

HeatCOOP ●

D2.1 Documentation of technical concept & existing organizations in the Living Labs (demo areas)

February 2025

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Introduction

The deliverable **D2.1 Documentation of technical concept & existing organizations in the Living Labs (demo areas)** consolidates the results of **T2.2 - Analysis of Existing Organizational Structures in the Living Labs** and **T2.3 - Process Support for the Technical Renovation Concept**.

The deliverable begins with an analysis of the initial conditions in the demonstration areas (Living Labs), focusing specifically on existing organizational forms and structures related to urban transformation and cooperatives. This analysis was conducted through interviews (M2.1) with key stakeholders, exploring the current situation in the demo areas across categories such as ownership structure, resident composition, socio-spatial resources, financial situation, and investments. These insights formed the basis for analyzing the environment (success and challenging factors) for the development of heat cooperatives, using workshops, surveys, and data collection. Annex I provides the survey among owners, managers and residents.

Secondly, the deliverable presents the technical renovation and decarbonization concept, along with preliminary considerations for the technical approach. However, as the Living Labs operate within an iterative process, the technical concept will evolve throughout the project.

The following aspects are analyzed for each Living Lab:

- Description of the Existing Organizational Structure
- Stakeholders of the Living Lab
- Analysis of the Environment (success and challenge factors) for the development of heat cooperatives
- Technical Concepts

Technical concept & existing organizations in the Living labs

Austria

Leben am Wilhelminenberg



Overview of key data:

- **Project Type:** Cross-property decarbonization with partial renovation
- **Location:** 1160 Vienna, Austria
- **Developer/Owners:** Decarbonization of 4 apartment buildings (condominiums), 3 rental properties, and 4 smaller buildings
- **Current Legal Form:** Primarily condominiums and private rentals
- **Form of residence (e.g. rented, individual ownership):** rented & individual ownership
- **Current Heating System:** Mainly decentralized gas heating system
- **Year of Construction:** Various construction eras, including some Gründerzeit buildings and others from the 1960s and 1970s
- **Number of Residential Units:** Approx. 100
- **Scope of the Living Lab:** Cross-property

Detailed Description of the Existing Organizational Structure

The project involves the renovation and cross-property decarbonization of four multi-family residential buildings and three rental properties in Vienna. The aim is to supply approximately 100 housing units with renewable energy through a shared anergy network. This initiative represents a significant step towards sustainable urban living.

Within the **Living Lab Wilhelminenberg**, the buildings are owned by multiple parties. However,

three of these buildings are owned by a single individual, who also serves as the project's initiator. This individual has taken on a leadership role, actively driving the project forward and demonstrating a strong commitment to implementing innovative and sustainable solutions. There has already been significant progress in evaluating various sharing opportunities, extending beyond heat supply to include electricity, mobility services, and other shared resources. A preliminary concept for these sharing mechanisms has been developed and serves as a foundation for further planning and execution.

Under the **HeatCoop Project**, the primary focus is on decarbonization and establishing a shared heating solution for the buildings involved. A preliminary technical concept has been prepared, detailing how the shared heat supply will be implemented. While this concept provides a solid starting point, it is expected to evolve and be adapted as the project progresses and as new insights emerge.

In summary, the project's structure is defined by the leadership of a dedicated individual owner, supported by collaborative efforts from other stakeholders to explore and implement innovative decarbonization solutions. The technical and organizational groundwork already established ensures that the project is well-positioned for future development and successful implementation.

Stakeholders of the Living Lab

Stakeholder group		Stakeholders in the Living Lab
Municipalities		Secondary stakeholder: The City of Vienna is not currently involved in the project but remains a relevant stakeholder due to its interest in replicating the outcomes of the Living Lab for broader application.
Different types of building owners	Condominiums	-
	Private real estate owners	Key stakeholders: The building owners, who are private real estate owners, play a crucial role as key stakeholders in the project.
	Public owners (social housing)	-
	Housing cooperatives	-
Residents		Key stakeholders: The residents of the buildings with active rental contracts are also key stakeholders in the Living Lab, as their approval is crucial for the project's success.
Housing managers		Secondary stakeholders: Although the housing managers have not yet been involved in the Living Lab, they are an important stakeholder due to their role in managing the properties.
Construction companies, technology providers, energy service providers		Secondary stakeholders
Additional stakeholders		-

