Guidelines for PED projects at early stages of development

(D4.3)

PED-ID

Holistic assessment and innovative stakeholder involvement process for identification of Positive-Energy-Districts

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Introduction

PED-ID Project

PED-ID is an innovation project aiming to accelerate the urban environment's decarbonisation by promoting the implementation of Positive-Energy-Districts (PED). PEDs are districts in urban areas that manage their resources to achieve net-zero energy balance (more energy is produced than consumed) and reduce greenhouse gas emissions. This project provides decision-makers with improved information about methods, tools and guidance for PEDs at an early stage of development, proposing a knowledge-based participation process. Stakeholders can actively use these methods in the data-driven participation process to consolidate their options and make decisions based on data. This process will be tested using real Living Labs of potential PED projects. With the help of this method, the decision on sites will be accelerated to reach the goal of 100 PED sites in Europe.

Scope of this document

- **What & Why** – what are PEDs? Why are they relevant? Which are the benefits? How does the PED process work? What aspects are involved in a PED?
- **Who is involved?** – Who are the stakeholders within a PED? How to map, analyse and understand them? How to engage and keep them involved?
- **Holistic method** – step by step on assessing and developing scenarios for a PED. How to select the best solutions? What is a holistic approach? Which business models to consider?
- **Roadmap to navigate the first stages of a PED process** – strategic and planning phases.
- **Living labs** – our project experience with PEDs in real life.
- **Other PED-ID publications** – a summary of all the reports and results published by PED-ID.

What & Why

The PED definition is not yet clear and comprehensive. The following text introduces various approaches to dealing with and defining the PED concept. Subsequently, based on their analysis, a summary of the main features of PED is presented.

PEDS ARE POSSIBLE NOW: solving present problems and mitigating future ones.

HOLISTIC METHODOLOGY IS BETTER: a symbiosis between different aspects such as technical, environmental, energy and others.

COLLABORATION IS NECESSARY FROM TOP TO BOTTOM: stakeholders must be involved in the early stages to help build the project vision and goals.

We from **PED-ID have the expertise** to be a facilitator and support you navigate through the process, from top to bottom.

PEDs Benefits

PEDs form urban transformation processes that integrate energy and urban planning process to achieve positive energy and climate-neutral neighbourhood. By combining these two areas into one holistic plan, PEDs are capable of providing many **benefits** to stakeholders and the city, such as:

- **A road to achieving climate neutrality in urban environments:** by integrating energy aspects, sustainability and climate neutrality into urban projects, PEDs represent pathways for cities to achieve climate neutrality. It promotes behavioural changes at many levels: in city design and urban planning, energy supply/management/consumption, building standards (energy efficiency first) and overall consumer behaviour (changing from a passive role to an active role in energy communities).

- **Energy resilient neighbourhoods:** areas that not only have a plus energy balance but also ensure business, habitants and users a reliable and regular supply of energy and contingency measures in place to guarantee energy access for all. Energy resiliency is also a way to mitigate energy poverty and supply citizens with reliable and climate-neutral energy sources for everyday activities.

- **Reduce energy costs:** In PEDs, energy savings and thus cost reduction come from shifting energy supply to a local level and managing the energy consumption and flexibility available along with energy-efficient buildings.

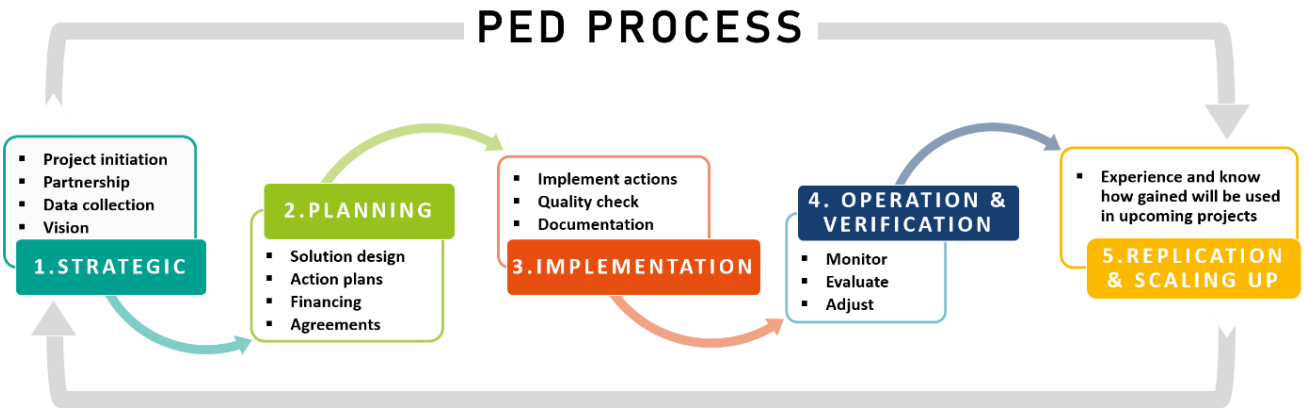
- **Improve life quality and district dynamics:** Ultimately, the PED actions and process will not only reach a climate-neutral and plus-energy neighbourhood but also a sustainable one, where stakeholders aim to live, work and develop.

- **Fostering innovation:** This makes sense in the PED context because they require a change in the way of thinking and designing neighbourhood-level actions and transformation. In this environment, new solutions and innovative designs and concepts are fertile ground to grow and be tested. It does

not necessarily mean high-tech approaches, but new strategies and arrangements that contribute to the PED goals can come up as solutions for the project.

Process Map

PEDs are not only projects but also processes – it involves a series of tasks that retro-feed one another and achieve the PED goal in a learn-by-doing practice. PEDs depend highly on local conditions (physical, social, and economic, regulatory factors), thus making it very complex to establish a definite process map to follow top-to-bottom by developers. Nevertheless, some steps should be more-less similar to PEDs throughout Europe. Below is presented an overview of how a PED process looks like from the very early stages until the replication phase:



1. **Strategic:** Establishing support and network for the process. Early stages of development, in which partnerships are formed, data is collected and analysed, and overall PED objectives and goals are agreed upon.
2. **Planning**: This is where concepts for the PED are created, solutions and designs are developed, and agreements between stakeholders are set. Here, we are planning and investigating what could be done in the PED area.
3. **Implementation**: This is where concepts for the PED are created, solutions and designs are developed, and agreements between stakeholders are set. Here, we are planning and investigating what could be done in the PED area.
4. **Operation & verification:** This is where concepts for the PED are created, solutions and designs are developed, and agreements between stakeholders are set. Here, we are planning and investigating what could be done in the PED area.
5. **Replication:** Disseminate and share the results with other potential districts - learnings, challenges and experiences.

