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EXECUTIVE SUMMARY

The Smart City Maribor Initiative is based in the Podravje region, which is the second largest region in Slovenia, located in the North-East part of Slovenia. It operates since 2014, as a network operating in the form of a cluster.

The mission of the Smart City Maribor Initiative is to activate a sustainable smart city environment, pursuing innovation in the city of Maribor and pilot projects enabling the start provision of smart city activities (services, technology development, and products development). Cooperation among parties aims at achieving a breakthrough projects which may enhance the territory of the Maribor city and wider regionally, encouraging technological, social and organizational innovation and support the betterment of urban development via sustainable smart city environment.

Smart City Maribor Initiative partners seek to develop projects integrating latest technologies with best environmental standards by involving citizens as end-users in the process.

Upon presented, management structure, responsible also for implementation of the Maribor's Urban Innovative action plan (UIAP), will be Smart City Maribor Initiative. Network provides triple-helix cooperation through high-quality partnership of partners, coming from research, development and innovation, educational, entrepreneurial and public sector.

Maribor's Urban Innovative action plan, is focused on three strategic identified fields, which are in line with all relevant adopted development documents of the city.

1. TRANSITION TO CIRCULAR ECONOMY

The strategic area is supported by own strategic document - STRATEGY FOR THE TRANSITION TO CIRCULAR ECONOMY IN THE MUNICIPALITY OF MARIBOR and by organizational structure, managed by WCYCLE INSTITUTE MARIBOR (<https://wcycle.com>). Transition to circular economy was also defined as top priority in the municipality key development document Sustainable Urban Strategy for Maribor.

The strategy foresees the set-up of an innovative urban circular economy system as a new business and economic model of the city in the field of efficient resource management. The model is based on the operation of enterprises that are predominantly publicly owned, which already provide public services for residents, and thus are the city's bottlenecks that until now have not functioned as a connecting link, which is a fundamental principle in the transition from linear to circular economy.

The following projects shall be implemented to reach the strategy objectives:

- Treatment of municipal waste and associated services,
- Use of processed construction and demolition waste and soil in urban construction,
- Managing surplus heat and renewable energy,
- Reuse of recycled water and alternative water resources.

2. SUSTAINABLE MOBILITY

Sustainable mobility is being defined as one of top priorities of the Municipality of Maribor. The strategic area is supported by two strategic documents:

- Integrated Transport Strategy/Sustainable Urban Mobility Plan (ITS/SUMP),
- Sustainable Urban Logistic Plan (SULP).



According to both strategies' objectives, following projects are planned to be implemented or further upgraded:

- Improved communication between the city administration and the stakeholders of the city centre,
- Municipal sustainable mobility and logistic department,
- Rent-a-bike / bike-sharing system,
- Charging infrastructure for e-vehicles,
- Further improvement of cycling infrastructure.

3. E-SERVICES FOR CITIZENS

Citizen participation is key element of the concept of smart cities. Most interpretations of the concept of smart cities are linked to the use of information and communication technologies to improve the quality of life in the city. Very important element is also satisfaction of citizens and engaging them in the development of the city.

In City of Maribor we also understand the concept of "smart city" as a city that identifies and solves its key development challenges and means to improve the quality of life of citizens with the involvement of citizens.

When preparing strategic documents we put a lot of attention on citizen involvement. We use different participatory methods and all important strategic documents were created with the focus on public participation (e.g. Sustainable Urban Development Strategy, Integrated Transport Strategy, Development Strategy of Maribor 2030, ...).

Following projects are important in the framework of e-services:

- Proof of concept single entry point (developed in the framework of the Urban Inno project),
- e-service LET'S IMPROVE MARIBOR (developed in the framework of the UPSIDE project),
- Participatory budget.

To enhance and support development participatory processes of planned city projects, in the framework of Maribor's Action plan, "Toolbox of Smart urban innovation participatory methods and tools" (<https://www.user-participation.eu/>) will be used.

Monitoring and evaluation of planned projects will be implemented in coherency with the UIAP's mission and objectives.

For monitoring and evaluation of UIAP, 'Strategic board' of Municipality of Maribor will be responsible. The role of Strategic board is to follow the preparation of project proposals and implementation of the projects related to important development areas of the city.

Evaluation concept of the UIAP, will be based on:

- Number of Joint actions/proposal initiated in the identified strategic areas,
- Involvement of key local stakeholders, which can contribute to long-term development of strategic areas in the city,
- Design of test-beds/pilot cases in a city related to strategic areas.

Evaluation concept will also take into consideration already identified indicators in Maribor's "Sustainable Urban Development Strategy".



By implementing actions defined in the action plan, the City of Maribor should become a modern urban ecosystem, where citizens are deeply involved in development and innovation of public services and governance. Citizens involvement is crucial to achieve other two key targets: introduction of sustainable urban mobility and circular economy. Impacts achieved in these two fields are highly depended on citizens behaviour and cooperation.

Quadruple-helix cooperation, established by the URBAN INNO project and put into practice with this action plan is a new form of cooperation within a city of Maribor that will also provide impacts beyond this action plan, since it provides an efficient framework for urban innovation in all fields of urban ecosystem.



BACKGROUND – OVERVIEW OF THE URBAN ECOSYSTEM

1 Characteristics of the urban innovation ecosystems – regional background

The Smart City Maribor Initiative is based in the Podravje region, which is the second largest region in Slovenia, located in the North-East part of Slovenia.

Picture 1: Map of Slovenian regions



Source: <http://www.slo-link.si/zemljevid.html>

Podravje region has 332.034 inhabitants, representing 15.7% of the total Slovene population. Podravje region, together with Central Slovene region creates almost one half of the total Slovene GDP. With 95.948 inhabitants, the City of Maribor is the 2nd largest city of Slovenia and acts as a centre city in the North-Eastern part of Slovenia, the Podravje statistical region. It operates with very flexible leadership, strong business (approx. 10.000 companies in city), research, social, educational, cultural (European Capital of Culture 2012) and other environments. Maribor region has the potential of combining competitiveness and sustainable development on institutional and non-institutional levels, using existing channels and partnerships, covering important players/levels of R&D&I institutions, public administration as well companies.

Maribor urban region development potentials include:

- Industrial tradition (automotive, metal),
- Fast development of service sector,
- University with good tradition and quality in technical fields,
- Arts and Culture – cultural centre of eastern Slovenia,
- Good geographic position (intersection of European 5th and 10th corridor),
- Winter sports centre and preserved natural environment,
- Capital of Podravje region.

2 Socio-economic and SWOT analysis of the urban innovation ecosystem

Table 1: Some statistical socio-economic information about Maribor (Data sources from 2012-2018)

Size of the region	147.5 km ²
Number of inhabitants (SURS 2016)	110.540
Population density (inhabitants per km ²)	749
Income per inhabitant	82% of SI average, 67% of EU average
No. of city quarters and city parishes	11:6
No. of public housings	35.150
Public transport coverage in the city	Ca. 50%
City bus routes length	Ca. 350 km
Surface of protected natural sites	13,4 km ² (9,13%)
Park areas	0,34 km ² (0,3%)
Green areas	11,68 km ² (7,93%)
Urban forests	53,3 km ² (36,16%)
Agricultural areas	55 km ² (37,31%)
City cycling routes length	Ca. 50 km
Active working population (Dec 2016)	57.119
Percentage of unemployed population (SURS 2016)	16%
Investments in sustainable mobility (2015)	10,5 mio EUR (10,7% PR 2015)
Investments in environment protection 2015)	455.722 EUR (0,5% PR 2015)
Quantity of collected municipal waste in T (2014)	61.947 T
No. of tourist overnight stays (2018)	451.610
No. of tourist arrivals (2018)	202.279
No. of electric car charging stations (2015)	21
No. of motor driven vehicles (Percentage of alternative driven vehicles)	68.000 (0,2%)
No. of enterprises (2016)	11.084
No. of ICT enterprises (2016)	Ca. 300
Student's number of University of Maribor (2015)	14.000
No. of public lighting units (2012)	14.610
Consumption of energy in GWh (2014)	2.366 GWh
CO ₂ emission in T (2014)	0,7 mio T
PM ₁₀ particle rate (2012)	34 (threshold value: 40)
No. of cell phone users (2014)	2,284 mio (data for SLO)
No. of daily migrations (2016)	60.000
Annual no. of passengers in public transport (LEK 2018)	3.958.039

Sources: National Statistical Office, MOM internal information, Maribor Tourist Board, Integrated Urban Strategy, Integrated transport Strategy, Ordinance on Air quality, ENERGAP, Local Energy Concept, TRAMOB project, PMinter project, e-Businessman project, AJPES.



