DELIVERABLE T1.1.3

Strategy on institutional coordination for integrated mobility planning at FUA level

Case studies: Leipzig (DE), Brno (CZ) and Koprivnica (HR)

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Executive Summary

This report presents the outcomes of the institutional cooperation process in the framework of the sustainable mobility strategy development in pilot areas of three Central European functional urban areas (FUA): Leipzig (Germany), Brno (Czech Republic) and Koprivnica (Croatia). It documents the process of developing Action Plans for low-carbon mobility in the three FUAs, including different options for institutional coordination, governance models for different FUA contexts, and recommendations for regional, national and transnational uptake.

Given the fact that the three FUAs have different planning conditions, the institutional cooperation process has been tailored to the respective context and looked also at the future development of the areas in the FUA context. However, this report is developed as one single overarching presentation of the three FUAs (Leipzig, Brno and Koprivnica), including good practice examples from other project partner FUAs (Krakow, Skawina and Szeged), to provide a good overview over a palette of different suitable cooperation models.

1. Introduction

The implementation of sustainable and innovative transport services plays an important role in the EU's energy and climate objectives. With over 60% of the European citizens living in urban areas with >10,000 inhabitants, and over 72% in functional urban areas, urban mobility accounts for 40 % of all CO2 emissions of road transport and up to 70 % of other pollutants from transport (the whole transport sector in EU accounts for about 25% of total CO2 emissions). The low-carbon public transport (PT) systems account only for 10% of CO2 emissions while private motorized modes account for 90%. Enhancing capacities for low-carbon mobility planning is one of the main tools to reduce transport-related greenhouse gas emissions in urban and suburban areas.

From the start, the LOW-CARB project focused on improving capacities for mobility stakeholders at FUA level in the three partner cities, and subsequently in all the other partner cities, by creating a good collaboration fundament. It was set up and practiced in the process of developing sustainable mobility Action Plans for specific areas in these cities. Planning an attractive, integrated low-carbon mobility system, based on clean public transport services (PT) and complemented by innovative mobility offers, was a key element in order to reach the project's main goal of creating good practices with high take-up potential in Central European FUAs.

The report follows the structure of the SUMP cycle, comprising 4 phases, each with three planning steps and a total of 32 activities. It identifies successful governance processes corresponding to each of them, and is structured in 8 sections as follows:

1. **Introduction**
2. **Description of strategy preparation and status quo analysis**

Figure 1: Phase 1 of the SUMP cycle, SUMP Guidelines, © Rupprecht Consult 2019

3. **Description of the strategy development as a stakeholder-driven process (study case: Leipzig)**

Figure 2: Phase 2 of the SUMP cycle, SUMP Guidelines, © Rupprecht Consult 2019

4. **The process of selecting and prioritising the measure packages together with stakeholders**

Figure 3: Phase 3 of the SUMP cycle, SUMP Guidelines, © Rupprecht Consult 2019

5. **Implementation and monitoring**

Figure 4: Phase 4 of the SUMP cycle, SUMP Guidelines, © Rupprecht Consult 2019

6. **Recommendations and next steps**
7. **Conclusions**
8. **Annexes**

As explained in the 2nd edition of the SUMP Guidelines[1], the SUMP cycle and structure is an "idealised and simplified representation of a complex planning process" and needs to be adapted to specific needs while following the overall principles of Sustainable Urban Mobility Planning. Therefore, this report focuses on presenting flexible approaches for different stages of the planning process and different contexts. It does not intend to provide a comprehensive method of developing a SUMP.

In the two previous reports (D.T1.1.1 and D.T1.1.2), an analysis of regulatory frameworks and stakeholder involvement in the FUAs of Leipzig, Brno and Koprivnica was conducted. Based on their findings, stakeholder involvement was planned, working groups established and the collaboration framework designed and agreed upon. The first stakeholder meetings had the aim of strengthening the cooperation, harmonizing the working styles of actors within one FUA, and on that basis discussing the major mobility problems in each city and creating a common mobility vision for the pilot area. The current report builds on the outcomes of the previous discussions and summarises the strategy development process in the three FUAs.

Moreover, this document focuses mainly on the governance model followed by each FUA and on the collaboration methods chosen to better work together, thus the measures and packages of measures selected for implementation are listed in the respective deliverables: D.T1.5.1-4 (one separate document per FUA).

The eight SUMP principles

Figure 5: The eight SUMP principles, SUMP Guideines, © Rupprecht Consult 2019

The concept of Sustainable Urban Mobility Planning is based on eight guiding principles. The best planning methods that help achieve mobility strategies take into account a close exchange with relevant authorities at other levels of government (e.g. district, municipality, agglomeration, functional urban area, region and state). The vision elaborated together with all key stakeholders at the FUA level is one of the key success factors that helps harmonize the view on mobility as a functional system. Thus, consistent efforts invested in attracting all key stakeholders directly affected or impacted by the mobility flows at the FUA level, and in clustering them into different levels of working groups (e.g. decisional, operational) usually pay off in the long run. A good level of collaboration can provide a better overview of the mobility situation and planning framework outside administrative borders and bring perspective into the planning process. Moreover, by setting up Inter-departmental and cross-institutional teams leads to an improved data-sharing process through availability of larger sets of data and information coming from the different municipalities and actors involved. Through modern technology and digital tools (e.g. traffic modelling), processing large amounts of data – including open-source data - has become more and more accessible, especially in the collaboration framework between several urban and rural centres part of a FUA. In addition, quicker and efficient validated methods that help directly involve the public (citizens, local influencers, companies, start-ups), in the fundamental public policy choices that help

[1] https://www.eltis.org/sites/default/files/sump_guidelines_2019_interactive_document_1.pdf

shape the FUA vision are now widely available. For example, very successful urban competitions among start-ups organised in Brno (2017), Leipzig (2019) and Szeged (2019) formed a solid basis for data and idea collection in the process of vision elaboration and measure selection at the entire FUA level. More information on the urban competitions (hackathons) organised in the framework of LOW-CARB in Leipzig and Szeged can be checked in deliverable D.C.4.5. The Hackathon organised in Brno in March 2017 contributed largely to their SUMP update process and was organised as part of their SUMP public engagement strategy – one of the main outcomes of the City of Brno in the CH4LLENGE project[2].

The first SUMP principle: Plan for sustainable mobility in the functional urban area

Figure 6: The first SUMP principle, SUMP Guideines, © Rupprecht Consult 2019

The first SUMP guiding principle[3] emphasizes to plan mobility at the functional urban area level, looking at the daily flows of goods and people beyond the city boundaries. Many cities focus on relieving the city centre of intensive motorized traffic to create space for a thriving, liveable and safe environment, but districts on the edge of the city come across very different mobility challenges. They must face increasing levels of motorized traffic, resulting from travel-to-work flows and daily exchange with suburban areas and surrounding communities. Most traffic flows usually cross city boundaries. To plan effectively in this context, SUMP explores how mobility planning can become a more dynamic and flexible process based on real movement patterns and not on administrative boundaries. To avoid contradictions with the plans of surrounding public authorities, the development of a mobility strategy for an entire city, a district or a neighbouring town should be integrated with the overarching mobility vision at the functional urban area level.

