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RE-PUBLIC SPACES

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D1.2.1 STRATEGY FOR ADAPTING FIVE HISTORIC COURTYARDS TO CLIMATE CHANGE IN THE CITY OF VELENJE

Version 1

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1.1. Historical background of Velenje

Velenje is a young town in Šalek Valley, even though the first written mentions go back to the 13th century. Today's old town square of Velenje (Staro Velenje) is a settlement at the foot of Velenje Castle and at the crossroads of two important paths. The former square is first mentioned in written sources in 1264. It was granted the town rights by the Lords of Kunšperk, the first owners of the Velenje Castle. On the eastern part, it borders on the historic Villa Bianca from the middle of the 19th century and on the west the square once bordered on the famous Rakov hotel, later also known as Majerhold House. None of the houses, which are mainly multi-storey, as the ground floor was used for crafts, is much older than 200 years. In 19th century the market burned down completely. The market was also destroyed in 1643 by the Turks, who first invaded the Šaleška valley on their return from Carinthia. Throughout its turbulent history of more than 750 years, Velenje square remained a small provincial square, in which there were only 16 households with a little more than 82 inhabitants in the middle of the 18th century. The number slowly increased in the 19th century, and around 1820 there were 147 people living in the square in 31 houses, who kept 30 horses and 46 cows. Around 1885, the square had 35 houses and 266 souls. Before the Second World War, in the thirties of the 20th century, there were 79 houses and 648 people in the square. At the beginning of the 20th century, the square boasted a hotel with a garden and seven inns. There were three doctors, a bank, a sawmill, a mill and several craftsmen. The changes were accelerated by the emergence of industry, but above all the market grew after 1875, when the Velenje coal mine started operating and employed more people every year. At the same time, Velenje square opened to the world more and more with the construction of the road and railway connection to Celje and Dravograd. After the end of the Second World War a modern town was built next to the square. Today, the market is part of the larger city of Velenje with 25.235 inhabitants.

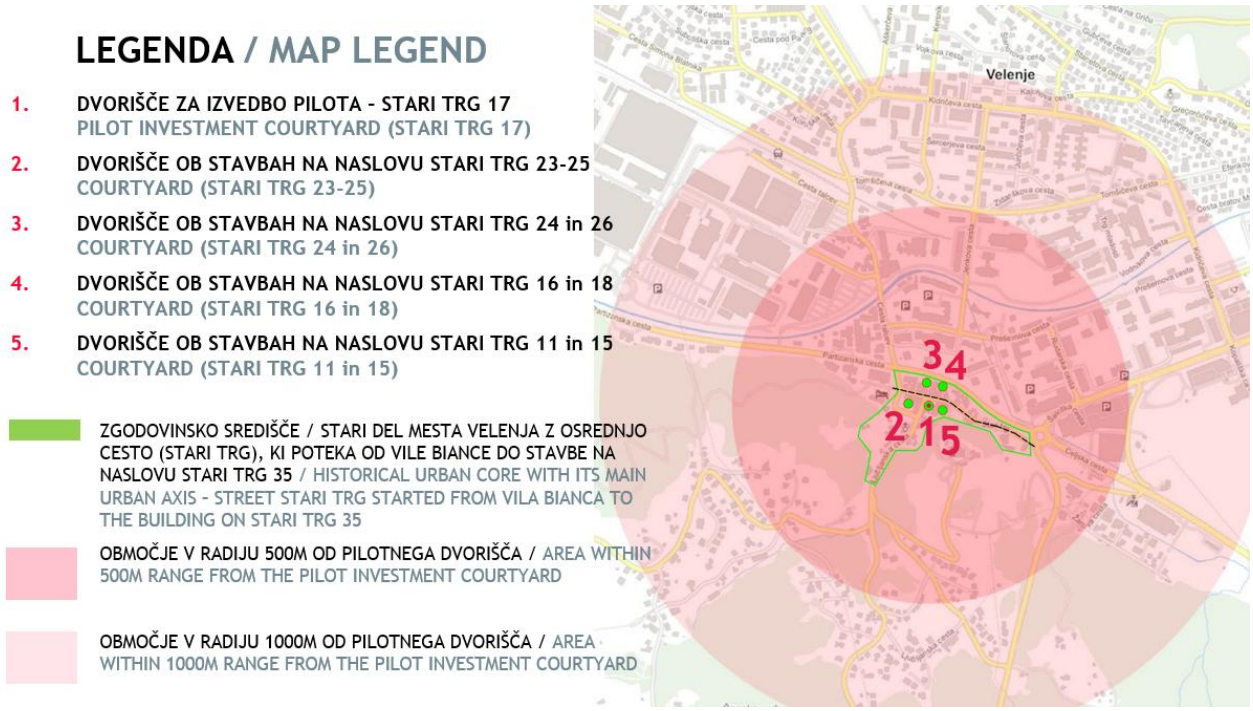

Figure 1. Location of the Analyzed Courtyards in Staro Velenje.
Source: Velenje - Charter of Cortyards

1.2. The Historic Urban Core

Today's Staro Velenje is a settlement at the foot of Velenje Castle and at the crossroads of two important paths. The former square is first mentioned in written sources in 1264. It was granted the town rights by the Lords of Kunšperk, the first owners of the Velenje Castle. On the eastern part, it borders on the historic Villa Bianca, which was built on the site of the original building in the middle of the 19th century by the counts de la Fontaine and d'Harnoncourt–Unverzagt, and from 1851 to 1858 by the owners of Castle Velenje, and on the west the square once bordered on the famous Rakovor Bizjak hotel, later also known as Majerhold House. None of the houses, which are mainly multi-storey, as the ground floor was used for crafts, is much older than 200 years. On May 26, 1801, the market burned down completely. The market was also destroyed in 1643 by the Turks, who first invaded the Šaleška valley on their return from Carinthia already in the 15th century, more precisely in 1473.