SWOT Analysis

Table 2: SWOT analysis of the urban innovation ecosystem

S			W
	<p>Smart Economy</p> <ul style="list-style-type: none"> ■ Rich industrial tradition (automotive, metal) ■ Good geographical position at intersection of 5th and 10th transport corridors ■ Good accessibility (railway, international airport, highway) ■ Diversity – balanced mix of branches ■ Enough industrial infrastructure (land, energy, water etc.) available for investments ■ Growing export ■ Growing number of companies in region ■ Big number of companies in ICT 	<p>Smart Economy</p> <ul style="list-style-type: none"> ■ Unpredictable legal environment (tax regulations, not transparent and slow administration) ■ Weak business climate ■ No headquarters of large global leaders ■ The region and its businesses have not enough (international) visibility ■ Lack of business know-how to turn SMEs into „ World class players“ ■ Poor internationalisation supporting Environment ■ Absence of high-tech global players in region (R&D) ■ Poor knowledge of global market needs and trends ■ Lack of venture capital 	
	<p>Smart People</p> <ul style="list-style-type: none"> ■ Strong university with good technical faculties ■ Growing share of people with high education ■ Competitive HR potential (knowledge, language, attitude, cost) ■ Well-developed social and healthcare system ■ Well-developed lifelong learning system 	<p>Smart People</p> <ul style="list-style-type: none"> ■ Emigration of best qualified young people (vicinity of Austria, Germany) ■ Weak flexibility of University as concerns research and education ■ High share of non or under qualified unemployed people ■ Not attractive for best R&D staff (obsolete technology in industry, no high-level research institutes) ■ Lack of motivation among citizens to take more active role in regional development due to poor social and economic situation 	
	<p>Smart Governance</p> <ul style="list-style-type: none"> ■ Regional development documents (regional development programme and regional innovation strategy) in place ■ Let's Improve Maribor - Interactive Web Service for the Submission of Initiatives, Praises and Issues, to involve citizens in city development 	<p>Smart Governance</p> <ul style="list-style-type: none"> ■ Introverted development documents with lack of international positioning of the region ■ Documents focused on public sector developments ■ No true regionalization of Slovenia – no regional authorities ■ Poor cooperation tradition in region ■ Absence of positive leadership tradition 	



<p>Smart Mobility</p> <ul style="list-style-type: none"> ▪ Successful use of EU funds in the field of improving mobility in the city. City administration participated in several EU projects to improve specific critical segments of mobility (MAX, Involve, Bypad, Advance, ATTAC, PIMMS TRANSFER; ADDED VALUE, TRAMOB...) ▪ First Centre for Sustainable Mobility in Slovenia. The aim is to ensure proper supportive environment for the development and promotion of sustainable mobility in the city ▪ New integrated mobility strategy of the city in place since 2015 including Sulp since 2019 	<p>Smart Mobility</p> <ul style="list-style-type: none"> ▪ Public transport in the city is still not organized user-friendly and not integrated and connected with other transport possibilities ▪ Pedestrian and cycling network is fragmented and full of dangers spots ▪ Use of cars puts Maribor in the group of cities, which deal daily with excessive levels of polluted air and noise
<p>Smart Environment</p> <ul style="list-style-type: none"> ▪ Relatively clean environment and available public recreational infrastructure in the city ▪ Close connection to Pohorje, a lot of available green areas and sport opportunities (hiking, cycling, skiing...) ▪ Raise of ecological awareness: related to sustainable production of food and promotion of local food specialities. For example: eco-market and common urban ECO garden to ensure sustainable production of high quality organic food, strengthening self-care, care for the environment, acquiring new skills and knowledge, promotion of community organizing and strengthening the social contacts. 	<p>Smart Environment</p> <ul style="list-style-type: none"> ▪ High level of light pollution in the city ▪ Degradation of historic city centre
<p>Smart Living</p> <ul style="list-style-type: none"> ▪ Large number of technology and internet receptive people that can serve as test users for new technologies and service in the regional Living Labs and Good accessibility to ICT infrastructure ▪ Integrated Public Transport Ticket 	<p>Smart Living</p> <ul style="list-style-type: none"> ▪ Low use of cultural and touristic potential of the city ▪ Lower level of safety in comparison to Slovenian average



O			T
	<p>Smart Economy</p> <ul style="list-style-type: none"> ■ Foreign investments (competitive HR, good language capacities, competitive price of infrastructure and HR) ■ Internationalisation of SME's (export tradition, ■ competitive prices for supplying industries ■ Increase of industry – research – community development cooperation with strong involvement of ICT sector ■ Access to global markets for high-tech SME's and start-ups ■ International cooperation of region with globalised regions 	<p>Smart Economy</p> <ul style="list-style-type: none"> ■ Further disconnectedness from global high-tech developments ■ Unpredictable legal environment ■ Setback in supply chain ■ Further absence of strong regional cooperation and internationalisation ■ Investing in „wrong“ direction as the result of not knowing global trends ■ Openings of new investment friendly destinations worldwide 	
	<p>Smart People</p> <ul style="list-style-type: none"> ■ Better educational system at college level – bringing it closer to industries ■ Knowledge transfer from the regional Higher Education and Research organizations to industry ■ Keep graduates in the region 	<p>Smart People</p> <ul style="list-style-type: none"> ■ Emigration of best staff ■ Demographic dynamics 	
	<p>Smart Governance</p> <ul style="list-style-type: none"> ■ Preparation of development documents with more focus on international positioning of the region ■ Establishment of public companies holding ■ Connecting public companies' e-services 	<p>Smart Governance</p> <ul style="list-style-type: none"> ■ New financial and administrative burdens for industries as a result of absence of structural reforms at national level ■ Further demotivation as a result of deepening of the economic crisis 	
	<p>Smart Mobility</p> <ul style="list-style-type: none"> ■ Better exploitation of geostrategic positions of the city and of good global connectivity ■ Positive trend of public transport use among citizens since 2012 and continuity of investing in new bus fleet, which is environmentally friendly and has wifi connection ■ Improving pedestrian and cycling network, since spatial characteristics of Maribor allow residents and visitors to do all journeys on foot or by bicycle (distance from city centre to suburban areas do not exceed 5 km or 15 minutes by bike) ■ Utilization of planned investments in car sharing, set-up of network of electric vehicles filling stations and bicycle parking spaces (currently only one) 	<p>Smart Mobility</p> <ul style="list-style-type: none"> ■ Failing to finance and implement integrated smart mobility solutions ■ Continuous pollution of air and noise in the city due to overdependence on car use, lowering the quality of life in the city 	



	<p>Smart Environment</p> <ul style="list-style-type: none"> Improving the environmental indicators and the shift towards local self-sufficiency in food energy renovation of residential, commercial and public buildings new social, spatial and economic role of green city areas 	<p>Smart Environment</p> <ul style="list-style-type: none"> the impact of global climate change and other environmental trends Economic and social situation the impact of rapid spatial and social (global) changes that they city council will not be able to follow quick enough the impact of negative demographic trends on the social and economic situation 	
	<p>Smart Living</p> <ul style="list-style-type: none"> Research – driven cluster development with strong international focus Establishing a Smart Grid demonstration centre in a residential neighbourhood under real conditions. A system for advanced local control of electricity production from renewable energy sources and a system for advanced local control of electricity consumption 	<p>Smart Living</p> <ul style="list-style-type: none"> Weak economic welfare of the citizens and inhabitants of Podravje region, connected to still weak economy situation, burdened by brain drain and ageing of population. 	

3 Summary of the current situation and major challenges

The city of Maribor and Smart City Maribor initiative has set following objectives: User-oriented innovation where public sector, industry, academia and citizens work together to drive structural changes; Making the city attractive to investors, business and citizens; Urban planning focusing on economic, social and ecological sustainability (mobility); Circular economy; Implementing the countries smart specialisation strategy.

According to different smart city topics of the Smart City Maribor Initiative network the current situation is described in form of SPOT analysis for each key field:

1. Smart Economy

In the field of smart economy, Maribor’s strengths expose themselves in the following aspects: a diverse mix of industry branches, growing number of SMEs in the region and a big number of ICT companies that can support modern urban solutions. Key problems lie in absence of know-how about global markets, needs and trends, unpredictable legal environment, lack of venture capital and poor internalization support. Opportunities lay in geostrategic position at intersection of 5th and 10th corridor and with that attracting foreign investors to the region, strengthening cooperation among industry, research and community, internalization of SMEs. Key threats that need to be avoided are further disconnectedness from global high-tech developments and not being able to integrate Maribor’s SMEs in global value chains.



2. Smart People

The most important strength in this field is Maribor's competitive human resource potential. People have knowledge, good working skills and speak several foreign languages. Slovenia has also developed very good life-long learning system, which is widely used by citizens. The problem causing the most concern is the raising trend of best-qualified young people emigrating to other EU countries and US, due to absence of high-level research opportunities and inflexible university system. Improved conditions in the field of knowledge transfer from research institutions to industry sectors constitute the most important opportunity identified. Key threats are continuous emigration of best experts from the region and negative demographic dynamics.

3. Smart Governance

Regional policy stakeholders have become aware of the need of engaging citizens in the city development processes and of the importance of supporting innovation opportunities in the city and region. Proactive mind-set and awareness are important strength after several years of crisis. Among current problems that have been identified are the ones connected to development documents and plans since they lack international positioning, global comparison and perspective. Opportunities are found in the orientation towards a focus on providing citizens-friendly solutions and devotion to long-term development. The opportunity also lies in further improvement of e-government and e-services and in existing civil initiatives in the field of local governance. Threats include bureaucratic and financial burdens for industries, due to absence of national structural reforms.

4. Smart Mobility

In the field of smart mobility, the city administration has devoted a lot of time and effort over the past years to gain new information, knowledge and good practices about smart mobility solutions in the city, through participation in several EU funded project with an aim to improve specific critical segments of mobility. In 2015 also a long-term integrated smart mobility strategy to improve current conditions was confirmed. Among the most important problems is the unfriendly city public transport, which is not connected to any other transport means, the fragmented and dangerous pedestrian and cycling network and also the polluted air and noise in the city due to high share of car use. Opportunities to take advantage of include better use of the geostrategic position of the city and of global connectivity, the positive trend of public transport use since 2012 and commitment to replacement of old bus fleet, improving pedestrian walkways and cycling network and commitment to financing and implementing the measures planned in the framework of Maribor's mobility strategy. The continuation of the 'status-quo' with overdependence on car use constitutes a threat. Also, in year 2013 the first mobility centre was established in Maribor (also the first in Slovenia). In 2019 the Sustainable Urban Logistics Plan (SULP) was prepared to improve the management of city' logistics. The continuation of the 'status-quo' with overdependence on car use constitutes a threat. Maybe project Integrated Public Passenger Transport (IPPT) gives us the opportunity to improve the situation. The IPPT ticket was already introduces in autumn 2017 for students. In July 2019 the operator of public passenger transport starts introducing IPPT tickets for all public transport users.



