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1 INTRODUCTION

This document summarizes the English short versions of the 12 drafted territorial partner SUMPs. The partners themselves with the support of Vienna University of Technology (VUT) prepared the SUMPs. The 12 following Functional Urban Areas (FUA) or municipalities drafted a SUMP:

- FUA Alba Iulia
- Municipality of Banja Luka
- Municipality of District 14 of Budapest, Zugló
- Municipality of Dimitrovgrad
- Municipality of Dubrovnik
- FUA Koper-Izola-Piran Conurbation
- Municipiului Odorheiu
- The Municipal District Prague 9
- FUA Sárvár
- Municipality of Velenje
- Municipality of Weiz
- Municipality of Zadar

This task began with the setting up of a transnational working group. With support by VUT the working group prepared an approach how to establish a SUMP at FUA level. The process of SUMP drafting is supported by 5 common learning interactions. Practical solutions are developed and expertise transfer, capacity building and exchange of experience took place. In addition, study visits are carried. At the local level, the project partners held a regional/local seminar in which the prepared SUMP was introduced to the regional/local communities. The following sections are prepared by the partners and compiled by VUT.

2 COLLECTION OF ESTABLISHED LOCAL SUMPS

2.1 FUA ALBA IULIA: SUSTAINABLE URBAN MOBILITY PLAN (SUMP) DRAFT

Drafted by:	RDU CENTRU
Authors:	
Date:	30/11/2018

Effective sustainable transport is a crucial and determinant factor in the future success of the Alba Iulia Municipality Functional Urban Area, which is heavily impacted by the socio-economic activity and the poor existing transport infrastructure. Alba Iulia Municipality Functional Urban Area (FUA Alba Iulia - as referred in the current document) is composed of one urban administrative unit - Alba Iulia Municipality (which is the core city of the FUA) and other seven rural administrative units. Alba Iulia Municipality is also the lead partner for the AIDA LT Association representing an intercommunity Association for transport development constituted of the core city together with the constitutive members which are the same communes that compose the Functional Urban Area. In this way the geographic boundary delimitation of AIDA LT and FUA represent one and the same area. The main advantage of AIDA – LT is that they are delegated to provide integrated public transportation services within a well-defined area, having a single information service provider, a unique charging system and a single transportation schedule, according to EC Regulation no. 1370/2007 of the European Parliament and of the Council from 23rd of October 2007 concerning the public transportation services by means of road and rail. FUA Alba Iulia is mostly dependent on land-based transport predominantly serviced by privately own vehicles. Road access is via the A1 motorway (350 km from Bucharest). Alba Iulia is crossed by one of the main Romanian railways (Bucharest-Arad) connecting Alba Iulia directly with Budapest. Alba Iulia is located at the intersection of two highways under construction, which will be completed in the next two years, namely Pan-European Corridor 4 Bucharest- Nadlac and the Sebeş-Turda highway linking A1 and A3 (Bucharest-Bors or Transylvania Highway), ensuring the connection of Alba Iulia with other regions, as well as with the corridor and the road transport networks that connects with Europe through Hungary. Alba Iulia is linked by national roads to the main

cities of Transylvania, and the regional road network is modernized. Therefore, the core FUA city is accessible by all means of transport.

Based on the existing mobility system at FUA level, this document aims to provide a high-quality and sustainable mobility and transport to, through and within the Functional Urban Area Alba Iulia.

SUMP FUA Alba Iulia, drafted within CHESTNUT project, is a strategic document designed to satisfy the mobility needs of people and businesses from the Functional Urban Area of Alba Iulia Municipality and to improve the quality of their life, by identifying optimal solutions to the existing urban transport challenges in this area.

The current SUMP has been compiled through the implementation of a successive set of actions, included in two work packages that concluded with the creation of a draft document containing five overarching goals.

Based on the valuable scientific support offered by the Vienna Technical University, the initially set overarching goals have been perfected and rephrased, as follows:

2.1.1 Goal 1: Accessible Functional Urban Area

The development of a functional intermodal transport system at the FUA level is fundamental to the efficiency of transport and mobility policies at the FUA level, whether it concerns goods, commodities or passengers. The mobility plan developed at the FUA level will propose measures aimed at the implementation of intermodal nodes, of “park and ride” and “bike and ride” points as well as areas destined for exclusive pedestrian traffic through the proposed pedestrian routes.

Also, due to the fact that FUA residents will benefit from safer, more accessible and high-quality public transport, decreasing travel time they will contribute to the increased use of public transport. At the same time, this is encouraged by the existence of intermodal means of transport, which facilitates users' access to various points of interest within the FUA area.

2.1.2 Goal 2: Efficient Functional Urban Area

The efficient management of public transportation services combined with the introduction of an integrated unitary payment system for all means of public transport at the FUA level will further encourage the use of public transport as it simplifies the purchase of transport services and

the validation of the journey. At the same time, such a system ensures a transparent taxation of the public transport services on different means of transport (bicycle, bus, train).

2.1.3 Goal 3: Environment-friendly Functional Urban Area

Increasing the use of public transport and non-polluting transport modes such as bicycles, electric vehicles, walking, etc. at the FUA level will ensure an interconnected infrastructure for non-polluting transport means. This will also be reflected in changing the behavior of traffic participants and will reduce pollution caused by personal cars traffic at the FUA level.

2.1.4 Goal 4 Safe and healthy Functional Urban Area

The implementation of measures aimed at making mobility at the FUA level more efficient and better regulated (urban / road regulations, signaling, traffic management systems, pedestrian and bi-cycle infrastructure development, and the development of lanes specifically dedicated to public transport), will ensure a safer environment for all traffic participants.

Goal 5 High quality of life and tourism in the Functional Urban Area

A better quality of urban environment by ensuring high quality shared spaces along with higher standards for public transportation at FUA level by using comfortable and non-polluting transport vehicles. This will also ensure increased satisfaction not only of the residents, but also of the tourists, regarding the quality of the transport infrastructure and of the living conditions.

In order to achieve these goals, within the document were set 14 priorities, 25 targets, 34 indicators and 42 measures. The measures are connected to the priorities and targets; also during the elaboration of the draft document the mobility consultants evaluated the added value of each measure in relation to the identified targets. Also, for each measure were estimated costs, identified possible funding sources and the responsible authorities with its implementation.

Each measure, priority, target and indicator was discussed with the CHESTNUT Local Stakeholders Group members during the SUMP dissemination seminar held on 23rd of November, 2018 in Alba Iulia. After the meeting the FUA members were invited to sign a memorandum of understanding, in order to demonstrate their motivation to support the implementation of each measure included in the SUMP FUA Alba Iulia and to work with the CHESTNUT partners and experts to jointly tackle crucial planning barriers towards a sustainable urban mobility in the area. Also, during the meeting, the participants outlined possible approaches to engage key stakeholder and the public into the implementation of these measures.

2.2 MUNICIPALITY OF BANJA LUKA: SUMP FOR CITY OF BANJA LUKA

Drafted by:	LIR Evolution
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The development of the sustainable urban mobility plan (SUMP) for the City of Banja Luka, in accordance with spatial, social and economic characteristics, has been implemented in several phases. Due to scarce spatial planning documentation and data on the traffic system, the first phase included an analysis of the existing state.

2.2.1 Analysis of the Existing State

In the City of Banja Luka, the city center (core city) is actually a functional urban space (FUA) for which the official data exist. The City consists of 57 smaller territories, in which one person is in charge of collecting the citizens' requests and bringing them to the headquarters of the city administration that contains all the city management services. The surface area of Banja Luka is large, but the majority of the population is located in the urban area. The implementation of strategic planning documents, such as the Urban Plan, had been interrupted due to war. Under such circumstances the problem occurred in the city, due to the fact that an increase in the number of motor vehicles was not followed by the construction and development of the infrastructure. Banja Luka is the main administrative center of the Republika Srpska, one of the two territorial units in Bosnia and Herzegovina. In the city center are located almost all the Ministries of the Republika Srpska, the Tax Administration, the Geodetic Authority, the city administration and authority, as well as a large number of public companies. In addition to administrative and business facilities, in the city center are located the most of the secondary schools, banks, commercial

and catering facilities. Trips to the city area can be conducted in three possible ways: by using passenger cars, as pedestrians and by using buses.

Analysis of the number of registered vehicles demonstrates that there has been a rising trend in the number of passenger cars in recent years, thus in comparison to 1990, the number of passenger cars has almost doubled. An increase in the number of passenger cars and average age of passenger cars of more than 15 years is a major problem for traffic safety and environmental pollution.

The network of public transport lines is well developed and population from almost all parts of the city has a direct connection (without interchanges) with the central city area. All the suburban settlements have a connection with Banja Luka by bus lines.

The above mentioned indicators with daily migration of the surrounding regions' population towards Banja Luka indicate that continuation of the current development trend of traffic system in Banja Luka would have a negative impact on the development of the City in the next years, which would be manifested through the following aspects:

- Increase of the participation of passenger cars to meet the mobility needs,
- Increase of traffic congestion and crowded streets,
- Negative impact on environment and economic activities,
- Insufficient quality of public transport,
- Reduction of the number of passengers in public transport,
- Insufficient number of parking space and problems related to parking,
- Bicycle traffic will be very poorly developed,
- The traffic safety will be very poor.

Unless the policies change and activities direct towards creating a sustainable transport system, Banja Luka will become a city of cars that have an advantage over people. Integrated and sustainable mobility will not exist, and the city will lose its attractiveness and comparative advantages for development that it currently possesses in comparison with other cities in wider region.

2.2.2 Strategic Framework for City Development

The City of Banja Luka is one of the first local communities in BiH that joined the initiative of the European Commission by signing the "Covenant of Mayors". In this manner, the city obliged,

among other things, to reduce CO_2 emissions by 20% until 2020, which will be achieved by increasing the energy efficiency by 20% and by 20% in the share of renewable energy sources in combination with other energy sources (20:20:20). Accordingly, the City of Banja Luka adopted the Sustainable Energy Action Plan of the City of Banja Luka (SEAP), at the session of the Banja Luka City Assembly in 2010. SEAP contains activities in the following sectors: building/constructions, traffic, public lighting, waste management, industry etc. The economy crisis, the floods that took place in 2014, the goals that were unrealistically set for the economic situation, etc. have affected the full realization of the SEAP. Additional difficulties in the realization of certain SEAP objectives are found in the lack of legal frameworks at the state level.

By adopting the Law on Energy Efficiency and the Energy Efficiency Action Plan of Republika Srpska, following goals are achieved:

- SEAP revision in 2013,
- The Energy Efficiency Action Plan for the City of Banja Luka was adopted, containing the main goal: to reduce total energy consumption by 9% by 2018,

- The Local Environmental Action Plan (LEAP) for the City of Banja Luka for the period 2016-2021 was adopted in 2015,

- In 2016 the Local Nature Protection Plan for Banja Luka was adopted.

In the city area, air pollution and noise are continuously monitored. Movable laboratories for measurement of aero parameters are located in three locations in the city. Noise is measured every month at five locations in the city.

The City of Banja Luka received Certificate on energy efficiency from the Environmental protection and Energy Efficiency Fund in 2017, becoming the first local authority in the Republika Srpska that has this certificate.

2.2.3 Goals

SUMP for City of Banja Luka has following goals:

- Active mobility and carless lifestyle
- Eco safe city
- Efficient city

First goal, **Active mobility and carless lifestyle**, refers to the Banja Luka citizens attitude on the mobility and its realization. Almost every movement in the city, except going to school, in the last

15 years, is done by car. In order to change attitudes and behavior of the citizens and to promote new lifestyle based on other transport means, following priorities are defined:

- To increase public transport usage – first choice for movement in the city
- To increase usage of bicycles
- To increase number of pedestrians
- To increase accessibility and better conditions for public transport usage to the specific groups: children, elderly people and people with disabilities.

The second comprehensive goal is to reduce the risk of traffic and traffic systems in order to increase the quality of life in Banja Luka and security. The consequences of traffic, especially the traffic of passenger cars, are traffic accidents. Numerous examples have shown that the use of repressive, strict legal and regulatory measures, or interventions on the street network, cannot achieve the desired goals related to the number and structure of traffic measures in cities. Negative traffic products are emissions of pollutants, gases and substances that affect the increase of local and global pollution, as well as noise. To achieve this goal, the following priorities are defined:

- To increase the level of traffic safety,
- To reduce the emissions of pollutants,
- To reduce the level of noise.

The third overall objective is to increase the efficiency that can be achieved above all through openness and accessibility. In order to increase efficiency and accessibility, the following priorities are defined:

- The City of Banja Luka - good international accessibility,
- Efficient mobility,
- Increased accessibility to the city center and its regional capacities for all transport modes/means.

2.2.4 Indicators and Measures

In order to achieve the objectives of the project, it is necessary to define indicators that will describe the existing traffic conditions in the City of Banja Luka, based on merit values. In order to evaluate the effects and the quality of the measures taken, the desired or required values of these indicators are also defined.

In accordance with the set goals and priorities of the development, various infrastructure and soft measures have been proposed for the creation of a sustainable traffic system in Banja Luka:

1. **Transport model up to 2021** – represents a set of relevant data (numerical, graphical and other), indicators, parameters and simulation models, in order to reconstruct specifics and behavior of the transport system in the past in the spatial scope of the model and in different time horizons. The model will present transport requirements, transport offers, socio-economic and spatial parameters, evaluate the existing state of the transport system, evaluate, forecast or project the functioning of the transport system or its parts in the future, evaluate individual and existing or scenarios of defined state development, using the Transport Model elements.
2. **Development of 5 calm traffic zones up to 2028,** which implies changing the traffic regime by integrating all types of transport along with the reconstruction of street profiles.
3. **Specialized website and printed publications for information in public transport, information center development, real-time information on bus stands and mobile phone applications,** development of a functional public information system in order to increase the use of public transport, especially for travel to work.
4. **Database,** including a comprehensive socio-economic characteristics of the area covered by the transport model, parameters and indicators of traffic requirements and system offerings, and land utilization and use data.
5. **Development and improvement of "Urban plan",** as management policy on land usage that directly influences the selection of non-motorized transport modes for the realization of the journey and directly involved to the realization of all project objectives.
6. **Measures to increase the public transport share in the traffic distribution**, defined through 3 measures in public transport, which will have a direct or indirect impact on the increase of public transport share in the traffic distribution:
   6.1. Increase the number of buses
   6.2. Increase the density and number of public transport lines
   6.3. Increase accessibility to public transport
7. **Construction of a P&R (park and ride) system by 2023**, as an infrastructure measure which would enable workers/pupils migrants to use public transport for daily travel to the central zone of Banja Luka.

8. **Parking policy (regime and tariffs) with the aim of improving the accessibility of the city's central zone for working and commercial purposes by 2020** - regulatory and economic measures in the area of parking that have the most significant impact on reducing car use and accompanying adverse effects, increasing all aspects of sustainability the traffic system.
9. **Developing the Strategy for development of cycling up to 2021** - a useful tool for organizing cycling-driven measures, with the overall aim of increasing bicycle share in relation to other transport modes.
10. **Construction of 5 multimodal bus stops by 2024**, which will enable bikers to leave the bicycle in the secured space and continue the bus ride, as well as passengers who come by bus to take the bicycle and continue the journey.
11. **A specialized web site for bike services**, including web services and information along with marketing measures, and interactive platform for both users and planners.
12. **Increasing the number of bike sharing stations from 4 to 14, until 2025 and the number of bicycles in the system up to 100**
13. **Construction of 30 bicycle parking places in attractive locations**
14. **Increasing the number of cycling trails from 14 km to 50 km**, existing and planned bicycle paths will be connected to a functional network that will enable safe access to the bicycle of most zone attractions in Banja Luka.
15. **Construction of 1 regional bicycle route by 2023**, as the first international bicycle route that would link the area of Banja Luka to the existing routes in the surroundings.
16. **Organization of promotional public/media campaign**, in order to inform public audience and raise awareness on the benefits of public transport, bicycle usage, with the basic aim of changing people's attitudes and habits in terms of public transport and bicycle use.
17. **Increase accessibility of attraction facilities in the central city zone between following streets: Olimpijskih pobjednika, Gundulićeva, Aleja Svetog Save, Vase Pelagića, Tržnička, Bulevar cara Dušana, Kninska, Vidovdanska and I krajiškog korpusa**.
18. **Restricting vehicle speed at 30 km/h in all residential areas**,
19. **Reducing the waiting time of pedestrians at traffic lights to reduce the number of irregular road crossings**, pedestrian traffic and pedestrians would be placed on pedestrian crossings of the signaled intersections having better treatment than the cars, which is in accordance with the principles of sustainable development.

20. **Adjusting the school plans and programs for 10 schools by 2023**, aiming to promote the goals of sustainable mobility for young people, i.e. in secondary schools
21. **Reconstruction of the central pedestrian zone and the pedestrian lanes in three residential areas per year**, as one of the measures affecting to increase the attraction of the central city zone, which besides the primary has a secondary role in promoting the walking as the most natural and healthier mode of movement.
22. **Introduction of a new concept of public space use in residential areas**, which would define the standards to be respected during construction of new facilities and the necessity to carry out a Traffic Impact Assessment Study when building residential and business facilities.
23. **Removing obstacles on pedestrian paths in the central zone for persons with disabilities by 2025**, in order to improve the existing facilities in terms of increasing the accessibility for persons with disabilities, as well as the implementation of the concept of Universal Design in future development of traffic system and all its elements in planning and designing.
24. **Set up a display indicating free parking lots in the central zone by 2023**, which will affect the increase of the attraction of surrounding facilities, reduce travel time and emissions of pollutants.
25. **The Traffic Management Center**, in the manner that the Center is not intended to serve to the motor transport vehicles, but also to public transport, bicycles and pedestrians, in order to exclude the possibility that its existence is stimulating the use of a passenger cars.
26. **Optimization of phase plans and implementation of measures for activity of the signaled intersections by 2023**, which would react to changes in traffic requirements at intersection approaches.
27. **Increasing the number of vehicles using eco-fuels, hybrid and electrical vehicles from 5.000 up to 11.000 by 2028**, the City would be the initiator of the revision of certain legal regulations that would stimulate the use of vehicles that use eco-fuels.
28. **Increasing funds for e-mobility from 70.000 BAM up to 200.000 BAM by 2028**, the City is participating in various international projects.
29. **Increase in the number of electrical vehicle stations from 2 to 5 to 2023**, Banja Luka would hold leadership position, as one of the first cities in Bosnia and Herzegovina and one of the first in the region, to finance the construction of electrical vehicle stations.

30. **Increasing the number, in the total number of vehicles, of vehicles that do not emit noise by 2% by 2028**, which is directly related to the measure relating to the increase in the number of electric vehicles.

Unlike conventional traffic planning methods that are integral part of all traffic studies carried out on the territory of the former Yugoslavia over the past period, the modern method incorporated in SUMP implies a significantly wider range of traffic management instruments. The proposed measures, apart from infrastructure measures, imply a number of soft measures to encourage greater use of sustainable modes of transport.

2.3 Municipality of District 14 of Budapest, Zugló: Sustainable Urban Mobility Plan (SUMP) Draft

Drafted by:	Municipality of District 14 of Budapest, Zugló
Authors:	Miklos Radics Viktor Merker
Date:	02/12/2018

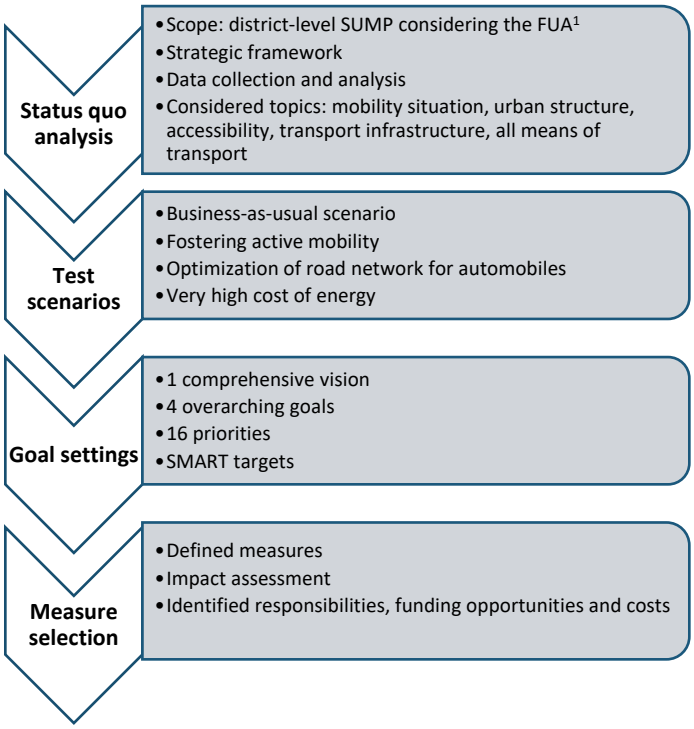
2.3.1 Introduction

Municipality of District 14 of Budapest, Zugló is strongly committed to sustainable urban mobility. The aim of Zugló is to provide healthy, livable, safe and sustainable urban environment for those who live, study, work or move through the district. The current Local Transport Plan was accepted in 2012. Although its methodology follows the principles of sustainable urban mobility planning it is time to review and update the transport plan.

The CHESTNUT project is part of a framework program called MiZuglónk which is a platform run by Zugló to bring together residents, businesses, other local stakeholders and decision makers by applying participatory planning and decision-making methods.

The drafting process of the Zugló SUMP took place in four main phases. The following flow chart summarizes these steps and the results of each.

1. First, the current situation was analyzed covering the topics like mobility situation, urban structure and strategic framework.
2. After drawing the conclusions of the status quo analysis, four test scenarios were defined and their consequences were evaluated.
3. The third step was the goal setting which is based on the results of the previous steps. A comprehensive vision, 4 overarching goals, 16 priorities and SMART targets were set up.
4. Finally, possible measures were identified which implementations could contribute to achieving the set-up goals.



2.3.2 Status Quo Analysis

The scope of the proposed SUMP is the district of Zugló, considering wider areas of the functional urban area (Budapest and its agglomeration).

[1] Functional Urban Area

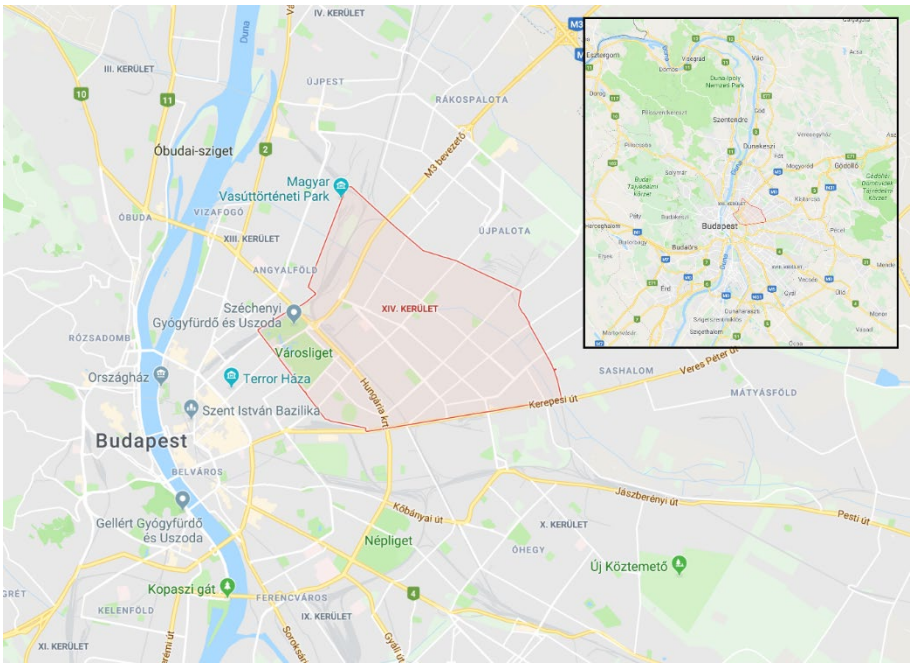


Figure 1 Location of Zuglo within Budapest

2.3.3 Strategic Framework

The work was carried out with an integrated planning approach by considering priorities from international to local level. The scope of the status quo analysis was widened to all relevant topics that are linked to mobility such as land-use, urban development, infrastructure, all means of transport, goods delivery, institutional background and awareness raising. The following table summarizes the strategic framework and the most important documents that were examined.