Throughout its turbulent history of more than 750 years, Velenje square remained a small provincial square, in which there were only 16 households with a little more than 82 inhabitants in the middle of the 18th century. The number slowly increased in the 19th

century, and around 1820 there were 147 people living in the square (together with Pesje, Podgorje, Preloge and Staro Velenje) in 31 houses, who kept 30 horses and 46 cows. Around 1885, the square had 35 houses and 266 souls. Before the Second World War, in the thirties of the 20th century, there were 79 houses and 648 people in the square. At the beginning of the 20th century, the square boasted a hotel with a garden and seven inns (among them the Skazova, Ježovnikova, Gollova, Lahovnikova and Hudovernikova inns). There were three doctors, a bank, a sawmill, a mill and several craftsmen. The changes were accelerated by the emergence of industry, but above all the market grew after 1875, when the Velenje coal mine started operating and employed more people every year. At the same time, Velenje square opened to the world more and more with the construction of the road connection through Huda Luknja in 1826 and the establishment of the railway connection Celje-Velenje-Dravograd at the end of the 19th century. After the end of the Second World War a modern town was built next to the square. Today, the market is part of the larger city of Velenje with 25.235 inhabitants.

The houses around courtyards were mostly constructed after the great fire in 19th century. They are mainly multi-storey, as the ground floor was used for crafts and the first floor for living. Most of the houses were renovated in the last few years. A house called „Rakov hotel“ was removed due to its poor conditions. That‘s why it‘s now the courtyard nr. 2 L-shaped. Common layouts of courtyards are O, U or L shapes. Only one of the courtyards is shady, the rest are well sunlit. The courtyards serve as public, semi-public or private spaces. There are currently no comprehensive guidelines for adaptation of the historical courtyards to climate change.

Courtyards in Staro Velenje, while originally designed for utilitarian purposes, now serve as important components in old part of Velenje. They reflect both the challenges and opportunitie: restricted green space, insufficient comfort for everyday use, but also a high potential for ecological adaptation and social revitalisation.

Figure 2. Inventory of the Analyzed Courtyards by Size and Shape
Source: Velenje - Charter of Cortyards

As a priority area from both historical and urban perspectives, the Historic Urban Core of Velenje is protected through several Local Spatial Development Plans, as well as heritage protection measures based on local conservation policies and strategies.

1.3. Characteristics of the Courtyards

For the purpose of the Re-Public Spaces project, we selected five courtyards located within the Historic Urban Core of Velenje. These sites are the only courtyards in Staro Velenje, which represents a very small part of the town. The selected courtyards meet common criteria such as historical character, typical size, and ownership conditions — all properties are owned and maintained by the City of Velenje. Additionally, their land use provides sufficient space for adaptation works; while a few courtyards contain scattered greenery, most lack adequate vegetation and ecological functions, leaving them poorly prepared to address climate challenges in their current state. The following courtyards were therefore chosen for detailed analysis and assessment within the project: Stari trg 17 (which also serves as a site for exemplary pilot implementation), Stari trg 23-25, Stari trg 24 and 26, Stari trg 16 and 18, and Stari trg 11 and 15.

The courtyards maintain a uniform ground level with the adjacent street. In all courtyards, rainwater is drained into the stormwater sewer system. Modern adaptations have successfully improved accessibility to the courtyard's level.

Ground surfaces are paved with a mix of historic and modern materials such as asphalt, grass plates with gravel, concrete setts, sawn-split granite paving stones,

concrete/granite plates in gray tones. Original stone paving is not preserved. In the past, the yards in Staro Velenje were sandy.

Figure 3. Inventory of the Analyzed Courtyards - Photographic Views of Each Courtyard
Source: Velenje - Charter of Cortyards

Characteristic architectural and design elements contribute to the identity of selected courtyards. Facades are painted in historically grounded colors, supported by studies and conservation rules, while windows and doors range from preserved wooden joinery to newer PVC frames which reinforce the unique genius loci of the courtyards. Gates, often decorated in wood, remain defining features.

Some courtyards remain closed and "well-shaped," while others offer opportunities to connect with adjacent plots, potentially creating larger shared public spaces. Fencing and boundary treatments depend on the presence of outbuildings. Unfortunately, mesh metal fences prevail. Most courtyards lack facilities tailored to diverse resident groups. Safety is addressed through lighting, non-slip paving, car restrictions.