Each step is a new understanding for the stakeholders involved. Therefore between each phase, it is recommended to have feedback loops and retro-feed information and learnings. **It is a living process that adapts according to experience gained.**

What is a PED?

PEDs are energy-efficient and energy-flexible urban areas, which essentially generate more renewable energy (RES) than it consumes over a period of time, usually yearly based. **Therefore, the PED represents:**

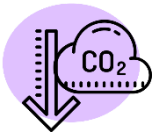
Group of buildings or urban area ▼
Minimum 3 buildings in respect of positive energy blocks (PEBs).

High degree of system and communication integration ▼
Requires interconnection and interaction of several sectors (private buildings, public buildings, transport and mobility, infrastructure…).

Energy management ▼
A shift from the basic level of EM implementation to the advanced level of EM implementation. Utilization of the energy flexibility concept and demand-response principle.

Energy-efficient buildings ▼
Energy efficiency first to reduce energy needs to its lowest levels: Plus energy, Zero energy, Passive standard.

Local RES and energy storage ▼
PEDs rely exclusively on the (local) renewable energy sources and energy storage systems.



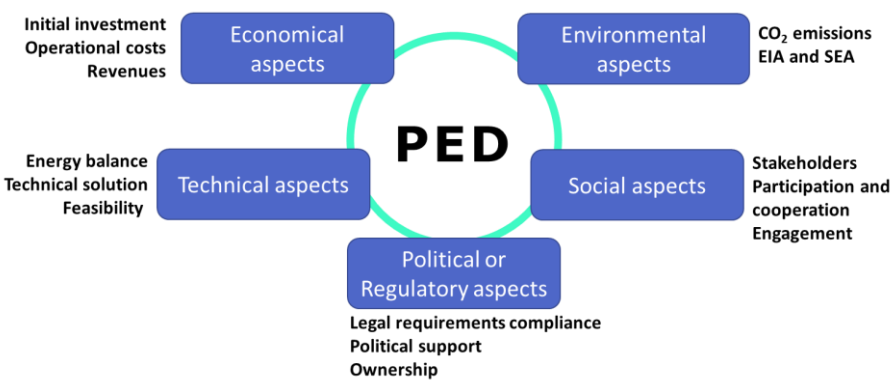
Net-zero energy import and GHG emissions ▼
PEDs represent the path to the (local) carbon neutrality and strive for zero GHG emissions balance.

Innovative social, technology, material or technical solutions ▼
PEDs are not limited by the chosen solutions. Modern and innovative technologies and approaches will be essential for the implementation.

These points represent the main elements of PEDs, a very comprehensive system with many associated risks, challenges and other opportunities. In a PED project, we must **combine the synergies from various areas to achieve an energy-positive balance** while creating an emission-neutral, energy-self-sufficient, sustainable local economy and system.

→*Read more about this is D3.1*

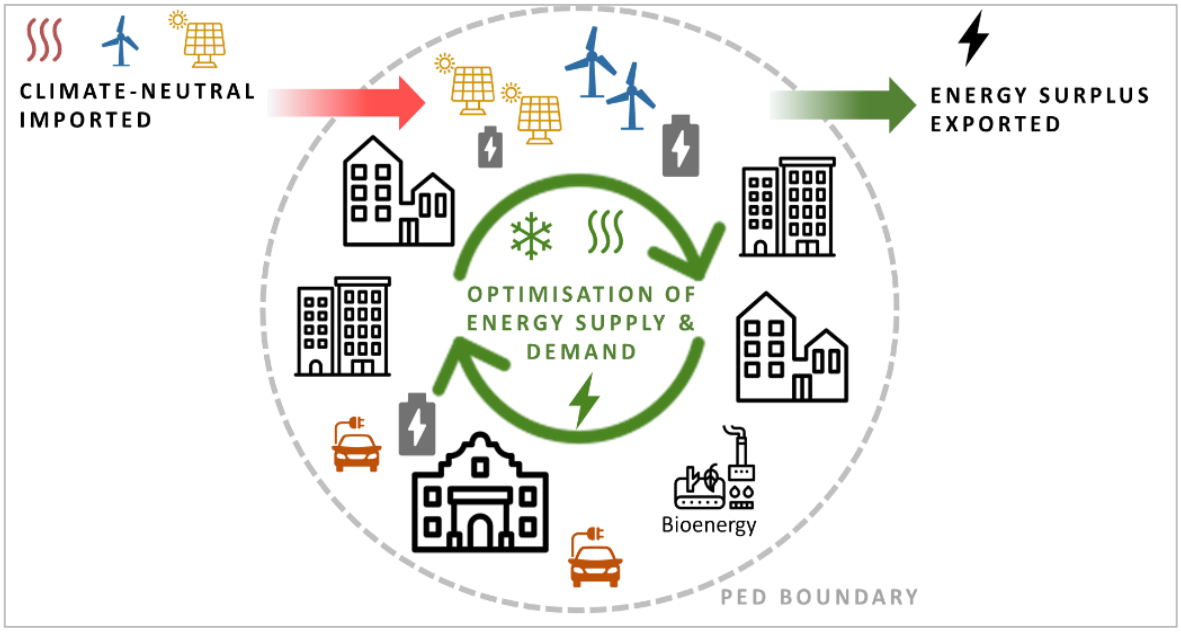
Aspects of a PED



The PED's main objective is to establish an **energy balance that is positive for an urban area.** Consequently, the design needs to **integrate the energy needs and analyse the district as a holistic urban system,** including economic, technical, environmental, social and regulatory factors. These five perspectives do not represent five separate areas. They are interconnected and intertwined in many cases. Therefore, it is necessary to address them as a whole complex cycle or mutual process.

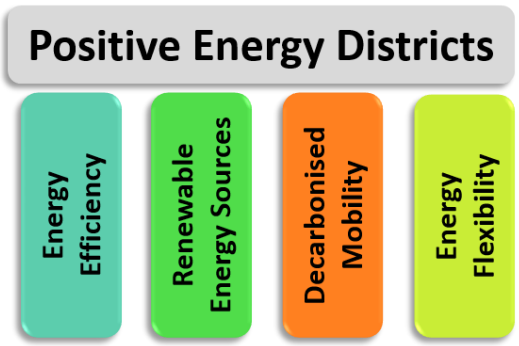
System boundaries

PEDs are energy self-sufficient locations that provide a secure energy supply while responding flexibly to changing demand, balancing energy consumption peaks and optimizing energy supply. Surplus production of renewable energy is integrated and supplied to the regional or national energy distribution network.



The goal of positive energy districts is to minimize energy consumption, use highly efficient systems and cover energy consumption with local renewables. PEDs should ideally form a coherent area where all relevant parameters can be evaluated. First, it is necessary to identify the area's potential, i.e., its possibilities, barriers and limits (data collection). Then, a decision on selecting the f**inal outline and system boundaries is made based on elements of the area:** possibilities, opportunities, barriers and

limits. The goal of PED is to produce more energy than it consumes using highly efficient systems and covers energy consumption with local renewables as much as possible. Therefore the four energy pillars (efficiency, renewable, mobility and flexibility) should be conceived and designed to minimise overall consumption, explore production and optimise demand.



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PEDs can achieve:

- **Positive energy balance based on local renewable energy sources, energy efficiency measures and energy flexibility management.**
- **Acceleration towards carbon neutrality**
- **Energy-system transformation**
- **Improved local climate & life quality**
- **Reduction of energy poverty**
- **Increase energy resilience of the community**
- **Guarantee energy supply security**
- **Opportunities for new business models and revenue sources**

Objectives & driving forces:

Who is involved?

Stakeholders are all companies, persons and organisations that may be affected or impacted by the project. **In an urban transformation process such as PEDs, it is essential to communicate and engage stakeholders from the very early stage to achieve project goals.** The stakeholder engagement methodology used in PED-ID was based on a previous experience with multi-stakeholder and co-creation processes related to sustainable urban development: The Södertörn Model[1]. It highlights three important core city planning and urban development elements and proposes that urban development should be:

1) KNOWLEDGE-BASED:	2) COLLABORATIVE:	3) VALUE-CREATING:
Urban planning based on knowledge, using methods for gathering & analysing data and channels for sharing it.	With a participatory process for creating a shared vision for the project, understanding needs & desires.	Through increasing cooperation in the early planning stages, identifying synergies or "win-wins".

The number and types of stakeholders are very unique for each project. Depending on the project characteristics, the following stakeholders may be involved:

- **Local authorities/Municipalities**: Includes housing, environmental, energy and planning departments, relevant public-owned service providers.
- **Real estate owners**: Companies and associations.
- **People living and/or working within the area**.
- **Consumers/producers of energy within the PED area.**
- **Energy professionals:** From energy sectors, including energy advisors.
- **Construction professionals:** Throughout the whole construction period.
- **Planning professionals:** Include Building Engineers and Architects.
- **Specialised governmental agencies**: Mandated to address energy production, energy efficiency, climate, urban development, and manage financial and non-financial support schemes to improve the energy efficiency of residential buildings and install renewable energy sources.
- **Policymakers:** Supporting a shift towards sustainable policy processes and products in the energy sector and providing financial incentives to realise this.
- **General Public:** to generate awareness regarding PEDs and its benefits to everyday life.
- **Academia:** Providing input for new areas of research and competencies.
- **Standardisation bodies:** Enabling standardisation to be possible. Supply insight and support into how standards are established based on the project results.
- **Service providers:** Companies that supply services such as access and management of energy grids, energy supply and energy generation, ESCOs and others.
- **Technology providers**.

→*Read more about this is D2.2*

[1] http://sodertornsmodellen.com/home

Mapping and analysing stakeholders

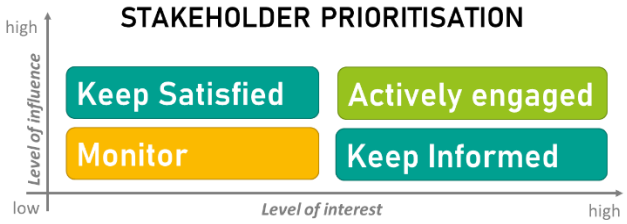
Knowing who is affected or involved by the project is the first step. Stakeholder mapping is a crucial exercise to determine who are the stakeholders involved in the process, what are their needs, what is the level of engagement needed, the communication strategy needed.

Step 1: List and analyse the different stakeholders: name, their potential impact and influence over the project (low, medium, high), what is important to the stakeholders = their driving forces, their potential contribution or in worst case risk to block the project and finally the strategy to engage them:

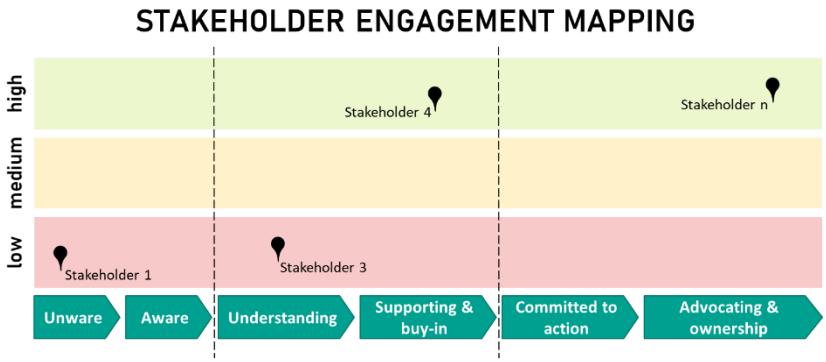
STAKEHOLDER ANALYSIS MATRIX

Name	Contact	How much does the PED impact them?	How much influence do they have over the project?	What is important to them?	How could they contribute to the project?	How could they block/stop the project?	Possible strategy to get them on board

Step 2: All the stakeholders can then be mapped into this matrix depending on their influence and interest. This is a key to understand the communication strategy to be used with each one.



Step 3: Map the stakeholders using engagement matrix – the different stages of engagement are here divided into the categories: Unaware, Awareness, Understanding, Support and Buy-in, commitment and action and Advocacy and Ownership. This should be updated as the project involves and relationships are being created and change. The matrix is a footprint showing the level of engagement of all parties.



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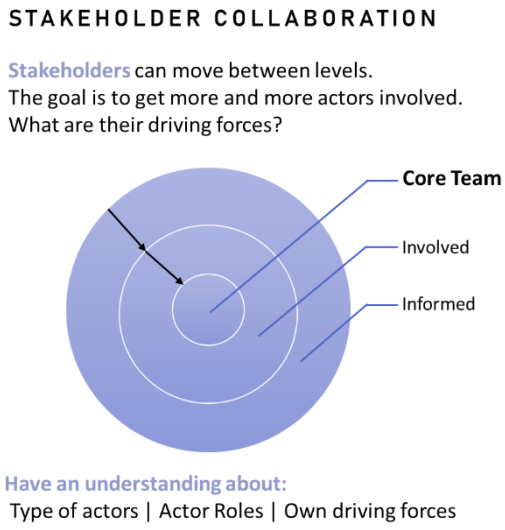
Engagement process: communicating with your audience

Both internally and externally, communications are important for the successful realisation of a PED. A joint **communication strategy should be developed with the involvement of the main stakeholders**, who may also have useful resources available to support the communications activities. Key messages can be developed that relate to the interests and aspirations of the main stakeholders (from the analysis matrix).