5. Smart Environment

Strengths related to the smart environment are relatively good environmental conditions in the city, good public recreational infrastructure and available green areas of Pohorje. In the past years, awareness about the production of healthy food in urban areas has also risen and first common urban eco-gardens and eco-food markets have been set up. Maribor's challenges related to environment include a high level of light pollution in the city, degradation of historic city centre and lower level of safety in comparison to Slovenian average.

Opportunities have been identified in the area of improving the environmental indicators and in the shift towards local self-sufficiency in food, energy renovation of residential, commercial and public buildings, new social, spatial and economic role of urban green spaces. Another opportunity represents the adopted strategic document (Strategy for The Transition to Circular Economy in The Municipality of Maribor) that puts Maribor not only on the map of important cities in the effort to move to a circular economy, but installed Maribor as the first Slovenian city with adopted the official Strategy for the transition to Circular Economy. Future threats are related to the impact of global climate change and other environmental trends correlated to economic and social situation, the impact of rapid spatial and social (global) changes that city council will not be able to follow quick enough and with the impact of negative demographic trends in the social and economic situation.

6. Smart Living

Positive factors related to smart living are the good accessibility of ICT infrastructure and large number of people receptive to technology and internet use that can serve as test users for new technologies and services in the regional Living Labs. The city government is interested in establishing a Smart Grid demonstration centre in a residential neighbourhood under real conditions. A system for advanced local control and monitoring of electricity production from renewable energy sources and a system for advanced local control of electricity consumption are an additional strength.

Problems are related to currently low use of cultural and touristic potential of the city and lower level of safety in comparison to Slovenian average.

Opportunities lay in better collaboration between research, industry and local government to provide quality services for citizens in all relevant areas. The opportunities are also tourist potential of Pohorje and available and recognised cultural events.

Threats related to the quality of living in the city and region are relatively weak economic welfare of the citizens and inhabitants of Podravje region, connected to still weak economic situation, burdened by brain drain and ageing of population.

The major **opportunities and risks** for the development of the urban innovation ecosystem are:

The major *opportunities* represent the investments through Integrated Territorial Investment mechanism, especially in the field of mobility. Another financial mechanism representing the opportunity to finance activities are Strategic Research and Innovation Partnerships (SRIPs) which through national calls represent possibility to finance implementation of action plans set by different SRIP (according to the specialisation strategies). The opportunity also represents the project UIA (Urban Innovative Actions). All calls also offer opportunity for cities to cooperate with industry, RR and citizens and as such create opportunity for urban innovation processes.



Other *opportunities* lie in adopted strategic documents of the city. The city of Maribor is the first city in Slovenia which adopted the official Strategy for the transition to Circular Economy (Strategy for The Transition to Circular Economy in The Municipality of Maribor) and as such has an advantage in this field. City of Maribor was also one of the first cities in Slovenia which adopted Sustainable Urban Mobility Plan and will be among first cities which adopted Sustainable Urban Logistics Plan. Both documents represent a big potential for influence in the field of mobility.

The other opportunity represents the change of organisational structure of Municipality of Maribor and its public companies. The establishment of Maribor holding could represent an opportunity for a lot of innovation potential and very good cooperation with Maribor university and consequently for higher research potential and better chances to successfully apply for projects financed through national and international projects calls.

Because cities can shape the quality of life for a city population, they have a tremendous opportunity to contribute to equitable and sustainable development. So, in this process, city governments must begin to recognize that citizens are not merely customers or end users of services, but also interested parties that are well positioned to understand the problems facing their communities and how to tackle them. The city government must use the opportunity to align innovation across city departments and empower citizens - from businesses to private citizens - to become problem solvers and partners playing a key role in the innovation ecosystem.

The *risks* connected to the development of urban innovation ecosystem are that:

In tackling horizontal challenges such as mobility, city need to adopt a systematic approach, bringing in stakeholders that, in the case of mobility, may range from transport agencies to electric vehicle manufacturers to app developers. Yet there is a risk that innovation will depend on individuals or teams that are isolated from others in an innovation or technology office. Moreover, there is a risk in culture which is resistant to experimentation. This can increase the risk of failure since it tends not to launch new approaches or services until they are “perfect”—which means missing opportunities to test and learn.

The risk also lies in city government not being prepared to change the way of work and its organisational procedures. City government needs to make progress in three key dimensions:

- Align innovation efforts to the most important problems to solve;
- Empower a broad ecosystem to develop and launch solutions;
- Grow innovative efforts from individual pilots to achieve impact at scale.

These new approaches namely demand new ways of working. City government also needs to give concrete directions which goals it wants and needs to achieve. If not, there is a high risk opportunities available will not be used as efficiently as they could have be.

The risks also lies in financial means not being available to finance new development and projects. If there is no financial support, the desire to cooperate and develop new products and services will be lower.



ACTION PLAN

4 Thematic priorities – fields of action

Smart City Maribor Initiative identified the priorities in Maribor region with respect to the following thematic areas: smart economy, smart people, smart governance, smart mobility, smart environment and smart living. Main challenges and opportunities in each of those areas were identified.

MARIBOR	Major challenges to overcome	Major opportunity to use
Smart Economy	<ul style="list-style-type: none"> ▪ Achieving higher productivity ▪ Internationalisation of business and FDI 	<ul style="list-style-type: none"> ▪ Geostrategic position at intersection of 5th and 10th corridor
Smart People	<ul style="list-style-type: none"> ▪ Braindrain of graduates from engineering/technical fields ▪ Lower flexibility related to age structure 	<ul style="list-style-type: none"> ▪ Highly qualified human resources
Smart Governance	<ul style="list-style-type: none"> ▪ Transparent governance ▪ Participation in decision making 	<ul style="list-style-type: none"> ▪ Further improvement of e-government and e-services ▪ Existing civil initiatives in the field of local governance
Smart Mobility	<ul style="list-style-type: none"> ▪ Low use of sustainable mobility ways ▪ Underdeveloped mobility infrastructure 	<ul style="list-style-type: none"> ▪ Higher priority of mobility challenges within local policies/governance ▪ Strong NGOs engagement in the field of sustainable mobility
Smart Environment	<ul style="list-style-type: none"> ▪ Air pollution (PM particles) ▪ Sustainable resource management 	<ul style="list-style-type: none"> ▪ High priority of circle economy policy/concept on local level ▪ High level of green areas in the local environment
Smart Living	<ul style="list-style-type: none"> ▪ Housing for younger population ▪ Socially deprived population 	<ul style="list-style-type: none"> ▪ Education facilities (Medicine faculty) ▪ Tourist potential in Pohorje ▪ Available and recognised cultural events (Lent, Maribor theatre)

From above mentioned thematic priorities we decided to focus especially on fields:

- Smart Mobility,
- Smart Environment (circle economy),
- Smart Governance (improvement of e-services and in participation in decision making).

The reason why we focused on these fields is that those fields are being also financially supported on local and national level (according to the national and local strategies and directions).



National support for all three fields lies in Smart Specialisation Strategy of Slovenia (S4) which focuses on sustainable technologies and services for a healthy life on the basis of which Slovenia will become a green, active, healthy and digital region with top-level conditions fostering creativity and innovation focused on the development of medium- and high-level technological solutions in niche areas. Strategy has three pillars (I. Digital, II. Circular, III. (S)Industry 4.0) and nine priority domains with corresponding focus areas and technologies (I.1 Smart Cities and Communities; I.2 Smart Buildings and Home, including Wood Chain; II.1 Networks for the Transition to a Circular Economy; II.2 Sustainable Food; II.3 Sustainable Tourism; III.1 Factories of the Future; III.2 Health-Medicine; III.3 Mobility; III.4 Materials as Products). Strategic Research and Innovation Partnerships (SRIPs) defined the areas of joint development in their action plans and a lot of projects and activities could be supported from this.

In the context of Maribor cluster, so on local level, the most influence have fields of Smart Mobility and Smart Environment.

Smart Mobility is one of the topics where the most funds from national calls and European calls are available. It is also the field which is strongly supported in projects financed through integrated territorial Mechanism in city municipalities in Slovenia.

In the field of Smart Mobility, the city administration has devoted a lot of time and effort over the past years to gain new information, knowledge and good practices about smart mobility solutions in the city, through participation in several EU funded project with an aim to improve specific critical segments of mobility. Municipality of Maribor was one of the first municipalities in Slovenia which prepared and adopted Integrated Transport Strategy/Sustainable Urban Mobility Plan (ITS/SUMP). Consequently, Maribor is also the first city which established the Sustainable Mobility Centre in 2013, which serves as a focal-informative-educational point for sustainable mobility in the city. In 2019 the Sustainable Urban Logistics Plan (SULP) was prepared to improve the management of city' logistics.

Smart Environment (circle economy) has a strong impact in Maribor region since Municipality of Maribor and its public companies have big projects in the field of circular economy. Transition to circular economy is defined as top priority in the municipality key development document Sustainable Urban Strategy for Maribor. In June 2018 Maribor's city council adopted a strategic document (Strategy for The Transition to Circular Economy in The Municipality of Maribor) that puts Maribor not only on the map of important cities in the effort to move to a circular economy, but installed Maribor as the first Slovenian city with adopted the official Strategy for the transition to Circular Economy. The document was prepared in frame of "Greencycle" project (Interreg Alpine Space).

The strategy is prepared as a starting point document on how to connect waste, surplus materials, substances, energy and process them in a way, so they can be reused in production processes. Maribor is the first Slovenian city to prepare and adopt such a strategy - a document as a focused plan on how to make the city live on circular economy principles.

There are several other ongoing projects which represent the actual implementation of the strategy: Snaga, public waste management company, is participating in establishing Sorting plant for the preparation of secondary raw materials, Nigrad, public utility company, is partner in the Cinderella project, and eight partners from Maribor, including Snaga, Wcycle Institute Maribor and Municipality of Maribor, are



cooperating in the URBAN SOIL 4 FOOD (Establishment of Innovative Urban Soil Based Economy Circles to Increase Local Food Self-sufficiency and Minimize Environmental Footprint project), for which almost 3 million EUR was approved by the UIA initiative.