2. Description of strategy preparation and status quo analysis in FUAs Leipzig, Brno and Koprivnica

This section covers the three steps of the 1st SUMP cycle phase "Preparation and analysis":

1. Set up working structures
2. Determine planning framework
3. Analyse mobility situation

[2] City of Brno | SUMP Challenges (sump-challenges.eu)

[3] https://www.eltis.org/mobility-plans/sump-concept

LOW-CARB governance models at a glance

There are different governance models for how to coordinate mobility planning in a FUA. All of them can be effective, depending on the legal and institutional context. The LOW-CARB project provides for three different cases as described below:

Leipzig

Challenge: fast-growing industrial area near the airport, difficult travel-to-work flows, mobility and economic pressure at the regional level;

Solution: a zonal mobility Action Plan, aligned to both city and region strategic goals.

Governance model:

- Different working levels among stakeholders (Steering Group, working group); established long-term collaboration; regular meetings;
- Focus on dialogue with private stakeholders/ target group (companies).

Brno

Challenge: outdated SUMP, emergence of new mobility challenges at the FUA level;

Solution: SUMP Action Plan update, yearly revisions, closer monitoring of measure implementation.

Governance model:

- Process initiated and managed by the City of Brno
- Built on the previous SUMP development experience (working groups with the key stakeholders, constant dialogue, regular exchange, regular public consultation)
- More efficient monitoring process.

Koprivnica

Challenge: Design the organisation and limits of FUA, strong mobility challenges at the FUA level, no central regulatory framework for sustainable mobility, call for action;

Solution: SUMP Action Plan for FUA, focus on public transport, real prospect for accessing EU funds with a strategic basis in place

Governance model:

- Challenging stakeholder engagement process (small FUA communities with limited resources): direct dialogue, bilateral consultations;
- Get early external support starting with data collection

Forms of stakeholder cooperation

Planning for low-carbon mobility at functional area level requires a close cooperation among the many entities operating in the area. In the mobility strategy development, different forms of cooperation could be differentiated as follows:

Vertical cooperation – organisations which are accountable to other organisations in a hierarchical manner (e.g. a local authority and the local public transport authority)

Horizontal cooperation – autonomous relationship between different organisations (e.g. a local authority and private operators)

Spatial cooperation - organisations representing different geographical areas and levels (e.g. a lead local authority and the neighbouring authorities)

Inter-sectoral cooperation - organisations and experts with different backgrounds, knowledge and fields of expertise (e.g. different departments of the local authority).

In the case of LOW-CARB, within the Action Plan development process, all forms of cooperation were applied. For each FUA, the specific cooperation model, procedures and structure for how the local authorities and stakeholders work together were defined. The stakeholder constellation at a FUA level is more complex than at a city level, and sometimes requires a higher number of institutions engaged in the process, with different levels of relations and involvement among them. The Topic Guide *Sustainable Urban Mobility Planning in Metropolitan Regions* [4] provides further guidance for stakeholder involvement in developing a Sustainable Urban Mobility Plan (SUMP) at the metropolitan and regional scale. It identifies four types of metropolitan governance: ***informal/ soft coordination***; ***inter-municipal authorities***; ***supra-municipal authorities***; ***special status metropolitan cities*** and recommends examples and planning principles for the different institutional set-ups.

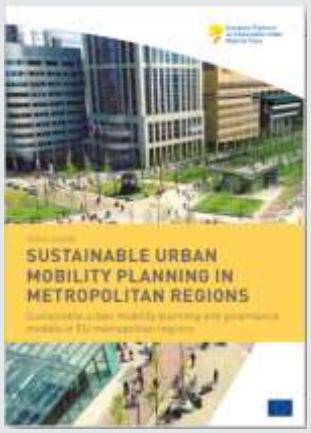


Figure 7: Cover page Topic Guide Sustainable Urban Mobility Planning in Metropolitan Regions, 2019

The metropolitan model of governance is highly relevant for functional urban areas as in both cases different public authorities and levels of institutions beyond the local ones are represented. For example, in the case of FUAs Leipzig and Brno, the regional public transport authority was included from the beginning in the key stakeholders' group, whereas in Koprivnica the horizontal cooperation between over 10 different local authorities and the main urban centre was in focus.

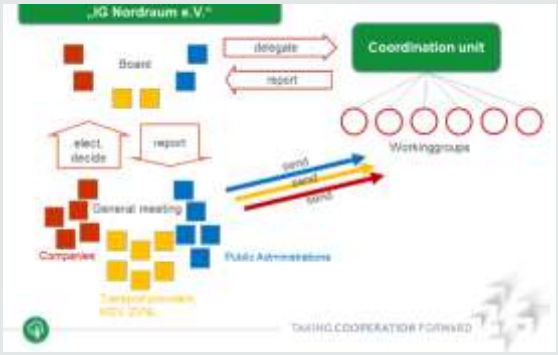
Step 1: Set up working structures

After identifying the main stakeholders to be involved and the goals of the involvement process, the process planning should start. Suitable working structures need to be defined.

Leipzig - Cooperation of three institutions with jointly developed working structures

In Leipzig, right at the beginning of the project, the three main project partners[5] - who also represent the main institutional and geographical levels (city, region and public transport) – jointly developed three governance levels for Action Plan development:

1. *Steering group* (decision making level): The heads of units of the three institutions meet every three months together with project leaders and team. Their role is to take the final decision on milestones, content and framework of actions.
2. *Project leader*: It was decided to name a project leader in each institution to prepare the decisions and consult the practical work of the *Team*. The project leader takes part in the regular meetings of the Steering Group organised every 3 months, but also in the weekly team meetings (see below).
3. *Team*: New staff was hired for developing the masterplan. All team members are working in the public transport departments. The team worked in close cooperation with specific but not fixed roles during the process. One person was specialized in data-driven analysis, one in networking and communication and one in strategic planning. The team meets every week and communicates daily in the process.



Figures 8 and 9: The governance structure and functions of working groups in Leipzig, the Leipzig Steering Group structure and roles

Brno – a city-led validated process of scaling up the mobility strategy at the FUA level

In Brno, the working structures for updating the previous version of the city SUMP were already set up in the framework of the CH4LLENGE project[6], during which the first SUMP had been developed. Based on the lesson learnt in CH4LLENGE, and on the existing collaboration of main stakeholders at both city and FUA levels, the institutional cooperation framework was defined. It focused on strengthening and continuing the good

[4] https://www.eltis.org/sites/default/files/2019_sump_metropolitan_region_guide.pdf

[5] The three project partners from Leipzig are: City of Leipzig (LEI), Leipzig Transport Company (LVB) and Central German Transport Association (MDV).