Analysis of the environment (success and challenging factors) for the development of heat cooperatives

There have been approximately 5-6 meetings with the initiator of the Wilhelminenberg

Project, during which interviews have been conducted to gather detailed insights into the current situation within the Living Lab. These discussions focused on key aspects such as the ownership structure, resident composition, and financial situation. The interviews were crucial in understanding the existing organizational structure, identifying challenges, and determining the next necessary steps for the project.

The analysis revealed several positive outcomes: the geographical conditions and technical feasibility for a cross-property heating supply are favorable, making implementation viable. Additionally, the fact that a single property owner has taken on the role of initiator is a significant success factor. Experience from other projects has shown that having an initiator—or at least one among the initiators—who is directly involved in driving the project and has the authority to make investment decisions greatly enhances the project's progress and success. However, the following aspects have been identified as challenges:

- A key challenge is the lack of resources for project development before investment decisions, as Austrian funding focuses on investment costs rather than support for participation projects & project development. The HeatCOOP project aims to fill this gap, but it is uncertain if its resources will be sufficient.
- Another challenge is the legal framework. This includes regulations related to decarbonization within a single building, where rental law plays a significant role. Additionally, the legal aspects of implementing a cross-property solution must be addressed and clarified.

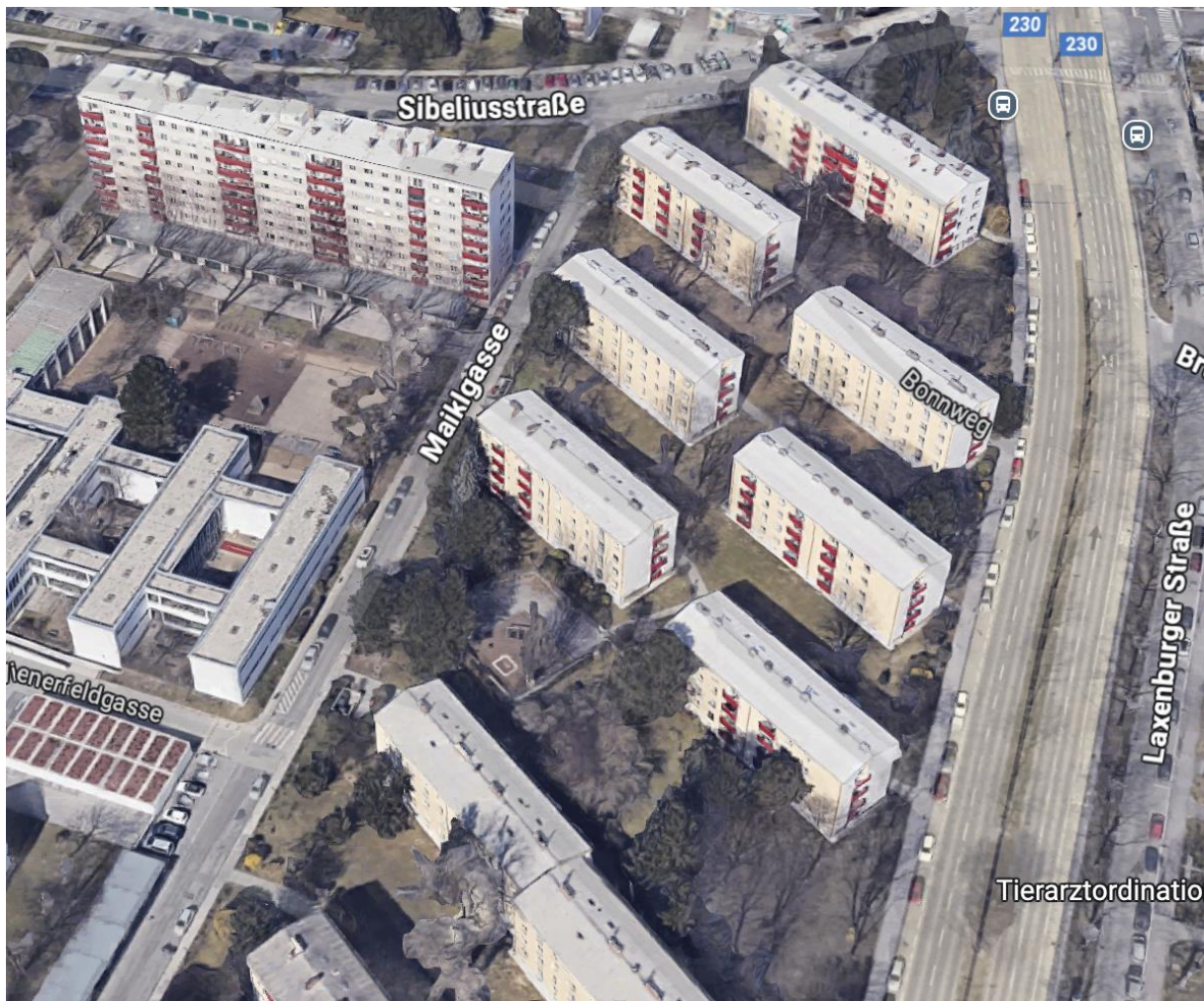
Technical Concepts

The technical renovation of individual buildings will be carried out independently by the respective property owners where necessary. Where the thermal quality of the participating buildings is insufficient, it will be improved through appropriate insulation measures and, if required, window replacements. These insulation measures aim to achieve a heating demand value that enables state-of-the-art, energy-efficient heat supply for the buildings using locally available renewable energy.

Decarbonization will be achieved through the joint construction of an energy network that distributes geothermal energy (via deep drilling) to the distribution points of each building. Heating will be provided in each building either by a central brine/water heat pump or by decentralized small heat pumps for individual apartments. Additionally, photovoltaic (PV) installations on one or more buildings are planned, provided they are technically and economically feasible.