Smart Governance (improvement of e-services and in participation in decision making) is also one of the fields Maribor region and Smart City Maribor Initiative decided to focus on. Citizen participation is key element of the concept of smart cities. In Maribor Region we namely understand the concept of "smart city" as a city that identifies and solves its key development challenges and means to improve the quality of life of citizens with the involvement of citizens.

So besides understanding the concept of smart cities as the use of information and communication technologies to improve the quality of life in the city, we put a strong emphasis on satisfaction of citizens and engaging them in the development of the city.

For example, in the begin of 2016, Municipality of Maribor adopted the Sustainable Urban Development Strategy which integrates social, economic and environmental factors to define the policies and priority projects of a city. Social and economic agents (such as neighbours, unions, entrepreneurs, administrations, associations, etc.) are the active players in the urban transformation. They are actively involved in decision taking processes for the specific projects which are strategic to the whole city.

5 Mission statement and objectives

5.1 Overarching mission statement and objective(s) for the UICN

The mission of the Smart City Maribor is to activate a sustainable smart city environment, pursuing innovation in the city of Maribor and pilot projects enabling the start provision of smart city activities (services, technology development, and products development). Cooperation among parties aims at achieving a breakthrough projects which may enhance the territory of the Maribor city and wider regionally, encouraging technological, social and organizational innovation and support the betterment of urban development via sustainable smart city environment.

Smart City Maribor Initiative partners seek to develop projects integrating latest technologies with best environmental standards by involving citizens as end-users in the process.

5.2 Strategic and operational objectives

Smart City Maribor initiative network shall answer to urban challenges in following fields of action:

- Competitiveness & Research - setting up innovation and R&D hub in region;
- Health and quality of life – new technologies and services in response to changing demographic situation in urban areas;
- Environment – waste, water, air quality and green areas management focusing on user-centred solutions, using latest ICT solutions with underlying principle of the circular economy;
- Mobility – sustainable multimodal mobility using alternative fuels and ICT solutions;



- Energy – substantial reduction of energy consumption in city, including public buildings, communal utilities, public transport and industry with strong integration of ICT solutions;
- Smart governance – transparent governance, relying on open innovation principles, using modern ICT e-governance solutions;
- Education & Creativity – designing open space for creativity and new forms of education at all levels;
- Internationalisation of city and SCMI stakeholders through collaboration with Smart City Clusters in EU and globally.

Above mentioned strategic orientations are long-term and their implementation depends heavily on resources (finances, human resources, knowledge) available or activated to support them. The City of Maribor has adopted several mid-term strategies where specific development focus is given to selected fields. Last, but not least – actual policy orientation of the city government also defines short-term priorities which defines development priorities even more specific. And in addition to that, other Smart City Maribor partners, regional and national stakeholders have additional development initiatives that should be acknowledged.

Below presented priorities are reflecting above mentioned developments and are merely mid-term orientations where the focus of Smart City Maribor will be placed.

6 Major initiatives and projects to be implemented

There are three fields where there is a potential of urban innovation in the City of Maribor:

- TRANSITION TO CIRCULAR ECONOMY – supported by the strategy and organizational framework
- SUSTAINABLE MOBILITY – supported by the strategy and organizational framework
- E-SERVICES FOR CITIZENS – supported by several good practices in the city.

Development of major initiatives and projects will be supported with the use of “Toolbox of Smart urban innovation participatory methods and tools” (<https://www.user-participation.eu/>) in order to ensure quality participation process of all relevant stakeholders.

Initiatives are further described in following chapters of the action plan.

6.1 Strategic area “TRANSITION TO CIRCULAR ECONOMY”

The strategic area is supported by own strategic document - STRATEGY FOR THE TRANSITION TO CIRCULAR ECONOMY IN THE MUNICIPALITY OF MARIBOR and by organizational structure, managed by WCYCLE INSTITUTE MARIBOR (<https://wcycle.com>). Transition to circular economy was also defined as top priority in the municipality key development document Sustainable Urban Strategy for Maribor.

The strategy foresees the set-up of an innovative urban circular economy system as a new business and economic model of the city in the field of efficient resource management, which has not existed anywhere yet and complements the principles of sustainable mobility and co-operative economy.



The basic idea is its own innovative model as a system for managing all the resources available in the Municipality of Maribor and the wider urban area. The model is based on the operation of enterprises that are predominantly publicly owned, which already provide public services for residents, and thus are the city's bottlenecks that until now have not functioned as a connecting link, which is a fundamental principle in the transition from linear to circular economy. Only close cooperation between public companies, citizens, industry and local self-government can lead to a successful interconnected system that optimizes resources and results - economic, environmental and social. This is a long-term project that provides development-oriented efficient management of resource flows in local and regional environments.

The baseline of the strategy:

- The city has no landfill and does not want to have it, nor does it want to dispose waste with incineration;
- All in the urban area generated output sources, preferably from the population, utilities, construction, industry, agriculture, water management and service activities, must be included in the process of processing and appropriate handling, with the aim of maximizing re-use;
- The advantage of processing output sources is in material use; in recycling of materials and water and in production of new composite materials, followed by the energy use;
- The holders of processing the output sources for each strategic project area are enterprises in predominantly municipal ownership, which are already performing public services for the city, while the holder of soft contents of the social environment is the city administration;
- New processing and service capacities for the management of output sources are planned primarily in the area of urban degraded areas with the aim of their regulation and regeneration;
- Only close cooperation between public companies, citizens, industry and local government leads to a successful interconnected system that optimizes resources and brings economic, environmental and social results.

The project objectives for planning and implementing the circular economy “Wcycle system” project are:

- Reducing the environmental burden,
- Reducing the use of natural resources,
- Increasing the use of renewable sources, energy and water,
- Quality use of land,
- Development of cooperative economy,
- Creating new, predominantly green jobs,
- Creating added value and economic growth,
- Use of new technologies, own research and development.

The following projects shall be implemented to reach the strategy objectives:

1. Treatment of municipal waste and associated services
2. Use of processed construction and demolition waste and soil in urban construction
3. Managing surplus heat and renewable energy
4. Reuse of recycled water and alternative water resources.



Treatment of municipal solid waste and related services		
PARTNERSHIP		
Lead Partner	Snaga Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	Wcycle Institute
	Civil society / NGOs...	
	Others	
DESCRIPTION		
Objectives	<p>The strategy for developing the management of municipal waste management and related services is based on the following principles:</p> <ul style="list-style-type: none"> > all activities are subordinate to the transition to circular management > own comprehensive business system for managing mass flows of municipal waste > integration into meaningful links with other public and economic stakeholders with a view to meeting the principles set out in the first and second indents 	
Activities	<p>Activities of transition to the circular economy are mainly:</p> <ul style="list-style-type: none"> > ensuring the maximum possible recycling of already generated municipal waste by closing circular loops along the hierarchy in the local, national, regional and European frames > encouraging and participating in projects to change consumer habits of people > establishment and monitoring of the network for prolonging the usability of products already in use (re-use, storage of useful discarded things, organization of service for repairs and replacement of spare parts, repair shop, etc.) > education, raising awareness and integration of all groups of stakeholders (citizens, organizations, administrations, industry, NGOs, etc.) 	
Timeframe	ongoing	
Estimated costs & sources of funding	NA	
Internationalisation linkages	NA	
Expected impact	Communal waste management system based on the principals of circular economy, closing material flows within the city – minimizing environmental impacts and maximizing economic benefits of waste management.	



Use of processed soil and construction and demolition waste in urban building

PARTNERSHIP

Lead Partner	Zavod za gradbeništvo Slovenije	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	Nigrad d.d.
	Research & Higher Education	Wcycle Institute
	Civil society / NGOs...	
	Others	

DESCRIPTION

Objectives	In this area, the goal is to develop its own systematic eco-innovative approach to new circular business models for sustainable construction in the urban environment. As construction is a major consumer of raw materials, new, more sustainable approaches are needed, which will also be economically more efficient. Such an approach envisages, inter alia, the use of new materials and products, generated by the recycling of construction, industrial and certain waste from utility activities and excavation materials. The cascade use of new raw materials, materials or products for new construction will be important in this field. The organizational goal is also to develop a one-stop model for the provision of services, which will enable users to have a comprehensive overview of the available waste for processing, the products that have already been processed and their characteristics and characteristics according to the user's needs, using appropriate IT technology, platforms and modern planning tools.
Activities	Development of a Business model for construction and industrial waste management
Timeframe	2018 – 2021
Estimated costs & sources of funding	7,77 mio EUR
Internationalisation linkages	International partnership
Expected impact	Reuse of construction and demolition materials in construction and other sectors within a city.



Management of surplus heat and renewable energy		
PARTNERSHIP		
Lead Partner	Energetika Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	Wcycle Institute
	Civil society / NGOs...	
	Others	
DESCRIPTION		
Objectives	<p>In order to achieve the goals of energy circulation in the field of heat supply, efforts to increase the energy efficiency of technologies and the use of renewable sources (RS), in particular in district heating systems (DH), must be intensified by increasing the efficiency of energy use through the renovation of existing buildings. These measures represent the starting point for the urgently needed accelerated development of sustainable heating (and cooling), which is one of the priorities of the European Energy Union.</p> <p>Technologically suitable DH systems provide cost-effective, environmentally-friendly and reliable energy supply for heating, which include the use of surplus heat, especially in manufacturing processes in industry, and the effective use of RS. Technological, environmental and climatic criteria have already been laid down and in force in different directives (eg. the Energy Efficiency Directive), which need to be achieved through the implementation of properly planned energy plans in cities and local communities. But they need to be upgraded with the philosophy of a circular economy.</p>	
Activities	<p>In order to achieve the above objectives, the development of DHs will need to be systematically built on the following starting points:</p> <ul style="list-style-type: none"> > Production and regular renewal of the concept of spatial analysis of the use and production of heat, as a starting point for further development planning (DH) > Optimization of energy use for production of heat, electricity and implementation of system services by building heat storage > Introduction of available renewable resources: landfill gas from closed landfills, biogas or synthesis gas obtained from the processes of processing (biological) waste, and the energy use of the available biomass (fast growing plants, unpolluted wood biomass such as debris, green trim, ...) > Introduction of alternative fuels derived from waste > Use of available surplus heat (with condensing technological solutions, heat pumps, geothermal, ...) 	
Timeframe	ongoing	
Estimated costs & sources of funding	NA	



Internationalisation linkages	NA
Expected impact	Advanced system of city district heating integrating highest possible share of surplus heat from industry and RES.