Taken together, these elements demonstrate both the shared heritage and evolving functions of Staro Velenje's courtyards. Their distinctive layouts, historic architectural features, and potential for adaptive reuse underscore how these spaces serve both as protected cultural assets and as opportunities for ecological, social, and spatial renewal.

1.4. Accessibility

When considering accessibility in historic courtyards, it is essential to account for the specific characteristics of heritage buildings. These structures are legally protected due to their historical and architectural significance, and any interventions must respect conservation principles. Therefore, accessibility should be analyzed from both construction and preservation perspectives.

The courtyards in Staro Velenje and the ground floors of the buildings have largely been adapted to meet the needs of disabled and elderly people through previous revitalizations. Nevertheless, there are still no ramps for significant height differences in courtyard No. 3.

Courtyard No. 3, which is not accessible to people with functional disabilities, requires remodeling. The existing layout must be redesigned to include ramps, a reduction of parking areas, and the addition of new vegetation. The ramps should seamlessly blend into the urban interiors and be difficult to remove. Any new ramp designs should harmonize with the chosen materials and complement the character of the renovated spaces.

2. Urban and Climate Context

2.1. Climate Characteristics and Adaptation Potential

Velenje is a modern post-industrial town in central Slovenia, best known for its rich industrial heritage, lake, and natural beauty. The city was built in the 1960s and 1970s as an industrial hub focused on mining and energy, and today it represents an important economic and cultural center of the region. The town is spread across hilly terrain.

Velenje recognizes the importance of sustainable development and environmental challenges related to its industrial past, and is committed to revitalizing its urban environment, improving quality of life, and promoting green mobility. It is a dynamic city that combines industrial heritage, natural beauty, and modern development opportunities, re-emerging as a center of cultural and economic vitality in the region.

Climate change will impact Velenje in several ways, which will be significant for its living conditions, economy, and environment. The main effects include:

- **Increase in temperature extremes:** Rising average temperatures and more hot days could lead to more heatwaves, negatively affecting residents' health—especially the elderly and vulnerable groups—and increasing energy consumption for cooling.
- **More rainfall and flooding:** An increased volume of precipitation raises the risk of floods, especially during heavy storms, which can threaten infrastructure, residential buildings, public facilities, and commercial areas. This is particularly critical for areas near river Paka.
- **Increased energy demand:** Changing climate conditions with more extreme heat will likely raise the need for cooling and heating, leading to higher energy consumption and potential stress on local energy sources.
- **Environmental and health challenges:** The effects of climate change can also result in poorer air quality and increased health issues related to heat, pollution, and allergens.

Velenje aims for sustainable development and managing climate risks, making it crucial to develop adaptation measures, reduce emissions, and improve resilience of both the community and infrastructure to these challenges.

Figure 4. Inventory of the Analyzed Courtyards - The Size of Green Areas
Source: Velenje - Charter of Cortyards

The selected courtyards share common physical, functional, and ecological characteristics:

- **Layout and Structure:** O-, U-, or L-shaped tenement arrangements with outbuildings along the plots.
- **Surfaces and Materials:** Predominantly non-permeable surfaces (93–100%) such as asphalt, grass plates with gravel, concrete setts, sawn-split granite paving stones, concrete/granite plates; façades are light-colored, reducing some heat absorption. Most of façades are insulated with EPS to improve thermal performance.
- **Sunlight and Ventilation:** Most courtyards receive at least four hours of direct sunlight. Ventilation ranges from low to medium depending on orientation and shape, contributing to heat accumulation during summer months.
- **Greenery and Biodiversity:** Vegetation is limited to small lawns, some trees, potted plants, or climbing plants along walls. Vertical greening on walls and fences is largely unused.
- **Rainwater Management:** Courtyards primarily rely on sloped surfaces directing water to drains or streets, with minimal local retention.

These characteristics directly relate to the four key climate adaptation strategies.

Figure 5. Simple Climate Strategies as a Response to Existing Challenges
Source: Łódź. Work Progress. 25.02.2025

2.1.1. Urban Heat Island (UHI) and Heat Waves

Currently, the courtyards are dominated by sealed surfaces (93–100%) made of asphalt, grass plates with gravel, concrete setts, sawn-split granite paving stones, concrete/granite plates, which absorb and retain heat. Most courtyards receive direct sunlight, and poor ventilation allows heat to accumulate during the summer months. Light-colored façades help reflect some solar radiation, yet the lack of greenery and nature-based solutions (NBS) results in minimal natural cooling. At present, residents rely primarily on small potted plants for relief, which have little effect on the microclimate. Expanding vegetation, incorporating NBS, and designing climate-sensitive surfaces would be crucial to reduce localized heat buildup and improve thermal comfort. Unfortunately, within the scope of this project, we cannot alter the ground surfaces. Slight warming of the courtyards can be addressed by adding vegetation and various shading elements.

2.1.2. Torrential Rains – Water Management

Rainwater management in the courtyards is largely based on sloped surfaces that channel water directly into drains or toward the street. This system prioritizes quick discharge into the sewage network, with no provisions for retention or infiltration. As a result, heavy rainfall often can cause temporary flooding. None of the courtyards currently make use of rainwater for local ecological or social benefits. Strategic interventions are needed, such as partial de-concreting, introduction of permeable surfaces, rain gardens, or small water retention tanks. These measures would not only reduce flood risk but also support cooling and biodiversity functions in the courtyards.