[6] SUMP Challenges (sump-challenges.eu)

practice of regular collaboration among the different levels of government – local, regional and national through regular exchange in meetings and workshops. Within the pool of stakeholders, the most relevant ones are departments of Brno City Municipality (Department of City Planning and Development, Department of the Environment, Office of the Strategy of the City of Brno and Department of Transport), neighbouring municipalities, South Moravian Region office (Department of Regional Development, Department of Transport Development, Department of Regional Planning and Building Code), Dopravní podnik města Brna (Public Transportation Company of the City of Brno), KORDIS JMK ([Integrated Transport System Co-ordinator of the South Moravian Region), Czech Railways, academia, research institutions (e.g. CDV), Local (BKOM) and National (RSD) Road Authorities.

The City of Brno developed a SUMP engagement strategy in cooperation with a consultancy specialised in communication and participation that helped the city to conduct a professional and meaningful participation process. The strategy included traditional methods, such as public discussions, round tables, and communication through a dedicated website, but also new approaches such as the 'Brno Mobility – 2050 Vision – Experts Workshop'. In the engagement process from 2015 to 2018, more than 2500 comments from citizens were analysed, more than 500 people were involved in about 30 events, and several workshops with citizens, experts, city districts and municipalities, as well as politicians were organised.

Koprivnica – pioneering and consolidating a new model of mobility planning: the first Croatian functional urban area

Grad Koprivnica

In Croatia the FUA concept is still new and the regulatory framework does not cover this type of spatial organisation yet. The pioneer city of Koprivnica – the first Croatian city to develop on its own a SUMP in 2014 – went one step ahead and put the basis of the first Croatian functional urban area with the City of Koprivnica as its urban centre, and linked it to the national administrative framework. The arguments were the lack of integration between different (and scarce) public transport systems covering the city and its surrounding localities where commuting flows are creating more and more mobility issues (e.g. traffic congestion at peak hours, high pollution levels alongside high-traffic corridors, increased number of cars traffic at the regional level). The City of Koprivnica defined their FUA in connection to a functional public transport system which is optimised to improve the connectivity in the inter-urban area of the city.

Step 2: Determine planning framework

Hand in hand with the setup of working structures, the planning framework needs to be determined to tailor Sustainable Urban Mobility Plan development to the local situation. This includes the definition of the geographic scope, which ideally should address the 'functional urban area'. Other important aspects are to follow legal planning requirements and to link with planning processes of related fields. The results of all previous activities are then summarised into an agreed timeline and work plan, which should be politically approved to create reliability for involved actors. If lack of capacities has been identified before, suitable arrangements need to be made to get external support for SUMP development.

Leipzig

In Leipzig, the partners discussed the scope, the area and the aims of the masterplan during several steering group meetings. The area was selected based on already existing informal planning instruments. Important was to go beyond the administrative borders of the city and to involve the main industries located around the Leipzig airport. But also, to include the daily commuter flows, which reach beyond the FUA into the hinterlands of central Germany. Another focus was put in terms of content. The masterplan should take into consideration all environmentally-friendly transport modes and not just public transport. It was also agreed to involve stakeholders from the beginning and throughout the whole process.

Koprivnica

A different approach was taken in Koprivnica, a small city located in the North-western part of Croatia. As a clear regional centre in terms of number of inhabitants, the city is also the economic centre, not only for the neighbouring communities in the FUA, but for the entire Koprivnicko-krizevacka county. The industry is largely predominated by the *Podravka* industry group that produces food and pharmaceuticals products. The Podravka group currently employs around 5500 workers, with most of the industrial facilities being in Koprivnica. Due to this fact there is a large group of workers that is commuting daily to Koprivnica from the surrounding municipalities in the FUA. Also, Koprivnica is offering many of the services that are being used by the citizens of the local communities, such as sports, educational, medical care and other facilities. Koprivnica has a population of approximately 31,000 inhabitants that are dispersed across 9 settlements. The largest settlement - the urban centre – is formed by the City of Koprivnica, making it the regional urban core, while the other 11 less dense neighbouring settlements form the Koprivnica FUA. The FUA has in total 62.464 inhabitants. Thus, the main challenge was to set up a good basis for collaboration among the different many public administrations, and to harmonize the mobility vision for the entire FUA.

A large number of stakeholders was included in the planning process and in the Action Plan development. Their main input was to communicate their needs on sustainable mobility and suggestions on how to better connect in terms of infrastructure with the urban centre Koprivnica. The first part of the planning process was thus to define the geographical scope of the FUA and to get all key actors relavant in the Action Plan development on board. A lot of effort was put into analysing the existing data and the needs of the FUA. Besides Koprivnica SUMP there are other strategic plans (e.g. the regional masterplan covering a wider area, the national transport masterplan). Thus, to have a good quality strategy, the compliance with these overarching documents had to be considered.

No.	Name of public authority in Koprivnica FUA	No. of inhabitants
1	Općina Koprivnički Bregi	2.403
2	Općina Novigrad Podravski	3.161
3	Općina Peteranec	2.848
4	Općina Hlebine	1.407
5	Općina Virje	5.197
6	Općina Drnje	1.863
7	Općina Sokolovac	3.964
8	Općina Rasinja	3.818
9	Općina Koprivnički Ivanec	2.361
10	Općina Legrad	2.764
11	Općina Đelekovec	1.824
12	Grad Koprivnica	30.854
TOTAL nr. of inhabitants in FUA Koprivnica		**62.464**

Figure 10: Overview on public administrations part of the new FUA Koprivnica and their nr. of inhabitants

For more information on stakeholder constellation in FUA Leipzig, Brno and Koprivnica, please refer to deliverables *D.T1.1.2 Report_on_stakeholder meetings_and_common_strategy_vision*, prepared as three separate documents, one for each FUA (submitted in PR5).