Reuse of recycled water and alternative water resources

PARTNERSHIP

Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	
	Industry	Mariborski vodovod d.o.o.
	Research & Higher Education	Wcycle Institute
	Civil society / NGOs...	
	Others	

DESCRIPTION

Objectives	Exploring the possibilities of implementing the distribution system for the recycled water in the city with a goal to later implementation.
Activities	As systemic implementation is currently not economically feasible due to the abundance of fresh water, representatives of the abovementioned organizations cooperate with local, national, international and European institutions in the preparation of the necessary documents, which would allow for appropriate incentive measures on the demand side. The designed distribution system of recycled urban water is based on the idea of maximum reuse (of over 7.0 million m ³) of purified and discarded water at the Central Wastewater Treatment Plant in at least 6 existing urban industrial zones, 4 central planned urban depots (urban gardens, urban greenhouses, energy planting zones, snowmaking) and an unspecified number of other potential large hauliers (Magna, ERM Airport, ...).
Timeframe	Ongoing
Estimated costs & sources of funding	NA
Internationalisation linkages	
Expected impact	Advanced system of urban water recycling with established city waste water circle.



6.2 Strategic area “SUSTAINABLE MOBILITY”

Overview:

In the field of smart sustainable mobility, the city administration has devoted a lot of time and effort over the past years to gain new information, knowledge and good practices about smart mobility solutions in the city, through participation in several EU funded project with an aim to improve specific critical segments of mobility. Sustainable mobility is being defined as one of top priorities of the Municipality of Maribor. The strategic area is supported by two strategic documents:

Integrated Transport Strategy/Sustainable Urban Mobility Plan (ITS/SUMP)

Municipality of Maribor was one of the first municipalities in Slovenia which prepared and adopted ITS/SUMP. Consequently, Maribor is also the first city which established the Sustainable Mobility Centre in 2013, which serves as a focal-informative-educational point for sustainable mobility in the city. ITS/SUMP was adopted in 2015 and it consists of five connected pillars which represent a list of measures to regulate sustainable mobility in the city:

- Integrated traffic planning,
- Walking as an important mean of mobility,
- Optimal use of cycling,
- Forming of attractive public passenger transport,
- Rational use of motorised means of transport,
- City logistics.

Sustainable Urban Logistic Plan (SULP)

In the beginning of 2019, Municipality of Maribor prepared the Sustainable Urban Logistic Plan (SULP) as a part of ITS/SUMP. Document consists of chapters dealing with urban logistic management with the list of measures to regulate sustainable logistics in the city of Maribor.

SULP has its origins from SUMP and is based on the principles of sustainable development of logistics using environmentally friendly means of transport and creation of synergies with deployment of the most advanced technological and information solutions. It is built on the principles of collaboration – joint identification of solutions through new cooperation models and a continuous improvement process.

According to both strategies’ objectives, following projects are planned to be implemented or further upgraded:

1. Improved communication between the city administration and the stakeholders of the city centre
2. Municipal sustainable mobility and logistic department
3. Rent-a-bike / bike-sharing system
4. Charging infrastructure for e-vehicles
5. Further improvement of cycling infrastructure.



Improved communication between the city administration and the stakeholders of the city centre – city manager

PARTNERSHIP

Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	
	Civil society / NGOs...	
	Others	

DESCRIPTION

Objectives	The results of the survey, which was carried out among the retailers and caterers of the city centre for the first time in 2017 and repeated in 2018, showed that the current communication between the city administration and the stakeholders of the city centre is insufficient. The research identified the need for permanent cooperation, information, communication and integration of individual content and activities of the city core. The need for proper management of the city centre was recognized. The initiative is in line with SUMP and SULP. The initiative is also in line with Sustainable Urban Strategy.
Activities	Within the framework of the measure, the municipality will take appropriate organizational measures to establish better conditions for cooperation and implementation of specific activities with the ultimate goal of promoting the offer and revitalization of the city centre.
Timeframe	2020-2021
Estimated costs & sources of funding	Within an existing work of municipal administration
Internationalisation linkages	/
Expected impact	Activities to improve the communication and other cooperative events between the involved entities Establishing the management of the city centre (city manager)



Municipal department for sustainable mobility and logistics

PARTNERSHIP

Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	
	Civil society / NGOs...	
	Others	

DESCRIPTION

Objectives	Municipal department for sustainable mobility and logistics will be organized to bring together all the competencies, personnel, financial resources, knowledge and processes of all levels of planning and management of mobility and logistics. One of its objectives will be to further develop a system for monitoring and evaluating the indicators of mobility and transport. Within 5 years of operation, it is foreseen to take over the transport model and the implementation of traffic simulations under its wing. The initiative is in line with SUMP and SULP.
Activities	At the strategic level, it will be responsible for monitoring and upgrading SUMP and SULP and their consistency with other strategies at the level of the city, region, state and EU. The unit will be responsible for research and development of knowledge, acquisition of state projects and EU funds. At the operational level, the department will manage the traffic system and traffic demands.
Timeframe	2020-2021
Estimated costs & sources of funding	Within an existing work of municipal administration
Internationalisation linkages	/
Expected impact	Systematic approach at managing mobility and logistics within the city



Rent-a-bike / bike-sharing system		
PARTNERSHIP		
Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	
	Civil society / NGOs...	
	Others	Private entity in cooperation with MOM
DESCRIPTION		
Objectives	The purpose of the project is to establish Rent-a-bike / bike-sharing system in Maribor, which will be intended for the citizens of MOM and visitors. With the option of renting bicycles, we want to provide citizens a sustainable, environmentally, health-friendly and energy-efficient way of mobility in the city. The measure will help achieve the environmental goals of the municipality, such as cleaner air, less CO2 emissions, less noise in the city, and consequently improving the health of citizens. At the same time, the use of energy in transport will also be reduced. The project is in line with SUMP and Sulp.	
Activities	Setting up 12 bicycle rental facilities, where 120 bicycles are offered for rent.	
Timeframe	2020-2021	
Estimated costs & sources of funding	Private funding	
Internationalisation linkages	/	
Expected impact	<ul style="list-style-type: none"> • provide the citizens a sustainable, environmentally, health-friendly and energy-efficient way of mobility in the city • achieving the environmental goals of the municipality (cleaner air, less CO2 emissions, less noise in the city, and consequently improving the health of citizens) • reducing the energy use of energy in transport 	



Charging infrastructure for e-vehicles		
PARTNERSHIP		
Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	
	Civil society / NGOs...	
	Others	Private entity in cooperation with MOM
DESCRIPTION		
Objectives	City centre should also be equipped with electric charging stations to promote and trigger use of electric vehicles for mobility and delivery/pick-up. As a part of newly identified areas, a plan for e-charging stations for mobility and delivery vehicles will be prepared. The backbone of the development for the electrification of logistics system should be represented by the so-called multifunctional electric charging stations for fuelling also larger electric delivery vehicles/trucks, public transport vehicles, garbage trucks, electric bicycles and electric cars. Municipality of Maribor will also check the possibilities for testing of dynamic charging of electric vehicles. The initiative is in line with SUMP and SULP.	
Activities	To prepare a case study - plan for e-charging stations for mobility and delivery vehicles.	
Timeframe	2023-2025	
Estimated costs & sources of funding	10.000 € - A case study 2.000.000 € - Establishment of e-charging stations for delivery and freight vehicles	
Internationalisation linkages	/	
Expected impact	<ul style="list-style-type: none"> to provide sufficient e-charging infrastructure in the city achieving the environmental goals of the municipality (cleaner air, less CO2 emissions, less noise in the city, and consequently improving the health of citizens). 	



Further improvement of cycling infrastructure		
PARTNERSHIP		
Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor
	Industry	
	Research & Higher Education	University of Maribor - Faculty of Civil Engineering, Transportation and Architecture
	Civil society / NGOs...	Maribor Cyclist Network
	Others	
DESCRIPTION		
Objectives	<p>The purpose of the project is to establish cycling connections between the town districts, so that they are safe and usable for less skilled cyclists and that they will offer a good (fast and safe) alternative instead of driving a car. By further improving, we want to build the appropriate cycling lanes where they do not exist and to improve the standards of the existing ones.</p> <p>The project of the Cycling Infrastructure Project consists of several connected sections in the area of town districts, the city center and partly between neighbouring municipalities (Drava cycling route). The project is in line with SUMP and Sulp.</p>	
Activities	<ul style="list-style-type: none"> • build the appropriate cycling lanes where they do not exist • to improve the standards of the existing cycling lanes 	
Timeframe	2020-2021	
Estimated costs & sources of funding	EU structural and investment funds (ERDF, CF), Municipality of Maribor	
Internationalisation linkages	/	
Expected impact	<ul style="list-style-type: none"> • Established bicycle connection between city districts and the city centre • Improving the modal split - in favour of higher share of cyclists 	



6.3 Strategic area “E-SERVICES FOR CITIZENS”

Citizen participation is key element of the concept of smart cities. Most interpretations of the concept of smart cities are linked to the use of information and communication technologies to improve the quality of life in the city. Very important element is also satisfaction of citizens and engaging them in the development of the city.