2.1.3. Nature-Based Solutions (NBS)

Currently, greenery in the courtyards is sparse, fragmented, and often in poor condition. Small lawns, some trres and potted plants maintained by residents exist in some sites, but they provide minimal cooling, air quality improvement, or recreational opportunities. Most surfaces remain sealed, and greenery does not significantly influence the microclimate. To transform these spaces, the introduction of vertical greening, rain gardens, and pocket lawns could enhance air cooling, increase comfort, and create welcoming, social spaces for residents.

2.1.4. Building Green Infrastructure (GI) and Biodiversity

Presently, the courtyards contribute little to biodiversity. With a few exceptions, such as occasional trees, the ecological value of the spaces is low. The lack of diverse plantings and permeable surfaces limits habitats for pollinators, birds, and other species. However, even these modest plantings show potential: climbing plants, shrubs, and flower beds can serve as a starting point for ecological enrichment. Introducing additional GI elements—such as planters, lawns, bio-retention areas, and vertical gardens—would not only support biodiversity but also improve the well-being of residents and promote healthier living conditions.

Overall, while the five courtyards currently face challenges in heat accumulation, water management, and ecological functions, their historic layouts, resident engagement, and available space provide strong potential for implementing climate adaptation strategies in line with the four focus areas.

2.2. Rainwater Management in Historic Cities: Challenges, Opportunities, and Solutions

Historic cities face unique challenges in adapting to the impacts of climate change, particularly with respect to water management. Their dense urban fabric, extensive sealed surfaces, and fragile heritage structures limit the possibilities for conventional drainage systems. At the same time, these environments provide opportunities for small-scale, integrated solutions that combine sustainability with heritage conservation.

2.2.1. Challenges of Rainwater in Historic Urban Fabrics

The morphology of historic city centers typically includes narrow plots, high-density buildings, and limited open space. Courtyards and streets are often paved with impermeable materials such as stone setts, concrete plates, or asphalt, leaving little room for natural infiltration. This creates several pressing challenges:

- **Flood risk during torrential rains.** Heavy precipitation events can overwhelm existing drainage networks, causing localized flooding in courtyards, basements, and adjacent streets.
- **Poor water retention capacity.** Historic centres usually prioritize rapid discharge into sewage systems, meaning that rainwater is lost rather than used locally for ecological or social benefits.
- **Lack of soil.** In the old city cores, there is a lack of open terrain that would retain stormwater and allow plants to grow normally.
- **Constraints of heritage preservation.** Interventions must respect historic layouts, architectural integrity, and conservation regulations, restricting options for large-scale infrastructural modifications.
- **Vulnerability of buildings**. Moisture penetration into foundations or walls poses a direct risk to the longevity of historic structures. Infiltration-based solutions therefore require careful siting and protective measures.

These challenges are compounded by climate change. Projections for Central Europe, including Velenje (Slovenia), predict more frequent and intense rainfall events, alongside higher temperatures. Historic cores are therefore at particular risk from both urban

flooding and heat accumulation, underscoring the urgency of climate-sensitive water strategies.

Despite surtain limitations, historic cities also hold great potential for innovative rainwater management. Courtyards, as semi-public spaces, can function as platforms for integrating blue-green infrastructure (BGI) and nature-based solutions (NBS). Their moderate scale makes them ideal for pilot projects, which can then be replicated across wider neighborhoods. Key opportunities include:

- **Micro-scale interventions**, such as permeable paving, rain gardens, or pocket lawns, can significantly improve local infiltration and cooling.
- **Integration with heritage features.** Integration with heritage features: Historic paving stones and decorative elements can be preserved and incorporated into new structures, such as drainage channels, retention basins, or vertical greenery.
- **Community engagement.** Courtyards are lived-in spaces where residents directly experience environmental issues. Public consultations and co-design processes can help ensure solutions meet both ecological goals and everyday needs.

By aligning ecological, social, and heritage considerations, courtyards can become multifunctional “green chambers” that both mitigate climate risks and enhance quality of life.

2.2.2. Key Steps in Revitalizing Courtyards for Water Management

Developing effective rainwater strategies in historic courtyards requires a systematic approach that balances technical precision with community and heritage sensitivity. The process involves several stages:

*1) **Site assessment**. A thorough inspection of the courtyard and its microclimatic conditions, including inventory of historic and contemporary materials, is the foundation of any intervention.*

*2) **Archival and technical research**. Collecting documentation and existing infrastructure plans helps identify constraints and opportunities for water management.*

3) ***Hydrological analysis****. Modeling rainfall patterns, runoff volumes, and extreme event scenarios reveals vulnerabilities to flooding and guides design decisions.*

4) ***Geological and soil studies****. Understanding soil permeability, field capacity, and erosion risks determines the suitability of infiltration versus retention strategies.*

5) ***Community involvement****. Public consultations ensure that tenant expectations, needs, and habits are integrated into the design.*

6) ***Boundary conditions****. Evaluating building foundations, waterproofing, and existing drainage networks sets the technical limits for safe interventions.*

7) ***Concept development****. Designers select appropriate NBS and infrastructural solutions that balance ecological, aesthetic, and social considerations.*

This structured process ensures that proposed measures are both technically feasible and socially acceptable, while respecting heritage values.