European Union	National	Regional	Budapest	Budapest XIV.
SUMP Guideline by the EU	National Development and Territorial Development Concept	Pest County Spatial development Concept	Budapest Spatial Development Program	Budapest XIV. Development Strategy
White paper	National Transport Strategy	Pest County Spatial development Program 2014-2020	Budapest 2030	Budapest XIV. Transport Strategy
Green Paper			SUMP of Budapest - Balázs Mór Plan	Budapest XIV. Cycling Strategy

Figure 2 Framework conditions

2.3.4 Analysis Of The Current Situation

To analyze the consequences of possible future mobility scenarios, the current situation had to be understood first. Mobility and other relevant data were gathered and analyzed to get more insights. The status quo analysis was carried out in a comprehensive manner to answer questions such as: Where and what kind of problems occur? How do people get from A to B? How is the urban structure of Zuglo? What is the situation about traffic accidents in general? Where are the gaps in the transport network? Besides the weaknesses, the strengths and opportunities were also identified.

As Zugló is situated between the core city and the outskirts of Budapest, heavy through traffic and the high number of commuters have major effects on the district in various ways. Traffic congestions, air and noise pollution, overcrowded public transport are part of Zugló's everyday life. However, solving these transport related problems go beyond the responsibilities of the local government and municipal institutions.

Zugló is bounded by railways and busy roads, which pose great barriers for all means of transport, especially for walking and cycling. High quality and accessible bike and pedestrian crossings are lacking towards the neighbor districts. Although the compact size and high density of the district provide favorable conditions for cycling, the less developed cycling network limits the spread of this form of active mobility.

The public transport network is quite dense, and the short-distance catchment area of stops covers the whole district. However, major, high capacity lines are missing, and the intermodal conditions should be improved as the railway services are not integrated into the city's transport offers and the stations are hardly accessible.

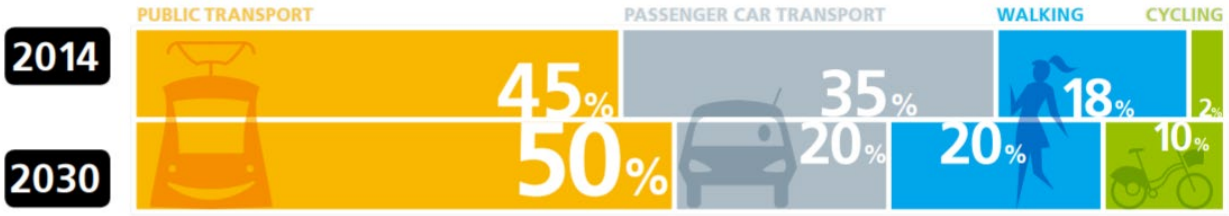


Figure 3 Modal split objectives defined by the SUMP of Budapest

2.3.5 Test Scenarios

Four future test scenarios were developed and assessed. This method was necessary to illustrate possible future situations and find effective measures for each case. This approach also initiated discussion on policy alternatives and on their possible impacts. The developed test scenarios are as follows.

Scenario 01: Business-as-usual scenario

In this test scenario, it is assumed that Zugló follows Budapest's SUMP (Balázs Mór Plan, BMT). BMT set up overarching goals and targets for a livable capital city and for a sustainable transport system. The district will follow the directions of Budapest's SUMP. Every decision and measure will be made according to BMT.

The focus areas of scenario 01 are as follows:

- Better connections between different modes of transport, improved intermodality
- Better walking and cycling facilities
- More attractive public transport services and vehicles
- More effective institutional background
- Continuous feedback analysis and monitoring

Scenario 2: Fostering "active" transport modes (walking and cycling)

In this test scenario, it is assumed that Zugló fosters active transport modes such as walking and cycling for all target groups from children to elderly people by providing comfortable and safe conditions for all.

The focus areas of scenario 02 are as follows:

- More attractive streets for cycling and walking
- Traffic safety
- Attractive cycling network, green ways
- Better bike parking facilities
- Better conditions for elderly and mobility-impaired people, accessible streets
- Promoted short-distance journeys

Scenario 3 - Optimization of road network for automobiles

In this test scenario, it is assumed that Zugló will focus on optimizing its road network. Technological progress will have a positive effect on traffic safety and capacity (e.g. ITS solution, autonomous vehicles). Promoting renewable energy and intelligent solutions will lead to environmentally clean urban traffic flow (e.g. air and noise pollution).

The focus areas of scenario 03 are as follows:

- Optimization of motorized traffic flow
- ITS solutions: capacity optimization, traffic management
- Electric mobility
- Better parking facilities
- Traffic safety

Scenario 4 - Very high cost of energy (fuel and electricity)

This scenario differs from the previous scenarios regarding its structure and approach. It assumes that energy and fuel prices will increase, and mobility will thus become more expensive. Whereas the other scenarios focus on particular modes, in this case the changing context conditions and the emerging adaptation strategies are in the foreground. The focus is on electric mobility, inter-modality and mobility management.

The focus areas of scenario 04 are as follows:

- Reduced private car use, increased car occupancy
- Longer journeys done by walking or cycling
- Efficient mobility management

2.3.6 Goal Setting

Comprehensive vision

Based on the previous steps of the SUMP drafting process, the comprehensive vision was defined as follows:

Zugló will develop a sustainable, equal, accessible, safe and attractive mobility system, which will contribute to the improvement of the quality of life and economic development.

Overarching goals

Based on the comprehensive vision four overarching goals were defined which also determine the key intervention areas as follows.

Table 1 Overarching goals

Livable urban environment
Zugló's transport system will contribute to high quality living conditions for its citizens. Zugló will provide healthy environment for all.

Fair, accessible and safe
Street space will be allocated fairly. Mobility will be safe to all kinds of users, especially for vulnerable groups. Sustainable mobility will be attractive, accessible and affordable for all.
Eco-friendly, efficient
Transport related pollution and energy consumption will be minimized by increasing energy efficiency, high use of alternative energy resources and higher share of active and sustainable mobility modes. The integration of different modes of transport is also crucial.
Partnership, cooperation
Partnership with stakeholders and local residents will be emphasized as well as better institutional cooperation will be implemented to have a more efficient and well-coordinated, reliable transport system, which serves local, needs.

2.3.7 Priorities and Targets

The following table summarizes the priorities and targets of each overarching goal.

Table 2 Priorities and targets

Priorities	**Targets**
Livable urban environment	
• Livable, accessible residential areas, car-free public spaces • Improving accessibility of Zugló for commuters by providing alternatives to reduce transit car traffic	• Decrease car use • Reduce transport related air pollution and traffic noise nuisance • Increase general satisfaction of inhabitants about livability and accessibility of public spaces
Fair, accessible and safe	
• Traffic safety • Safer access to schools • More space for sustainable modes • Accessible sustainable urban mobility • Better access to institutions, services and workplaces	• Decrease the number of traffic accidents • Extend the area of paid parking zones • Decrease the public space occupation of cars • Increase the share of schools in traffic calmed zones • Increase the area of public space for pedestrians and cyclists • Extend the catchment area of public transport and shared mobility

Eco-friendly, efficient	
• Enhancing intermodality • Prioritizing active mobility • Better public transport services • Energy efficient and green vehicles • Eco-friendly urban freight transport	• Increase the share of walking, cycling and public transport • Increase the share of residents who are physically active on their everyday trips • Increase and optimize B+R and P+R capacities • Increase the number of green vehicles • Decrease the overall energy consumption
Partnership, cooperation	
• Effective partnership with external actors and with the community • Advocacy and lobbying for the desired projects • More efficient institutional background • Awareness-raising, marketing, education for sustainable mobility • Strengthening international relations	• Enhance effective partnerships with local businesses, professionals and NGOs • Regular public involvement and participatory planning, enhanced participatory decision making • Enhance effective partnership among local governmental bodies • Increase the number of those who are reached by awareness-raising and educational activities •

2.3.8 Indicators

To make the impacts of measures measurable, indicators were also identified. As the length of this document is limited, only a list of a few indicators is introduced here: modal split, total CO2 emissions and energy consumption, traffic noise, land use, general public opinion or user satisfaction, number traffic accidents, share of physically active inhabitants etc.

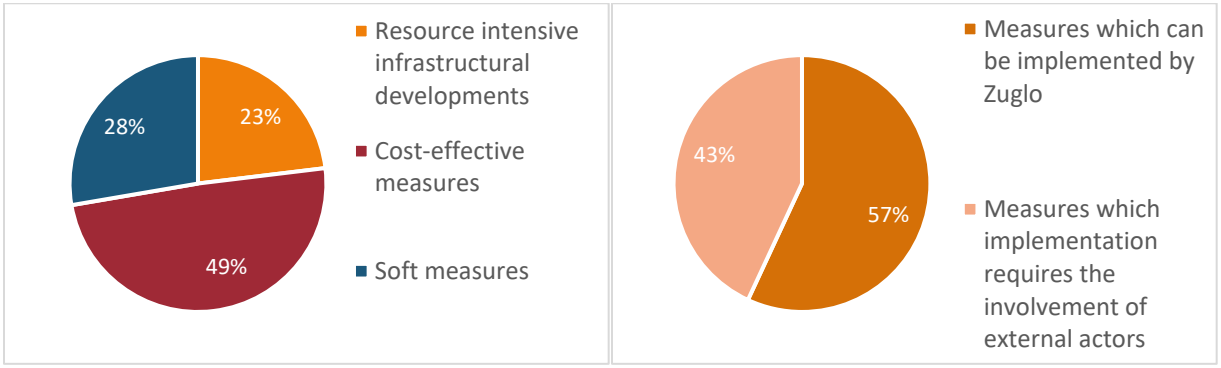
As data is not available in all cases, base measurements should be established in the future. After that, the target values of each indicators could be defined. All targets should be SMART (Specific, Measurable, Achievable, Realistic and Time-bounded).

2.3.9 Measures

The proposed SUMP defines measures which address all the identified transport related problems and can help Zugló to achieve its desired vision.

Most of the proposed measures focus on active mobility and on decreasing the negative effects of motorized transport. Those measures which can be implemented by the local municipality,

within local responsibilities and from local budget, were prioritized. Quick-win measures which contribute to the improvement of the quality of residential areas were also favored.
Besides that, there are projects, which should be done to address major and more complex issues. These measures require the involvement of external actors and budget as major roads and the public transport network are operated and developed by organizations, which Zugló cannot directly control. The following charts introduce the main characteristics of the measures.



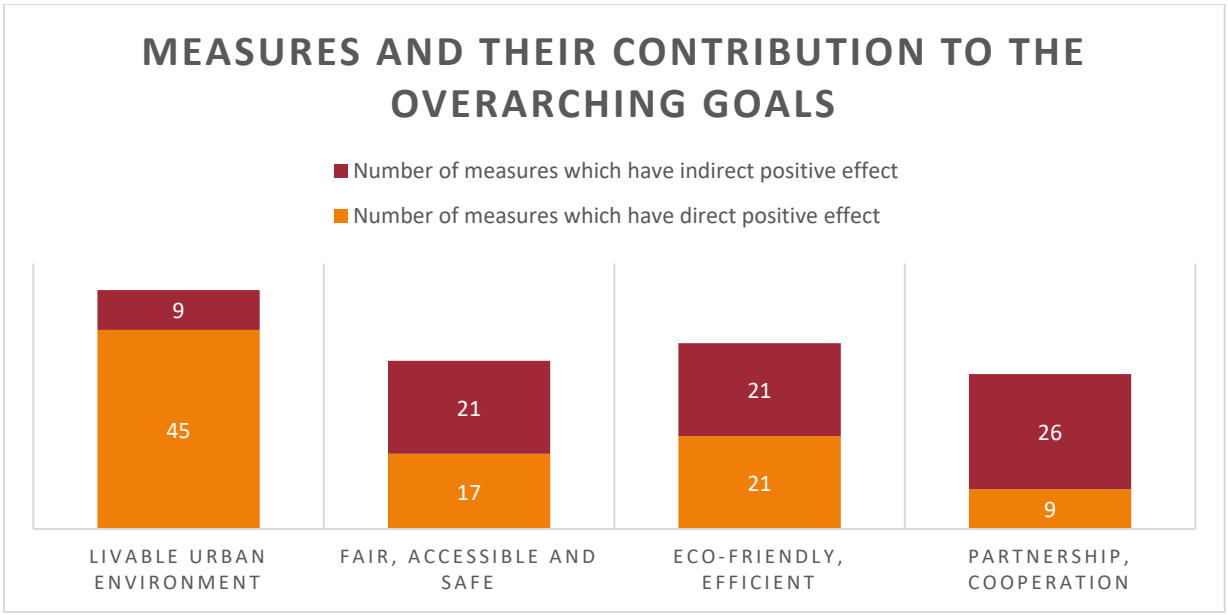


Figure 4 Measures and their contribution to the overarching goals

2.4 MUNICIPALITY OF DIMITROVGRAD: SUSTAINABLE URBAN MOBILITY PLAN (SUMP) DRAFT

Drafted by:	Dimitrovgrad
Authors:	Yasho Minkov
Date:	30/10/2018

The present Sustainable Urban Mobility Plan of Dimitrovgrad Municipality (SUMP-Dimitrovgrad) is developed within the framework of the international project "CHESTNUT – Elaboration of Comprehensive Strategic Plans for Sustainable Urban Transport", financed under the "Danube Transnational Cooperation Programme2014-2020", co-financed from the European Union through the European Regional Development Fund and from national co-financing, within which Dimitrovgrad Municipality is one of its 12 project partners. On a practical level, the project aims to reduce by2-3% within the next 5 years the use of private vehicles, develop a better interconnected and operationally compatible environmentally friendly transport and safety system in the urban areas of the project partners, based on the integration of more sustainable means such as public transport , bicycles, walking, electric vehicles. The expected change that CHESTNUT intends to create, and the development of the current plan to contribute, is about both the capacity building of regional and local authorities in the sustainable planning of intermodal mobility at over-communicative level, and the promotion of urban mobility models be less dependent of cars.

SUMP is a strategic plan based on the existing planning practices and takes into account the principles of integration, participation and development to meet today's and tomorrow's mobility needs of people and to create a better quality of life in cities and their areas. In process of elaborating the Plan are applied the principles of integration, active participation and development, which ensure satisfaction of mobility needs now and in the future of the various target groups (residents, tourists, business, service providers, etc.), as well as the creation of conditions for a better quality of life in Dimitrovgrad Municipality. Mobility management encourages passengers to use the most efficient means of transport. On one hand, it regulates, and on the other hand, reduces the use of motor vehicles (for example for short trips), as well as ensures that there are sufficiently effective and diverse options for passengers that subsequently operate successfully in the unified system. The Plan will be a key factor in effectively addressing the issues of transport's negative impact on the health, safety and security of citizens, atmospheric and noise

pollution, energy inefficiency, inefficiency in the cost of transporting people and goods and improving the urban environment, urban architecture and quality of life. In order to meet the above-described modern needs of residents and visitors of the city, SUMP-Dimitrovgrad has the following objectives and tasks:

- Providing citizens with access to residential and industrial areas, administrative buildings and dedicated service spaces, and recreation areas. Improvement of the traffic safety in the municipality and the health and safety of the citizens;
- Reducing pollution, noise, harmful vehicle emissions and energy consumption as planned in other strategic documents of Dimitrovgrad Municipality and Europe-wide targets set in the „Europe 2020“ Strategy;
- Improving public transport performance as well as the efficiency and effectiveness of transporting people and goods;
- Improving the attractiveness, quality and accessibility of the urban environment;
- Defining a clear vision for sustainable and modern transport development in its most complete definition as a service system on the territory of Dimitrovgrad Municipality;
- Planning a perspective for urban development ensuring maximal accessibility for citizens.

The implementation of the developed SUMP-Dimitrovgrad sets the basis for long-term benefits for residents and visitors of the city, revealed in:

- Integrated, intermodal, sustainable, accessible and attractive transport solutions and services;
- Improved urban mobility coordination, planning and management, including all its components - public and private vehicles;
- Passenger and freight transport, motorized and non-motorized transport, transportation and parking in the urban environment on the territory of Dimitrovgrad Municipality;
- Achieving integration in the process of formation and implementation of policies at a municipal and district level.

The challenge for urban areas in the context of sustainable development is enormous: on one hand, combining economic development and accessibility, and on the other, improving the quality of life and protecting the environment. Modern cities need efficient transport systems to help the local economy and the well-being of their citizens. About 85 % of EU GDP is produces in cities. Urban areas today face the challenges of making transport sustainable from an environmental

point of view (CO2, air pollution, noise) and competitiveness (congestion) while paying attention to social issues.

This is stretched by the need to focus health and demographic trends on fostering economic and social cohesion to take into account the needs of people with reduced mobility, families and children.

In order to address the challenges of modern cities, which have many different consequences, the overall effort will enable the search for innovative and ambitious solutions to urban transport to make cities less polluted, more accessible and easier to navigate.

These challenges can be summed up to five and they should be overcome by an integrated approach:

2.4.1 Easy Navigation in the Cities

Dimitrovgrad operates public transport, which covers 4 urban lines and is made by buses. Unfortunately, it is insufficient and it is difficult for citizens to move, especially from the neighborhoods of Slavyanski, Iztok, Chernokonevo and Marino. There are no bicycle paths in the city and there is, therefore, no complete bicycle infrastructure.

The experience of stakeholders shows that there is no single solution to reduce congestion. However, alternatives to the use of private cars, such as walking, cycling, public transport or the use of motorcycles and mopeds, should become attractive and safe. Citizens must be able to optimize their travel through efficient connections between different means of transport. It is the responsibility of the authorities to encourage the combination of different means of transport and to adequately manage the spaces that are released as a result of successfully implemented congestion mitigation measures. Some intelligent and adapted traffic management systems have also proven their efficiency to reduce congestion. The parking fee can be used as an economic tool. Different tariffs can be envisaged to reflect the limited availability of public space and create various incentives (eg free parking in peripheral areas and high tariffs in the center). Attractive Park & Ride facilities can promote the combination of personal and public transport, for example, by building buffer parks in the city's main entry-exit roads.

In this way, efficient and quality uninterrupted public transport connections allow urban areas to move away thanks to integrated transport systems.

2.4.2 For Greener Cities

Major environmental problems in cities are related to the use of mainly fuel oil, a source of CO2, air pollution and noise. Transport is one of the most difficult to manage sectors in terms of CO2 emissions. While the advancement of automotive technology, the increase in road flow and constant stops and hikes in urban traffic, cities are increasingly becoming a major and growing source of CO2 emissions, resulting in climate change. These changes have a multiplying negative effect in the global ecosystem and urgent action is needed to limit the effects of a manageable level. The EC has set itself the goal of reducing greenhouse gas emissions by 20% by 2020. The traditional technology of internal combustion engines is becoming cleaner thanks to the industry and in response to the European emission limitations. In the future, catalytic converters and particulate filters will lead to significant reductions in pollutant emissions. Research and technological development co-funded by the EU focused largely on clean and energy-efficient automotive technologies and alternative fuels, such as biofuels, hydrogen and fuel cells. In the future, the progress achieved in cars in the field of environmental protection can be improved by the adoption of harmonized minimum standards for vehicles. The progressive tightening of these standards into perspective would lead to a protracted process of modernization or withdrawal of old polluting vehicles. Further promotion of the massive introduction of new technologies on the market can be achieved both by economic instruments such as stimulating the purchase and use of clean and energy-efficient vehicles by public authorities as well as by non-economic instruments such as the application of restrictions on highly polluting vehicles and privileged access to more sensitive areas for low emission vehicles, under the condition that these measures are in line with the internal market. The rapid progress of electric cars also sets a promising direction for a sustainable solution to the problem of air pollution in cities.

2.4.3 Towards more Organized Urban Transport

The density of the mass urban transport network (MTG) in the municipality is at the lower limit of the norm (1.5-2.5 km / km2). The number and frequency of transport links between Dimitrovgrad and the villages is determined by the local needs. Student transport is provided between some of the villages, but there is no specialized transport of people in social isolation or with the need for special health care. Priority in the municipal transport scheme have the connections of the settlements with the municipal center and, hence, with the Haskovo district center. The bus

traffic on the line Dimitrovgrad - Haskovo is 15 minutes. Traditionally, the population of the municipality prefers to travel by private vehicles rather than using public transport, bicycles and / or a combination of intermodal methods of transport. There is no local data on the level of motorization on the territory of the municipality. Analyzes show that wealthier cities have motorization levels below 450 vehicles / 1000 inhabitants, which reinforces the trend that the higher the annual GDP per inhabitant, the less the ownership per car / 1000 inhabitants. The prevailing preference for moving with a private vehicle is one of the key challenges that local authorities should face in the coming years. An important prerequisite for addressing this challenge is the establishment of an appropriate transport and communication infrastructure for the use of transport other than a private vehicle.

2.4.4 Towards more Accessible Urban Transport

The usability of public transport is not high enough compared to the usability of passenger cars. Probably most of the movements are on foot. The main reasons are the low speed of mass transit and the obsolete fleet of public transport. As additional reasons, uncomfortable travel, inconvenient intervals, lack of traffic information, and timetables can be highlighted. Simultaneously with the mass urban transport, the railway infrastructure is extremely important for the optimal transport service and the connection of Dimitrovgrad Municipality with other municipal and district centers, but it also needs renovation and modernization. Dimitrovgrad Railway Station also provides international access to the municipality. Unfortunately, there are no data on the daily number of people traveling to / from railway stations to the target area, but the general preference for use of such transport is limited. On the other hand, as noted above, there is no specialized transport of people in social isolation or with the need for special health care. New innovative solutions for mobile public transport, such as a fast bus, are becoming increasingly common as an alternative to more expensive metro and tramway systems. Fast transit bus transport systems offer fast and frequent transport services using reserved corridors and stops similar to metro. A specific area is the use of taxis in the public transport chain and on call transport, with the help of ITS.