In City of Maribor we also understand the concept of "smart city" as a city that identifies and solves its key development challenges and means to improve the quality of life of citizens with the involvement of citizens.

City of Maribor is aware that citizen participation in decision-making brings many advantages. Through project UPSIDE (establishment of on-line tool let's improve Maribor) we made first steps to establish active cooperation between local government and citizens with the help of technology. The application allows a further step in the development of the relationship between citizens and city officials. We introduced on-line tool “Let's improve Maribor”, a tool for citizens which offers direct communication with the city administration. One can simply enter their ideas, suggestions, complaints etc. to a web-site or mobile app. The suggestions are seen on-line. The citizens receive reply to their suggestion per e-mail and the answers are also published on-line.

Citizen participation has been widely recognized as important for improving government decision making. In City of Maribor we advocate citizen participation because of its potential to enhance governance and promote efficiency. However, promoting substantive participation has never been an easy task. Public officials' and citizens' diverse interests, commitments, and expertise are the main obstacles for citizen participation.

Even though promoting authentic participation is particularly challenging, City of Maribor is engaged in many activities in this field. We also supported pilot project to introduce the participatory budget in one of the City quarters, which became first urban quarter to introduce this pilot model.

When preparing strategic documents we put a lot of attention on citizen involvement. We use different participatory methods and all important strategic documents were created with the focus on public participation (e.g. Sustainable Urban Development Strategy, Integrated Transport Strategy, Development Strategy of Maribor 2030, ...).

In implementation phase of project activities we always involve citizens. During participatory process in pilot activities in URBAN INNO project the idea of establishment of single entry point by integrating public infrastructures and end-users through common platform was developed as a Proof of concept (PoC). The aim of pilot activities was to raise level of engagement of end users (citizens) and to improve services of public companies, which they offer to citizens. In the participative innovation process a proof of concept was developed which could represent a common platform of public e-services - the single entry point. In the participative process also the idea was created to establish a so called “user club” – a permanent group of citizens being involved in development of new services and upgrade of existing ones. If realised this would represent a permanent and ongoing user involvement.



PROOF OF CONCEPT SINGLE ENTRY POINT

PARTNERSHIP

Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	Municipality of Maribor and public companies providing public services in the urban region of Maribor (water supply, district heating, public transport, waste management)
	Industry	/
	Research & Higher Education	University of Maribor Maribor public library
	Civil society / NGOs...	/
	Others	Citizens of Maribor

DESCRIPTION

Objectives

Wide selection of e-services is available to the citizens of Maribor by public-service providers (utilities, public transport, ...), but their big number and dispersion in cyber space provides a challenge for potential users. This results in low usage of e-services among citizens.

With this project it is aimed at the development of idea to establish single entry point, a common platform of e-services offered to citizens by municipality and public companies in Maribor. The value also lies in the process where information how to improve or create new service is gained - from the side of users, citizens.

Activities

The project team of the Municipality of Maribor and eZavod (URBAN INNO project partners) organized a stakeholder group of all relevant e-service providers to improve e-services and provide better navigation system focused on the end-user – citizen. The objective was to substantially increase the usage of e-services. The innovation process with service providers and citizens was managed as a Living Lab, including Demola method when engaging students. Students and elderly were defined as special target groups beside general population and were invited to join the co-creation process with a view to improve e-services. E-services were tested through the field actions implemented by focus groups of key target groups guided by mentors. They were followed by workshops where improvements of existing e-services were defined and new solutions identified.

In the participative innovation process a proof of concept was developed which could represent a common platform of public e-services - the single entry point.

End-users contributed to the final version in different ways: by testing the apps and other e-services and prepare comprehensive user feed-back, to provide user-experience in simplified way, to give practical recommendations on how to improve the e-services and to participate in co-creation process of common platform development.



	Their impact was very important since the concept of common platform was prepared in line with their suggestions and expectations.
Timeframe	Start was in September 2016. The proof of concept was prepared by end of 2018. City plans to develop this further.
Estimated costs & sources of funding	The project (proof of concept) started to be developed during URBAN INNO project (WP T3 – Implementing and evaluating participatory methods in urban innovation processes). Budget available in the project was 60.000 EUR (around 48.000 for staff costs, external costs 12.000). Further activities (staff costs, possible upgrade) will be financed from internal sources.
Internationalisation linkages	/
Expected impact	<p>The value lies in the process where city gained information how to improve or create new service from the side of users, citizens.</p> <p>Municipality and public companies in Maribor benefited from the project by gaining new knowledge on importance of involvement of end-users in the development of services. They also benefited in gaining knowledge about using participatory methods and tools.</p> <p>The citizens benefited in gaining knowledge about existing e-services already being offered and in being recognized as a valuable partner in future development of e-services.</p> <p>The Maribor pilot has a potential to be developed further by realizing the prepared proof of concept (common platform) and by establishment of so called “user club” – a permanent group of citizens being involved in development of new services and upgrade of existing ones.</p>

e-service LET'S IMPROVE MARIBOR		
PARTNERSHIP		
Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	
	Industry	
	Research & Higher Education	
	Civil society / NGOs...	
	Others	
DESCRIPTION		
Objectives	City of Maribor is aware that citizen participation in decision-making brings many advantages. For that reason city introduced on-line tool “Let’s improve Maribor” a tool for citizens which offers direct communication with the city administration. One can simply enter their ideas, suggestions, complaints etc. to a web-site or mobile app. The suggestions are seen on-line. The citizens receive reply to their suggestion per e-mail and the answers are also published on-line.	



Activities	<p>The on-line interactive tool for submitting initiatives, questions and comments to the Municipality, called Let's Improve Maribor City of Maribor hears you. Be involved!, was developed in the framework of the Smart City Maribor initiative. It was launched in Autumn 2015 and the participation and feedback of citizens are very positive. Citizens of Maribor already posted more than 700 issues/suggestions...</p> <p>The online tool is being upgraded especially in the process part, since lately there is a lot of effort put especially in the part of the process where citizens get fast and informative answers and especially information on activities which were taken by the municipal official to solve the issue reported.</p> <p>Where possible the photo of situation before and after is published on this tool.</p>
Timeframe	The on-line toll was launched in Autumn 2015 and is estimated to last as permanent e-service of the city.
Estimated costs & sources of funding	Establishment of e-service was co-financed by project UPSIDE (7th framework programme – staff costs, external costs for IT services and visual identity); running of e-service is financed from internal municipal resources (staff costs).
Internationalisation linkages	/
Expected impact	<p>With this on-line tool city tries to use information and communication technologies to improve the quality of life in the city. Very important element is also satisfaction of citizens and engaging them in the development of the city.</p> <p>As a result citizen participation has been recognized as important for improving decision making in the city.</p>

PARTICIPATORY BUDGET		
PARTNERSHIP		
Lead Partner	Municipality of Maribor	
Further regional / national partners	Policy/administration	
	Industry	
	Research & Higher Education	
	Civil society / NGOs...	Iniciativa za mestni zbor
	Others	
DESCRIPTION		
Objectives	Municipality of Maribor has supported pilot project to introduce the participatory budget in City quarter of Radvanje, which is the first urban quarter to introduce a pilot model for participation in the use of earmarked public funds in accordance with guidelines of the European Charter of Local Self-Government.	



	<p>The participatory budget is currently not specifically defined in the Slovenian legislation. Municipality of Maribor approaches to it with the civil society initiative modelled after European cities, where citizens already decide on priority investments within the expected budgets. It is therefore a direct decision making of the implementation queue of projects in urban areas. Out of the proposed projects, citizens establish a priority list by voting. Project, which receives the most votes, is included in the municipal budget.</p>
Activities	<p>Residents of the Municipality of Maribor, have from 22nd September 2015, one month, collected project proposals on investments, which were later financially evaluated by professional services of the Municipality of Maribor. They collected 45 proposals. Mayor and city administration committed themselves to the realization of projects with a total value of up to € 100,000. From the proposed projects citizens by voting created a priority list of 22 project proposals. Projects that have received the most votes were included in the budget.</p> <p>Every citizen had five votes available that he could award to those five projects, which he considers to be most important. This created a prioritized list of projects - from most to least votes received. From this list as many projects are selected as there are available financial resources.</p> <p>Citizens were able to choose among 22 project proposals. For realization in 2016, according to the available funds, 14 project proposals were selected (http://mariborpp.si/javnost/).</p> <p>On 22nd of November 2015 voting was attended by 652 citizens, which is slightly more than 10% of voters in this area (for the successful implementation of the participatory budget process at least 5% of voters in MC Radvanje had to attend).</p> <p>The participatory budget is continuing in 2018 where three city districts expressed interest to participate. City districts prepared list of projects to vote for (http://www.maribor.si/podrocje.aspx?id=1933). Voting took place on 23rd of May 2018.</p> <p>Each resident of chosen city district can rate three projects (with 1, 2 or 3 points). The projects with the most votes will be included in priority list of city district investments.</p>
Timeframe	<p>Project started in 2016. It is planned to be continued on an on-going basis.</p>
Estimated costs & sources of funding	<p>According to available financial resources in the frame of MOM' budget, there is approx. 100.000 EUR available for participatory budget for 14 projects (mostly landscape arrangements in the city quarter) in 2016. The projects were selected by inhabitants of city quarter Radvanje by voting.</p>
Internationalisation linkages	<p>/</p>
Expected impact	<p>Citizen participation has been widely recognized as important for improving government decision making. In City of Maribor we advocate citizen participation because of its potential to enhance governance and promote efficiency. However, promoting substantive participation has never been an</p>



easy task. Public officials' and citizens' diverse interests, commitments, and expertise are the main obstacles for citizen participation.

Even though promoting authentic participation is particularly challenging, City of Maribor is engaged in many activities in this field. We also supported pilot project to introduce the participatory budget in one of the City quarters, which became first urban quarter to introduce this pilot model.