2.2.3. Possible Solutions: From Retention to Infiltration

Rainwater management typically combines two complementary approaches:

- **Retention.** Local storage of water through tanks, cisterns, or decorative ponds provides immediate resources for irrigation and cooling. Retention is highly visible, socially attractive, and adaptable to small spaces.
- **Infiltration.** Directing water into soil systems supports groundwater recharge, biodiversity, and long-term ecological benefits. Infiltration requires careful siting away from foundations, often supported by bio-retention areas, swales, or permeable paving.

Specific solutions include:

- **Permeable surfaces** replacing concrete with stone setts on sand bedding or porous paving plates.
- **Rain gardens and biofilters** that capture and clean runoff while providing green benefits.
- **Vertical greening and green facades** that retain moisture and reduce heat stress.

- **Rainwater harvesting systems** (e.g., water catchers, tanks) integrated with irrigation.
- **Sedimentation tanks or separators** to remove pollutants where runoff is contaminated.
- **Native planting schemes** to maximize ecological resilience and minimize maintenance.

By carefully combining these solutions, courtyards can evolve into multifunctional, climate-resilient spaces that provide cooling, biodiversity, social value, and heritage-compatible design.

Rainwater management in historic cities cannot rely on a one-size-fits-all approach. Each courtyard, street, or square represents a distinct context shaped by heritage, infrastructure, and community use. However, the principles of site-specific assessment, multifunctional design, and integration of nature-based solutions provide a transferable framework.

Ultimately, the challenge of rainwater in historic cores is also an opportunity: to reimagine courtyards and similar urban micro-spaces as resilient, green-blue chambers that connect ecological function with cultural heritage and everyday urban life.

2.3. Public participation and tenant education.

Public participation plays a crucial role in the process of revitalization and in shaping effective ecological adaptation. In Velenje, as part of the Re-Public Spaces project, we carried out several activities with residents in the vicinity of the examined courtyards. The first activity was a survey where we asked residents about what kind of courtyard they would like, and what bothers them about the existing courtyards. The second activity took place at the pilot courtyard. As part of a public workshop, we gathered ideas for the renovation. At the third event, we discussed the proposal for redesigning the pilot courtyard with the residents. Finally, at the last event, we presented them with the final proposal.

All events highlighted how even simple educational processes can positively influence tenants' approaches to ecological adaptation. This engagement provides hope that the upcoming investment will not only inspire replication across the city and beyond —

demonstrating how communities can respond to environmental challenges while enhancing urban life — but also foster ongoing community involvement in maintaining the revitalized courtyard.

Figure 6. Public consultations in Stari trg 17 Velenje, May 2025.
Source: Personal archive

By giving residents, a meaningful role in the design process, the project strengthened social ties and nurtured a shared sense of engagement. The courtyard has a chance to become more than a functional space for rainwater management; it can serve as a hub for community interaction, education, and ecological awareness. Residents are empowered to care for the environment they helped shape, turning the courtyard into a living demonstration of sustainable urban design.

The revitalization of the Stari trg 17 courtyard can become not merely an architectural or ecological intervention — it is a collective act of placemaking, driven by the voices, needs, and aspirations of the residents themselves. Tenants were engaged from the earliest stage of the project, and through consultations, conversations, and surveys, their input informed crucial design decisions, including the placement of urban furniture and the organization of green areas. This inclusive approach ensured that the courtyard met not only aesthetic and ecological goals but also the practical rhythms of daily life in the community.

In essence, public participation transforms ecological projects from top-down interventions into co-created spaces where social cohesion, environmental education, and climate adaptation converge.

3. Strategic Framework

3.1. The Velenje City Development Strategy 2030+

The Sustainable Urban Strategy of Velenje 2030 (2022) was developed at a crucial turning point in the city's new development path. Due to the planned closure of coal mining activities in the coming years, the city faces a structural transformation—from a coal-based economy into a green region, i.e. a high-tech, environmentally friendly region with new, high value-added jobs. This transformation undoubtedly represents a major challenge for the city. Priority areas – listed below – clearly demonstrate that the Re-public Spaces project is directly aligned with the strategic development goals of the Sustainable Urban Strategy (SUS) of Velenje in the areas of Green Velenje, Social Velenje, Integrated and Sustainable Development of Velenje, and the Just Transition.

Below are key excerpts from the SUS that relate to the strategy of the Re-public Spaces project in Velenje and show how the project supports the achievement of objectives that have been identified as key development opportunities for the city and the region.

Development Opportunities – GREEN VELENJE

The European Green Deal has set ambitious goals for adapting to climate change and for the green transformation of the EU economy. The green transition of the Šalek Valley, as part of the restructuring of coal regions, presents a development opportunity for the Municipality of Velenje on its path toward a low-carbon society.

Within the thematic area of Green Velenje, key challenges are evident in the field of energy efficiency, including the green transformation of the district heating system. It is essential to implement measures for efficient energy use by promoting energy renovation of public and private sector buildings, cultural heritage sites, and by providing energy consulting to residents. The construction of new residential complexes will follow green building guidelines, which enable advanced energy management of buildings, increase energy efficiency and water use, ensure optimal use of construction materials, and promote the use of environmentally friendly materials—thereby reducing negative impacts on people and the environment.