(5) For safe and secure urban transport

From 108.7 km. municipal road network, only 15% is in good condition, about 20% on average, and the rest - in poor condition, i.e. over 80% of the road network needs rehabilitation and overhaul. In general, the state of the street network in the villages on the territory of the Municipality

of Dimitrovgrad is considered unsatisfactory. There is a need for repairs and / or the laying of completely new road surface on most of the streets in the villages to prevent possible road accidents caused by poor quality surface. In this regard, according to the data of the Regional Police Directorate Dimitrovgrad, an area with an increased concentration of traffic accidents cannot be identified on the territory of the municipality. In recent years there has been a decrease in the value of all three indicators: the number of traffic accidents has dropped by 11, the number of people killed decreases by three, and the number of people injured by 15. Information and educational campaigns are of great importance for increasing citizens' responsibility on the road. Special road safety campaigns and specific training initiatives for young people can be organized and one of the next European Road Safety Days may be targeted at urban areas. It is advisable to promote safe road behavior among cyclists, for example by encouraging the use of helmets or a more ergonomic form of helmets. Improving perceptions of safety and security depends on various measures in the urban environment. High-quality infrastructure with a good road surface for pedestrians and cyclists is crucial. Better visibility, for example, with improved lighting and a greater presence of authorities in the streets can increase the sense of security.

Developed scenarios and SUMP based mainly on one of them are elaborated according to collected and processed statistical information. This is taken from the official databases of the National Statistical Institute of Bulgaria, its regional divisions, the statistical information of Dimitrovgrad Municipality, a database of the Regional Police Directorate - Dimitrovgrad, surveys and researches from the private sector.

When developing a sustainable urban mobility plan, focusing on the future, account should also be taken of current opportunities and shortcomings. There is a need to analyze future challenges and relevant lessons on how to achieve the SUMP goals. The following issues are strongly addressed:

- What are the measures needed to achieve the identified SUMP objectives?
- What are the opportunities for development of Dimitrovgrad Municipality by 2015?

The following indicators will be addressed regarding future development:

- Demography and economic infrastructure;
- Urban and village development;
- Types of transport / road network, local and regional bus lines, rail transport;

- The number of registered cars;
- Costs related to mobility / fuel prices, public urban transport charges, etc.

Future development, both locally and globally, is a process of unexpected and unpredictable development. We face many uncertainties, such as economic fluctuations, a scarce resource of energy, rising energy costs, climate change and global warming. This also applies to demographic change, rapidly evolving social conditions and the growing need for mobility. Sustainable financing of transport infrastructure is another open-ended theme that faces ever more restrictions on public funding at national, state and local levels. In order to give a clear idea of the many unpredictable aspects of urban mobility development, we produce various scenarios with a time horizon - 2025. A baseline scenario that acts as the foundation on which the remaining scenarios will be built.

Scenarios are a tool used in planning to illustrate possible events in the future, using concrete and specific suggestions. As future proposals include a number of drastic actions / to highlight the effect of the measures / scenarios are called test scenarios. The foundation for developing a baseline scenario is an analysis of the current state of mobility, an assessment of the current directions of development, the measures already foreseen, the events and the changes in the near future for the Municipality of Dimitrovgrad.

The baseline scenario 2025 depicts the changes to be made by 2025, and also foresees the changes that will take place in Dimitrovgrad Municipality, taking into account possible impacts on the Municipality of Haskovo. The Baseline Scenario 2025 sets out a baseline framework that serves as a comparing platform of the test scenarios developed in the Sustainable Urban Mobility Plan along with the measures to achieve the objectives of the scenarios. This includes their impact on the choice of transportation regimes, routes and traveled distances per unit of time. Using the baseline scenario as an intermediate step, it is possible to highlight the effects of transport regardless of the test scenarios that will be presented in the next section. This serves as an indicator both for the effects of the planned and the already completed structural changes for the period between 2017 and 2025.

The test scenarios allow us to work on future development trends influenced by different conditions by comparing the effects set in them with those of the baseline scenario. They do not describe a specific strategy, but rather portray possible events with a different focus. The test sce-

narios are based on certain underlying assumptions, such as the financial framework. By calculating the scenarios we can get an idea of what the results of each transport plan would be and how much we can achieve the goals we have set. All test scenarios are based on the Baseline Scenario - 2025.

In the course of elaboration of SUMP, Scenario 02 was selected, a detailed analysis of the problems and the potential for development of the sustainable urban mobility in Dimitrovgrad Municipality was made, in order to create a conceptual environment of planning priorities, goals and measures for improvement of urban mobility.

2.4.5 Objectives

OG 1: Less cars, more bicycles and public transport

Priorities:

- Intermodal urban mobility;
- More streets for pedestrians;
- Bicycle transport;

OG 2: Easy, secured and safe mobility in a sustainable way

Priorities:

- Sustainability;
- Improved security and safety for participants in the urban mobility;

The OGs and the respective priorities address different targets as follows:

- Intermodal urban mobility - Increase the number of people using MUT (Means of Urban Transportation) to 12% in 2022 (where the basis is 2018);
- More streets for pedestrians - Increase pedestrian zones by 10% in 2022 (where the basis is 2018);
- Bicycle transport - Increase the modal split of cycling in the urban mobility system to 12% in 2022 (where the basis is 2018);
- Sustainability - Reduction of NO and CO emissions by 5%in 2022 (where the basis is 2018);

Improved security and safety for participants in the urban mobility - Decrease number of traffic accidents by 20% in 2022 (where the basis is 2018).

2.5 MUNICIPALITY OF DUBROVNIK: PLAN ODRŽIVE URBANE MOBILNOSTI (SUMP) DRAFT

Drafted by:	Mobilita Evolva d.o.o.
Authors:	
Date:	13/12/2018

2.5.1 Introduction

Cities have become the driving force behind economic activities in most countries and the center of economic, social, cultural and other activities. City infrastructure and service management models need to adapt to changes occurring in cities and globally. Apart from changing the traditional management model, cities are also required to change the understanding of key value generators, requiring a different view of city economic activity and public services.

Today's living conditions require daily spatial distribution of population, which produces transport demand. As the number of personal motor vehicles in cities increased, frequent traffic congestion problems occurred. Increased transport demand, especially in peak periods, can be solved by transport demand management strategies.

The transport demand management strategies aim to optimally utilize available traffic infrastructure in the urban environment and to rationalize and disinfect travel by car when the use of a personal vehicle is not indispensable. Therefore, the approach to managing transport demand has been translated into Sustainable Urban Mobility Plans to respond to the growing transport problems of urban environments.

The Sustainable Urban Mobility Plans (SUMP) are a strategic plan that is complementary to existing planning practice and takes into account the integration, participatory and evaluation principles to fulfill the needs of the city's population for mobility now and in the future, and provide better quality of life in cities.

The functional urban region faces today the trend of population decline, which is largely caused by immigration of people abroad. It also faces demographic trends of the older population. Also, the number of traveling cars is on the rise, while sustainable modes, such as rail and bus transport, stagnate or fall. There is also a downward trend in public transport, stagnation in the length of pedestrian and cycling trails, and increased travel by cars. In addition, more and more goods are

transported exclusively by road transport, and less and less other modes of transport. All of this leads to a significant reduction in the sustainability of the transport system, a reduction in the travel potential of the population, a reduction in the ability to transport goods, and thereby the decline of the company's competitiveness, increasing environmental degradation, increased power consumption and reduction of traffic safety and hence greater human impact health and the growing loss of human life.

Increasing transport demand produced by a number of factors imposes increasingly demanding solutions in the urban environment transport system. The need to increase mobility and, consequently, transport demand, coupled with spatial, energy, ecological and economic rationality, requires a new approach to addressing urban transport problems.

By combining strategies aimed at reducing the use of personal cars and strategies aimed at increasing the attractiveness of using other modes of transport (public transport and non-motorized traffic), the transport system's overall performance is achieved.

SUMP should be based on the long-term vision of traffic development and mobility for the entire urban agglomeration, rather than a series of partially implemented solutions in mutually unrelated segments of the city's activity. It has to cover all forms of traffic. Strategic vision provides a qualitative description of the desired future of the city and directs the development of appropriate planning measures. The vision should be determined by specific goals that describe the desired change. Changes and impacts must also be measurable and require a well-thought out set of goals that focus on specific areas and indicators. In addition, the choice of measures should be guided not only by efficiency but also by profitability, as it is crucial to achieve maximum impact with minimum re- source consumption.

2.5.2 Status Quo Analysis

Status quo analysis refers to the availability of data and information, characteristics of people's mobility in the functional urban region, urban population structure, accessibility within the urban area, motor vehicle traffic, road infrastructure and car related services, public transport, bicycle and pedestrian traffic and anticipated scenarios.

Availability of data and information

Analyzing available traffic planning documentation collects information and data on the functional system of the functional urban region. As part of the analysis, particular attention should

be paid to those segments of the transport system that are directly related to the measures in the domain of this document. The available documentation should provide systematic consideration and analysis of the entire transport system, with an analysis of the overall traffic situation and problems of the observed area.

Information and data which is needed to collect and analyze are traffic volume data on the most heavily loaded sections and intersections. Statistical data on demographic population structure and other social and economic characteristics need to be analyzed. It also requires analysis of urban development documents for traffic network and analysis of relevant existing traffic studies and documents. Most importantly, all available data and information must be updated to enable rational and objective management of traffic and transport policy.

Characteristics of the mobility of people in the functional urban region and city center

According to the latest traffic count and analysis of the data obtained, it can be concluded that traffic in the City of Dubrovnik is heavily loaded throughout the day and that it is extremely high at all important urban intersections. Traffic load is higher during the summer months (11%). In road traffic the largest share has a personal car with 78.8%. During the development of the transport model of the Main Development Plan for the Functional Region of South Dalmatia a citizen survey was conducted and one of the questions was the most frequently used form of transportation. Most of the respondents (66%) uses cars as the most common form of transportation. According to the above data, car is the dominant means of transport used by citizens of the City of Dubrovnik and the Functional Region of Southern Dalmatia.

Urban structure

Dubrovnik is the most significant urban center in the county as well as the residence of local self-government. It includes 32 districts, and according to the national census of 2011. There were 42,615 inhabitants (53% of women and 47% of men). In 2016, the City of Dubrovnik numbered 43 951 inhabitants, which increased by about 3% compared to 2011. The population of the City of Dubrovnik accounts for 35% of the total population of Dubrovnik - Neretva County. According to the 2011 census, there are 122,568 inhabitants in the county. Since the number of inhabitants in the Dubrovnik - Neretva County area, according to the 2001 census, was 122,870, it is a slight decrease of the population by 0.25%.

Accessibility within the urban area

Data on a comprehensive travel time by public transport from Dubrovnik to other parts of the functional urban region were obtained during the study of accessibility for Dubrovnik Airport as part of the Landside Airports Accessibility (LairA) project. The average time of public transport from the City of Dubrovnik to the Dubrovnik Airport outside the season is 31 min. Motor vehicle traffic in the summer months is about 11% higher than in the other months of the year, it can be concluded that the average time of public transport trips in the season is higher than the previous 31 min.

Motor vehicle traffic

In the territory of the Dubrovnik - Neretva County in 2017 a total of 66,467 vehicles were registered, out of which 51,108 personal cars (82.91%). This results in a motorization rate of 2.39 inhabitants per personal car or 418 personal cars per 1,000 inhabitants. Most likely, there are differences between the number of cars registered and the actual number of cars in the Functional Urban Region and the core of the City of Dubrovnik because there are more rent-a-car companies that register their cars in other cities of Croatia due to lower taxes or similar discounts. According to the survey conducted, 50% of respondents in their household have two and more functional vehicles or personal cars. Also 76.93% of respondents participated or experienced traffic accidents with the car (either as a driver or as a passenger).

Road infrastructure and car related services

The road transport network in the City of Dubrovnik consists of state, county, local, city and non-aligned roads. State Road D8 - The Adriatic Highway (Adriatic Tourist Road) is the most important road connecting City of Dubrovnik with the rest of Croatia. Parking is regulated by public or private parking / garage space. The lack of parking spaces is gradually replaced by the construction of public parking lots / garages, mainly in the urban space of Dubrovnik. Public garages are located at 23 locations in the inner city area of Dubrovnik, with a total capacity of 5,650 vehicles, while four in the Mokošica area have a capacity of 1,100 vehicles. In addition to the public garage, the public parking lot consists of a parking space along the road (street parking) with a total of 2,289 parking spaces and open parking spaces with 1,610 parking spaces. The total balance of the parking offer that attracts or generates car trips is 11,384 parking spaces. Street parking spaces are actually part of about 70% of parking spaces in Dubrovnik, which make it difficult to navigate during the summer season, mainly due to improperly parked cars. Park - and - ride as a

car - sharing service is currently not available in Dubrovnik and Dubrovnik Neretva County. There are currently indications for the implementation of the pilot project of car sharing services.

Public transport

The role of public transport is important for the development of a sustainable urban transport sys- tem. Public transport in the City of Dubrovnik was organized with 11 city and 19 suburban bus lines. The total length of the city bus line is approximately 341 km. The most important point for the local bus network is Pile station, the starting point or the very end of most urban bus lines. The trend of public transport use in the City of Dubrovnik and in the functional urban region is growing, mainly due to the inadequate number of parking spaces and / or public garages, so transportation is much more convenient for passengers and tourists of the City of Dubrovnik. The number of passengers on city and suburban lines in the last three years is about 10 million passengers.

Bicycle traffic

In the area of Dubrovnik there is no organized cycle path or cycling strip. Currently in the area of Dubrovnik-Neretva County, the bicycle infrastructure includes only three recreational cycling routes in the Konavle municipality. Since the configuration of the terrain in Dubrovnik is not suitable for cycling, as mentioned above, it is necessary to propose a quality alternative to traditional bicycles. In this respect, the proposal should refer to the introduction of a system of public electric bicycles and bicycles with an electric motor. This could be a solution to overcome the differences in the configuration of the terrain and allow the use of bicycles on the main slopes.

Pedestrian traffic

As far as the pedestrian traffic infrastructure is concerned, apart from the Old Town and the King Zvonimir promenade, there are no adequate pedestrian corridors and zones, which further complicates pedestrian traffic, especially for people with reduced mobility. Inadequate pedestrian infra- structure is also reflected in the lack of sidewalks in some streets or where existing walkways (their widths) are not adequate for the normal running of pedestrian traffic. Configuration of the terrain in Dubrovnik significantly complicates walking in the city, due to the large altitude differences and the numerous stairs. This is one of the reasons why pedestrian safety is unsatisfactory and locals often substitute walking by using motorcycles or cars. However, pedestrian

infrastructure can be considered incomplete, so it is imperative to define a new pedestrian corridor that will satisfy the pedestrian safety requirements and be accessible to disabled people and reduced mobility. Traffic between the port of Gruž and Pila is one of Dubrovnik's biggest traffic problems. It is estimated that around 80% of cruise tourists decide unship to Dubrovnik to visit the Old Town. Since pedestrian connections are inadequate to overcome such distances (over 2 km with narrow sidewalks and significant altitude differences), most passengers choose buses.

Scenarios

Based on the data obtained and the analysis of the current state of the traffic system, different projections can be made, apropos set the scenarios for the development of the traffic system or the individual transport sector, and based on these projections, the priorities for achieving a functional and accessible transport system or part of a particular section will be determined.

Increasing unsustainable and conventional transport

Time period – 2030

Such a scenario is based only on conventional mode of transport and as such can not contribute to a higher level of sustainability and the overall better functioning of the functional urban region. In addition, the quality of living in such a region will be down, there will be an increase in energy consumption and no positive changes will occur in the habits of the local population. Such scenarios is by no means the correct way to achieve a positive change and the overall urban transport system of the City of Dubrovnik.

Slightly increase in alternative modes of transport

Such a scenario is based only on a slight shift in the use of alternative modes of transport and as such can not contribute to increasing the level of sustainability and the overall connection of the functional urban region. All the essential parameters for achieving a sustainable traffic system will be in stagnation or a slight decline and no visible positive changes in the habits of the local population will occur. Such scenarios are not entirely in order to achieve the overall urban transport system of the City of Dubrovnik.

Encouraging alternative modes of transportation and reduction of gas emissions

This scenario is based on the use of alternative modes of transportation (bus transportation, pedestrians and cycling). Measures implemented will contribute to a higher level of sustainability and a better interconnection of the functional urban region. In addition, the reduction of air and noise pollution will be a positive change in the habits of the local population. To achieve this, more investment in the required infrastructure will be required: from e-buses, e-bicycle fleet to pedestrian infrastructure. Reducing energy consumption related to transport in a functional urban region, reducing the number of car drivers in daily travel to work and overall changes will lead to a reduction in CO2 emissions associated with traffic. Scenarios based on increasing the use of alternative modes of transport are the right way to achieve positive changes and the overall sustainable transport system of the City of Dubrovnik.

Strategic Framework

To successfully integrate sustainable forms of traffic into the transport system, it is necessary to link horizontally and vertically all planned documents dealing with mobility issues. In the context of the design and implementation of this document, horizontal planning would mean cross-sectoral cooperation between administrative departments and other relevant institutions addressing mobility issues in the City of Dubrovnik, while vertical planning would indicate that the Urban Mobility Plan of Dubrovnik is in line with the appropriate strategies at the European Union level and at national and regional level. Below is a review and summary analysis of the relevant strategic document plan at European, national, regional and local level.

Action Plan for Urban Mobility - it aims to foster the urgent development of urban mobility plans as the starting point for improving the performance of European cities' transport systems Document "Urban Mobility Guidelines - Together Towards Competitive and Energy Efficient Urban Mobility" - as a measure states the need to develop and implement sustainable urban mobility plans and ensure their integration into the urban strategy of the wider area or other development strategy. The "White Book" of the European Union proposes guidelines for creating a competitive and energy-efficient transport system. The Transport Development Strategy of the Republic of Croatia introduces a number of measures to improve the traffic system. The Spatial Planning Plan of the City of Dubrovnik establishes the basic organization of the area, contains the conditions and guidelines for the area’s editing and protection, determines the use and purpose of the area with the proposed conditions and measures of their arrangement, and contains measures for the improvement and protection of natural, cultural and historical values. The General Urban Plan of

the City of Dubrovnik elaborates and defines more in de- tail the provisions for the layout of the space that as a liability arise from the plan of the wider area, as well as all the other elements of importance for the City

Local Sustainable Mobility Plan - plan provides suggestions of procedures and activities aimed at reorienting the city's transport system to sustainable forms of travel Traffic study - the aim of the study was to analyze the traffic situation and to identify key problems in the city traffic system

Active Sustainable Energy Development Plan - in planning by 2015. Energy Efficiency Program - elaborates energy efficiency measures in urban traffic, the application of which will result in the reduction of primary energy consumption and the reduction of carbon dioxide emissions and other harmful gases, ensuring the sustainability of the urban transport system

2.5.3 Objectives and Indicators

It is necessary to determine the goals or solutions for the growth and development of the transport sector, respectively achieving an efficient and sustainable transport system of the functional urban region. In order to better define the goals, an overview of the current state of mobility and improvement measures can be obtained only through quality indicators. Indicators identify and identify problems in the traffic system that will need to be removed to improve the quality of the traffic system.

Objectives

The objectives are aimed at optimizing the utilization of the available urban transport infrastructure and to rationalize and discourage travel by car when the use of a personal vehicle is not indispensable. The goals are: "Healthy City", accessibility of city areas and traffic efficiency. They will contribute to sustainable city development and better quality of life in a functional urban region.

Indicators

Indicators observe and identify problems in the traffic system. Mobility indicators are key to creating the concept of a sustainable traffic system with the ultimate goal of harmonious functioning of systems from different areas of a particular city, in order to increase the quality of life for citizens. Below you will find traffic system mobility indicators of functional urban region.

Road traffic safety - of the total number of accidents in the Dubrovnik-Neretva County, about 60% of all accidents are related to the area of Dubrovnik. The number of traffic accidents in Dubrovnik in 2017 is 476. The number of people killed in these accidents is 7.*Modal distribution (Mobility Survey)* - Surveying is the basis for traffic planning and provides insight into the current state of the traffic, as well as data indicating the necessary reconstructions, building new traffic directions, or other measures to improve existing and future traffic.

- *Impact of traffic on the environment* - According to Croatian Environmental and Na- ture Agency statistics from 2017 and 2018, air pollution in Dubrovnik was PM10 and NO2 particles. The higher PMC particle concentration of the allowed value was exceeded for 4 days, while the concentration of NO2 particles was exceeded 235 hours in relation to the allowed value.
- *Traffic load on the road network* - Traffic load of the road network in Dubrovnik in the peak hour (08.00 - 09.00) is more than 25,000 vehicles.
- *Dissatisfied users of public transport* - About 30% of respondents are not satisfied with the offer of public transport in the City of Dubrovnik.
- *Dissatisfaction with public transport accessibility* - about 65% of respondents believe that public transport stops are not properly linked to the pedestrian path.
- *Availability of information* - around 20% of the respondents would be more motivated to use public transport more frequently if there was more information available.
- *Raising awareness of the benefits of using public transport* - Approximately 70% of the respondents were not familiar with Integrated Passenger Transport (IPT).
- *The number of tourists who believe that public transport information is not at a satisfactory level* - about 50% of tourists are not even familiar with the existence of liner bus services, while only 7% of tourists are familiar with the timetable and ticket prices of the same fashion.
- *The lack of a car sharing system and the public bicycle system* - 68.7% of respondents were familiar with the concept of Public Bicycle System, while about 25% of respondents stated that they would use the Public Bicycle System if they existed in the city of Dubrovnik.
- *Heavy vehicles* - According to the earlier poll, 87.8% of respondents would support the introduction of cargo bikes in the old town instead of the existing motor vans.
- *Survey results* - According to the results obtained, 94% of respondents believe that the investment costs of road construction should be directed towards the benefit of pedestrian, bicycle and public transport.

2.5.4 Measures

The choice of measures is the process of determining mobility and transportation measures that are most appropriate and cost-effective to achieve the vision and goals of a sustainable urban mobility plan and to address the identified local problems. Only well-chosen measures will define the achievement of the goals. They always take "packs" to compile potential synergies. An individual measure has limited impact while a package of measures can take synergies and strengthen each other.

Area of activity

These measures are aimed at achieving the vision and goals of a sustainable transport system.

- Reduce driving speed to 30 km / h on some roads (around hospitals, schools, kindergartens, universities and other public institutions),
- Improving the visibility of pedestrians on pedestrian crossings by implementing legal regulations (compliance with the law),
- Promotion of sustainable mobility and healthy lifestyle through educational activities,
- Improve parking management rates,
- Move the parking lots in the suburbs and on the periphery of the city,
- Integrated public transport organization: implementation of transport customs union,
- Improving infrastructure sidewalks in accordance with European and national standards,
- Initiating ITS and prioritizing public transport,
- Initiating the decision to introduce parking payment for all conventional vehicles and release the parking payment for electric vehicles in the public space,
- Implementation of public bicycle system,
- Introduction of fleets of electric buses,
- Expand (real time) display on public transport stations,
- Encourage Mobility Application Development (Mobility as a Service - MasS)
- Installing a ticket-buying machine,
- Setting up of information panels on all stations of public transport
- Implementation of e-tickets (digitization),
- Implementation of the system of cargo bikes,
- Increasing the number of information system passenger channels,
- Smart parking,

- Establishing a coordination body for alternative forms of mobility,
- Park & Ride system,
- Encouraging crossing of a taxi fleet to hybrid / electric vehicles,
- Connecting sidewalks for completion pedestrian path,
- Gradually replacing existing public vehicles with electric vehicles,
- Implementation Shared space zone,
- Increase number of electric charging stations,
- Systematic counting of cyclists and motorcyclists,
- Implementation of city logistics hubs,
- Increasing number of smart streets,
- Monitoring of traffic data,
- Implementation of the car sharing system,
- A regular Mobility Survey.