Step 3: Analyse mobility situation

The analysis of the mobility situation in a city if the last step of the strategy preparation phase. This is a major milestone that provides the basis for rational and transparent strategy development. Before conducting an analysis of the problems and opportunities in the field of urban mobility as well as including citizens in the analysis, information and data sources need to be identified and cooperation with data owners should be set up. The aim is to have target-oriented and focused data collection and analysis, which includes all transport modes and important mobility-related aims and trends for the entire functional urban area.[7]

Moreover, a self-assessment of planning practices, capacities and resources at the beginning is needed to identify strengths and weaknesses as well as barriers and drivers (e.g. political, institutional and legal framework) that might influence the development of a successful mobility strategy. An assessment of current planning practices will determine how closely they align with the SUMP principles. The functional urban area of Krakow, including LOW-CARB partner city Skawina, supported the testing and development of the regional approach of the SUMP Self-Assessment Tool[8] within LOW-CARB (part of WP T2, Activity A.T2.2 - Development of regional SUMP Self-Assessment Tool). The tool can be used strategically by stakeholders to monitor progress and to assure quality in the process of sustainable urban mobility planning, and can be applied for quality-checks after plan completion, to assess established plans and before or during plan preparation. Throughout 2020, Krakow and Skawina

[7] sump_guidelines_2019_interactive_document_1.pdf (eltis.org)

[8] https://www.sump-assessment.eu/English/start

organised together with the Krakow Metrpolitan Association (Metropolis) and an external expert a series of workshops gathering representatives of 14 municipalities who were guided to take the workshop-style of the self-assessment and thus analyse their current mobility situation at the local level. The individual results were afterwards analysed within the group. Topics such as air pollution, traffic congestion, low-emission zones, bike lanes, B&R and P&R were discussed, and sensible questions over differences in quality standards and indicators for decision-making were raised. The aim of a second series of workshops, organised online between 31.08 – 02.09.2020, was to lay the foundation fo the development of the FUA Krakow SUMP. The workshop was organised as a series of three online sesisons: an introductory webinar[9], individual workshops with each public authority, and a final conference where the participants discussed the common challenges across the metropolitan region, and around a common mobility vision.

Figure 11: The simplified SUMP cycle translated into Polish language. Source: Wolanski

Figure 12 and 13: Results of the SUMP self-assessment process conducted by municipalities in FUA Krakow. Source: Wolanski

With the support of LOW-CARB partners, the SUMP Self-Assessment Tool is available in all languages of the Central Europe region: Polish, Hungarian, Czech, Slovenian, Slovakian, Croatian, Italian and German. Other languages are constantly being added to make the tool convenient for usage by any public authority representative in a country (e.g. Spanish, Romanian or Turkish are alraeyd published and other language versions are currently being prepared).

Another method for collecting data at the inception phase of Action Plan development was used in the LOW-CARB framework by the City of Szeged. With the aim of reducing the CO2 emissions in the Szeged's

[9] https://youtu.be/yZ2UNQBrzTY

Industrial Logistics Center, where the mobility of employees relies mainly on private cars, the first step was to analyse the mobility patterns and needs of the employees with the means of a questionnaire distributed to both employers and employees. This framework was also used as an opportunity to tighten the cooperation and start a long-term communication between the representatives of the municipality, PT operator and the respective companies. A test survey with only one company has been conducted in December 2018, followed by a more elaborated second survey conducted the following year with representatives of all major companies in the area. The PT operator Közlekedés Kft. aggregated the results in an evaluation report based on which the Action Plan started to be developed and the main indicators selected.

Leipzig

In Leipzig, the analysis started with a kick-off meeting that established a dialogue about ongoing and planned activities in the northern part of Leipzig (*Nordraum*) in order to create synergies and avoid overlaps. A main aim was to capture the main challenges in the FUA North industrial area to create a good baseline for the common vision. Ongoing projects were clustered according to the topics Car use (studies and analysis of road infrastructure, car-sharing, car-pooling), Digital opportunities (autonomic driving, mobility platforms, flexible forms e.g. call-a-bus systems), E-Mobility (E-Car-sharing, E-buses, loading infrastructure), Public transport (integrated net, flexible forms e.g. call-a-bus systems, studies of commuters, potential of new train stations), Traffic management, Workplace mobility management, Urban logistics, Cycling (B+R, bike sharing, bike "highways"), and Multi-/inter-modality (B+R, P+R, new mobility stations, further services e.g. rent a bike).

Additionally, to widen the view, the team analysed all transport modes, both traditional ones, e.g. bus, train, tram, and new modes, such as autonomous cars, e-scooters and cable cars. The detailed analysis of the actual mobility situation was conducted by an external expert on sustainable mobility and traffic modelling. In parallel, the companies located in the planning area *Nordraum* were interviewed in relation to their mobility challenges in a series of meetings with the help of a questionnaire, and their employees were interviewed during the European Mobility Week in 2019. The results were discussed in workshops together with the vision and scenarios with departments of the City of Leipzig, district Northern Saxony and the Regional Rail Association (ZVNL).

3. Description of the strategy development process as a stakeholder-driven process

This section covers the SUMP phase 2: Strategy development → relate to the outcomes of strategy development process together with stakeholders including different options for institutional coordination/governance models.

4. Build and jointly assess scenarios
5. Develop vision and strategy with stakeholders
6. Set targets and indicators

This section presents how stakeholders in FUAs collaborated to develop the strategy, how each stakeholder contributed to the scenario(s) assessment and vision building process, and how a common agreement was reached on the strategic targets.

Steps 4 - 6: Build and jointly assess scenarios, develop vision and strategy with stakeholders, set targets and indicators

In this planning phase, the strategic priorities of the Action Plan are set, and important decisions regarding the future mobility vision, the FUA objectives, and the strategic indicators and targets are taken. This phase is also the point where the general public is invited to actively provide feedback on the main strategic elements mentioned above. This validates the strategic priorities and ensures public support and acceptance. At the end of this planning phase and halfway through the planning cycle, the strategic phase is completed, and the plan is forwarded to a city council for adoption and measures are afterwards prepared for implementation.

Leipzig

In Leipzig, the process of developing scenarios was combined with developing a common vision for the Northern industrial area. The aim at this stage was to get a quantitative overview of the likely future situation and a legitimation for the action plan. Clear figures about the predicted economic development of the area, the workplace situation, and the expected number of employees until 2030 were meant to justify a strong increase of offers of environmentally-friendly transport modes that is needed to reach the ambitious political aims of the city.

The focus of the scenarios was mainly set by the local steering group consisting of LOW-CARB partners Leipzig Transport Company (LVB), Central German Transport Association (MDV), and City of Leipzig. But it also reflected the views of stakeholders from the city, namely ZVNL and Northern District of Saxony, who were involved in a dedicated stakeholder meeting on 27.03.2019. An external expert was responsible for developing the quantitative scenarios and analysis with the help of the VISUM-based transport model of the City of Leipzig. The main task was to analyse the current situation of public transport and environmentally friendly transport modes in late 2018. This was the basis for the scenarios, which were discussed mainly at a stakeholder meeting on 27.03.2019. Two main aspects were taken into consideration, when creating a vision for the industrial northern area:

1. **Forecasted number of employees**

The participants decided to define a span for the increase in number of employees ranging from 60% to 100% compared to the current status and conducted different analytical scenarios in this range. For the maximum version (100% increase in number of employees based on the emergent occurrence of new large companies in the area), the expert took into account also a 50% increase for the industrial area surface in order to have an estimation which public transport capacities are needed in the mid-term perspective.

2. **Modal-Split Scenarios**

The City of Leipzig developed six scenarios for different future options in a scientific and open process.