To achieve this goal, energy consumption monitoring and management through digitalization and inclusion in energy communities is of key importance. In addition to

improving the energy efficiency of buildings, it is also necessary to promote energy efficiency in the economy, particularly in terms of efficient resource management, and to encourage companies to adopt energy standards and invest in energy-saving measures.

Another development challenge is to increase energy self-sufficiency (through the use of renewable energy sources – RES) and to reduce dependence on fossil fuels, enabling the gradual replacement of thermal energy sources. The Municipality of Velenje will promote investments in RES, especially in degraded areas, to provide alternative sources of heat within the district heating system.

The goal is to adapt to and strengthen resilience against the harmful impacts of climate change, by investing in flood and landslide risk management. At the same time, we must preserve and improve environmental quality, which will be achieved through the sustainable management of water resources. Through management and development measures in water supply systems and wastewater drainage and treatment systems, we will continue to restore existing systems and expand missing infrastructure in densely built-up areas of smaller settlements. Continuous and high-quality drinking water supply will also be ensured in the future, along with the protection of existing and potential water sources.

To mitigate the consequences of climate change, investments in green infrastructure must also be promoted. Through various measures, we aim to improve the condition of plant and animal species and thereby preserve habitat types. In the city center, we aim to maintain and supplement selected tree species.

Development Opportunities – SOCIAL VELENJE

Velenje is a city that offers a high quality of life in areas such as culture, sports, healthcare, living safety, and social services. This is confirmed by the results of conducted surveys and by the strong sense of identification residents feel with their place of living.

Within the thematic area of Social Velenje, we address the fields of education and training, where opportunities lie in creating an environment for rapid and flexible training of personnel according to labor market needs. The Municipality of Velenje is already investing, and will continue to invest, in the development of services and tools for long-term forecasting of competencies and skills required by the labor market (e.g. the Center of the Future).

In the field of culture, cultural production by public institutions, individuals, and the non-governmental sector is proving to be of high quality and value.

Development opportunities in the cultural sector are especially evident in the revitalization and renovation of cultural heritage and public cultural infrastructure, as well as in the digital innovation of culture. While the Municipality of Velenje is already active in restoring cultural heritage, many cultural sites have been identified as still needing renovation. This includes improving accessibility to cultural landmarks, which are currently almost inaccessible to certain vulnerable groups.

Development Opportunities - INTEGRATED AND SUSTAINABLE DEVELOPMENT OF VELENJE

The Municipality of Velenje is committed to the balanced and sustainable development of both the urban area and its rural surroundings, as we aim to be an environment characterized by an above-average quality of life. Promoting integrated and inclusive social, economic, environmental, and local development, along with culture, natural heritage, sustainable tourism, and safety in both the city and the wider municipal area, is essential for the continued integrated and sustainable development of Velenje.

If Velenje wishes to remain an attractive place to live, it must address the renewal of urban neighborhoods and the city center, as some areas are already in quite poor condition. The urban renovation of the city center is also important from the perspective of protecting and preserving cultural heritage, since the city center is protected as a settlement heritage site. With its distinctive modernist architecture and the concept of a "city in a park", it represents a development opportunity through which we can strengthen the city's recognition and reputation at the national and European levels, and thereby increase tourist visits.

Other challenges we face in neighborhoods include the management of stationary traffic and emergency access routes, providing spaces for recreation and social interaction, supporting multiculturalism, and improving conditions for entrepreneurship. In addition, certain parts of the city need to be adapted for people with mobility impairments.

To achieve the goal of harmonious development between urban and rural areas, it is crucial to address the needs of the rural population. Special attention will be given to improving the connectivity between the city and the countryside, particularly through

public transportation and the development of pedestrian and cycling infrastructure. This approach reduces pressure on the urban area and ensures more balanced development across the municipality.

In addition to infrastructure development, focus must also be placed on the programmatic and content-based development of rural areas, the revitalization of village centers, and the renovation or construction of multi-purpose community buildings and spaces. Efforts will also be made to encourage new activities in rural areas and promote sustainable tourism.

Development Opportunities – JUST TRANSITION

In the past, large coal reserves were discovered in the heart of the valley. This became the foundation for the industrialization of the Šalek Valley. Mining began, followed by the development and growth of Velenje. However, this rapid industrial expansion caused significant environmental degradation. The City of Velenje made great efforts to rehabilitate the damaged landscape caused by coal exploitation and to turn this disadvantage into an opportunity.

The entire Šalek Valley was once heavily exposed to pollution due to its proximity to Slovenia's largest thermal power plant, TEŠ (Šoštanj Thermal Power Plant). High emissions of SO_2 and heavy metals led to negative environmental impacts, including forest dieback and pollution of Lake Velenje and the Paka River. In response, the Municipality of Velenje, together with the municipalities of Šoštanj and Šmartno ob Paki, adopted an environmental remediation program, and in the 1990s, several ecological rehabilitation measures were implemented. The Šalek Valley has since become a good-practice example of degraded area restoration.