Responsibilities, costs and sources of financing

Responsibilities, costs and sources of funding for some of the above measures are listed below.

- Reduce driving speed to 30 km / h on some roads (around hospitals, schools, kindergartens, universities and other public institutions)
    - Responsibility: City Administration Costs: 500,000 € (15,000 per kilometer)
    - Source of financing: Local budget, state subsidy

- Improving the visibility of pedestrians on pedestrian crossings by implementing legal regulations (compliance with the law)
    - Responsibility: Gradska uprava (planiranje, natječaj za građevinske radove) Costs:
    - Source of financing: Local budget, state subsidy
- Promotion of sustainable mobility and healthy lifestyle through educational activities Responsibility: City Administration (Marketing Campaign)
    - Costs: € 7,500 (300 € for brochures, € 700 for internet campaign, € 5000 for organizing workshops, € 1500 for posters)
    - Source of financing: Local budget, EU funds

- Improve parking management rates
    - Responsibility: City Administration
    - Costs: 200,000 €
    - Source of financing: Local budget
- Move the parking lots in the suburbs and on the periphery of the city
    - Responsibility: City Administration (Planning)
    - Costs: 30.000 €
    - Source of financing: Local budget, EU funds
- Integrated public transport organization: implementation of transport customs union Responsibility: City Administration, County, City and Municipal Administration, Public Transport Operators
- Improving infrastructure sidewalks in accordance with European and national standards
    - Responsibility: City Administration (Planning) Costs: 1.200.000 €
    - Source of financing: Local budget, state aid, EU funds
- Initiating ITS and prioritizing public transport
    - Responsibility: City Administration (planning, tender for construction works)
- Initiating the decision to introduce parking payment for all conventional vehicles and release the parking payment for electric vehicles in the public space
    - Responsibility: City Administration
- Implementation of public bicycle systems
    - Responsibility: City Administration, Private Infrastructure (Infrastructure and Bicycles)
    - Costs: 150.000 € (48 bicycles)
    - Source of financing: Local budget, state aid, EU funds
- Introduction of fleets of electric buses
    - Responsibility: City Administration (includes a directive in the next concession con- test), public transport operators (purchase of electric vehicles)
    - Costs: 3.500.000 €
    - Source of financing: Carriers
- Expand (real time) display on public transport stations
    - Responsibility: City Administration (planning, tender for construction works) Costs: 50.000 €

- Source of financing: Local budget, EU funds

- Encourage Mobility Application Development (Mobility as a Service - MasS)
  - Responsibility: City, county and state administration (encouraging partnership be- tween public transporters)
  - Costs: Depends on the type of integration
  - Source of financing: Local budget, public private partnerships
- Installing a ticket-buying machine
  - Responsibility: City Administration (Planning and Construction Contest) Costs: 30.000 €
  - Source of financing: Local budget
- Setting up of information panels on all stations of public transport
  - Responsibility: City Administration (Planning and Construction Contest) Costs: 6.000 €
  - Source of financing: Local budget
- Implementation of e-tickets (digitization)
  - Responsibility: Public transport carriers (implementation) Costs: 7,000 €
  - Source of financing: Local budget
- Implementation of the system of cargo bikes
  - Responsibility: City Administration (Directives and Framework), Private Operators (Infrastructure) Costs: 42.000 € (3.000 per bike)
  - Source of financing: Local budget, private funds, EU funds
- Increasing the number of information system passenger channels
  - Responsibility: City Administration (directives and framework), public carriers (implementation)
  - Costs:
  - Source of financing: Local budget, public carriers
- Smart parking
  - Responsibility: City Administration (directives)
  - Costs: 275.000 € (about 50 per parking place)
  - Source of financing: Local budget, EU funds
- Establishing a coordination body for alternative forms of mobility
  - Responsibility: City Administration (establishment and directive)

- Costs: 2.500 €
- Source of financing: Local budget

- Park & Ride system
  - Responsibility: City Administration (Directives), Carriers (Implementation)
  - Costs: 30.000 € (equipment of created locations is required)
  - Source of financing: Local budget, stakeholders
- Encouraging crossing of a taxi fleet to hybrid / electric vehicles
  - Responsibility: Private carriers
  - Costs: 800.000 € (40.000 per vehicle)
  - Source of financing: State subsidy, carriers, EU funds
- Connecting sidewalks for completion pedestrian path
  - Responsibility: City Administration (Planning and Construction Contest)
  - Costs: € 1,260,000 (60,000 per km)
  - Source of financing: Local budget, state subsidy
- Gradually replacing existing public vehicles with electric vehicles
  - Responsibility: Public transport operators
  - Expenses: 12.000.000 € (40.000 per vehicle)
  - Source of financing: Local budget, state subsidy, EU funds
- Implementation Shared space zone
  - Responsibility: City Administration (planning and tendering for construction works)
  - Costs:
  - Source of financing: Local budget, EU funds
- Increase number of electric charging stations
  - Responsibility: City Administration (Directives), Private Operators (Infrastructure)
  - Costs: € 150,000 (15,000 per charge station)
  - Source of funding: Local Budget, Private Operators
- Systematic counting of cyclists and motorcyclists
  - Responsibility: City Administration (directives), state administration (implementation)
  - Costs: 42.500 € (8.500 per counter)
  - Source of financing: State budget

- Implementation of city logistics hubs
    - Responsibility: City Administration (planning and tendering for construction works)
    - Costs: 760.000 € (for 750 m2 of storage space)
    - Source of financing: Local budget
- Increasing number of smart streets
    - Responsibility: City Administration (planning and tendering for construction works)
    - Costs: 400,000 € (200,000 for one street)
    - Source of funding: Local Budget, Private Operators
- Monitoring of traffic data
    - Responsibility: City administration (directives, framework and infrastructure) Costs: 300,000 € (for the whole system over a period of seven years)
    - Source of financing: Local budget, state subsidies
- Implementation of the car sharing system
    - Responsibility: City Administration (Directives and Infrastructure), Private Re-sellers (Implementation)
    - Costs: 440.000 € (220.000 per system)
    - Source of financing: Local Budget, Private Brokers
- A regular Mobility Survey
    - Odgovornost: Responsibility: City Administration
    - Costs: 56.000 € (8,000 per year) during the implementation of quantified measures F
    - Source of financing: Local Budget

2.6 FUA KOPER-IZOLA-PIRAN CONURBATION: SUSTAINABLE URBAN MOBILITY PLAN (SUMP) DRAFT

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Date:	17/12/2018

One of the main objective of CHESTNUT project is to learn and start to prepare Sustainable Urban Mobility Plan (SUMP) on the level of Functional Urban Area (FUA). FUAs in Slovenia have been identified through the process of renewal of Slovenian Spatial Development Strategy 2050 in 2016, according to ESPON and OECD methodological frames of reference. Polycentric model of regional development represents basis for spatial and strategic planning in Slovenia since 1973, while FUAs are presented as next operational, joint governmental bodies. FUAs are not yet formally defined in Slovenian legislation, and therefor lack capacity in decision making process. With development of future focuses on strategic and spatial development of space, enhanced capacity of communication and planning in different fields on FUA level is necessary. Development of FUA SUMP includes different types of participatory approaches. We organized two thematic workshops and used questionnaires among stakeholders and interested public during European Mobility Week. The working group included staff in Regional Development Center Koper and external experts who participated in processes of municipal SUMP elaboration. Interdisciplinary team of traffic engineers, urbanists, economists, geographers, company representatives, among others participated in process of SUMP elaboration.

2.6.1 The FUA SUMP overarching goals

- Healthy region;
- Environmentally sane, spatially attractive region;
- Cooperative region.

What FUA needs in mobility is a new culture, where more passengers adopt higher share of active modes of transport. More space is dedicated to pedestrians and cyclists, while public transportation infrastructure and services are improved and expanded. Multimodal choices offer convenient, safe, and efficient movement in space, while new types of circular and sharing economies

are accessible to population and visitors. Cooperation between municipalities of FUA enhances commuter transport limitless to administrative borders, and optimizes traffic needs through land use measures as well.

FUA of Koper-Izola-Piran conurbation consists from five municipalities, namely Ankaran, Hrpelje-Kozina, Izola, Koper, and Piran. The dynamics of population change throughout the FUA, the area as whole exhibits a constant population growth during the whole period between 1960 and 2017. FUA currently accommodates 93.000 inhabitants. Trend of population ageing is increasing; hence, emphasis on planning for people with reduced mobility is necessary. To reach objectives related to improved quality of life and reduced negative externalities of traffic, enhanced and coordinated policy document beyond the border of a single administrative unit is presented. Mobility pattern in present form represents a threat to good quality of living in urban and Mediterranean environments, for people and for nature. Extensive land use for transportation infrastructure, and car-oriented environment, currently make it questionable to reach some objectives of Sustainable Development Goals 2030 on local level, especially those related to health, air quality, traffic safety, and energy consumption.

According to the methodological framework of CHESTNUT project partners, a detailed analysis of status quo is conducted. The analysis serves as one of the basic elements to recognize challenges, trends, and the process of scenarios building. Development scenarios are modelled with the assistance of EU Urban Roadmaps tool, and help us understand consequences of mobility pattern changes. Status quo analysis also represents a step to identify key pros and cons, potentials and deficits, which a SUMP will deal with.

Missing mobility data on FUA level are passenger km/day, minutes/trip (regional data available), kilometers/trip (national data available), and energy consumption (municipalities data missing). Municipalities had a chance to acquire missing data, but they missed the opportunity in the process of creating SUMPs. Missing data are a challenge for further research. Traffic counts are available on national and some urban roads, while Slovenian Infrastructure Agency is responsible for the counters and data presentation. There are two ways of how to collect missing traffic data, especially in urban areas and municipal roads; human resources who count traffic flows cover selected intersections, or with automatic cameras placed on selected sections. Alike cameras and IT programs for report making are already available on the market.

If we look at the dynamics of changes in population throughout the FUA, we can see that the whole area exhibits a constant population growth during the whole period between 1960 and 2017. The population grew faster during the 1960–1990 period and from 2000 to 2010; however, the growth was lower in the 1990–2000 period and even lower in the period after 2010. Demographic projections show that the number of population will continue to rise (currently around 0.5 % per year). This region is one of only three regions in Slovenia (out of 12 in total) which predict a population increase. The age structure will change significantly in favor of elderly inhabitants. Current ageing trends will continue and it is predicted that the proportion of old people will increase from 18 % in 2014 to 28 % by 2050, hence to around 23 % by 2030.

The area size is 579 km^2. Density of population is 158 inhabitants/km^2 and exceeds national average by 55 inhabitants per km^2. Most densely populated areas are municipalities of Izola, Piran, and Koper. Distribution of population tends to have higher density in close proximities of urban centers, and close to major road network in all five municipalities. In these centers, there are different communal services, banks, post offices, educational institutions, health care centers, shopping centers, jurisdiction services, industrial zones. Hinterland villages are dispersedly populated with lower number of services offered, usually a post office, agricultural cooperative or a smaller market, and somewhere a bar or a restaurant.

FUA employs approximately 36.400 people, while the core city of Koper employs 24.000. Nine identified biggest companies employ 7000 working population, and are mostly located in the conurbation of Koper-Izola-Piran, which are predominantly places with highest density of population. Each of the urban cores accommodate industrial and business parks, and shopping centers, while in Koper these areas are the biggest in size. Traffic currents by employers, leisure and other urban activities, are responsible for energy consumption (39 % of total use) and air pollution (30 % of total CO_2 emissions).

Average net monthly income of households on national level in 2017 is 1.800 €, meaning 21.600 € yearly per household. Average yearly expenses for mobility of a household is 3500 €, making Slovenia the country where household's expenditure on personal mobility is the highest in Europe.

The number of tourist arrivals in FUA is enormous, especially regarding size of the area. Just below 10 % of total tourist arrivals in Slovenia, spend a night in FUA. In 2016, 724.000 overnight

stays were recorded, while 66 % of them were in the municipality of Piran. The number of tourist arrivals and overnight stays is increasing since 2008.

Most of the bigger employers are located in urban centers of Koper, Izola, Piran, while Izola general hospital is located on the highest point between Koper and Izola municipality. Industrial and service companies are mostly located in Koper, while the biggest number of tourism sector working places are mostly located in Piran.

Cargo transportation and logistics are considered strategic generators of regional development, and together with tourism sector, they complement the strategic smart specialization of the region, as FUA being part of the region. Negative effects of traffic and tourism externalities influence the quality of life of local population, thereby integrated and participatory approach with stakeholders and population is tackled, while inhabitants do not really pay attention to exposing their thoughts on mobility topics.

Freight shipping represents an important part of maritime transport. The entire port has the status of a free port. The Port of Koper is the only Slovenian international cargo port under the management of a joint-stock company of the same name. Due to its geographical location, it provides the nearest connection of Central and Eastern Europe with the Mediterranean. The key commodity flows come to the port through the Strait of Gibraltar and Suez Canal. In the last two decades, the Port of Koper has developed into the most modern port in the northern Adriatic; it is one of the most important vehicles and generators of economic activity in the region. Since 2005, passenger traffic is also present in the port. Future development of the port is based on capacity of built second rail between Divača and Koper.

Since the beginning of the industrial revolution when the role of transport infrastructure became of strategic importance, the Coastal-Karst Region has changed at least five capital cities and their specific transport policies (Vienna, Rome, Belgrade, Ljubljana and Brussels). Each of these had its own vision and objectives that had a special impact on transport infrastructure in the area (construction of railways during the Austro-Hungarian Empire, road construction during the Kingdom of Italy, construction of the Port of Koper in Yugoslavia in 1957 and Divača-Koper motorway construction after the independence of Slovenia. Recently, there have been strong aspirations of connecting with European transport corridors TEN-T (the second track of the Divača-Koper railway line).

Along with some already implemented and planned projects, port activities have been followed by the development of other transport infrastructure in the interior of Slovenia, which is part of two European transport corridors, i.e. the V. or the Mediterranean Corridor and the Baltic-Adriatic Corridor. Therefore, due to its geographical location, the Coastal-Karst Region is exposed to strong traffic flows. The backbone of transport infrastructure consists of the road network, railway network, the commercial Port of Koper and Portorož Airport at Sečovlje.

In recent years, mainly road transport infrastructure has developed within the European corridors – construction of transit motorways and expressways with a purpose of taking up freight and passengers in transit corridor or tourist traffic in the Croatian and Slovenian Istria. Resolution on the National Programme for the Development of Transport and Transport Infrastructure in the Republic of Slovenia until 2030 foresees an approximately 60 % increase in the volume of goods traffic and an increase of around 30% in passenger traffic, which both will affect the increase in road traffic. The Transport Development Strategy in the Republic of Slovenia, which is part of the Resolution, provides for the construction of Koper bypass and mitigation of the impacts of motorized transport on the environment, construction of the Jagodje-Lucija expressway and effective connection of the Koper-Izola-Piran conurbation to the motorway system. Motorization of the population seems to be approaching the peak and will likely stabilize at a slightly lower level in the future. Parking problems in urban centers: Stationary traffic is generally not problematic and the problem with parking only occurs in urban centers. Even in the off-season period, the parking lots are fully occupied, while in summer the need for parking spaces increases so much that it becomes one of the main obstacles to the accessibility of particular places and areas.

As elsewhere in Slovenia, most bicycle traffic in the Coastal-Karst Region takes place on roads intended for motor vehicles, while the urban centers of Koper, Izola and Piran – which is normal for cities – have some lanes designed specifically for cyclists. Given that the coastal area has a strong tourist orientation and considering the structure of visitors and, in addition, that recreational cycling, running as well as the general and tourist movement are on the rise, the demand for facilities for such activities is increasing. In the area of Slovenian Istria there runs a regulated cycle path (mainly recreational), following the route of an abandoned narrow-gauge railway called *Porečanka* (Parenzana), which is becoming increasingly popular. The cycling track along

the entire route of the abandoned narrow-gauge railway Trieste–Poreč (Parenzana) is being improved year by year. Counters of cycling traffic on two sights along the route show increasing traffic flows during summer months, while winter values drop by seven to eight times.

Public passenger transport has a dual role in the region. Its function in sparsely populated, and less developed areas is to facilitate travel to work, schools and supply and service activities in order to preserve the population density and provide greater development opportunities. In developed and dynamic areas (coastal zone), the role of public passenger transport is to relieve road traffic, and serve as an alternative to individual motorized transport. In terms of infrastructure, a new central bus station has been planned at Koper. If united with the railway station in the immediate vicinity of the city harbor, it would represent an ideal passenger intermodal center for the transfer of passengers to various public transport systems. Similarly, central bus stations should be built at Ankaran, Izola, Piran and Portorož with at least the basic facilities for passengers where they could also get the basic information on schedules, lines, etc.

In the region, there is a public airport for international air traffic at Portorož, which is an integral part of the public airport system of the Republic of Slovenia. The airport is intended for passenger transport and sport, tourist and business flights. Each year between 20.000 and 25.000 passengers visit the airport.

The airport is mostly used by single-engine and two-engine, piston engine and turboprop general aviation airplanes with a capacity of ten seats and occasionally a few larger ones.

Modal split of inhabitants is currently car-oriented. Traffic infrastructure and services do not offer the best alternatives to personal traffic, something that is being addressed through adopted municipal SUMPs. Three municipalities, namely Koper, Izola, and Piran have started to implement measures for integrated transportation planning in 2017. Mobility pattern in present form represents a threat to good quality of living in urban and Mediterranean environments, for people and for nature. Extensive land use for transportation infrastructure, and car-oriented environment, currently make it questionable to reach some objectives of Sustainable Development Goals 2030 on local level, especially those related to health, air quality, traffic safety, and energy consumption. Modal split of FUA is derived from a national survey of mobility in 2016, where data was collected on a regional scale. FUA data are extracted from regional data of Coastal-Karst region, because municipalities which do not belong to FUA (Divača, Sežana, Komen), do not significantly change regional mobility status quo. Data for all FUA municipalities (including core city)

are therefore the same: 0.4 % commute by railway, 2,4 % by bus, 77,2 % by car (from those 10 % as co-drivers), 2,4 % by bicycle, and 17,5 % by foot as pedestrians. Due to dispersedly populated areas in Slovenia, we could assess that share of commuters by car is higher in smaller urban settlements; densely populated urban centers make more trips by foot, bicycle or public transport. Only a few SUMPs on municipal level in Slovenia have used the methodology to acquire latest modal share of their inhabitants.

Average door-to-door trip lasts 22.9 minutes as calculated from the research. Data is valid for all trip modes and any given purpose (work, education, business, shopping, leisure,…). Most of the trips are done for shopping, work, and private purposes. Approximately 39 % of energy consumption on national level and in FUA is generated by transport sector. Calculations show that personal cars use 65 % of energy within transport sector, while public transport 8 %. 13% is used by freight transportation and 14 % by other types of transport. Total carbon dioxide emissions from traffic are calculated based on national data and divided by number of population. In FUA, it is estimated that 880.000 tons of CO_2 is released every year. Approximately 30 % of them are generated by transportation and warehousing sector.

The purpose of adapted Integrated Transport Strategies on local level is to contribute to the development of urban mobility and establishment of sustainable transport system by which the municipalities in general aim at:

- Improving the attractiveness and quality of the living space in urban areas;
- Ensuring the availability of jobs and services for all;
- Improving the connections between hinterland and urban areas;
- Improving the utilization of transport infrastructure;
- Reduction of mobility costs;
- Sustainable tourism development;
- Reduction of greenhouse gas emissions and energy consumption;
- Increased traffic safety;
- Regional and local economic development and attracting investments.

In general, the purpose of the Integrated Transport Strategy (SUMP) is to contribute to the development of urban mobility and helping in the establishment of a sustainable transport system.

Other overarching documents related to spatial and mobility development, implement guidelines to stimulate use of public transport means and develop new, multimodal platforms for commuting. Slovenian Strategy of Spatial Development is a document where public transport is mentioned as an easy and fast accessible mode of transport. Transport Development Strategy of the Republic of Slovenia until 2030 identifies that there has been so little knowledge and financial resources invested into developing more sustainable means of transport, that it now became one of the priorities for the Ministry of Infrastructure. Resolution on the National Programme for the Development of Transport in the Republic of Slovenia until 2030 proposes to increase competitiveness of public transport as a mode for work and school commuters. Municipalities of Koper, Izola and Piran created Sustainable Urban Mobility Plans to detect and address local challenges of how to rise share of commuters by public transport, bicycle, and foot. Regional Development Plan 2014-2020 for Coastal-Karst development region proposes to develop integrated regional system of rising public awareness and supporting practical solutions of sustainable mobility through a regional mobility center. More actions to integrate SUMPs into a regional scale are necessary, and a more strategically, holistic approach to transport planning in general.

Other national legislation that relates to mobility planning is:

- The concept of the national bicycle network in the Republic of Slovenia.
- Resolution on the Transport Policy of the Republic of Slovenia (intermodality - time for synergy) 2006;
- Spatial Planning Act 2007;
- Road Transport Act 2007;
- Regulation on a mode of implementation of economic public service on passenger public line transport in inner road transport and about the concession of this public service 2009;
- Concept of national bicycle network in the Republic of Slovenia (Andrejčič Mušič 2005).

Personal cars have an important role in mobility of Slovenian people – and the same can apply to the FUA. Household expenditure on personal mobility is the highest in Europe. To decrease pollution, energy consumption, and personal expenditure on mobility, personal road transportation has to be discouraged, while cycling and walking represent fundamental pillars of modern mobility.

16 new measures are proposed, which are seed of CHESTNUT project work. They mostly refer to existing municipal documents on transportation, while at the same time address mobility challenges on national level. Further capacity and enhancement of both administrative bodies will be necessary in the future, to really live the accepted and adopted documents.

2.7 MUNICIPIULUI ODORHEIU: SECUIESC PLAN DE MOBILITATE URBANĂ DURABILĂ PENTRU ZONA URBANĂ FUNCȚIONALĂ

Drafted by:	FIP Consulting
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Date:	11/01/2019

This document is part of the international program -Interreg CHESTNUT (Comprehensive Elaboration of Strategic plans for sustainable Urban Transport). Within this project are the Municipality of Odorheiu Secuiesc and 11 other municipalities. The priority of this project is to create a more connected and sustainable energy Danube region. The specific objective of the program is to support a safe and environmentally friendly transport system maintaining a balance between urban and rural areas.

In order to create a sustainable and well-connected urban area, it is necessary to develop a Sustainable Urban Mobility Plan of the Urban Functional Zone (referred as the "Plan"), addressing the societal and business problems in the area of influence. Also has to propose objectives and projects to address these issues in an environmentally responsible and sustainable manner.

Under the auspices of sustainable development, FUA Odorheiu Secuiesc could become an important example of good practice at national level. FUA Odorheiu Secuiesc will become an accessible area for more people and businesses, using innovative technology and environmentally friendly transport methods.

The general objective proposed for FUA Odorheiu Secuiesc is transposed by the concept of "convective mobility". Which means to create and consolidate links that will increase the overall accessibility and facilitate the raising of the living standards and the well-being of the population in the impact area of the interventions proposed in the Plan.