The detailed technical implementation is still under development, so a precise investment cost estimate is not yet available.

Laxenburgerstraße Altmannsdorf-Hetzendorf



Overview of key data:

- **Project Type:** Decarbonization and refurbishment of a neighborhood owned and managed by a housing cooperative, together with the addition of stories and new construction.
- **Location:** Laxenburgerstraße 126-138, 1100 Vienna
- **Developer/Owners:** Altmannsdorf Hetzendorf
- **Current Legal Form:** cooperative
- **Form of residence** (e.g. rented, individual ownership): rental
- **Current Heating System:** individual gas heaters
- **Year of Construction:** 1964
- **Number of Residential Units:** approx. 500
- **Scope of the Living Lab:** Neighborhood

The residential complex of the Altmannsdorf-Hetzendorf housing cooperative has about 500 apartments and was built in 1964 in the Viennese district of Favoriten. It was thermally

refurbished in the 1990s. Hot water and heating are supplied by individual gas boilers in the individual flats. The cooperative would like to decarbonize the residential complex; a concept by the Treberspurg architects' office envisages a geothermal-based form of heat supply in combination with heat pumps and photovoltaics. The willingness of the residents to switch to the new form of heat supply remains unclear. The housing cooperative cannot oblige residents to do so due to the applicable laws. However, the investment will only pay off if almost everyone joins the new form of supply. It therefore takes good arguments and advantages (both financial and non-financial) to convince residents to switch. The residents have a diverse cultural background and are on low incomes. At least one person per household is a member of the "Altmannsdorf-Hetzendorf" cooperative. The Austrian team, supported by the European exchange, will take measures to achieve the consent of the residents by awakening a sense of neighbourhood and reviving awareness of being part of a cooperative by strengthening social cohesion.

Detailed Description of the Existing Organizational Structure

What is the ownership structure?

The housing complex is owned by a non-for-profit housing cooperative, and rented by the members of that cooperative. The building is governed by the WGG, an Austrian law specifically for housing cooperatives. MRG

Who is in charge of property management?