Today, the City of Velenje stands at another turning point. Coal mining will cease by 2033, as stated in the adopted National Strategy for Phasing Out Coal and Restructuring Coal Regions, in line with the principles of a just transition. Velenje must now find new pathways and sources for continued development and growth.

In the coming decade, we will need to create new jobs, including those with higher added value. One of the biggest challenges ahead will be the transformation of the district heating system and the search for new, green energy sources, as nearly the entire city population depends on this system.

As outlined in the national strategy, the exit from coal and the restructuring of coal regions should ensure a fair and inclusive transition toward climate neutrality, with minimal impact on workers and the community, guaranteed social security, and a healthy living environment. To achieve this, all sectors must be actively involved in the process.

We must also change the mindset across all generations, so that the closure of the coal mine is seen as a new, greener opportunity for the development of our city.

Development Vision of Velenje

In 2008, the City Council of the Municipality of Velenje adopted a strategic development document: Vision and Strategy, the main strategic development document (hereinafter referred to as VIS). The VIS remains the key development framework for the Municipality of Velenje.

The VIS was prepared during a time of growing economic and financial crisis. Despite this, it was developed with ambitious goals, which were reflected in local budget planning and the implementation of included measures and projects. The Municipality of Velenje succeeded in maintaining a high share of the budget for new investments, without reducing funding for social, cultural, sports, and other public programs.

During the preparation of the Sustainable Urban Strategy (SUS), thematic workshops with a wide range of stakeholders and a public opinion survey revealed that most of the measures defined in the VIS had already been implemented. As a result, the level of satisfaction with the quality of life and public services remains high. However, slightly less optimism was observed regarding job opportunities and the local economic climate.

The Vision of the Municipality of Velenje is as follows:

“The Municipality of Velenje will be characterized by a developed economy based on innovation and highly qualified professionals, especially in the fields of research, design, and modern technologies, with a strong focus on environmental and energy sustainability.”

A welcoming and tolerant atmosphere, along with environmental sustainability and high quality of life—including opportunities for cultural and sports activities and excellent infrastructure connectivity—will attract both creative individuals to settle in the city and tourist flows.

The vision incorporates key strategic priorities of the EU and Slovenia (quality of life, sustainable development, creation of quality jobs) and reflects the core aspirations of the local population (a pleasant living environment, good living standards, and environmental sustainability). Velenje will be a well-connected, innovation- and technology-driven open municipality, welcoming to residents, visitors, and the environment alike—progressive, innovative, entrepreneurial, and recognizable.

The development of a high-quality living and working environment and cooperation between the economic and public sectors will foster a creative and entrepreneurial atmosphere, rooted in mutual respect and promoting activity on multiple levels.

The implementation of this vision has been assessed as successful, particularly in areas related to the quality of life and the quality and scope of public services. However, economic development is lagging behind, especially in the growth of small and medium-sized enterprises, which need to become a parallel pillar alongside large business systems. This highlights the need to strengthen development measures in the area of sustainable economic growth.

Within the framework of SUS Velenje 2030, the Municipality of Velenje is pursuing the following strategic goals, which are directly aligned with the objectives of the Re-public Spaces project:

- Maintain air quality;
- Preserve and enhance the quality and extent of public and green spaces in the city;
- Revitalize the old town center and develop other local centers;
- Revitalize the city center;
- Improve conditions for attracting domestic and foreign direct investment;
- Improve conditions for the growth of the tourism sector;

- Strengthen the marketing strategy for the city center, promote the city as a business location, and position it as an attractive environment for young professionals and young families.

Strategic Goals — Green City with History

- Build a city resilient to health, climate and energy challenges.
- Support innovations that improve the efficiency of energy, water, and other resource use.
- Increase the availability and diversity of public spaces and recreational areas.
- Improve accessibility to public services (15-minute city concept, support for eco-friendly transport, expansion of pedestrian areas).

The city and its residents face growing challenges due to climate change and the restructuring of the coal region. Urban heat islands, water shortage (droughts), air pollution, rising noise levels, development of green spaces require a focus on spatial adaptation and long-term climate mitigation actions. Improving environmental conditions

— air quality, noise reduction, waste and water management, animal welfare — directly enhances urban quality of life.

Building infrastructure to support resilient natural systems and implementing nature-based solutions (NBS) — such as green roofs and facades, retention basins, bio-retention ditches, and rain gardens — is essential. Energy efficiency must be prioritized through the protection of natural energy resources, reducing environmental impacts of energy production, and using renewable sources. Climate adaptation should be integrated with economic, social, and spatial considerations, with broad local community engagement and intergenerational equity in access to natural, cultural, and economic resources. The overarching goal is to sustainably meet human needs.

Guidelines and Principles for Strategic Actions

Increase the Quantity and Functionality of Green Areas in Velenje

- Urban planning must integrate green spaces alongside construction zones.
- Revalorization of parks and green spaces; protection of existing urban forests and additional tree planting.
- Development of green corridors along roads, bike paths, and public transport infrastructure.
- Implementation of special green forms: vertical gardens, green roofs, urban meadows.
- Protection and renaturalization of rivers; implementation of blue-green infrastructure for stormwater retention and infiltration.
- Resident engagement and education initiatives.