2.7.1 Status quo analysis

At present, Odorheiu Secuiesc municipality has a PMUD made in 2016 and updated in 2018. The data available at the city level are complete, but at the FUA level - because of the novelty of such

approach - the available data is lacking in information. Based on the implementation of the Plan, a substantial addition of the data follows.

The required data at the FUA level have been identified as referring to traffic data, modal share, mobility of persons and goods, or data on commuting.

In order to obtain this information and to carry out a diagnostic analysis covering with sufficient and comparable data for all FUA localities, financial and human resources were mobilized. Through them, traffic data was collected within the project, questionnaires were made to synthesize the current state of mobility at the FUA level.

Based on the analysis, existing socio-economic data, data to be taken into account in the collection steps, as well as result indicators, which are the results of the SUMP (output data), have been identified.

The modal split for Odorheiu Secuiesc is: 13.5% public transport, 35.2% car, 10.2% bicycle and 39.6% walking.

Modal split for the whole FUA: 24% public transport, 62% car, 5% bicycle and 9% walking.

The municipality of Odorheiu Secuiesc is included in the section of the urban settlements of the second district in accordance with the PATN Section IV (Law 351/2001) and recorded 34257 inhabitants in 2011 (according to RPL 2011). The number of population has fallen more than 14% between 1992-2011. This negative dynamics improved slightly between the census measured intervals: 1992-2002 down 7.53% and 7.28 between 2002-2011.

The total distance travelled by cars in one year is 93,337,035 cars * kilometers, and 98% of this is the distance achieved in the main urban center. The average speed for cars at peak hours is 43 km / h and in the main urban center is 23.7 km / h.

The average distance covered by cars at peak hour is 6.5 km and in the main city center is 4.3 km. At peak hour, there are approximately 6,254 passenger car trips on the main city street network, of which 4% is transit traffic and 7,663 trips at FUA level.

The area of influence of the municipality is reflected in the localities of Brădeşti and Satu Mare, where the population density is above the average recorded at the level of the Functional Urban Zone. This may be due to the fact that Odorheiu Secuiesc is an important polarizer within the

area. The urban expansion process reflects on nearby localities, turning them into dormitory localities. Within the studied territory, there are areas with high density that generate high pressure on the transport infrastructure.

At the level of other FUA localities, the population is generally located along the main street or streets (Satu Mare, Feliceni, Tribod), in individual rural dwellings.

In 2017, a total of 861 commuters were registered at the FUA level, out of which 432 travels for workplace (located in Odorheiu Secuiesc). The highest number of commuters is found in Şimoneşti locality which has a very low employment density (0.184 jobs per 1000 inhabitants). In Mărtinis, is registered the lowest number of employed commuters (11 commuters), although the density of jobs is 0.178 / 1000 inhabitants. The rest of the localities have a number of commuters ranging from 12 to 70. Although Odorheiu Secuiesc is not the only polarizer at county level, the daily movements of at least 900 commuters have more effects on urban mobility and environment.

FUA Odorheiu Secuiesc is located along several routes of internal transport, giving all the attributes of an important road transport hub. The public transport system at the FUA level is provided by the county public transport service providers, who own licenses for routes that directly link the localities of FUA or link them to other localities at the county or national level. It can be seen that the superior daily frequency values are between Odorheiu Secuiesc and the polarized localities of FUA.

For Odorheiu Secuiesc in 2014, the motor rate was 360 cars per 1000 inhabitants.

The street network is quasi-irregular, being a combination of radial roads that converge towards a historic center whose street network consists of narrow and irregular roads. The peripheral neighborhood network, developed in recent years, is approximately orthogonal (network). Old areas, developed on the hills, are "irrigated" by an irregular street network. At the FUA level, the street network is predominantly linear.

According to city statistics, the areas with the highest risk of road accidents are the Bethlen Gabor and Beclean streets, according to studies conducted for the SUMP document. At the level of rural localities in FUA, incidents in traffic are rarely encountered.

The technical condition of the FUA Odorheiu Secuiesc road network is largely in an inappropriate state, which negatively affects the mobility of the population. Approximately 35% of the arteries

located in the city's core network are in a medium, bad or very bad state, highlighting the crossing routes used by freight vehicles as well as peripheral areas.

The market share and attractiveness of urban public transport are affected by the poor viability of the streets used by buses and minibuses.

Improving the technical viability of streets is a major objective for improving urban mobility of passengers, goods and non-motorized traffic of pedestrians and cyclists.

In rural areas of FUA, the situation is much worse. In no place the existing pedestrian infrastructure meets a minimum of technical conditions (width, quality of the surface), and overwhelmingly there are no sidewalks, which makes most pedestrian walk on the road, increasing the risk of accidents and this encourages the use of the car for daily trips.

Paid parking is available between 8:00 and 17:00, allowing residents to park for free at night. At present, public parking in Odorheiu Secuiesc can be used by any person who owns a vehicle, regardless of the place of origin, but with a parking charge and compliance. Parking spaces are classified according to their area (areas A and B).

At the level of the other FUA localities, there are no parking spaces on the public spaces. This is due to the demand for such spaces that is quite low (in the absence of attractions for car owners). In the few places that attract this category of population from the rural localities of FUA, the stationing is directly on the roadside.

Public transport available at FUA is by bus. The network feature is radial, focusing on the FUA's main streets. There are no central / sub-central transfer points for the bus. In the city center the bus line connects to the train station, but there is no infrastructure dedicated to this purpose. There is no priority for public road transport within the FUA.

The use of public transport is decreasing, and this phenomenon is due to inadequate public transport infrastructure, inadequate rolling stock, the frequency of buses is too low; areas not covered by public transport; means of transport are inadequate for various reasons, stations are too far apart, unattractive public transport, lack of facilities for people with reduced mobility and municipalities that do not benefit from local public transport in FUA.

In general, cities with a size (length / width) of about 5 km are favorable for cities that can be walked on. This is because the reduced size allows the city to cross in less than an hour or 15

cycling. Odorheiu Secuiesc is 6 km east-west and 4 km north-south. However, the most important facilities and the most densely populated areas inhabited in a perimeter of 3 x 3.5 km.

The existing infrastructure for cycling is about 5 km long, but there is no separate bicycle path and there are no separate traffic lights for bicycles. Existing bike paths and tracks are in a very poor condition: the markings are almost erased and the cars are parked irregularly over them.

There is no local bicycle legislative framework. The bicycle parking infrastructure is weak in the city center and nonexistent in the other municipalities.

There is no bike sharing scheme available in the city / FUA.

2.7.2 Development Scenarios

The scenarios developed for the Sustainable Urban Mobility Plan for the Functional Urban Zone of Odorheiu Secuiesc concern the year 2030

Scenario 1 (Business-as-usual): will focus on streamlining motorized transport and increasing traffic flow, as well as facilitating freight transport at regional level.

Scenario 2: Fostering "active" transport modes (walking and cycling).In accordance with this scenario, in 2030 a FUA Odorheiu Secuiesc regular resident travels on a bicycle or on a daily basis with public transport over longer distances and seldom with your personal car.

Scenario 3: The EU will prohibit or restrict mass ownership of personal cars by 2045

This scenario implies that the development of urban transport in the FUA will be based on ecological energy sources.

In order to proper evaluate the envisioned scenarios, the European, national and regional planning documents were consulted.

2.7.3 Overarching goals

For the Sustainable Urban Mobility Plan for the Functional Urban Zone of Odorheiu Secuiesc, 4 overarching goals have been established:

OG1.INTEGRATED: Integrate all transport systems to streamline daily journeys

Making available to all citizens transport options that allow them to choose the most appropriate means to travel to key destinations and services. This includes both connectivity, which refers to

the ability to travel between points and accessibility, which ensures that as best as possible, people are not deprived of travel opportunities due to deficiencies (eg a certain physical state).

The main priority within this objective is increasing the efficiency of public transport.

Public transport can answer to the need for travel between rural areas and the city center when either the person who has to travel does not own a car (perhaps for financial reasons), when walking or cycling involves a considerable physical effort or does not offer time savings for them. Integrated public transport with other modes of transport can lead to a general increase in accessibility within the FUA, which will provide the necessary synergy to increase the prosperity of the inhabitants.

Targets:

1. Increase the modal share for public transport from 24% in 2017 to 38% in 2025 and 42% in 2030

2. Increase the range of public transport accessibility in FUA from 40% in 2018 to 55% by 2025

OG2.CONNECTED & ACCESIBLE-Creating an attractive and affordable transport system supporting the concept of "Walk & Connect

The main priority within this objective is to increase connectivity for all alternative means of transport.

Targets:

1. Increase travel speed for non-motorized traffic from an average of 40 minutes / travel in 2018 to an average of 25 minutes in 2025
2. Increase the modal share of bicycle and pedestrian mobility from 14% in 2017 to 25% in 2025

OG3.SUSTAIN-Sustainable environment by reducing pollutant emissions, reducing greenhouse gases

The main priority within this objective is to reduce traffic congestion by reducing travel by car.

Targets:

1. Decrease of traffic values by 40% on the main routes linking localities to 6. Reduction of GHG emissions from transport from 47% in 2017 to 20% in 2030

OG4.PROSPER- Prosperous development through safer environment at FUA level

Targets:

1. Reducing the number of accidents involving pedestrians from 22% in 2017 to 18% in 2025 and 6% in 2030
2. Reducing the number of accidents involving cyclists from 45% in 2017 to 25% in 2025 and 15% in 2030
3. Increase the percentage of quality public spaces from 6% in 2017 to 12% in 2025 and to 24% in 2030

2.7.4 Fields of action

OG1.INTEGRATED: Integrate all transport systems to streamline daily journeys

To achieve the 42% modal share target for public transport by 2030, it is necessary to implement concrete measures to support this major change in the behavioral behavior of the FUA population.

Proposed measures:

a. Transforming bus stations to make it more attractive for passengers.
b. E-ticketing system.
c. Reducing travel times for public transport
d. Public campaigns to support bus travel
e. Attractive travel costs for all users

In order to achieve the target of increasing the surface served by public transport in the FUA from 40% in 2018 to 55% by 2025, the following measures were proposed:

a. Completion of public transport routes to cover all areas of the FUA
b. Completing the fleet of public transport vehicles with electric buses or hydrogen fuel
c. Installation of bus stations to serve the entire FUA population
d. Fast charging for buses
e. Implementation of the park & ride concept
f. Modern streets to make public transport more efficient

OG2.CONNECTED & ACCESIBLE-Creating an attractive and affordable transport system supporting the concept of "Walk & Connect

To increase the travel speed for non-motorized traffic from an average of 40 minutes / travel in 2018 to an average of 25 minutes / trip in 2025, the following measures were proposed:

a. Improving pavement widths
b. Improvement and implementation of new facilities for cyclists (racks)
c. Introducing a bike-sharing program

To increase the modal share of bicycle and pedestrian mobility from 14% in 2017 to 25% in 2025, the following measures were proposed:

a. Increase the total length of bicycle infrastructure
b. Increase the total length of pedestrian infrastructure
c. Creating attractive pedestrian paths for people
d. Campaigns to promote soft mobility
e. Increase the quality of pedestrian infrastructure by 30% by 2025 at the FUA level

OG3.SUSTAIN-Sustainable environment by reducing pollutant emissions, reducing greenhouse gases

In order to lower traffic values by 40% on the main routes connecting FUA localities until 2030, the following measures were proposed:

a. Increase in the number of centralized control intersections
b. Discouraging the use of personal vehicles for daily journeys
c. Introduction of paid parking for short-term stops
d. Restriction of motorized traffic on certain streets in the center of Odorheiu Secuiesc

To reduce GHG emissions from transport from 47% in 2017 to 20% in 2030, the following measures are proposed:

a. Promoting electric vehicles
b. Making green corridors
c. Introducing the pollution tax for cars

OG4.PROSPER- Prosperous development through safer environment at FUA level

To reduce the number of accidents involving pedestrians from 22% in 2017 to 18% in 2025 and 6% in 2030, the following measures were proposed:

a. Carrying out travel safety programs
b. A "safe street" approach to designing pedestrian areas
c. Increase the number of pedestrian areas

To reduce the number of accidents involving cyclists from 45% in 2017 to 25% in 2025 and 15% in 2030 the following measures are proposed:

a. Creating travel safety programs
b. Safe street approach to bicycle track design
c. Implementation of shared space zones

To increase the percentage of quality public spaces from 6% in 2017 to 12% in 2025 and to 24% in 2030, the following measures were proposed:

a. Creating new public spaces
b. Interconnecting pedestrian infrastructure with green spaces
c. Creation of touristic routes in Odorheiu Secuiesc and FUA localities

2.7.5 Responsibilities, costs and funding sources

The responsibilities are split in two sections: implementation the measures and operating the results of the projects.

The main stakeholders responsible with the implementation are the local authorities or different organizations that own the infrastructure (such as road administrations, local city hall, the public transport company etc.) In some cases the responsibilities in order to operate belong to other parts than those who's implemented the measures.

The costs were also split in two sections: costs for implementing the measures and costs for the operation of their result. The entire package of measures that have to be implemented is estimated on costing 41,024,000 euro by 2030, on 2018 prices.

The main funding sources that were identified are referring to the local budget of the local authorities that are part of the FUA, the county budget, European funds (ERDF program) and the budget of the other responsible bodies. State subsidies were also considered.

2.8 The Municipal District Prague 9: Plán Udržitelné Městské Mobility (SUMP)

Drafted by:	
Authors:	Mgr. Josef Mareš RNDr. Helena Kvačková
Date:	03/12/2018

The Sustainable urban mobility plan of Prague 9 (SUMP) has been elaborated between October 2017 and November 2018 as a part of CHESTNUT Project. The plan has been elaborated by local experts in close cooperation with experts from Vienna University of Technology, who provided guidance and methodology for SUMP drafting.
On the following pages, we summarize the most important features of our SUMP.

2.8.1 Status Quo Analysis

The Status quo analysis pointed out following important findings:

- Municipal District of Prague 9 is polycentric municipal district at northeastern part of The City of Prague with more than 52 000 inhabitants, situated in diverse terrain and influenced by huge industrial brownfields undergoing redevelopment. Beside densely populated industrial-era residential neighborhoods of western Vysočany, there are socialist mid-to high rise housing estates in the north (Střížkov and Prosek), transforming brownfield areas to the east and scattered lower-density residential neighborhoods to the south.
- Prague shows significant importance of public transit, especially for trips within the city itself. Almost half of trips undertaken on an average weekday within the city are served by public transit system. Another 31 % of trips are done on foot. Cars serve about 20 % of trips and biking only about 0.5 % of trips.
    - Public transit plays a crucial role in fulfilling needs of commuters in Prague as well as in Municipal district Prague 9. Public transit has a great importance especially in parts of Prague 9 located along metro lines and for connection of Prague 9 with central parts of Prague, which is well-served by metro.

- Car traffic is significant esp. at lower density areas and areas with worsened accessibility of rapid transit systems (metro, Tram). It also plays important role in connection of Prague 9 to suburban areas.
- Densely populated parts of Prague 9 basically show high walkability (e.g. by location of services within walking distance of housing for dozens of thousands of inhabitants) and trips done on foot therefore form a significant share on modal split.
- So far, there is very small importance of biking for daily commuting, esp. as a result of steep terrain around core areas of Prague 9 and incomplete biking infrastructure. We can expect that e-biking can boost share of biking on modal split, however issues such as safe storage of e-bikes and safety of bikers and other users of biking and road infrastructure must be dealt with to allow it.

- Prague 9 has a grid-like road network. The main network consists of fragments of expressways (radial Liberecká; circular Kbelská) and radial (Českobrodská, Poděbraská, Kolbenova, Prosecká) and circular (Vysočanská, Freyova, Spojovací) arterial roads. Road traffic is negatively influenced by missing parts of expressway system including (inner) City Ring road, Prague outer Ring road and radial Vysočanská expressway. Therefore, arterial and collector roads of Prague 9 are burdened by through traffic.
- The situation of parking in Prague 9 is critical at pre 1990s residential high-density districts (Staré Vysočany, Střížkov, Prosek). Missing residential zones in Prague 9 lead to occupation of parking lots by non residents and commuters, especially at Střížkov and Prosek districts (where commuters driving from the north of the country transfer to metro). Therefore, residents of pre 1990s densely populated districts (which have not been designed for current volume of cars) suffer from lack of parking lots and street space of such districts is overcrowded by parking cars.
- Prague 9 is well-served by metro (underground) lines B and C connecting dense neighborhoods of Prague 9 with Prague city center. Central parts of Prague 9 are also served by tramlines. Tangential and less important radial directions are served by bus lines. The railway service available at two local railway stations is so far not used up to its potential, since there is lack of capacity within Prague rail system to allow more frequent railway service.

- There is not favorable terrain for cycling beside central parts of Prague 9 and there is so far underdeveloped cycling infrastructure (except of one well-built cycling route stretching through Vysočany neighborhood).
- There are walkability issues at transforming old industrial areas, where scattered redevelopment takes place (barriers, not sufficient pedestrian infrastructure, dirt from construction works, etc.). There are also safety concerns, esp. at routes shared by pedestrians and cyclists as well as at pedestrian crossings among whose; there are some obsolete crossings with insufficient safety features (such as proper lighting).

2.8.2 Test Scenarios

There have been 5 more or less likely test scenarios identified and assessed:

1) Business as usual
- significant increase of car transport caused by new development at old industrial district
- significant increase of public transit ridership caused by new development at old industrial district
- slight increase of biking caused by new development at old industrial district

2) Making public transport more attractive
- moderate increase of car transport caused by new development at old industrial district
- significant increase of public transit ridership caused by measures promoting public transit ridership and new development at old industrial district
- slight increase of biking caused by new development at old industrial district

3) Fostering active transport modes
- moderate increase of car transport caused by new development at old industrial district
- moderate increase of public transit ridership caused by new development at old industrial district
- significant increase of biking as a result of new development and biking infrastructure improvement
- slight increase of walking as a result of infrastructure improvement

4) Optimization of road network for automobiles

- stagnation of car transport (decrease caused by shift of through-traffic to expressways compensated by growth of car traffic induced by new development)
- significant increase of public transit ridership caused by new development at old industrial district
- slight increase of biking caused by new development at old industrial district

5) Population of the FUA increases by 50% between 2020 a 2050

- significant increase of car transport caused by new development at old industrial district
- significant increase of public transit ridership caused by new development at old industrial district
- slight increase of biking caused by new development
- moderate increase of walking as a result of more urban/walkable character of new development

2.8.3 Objectives and Indicators

As a result of Status quo analysis findings and results of Test scenario assessment, and public debates of mobility issues, following overarching goals, priorities, targets and indicators have been defined:

Table 3 Overarching goals, priorities, targets and indicators

Overarching Goal	Priority	Target	Indicator
A. Efficient urban development	I. Reduce transport demand generated by new development	1. Residents of newly developed areas would conduct 30 % of trips on foot by 2030	Share of trips conducted by residents of newly developed areas on foot on overall trips on an average weekday (modal split)
	II. Reduce growth of car traffic generated by new development	2. Residents of newly developed areas would conduct no more than 20 % of trips by car in 2030	Share of trips conducted by residents of newly developed areas by car on overall trips on an average weekday (modal split)

B. Well-regulated car traffic	III. Reduce negative impacts of car traffic	3. Do not exceed 2016 car traffic intensity levels on arterial roads	Number of motor vehicles driving through arterial roads (Prosecká, Kolbenova, Poděbradská, Vysočanská, Freyova, Spojovací) on an average weekday
		4. Reduce delays of public bus lines caused by traffic jams by 50 % by 2030	Overall time of bus service delay (all connections combined) on an average day
	IV. Make parking policy more effective	5. Reduce number of on-street parking non-resident cars by 50 % by 2025	Number of on-street parking cars of non-residents
		6. Increase share of off-street parking spaces on overall parking places by 100 % by 2030	Share of off-street parking spaces on overall number of parking spaces
C. Environment-friendly transport	V. Foster transport modes alternative to car transport	7. Increase public transit ridership within Prague 9 by 20 % in 2030	Number of passengers going through public rapid transit stops in Prague 9 on average weekday
		8. Increase number of bikers using biking infrastructure by 200 % in 2030	Number of bikers counted annually by automatic bike-counter machines
	VI. Support spreading of eco-friendly propulsion technologies	9. Increase share of electro-propelled cars to at least 5 % in 2025	Share of electro-propelled cars on cars registered in Prague 9

		10. Increase share of bus-lines served by non-diesel vehicles to at least 30 % by 2030	Share of (originally) bus lines, where vehicles propelled by alternative fuels (electricity, CNG, LPG, etc.) are operated on overall number of bus lines serving Prague 9
D. User-friendly and safe infrastructure	VII. Improve traffic safety, esp. of pedestrians and cyclists	11. Reduce number of traffic accidents with injuries by 10 % in 2030	Annual number of traffic accidents with injury in Prague 9

2.8.4 Measures

Following measures have been defined to fulfill proposed goals, priorities and targets:

Table 4 Measures

Priority	Quantified Measure
I.	Careful design of new development based on Transit oriented development principles (mixed-use high density and high-walkable development within walking distance from rapid transit stations) - Creating urbanist plans based on Transit Oriented Development principles for new development/redevelopment zones Kolbenova, Harfa, Nová Harfa, Pekárny Odkolek, Na Klíčově, U Výstaviště Letňany.
	Create necessary public service infrastructure within newly developed areas, e.g. by using planning contracts to let developers co-finance new public infrastructure - 3 new nurseries, 1 new elementary school
II.	Create cycling infrastructure as part of new development (new bikeways serving new development, connection to existing bikeways, design of new development for higher bike-friendliness - e.g. good accessibility of bike storage rooms/cellars, etc.) - altogether ca 10 km of new bikeways
	Improve public transit service in newly developed areas - ca. 5 km of new bus lines, 15 new or upgraded bus stops
III.	Construction of expressways Městský okruh, Libeňská spojka and Vysočanská radiála (tunnel variant)
	Remove local road-bottlenecks (where possible - increase capacity, where not - prioritize public transit) - 1 new interchange (Harfa)
	Introduce smart applications for drivers - 1 application showing directions to vacant parking lots at parking houses or other larger-scale parking facilities

IV.	Introduce residential parking zones into Prague 9 (mixed-use system where residents pay annual fee and visitors hourly fee)
	Use parking fees as a smart tool to influence traffic behavior of drivers - divert occasional drivers to parking houses by higher fees for parking on-street, use different parking fees to divert parking from overparked zones, use parking fees as an alternative form of traffic toll
	Support development of car sharing (e.g. as part of parking policy) - designate 15 parking lots for car sharing (in cooperation with car-sharing companies)
	Build parking houses and underground parking facilities at areas with insufficient parking capacities - 1500 new off-street parking lots for public
	Support building P+R parking houses at convenient areas - 1 new P+R parking house near Střížkov metro station with ca. 1000 parking lots
V.	Increase rail capacity allowing more frequent rail service by creating new cross-center railway to divert local and national rail service
	Examine opportunities for construction of new rail stops on the territory of Prague 9 - a feasibility study
	Active role of Municipal District Prague 9 in project of modernization of Vysočany Rail Station to secure needs of local commuters
	Create mini/midibus service serving remote parts of Prague 9 with regard to needs of elderly people or people with worsened ability to move - 1 new 4 km bus line served by 1 minibus
	Introduce more preference tools for public transit vehicles (more special lanes for public transit buses, traffic lights aligned for preference of public transit vehicles, etc.) - 5 crossroads with new tools for preference of public transit vehicles
	Make public transit infrastructure more user-friendly - shorten distance between stops of different transit modes at Vysočanská and Nádraží Libeň transit hubs
	Introduce new smart applications for public transit users - 1 new smart application with real-time information about public transit schedules, delays, etc.
	Construct new bikeways in separate paths (esp. in areas, where bikers collide) - 10 km of new bikeways in separate paths
	Create or enlarge bike-parking facilities around potential biking destinations (public transit hubs, public institutions, shopping malls, etc.) with emphasis on theft-resistance (considering costly e-bikes) - 2 new parking towers for bikes, 250 pieces of bicycle parking racks
	Remove cycling barriers (stairs, unpaved biking paths, etc.) - improvement of 10 locations with barriers
	Remove walking barriers (create new pedestrian crossings, pedestrian bridges or underpasses allowing safe crossing of barriers, constructing new pedestrian connections) - 10 new/upgraded pedestrian crossings; 2 new pedestrian bridges, 2 km of new pedestrian connections (pathways)
	Improve quality of pathways (e.g. pave potentially important unpaved pathways, improve cleanness of pathways) - 3 km of newly paved pathways
	Support bike-sharing - 150 pieces of bicycle parking racks designated for bike-sharing

VI.	Support construction of electric car-charging stations - 2 new charging stations (for multiple number of cars)
	Introduce alternative propulsion bus fleet into public transit service - further development of e-bus fleet serving Prague 9 (+ 2 new e-buses)
VII.	Redesign dangerous crossroads allowing higher safety of cars, public transit vehicles, cyclists and pedestrians - 5 redesigned crossroads
	Enhance safety and visibility on pedestrian crossings (create pedestrian-only section in the middle of the crossing at certain crossings, add traffic lights to certain crossings, add warning orange lights to certain crossings, keep crossing signs well visible, add lights designed for higher nighttime visibility of crossing pedestrians) - 20 upgraded pedestrian crossings
	Improve road and pedestrian safety around schools and nurseries (install barriers preventing children from entering roads at dangerous spots, improve safety of pedestrian crossings around schools and nurseries, create new paths for pedestrians and pedestrian crossings wherever necessary) - 5 improved locations
	Create K+R - short term parking lots around schools and nurseries - 50 newly designed K+R parking lots around schools and nurseries

Among defined measures, most of them are within responsibilities of The City of Prague and/or The Municipal District of Prague 9 – in case of an investment as well as operation. Investment costs of some measures are quite huge (such as construction of expressways Městský okruh, Libeňská spojka and Vysočanská radiála), however it is within Prague fiscal powers to conduct them, esp. with help of state (and/or EU) funds. Costs of operation of proposed features and structures might be in some cases shared by users (by collecting fees and tolls), so they should not overburden public budgets. We tried to propose measures, which reflect existing plans and strategies and/or are debated over longer period of time, however in some cases, it might be very difficult to make them happen (e.g. it takes more than a decade to plan and construct an urban expressway – even in case when all approval processes go smooth).