The stakeholder engagement level (shown by the engagement mapping matrix) is also a key aspect to be taken into account in the communication strategy. According to their collaboration and engagement role, stakeholders can move between levels: **core team, involved or informed.** In PED projects, a substantial number of stakeholders should be involved from the initial stages up to the operation phase.

The core team can, for example, consist of the leading developer, the municipality and a coordinating part or a process leader. The core team will grow gradually and be better defined as the project advances – attracting more stakeholders from the "involvement" and "informed" spheres. **The goal is to get more stakeholders involved or at least informed. In this case, as the PED project advances**, more stakeholders will gravitate around the project and will board the engagement spheres progressively.

It is also **essential to understand the different stakeholders driving forces** – as well per actor as individually as an employee or as a private. What are their motivations? Value? Brand? Employees driving forces? Customers driving forces? All of this factors should serve as pillars of the communication strategy, that may focus more on workshops, social media, events and other strategies in order to bring these groups on board. →*Learn more about this is D2.2*

Creating a PED Vision & quality standards

At the start of the process, there will be a need to introduce the stakeholders to the PED concept since it is still not a familiar terminology to most people. It is also necessary to dialogue with the stakeholders about establishing the system boundaries and agreeing on the PED definition that will form the basis of the specific PED development.

Establishing a PED quality agreement requires commitment from all parties associated with the project to achieve the proposed objectives by monitoring the progress and actions planned at different stages of development. Some essential points to be considered when developing a standard quality statement are:

THE VISION OF THE PROJECT: The requirements established should contribute to the project's vision. These are ways to verify whether the overall project objectives and targets will be achieved and when.

ENGAGEMENT: In this decision process, all parties must communicate actively and be heard. It is essential that each requirement set resulted from a common decision or agreement of all stakeholders involved.

RESPONSIBILITIES: for each requirement established, it is important to define the stakeholders who will be directly involved or in charge of the action. They would report the status and plans to achieve the objective set in different project phases

The purpose of this agreement model is to detail terms & responsibilities concerning the distinct aspects involved in a PED project – thus being **an instrument for quality assurance to all stakeholders** involved. Generally, it is said that a solid Quality Agreement should clearly describe what will be executed and who is responsible. Below is an example of the areas that a PED quality agreement should cover:

To be adjusted to local conditions and aspects – tailored for each PED

Sector	Issue addressed	Actions committed	Responsible party & contributors	Control	
				Planning	Execution
Energy use & production	Energy Supply	▪			
	Local Renewable Energy Production	▪			
	Thermal Energy	▪			
	Lighting	▪			
	Energy Flexibility	▪			
Building Structure	New buildings	▪			
	Refurbishment	▪			
	Energy needs	▪			
	Architecture	▪			
Circularity	Material flow	▪			
	Water & Waste	▪			
Mobility	Decarbonise	▪			
	Pedestrians	▪			
	Bicycles	▪			
	E-vehicles	▪			
	Public Transport	▪			
Open Spaces	Public Spaces	▪			
	Green areas	▪			
Social aspects	Housing	▪			
	Fulfilment of essential needs	▪			
Management & PR	Management	▪			
	Communication	▪			

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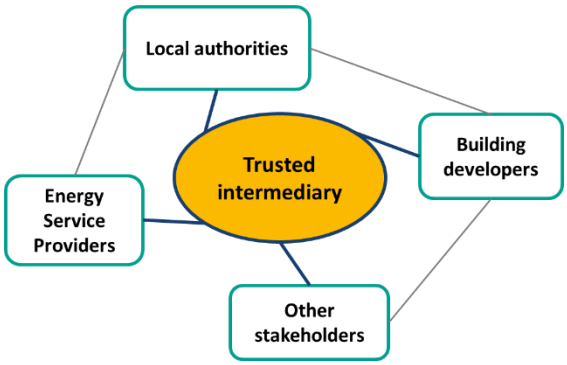
Keeping them involved

Urban transformation takes time, and it can be a challenge to find ways to keep the wide range of stakeholders that are needed to be involved in PEDs throughout the process. It is important to gain insight early on into the respective driving forces of those involved. It can be useful to consider **helping the stakeholders understand and articulate "WIIFM" or What's In It For Me?** This can make it easier to communicate why working to create a PED can be in their interests and help frame discussions about how PED ambitions can align with their goals and strategic objectives.

One useful way to specify an organisation's commitment is through obtaining Letters of Intent from senior decision-makers that commit their organisation to participate in the PED project process. This can be an essential step to gaining the required commitment from each core stakeholder to contribute with necessary resources for the duration of the process.

Trusted Intermediary: someone to keep everyone on board

Developing a district/area energy strategy requires the services of an energy specialist who should be independent. There are multiple energy users in the district, so it is reasonable to share the cost for conducting the energy analysis. It is not easy to get the major stakeholders on board and cooperating.

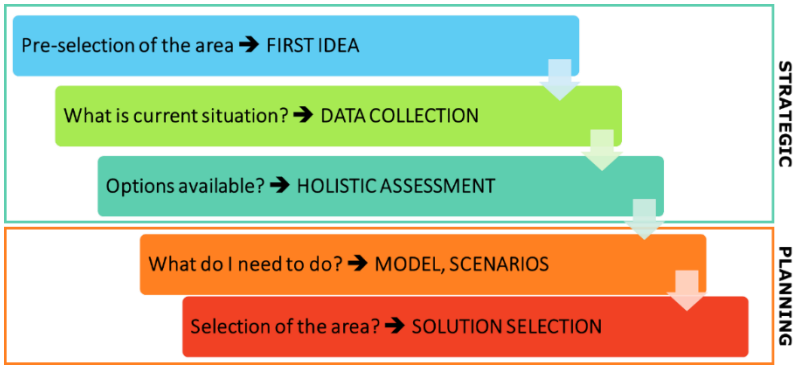


It is important from the outset to establish a trusted partner/intermediary with energy and stakeholder engagement expertise, creativity, passion, and pragmatism. This trusted intermediary will be in charge of the dialogue process, understanding stakeholders and their motivations, navigate actors through the PED process and managing the diverse aspects of the project. Finding an intermediary with all the necessary key competencies and identifying the funding for that role can be a significant challenge to widespread PED development.

→*Learn more about this is D2.1*

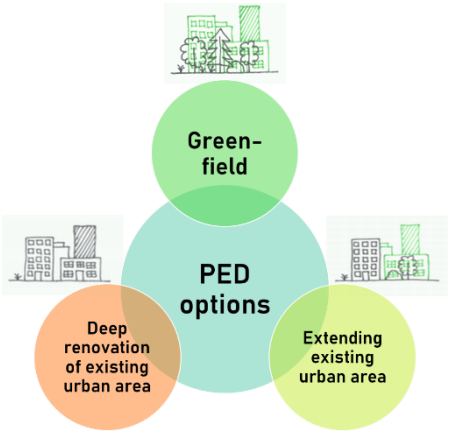
Holistic method for developing PEDs

Holistic assessment of PEDs consists of several key steps. As an Urban transformation process, a PED involves a large number of aspects such as energy, building, mobility, public spaces, commercial facilities and many more. Therefore a **holistic assessment is the best approach to develop the solutions and scenarios for a PED, taking into account the many factors that are relevant to the neighbourhood.**



First, there is a preselection of the area, where the PED in question could possibly be implemented. For this area, the data have to be collected on the basis of which the technical and technological solutions can be selected. The assessment of potential solutions leads to the development of possible implementation scenarios. The scenarios are assessed on the basis of indicators and benchmarks and then the final solution with the final area is selected.

Pre-selection of the area ➔ FIRST IDEA



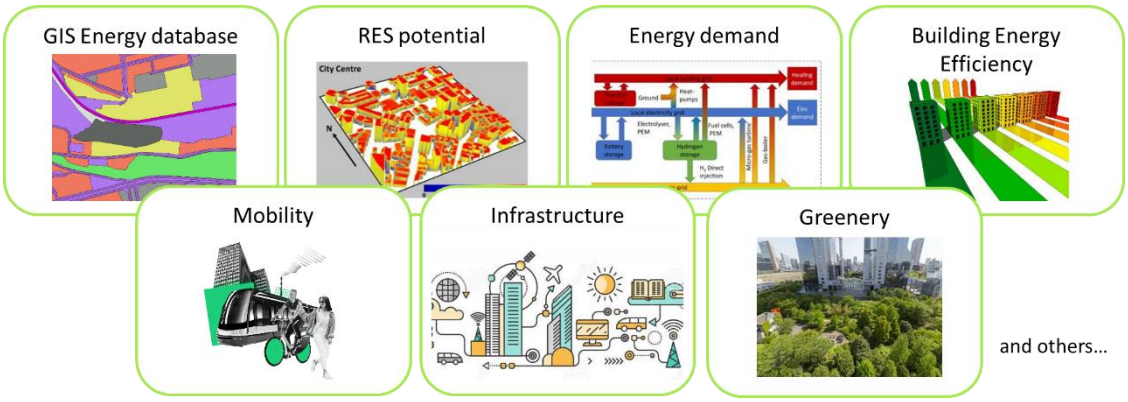
- **Assess the initial status of the area**: Is it a green field area? Extending existing urban area? Deep renovation of existing urban area?
- **Verify are the resources available:** Analyse the resources, delimitations, opportunities and challenges in the area. Based on these scans of the neighbourhood, the system and physical boundaries of the PED can be delimited.
- **Define the PED boundaries**: delimitate the buildings and physical infrastructure to be included, as well as the system boundaries (energy and other resources supply, distribution, consumption…)
- **Engage stakeholders:** Map and assess the level of commitment needed from stakeholders involved in the process.

Complexity level	Green field	Extending existing urban area	Renovation of existing area
Implementation	Low	Medium	High
Data collection	Low	Medium	High
Citizen engagement	Low	Medium	High
Ownership-/-/property	Low	Medium	High
Impact on climate protection	Low	Medium	High
Financing	Low	Medium	High

→Learn more about this is D3.1

What is current situation? ➔ DATA COLLECTION

- **Identify the current state:** Collect data related to the social, economic, environmental, regulatory and energy aspects related to the selected area: GIS Energy database, renewable energy potential, energy demand, building efficiency standards, heritage marks, transport & mobility, infrastructure and services, green potential, citizen preferences and more.
- **Estimate energy demand:** Based on the PED initial state (green area, renovation) different approaches can be used to determine the energy demand. It could be based on real measured data, or in predictions based on new buildings standards and occupancy. Either, an energy demand for the PED needs to be estimated in order to plan the renewable supply and production.



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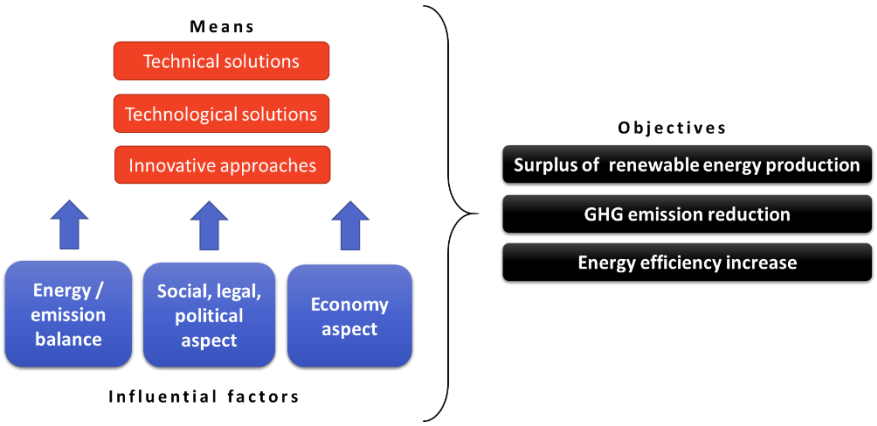
Options available? ➔ HOLISTIC ASSESSMENT

It is necessary to assess different solutions in terms of their benefits and requirements and to their feasibility in the PED area, based on the data collection.

Within the PEDs, an effort is expected for maximum utilization of the area's potential to reduce the energy consumption, greenhouse gas emissions (GHG), and increase renewable energy production. Technical concepts are then used to develop models and scenarios for PED implementation.

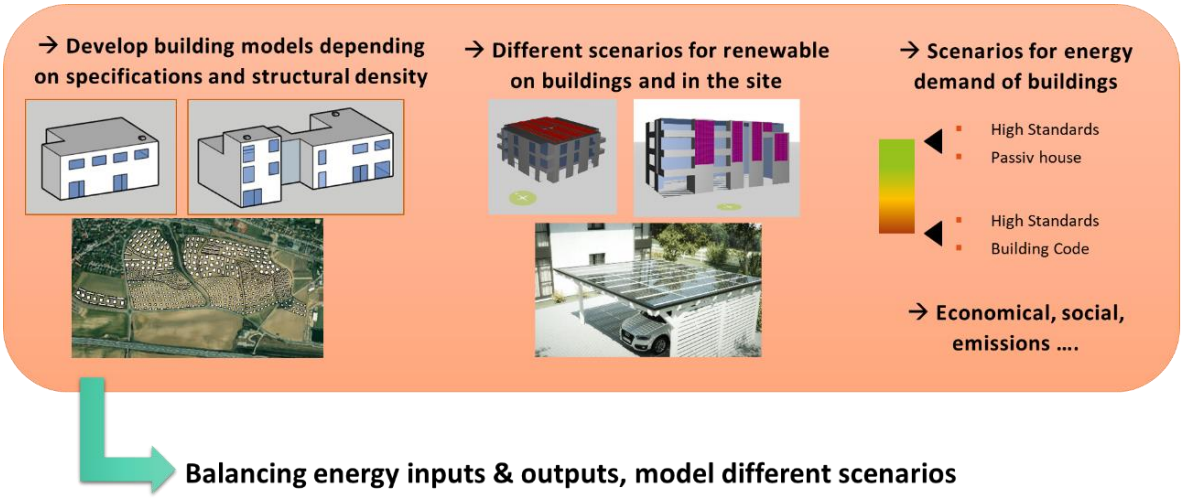


The commonly used technologies in such projects generally refer to the three energy pillars: **Generation, Efficiency and Flexibility**. The solutions can be combined in order to achieve the goals established for the project. The various combination possibilities will be the backbone of different use cases and scenarios that will be considered and simulated by the technical experts for the PED.

→Learn more about this is D3.1

What do I need to do? ➔ MODEL, SCENARIOS

Models are great instruments for studying and exploring possible solutions and scenarios for a PED. The site's limitations and the potential need to be carefully examined, unveiling the project's possibilities based on the existing conditions, building codes and regulations in the area. A synergic relationship between the technical solutions planned for each sector needs to be established to achieve the PED goals. That means when the **buildings** and construction sites are being planned, there should be considerations made towards the **mobility** (location and integration of EV charges, pathways…), the **RES generation** (especially shading over PV sites, incorporation of roof and façade panels...) and **flexibility**.



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Selection of the area? ➔ SOLUTION SELECTION

Then the decision on the solutions and strategies to be implemented in a PED needs to follow an evaluation of multiple criteria, both **quantitative and qualitative** (e.g., ensuring the quality of the indoor environment). It is not easy to combine the various scenarios and criteria for energy, finance, emissions, and stakeholders preferences, and imply in an iterative process until the final concept is achieved.

Quantitative criteria	Scenario 1	Scenario 2	Scenario 3
Positive energy balance reached (✓/ X)			
Total primary energy consumption (TJ)			
RES energy generation (TJ)			
Total investment costs (EUR)			
Total operational costs (EUR)			
Qualitative criteria	**Scenario 1**	**Scenario 2**	**Scenario 3**
Life comfort and quality improvement			
Social acceptability			
Score achieved per scenario			

A Multi-Criteria Decision Analysis (MCDA) establishes that stakeholders should be brought together in a co-development process for enhancing sustainable urban planning. MCDA follows technical analysis and introduces additional criteria – economic, social, regarding urban planning etc. The aim is to benchmark technical scenarios vis-à-vis more subjective criteria beyond simply achieving PED energy balance or not.

1. Defining criteria together with stakeholders and allocating weights to the different criteria with stakeholders.
2. Definition of the decision-making scheme: weights from each criteria selected.
3. Deciding according to defined criteria and test the energy balance.

QUANTITATIVE

PED level

- Total investment cost (CAPEX)
- Investment efficiency (specific cost of saved energy and CO_2)
- Operational costs (OPEX)
- Degree of energy self-sufficiency
  - Export
  - Import
- Total energy consumption decrease
- Total GHG emissions decrease
- Total RES energy production

Individual measure level

- Total investment cost (CAPEX)
- Investment efficiency (specific cost of saved energy and CO2)
- Operational costs (OPEX)
- Energy savings (%)
- Energy savings (TJ)
- Total GHG emissions decrease

QUALITATIVE

General criteria

- Urban development
- Improving life quality
- Overall feasibility and demands of PED implementation
- Social acceptance
- Aesthetics, appearance, inclusion in the area
- Legal barriers

Economic assessment

- Payback period
- Available subsidies

Non-energy benefits

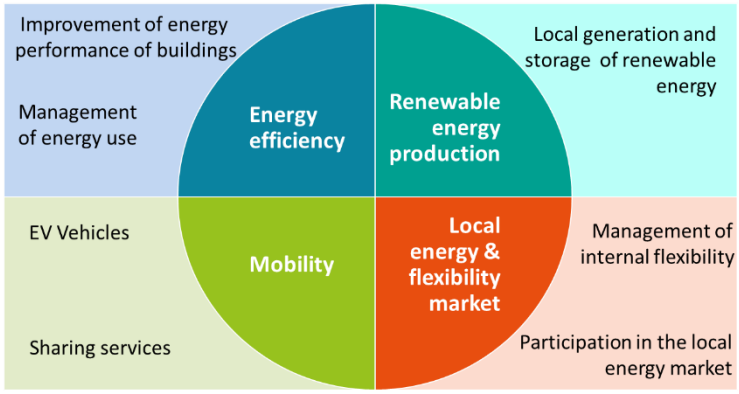
- Technical – condition of the buildings, quality, life cycle, energy security, energy independence
- Social – public health, content, contentment, labour productivity, life standard
- Environmental – local and global climate impact
- Other – urban development, public acceptance, appearance…

→*Learn more about this is D3.1*

Business Models

Each PED will have its own set of circumstances that will impact which business models to be used. The **business models need to be addressed from early stages as strategies to guarantee a long life to the actions planned.** They should cover the complete process from engineering and design development to the installation's implementation, operation, and maintenance. What can be viable is highly dependent on many local factors, including energy prices, regulations, market actors, subsidy mechanisms and local resources. It is **crucial to identify attractive opportunities with value propositions that meet stakeholders' needs and expectations**. Suitable business models already exist in other contexts, so the challenge can be to identify those that are most appropriate and have a chance of being successful in the specific contexts of the PED project. Some typical business model areas are shown in the illustration below:

Business Model sectors of a PED:



→*Learn more about this is D2.1*

Communicating the holistic process with stakeholders

Transmitting correctly each stage of the holistic method to stakeholders is essential to achieve good results. From the very idea to a mutual understanding and agreement among all the involved stakeholders. The information flow in both directions increases as the PED process progresses. However, to make the process sustainable and reach a feasible decision option in the end, it is necessary to narrow down the amount of information in the end and based the decision making on just a few selected benchmark parameters. The concept is depicted below:

Objective	Level of detail	Complexity: Simple → Complex			
Tell the basic idea, get a go/no-go	Simple, plain				
Obtain the necessary	Detailed, not aggregated				
Formulate scenarios	Comprehensive, aggregated				
Benchmarking, making PED investment decision	Simple, few parameters				

In the beginning, only a vague understanding of PED opportunities is expected on the side of most of the stakeholders. Following the path of slowly widening the presentations' scope and data requirements, a consultant may get stakeholders on board, gather sufficient hard data and subjective limits, and define technically, economically, environmentally, and socially acceptable scenarios of PED development. Then, following the converse process of narrowing down the selected options and facilitating relevant stakeholders' final decision making.

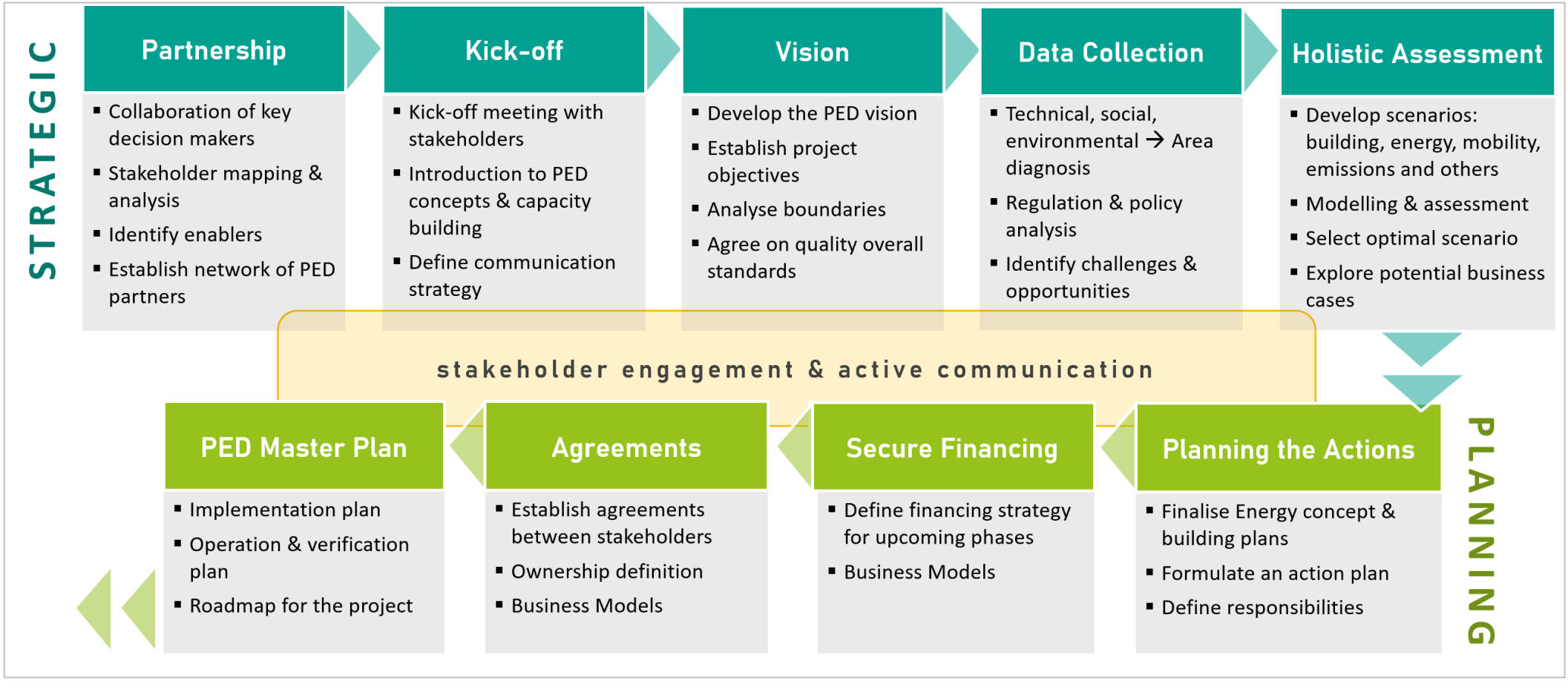
One of the successful key approaches is to visualize the data and information communicated with stakeholders. Various map visualizations, graphs, tables and other visual tools can greatly facilitate the understanding of the PED concept and its characteristics and parameters on both sides.

→*Learn more about this is D3.2*

Roadmap

To summarise the many steps presented so far in this guideline, we have proposed the following roadmap to be used from the very early stages of development until the end of planning phase:

ROADMAP FOR PEDS AT EARLY STAGE OF DEVELOPMENT



Living Labs – transforming ideas into actions

Uppsala Business Park | Sweden | Leader: White

Uppsala Business Park (UBP) is a Life science district in Uppsala, a city located north of Stockholm. The innovation-based industry has sprung out of a collaboration between the Universities in Uppsala, business development and society. The district was developed by Pharmacia in the 60s that laid the foundation for the life science and biotech industry that characterize the district. In 2006 the real estate company Klövern (now Corem) acquired a large section of the UBP area and formed the Uppsala Business Park brand. Mandaworks won the invited competition to masterplan the district in 2020. The masterplan will form an important part of Uppsala's southern expansion adding new laboratories, offices, industrial facilities, schools and long-stay research housing.

Main aspects:

- **Approximate area of the site:** 700 000 m² total area
- **New building** area to be developed by 2031 within the area: 300 000 m²
- **Type of buildings**: Commercial and industrial buildings mainly Life science industry
- **Organisation**: one urban district developer that leads the process, 1 main building owner that will develop new buildings within the district.

Focus of action: A roadmap for how Uppsala Business Park can become a Positive Energy District was developed in collaboration between the property owners, the utility company and the municipality. An energy balance scenario for UBP shows that it is possible to reach the Positive Energy District goal in 2031.

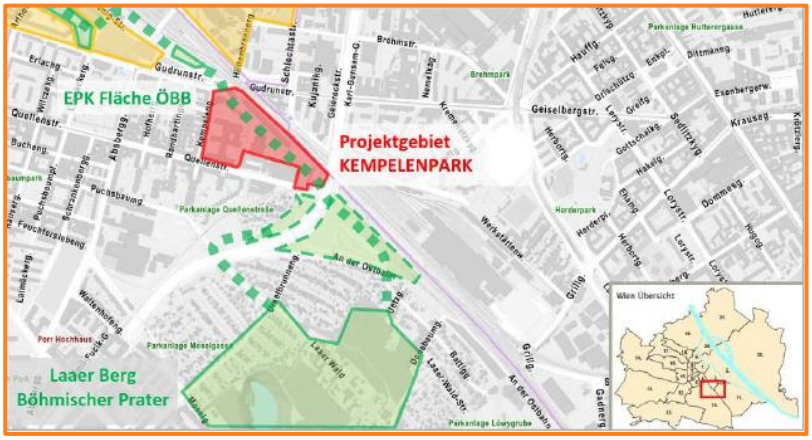
The **concept for achieving a net plus energy balance** within UBP is based on a strategy to minimize the energy consumption within the existing buildings within the district with 40%. The first steps in the renovation program of the existing buildings show energy reductions of 44% which give confidence to the strategy.

By utilizing waste heat from one of the laboratories within the district in a planned balanced local heating and cooling grid coupled with ground sourced heat pumps and geo energy the heating and cooling demand can be brought down to a minimum. Approximately 300 000 m2 new energy efficient life science laboratory buildings are planned to be built by 2031. Solar panels on 65% of the roof area of the existing buildings and new buildings in combination with utilization of 20% of the façade area of new buildings within the district is calculated to produce more energy than consumed by the buildings energy demand in 2031 in this scenario.

→*Learn more about this is D5.1*

Kempelenpark | Austria | Leader: e7

Kempelenpark is an existing commercial-only area located in Vienna that will be completely remodelled. There will be built approximately 1,100 rental flats, two thirds of those will be built on a non-profit basis and one third will be privately financed. This will enable high-quality and at the same time affordable living. In combination with a wide range of commercial areas, local supply and the construction of an all-day primary school and a kindergarten, a balanced mix of living space. The goals for the Kempelenpark area are: positive energy balance, climate resilience, cross-property greening, energy and water concept, quality assurance method and participative process of urban development



Main aspects:

- PED area: Complete renovation of an existing 50,000 m²
- Type of buildings: 80% for residential use, 20% for business use
- Organisation: one urban district developer that leads the process, 5 individual building owners that will develop buildings, 8 different building projects.

Focus of PED-ID action:

- **Spatial Energy Analysis** in selected area and adjacent zone (regional energy potential). Special focus on waste water use as there is a big sewage system bordering the urban district
- **Demand Side Scenarios** based on scenarios for building types and users (incl. requirement for Energy-Plus buildings with focus on energy efficiency first)
- **Local and regional renewable energy potential** based on Spatial Energy Analysis and Demand Side Scenarios
- **Potential of energy flexibility**, Demand Side Management and cross-sectoral integration
- Existing local energy supply concepts and energy supply companies
- **Conception of Positive Energy Balance** of selected area

→*Learn more about this is D5.1*

Rožnov pod Radhoštěm | Czech Republic

The Living lab area is located in a Czech town of Rožnov pod Radhoštěm (Rosenaw), which lies in the eastern part of the Czech Republic at the edge of a mountain range of Moravian-Silesian Beskyds. Rožnov has more than 16,000 inhabitants and it is significant both tourist and industrial place.

Living lab in Rožnov **is implemented in a developed area**, therefore it focuses on renovation of existing buildings mixed with new constructions of the Cultural Centre and Library extension. As the Centre and Library extension are designed in passive standard with heat pumps and photovoltaic power plant, its consumption parameters are included in Positive energy district project.

Main aspects:

- PED area: Renovation of an existing buildings along with new construction
- Type of buildings: 100% public buildings owned by municipality

Organisation: town of Rožnov as a leader of the PED process, 3 individual building projects (energy services with guaranteed results, construction of new cultural centre and PED project)

Focus of action:

- **Spatial Energy Analysis** in selected area and adjacent neighbourhood with aim to cover the energy consumption of buildings with renewable sources as much as possible
- **Demand Side Scenarios** based on scenarios for building types and users with focus on energy efficiency first principle and use of renewable sources (preferably heat pumps)
- **Local and regional renewable energy potential** based on Spatial Energy Analysis and Demand Side Scenarios (construction of a biogas plant to cover part of energy consumption)
- **Potential for creating energy community within the area**
- **Feasibility study with focus on reaching Positive Energy Balance** of selected area

Other PED-ID publications:

D2.1 - Process map from knowledge-based, Digital and Business Model approach

→ https://sustainableinnovation.se/app/uploads/2022/06/PED-ID_D2.1_Process-Map_v4_220415.pdf

D2.1 Annex - Identifying the Potential Role of Digital Twins in Supporting PEDs

→ https://sustainableinnovation.se/app/uploads/2022/06/PED-ID_D2.1_Annex_DigitalTwins_v2_220624.pdf

D2.2 - Holistic Stakeholder Engagement Model for early PEDs

→ https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D2.2_StakeholderEngagementProcess_v3_220415.pdf

D3.1 - Holistic assessment method in early development phase of potential PED areas

→ *https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D3.1_HolisticAssessmentMethodPED_V5_220415.pdf*

D3.2 - Visual concept for presentation of results of PED assessment

→ *Report: https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D3.2-VisualConcepPEDAssessment_V5_220415.pdf*
→ *Presentation: https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D3.2-Visual-concept-for-presentation-of-results-of-PED-assessment_Annex-1_final.pdf*

D4.1 - Criteria catalogue for Positive-Energy-Districts

→ *https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D4.1_PEDcriteria_V5_220415.pdf*

D4.2 - PED agreement model for cities and municipalities

→ https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D4.2_QualityAgreement_V4_220415.pdf

D5.1 - Living Lab report from AT, CZ and SE

→ https://sustainableinnovation.se/app/uploads/2022/05/PED-ID_D4.2_QualityAgreement_V4_220415.pdf

Project Videos

→ https://www.linkedin.com/feed/update/urn:li:activity:6925368137815068672
→ https://www.linkedin.com/feed/update/urn:li:activity:6943109939238203392

More information about PED-ID:

→ https://sustainableinnovation.se/pedid/
→ https://www.e-sieben.at/de/projekte/20049_PED_ID.php
→ https://www.svn.cz/en/news-article/positive-energy-districts-peds
→ https://whitearkitekter.com/project/positive-energy-districts-ped-id/

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