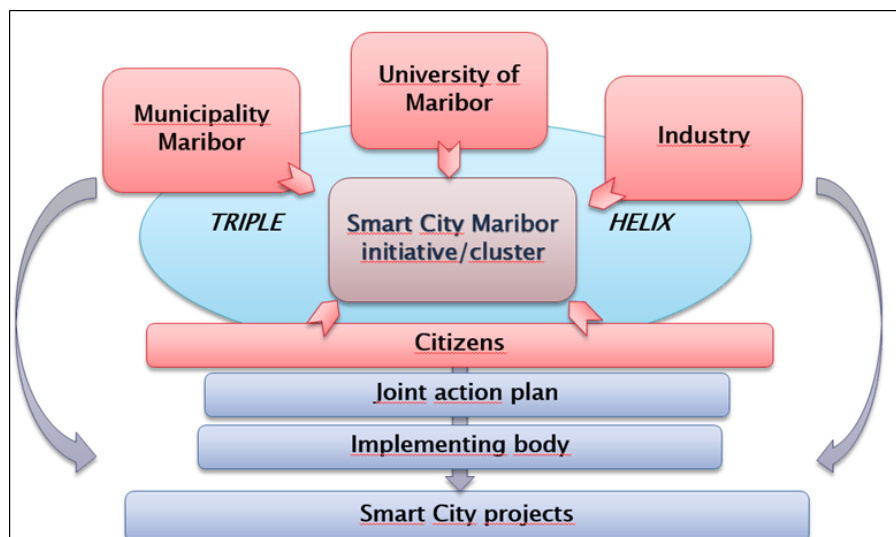
IMPLEMENTATION – MONITORING AND EVALUATION

7 Management structure

Support to innovative urban development in Maribor is already provided through operation of Smart City Initiative Maribor, which is operating since 2014, as a network operating in the form of a cluster. Initiative is focused on development and implementation of project proposals that complement and enhance, strategic areas identified in Maribor’s “Sustainable Urban Development Strategy” (adopted in 2016) and other strategic documents important for future development of the city.

Upon presented, management structure, responsible also for implementation of the UIAP, will be Smart City Initiative. Network provides triple-helix cooperation through high-quality partnership of partners, coming from research, development and innovation, educational, entrepreneurial and public sector.

Picture 2: Management structure of Smart City Maribor Initiative



Source: Project UPSIDE – triple-helix Smart City Maribor Initiative, 2013

The cooperation is built on open innovation principles and it strives to:

- Make better use of the local ecosystem, triple Helix collaboration and innovation potential,
- Increase the efficiency of knowledge and technology transfer and business creation,
- Share good-practices on cluster organization and development.

Partners joined the network by signing a memorandum in which they commit to respect the operating principles and the initiative's development policies.

Smart City Maribor initiative network already cooperates in the field of key urban challenges, identified in Maribor’s development strategies and documents, more precisely in following fields of action:

- Competitiveness & Research - setting up innovation and R&D hub in region;
- Health and quality of life – new technologies and services in response to changing demographic situation in urban areas;
- Environment – waste, water, air quality and green areas management focusing on user-centred solutions, using latest ICT solutions;
- Mobility – sustainable multimodal mobility using alternative fuels and ICT solutions;



- Energy – substantial reduction of energy consumption in city, including public buildings, communal utilities, public transport and industry with strong integration of ICT solutions;
- Smart governance – transparent governance, relying on open innovation principles, using modern ICT e-governance solutions;
- Education & Creativity – designing open space for creativity and new forms of education at all levels
- Internationalisation of city and SCMI stakeholders through collaboration with Smart City Clusters in EU and globally.

The governance structure of the SCMI network is based on democratic principles with all the partners on equivalent level. Specific roles have three organizations:

1. Municipality of Maribor (MOM) acts as coordination unit in charge of the coordination and communication within the SCMI network. MOM's Office of project development is defined as coordination body. MOM, in full cooperation and consultation with the participating partners, is in charge of operations of a coordinative nature, as well as of the execution of those administrative procedures necessary for the achievement of the aim of this present Memorandum of Understanding. It supports following coordination activities:
 - encouragement of innovative solutions in SCMI fields of action;
 - the design and coordination of the sustainable smart city environment and encouraging pilots to be put in place using user driven participatory approaches;
 - communicating SCMI network and pilot projects to population of Maribor urban region and wide.
 - plays a strong role as a local innovation and research catalyst, so as to achieve the full realisation and integration of all local actors in the sustainable smart city eco-system. In order to give practical implementation to these aims, MOM is promoting and coordinating the set-up of the sustainable Smart City Maribor Initiative.
2. University of Maribor acts as research partner in all fields of SCMI actions.
3. E-institute as Network manager is in charge for operational and technical issues in order to provide functionality of the SCMI network.



8 Communication

Communication concept and activities for promoting UIAP will be also organized and implemented in the framework of already existing Smart City Maribor Initiative's communication tools.

Since its start of operation, Initiative is informing and communicating about key activities, through three communication channels:

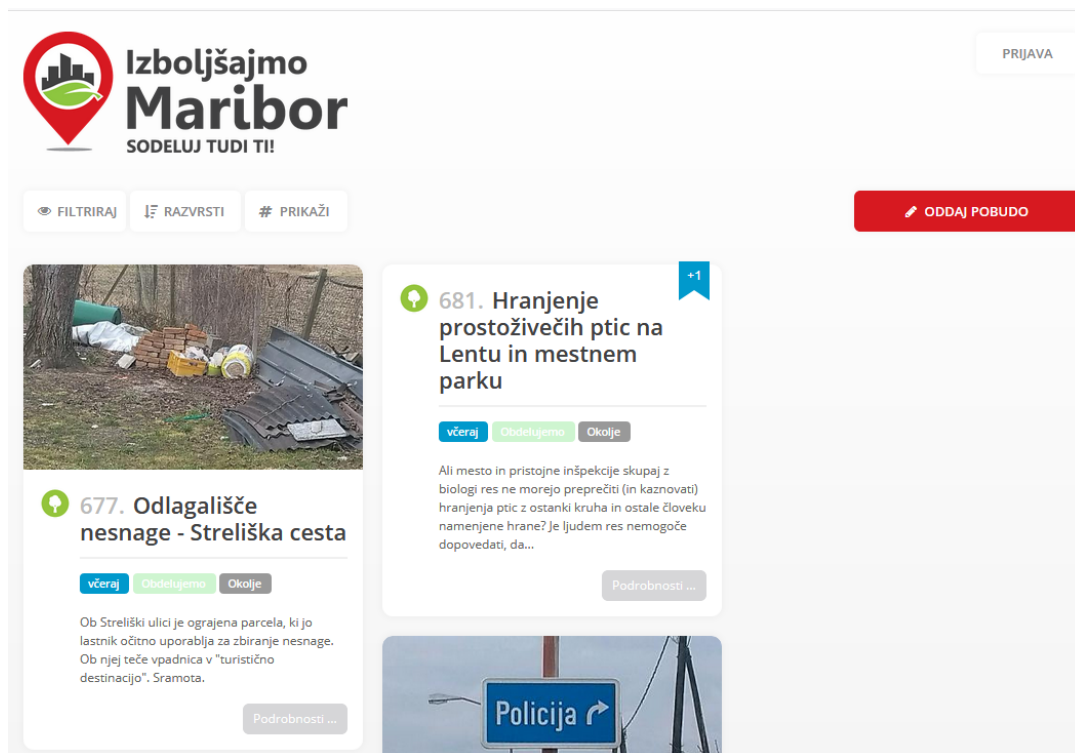
Smart City Maribor Platform: <https://www.smartcitymaribor.si/>

Social media: <https://www.facebook.com/SmartCityMaribor/>



On-line interactive tool: “Izboljšajmo Maribor” (Let’s improve Maribor): <https://izboljsajmo.maribor.si/>

The purpose of the interactive tool is to involve citizens of Maribor into development and improvement of the city. The tool is well accepted by the citizens, many initiatives, questions and comments are provided. Until today, almost seven hundred issues/suggestions were posted by citizens.



Besides organization of physical meetings and events with relevant stakeholders, which can contribute to implementation, Maribor ‘s UIAP, can be more widely presented and communicated to larger audience, through existing communication tools of Smart City Maribor Initiative.

9 Monitoring and evaluation

Monitoring and evaluation will be implemented in coherency with the UIAP’s mission and objectives.

For monitoring and evaluation of UIAP, ‘Strategic board’ of Municipality of Maribor will be responsible. The role of Strategic board is to follow the preparation of project proposals and implementation of the projects related to important development areas of the city.

Evaluation concept of the UIAP, will be based on:

- Number of Joint actions/proposal initiated in the identified strategic areas,
- Involvement of key local stakeholders, which can contribute to long-term development of strategic areas in the city.
- Design of test-beds/pilot cases in a city related to strategic areas.

Evaluation concept will also take into consideration already identified indicators in Maribor’s “Sustainable Urban Development Strategy.



EXPECTED IMPACT FOR THE TERRITORY

10 Expected impact

By implementing actions defined in the action plan, the City of Maribor should become a modern urban ecosystem, where citizens are deeply involved in development and innovation of public services and governance. Citizen's involvement is crucial to achieve other two key targets: introduction of sustainable urban mobility and circular economy. Impacts achieved in these two fields are highly depended on citizen's behaviour and cooperation.

The City of Maribor is regional leader with its approach to the introduction of circular economy, but in next phase, implementation of several circular loops will be made, which requires even closer cooperation among municipality, public service providers (waste, water, heat..), citizens and private sector. The action plan is providing a quadruple-helix cooperation framework that can enable required cooperation at the full-scale introduction of the circular economy in Maribor.