2.9 FUA SÁRVÁR: SUSTAINABLE URBAN MOBILITY PLAN OF SÁRVÁR FUNCTIONAL URBAN AREA

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Date:	20/11/2018

The current Sustainable Urban Mobility Plan (SUMP) was prepared to satisfy mobility needs of inhabitants, commuters, and entrepreneurs of Functional Urban Area (FUA) of Sárvár with sustainable mobility plans referring to mid-term future. It has to be highlighted that the target area of this SUMP is not only Sárvár, as FUA center, but also the other, smaller municipalities of the Functional Urban Areas as well. This extended target for the SUMP, is a novelty not only in the Danube Region but in whole Europe as well. During SUMP preparation, the already existing mobility strategies, action plans and conceptions of the whole FUA were examined and the main content of these are included in this document too, certainly completed with further mobility plans.

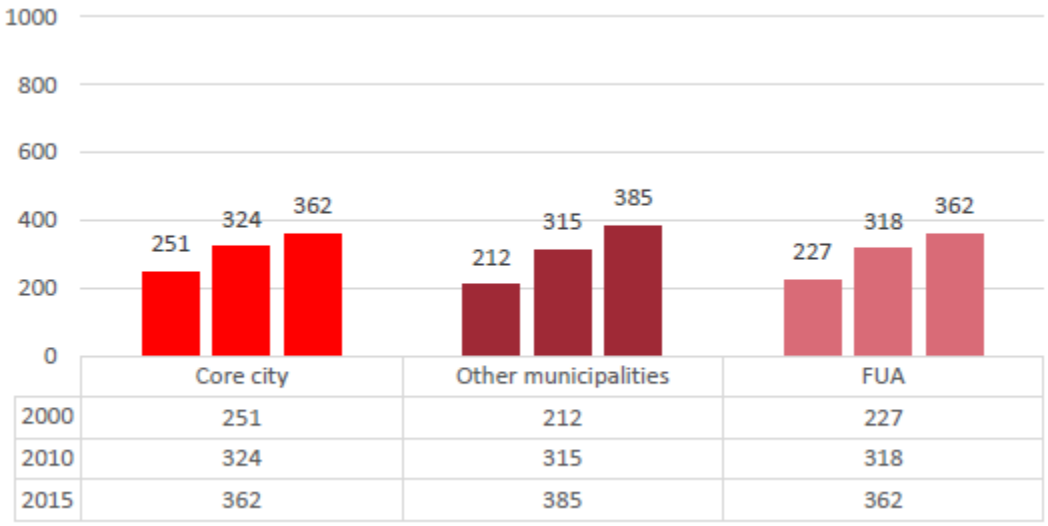
2.9.1 Status Quo Analysis of Sárvár Functional Urban Area

In the first half of the document, the main results of Sárvár FUA's recent data collection were shown, which was carried out in 2017. The focus of this data collection was mainly on mobility, but besides that demographic and economic status were examined too. As the third main chapter shall reveal, the information regarding people's mobility cannot be stated unequivocally, because no reliable and up-to date mobility data were found, as a result, merely estimations may mean the base of modal split and further mobility data. Therefore, a comprehensive survey has to be conducted which would provide up-to-date and reliable data in the mobility field, including modal split, purpose of trip and so on.

However, in the status quo analysis part (third main chapter) sustainable mobility means shall be depicted which are already operating in the area of Sárvár FUA.

There was reliable and recent data about the density of passenger cars in the Functional Urban Area of Sárvár. It is visible on Figure 7 that an increasing tendency in the density of passenger cars is present in this area too. When we examine the measure of the increase in the density of

passenger cars in the core city an almost 50% increase is realized. Figure 7 points out that the density of passenger cars not only in the FUA center, Sárvár increased but in the other municipalities of the FUA too, so the increasing tendency is present in the FUA total.



	Core city	Other municipalities	FUA
2000	251	212	227
2010	324	315	318
2015	362	385	362

Figure 5 Timeline of density of passenger cars in Sárvár FUA between 2000 and 2015 [number of cars/1000 inhabitants]

As far as the already existing sustainable mobility elements are concerned in the Sárvár FUA, from the pull measures it has to be mentioned that big trucks are not allowed to go in the city center of Sárvár, and they have to choose a bypass outside of the city. An excellent way of the bypass is the M86 highway which was finalized in 2016, and since then fewer passenger cars are moving in Sárvár and the other municipalities of the FUA, which result is fewer CO2 emission and cleaner air.

Furthermore, in Sárvár there is a kind of Hop-on, Hop-off “train” which is operating from March to November and can be functioned as a public transport in Sárvár, because it is able to carry 56 passengers. Regarding active transport, bike sharing is available in Sárvár, managed by the main touristic destination management of the FUA. From 2017 August, the bike fleet was supplemented by six e-bikes, so now 6+6 traditional and e-bikes can be rented by local people, commuters and tourists. Besides the touristic destination management there are two companies who provide bike renting, however these stations are operating separately and the goal is to establish a common bike sharing system with extended stations and number of bikes.

The construction of bicycle and pedestrian routes plays important roles in Sárvár's conception. In the neighborhood of the spa, a bike route has already been built. In the Health Resort Area, the speed limit is 30 km/h and 12 t heavy vehicles are not allowed to go in. 12 t heavy vehicles – except direct freight – are restricted from the main road going via the city center. In the sustainable mobility related policy goals further bicycle and pedestrian routes are planned to be built in the city in the future.

When we examine the available electric car charging stations in the FUA, they are merely present in Sárvár, and three such stations can be used free of charge, but some hotels are providing this charging opportunity for their guests as well.

Regarding public transport, none of the municipalities in the FUA possesses an internal public transport system. However, a kind of hop-on hop-off system, which is situated in the main season in Sárvár, can be embedded into local public transport. The train railway system is operated by Hungarian State Railways. (MÁV-Zrt.), however it has to be emphasized that not every municipalities possess railway stations.

Within the FUA, long distance bus line are running by ÉNYKK (there are stops at the major public places: Spa, hospital, city hall, railway station, so these frequented places are accessible by bus. These interurban bus lines reach the other municipalities of the FUA too.

As regards ICT-based tools in Sárvár FUA mobility, there is an opportunity to look for the bus/train timetable on the Internet. There is an integrated national website (www.mene- trendek.hu) where passengers can nationwide search all bus and train lines' timetable together, so trains and buses in Sárvár FUA are available as well.

Nevertheless, this website only provides timetable, purchasing the tickets is not available via www.menetrendek.hu. In case passengers would like to buy their tickets they can go to https://www.mavcsoport.hu/, however here only train tickets can be bought, bus tickets cannot be purchased online. In case passengers buy their ticket via ticket machine, 5% discount is given. If tickets are bought via https://www.mavcsoport.hu/, 10% reduction is available from the price.

It has to be highlighted that a mobility related smart phone application is being developed at the moment and will be finalized in the end of 2018 within the framework of SOLEZ project pilot action in the Interreg Central Europe Program, co-financed by the European Union. This application (software) would contain the different means of transport, and their timetable within the

FUA. Among others, the available train and bus lines would belong to the app, whereas the available e-bikes and traditional bikes, that can be rented in Sárvár, Sárvár's inner train (seasonal Hop-on, hop- off) system, and the electric charging stations may be part of the app as well. Besides, the available pedestrian and cycling routes, their length, in the whole FUA, the place of available parking places will be embedded in the software. Furthermore, the prices of the public transport, taxi opportunities and car-pooling facilities will be included in the application.

In the second half of the third section, the planned mobility scenarios referring to 2030 were discussed. According to the first scenario ("business-as usual") current transport/mobility policy will not change in Sárvár FUA in the next 20 years. Furthermore, current transport/mobility policies of the EU, Hungary and Vas county will not change either in the next 20 years. The second scenario is fostering active transport modes including cycling and walking as well. Within this scenario, among others more effective organization/management of public transport, and implementing new bicycle/pedestrian lanes within the core city and between Sárvár and rest of Sárvár

FUA are planned. The third mobility scenario is counted with very high cost of energy and the double price of the fuel by 2030, and due to this active transport shall be preferred in the FUA.

2.9.2 Strategic Framework; Mobility-related European, National and Regional Strategies

The fourth main chapter is scrutinizing the existing mobility related action plans, strategies and conceptions of Sárvár FUA. This chapter is highlighting the main elements of these already adopted documents which are fostering sustainable mobility.

The key sections of these official documents are listed here as well:

Sustainable Energy and Climate Action Plan (SECAP; June 2017)

Sárvár -as the first municipality in Hungary- prepared the Sustainable Energy and Climate Action Plan (SECAP), which was accepted by the city council of Sárvár in June 2017. This document involves some elements in connection with transport and supports low emission solutions in Sárvár FUA. The main mobility related objectives appear in the SECAP are the followings:

- Building of new bicycle paths between the center of the FUA and other municipalities e.g.: Sárvár-Gérce, Sárvár-Rábasömjén
- Purchase of modern vehicles, development of parking situation in Sárvár FUA
- Completely electric vehicle fleet (with approx. 25 vehicles) for the Municipality of Sárvár by 2030

- Establishment of electric car stations in Sárvár
- Organization of trainings advocating fuel-safe driving
- Support the spread of electric and combined fuelled vehicle fleet (e.g.:100% electric cars in Sárvár's municipality's fleet by 2030)
- Promotion the distribution of B20 biodiesel fuel
- Complete energy consumption and reduction of CO2 emission (18% reduction in transport related CO2 emission by 2030, 11% reduction in transport related energy consumption by 2030)

Integrated Urban Development Strategy of Sárvár ("IUDS": April 2015)

Sárvár is a national Health Resort, so the main objective of the Strategy is to provide a liveable place and higher living standards to citizens and visitors. Therefore, three different parts are distinguished in the Strategy: development of tourism, development of the city, and development of Human Resources. As far as tourism development is concerned, it is an inevitable criterion to improve the accessibility of Sárvár, and the transport ways within the city. For this purpose, the ensuring of the appropriate level of individual and public transport ways (bus, cycling, pedestrian) as well as correspondent information system (tourism system board, internet-based prospectus) are also important. The perception that sustainable development is a key issue has been widely accepted in Sárvár. Hence, the decrease of CO2 emission vehicles, parallel with the sup- port and preference of environmentally friendly alternative-powered vehicles, and cycling are also mentioned in this strategy. In order to achieve this, the configuration of necessary services (resting places, parking lots) also contributes to make Sárvár a liveable place. The strategy puts great emphasis on environmentally friendly measures, because several new biking routes are planned to be built in Sárvár, which would make the transport easier by bicycle within the city.

Health Resort Development Strategy 2014-2020 (January 2016)

Besides the IUDS, Sárvár also prepared the Health Resort Development Strategy for period 2014-2020. This document elaborates the strategic goal on Tourism Development of IUDS ("to develop Sárvár towards an international Health Resort"). To keep the image of the health resort and other touristic attractions (spa and wellness, Sárvár Castle) the city needs also the image of clean air. Several actions (e.g. new, safe pedestrian connection between the city center and the Health Resort Area, biking road development, e-biking) help to ensure this objective. It also requires a

strong partnership between municipalities, tourism related enterprises (Spa, hotels), their joint organization the Tourism Destination Management and other local civic organizations.

Cycling development concept of Sárvár (October 2016)

This concept outlines numerous elements in favor of promotion/development of cycling sys- tem mainly in the center of the FUA, Sárvár, but the strategy consists some solutions, which pertain to other municipalities as well in the FUA. Among others, it advocates the development of cycling in Sárvár FUA with forming different kind of places where cyclists can travel (e.g.: bike- trails, open/close cycle lanes, or even cycle paths). The concept compares the different kind of solutions and suggests the most appropriate one to the relevant areas. Besides, this concept offers a biker-friendly logo of Sárvár, which would appear on leaflets, bike parking places, Sárvár applications, and other information systems.

Another crucial proposal of the concept is the development of bicycle storage, with improvement or fully replacement of the current stores. The concept is highly advocating the establishment of a well-functioning public bike sharing sys- tem, with further stations in Sárvár and in other municipalities with traditional bicycles, even with e-bikes. The writers of the concept are convinced that a prosperous bike sharing system would not only contribute to the development of tourism, but also it might contribute to the low emission in the area of Sárvár FUA.

The concept is dealing with smart solutions too, with the proposal of a smart phone application that would show the bike stations, the bike routes and services in the area of the whole FUA. Sárvár FUA's Value-Added Service Pilot Activity is totally in line with this conception, because the ICT-tool, which will be implemented as Sárvár FUA's pilot, among other sustainable transport modes will involve these biker-friendly elements too.

2.9.3 Proposed Overarching Goals and Priorities of the FUA

The fifth chapter is dealing with the suggested medium-term plans, which may make the Functional Urban Area of Sárvár more sustainable and environmentally friendly area with improving the cur- rent mobility means and implement new solutions.

It has to be emphasized that the main goal of Sárvár -together with the other municipalities as well- is to keep the Health Resort Status, which was received by two areas of Sárvár in 2012. As Table 5 points out four overarching goals were prepared for Sárvár FUA, but all of them are sub-

ordinated by this main goal which is to keep the good quality of Sárvár, and the other municipalities of the FUA as well. The first overarching goal is exactly mentioning the keeping the Health Resort Status of Sárvár, and the priority within this goal is to keep the good quality of the air. The requirements of this status is to keep the noise level in a sufficient level, and moreover it is an expectation that the mobility infrastructure, and public services have to operate in an appropriate level and the emission of harmful gases has to remain on a low level.

Table 5 Overarching goals and priorities for Sárvár FUA for 2025/2030

Overarching goals	**Priorities**
• Sustainable ‚Health Resort' City	• Keeping the air quality in Sárvár Health Resort Area and the other municipalities of the FUA
• Environmental Friendly FUA	• Mobility by use of alternative energy • Non-motorized mobility
o Safe FUA	• Safety at crossroads
	• Safe mobility between city center and neighborhoods • Safety of non-motorized mobility
Cooperative FUA	• Involvement of local residents on raising awareness for sustainable transport within

	Sárvár • Co-operation with neighboring municipalities of Sárvár for sustainable transport in Sárvár FUA

The second overarching goal of the SUMP is to create an environmentally friendly and sustainable FUA involving the center, Sárvár and other smaller municipalities as well. This goal prefers alternative fueled vehicles and active transport modes rather than conventional powered vehicles. Within the goal two priorities were formulated; the first priority is advocating vehicles operated by alternative energy, the second is supporting active transport. Needless to say, that the preference of these vehicles will undoubtedly contribute to keep the good air quality, and the health resort status of Sárvár and the other municipalities of the FUA.

The third overarching goal is focusing on the shaping of a safe Functional Urban Area, with establishing safe roads and crossroads between the center of the FUA and other municipalities. The measures taken within this goal are contributing to safe mobility for traditional, alternative and active mobility modes as well.

As far as the fourth overarching goal is concerned, it is concentrating on a co-operative functional urban area, with collaboration of citizens, civil organizations, mobility actors, experts and the representatives of the municipalities of the FUA, to work together on making the FUA's mobility more sustainable.

2.9.4 The Current and Planned Status of the Planned Measures Including Timeframe

The second half of the fifth chapter is showing a comparison between the current and the planned mobility status separately with measures of every overarching goal referring the time frame as well.

The table is depicting the current and the planned status of the measures, but as it can be seen, there were some measures where there was no reliable and up-to-date data, so no exact numbers can be presented.

Table 6 The current and planned status of the planned measures including timeframe

Overarching goal	Priorities	Quantified measures	Current status	Target status	Target year
	Air Quality	Double the Number of parking places for motor vehicles by 2022	No exact Data is available	x*2	2022
		Set up an intermodal junction in Sárvár	0	1	from 2025
		Extension of Sárvár ring (by-pass road)	8,3 km	11,5 km	from 2025

Sustainable ‚Health Resort' City		Sustainable Mobility related smartphone application	There are 2 at the moment but they are not integrated	The third one will integrate sustainable mobility means and touristic destinations as well	2019
Environmental		Change of the car stock of Sárvár municipality entirely to e-cars	0%	100% (14 pieces of electric vehicles as indicated by SECAP)	2030
Friendly FUA	Mobility by use of alternative energy	Install e-charging facilities in Sárvár	3 stations	5 stations	2025
		Install one Public gas-powered bus by 2030	0 piece	1 piece	2030

Environmental Friendly FUA		Increase the Number of bike sharing stations from 1 to 5 until 2025	3 separate stations	5 integrated stations	2025
		Increase the number of shared e-bikes from 6 to 20 until 2025	6 e-bikes	20e-bikes	2025
		Increase the length of pedestrian paths by 25% until 2020	79,67m2	99,58m2	2020
		Increase the length of cycling road	4km	8km	2025
	Non-motorized mobility	System by 50% until 2025			
	Safety at cross-roads	Set up three new traffic circles until 2022	3	6	2022

Safe FUA		Increase the number of lamp bodies by xx until 2020	No exact data is available	more than current	2020
	Safety of non-motorized mobility	Improve the lighting system at the junctions of non-motorized and motorized traffic (change xx lamps, install xx new lamps)	No exact data is available	Safer more visible traffic signs	2025
	Involvement of local residents on raising awareness for sustainable transport within	Annual conference with local companies on transport system of Sárvár FUA from 2020	0	1 mobility related conference in Sárvár FUA	from 2020

Cooperative FUA	Sárvár	Smaller awareness raising campaigns to citizens on mobility topic	0	4 per year	from 2020
	Co-operation with neighboring municipalities of Sárvár for sustainable transport in Sárvár FUA	Completed cycling network plan within Sárvár and for Sárvár FUA until 2020	0	1	preparing from 2020

Under the framework of 'Sustainable Health Resort City" an intermodal junction is planned to be built in Sárvár at the train station, where all the mobility modes would appear at the same time and would make the mobility easier for passengers. Besides the extension of the Sárvár Ring, (by-pass road) belongs to the plan in order fewer cars move to the city. Another measure is to double the parking places next to the Health Resort Area. It is important to mention. The last measure of this goal is to develop a smart phone application under the framework of EU-funded Solez project which is going to integrate all information of the available transport modes of the FUA (train, bus, car-renting, bike-renting, charging station, car-pooling,..). The intention is to encourage people to use public or active transport instead of their passenger cars.

As it has been indicated before, the creation of an environmental and sustainable FUA main goal is divided to the preference of alternative-based and active mobility priorities. Sárvár's SECAP fore- cast that Sárvár's municipality car fleet will be full electric with 14 vehicles by 2030. The SUMP is indicating to increase the number of electric charging stations from 3 to 5 by 2025. One of the biggest measure planned to be taken within this priority is to install a fully electric bus by 2030, which would move in the FUA and would carry passengers. Another important target is to establish a well-functioning bike sharing system in Sárvár with five stations both with traditional and e- bikes too. The aim is to integrate the current bike-renting companies, and extend the number of e- bikes from 6 to 14 by 2025. Moreover, it is a medium-term future goal by 2025, to extend the pedestrian paths in Sárvár by 25% and the bicycle lanes in the whole FUA by 50% by 2025.

When we examine the third overarching goal, namely the creation of a safe Functional Urban Area, three new traffic circles in Sárvár the increase the number of lamp bodies and the renewal of traffic symbols of the whole FUA belong to the implementation plans.

Further objective is to establish a co-operative functional urban area with the participation of inhabitants, mobility providers, experts, civil organizations and municipalities to work together on a sustainable FUA. One measure for this target is to organize annual conference with the mentioned actors in order to raise awareness of local people about sustainable transport modes available in the FUA, and they can plan how to improve the current situation. Besides, the annual conference further smaller targeted events can be organized within the FUA, where relevant stakeholders and citizens would have the possibility to exchange ideas on mobility improvement. During these events, attendees together would prepare a common cycling network plan for the whole FUA, which is another planned measure within this overarching goal.

2.9.5 Proposed Mobility Measures with Responsible Bodies, Estimated Expenditures and Possible Financial Sources

The first part of the sixth section is revealing the connection between the planned measures and the priorities whether they have direct, indirect or neutral compact or even counterproductive impact on each other. Most of the measures have direct or indirect impact on all of the priorities, but there are some exceptions, where one measure is counterproductive with a priority or one measure has a direct impact on several priorities. The preparation has revealed that the extension of the capacity of the cycling paths and the effective co-operation with local actors on an

annual mobility conference would have the biggest impact on the priorities. One measure, namely the duplication of parking capacity next to the Health Resort Area was counterproductive impact on the priority increasing the length of cycling road system by 50% until 2025.