The cooperative has its own property and facility management, which is divided into

- Property management: dedicated to the care of tenants.
- Technical management: technical Property and facilities management, dedicated to the technical aspects.

Property Management is also responsible for managing the decarbonization and refurbishment of the cooperative's building stock.

The cooperative wants to establish a Computer Aided Facility Management and would like to hire an operator or contractor for the energy system. This operator / contractor should be responsible for the maintenance of the system. They should also be the first point of contact for the residents.

Is there already an organization (Association/Cooperative) involved?

The existing Housing Cooperative Altmannsdorf-Hetzendorf, a rather small but old and experienced organization that is still aware of its roots as bottom-up housing cooperative is the initiator of the refurbishment and decarbonization.

The cooperative is also very active in Vienna's funded housing program and has therefore capacities with regards to building and is supported by a team of architects and other professionals and consultants. Among the team is also realitylab, who are often involved in

running social processes among residents.

Who is the initiator of the Living Lab (Municipality, Association, Cooperative, Owners, Residents)?

The cooperative is the main initiator of the living lab.

Stakeholders of the Living Lab

Stakeholder group		Stakeholders in the Living Lab
Municipalities		Secondary stakeholder: The City of Vienna has been involved for new zoning planning and remains a relevant stakeholder. There is an established, very helpful relationship between housing cooperatives and the City of Vienna with all its departments responsible for housing and urban development, such as housing subsidies (MA50), Zoning and development planning (MA21) etc.
owner	Housing cooperatives	Key stakeholders: The building owner – the cooperative Altmansdorf Hetzendorf
Residents		Key stakeholders: The residents of the buildings with active rental contracts are also key stakeholders in the Living Lab, as their approval is crucial for the project's success.
Housing managers/property managers		Secondary stakeholders: The housing manager has been involved in the Living Lab from the very beginning and is an important stakeholder due to their role in managing the properties.
Construction companies, technology providers, energy service providers		Secondary stakeholders - Treberspurg and partner – Architekt - Vasko und Partner - Energy planer - Dr Rudisch Ziviltechniker- Structural engineers
Additional stakeholders		- Cooperative Sozialbau - owner of the neighbour buildings) - Wiener Wohnen (City of Vienna – owner of the the neighbour buildings) - Wohnpartner - responsible for social cohesion in municipal buildings

Technical Concepts

This section should describe the planned technical concept of the decarbonization.

It will be a hybrid system consisting of geothermal probes, water heat pumps, air-to-water heat pumps with a heating centre in a new building.

Hot water will be provided decentrally, from flat to flat, by electric boilers.

Photovoltaic panels on the roofs serve the central heating plant and the general electricity supply.

Analysis of the environment (success and challenging factors) for the development of heat cooperatives

The cooperative carried out extensive research into possible new heating concepts. Among other things, they used 2 house typologies as a reference (a housing estate from the 20s and

a

building from the 1960s), calculated them and decided on the hybrid system mentioned above.

The challenges are

- Financing, also because infill development associated with decarbonisation is costly.
- A rent increase is likely to be necessary and the tenants will have to accept this. As there are people living there a consent will also be required to replace the heating system. This could be a challenge as the residents are on low incomes, this will require special attention and sensitivity in the communication plan.
- Trees hinder deep drilling in some cases.
- Cellars need to be cleared and temporary storage organised during the refurbishment.
- Some tenants will have to give up their allocated parking space during the construction phase.

We are trying to establish contact with the neighbouring housing complexes owned by the Sozialbau and the City of Vienna in order to find common solutions for heating beyond the neighbourhood.