1. ***Continuation of the current mobility strategy;***
2. ***Continuation of the current mobility strategy with constant fares;***
3. ***Sustainability scenario;***

4. ***Bicycle City scenario***;
5. ***Public transport priority scenario***
6. ***Community scenario***

These scenarios were evaluated using various criteria (attractiveness for users, ecological attractiveness, economic attractiveness, systemic attractiveness) and a qualitative assessment was conducted. The City Council decided to follow scenario nr. 3: the Sustainability scenario.

The partners named the chosen scenario "*Umweltverbundszenario*", which describes the vision for the industrial northern area. The main characteristic is a maximum increase of environmentally friendly transport, with no additional increase of motorized individual traffic from the city population and just a constant development of motorized individual commuting from the FUA but with an increasing share of ride pooling. The pedestrian share remains the same, while the increased travels are mainly covered by public transport and cycling. The scenario will be flanked by two alternative scenarios. The first one is a do-nothing projection, which shows what would happen if no measures are taken. The second one includes a moderate increase of environmentally friendly transport.

The results of the *Umweltverbundszenario* showed that an ambitious goal was set. The vision to reach this goal was documented in a storytelling style comprising the following main elements:

- ✓ Around 70,000 employees work in the Northern Area of Leipzig
- ✓ 44% use environmentally friendly transport modes, just 65% the car
- ✓ The majority of employees has access to Train or Tram, meaning fast connections to main nodes
- ✓ For the last mile, different transport modes can be used:
  - buses with direct connection to companies;
  - on demand (partly autonomous vehicle) and ride pooling to increase flexibility;

2030 A sustainable northern industrial area – safe, reliable, affordable and clean mobility

44 percent of commuters use low-carbon means of transport. Most of them have access to regional and local train and tram systems. Through fast connections the employees can easily reach the public transport connection points at the edge of the area. There, various means of transport are available to take the employees to their workplaces especially direct bus lines with higher frequency at peak hours. On some sections, flexible on-demand services and automated mini-buses are available. For short distances, well-developed, green bicycle and footpaths are in place. Bike-sharing service and generous bicycle parking facilities at the connection points and at the front of larger companies ensure that the employees can spontaneously choose a means of transport they like. A personalised assistance-App supports each employee in choosing different means of transport and suggests alternative possibilities depending on travel time, comfort, CO2 footprint, price, sport-related or social aspects. Excellent signage and information system implemented by companies as well as night service for public transport are avaiable.

- improved pedestrian and cycling infrastructure;
- bike-sharing and bike stands that increase multimodality;
- simple booking and information of offers through Apps, LOW-CARB accessibility map, and place-based information.

Koprivnica

In 2014, the city of Koprivnica decided to develop a SUMP. As part of the first stage of the SUMP development process, the city researched which steps it would need to take and the resources required to produce such a document. Based on this research, the Koprivnica SUMP team ascertained that there weren't enough resources and that therefore there was a need to involve external mobility experts. The SUMP team searched within Croatia for mobility experts with enough experience to guide the team through the development process. With the help of these experts, the city conducted a status analysis and a baseline traffic survey.

A SUSTAINABLE AND EFFICIENT MIX OF PUBLIC TRANSPORT AND BIKE-SHARING SYSTEMS IN THE NEWLY CREATED FUA KOPRIVNICA

A comprehensive public transport and bike-sharing system covering all commuting flows among localities in the newly created FUA Koprivnica, based on energy-efficiency and on-demand concepts. A flexible model consisting of creating a mix between BUSKO (public transport) and BICKO (bike-sharing) services, contextualised to adress the specific needs in FUA.

One of the main reasons why there is a need to implement measures that will promote sustainable means of travel on a FUA level is the fact that the public transport connection between the City of Koprivnica and its surroundings is poor. Clearly there is a need for a stronger connection, but this issue is not dealt with on a national level that would have to give the legal framework for setting up such an "entity". The first step that was made, and that was rather accidental in terms of promoting sustainable means of travel, is the expansion of the existing municipal utility company Komunalac Koprivnica that is based in Koprivnica, whereby the rest of the FUA Koprivnica municipalities have got into the ownership structure of the company, allowing them to use all the services that the municipal utility company has to offer, which includes the usage of a public transport system without having to go through the process of concessions and similar activities. This fact has developed the vision that MUC Koprivnica could offer the services it offers in Koprivnica and expand them into the larger, FUA Koprivnica area.

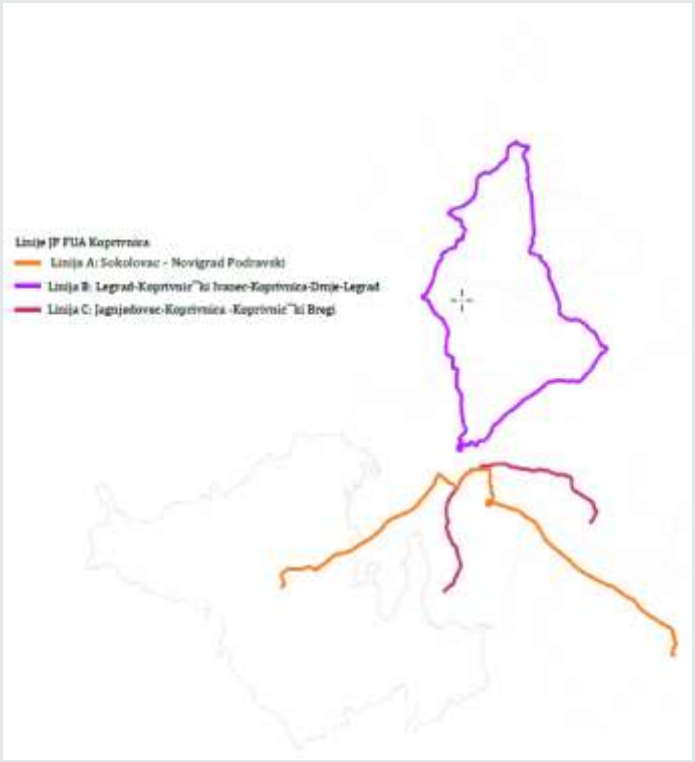


Figure 14: Scenarios for the expansion of public bus transport in the FUA Koprivnica area – new lines. Source: QGIS tool, City of Koprivnica, 2020