The second part of the sixth main section is demonstrating the responsible bodies for implementation and operation of each planned measure, besides the estimated expenditures, and the funding opportunities for the measures will be discussed in this section.

Regarding the responsible bodies, the Municipality of Sárvár, and the other municipalities of the FUA are directly involved in almost all of the measures, nevertheless, it has to be mentioned that for the majority of the measures, public procurement, and tendering will have to be carried out. Besides, at some measures the main touristic destination management (called TDM) of the FUA, located in Sárvár, may be in charge of the implementation and operation of some measures like the installation, and the maintenance of the sustainable mobility related smartphone application, the extension of bike sharing system, and the extension of e-bike capacity can be accomplished by TDM. Certainly, the mobility providers of the FUA may be responsible for some measures, like establishing of an intermodal junction in Sárvár, and the installation of an electric bus.

As far as the expenditures are concerned, only estimations were done, because no exact budget could be measured. As a result, the planned measures were divided into three groups, based on their estimated expenditure. (see Table 7) In the first group there are some measures which would cost less than 100.000 €: The development of the sustainable mobility related smart phone application, the installation of two more electric charging facilities, the extension of the bike-shar- ing system with stations, and electric bikes, as well as the annual mobility conference, the smaller mobility related events can be organized, and the within this budget. The third group contains measures whose costs would be more than one million €, the establishing of an intermodal junction in Sárvár, the extension of the Sárvár Ring bypass, and the construction of three traffic circles be- long to this category. The rest of the measures would cost between the two groups, so more than 100.000 € but less than one million €.

Table 7 The planned measures and their estimated implementation expenditures

Less than 100.000 €	Between 100.000-1.000.000 €	More than 1.000.000 €

Development of the sustainable mobility related smart phone application for Sárvár FUA	Double the parking place capacity for motor vehicles next to the Health Resort Area	Establishing of an intermodal junction in Sárvár
Installation of two more electric charging facilities in Sárvár FUA	Change of the car stock of Sárvár municipality entirely to e-cars	Extension of the Sárvár Ring bypass
Increase the number of bike sharing stations from 1 to 5 until 2025	Install one public gas-powered bus	Construction of three traffic circles
Increase the number of shared e-bikes from 6 to 20 until 2025	Increase the length of pedestrian paths by 25% until 2020	
Annual conference with local companies on transport system of Sárvár FUA from 2020	Increase the length of cycling road system by 50% until 2025	
Smaller mobility related events	Improve the lighting system at the junctions of non-motorized and motorized traffic	
Completed cycling network plan for the FUA		

When it comes to financing of the indicated measures, most of them are required to finance by different kind of state subsidy or European Union funds, but of course the expenditures can be completed by the municipal budget. As Table 7 indicates numerous planned measures are very costly, so a kind of external financing source is undoubtedly needed. In Hungary measures can

be partly financed by the National Development Fund, and regarding EU, European Regional Development Fund can be applied.

2.10 MUNICIPALITY OF VELENJE: SUSTAINABLE URBAN MOBILITY PLAN FOR FUA SAŠA REGION

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2.10.1 Motivation

The motivation to start SUMP is to analyze traffic conditions within whole FUA with several goals:

- To understand the current mobility situation of your FUA;
- To develop and analyze several scenarios that help stakeholders better understand the likely combined effects that mobility-related measures discussed in SUMP will have;
- To share the developed scenarios with wider public so that they stimulate the future discussion while your SUMP is drafted.

2.10.2 Status Quo Analysis

Data availability

Mobility of FUA and core city can be analyzed with key data collected. For whole FUA with core city included data about demography is collected, with exception of data for future (projected population by age group, sex, population density, growth in 2030). Urban data is also available for whole FUA with core city with exception of number of employees in shopping centers, yearly expenses for mobility of households, shopping centers (employees and visitors) and area of leisure facilities (sport and culture). Data for describing urban facilities and transport infrastructure are available for whole FUA and core city. Mobility statistics data is the most deficient since most of it is missing. The reason for not collecting data caused is a lack of interests and priorities in spatial planning in all of the municipalities of FUA region with exception of core city of Velenje.

To obtain the necessary data for SUMPs in all of the municipalities in FUA, first the request at national level should be implied to all of the municipalities. Missing data, mostly about mobility statistics are simply not being collected, since in past it was not a priority to do it so. From national level to regional and further to local level the request should be implied and they could choose the methodology which suits the most to their spatial characteristics. The reason that data was

not collected in the past is also a result of insufficient data collection know how collecting data knowledge, where a solution may be an instruction manual for different types of methodological approach. Solving the problem of not collecting the data is not only important for understanding the present situation to make SUMP. Gathering data for longer time will be useful also for further research activities about trends and also for monitoring progress after adopting SUMP.

Analysis of current mobility situation

The concrete numbers about modal split in all of the municipalities are unknown, but average statistics from national level could be implied to FUA region. The statistics about modal split at national level are collected by Ministry for infrastructure of Slovenia in document Transport development strategy in the Republic of Slovenia (2014). In passenger transport the use of private vehicles prevails; 8% of journeys are taken by public passenger transport, 5% by bicycle and 18% walking. More journeys in Slovenia are taken by private vehicle, since Slovenia has a lower level of urbanization and there are no major cities; however, there are many small, fragmented and dispersed rural settlements. More journeys by private vehicle are undertaken in small settlements, and fewer journeys in large settlements. Described can also be transferred to FUA, since characteristics are similar. Data for core city Velenje is collected and it is quite similar to data at national level:

Table 8 Modal split of core city in FUA, Velenje

Passenger car (+ taxi)	61%
Railway (train, tram, metro)	0%
Bus (bus, trolley bus)	10%
Bicycle	9%
Walking	20%

Scenarios of future development

The role of test scenarios in the context of sustainable urban mobility planning is to encourage wide range of the stakeholders to discuss the future mobility of the area concerned e.g. FUA. Scenario is a tool to help authorities, transport service providers, citizens, experts, companies, schools and other stakeholders to openly discuss the future of mobility and relevant policy in the

region. It also help them to feel the “ownership” of SUMP as the common future vision of the FUA.

These test scenarios are to stimulate the discussion, and are not meant to be mobility or transport policies itself for the future. With the help of test scenarios involving various stakeholders a preparation of FUA-level SUMP will be easier.

Following test scenarios were chosen for FUA transport development:

1) Business-as-usual:
- Continuing the current transport/mobility policy in next 20 years;
- EU, National and Regional Policies do not change in next 20 years;
- All trends related to mobility in FUA are the same;

2) Making public transport more attractive;
- Public transport covers 80% of the FUA’s population and workplaces/schools by 2025 within 300m of stations/stops.
- High frequency of the service and longer service hours is provided.
- Introduction of integrated ticket system for all types of public transport (bus, tram, railway);

3) Very high cost of energy (fuel and electricity)
- Fuel price will double in 2025 compared to now;
- Introduction of renewable energy pushes up the energy cost;
- Decrease of usage of fossil fuels – reduction of negative effects (air pollution, greenhouse gasses, etc.)
- Increase of usage of renewable sources of energy – costs are shared between users;

4) National road pricing on all roads
- The national government decides to introduce nation-wide road pricing for automobiles and trucks including all types of urban roads in 2025.
- The pricing is 2% of average annual household income per automobile.

2.10.3 Strategic framework

Mega trends

In core city residents will emigrate to other parts of municipality, out of urban area, but still near accessible roads to get to core city. It is expected that population in more isolated parts of the FUA will continue to decrease (e.g. Solčava, Luče, etc.). On the other hand population is expected to increase in core district of Velenje and other more vibrant municipal centers along the main transport corridors (e.g. Šoštanj, Mozirje, etc.). In whole FUA the inhabitants will get old, as the result of global trends and also projections at national level can be transposed to FUA level.

In approximately 10 year period from now, no transport technology will disappear. The reason is that in such a short period we are not expecting huge innovation without a transition period. In transition period, individual electric mobility will slightly expand and shift in environmentally clean urban transport technology is expected. Beside electric mobility, the promotion of walking and cycling at smaller distances will result in development of infrastructure and supporting infrastructure for active transport nodes and recreation. Infrastructure for increasing multimodal travels will increase in Velenje (example: P+R parking). Public transport users will decrease, since it is unattractive and expensive in FUA.

European, national and regional requirements – existing strategies

The European Union is paying ever more attention to cities as centers of productivity and hubs of demographic development. Urban transport thus also becomes a focal issue. The objectives set out by the European Commission in the “White Paper on Transport” of March 2011 are particularly important in this context. Moreover, the European Commission is calling SUMPs as the most important topic in Commission's Urban Mobility Package. They have published guidelines for “Sustainable Urban Mobility Plans” or SUMP, setting a new standard for strategic transport planning. The SUMP guidelines were updated in August 2017. This new planning approach is implementation oriented, cooperative, integrated and dialogue oriented.

In FUA there are no other relevant development plans, strategies for climate protection or energy production and consumption and smart city plans.

Local SUMPs are targeting five main pillars of developing – establishing of strategically holistic approach to transport planning, promoting walking as mean of transport, exploitation of good

conditions for cycling, developing of attractive public transport and changing of behavior of car drivers.

2.10.4 Objectives and indicators

Overarching goals are basis for development of action plan in Velenje FUA until 2025. All relevant interests were taken into consideration while defining overarching goals. These goals are going to be achieved through effective measures, which will be defined in the later stages of SUMP preparation. With a list of goals we set up a guidelines for the development of measures and also a basis for evaluation of the FUA SUMP implementation.

The target we are aiming at with our planning is sustainable mobility development. There is no sustainable end state in this definition. As the FUA grows and restructures so are relations among the natural environment, society, economy, etc. continuously changing. That is why sustainability is a moving goal, and the actions towards it are likely to change direction. Meeting the goals in future will happen with different key measures, which are going to be defined in following steps.

Overarching goals are:

OG 1: Improving accessibility to the region and within the region, for all social groups

OG 2: Infrastructural transformation in the region for future mobility

OG 3: Reducing car dependence and improving the conditions for transport sharing, public transport and multimodality.

OG 4: Increase of walking and cycling for shorter routes.

OG 5: Improving the state of the environment, the quality of life and human health.

Indicators

Indicators and target values are set for each overarching goal in chapter 5.2.

Table 9 Target and indicators

OG 1: Improving accessibility to the region and within the region, for all social groups	
Target	**Indicator**
	The share of PT in modal split

Increase of the share of PT in modal split for 30 % by 2023	
Increase of the share of cycling in modal split for 30 % by 2023	The share of cycling in modal split
	Number of eliminated critical points within existing cycling network
	Number of improved cycling lanes within existing cycling network
	The length of new cycling lanes [m]
Decrease of traffic jams for 25% by 2023	Time lost in traffic jams
	Number of traffic jams
Decrease of the number of traffic accidents for 25% by 2023	Number of traffic calming measures
	Number of traffic accidents
Improvement of the accessibility of recreational and tourist locations by sustainable modes for 10% by 2023	Number of P&R
	Number of sustainable PT modes at recreational and tourist locations
	Length of new cycling lanes [m]
	Length of new pedestrian lanes [m]
Increase of accessibility for handicapped for 50 % by 2023	Number of measures for improving the accessibility for handicapped

Indicators and targets for OG2:

Table 10 Indicators and targets for OG2

OG 2: Infrastructural transformation in the region for future mobility	
Target	**Indicator**
	Number of e-bikes

Increase of e-mobility and other alternative fuel vehicles by 25% by 2023 and the decrease of standard vehicles by 25 % by 2023	Number of e-buses and other alternative fuel buses
	Number of e-charging stations
	Number of standard vehicles
Increase of the number of alternative PT transport services by 10% in by 2023	Number of alternative PT transportation services

Indicators and targets for OG3:

Table 11 Indicators and targets for OG3

OG 3: Reducing car dependence and improving the conditions for transport sharing, public transport and multimodality.	
Target	**Indicator**
Increase of the number of car sharing service for 10% by 2023	Number of car sharing services
Increase of the number of car pooling services for 10% by 2023	Number of car pooling services
Increase of the share of PT in modal split for 30% by 2023	The share of PT in modal split
Set up parking management by introducing 5 parking policies by 2023	Number of new established parking policies
Increasing the share of cycling in modal split for 30% by 2023	The share of cycling in modal split
	Number of eliminated critical points within existing cycling network
	Number of improved cycling lanes within existing cycling network
	The length of new cycling lanes [m]

Indicators and targets for OG4:

Table 12 Indicators and targets for OG4

OG 4: Increase of walking and cycling for shorter routes.	
Target	**Indicator**
Improvement of the quality of walking lanes, pedestrian zones for 50 % by 2023	Surface dimension of new green areas [m²]
Increase of the share of cycling in modal split for 30% by 2023	The share of cycling in modal split
	Number of eliminated critical points within existing cycling network
	Number of improved cycling lanes within existing cycling network
	The length of new cycling lanes [m]
Increase of the share of pedestrians in modal split for 30% by 2023	Increase of pedestrian areas, lanes [m]
	The share of pedestrians in modal split
	Number of improvements in pedestrian zones and walking lanes

Indicators and targets for OG5:

Table 13 Indicators and targets for OG5

OG 5: Improving the state of the environment, the quality of life and human health.	
Target	**Indicator**
Increase of awareness and capacity of the general public by 25% per year	Number of awareness raising events with general public
	Number of published promotion materials

Increase of capacity of the decision makers by 25% per year	Number of awareness raising events with decision makers
	Number of participating municipalities in awareness raising events with decision makers
Reduction of CO2 and PM10 emissions caused by PT by 25 % by 2023	Amount of CO2 and PM10 emissions
Reduction of CO2 and PM10 emissions caused by freight transport by 25 % by 2023	Amount of CO2 and PM10 emissions
Reduction of CO2 and PM10 emissions caused by personal transport by 25 % by 2023	Amount of CO2 and PM10 emissions

Measures

Each measure for overarching goal is set as follows:

Table 14 Measures OG1

OG 1: Improving accessibility to the region and within the region, for all social groups		
Target	**Indicator**	**Measure**
Increase of the share of PT in modal split for 30 % by 2023	The share of PT in modal split	Integrated public transport
		Building of displays at the PT stations
		Improvements on the railway system
Increase of the share of cycling in modal split for 30 % by 2023	The share of cycling in modal split	Bike sharing system
	Number of eliminated critical points within existing cycling network	Improvements of the existing cycling infrastructure
	Number of improved cycling lanes within existing cycling network	

	The length of new cycling lanes [m]	Building of local and regional cycling network
Decrease of traffic jams for 25% by 2023	Time lost in traffic jams	Integrated public transport
	Number of traffic jams	
Decrease of the number of traffic accidents for 25% by 2023	Number of traffic calming measures	Introduction of traffic calming measures
	Number of traffic accidents	
Improvement of the accessibility of recreational and tourist locations by sustainable modes for 10% by 2023	Number of P&R	P&R at the entrance of the Logarska valley
	Number of sustainable PT modes at recreational and tourist locations	Establishing PT connection to the skiing resort Golte
	Length of new cycling lanes [m]	Building of local and regional cycling network
	Length of new pedestrian lanes [m]	Building of new sidewalks and walking paths
Increase of accessibility for handicapped for 50 % by 2023	Number of measures for improving the accessibility for handicapped	Improvements on the infrastructure for handicapped

Table 15 Measures OG2

OG 2: Infrastructural transformation in the region for future mobility		
Target	**Indicator**	**Measure**
Increase of e-mobility and other alternative fuel vehicles by 25% by 2023 and the decrease of standard vehicles by 25 % by 2023	Number of e-bikes	Building of charging stations for e-bikes
	Number of e-buses and other alternative fuel buses	Introduction of alternative fuel buses for PT
	Number of e-charging stations	Building of charging stations for e-cars
	Number of standard vehicles	Introduction of e-bikes in bike sharing systems

Increase of the number of alternative PT transport services by 30% in by 2023	Number of alternative PT transportation services	Introduction of alternative fuel buses for PT

Table 16 Measures OG3

OG 3: Reducing car dependence and improving the conditions for transport sharing, public transport and multimodality.		
Target	**Indicator**	**Measure**
Increase of the number of car sharing service for 10% by 2023	Number of car sharing services	Introduction of car sharing service
Increase of the number of car pooling services for 10% by 2023	Number of car pooling services	Introduction of car pooling service
Increase of the share of PT in modal split for 30% by 2023	The share of PT in modal split	Integrated public transport (integrated ticket for different means of PT)
Set up parking management by introducing 5 parking policies by 2023	Number of new established parking policies	Building P&R at the entrance of Logarska Valley and establishing alternative fuel buses to enter the valley
		Establishing parking policies in order to support sustainable mobility
		Improvements in parking controlling system
Increasing the share of cycling in modal split for 30% by 2023	The share of cycling in modal split	Improvements on the existing cycling network
	Number of eliminated critical points within existing cycling network	
	Number of improved cycling lanes within existing cycling network	
	The length of new cycling lanes [m]	Building of local and regional cycling network

Table 21: Targets, indicators and measures for OG3.

Table 17 Measures OG4

OG 4: Increase of walking and cycling for shorter routes.		
Target	**Indicator**	**Measure**
Improvement of the quality of walking lanes, pedestrian zones for 50 % by 2023	Surface dimension of new green areas [m²]	Planting the trees along the walking lanes and in the pedestrian zones
Increase of the share of cycling in modal split for 30% by 2023	The share of cycling in modal split	Introduction of cycling friendly urban furniture
	Number of eliminated critical points within existing cycling network	Improvements on the existing cycling network
	Number of improved cycling lanes within existing cycling network	
	The length of new cycling lanes [m]	Building of local and regional cycling network
Increase of the share of pedestrians in modal split for 30% by 2023	Increase of pedestrian areas, lanes [m]	Building of local walking networks and establishing safe school ways
	The share of pedestrians in modal split	Introduction of shared space
	Number of improvements in pedestrian zones and walking lanes	Building the pedestrian crossings over the railway

Table 18 Measures OG5

OG 5: Improving the state of the environment, the quality of life and human health.		
Target	**Indicator**	**Measure**
Increase of awareness and capacity of	Number of awareness raising events with general public	Designing and setting of unique graphic communication for general public

the general public by 25% per year	Number of published promotion materials	Distribution of promotion materials
Increase of capacity of the decision makers by 25% per year	Number of awareness raising events with decision makers	Awareness raising events for general public
	Number of participating municipalities in awareness raising events with decision makers	Awareness raising events for decision makers
Reduction of CO2 and PM10 emissions caused by PT by 25 % by 2023	Amount of CO2 and PM10 emissions	Introduction of alternative fuel buses for PT
Reduction of CO2 and PM10 emissions caused by freight transport by 25 % by 2023	Amount of CO2 and PM10 emissions	Establishing alternatives for freight traffic - dedicated parking facilities, time and mass restrictions, distribution centers etc.
Reduction of CO2 and PM10 emissions caused by personal transport by 25 % by 2023	Amount of CO2 and PM10 emissions	Improving the conditions for PT - new lines, busses, bus stations, information etc.

The list of measures:

- Integrated public transport
- Building of displays at the PT stations
- Improvements on the railway system
- Bike sharing system
- Improvements of the existing cycling infrastructure
- Building of local and regional cycling network
- Introduction of traffic calming measures
- P&R at the entrance of the Logarska valley
- Establishing PT connection to the skiing resort Golte
- Building of new sidewalks and walking paths
- Improvements on the infrastructure for handicapped

- Building of charging stations for e-bikes
- Introduction of alternative fuel buses for PT
- Building of charging stations for e-cars
- Introduction of e-bikes in bike sharing systems
- Introduction of car sharing service
- Introduction of carpooling service
- Establishing parking policies in order to support sustainable mobility
- Improvements in parking controlling system
- Planting trees along the walking paths, sidewalks and in the pedestrian zones
- Introduction of cycling friendly urban furniture
- Building of local walking networks and establishing safe school ways
- Introduction of shared space
- Building of safe level crossing on railway
- Designing and setting of unique graphic communication for general public - promotional materials
- Distribution of promotion materials
- Awareness raising events for general public
- Awareness raising events for decision makers
- Establishing alternatives for freight traffic - dedicated parking facilities, time and mass restrictions, distribution centers etc.
- Improving the conditions for PT - new lines, busses, bus stations, information etc.

2.11 MUNICIPALITY OF WEIZ: SUSTAINABLE URBAN MOBILITY PLAN (SUMP) DRAFT 2018

Drafted by:	Ingenieurbüro Dipl.-Ing. Johann Rauer Mobilitätsbüro Weiz
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Date:	20/12/2018

2.11.1 Introduction

The City of Weiz is located in the eastern part of the Province of Styria, approximately 30 km northeast of the province capital Graz. It is located at the beginning of a valley enclosed by the mountains of the Fischbach Alps in the north. In the southern part of this valley you can find the typical landscape of the east Styrian hilly country.

Weiz is the center of the district of Weiz and it is home of all major institutions of administration, education, work, care and culture.

Together with the 6 surrounding municipalities Mitterdorf at the Raab, Mortantsch, Naas, Thannhausen, St. Ruprecht at the Raab and Puch nearby Weiz, the city of Weiz are building the "Region Weiz".

Table 19 Inhabitants and area of each municipality of the region of Weiz, (Source: Gemeinde-server Land Steiermark, data from 2017)

Municipalities	**Inhabitants**	**Area (km²)**
Weiz	11.508	17,5
Thannhausen	2.448	33,5
St. Ruprecht an der Raab	5.260	41,1
Mitterdorf an der Raab	2.060	21,0
Mortantsch	2.117	17,6
Naas	1.357	20,8

Puch bei Weiz	2.068	24,8
Total	**26.818**	**176,3**

Figure 6 The city of Weiz and 6 surrounding municipalities

The general slogan of the town is a „city full of energy„, which means that Weiz is regarded as a very dynamic town, making many new ideas in all fields of urban life possible.

2.11.2 Status Quo Analysis

Weiz has a very dynamic economy. The main players are the Magna Presstec and Auteca company, the Siemens and Andritz Hydro company, the Elin EBG Motoren company, the construction industry and many medium sized companies in the service industry.

There are approximately 12000 employees in the city of Weiz. This requires a high proportion of commuter traffic. More than 80 % of this can be contributed to motorized vehicle traffic. 8.100 people commute daily to their working places in the city of Weiz and 2.300 commuters go out.

In addition in Weiz are situated 13 schools including a grammar school and higher vocational schools for technology, economics and domestic science. About 3.500 pupils attend these schools, many of them are commuters from the surrounding region. Most of them travel by public transport. Students of upper secondary schools increasingly use their own car for travel.

In the year 2016 / 2017 a survey was conducted of the mobility behavior for the way to and from the workplace in all companies in the city of Weiz.