Examples of Actions:

- Removal of unnecessary concrete installations; permeable surfaces instead of asphalt/concrete.
- Pocket parks, vertical gardens, green roofs and walls.
- Household rainwater collection and targeted water management.

- Nature-based solutions for environmental, social, and economic benefits.
- Community gardens, wild zones, flower meadows, permeable park paths.
- Street, square, and courtyard tree planting.
- Preservation of existing trees and diverse plant species.
- Etc.

3.2. Strategic Development for the Courtyards in Velenje

The adaptation of the courtyards must be understood not as isolated interventions, but as integrated elements of a city-wide ecological and social strategy. By aligning the pilot project at Staro Velenje 17 and the evaluation of the other four courtyards from different perspectives the courtyards serve both as practical implementations of climate adaptation principles and as symbolic anchors for broader urban transformation.

Courtyards demonstrate the potential of nature-based solutions (NBS) in compact, historic urban settings. Ecological objectives include:

- Climate adaptation: reducing the effects of urban heat islands (UHIs) and creating cooling microclimates.
- Water management: promoting retention and infiltration, reducing pressure on the sewage system, and ensuring sustainable rainwater use.
- Biodiversity enhancement: introducing plant diversity, creating micro-habitats, and supporting pollinators and small fauna.
- Resident well-being: increasing access to green, shaded, and multifunctional spaces that improve daily life.

At the scale of individual courtyards, these objectives correspond directly with city-wide ecological goals, including expanding blue-green infrastructure, improving environmental quality, and building resilience against climate change.

3.2.1. Main Actions – Strategic Steps

To integrate courtyard revitalizations with the city's strategic vision, the following actions are proposed:

1. **Green Infrastructure Development**

- Replacement of sealed surfaces with permeable paving.
- Introduction of rain gardens, vertical greenery, and planted roofs.
- Systematic planting of trees and shrubs to increase shading and evapotranspiration.

2. **Water Retention and Reuse**

- Installation of localized retention tanks and cisterns for irrigation.
- Use of permeable surfaces and infiltration beds to reduce runoff.

3. **Cultural-Heritage Sensitive Adaptation**

- Emphasizing the need to protect historical building's facades and other historic architectural elements while introducing new ecological solutions, including the preservation of the heritage asset's visual perception and exposure.
- Preservation of historic facades while integrating new ecological functions.
- Use of reversible and non-invasive design techniques to respect heritage regulations.

4. **Social and Educational Programs**

- Embedding participatory design workshops and tenant consultations at each stage.
- Transforming courtyards into "learning sites" for sustainable design, demonstrating NBS in practice.
- Strengthening neighborhood engagement and eco-education, especially among children and youth.

5. **Integration with Wider Urban Systems**

- Linking courtyard projects with planned strategic projects.
- Establishing courtyards as nodes in a larger ecological network — micro-habitats and "cool islands" interconnected with streets and parks.

3.2.2. Implementation Timeline

The revitalization of the five courtyards should follow a phased approach, aligned with the scope and estimated cost of investments defined by the Re-Public Spaces project:

Short-term (until the end of 2026)

- Pilot implementation at Courtyard in Staro Velenje (Stari trg 17, Velenje), with full monitoring of ecological and social outcomes.
- Launch of public education campaigns on water-saving, planting the plants of the future and eco-friendly practices.

Medium-term (2027–2031)

- Analysis of the results of the revitalization at courtyard Stari trg 17, as well as of the Guidelines and the Charter for Courtyard Spaces in Historic Cities.
- Continuation of public education campaigns on water conservation, planting the plants of the future, and eco-friendly practices.

Long-term (2030+)

- Continuation of public education campaigns on water conservation, planting the plants of the future, and eco-friendly practices.

3.2.3. Expected Impacts

By aligning local courtyard revitalizations with city-wide strategies, the following impacts can be achieved:

- Environmental: Increased stormwater retention, improved microclimates and enhanced biodiversity.
- Social: Stronger community cohesion and improved quality of life.
- Educational: Courtyards serving as living platforms for climate adaptation, inspiring replication across neighborhoods.
- Economic: Reduction of infrastructure maintenance costs and improved attractiveness of Velenje as a climate-resilient city.

The revitalization of courtyards in Velenje is conceived as an integrated element of the city's ecological and social strategy, rather than as isolated interventions. By connecting
the pilot project at Staro Velenje 17 with evaluations of four additional courtyards, these spaces function both as practical examples of climate adaptation and as symbolic anchors for broader urban transform

4. Summary

An analysis of large-city courtyards, combined with expert input in the fields of environmental protection, heritage conservation, and accessibility for people with individual needs, provides the foundation for developing universal guidelines. These will complement the city's strategic objectives.

The preparation of Guidelines for Climate Change Adaptation of Courtyard Spaces in Historic Cities as well as the Charter for Green and Sustainable Courtyards in Historic Cities will ensure the proper implementation of subsequent courtyard revitalizations in Velenje, across Slovenia, and throughout Central Europe. The universality of this documentation guarantees that the developed solutions will extend beyond courtyard revitalization alone, forming a baseline for broader urban interventions.

5. List of Figures: