PED-ID

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

D5.1 Living Labs: PED-ID experiences in Austria

1 Austria | Kempelenpark

1.1 Site description

A new, diverse urban district is being created at "Kempelenpark" in Vienna. Around 1,100 rental flats will be created in what has been a purely commercial location up to now. Two thirds of these 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 will be created.

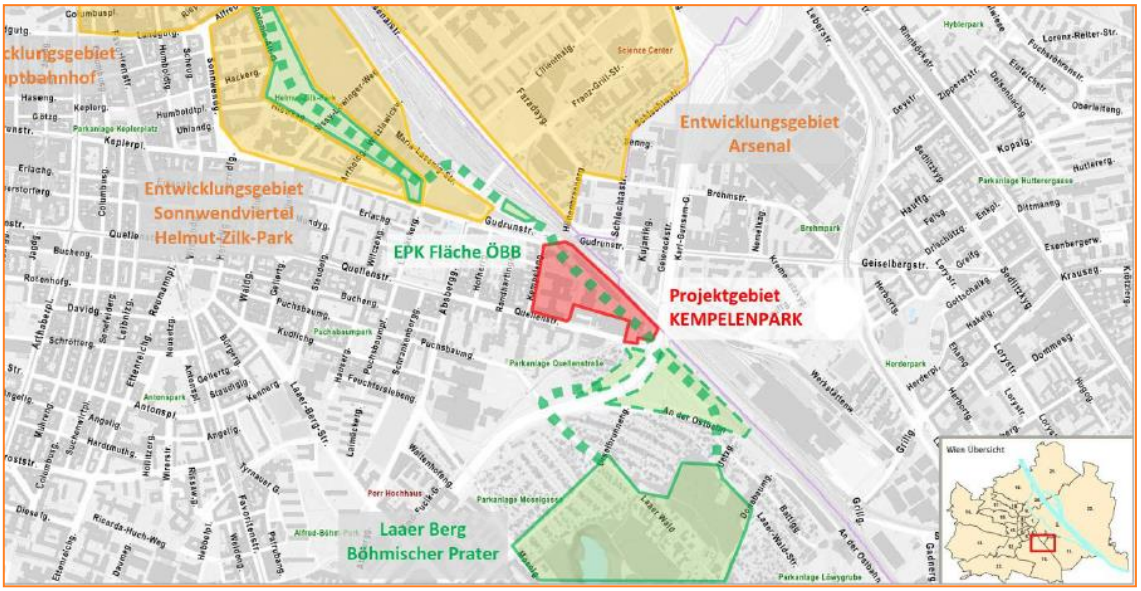

Figure 1: Overview plan of the selected area and surroundings (Source: city map, city of Vienna; edited by STC)

Key data:

- **Size of area**: 50,000 m² total area
- **Number of apartments**: 1,100
- **Building area for business use**: 25,000 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

A large public park forms the heart of the urban development planning. Together with the adjoining green spaces, the area will contribute to a climatically pleasant living environment in the future. Sustainable mobility and the networking of inner-city routes (Sonnwendviertel and Böhmischer Prater) make the new urban quarter a promising project for the entire district.

Figure 2: Overview of selected area (Source: google maps, edited by e7)

The urban developer of this area, co-applicant STC, set ambitious goals for sustainability and quality of living planned in this district. In the field of energy and CO2, this district should be both, a Positive-Energy-District and Zero-Carbon Neighbourhood. By implementation of the Digital Twin approach, these goals should be realised also in the operation phase of this district.

1.2 Stakeholder engagement

The stakeholder engagement process aims to develop integrated solutions with future building owners. The goals of the stakeholder engagement are to implement a cross-property and cross-system greening ty and cross-system greening and energy concept for the "Am Kempelenpark" neighbourhood development. This will be realized with innovative, identity-creating participation processes and a comprehensive quality assurance process. The focus lies on an interconnected consideration of integral greening concepts with higher-level water management and plus-energy concepts.

In this process, concrete and measurable quality goals are defined with the developers for the quality framework provided by the neighbourhood developer on the topics of greening, water management and energy supply, and broken down to building site level, or the necessary infrastructure is divided among the properties.

The close interrelationships between infrastructural green space, rainwater and greywater management and the local energy concept are worked out and cast into requirements for the planning of each building site. A quality assurance process for planning, construction and operation is to ensure that the jointly set goals are also realised.

The necessary monitoring is defined for this process. With this kind of participatory coordination between the developers even before the actual planning begins, with the networking of the greening, water and energy systems, as well as the interlocking of the infrastructure of the general neighbourhood with that of the properties, lieBeKlima is breaking new ground in integral planning.

The following stakeholders are involved in this process:

- **Urban district developer:**

  - STC
- **Experts:**
  - e7 energy innovation & engineering: energy expertise
  - grünplan: expertise in urban greenings
  - University of Natural Resources and Life Sciences, Institute of Sanitary Engineering and Water Pollution Control (SIG): expertise in water ressources
  - Realitlab: coordination of stakeholder engagement process
- **Building owners**
  - Heimat Österreich: non-profit building developer
  - BG Frieden: non-profit building developer
  - WBV-GPA: non-profit building developer
  - STC: building developer
- **Architects and planners:**
  - Delugan Meissl: architects
  - Architekturbüro Knötzl: architects
  - rajek&barosch: landscape architecture
- **City of Vienna:**
  - Department for Urban Development and Planning
  - Department for Architecture and Urban Design
  - Department for Energy Planning
  - Department for District Planning and Land Use
  - Department for Road Administration and Road Construction
  - Department for Vienna City Gardens
  - Department for Viennese Waters
  - Department for City Planning Department

This process will be continued after project end of PED-ID.