Slovenia

Pilot no.1



Overview of key data:

- **Project Type:** Toplotna zadruga Radlje ob Dravi
- **Location:** Partizanska ulica 12, Radlje ob Dravi
- **Developer/Owners:** Energap/ Municipality Radlje ob Dravi, inhabitants, users
- **Current Legal Form:** Cooperative in the making
- **Form of residence (e.g. rented, individual ownership):** business premises, public administration, individual ownership
- **Current Heating System:** central boiler room powered by heating oil (it is unknown if any changes have been made)
- **Year of Construction:** residential building 1976, municipal building 1979, business building (utility company and post office) 1965, business building (housing fund) 1969
- **Number of Residential Units:** 23
- **Scope of the Living Lab:** neighborhood/municipality

Detailed Description of the Existing Organizational Structure

Description of the existing organizational structure:

- *What is the ownership structure?*
Ownership structure: building 804605: mostly privately owned, building 804600: mixed public private ownership of business premises, building 844599: public utility company, Post, building 844614 (hotel across the street): municipality, private company (Vabo d.o.o.)
- *Who is in charge of property management?*
3 different management companies (SZ Smreka, javno komunalno podjetje Radlje ob Dravi, Indoma)
- *Is there already an organization (Association/Cooperative) involved?* Not at the moment.

- *Who is the initiator of the Living Lab (Municipality, Association, Cooperative, Owners, Residents)?* Municipality Radlje ob Dravi

Technical Concepts

This section should describe the planned technical concept of the decarbonization.

- **Proposed Solution:** District Heating System powered by wood biomass
Goal: Replace the current oil (heating) system with a sustainable energy source.
Technical Approach:
 - Use wood biomass as the primary energy source.
 - Install modern biomass boilers with a central system.
 - Potential to integrate additional renewable energy sources (e.g., solar energy).

Key Challenges:

- Logistics and distribution of wood biomass.
- Transition costs and the potential need for subsidies.
- Acceptance among residents and property owners.
- Adapting the existing infrastructure for implementation.

This approach outlines a sustainable solution to replace the current heating system, aiming to enhance energy efficiency and reduce the carbon footprint by using renewable energy sources.



Concept idea of district heating system

Analysis of the environment (success and challenging factors) for the development of heat cooperatives

Success factors:

- **Municipal Support:** The municipality is the project initiator, which can facilitate access to financing and regulatory simplifications.
- **Existing Infrastructure:** The presence of a shared boiler room eases the transition to the new system.
- **Environmental Acceptability:** Wood biomass is considered a renewable energy source with a positive impact on the environment.
- **Experience from Other Projects:** Examples from Austria show the successful implementation of similar systems in Living Lab environments, where collaboration among owners is key.