Maribor is also advanced in sustainable mobility planning, where cooperation of key stakeholders was already established – municipality, university, public transport provider. However, the involvement of the citizens and NGOs will be crucial in mid-term phase to make a shift in mobility behaviours happen. Namely, Maribor is building new sustainable mobility infrastructure (cycling network) and introducing smart mobility systems (car-sharing, bike-rentals etc.), but only involvement of end-users (citizens) can bring desired results. Action plan is integrating tools and methods for citizen involvement with mobility projects to maximize their impact.

Quadruple-helix cooperation, established by the URBAN INNO project and put into practice with this action plan is a new form of cooperation within a city of Maribor that will also provide impacts beyond this action plan, since it provides an efficient framework for urban innovation in all fields of urban ecosystem.

11 Outlook

Existing policies and initiatives that have potential synergies with UIAP

National level

On national level the one of the most important policies is research and innovation policy. Slovenian research and innovation policy is the responsibility of the Ministry of Education, Science and Sport and the Ministry of Economic Development and Technology.

In 2011, the Slovenian government approved two important long-term strategic documents: **Research and Innovation Strategy of Slovenia – RISS** and **National Programme for Higher Education – NPHE**. Both cover the period 2011-2020.

The Research and Innovation Strategy of Slovenia (RISS) 2011-2020 is the highest strategic document in the field of research and innovation in Slovenia. The document aims to establish by 2020 "a modern research and innovation system that will allow for a higher quality of life for all through critical reflection of society, efficiency in addressing social challenges, increased value added per employee, and assurance of more and higher quality workplaces".



The Strategy sets a national R&D intensity target of 3.6% of GDP to be reached by 2020.

Other important strategic documents:

The Slovenian Development Strategy 2030 represents the state's new core development framework as set out in the Vision of Slovenia, and a review of the current situation and global trends and challenges. The Slovenian Development Strategy 2030 also includes sustainable development goals in order to implement the global development plan set out in the UN's 2030 Sustainable Development Agenda (2030 Agenda). In 2015 the Government of the Republic of Slovenia adopted the Smart Specialization Strategy of Slovenia "S4" Smart Specialisation (where Smart City topics are heavily included).

Strategy has three pillars (I. Digital, II. Circular, III. (S)Industry 4.0) and nine priority domains with corresponding focus areas and technologies (I.1 Smart Cities and Communities; I.2 Smart Buildings and Home, including Wood Chain; II.1 Networks for the Transition to a Circular Economy; II.2 Sustainable Food; II.3 Sustainable Tourism; III.1 Factories of the Future; III.2 Health-Medicine; III.3 Mobility; III.4 Materials as Products). Strategic Research and Innovation Partnerships (SRIPs) defined the areas of joint development in their action plans; these documents not only outline joint development activities but also specify how joint venture will be carried out in terms of human resources development, internationalisation, promotion of entrepreneurship and other joint action.

Action plans are being regularly updated; as such, they represent the dynamic, evolving part of S4 which will help innovation policy gain more focus and greater concentration on key niches. Additionally, S4 will be subject to a thorough review in 2019, and, if necessary, a revised version of the strategy will follow.

Strategic Research and Innovation Partnerships or SRIPs are long-term partnerships between (1) business community, (2) research organisations, (3) state and municipalities, and (4) facilitators, innovation users and NGOs – so-called quadruple helix - to pool investment and intellectual potentials of Slovenian stakeholders, and help the stakeholders set up a comprehensive innovation ecosystem with the aim of entering global markets and improving the position in S4 priority areas.

SRIPs have a total of 783 members of which 83% are enterprises, large enterprises accounting for 21% of these, with a balanced structure in both cohesion regions (for statistical data see here).

As SRIPs are and have to be open platforms of cooperation, new members and initiatives are always welcome (the number of members grew by 24 % since their establishment in 2016).

The most interesting SRIP for our cluster is Smart Cities and Communities SRIP. The action plan of Smart Cities and Communities SRIP has **six industrial vertical** (Health, Energy and utilities, Mobility, transport and logistics, Security, Smart city ecosystem and Urban life quality) and **six different technology areas** gathered under Horizontal ICT network (Cybersecurity, Digital transformation, GIS-T, HPC and big data, IoT and IoT).

Digital Slovenia 2020 – development strategy for the information society until 2020 with the associated strategic documents Cyber Security Strategy and Plan for Developing Next-Generation Networks by 2020.

Digital Slovenia 2020 - Development strategy for the information society until 2020 is an umbrella strategy determining the key strategic development orientations and uniting the mentioned strategies in a uniform strategic development framework. At the same time, the strategy is one of three key strategies in this area (in addition to the RISS - Research and Innovation Strategy of Slovenia, and SIP - Slovenian Industrial Policy), which provide guidelines for the creation of innovative knowledge-based society and which are united in the Strategy of Smart Specialisation (SSS) as a platform for focused investment in priority areas. Since the scope



of the information society and ICT is horizontally included in the SSS across vertical content areas, the Development Strategy for the Information Society until 2020 specifies strategic directions of the digitisation of society and business, which will form the foundations of development projects by priority areas of the SSS. It foresees measures for harnessing the social and economic potential of ICT and the internet for digital growth, focusing on digital infrastructure, intense use of ICT and the internet, cyber security and an inclusive information society.

The Public Administration Development Strategy (adopted by the Government in April 2015) and the so-called Policy of Progress and Quality of Modern Public Administration.

Open and transparent public administration ensures the public to monitor the work of public authorities and have an impact on their work via cooperating in decision-making processes and holding the decision-makers responsible. The Ministry of Public Administration, as the competent ministry in the field of transparency, has access to public information and public procurement. It carries out a number of systemic activities to achieve greater openness in the functioning of wider public sector authorities, with the intention to prevent corruption risks.

The Access to Public Information Act (hereinafter: the Act) is the key act which ensures open and transparent functioning of public authorities. The authorities must endeavour to provide the public with as much information about their work as possible. From a systemic point of view, the so-called proactive transparency is one of the essential elements for public control of the legality of the activities of public sector authorities and their use of public funds. The 2015 amendments to the Act (ZDIJZ-E) implemented the changes of the EU Directive from 2013 on the re-use of public sector data and obliges the authorities to be proactive on opening public sector information. In line with these goals the Ministry has developed Open data Portal called 'OPSI - Odprti podatki Slovenije' and also the corresponding manual on opening the data.

Local level

Similar to Slovenia, Municipality of Maribor was also hit hard by the financial and economic crisis, which resulted in substantial job losses since 2008 and deteriorated economic and social development. Responding to that, Municipality of Maribor redefined some of its policy and prepared some strategic long-term documents, which are forming a solid framework with concrete measures for a long-term sustainable development.

Development Strategy of Maribor 2030 Document was adopted in 2012 as a respond to the emerging crisis. The document heavily relates on adopted strategy Europe 2020 and includes measures according to smart, sustainable and inclusive growth with specific local indicators. City Council of the Municipality of Maribor committed itself to achieve economically, socially and environmentally sustainable city in the context of a comprehensive vision of a clean, green and connected city, which includes an innovative economy and sustainable neighbourhoods and communities. This is a long-term vision of the city, defined in the "Development strategy of Maribor 2030". Energy represents an important area of sustainable vision. Among the seven headline targets of the Strategy are:

- Reducing greenhouse gas emissions by at least 30% compared with the level in 2009.
- Increasing the share of renewables in final energy consumption by 20% compared to the year of 2009.
- Increase energy efficiency by 20% (both public infrastructure such as households and companies) in relation to the year of 2009.



Integrated Transport Strategy/Sustainable Urban Mobility Plan (ITS/SUMP) Municipality of Maribor was one of the first municipalities in Slovenia which prepared and adopted ITS/SUMP. Consequently, Maribor is also the first city which established the Sustainable Mobility Centre in 2013, which serves as a focal-informative-educational point for sustainable mobility in the city. ITS/SUMP was adopted in 2015 and it consists of five connected pillars which represent a list of measures to regulate sustainable mobility in the city:

- Integrated traffic planning
- Walking as an important mean of mobility
- Optimal use of cycling
- Forming of attractive public passenger transport
- Rational use of motorised means of transport
- City logistics.

Local Energy Concept and Local Energy Action Plan In 2006 the Municipality of Maribor established the Energy agency of Podravje (EnergaP) which led preparations and coordination of two important strategic documents for more energy efficient, energy sustainable and greener Maribor. Local Energy Concept was adopted by the City Council in 2009, but the Local Energy Action Plan is still in the confirmation process. Local Energy Concept was also approved by the Covenant of Mayors for Climate and Energy. Local Energy Action Plan was prepared within the cross-border project with Austria in 2012. Within the same project, a pilot environmental zone was introduced in a small area of the city centre.

Ordinance on Air Quality of Maribor Municipality also adopted the Ordinance on Air quality in 2013 according to Air Quality Directive. City of Maribor is coping with the rising exceeding of PM10 particles in the air. The ordinance determines the overly polluted areas with PM10 particles, the 3 pillar-measures (energy efficiency, sustainable mobility and other areas), monitoring of the implementation of the measures, responsible institutions for measures implementation, pollution cause analysis.

Sustainable Urban Development Strategy. In the begin of 2016, Municipality of Maribor adopted the Sustainable Urban Development Strategy which integrates social, economic and environmental factors to define the policies and priority projects of a city. Social and economic agents (such as neighbours, unions, entrepreneurs, administrations, associations, etc.) are the active players in the urban transformation. They are actively involved in decision taking processes for the specific projects which are strategic to the whole city.

Sustainable Urban Logistic Plan In the begin of 2019, Municipality of Maribor prepared the Sustainable Urban Logistic Plan (SULP) as a part of ITS/SUMP. Document consists of chapters dealing with urban logistic management with the list of measures to regulate sustainable logistics in the city of Maribor.

SULP is based on the principles of sustainable development of logistics using environmentally friendly means of transport and creation of synergies with deployment of the most advanced technological and information solutions. It is built on the principles of collaboration – joint identification of solutions through new cooperation models and a continuous improvement process.