1.3 PED Process

The goal for this urban district development is to become a Positive Energy District. Besides stakeholder engagement process, e7 together with the urban district developer STC developed an energy concept for this district, taking into account renewable potential on site.

The following methods and activities were carried out during this assessment:

- 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

- Perspective for Positive Energy Balance of selected area

The following data was used in this assessment:

- Masterplan for this urban district
- Specific data on building use
- Time schedule for construction phase of buildings
- Existing energy supply
- Spatial energy data from the City of Vienna
- Specific data from sewage system

1.4 Results achieved

The work is still ongoing and will be continued after the end of PED-ID. As 18 months of project duration is a very little time frame for urban development, work in PED-ID could just initiate a process and give first orientation targeting Positive Energy District.

Figure 3: Kempelenpark vision by STC. Source: kamkempelenparkt.at

The first **integrated energy concept** taking into account renewable energy source at site was developed and discussed with the urban district developer STC. This first concept will serve as input to the stakeholder process.

In the stakeholder process, **workshops and discussions** between future building owners, urban district developers and experts took place. Other workshops will follow to develop cross-property quality assurance process for water, greening and energy.

Results of the **quality assurance process for planning**, construction and operation can serve the new specifications for the City of Vienna. This concept should also be applied for other urban district development processes in the future.

This should result in the greatest possible cost-benefit optimisation for the developers and users, as economic potential is also made possible by leveraging synergies. It is important not to lose sight of the big picture. The property boundaries between the properties should not be "noticeable".

The energy concept will be further assessed and developed in order to fulfil the requirements for Positive Energy Districts. Stakeholders are convinced about that but there is still work to do to become a Positive Energy District.

2 Tailored Criteria Catalogue for PED-ID Living Labs

In the very early stages of a PED process, it is critical to define with all stakeholders involved the specific vision and objectives of the project, **establishing general requirements and indicators**. These will include requirements for energy efficiency and renewable energy sources, and possibly also for the environment, economy, management and other aspects. These agreements can be structured in a "Criteria Catalog", further explored and addressed in report ***D4.1 -Criteria catalogue for Positive-Energy- Districts***[1]. In this section, we revisit the requirements listed in report D4.1 and apply them to the three Living Labs, analysing individual aspects of what a "plus-energy definition" looks like for each of them.

2.1 AT | Kempelenpark

Core objective

Objective	Selected Option
Plus-energy balance	●
Plus-emissions balance	●

General indicators

Indicators
Total primary energy
GHG emissions

Accounting Period

Period accounting	Period under consideration/ temporal balance limit
Annual	1 Year

Spatial Boundaries

Spatial delimitation	Choice
Development area of the building (e.g., PV on the roof)	●
Property of the building (e.g., PV on the property)	●

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

Property with energy resources from outside the property (e.g., biomass boiler)	●

Energy Uses Boundaries

Category	Sector	Energy use	Selected
Operating energy	Building operation	Heating	●
		Cooling	●
		De-/Humidification	●
		Auxiliary energy	●
		Lighting	●
	User electricity	Household electricity	●
		Operating electricity	●
	Process energy	Process heating	●
		Process cooling	●
		Process current	●
	District	Lighting	●
		Supply	●
		Disposal	●
Embedded energy	BG0	Thermal building envelope	●
	BG1	Complete thermal building envelope	●
	BG2	BG1 incl. internal walls	●
	BG3	BG2 incl. internal walls, basement components, unheated buffer rooms	●
	BG4	BG3 incl. open development areas	
	BG5	BG4 incl. building services	
	BG6	BG5 incl. entire outdoor facilities	
Mobility	Passenger mobility	Public Transport	●
		Sharing Mobility	●
		Motorised private transport	●
	Transport of goods	Transport of goods	

Example of a Summary of the Energy Requirements for Kempelenpark, AT

Dimensions of observation	Determination
Indicator energy service	Total primary energy, CO2 Emission

Target	Plus energy balance, Plus emission balance
Accounting period	Annual
Spatial boundaries	Heat: Energy production outside the property, with direct supply Electricity: Production on the property
Energy use boundaries	All operating energy Embedded Energy → BG0 – BG3 Everyday mobility: → Passenger Mobility

PED-ID TEAM

Coordinator:

	e7 Energy Markt Analyse GmbH (e7)

Partners:

	Czech Technical University in Prague, Faculty of Civil Engineering (CVUT)
	SEVEn, Energy Efficiency Center, z.ú. (SEVEn)
	Sustainable Innovation AB (SUST)
	White Arkitekter AB (WHITE)

CONTACT

Project Coordinator:

e7 Energy Markt Analyse GmbH

Camilla Borges Rampinelli | camilla.rampinelli@e-sieben.at

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