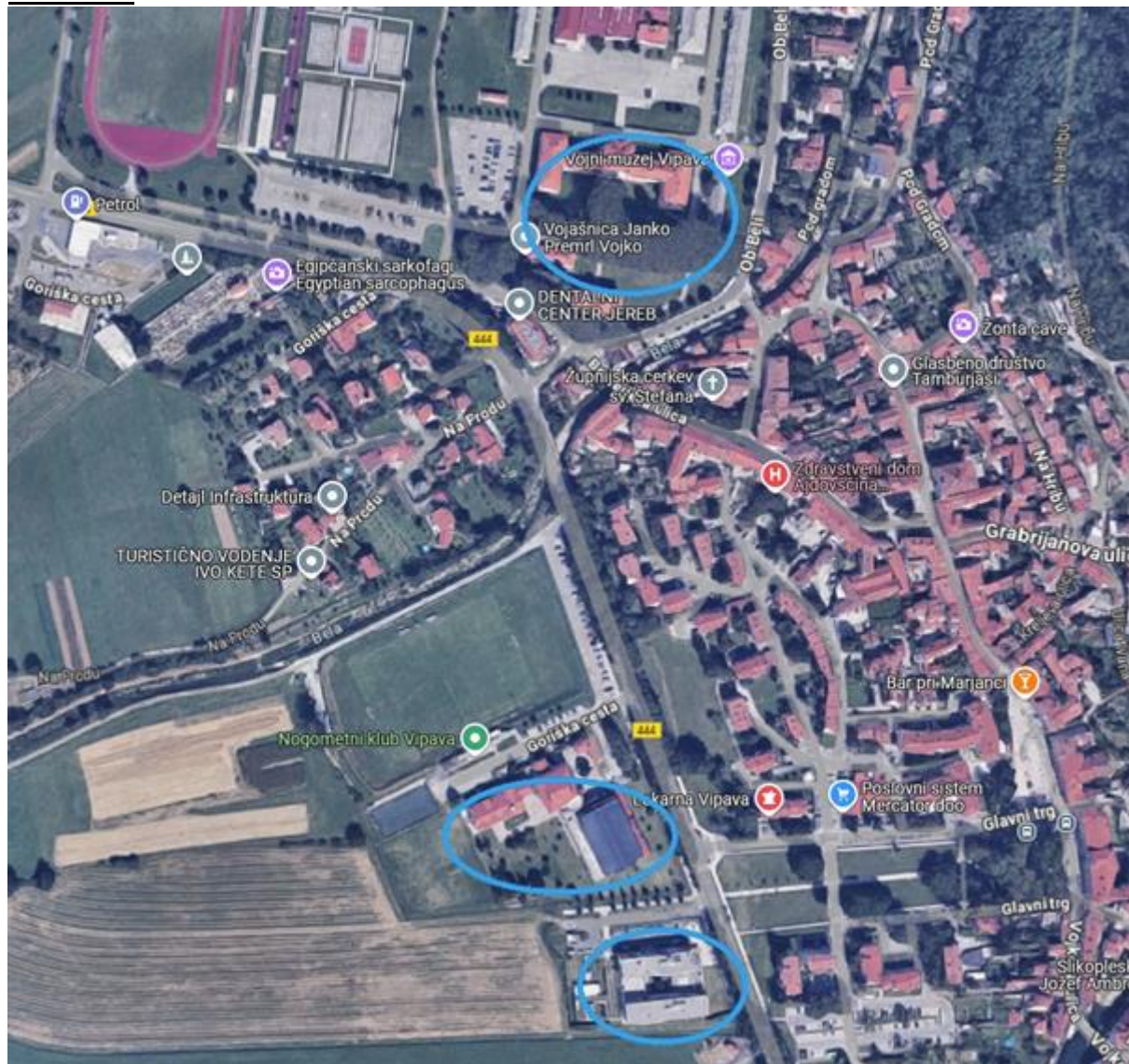
Challenges:

- **Investment Costs:** The project launch requires significant funding, which will need to be sourced from European or national funds.
- **Long-term Sustainability:** A precise cost-benefit analysis is needed, including the potential price instability of biomass.

- **Spatial Integration:** A challenge will be the placement of the system in an urban and built environment, as the boiler plant requires a large boiler and chip storage.
- **Legal Framework:** Issues related to ownership and management of the new system will need to be resolved.
- **Social Aspect:** Acceptance of the project among residents is crucial for successful implementation, requiring extensive communication and education.

The "District Heating Cooperative Radlje ob Dravi" project presents an important opportunity for the sustainable development of the local community. With proper stakeholder collaboration, financial support, and technical execution, the project can successfully contribute to the decarbonization of heating in the Radlje ob Dravi municipality. Experiences from other European cities show that organizational support is crucial for long-term success, making the establishment of a stable cooperative and legal foundation a key priority.

Pilot no. 2



Overview of key data:

- Project Type: District heating system on wood biomass – Municipality of Vipava
- Location: Vipava
- Developer/Owners: Municipality of Vipava
- Current Legal Form: Public buildings as well as private ones (barracks, high school, retirement home)
- Form of residence (e.g. rented, individual ownership): Individual ownership
- Current Heating System: Different sources (local energy systems)
- Year of Construction: Barracks – 1995, high school-1999, retirement home 2009
- Number of Residential Units: n.a. (will be determined in the future)
- Scope of the Living Lab: Several properties

Detailed Description of the Existing Organizational Structure

Description of the existing organizational structure:

- *What is the ownership structure?*

The project involves the construction of a district heating system powered by wood biomass, which would provide heating for several buildings in the Vipava Municipality area via a central heating plant. The identified buildings that could be included in the system are: the Vipava Barracks, Škofijska Gymnasium Vipava, Vipava Retirement Home, and the future building for the center for disabled youth. The central biomass boiler plant for the district heating system would be located near the barracks. The building owners included in the system are private owners as well as buildings owned by the Republic of Slovenia.