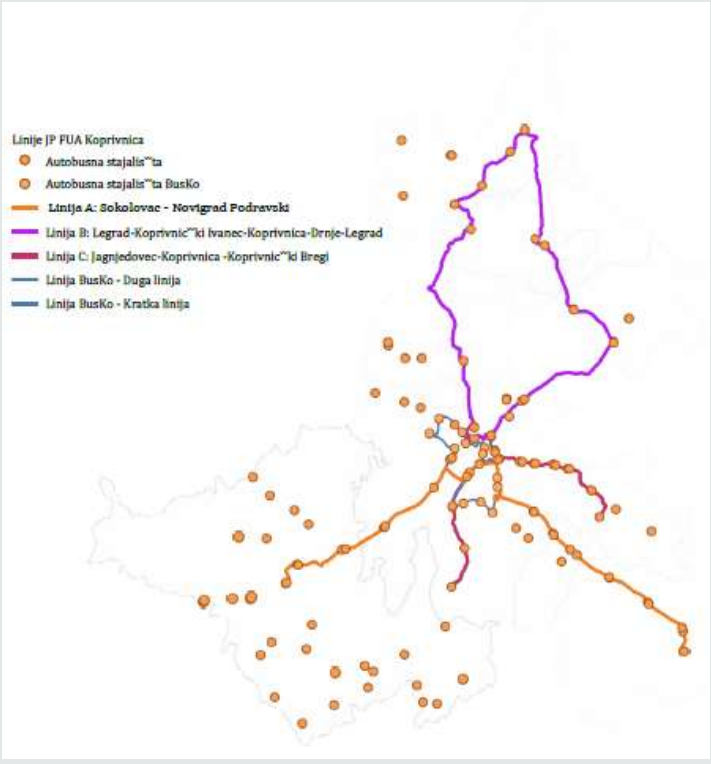


Figure 15: Public transport network in FUA Koprivnica (existing and planned routes). Source: QGIS tool, City of Koprivnica, 2020

Brno

Brno FUA strategy development process built strongly on the experience gathered when developing the first SUMP in the frameworks of the CH4LLENGE project. The Sustainable Urban Mobility Plan of the city of Brno (SUMP Brno) is a strategic document based on a comprehensive analysis of transport, economic and demographic data. This document sets out measures that will enable the mobility of people and businesses in and around the city to be met. The document emphasizes the sustainable development and improvement of the quality of life in the city of Brno. The SUMP is also a strategic document to access EU available funds to support the development of transport infrastructure.

BRNO IS A CITY EASY TO LIVE IN (EVEN WITHOUT A CAR)

In 2050, Brno ranks first in the chart rating the quality of life in cities. 480 thousand satisfied citizens live in there; they are not forced to leave the city for clean air even on their days off. Brno is a city where it is easy to live without a car. It is a city of short trips with interconnected and consistent modes of transport. Mobility is the main political issue as a foundation stone of the quality of life in the city, and for 35 years already, the city residents have been actively involved in the topic of urban mobility with creative suggestions. Being a senior or handicapped in Brno does not mean any limitation of travel habits. In the long term, the city has been making the transport system more efficient in a conceptual and coordinated manner. The ease, possibility and speed of travel are the main objectives of transport planning. At the same time, the city is capable, on the basis of a broad data basis, to respond flexibly in the area of mobility to trends not only in transport but also in demography, economy and migration of population.

Building on the SUMP Brno set of targets and proposed measures, the updated SUMP Action Plan started from strengthening the cooperation with municipalities in FUA Brno and other municipalities in the South Moravian Region. Together and under the coordination of the City of Brno, the stakeholders defined together a mobility vision for the entire FUA to tackle the commuting flows to and out of the city especially for work and education. Experts from different fields and politicians (members of City Council and members of the opposition too) have been involved in this process, and the vision was validated during a strategic workshop Brno Mobility 2050, being afterwards approved by the City Council.

Figures 16 and 17: Vizualization of planned tram lines from Osová to Kampus, in process of realization in Brno. It is planned to be in operation in 2022. Photo credits: salinounakampus.dpmb.cz

Figure 18: Vizualization of tram lines Plotní in Brno. The tram lines were moved to another street to enhance accesibility in the area. The project is currently under construction and should be finalised in 2020. Source: FB - Tramvaj Plotní

*Figure 19: Visualization of reconstruction of tram lines Nové sady in Brno, where the "green belt" - meadow lawn with flowers - will be built for less noise and dust. Source: www.dpmb.cz^*

Sustainable Urban Mobility Indicators (SUMI)

Indicators play a vital role in a city's efforts to make and monitor progress towards a more sustainable mobility system. To support cities in this important activity, the European Commission (DG MOVE) funded the SUMI (Sustainable Urban Mobility Indicators) project to review and contextualise the existing indicator set SMP2.0 of the World Business Council for Sustainable Development[10] to make the indicators more suitable for European cities, more compatible with the availability of existing data sets and with the institutional context of data owners.

The idea behind the project is that sustainable urban mobility indicators are a useful tool for cities to identify the strengths and weaknesses of their mobility system and to focus on areas for improvement. As cities continue to develop Sustainable Urban Mobility Plans (SUMPs) and work towards EU policy goals, it is important that this progress is being assessed to ensure that solutions to mobility challenges are tailored to respond to local needs.

[10] www.wbcsd.org/Programs/Cities-and-Mobility/Transforming-Mobility/Transforming-Urban-Mobility/SiMPlify/Resources/Sustainable-Mobility-Indicators-SMP2.0

Data from a broad range of stakeholders were typically required as input to most indicators, primarily various city departments, public transport operators and national statistics offices. Also, data collection support for urban areas was required for almost all indicators, which has a bearing on the long-term use of the indicator set. Support can and should take various forms: Assistance from statistics offices, through specific funds and –mainly so – through hands-on tailored advice, tips and guidance from experts such as Indicator Mentors or Urban Area Coaches.

SUMI indicator set helps cities to perform a standardised evaluation of their mobility system and measure the improvements resulting from the implementation of new mobility measures, practices or policies. These indicators provide a practical and reliable indicator set that can track progress towards policy goals and identify the potential for improvement in order to make their mobility system more sustainable.

No.	Indicator	Level of data availability as signalled by participating cities
1	Affordability of public transport for the poorest group	High
2	Accessibility for mobility-impaired groups	Medium
3	Air pollutant emissions	Medium
4	Noise hindrance	High
5	Fatalities	High
6	Access to mobility services	Medium
7	Quality of public spaces	Medium
8	Urban functional diversity	Low
9	Commuting travel time	Medium
12	Mobility space usage	Medium
13	Emissions of greenhouse gases	Medium
14	Congestion and delays	Medium
15	Energy efficiency	Low
16	Opportunity for active mobility	Medium
17	Multimodal integration	High
18	Satisfaction with public transport	Medium
19	Security	Low
20	Traffic safety active modes	High
	Modal Split	Medium

Figure 20: The SUMI indicator set

4. The process of selecting and prioritising the measure packages together with stakeholders

This section covers the 3rd phase of the SUMP cycle "measure planning" covering the following steps:

7. Select measure packages with stakeholders
8. Agree actions and responsibilities
9. Prepare for adoption and financing

With the third phase, the planning process moves from the strategic to the operational level. This phase focuses on measures to achieve the agreed objectives and targets.

Leipzig

In Leipzig, the development and prioritization of actions has been conducted in a step-by-step approach. In late 2018, the project team from LVB, MDV, and City of Leipzig developed a set of around 90 draft actions, which were presented to project leaders in three meetings during 2019. The results of this internal consulting process were presented in a final internal high-level workshop with heads of partner institutions, external experts and project management of LOW-CARB on 20th August 2019. In this workshop, the partners discussed the actions and prioritized them according to their effectiveness to enhance public transport services and environmental-friendly transport modes.

In preparation of this workshop the most important stakeholders from the region - ZVNL (associated Partner) and the District of Northern Saxony - have been consulted to provide professional input to the ideas for actions.

Further stakeholders from the FUA have been involved in the training workshop on 10th September, including additional departments from the City of Leipzig (department for economic affairs department for environment, department for city planning, department of traffic and road construction), the City of Schkeuditz, and PT of Northern Saxony. The participants widely accepted the actions and will support their implementation. They wish a further dialogue and involvement in the development of actions and especially when it comes to implementation.

After having the support from the administration and political level, the next step was to involve and convince the companies. A first step had been realized already in a first workshop on 1st August 2018 with 11 companies from the Northern industrial area, which dealt with the current situation, companies' needs and information on current offers. Continuous contact to companies in the European Mobility Week and bilateral consultation established a good working relationship during 2018 and 2019. Two more meetings with stakeholders were organized on 10 September and on 29 October 2019.

This background was used by the Leipzig partners in order to organize a stakeholder meeting with companies on 6th November 2019, where 9 companies participated. The companies embraced with enthusiasm ideas starting from new bus lines, new train stops, to micro mobility hubs with the aim to improve the mobility system for their companies and employees. The discussion had shown that the actions met the specific needs of companies dealing with changing shift times, need for direct connections and high-quality transport systems. At the end of the day, it was clear that there is an urgent need to implement the actions in order to really improve the system and go beyond just concepts. The companies showed willingness to support the process: "What can we do to make these actions happen?"

After actions were agreed, further consultations and information meetings took place in 2020 with stakeholders, transport providers and city administrations in the FUA. The actions were adjusted and for some of them a detailed financial planning and adaption, especially of the actions with short time perspective until 2024, have been made in a close cooperation of the city administration of Leipzig and public transport operator LVB.

Brno

In Brno, the measures were selected based on setup goals and policy fields. SUMP measures are agreed and prioritised in the SUMP Action Plan every year. The newly developed SUMP monitoring tool is useful for gaining a clear picture who oversees measure and where the funding comes.

Koprivnica

Grad Koprivnica

In the case of Koprivnica, many of the measures that are laid out in the FUA action plan were already recognized in documents of higher importance, developed on a regional and national level. These documents included analysis and development of measures that were agreed by the stakeholders on a higher level. Since the FUA Koprivnica plan is quite straight forward, containing only several measures that are being thematically based on the expansion of current sustainable mobility services that the City of Koprivnica has to offer to the FUA area and meeting some requirements that necessary in order for those measures function on a FUA level, the responsibility for the measure implementation and monitoring will be carried out by the City of Koprivnica. The approval of the measures and the Plan will not be formal, as in the case of the 1st generation SUMP of Koprivnica. A proposed set of measures was defined to enhance the level of sustainability in transport at the FUA level, lying in the expansion of the PT system in Koprivnica and FUA, bike and e-bike system, organisational set-up of the PT system, cost projections of the investments and running costs of the investments. The financial aspect was particularly important because the central administration is currently in the process of organising the next financial period 2021-2017, thus in order to apply for funding cities, regions and other administrative bodies need a strategic basis. Thus the main aim of the Koprivnica FUA Action Plan was to: define measures, define costs and prepare for accessing funds in 2021-2027.

5. Implementation and monitoring

This section covers the 4th phase of the SUMP cycle "implementaton and monitoring" covering the following steps:

10. Manage implementation
11. Monitor, adapt and communicate
12. Review and learn lessons

The fourth phase focuses on implementing the measures and related actions defined in the SUMP, accompanied by systematic monitoring, evaluation, and communication.

Leipzig - implementation and monitoring phase in the Action Plan development

Stadt Leipzig

Leipziger Verkehrsbetriebe

MDV

After having the support from the public administration and from companies, further involvement of additional stakeholders from FUA, politicians from regional and national level, and further companies was necessary. To ensure implementation the partners developed a so-called *Governance strategy for the implementation*, including a working structure for the upcoming years and a new decision-making process. The steering group decided to use a similar structure in the beginning but widen the staff responsible for implementation in mid-term perspective. Therefore

The following fields for working structure have been considered in several workshops during the year 2020: project management, marketing, stakeholder involvement including administrations and companies, preparation of actions and financing. Here a new staff is required at

least six new staff members in the partner institutions for coordinating the process. It was started to acquire for funding to ensure sustainability of staff and acquire new staff to realize these fields of actions. Detailed working structures will establish begin of year 2021 but also used already existing structures from several projects and processes in the FUA.

A focus for the implementation will be the involvement of companies beside stakeholders. A joint decision making, financing and selecting will be a key to have a successful implementation. Therefore, different legal institutional forms (GmbH, e.V. UG, e.G) and financing models based on the number of employees have been analyzed. The recommendation result to establish an association (e.V.) with different groups and a timeframe for implementation.

A brochure and two videos have been produced to communicate the masterplan to companies and stakeholders. For the implementation of several actions a communication strategy will be developed by the marketing team. Because of the different character of actions, from small infrastructure to new PT offers and company-based mobility consulting, different approaches might be necessary. Different target groups, e.g. political level, companies and employees, will be addressed, so different approaches will be needed. The implementation will be monitored by the coordination team, using the pilot action accessibility map and maybe an adapted planning tool which measures the effects of actions based on increased accessibility and further data. Additional further studies are planned by the city to measure the possible effects of actions of the masterplan towards road infrastructure MIT use and commercial transport.

The review and lessons learned will be shown by practice through the coordination unit. Further review and adjusting of plans are also foreseen in Dynaxibilty4CE project, which focus on MaaS and automated driving, on-demand transport.

Brno

In Brno, the measure evaluation was made using the newly developed GIS Monitoring tool - the progress of the measure implementation is regularly updated, therefore actual information about progress and status of measure is available. The tool is mainly used internally by all involved parties, the stakeholders who are also involved in SUMP development. The information on annually approved Action Plan and on the measures proposed was made available to the larger public. Moreover, the LOW-CARB partner City of Brno used the SUMP Self-Assessment Tool in the process of updating their SUMP Action Plan and validating the compliance of their selected measures with the SUMP principles (more information on the FUA Brno Action Plan can be checked in deliverable D.T1.5.1-4 Brno Report SUMP Action Plan, submitted in PR7) and preparing the new mobility projects in the city. Given the experience gathered by the municipality while developing the SUMP in the framework of the CH4LLENGE project, the results of the self-assessment showed that the city understands the SUMP methodology well, and that the measures selected are sustainable, but more efforts need to be invested in enhancing the cooperation at the FUA level.

Koprivnica

In Koprivnica, the success of the Action plan will be visible in a short- and mid-term period and will depend on several factors. The assessment of the Plan will be done by the dedicated City of Koprivnica employees and the representatives of the stakeholders. The results will be visible through clear indicators that are set in D.T1.5.1-4 Report on pilot area action plan, which are clearly laid out and understandable to all participating parties. Examples

of the indicators are the changes in the number of public bikes available, number of additional public transport lines and the development of new infrastructure, like new cycling and pedestrian paths that connect the core of the FUA, City of Koprivnica with the rest of the FUA area to form a functional unit that would increase the usage of sustainable means of transport and overall increase the sustainability of travel in the dedicated FUA area.

A very interesting example of measure evaluation was offered by the LOW-CARB partner City of Skawina. To evaluate their newly introduced low-emission bus line, the city conducted an extensive survey among the passengers. The turnout was impressive: a total of 439 surveys were filled in, out of which 198 by passengers in the bus and 239 online. The main conclusions of the survey are regularly being analysed by the municipality and measures linked to the route and frequency are taken based on the results.

As a result of the research, the conclusions should also include the fact that during early morning hours (5:00 - 6:30) and late evening hours (20:00 - 22:40), the routes are characterized by a very low passenger turnout. People travel then only sporadically. Most passengers declared traveling around the city due to the possibility of connecting many traffic generators in the city, and additionally connecting a neighbouring municipality with the centre of Skawina. The bus occupancy rate is strongly linked to the traffic to and from schools, and to the rail connection with the Skawina Communication Center.

6. Recommendations and next steps

- Recommendations for future improvements and strategy updates
- Strategy sustainability and follow-up
- Next steps towards measure implementation and financing

Leipzig

In Leipzig, the implementation process will show, which parts maybe must be adjusted or revised. The process especially with high level of involvement of companies is new. Further development of aspects from Dynaxibilty4CE and further planned national funded projects for innovative aspects esp. for on-demand transport will be introduced. The focus will be the implementation of strategy. Therefore, letter of intents and city council decisions are prepared now. The more participated approach of companies will be realized step by step, now started with first actions in the field of company-based mobility management. Esp. for the infrastructure, feasibility studies are necessary and some in depth look of every action is needed, thus several funding opportunities mainly on national level are under preparation. This relates to small programs to co-finance staff and some studies as well as bigger investment programs.

Brno

In Brno, for next steps more close cooperation with neighboring municipalities is needed, to find ways how to engage them into the process; however, establish institutional cooperation is very successful and its important also for other fields; for GIS Monitoring Tool is essential that all involved institutions consider this tool as important and useful and therefore they are working with it, thanks to this the updating of the measure status is easy as well as developing of action plans.

Koprivnica

Grad Koprivnica

Next steps in the case of Koprivnica would include a much more detailed cost benefit study that would clearly define the needed resources for the implementation of the measures, especial those that relate to the development of new infrastructure, like the cycling and pedestrian paths that need elaborated plans and project documentation. The sustainability of the document is, as always in such documents that include more stakeholders, especial more municipalities as in this case. A key factor that would ensure the sustainability of the strategy is the promotion of the Plan at a higher, national level. This would ensure the, although not formal, a approval of the document that would lead the path towards concrete funding solutions for the implementation of the measures laid out in this document. The first steps regarding the visibility of the document and the proposed measures is already taken, listing the measures in the list of potential documents for the funding from the new EU programming period on a regional level.

7. Conclusions

The Action Plan development in FUA Leipzig, Brno and Koprivnica contributed to identify and agree with key stakeholders a set of concrete actions that can contribute to improve sustainable mobility and transport in each city and its functional urban area in a short-, medium- or long-term timeline. The actions outlined are the results of a governance process, initiated by the relevant departments in a city (in Brno and Koprivnica) or by a Steering Group formed of city, public transport operator and regional transport authority (in Leipzig). It is because of such a holistic approach on governance that the acceptance and ownership of proposed actions was high among all involved stakeholders.

Leipzig

Stadt Leipzig

Leipziger Verkehrsbetriebe

MDV

The process of developing the Leipzig *Nordraum* masterplan has shown the following results and lessons learned:

Following the SUMP approach worked well and lead to a high acceptance and willingness for the implementation.

The process and the flexibility in the process allowed looking beyond borders to consider new ways of mobility and innovation.

An ambitious vision could be created through not directly focusing in the beginning of financial resources.

The process showed that all stakeholders need a willingness for change and a strategic view beyond the transport sector to take in consideration needs of companies and economy.

The close cooperation of all stakeholders and esp. the companies will be the key for a successful implementation. The developed governance strategy is first step to make this reality.

Brno

In Brno, the cooperation established during the SUMP development is helping not only the implementation of the measures but also their evaluation, at which step the SUMP monitoring tool was the key instrument that is keeping the stakeholders together and structures their continuous collaboration. On that basis, this established cooperation will further continue for another cycles of SUMP update/new development.

Koprivnica

In Koprivnica, developing a document that does not have any legal background in the existing national legal framework – the SUMP – proved to be a challenging task. This is something that is very similar with the promotion of SUMPs in Croatia, where the national level representatives did not, and still do not have any understanding for such documents. With that in mind, the main advocates of such documents are cities and municipalities that want to solve such issues because it has a direct effect on their local mobility situation and they experience the difficulties caused by lack of strategic thinking the mobility at regional and FUA level by themselves. The FUA Koprivnica Action Plan is not a breakthrough document that will change drastically a geographical area and the way people commute in a short or a medium term, but it will lay the foundation for a good practice method for solving mobility issues, not only in terms of sustainable transport but also in other issues where the communication between the urban core and the hinterland is needed. On the other side this communication is slowed down due to the relatively slow response rate to local problems at the national level.

The LOW-CARB commons aspects in the multi-facet stakeholder cooperation process at a wider level:

Overcome geographical barriers and enhance spatial collaboration among local authorities in a FUA

Inter-departmental and cross-institutional teams - consistent effort directed towards getting the right stakeholders on board, including private sector (companies)

Follow the validated SUMP process in all steps of the strategy development

Focus on public transport as the backbone of the mobility system at the functional urban area level

Engage external expertise to ensure quality.

The most important learning from the development process of the LOW-CARB Action Plans in FUAs Leipzig, Brno and Koprivnica showed that a FUA-level governance process must take into consideration the political and administrative realities at the local and regional level, as well as all needs and challenges of the relevant stakeholders. Therefore, one of the major challenges was to align project

deliverables and deadlines with governance processes taking place in the functional urban area. In FUA Leipzig, Brno and Koprivnica, the transnational project meetings, stakeholder meetings, bilateral discussions all provided opportunities to reflect and strategically plan the implementation of actions and pilot activities, and also to provide stakeholders on local and regional level with best practices and learnings from other Central European functional urban areas.

8. Annexes

For a complete set of annexes please check the deliverables D.T1.5.1-4 Action Plans as well as the related brochures developed in the framework of LOW-CARB project by the four FUAs (linked to the respective deliverables).