations in areas such as mobility, buildings, urban data, ICT infrastructure, and citizen engagement.



"Scalable Cities." Smart Cities Marketplace, European Commission. Available at: https://smart-cities-marketplace.ec.europa.eu/scalable-cities



Get in touch via the following channels & scan the QR code to discover more!

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