- *Who is in charge of property management?*

The buildings that would be part of the district heating system are both publicly and privately owned. Currently, the buildings are heated locally with their own heating systems. The management of heating systems in individual buildings is carried out locally (own systems, own building managers). The real-estate is managed by individual institutions or building owners (private owners).

- *Is there already an organization (Association/Cooperative) involved?*
- *Who is the initiator of the Living Lab (Municipality, Association, Cooperative, Owners, Residents)?*

There are currently no community projects in progress in this area. The project initiator is the Municipality of Vipava, which aims to explore the possibility of implementing a district heating system powered by wood biomass in this area, thereby increasing the use of renewable energy sources and reducing CO₂ emissions.

Through this project, the goal is to obtain a feasibility study for the implementation of the wood biomass district heating system in the Vipava Municipality area and, in turn, accelerate the possibility of investing in the construction of an energy-efficient heating system that utilizes renewable energy sources.

Technical Concepts

This section should describe the planned technical concept of the decarbonization.

In the case of confirming the economic feasibility of implementing district heating using wood biomass in the Vipava Municipality area, the existing local heating sources for individual buildings will be replaced with heat from the district heating system powered by wood biomass. Wood biomass will be used for heat production in the central boiler plant. Hot water will be transported through a piping system to individual heat substations in each building. Wood biomass is considered a renewable energy source with a neutral CO₂ emission, meaning that the combustion of wood biomass releases the same amount of CO₂ as if the wood had decayed in the forest.

The detailed technical implementation of the project is still in development, and therefore, an exact estimate of investment costs is not yet available.

Analysis of the environment (success and challenging factors) for the development of heat cooperatives

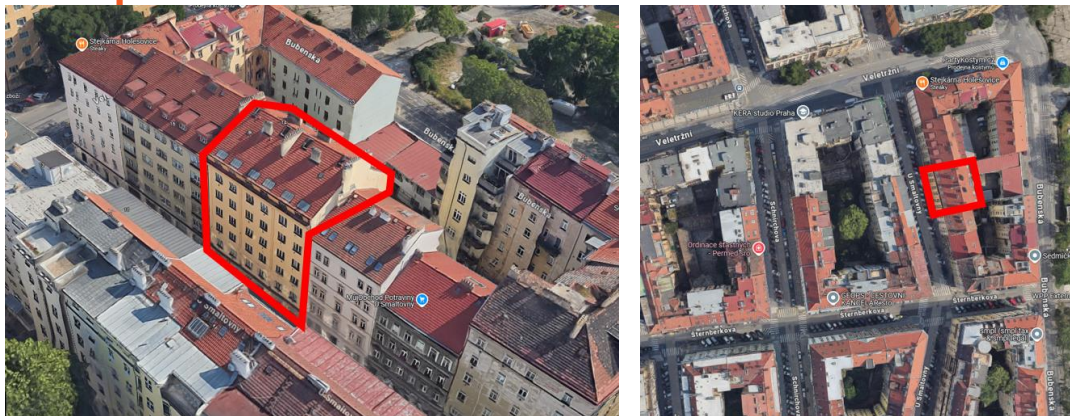
Several meetings were held with The Municipality of Vipava in which the need for more energy-efficient heating in this part of the municipality and the increased use of renewable energy sources were discussed. These meetings led to the identification of a possible location for the implementation of a district heating system powered by wood biomass and the selection of potential buildings that could be connected to the system. The municipality aims to create a feasibility study that will cover both technical solutions and the financial aspects of the investment. This study will serve as the basis for making a decision on whether to proceed with the investment and seek funding sources.

Obstacles that have been identified include:

- Whether there is enough energy demand to justify the implementation of the system.
- Whether the heat prices will be suitable for the connected consumers.
- Determining the location of the boiler plant.
- Whether the municipality is able to finance the implementation based on the size of the investment.
- Aligning the timeline for the construction of the district heating system and the new Cirius building.
- The buildings have different owners.

These factors will be critical in the decision-making process for moving forward with the project.

Czech Republic



(picture source: www.google.com/maps)

Overview of key data:

- **Project Type:** Decarbonisation by switching to central heating
- **Location:** Prague, Holešovice district
- **Developer/Owners:** Owned by 9 individuals on the basis of their shares
- **Current Legal Form:** Co-ownership
- **Form of residence (e.g. rented, individual ownership):** Rental and co-ownership
- **Current Heating System:** Individual gas heaters (gas wafers) and electric heaters (accumulation heaters)
- **Year of Construction:** 1931
- **Number of Residential Units:** 43
- **Scope of the Living Lab:** Single building with multiple owner

Detailed Description of the Existing Organizational Structure

Description of the existing organizational structure:

- **What is the ownership structure?**

The house is in shared ownership, i.e., it is owned by individuals on the basis of their shares. The rights of the co-owner of the property and his obligations are regulated by the Civil Code No. 89/2012 Coll., Part 4 - Co-ownership, whereby the following applies:

- The property is a single unit; therefore, the co-owners must deal with it as a single person.
- Each co-owner has a right to the whole property, which is limited by the equal right of the others.
- The share expresses the degree of participation of each co-owner in the formation of the common will and in the rights and obligations arising from the co-ownership of the property.

- **Who is in charge of property management?**

Financial management and part of the facility management (mandatory audits and other legislative obligations) is handled by a specialized facility management company.

Other house management – investments, maintenance, negotiations with tenants and contractual matters are handled by the co-owners of the building, by agreement and designation.

- **Is there already an organization (Association/Cooperative) involved?**

No.

- **Who is the initiator of the Living Lab (Municipality, Association, Cooperative, Owners, Residents)?**

Owners.

Stakeholders of the Living Lab

Stakeholder group		Stakeholders in the Living Lab
Municipalities		Secondary stakeholder: City of Prague - not yet included
owner	Housing cooperatives	Key stakeholders: The building owners
Residents		Key stakeholders: The residents of the buildings with active rental contracts are also key stakeholders in the Living Lab, as their approval is crucial for the project's success.
Housing managers/property managers		Secondary stakeholders: Facility management company – not yet involved
Construction companies, technology providers, energy service providers		Not yet involved / identified
Additional stakeholders		Not yet involved / identified

Technical Concepts

This section should describe the planned technical concept of the decarbonization.

The aim of this project is to transform the existing heating and hot water system in a residential building in Holešovice into a central, emission-free heat source. This step is intended to increase the comfort of the residents, reduce the environmental burden, and ensure the economic affordability of heating.

Currently, the building is a brick residential structure in a block development, where each apartment unit has its own separate gas or electric heating and hot water system. These decentralized solutions have lower energy efficiency, leading to higher energy costs and a greater environmental impact. As part of the project, the creation of a central boiler room is planned, which would serve the entire building. This system would provide more efficient hot water heating and heating through a single source, thereby reducing operating costs and improving energy efficiency.

An important component of the proposal is also the exploration of options for installing renewable energy sources. Potential solutions include the installation of solar panels, which could contribute to hot water heating and support heating, as well as the use of heat pumps as a heat source. These technologies would not only reduce greenhouse gas emissions but also contribute to the long-term sustainability of the building's energy system.

Analysis of the environment (success and challenging factors) for the development of heat cooperatives

The environmental and economic analysis will be a key step in the decision-making process. A detailed cost-benefit study related to the change in heating will be developed, taking into account savings on energy, operating costs, and potential subsidies for renewable sources. The results of this analysis will be presented to the homeowners' association that manages the building, and discussions will be held with the residents regarding the possibilities for implementing the proposed changes. Obtaining consent and actively involving residents in the decision-making process is essential for the successful realization of the project. In addition, the project will focus on surrounding buildings that have a similar heating system. Discussions with representatives of these buildings could provide valuable insights and suggestions for extending the central heat source to other nearby properties. This would create a network of interconnected systems that could share resources and optimize energy consumption. The implementation of the proposed changes could serve as a model for other similar projects in the Prague area and the Czech Republic, thereby supporting a broader transition to sustainable and ecological energy sources.

Annex I - Survey among owners, managers and residents