The evaluation gives the following result:

1. **Modal Split of all respondents** (Employees from City of Weiz and also of the surrounding countryside)

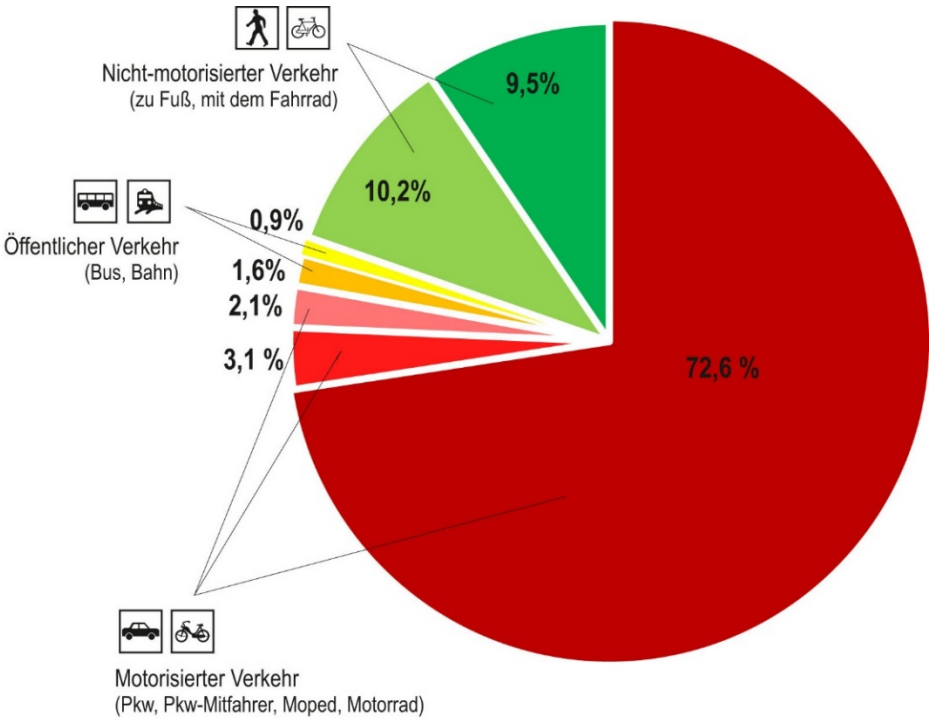

Figure 7 Modal Split of all respondents (Employees from City of Weiz and the surrounding countryside)

77.8% of all employees use a MIV - motorized individual mode of transport (car, car passenger, moped / motorcycle)

- Only 2.5% travel to work by bus and train

- After all, 19.7% walk or cycle to work

2. **Modal Split of respondents from the surrounding countryside**

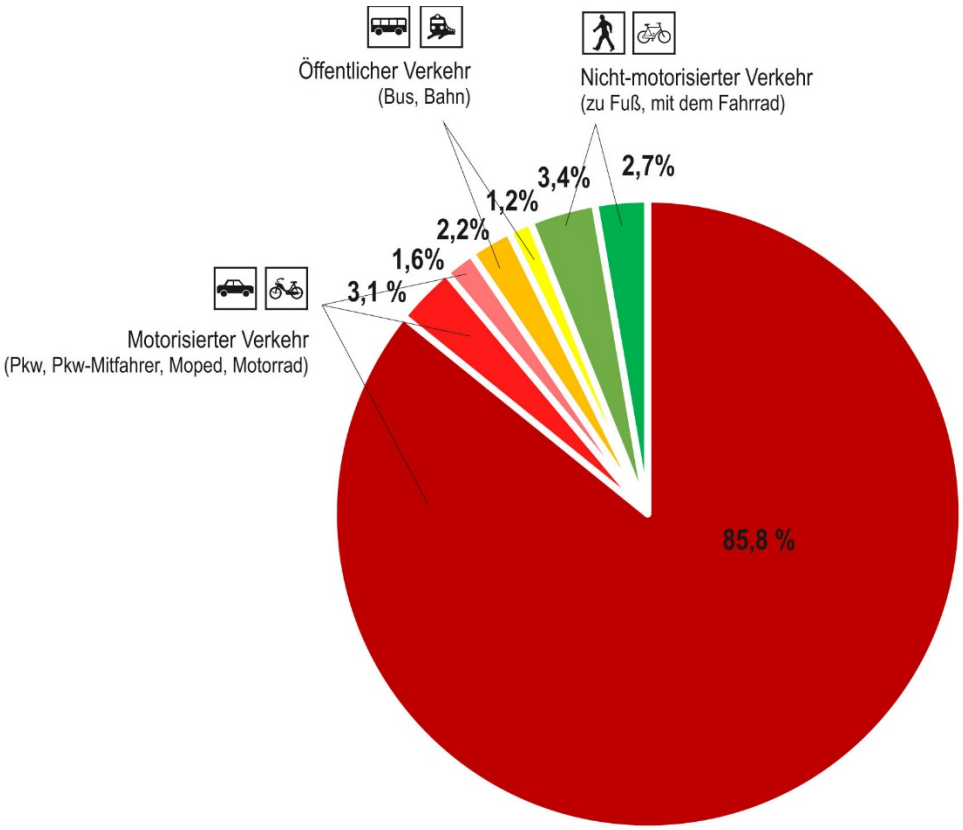

Figure 8 Modal Split of respondents from the surrounding countryside

- Much higher, at 90.5%, is the proportion of MIV users among employees who commute to work from outside of the city of Weiz
- The proportion of public transport (bus, train) users among employees outside is only 3.4%
- 6.1 % walk or cycle to work

3. **Modal Split of respondents from the city of Weiz**

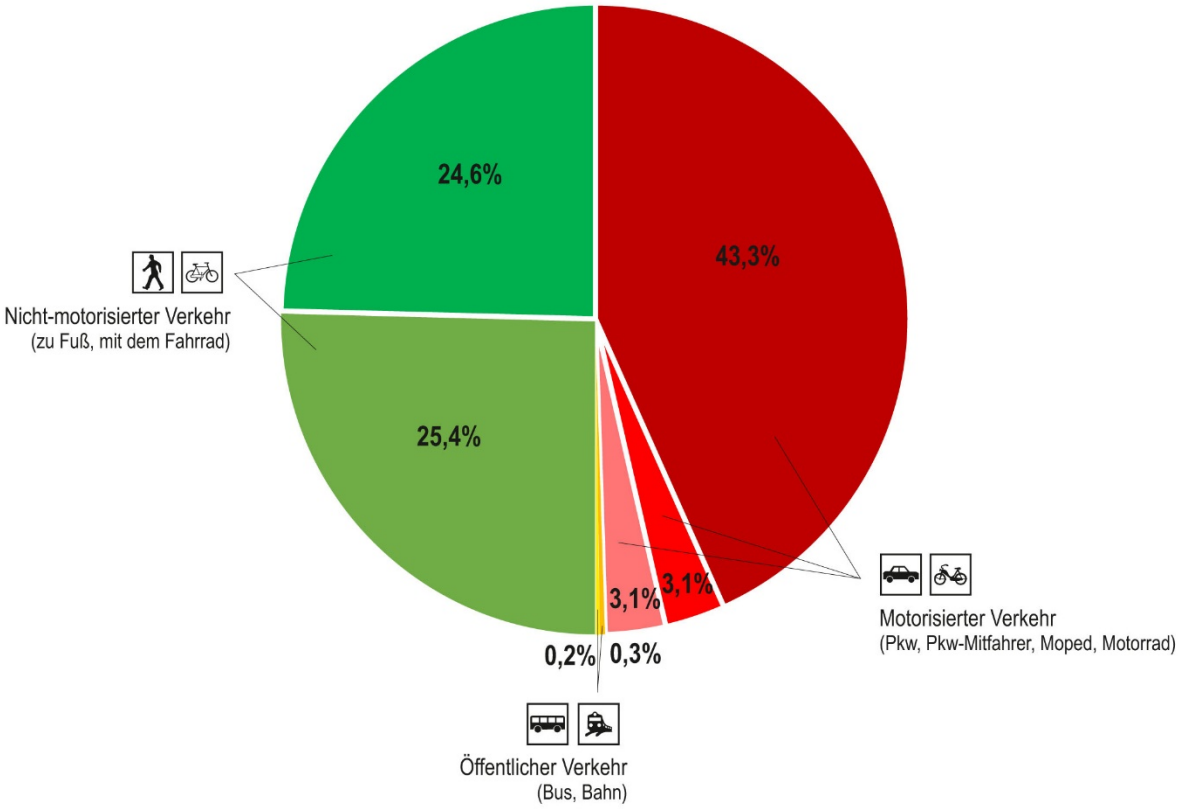

Figure 9 Modal Split of respondents from the city of Weiz

The situation is much better with the employees who live and work in the city of Weiz. Exactly 50.0% of all employees walk or cycle to work

- 49.5 % use a MIV
- only 0.5 % travel to work by bus or train

2.11.3 Strategic Framework

According to the transport policy planning, a change of the modal split according to Abb. 5 is aimed for a period of only 10 years

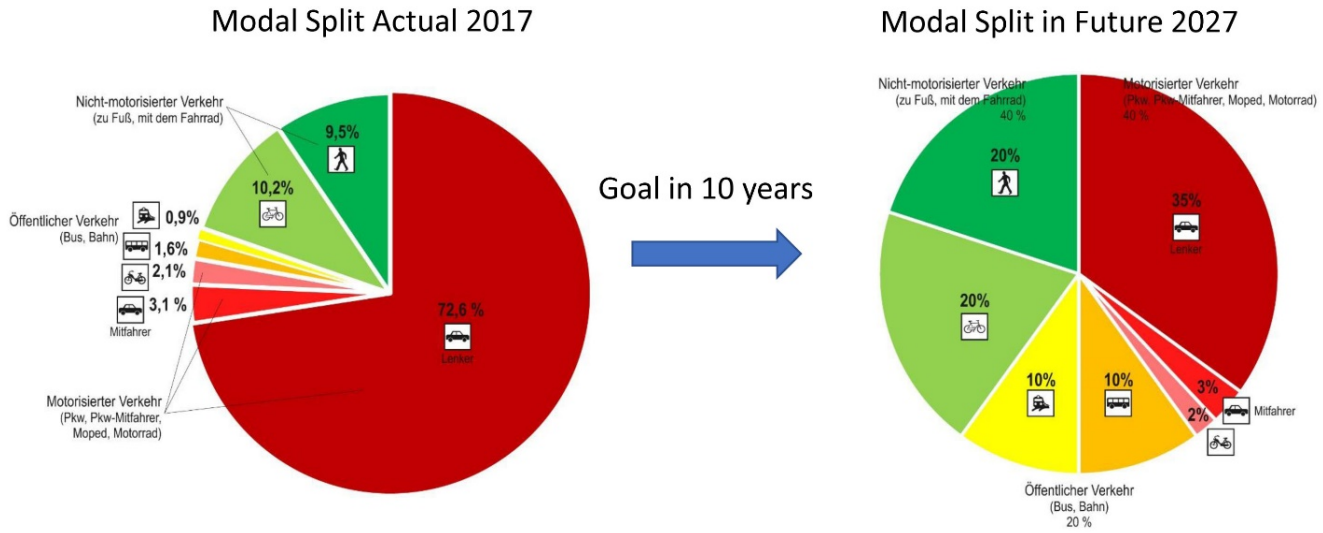

Figure 10 Change of Modal Split in commuting 2017 – 2027

According to the target the proportion of pedestrian and cycle traffic is accepted to be around 40 % by 2027. The proportion of public traffic should then be around 20 %. The MIV is to be reduced by 78 % to 40 %. These values are to be regarded as clear targets in the sense of a strategic framework planning.

"Push"- and "pull"-measures must be applied equally, which means that in addition to the promotion of pedestrian, cycle and public transport, it is also necessary to restrict motorized vehicle traffic to its necessary level of excitement.

Nobody will use the beautiful cycling paths and the attractive bus and train terminals we built, if in the same time the same goal can be reached with the own car on a comfortable city highway with a parking area near to the entrance.

2.11.4 Objectives and Indicators

4 main objectives are defined for the SUMP

- Providing a high quality of life in the city
- Offer a sustainable mobility
- Promoting a conscious traffic and mobility behavior
- Sustainable town planning

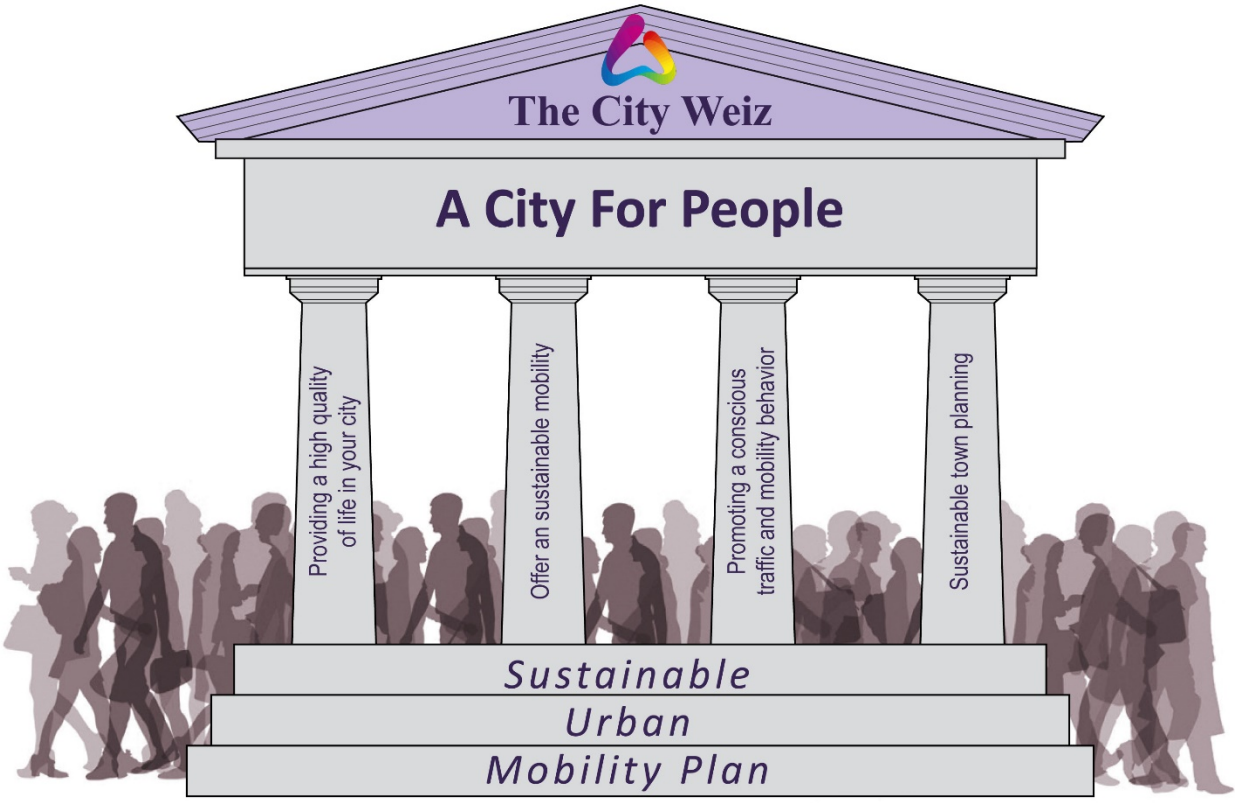

Figure 11 The 4 main objectives of SUMP Weiz

1. **Providing a high quality of life in your residential area**

- Providing a high quality of life in your residential area
- Avoidance of the reduction of the quality of life caused by traffic
- Achieving the maximum protection of the environment by taking soft mobility measures
- Optimum area planning by considering environmental issues

2. **Offer a sustainable mobility**

- Promoting and supporting pedestrian and bicycle traffic
- Supporting and improving public transport (bus, train …)
- Reduction of motorized vehicle traffic to the smallest amount
- Support of the combined traffic

3. **Promoting a conscious traffic and mobility behavior**

- Promoting environmentally friendly mobility habits
- Promoting soft mobility

- Reducing using motorized traffic

4. Sustainable town planning

- Promoting the further development of a "city of short distances“
- Avoidance of vehicle-oriented area planning and supporting people - oriented town planning
- Development of settlement structures aiming at an optimal use of eco - mobility (walking, bike, public transport)
- Reducing the consumption of space for traffic to a minimum

2.11.5 Measures, Responsibility and Costs

Measures regarding

1. Pedestrian traffic

- providing a comprehensive/concluded pedestrian path network
- designing walking areas more attractive
- establishment of short path connections
- Traffic calming in the city center

Responsibility: municipality and state

Costs: € 1.1 Mio.

Funding sources: local and state budget

2. Bicycle traffic

- providing a comprehensive/concluded cycling path network with attractive cycling infrastructure
- designing cycling areas more attractive
- establishment of short path connections
- establishment of road connections past the city boarders connecting to public transport stops

Responsibility: municipality and state

Costs: € 6.7 Mio.

Funding sources: local and state budget

3. Public transport (bus, train)

- improvement of PT timetable
- expansion of WASTI (local micro PT system) and call-and-collect-buses
- improvement of the PT stop equipment and furniture

Responsibility: municipality, province, state and nation

Costs: € 1.6 Mio.

Funding sources: local and state budget

4. Motorized vehicle traffic

- traffic calming and speed reduction in the city center
- reduction of parking areas and parking space management
- establish a pedestrian area in the older town center
- promoting the use of electric vehicles and other sustainable power units in the way of car-sharing

Responsibility: municipality

Costs: € 2.0 Mio.

Funding sources: local budget

5. Awareness

- Formation of active groups
- Marketing in traffic
- Role model

Responsibility: municipality

Costs: € 200.000,-

Funding sources: local budget

6. Spatial planning

- Transport requirements in spatial planning
- Spatial planning strategies

Responsibility: municipality

Costs: € 100.000,-

Funding sources: local budget

2.11.6 Conclusion

In the development of the SUMP as part of the INTERREG Danube Transnational Programme CHESTNUT we have to consider the following with such a work process:

- First of all: you have to define clear goals, which you like to reach. “Only if you know your goal, you will find the way”!
- It is also necessary to use exact indicators and you have to define exact limits
- It is also necessary to develop “PUSH”- and “PULL” measures. For example: you have to build new and attractive pedestrian and cycling routes and at the same time you also have to reduce the parking spaces and establish a pedestrian area in the center of the city

With the help of the SUMP the city of Weiz will develop and implement a new sustainable mobility plan in the next 10 years.

2.12 MUNICIPALITY OF ZADAR: SUSTAINABLE URBAN MOBILITY PLAN (SUMP) DRAFT ZADAR FUA

Drafted by:	Zadar
Authors:	Prof. Josip Faričić, PhD Assistant professor Ana Pejdo, PhD Tome Marelić, MA, research assistant Associate professor Anica Čuka, PhD
Date:	04/12/2018

The main objective of CHESTNUT is to contribute to reduce by 2-3% within 5 years the private motorized traffic and hence developing a better connected and interoperable environmentally-friendly transport and safe system in the Functional Urban Areas of the Danube Region involved in CHESTNUT, overall based on integration between more sustainable means, like public transport, cycling, walking, electrical vehicles. A Sustainable Urban Mobility Plan (SUMP) is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles. A SUMP tackles transport related problems in urban areas more efficiently. It is the result of a structured process that comprises status analysis, vision building, objective and target setting, policy and measure selection, active communication, monitoring and evaluation – and the identification of lessons learnt.

During the last decades numerous problems have arisen regarding transportation system within the Zadar FUA limits. Transport system of Zadar FUA consist of developed network of local, regional and state roads, among which the most important ones are the Adriatic Highway and Adriatic Tourist Road, Zadar Airport, international railroad Zadar – Knin, passenger sea port „Zadar“, commercial port „Gaženice“ same as large number of ports, anchorages, marinas, car-ferry landings, in the coastal area and on the islands.

Although the developments of the Zadar FUA transport system, at the beginning of the 21st century had exclusively positive influence on the economy, there is still evident disproportion between road, air and sea passenger transport in relation to rail and commercial sea transport. Public transport system in Zadar is designed as a radial one focused on peak hour commuter travel. As one of the most popular tourist destinations in Littoral Croatia, Zadar attracts large

volumes of tourist flows causing additional problems for resident population and numerous visitors. Traffic congestion, especially in the city center causes longer trip times, parking difficulties and delays for all involved in the transport system.

The main problem encountered in the process of drafting SUMP was the lack of statistical data for numerous indicators. Field research and analyses of available statistic data determined that the dominant transport mode in the Zadar FUA is road transport. City bus system is based on regular operation of transit buses along a route calling at agreed bus stops according to a published public transport timetable. Main reasons of the congestions are: inadequate road infrastructure on some road sections and increased number of vehicles due to tourist arrivals. Public transport system in Zadar and majority of other towns in County is designed as a radial one focused on peak hour commuter travel. Road analyses indicate that 74% of roads in the City have no sidewalk, 7% have a sidewalk on one side and only 19% have sidewalks on both sides of the road. Building of roads was not followed by the implementation of cycling infrastructure and other related facilities such as parking spaces for bicycles. Because both local population and tourists cycle more and the infrastructure is not following the enlarged demand the number of traffic accidents involving cyclists will probably continue to increase. During the last ten years mainly due to the increased demand coming both from local population but also from tourism industry local authorities invested in several cycling routes and is begging to recognize the importance of cycling. Cycling transport practically does not exist aside several cycling lames in the City of Zadar, cycling lane from Zadar to Island of Vir and numerous macadam roads labelled as cycling roads primarily for recreational use.

The most comprehensive study on transport in Zadar settlement so far is Study of transport system of City of Zadar: ITS (intelligent transport system) and reconstruction of roads in City of Zadar. At the moment Master plan for the North Dalmatia region is being written and Zadar FUA is the integral part of the region. Research done will serve as the basis for future elaboration of all documents on transport planning in Zadar FUA.

The overarching goals and measures that were defined as action lines to achieve sustainable mobility for Zadar FUA SUMP are: SMART Mobility, LOW Carbon, ACCESS for all and SAFE transport. There are numerous smart mobility solutions which can reduce traffic and air pollution and increase efficiency. Targets that need to be fulfilled until 2030 are to: reduce average delay

times by 30%, increase the frequency of public transport services by 30%, increase the percentage of walking to 50%, use of city buses to 30%, and use of bicycles to 30% compared to 2017, increase percent of population living within 1 kilometer of transit stop with service of 15 minutes or less by 30%, reduce the number of hours exceeding the NO2 limits by 50%, increase the number of bus lines for 30%, increase the length of cycling paths by 50% until 2030.

Increase the number of population cycling by 30 %, decrease the waiting time in public transport by 50%, increase the number of passengers on ship and ferry lines by 30%, increase the number of berths for daily use, from 0 to 30, it is necessary to reduce the number of traffic accidents by 40% and the number of fatalities by 100% by 2030 compared to 2017, increase the length of side-walks for 70% until 2030.

Implementation of ITS system & Introduction of e-ticketing is the measure that could solve some of the current problems within Zadar FUA transport system. By implementing intelligent transport system following will be achieved: coordination of road transport with economy development, improvements of transport safety, especially pedestrians and school children, protection of the environment, noise reduction, and reduction of travel times.

One of the measures predicted by SUMP is to add 50km of cycle lanes during the total time frame of the SUMP and expand current bike-sharing scheme. Cycling is the best type of transport for short-distance trips and it is considered low-carbon environment-friendly, economical and above all beneficiary to human health. Majority of trips in Zadar FUA are short ones up to 5 km. Daily commuters mainly travel up to 30 minutes from the place where they live to the place where they work or go to school.

In order to increase the number of public transport users, reorganization of current bus system routes is in plan. Public transport system in Zadar is designed as a radial one focused on peak hour commuter travel. Measures that will be implemented are reorganization of current bus lines, introduction of e-ticketing system, implementation of buses with lower CO2 emission; electric city buses for environmentally friendly short-haul transport.