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LOW-CARB

RECOMMENDATIONS FOR LOW CARBON MOBILITY PLANNING WITH COMPANIES IN SUBURBAN AREAS

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EXECUTIVE SUMMARY

The LOW-CARB project focused on improving capacities for mobility stakeholders at the Functional Urban Area level in partner cities by creating a good collaboration fundament. It was set up and practised 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 to reach the project's main goal of creating good practices with high take-up potential in Central European FUAs. The present document gives recommendations how PT can support sustainable workplace mobility to remote business areas at the periphery of urban cores as active initiator and moderator of the planning process.

1. Introduction

Planning for integrated and low-carbon mobility for public transport (PT) was at the heart of the LOW-CARB project. The main objective was to increase public transport accessibility in the functional urban area (FUA) of cities in central Europe, thereby creating good planning practices, tools, and strategies with high take-up potential. Planning for sustainable mobility in the FUA means to go beyond administrative boundaries, and to consider the integrated area of daily flows of people and goods, rather than a confined municipal area. This entails communicating with a variety of "new" or additional institutional and organizational actors on a common vision, joint objectives, targets, and indicators. As such a procedure challenges the traditional planning approach, it requires to find new ways of cooperation and agreements.

In this regard, two local partner teams in Leipzig (DE) and Szeged (HU) – PT operators and associations, city administrations, regional planning associations, consultancies - developed highly innovative action plans to optimize their low-carbon mobility offers for sustainable workplace mobility to remote industrial areas. Their mobility problems - predominant car-traffic infrastructure, shortage of public transport services, and hostility to active mobility - are representative for the challenges that many cities face at the level of their FUA's. Especially when characterized by growing industrial activities and space consumption, it becomes crucial to prevent additionally induced traffic, congestion, and air pollution, and to plan for better quality of life in the area and the working-district.

In both cities, the planning process was led by the PT operators, LVB and SZKT, who initiated and moderated the action plan development between stakeholders in their FUA's and the main target group: companies and their employees. They entered a continuous dialogue with this target group, which provided valuable feedback from both an expert and potential user perspective for the mobility planning process.

This document illustrates how Leipzig and Szeged developed their action plans based on interaction and feedback with companies in their planning areas and gives general recommendations how PT can contribute to sustainable workplace mobility by integrated planning with potential users.

2. PT as key actor to support sustainable workplace mobility

PT can develop a key role when planning for low-carbon mobility offers beyond administrative boundaries, as the general service area usually reaches into or covers the FUA. Thus, PT operators can reach out to all important stakeholders and users, to understand their perspectives and needs. As mobility providers and planners, they have the expertise to co-develop solutions to difficult mobility problems. This was realized in an integrated planning process at the level of the FUA in both Leipzig and Szeged[1], based on a continuous dialogue with local companies in the planning areas, which resulted in the development of detailed action plans for sustainable workplace mobility for the two planning areas.

The close communication and interaction with their target group enabled LVB and SZKT and their partners to develop integrated measure packages that support attractive, intelligent, connected and, above all, intermodal mobility offers - from bus and rail, bicycle, and pedestrian traffic to sharing systems. Furthermore, the dialogue was used to create awareness and acceptance of existing low-carbon transport offers and to promote active mobility.

As an important outcome of this participative approach, the foundation for a successful corporate mobility management was laid. A joint understanding and willingness to cooperate between PT operators and companies, but also among companies themselves was formed. On this basis, both Szeged and Leipzig could develop measures that not only aim at providing high-quality mobility offers, but also to find common ground with employers and

[1] Find more information on approaches to FUA governance in LOW-CARB's handbook on mobility strategies here.

employees for corporate mobility management measures. These aim at adapting mobility behaviour by coordination and information provision, and by organisational and advisory measures on company level.

Despite the similarities between the objectives and process in Leipzig and Szeged, the topic 'corporate mobility management' was approached differently in Leipzig and Szeged, due to the differences of the planning areas in size, structure, and accessibility by existing PT services. As present PT usage and experience with corporate mobility management is more advanced in the Szeged industrial district, where the planning area is closer to the city and better equipped with PT offers, the action plan contains more detailed corporate mobility management measures. Contrarily, the much larger size and big company structure of the 'Nordraum Leipzig' area, situated at a more peripheral location, also needs heavy infrastructure investment in parallel with development of bus lines and integrated services. More detailed corporate mobility management measures will be developed during the implementation of the action plan.

Along the communication process with local companies in the planning areas, the PT operators successfully used the opportunity to raise awareness and trust by offering mobility consulting and testing of measures.

2.1. The SUMP planning phases used for LOW-CARB Action Plan development

The SUMP methodology[2] served as general framework reference in LOW-CARB. Its main aim is to improve accessibility and to provide safe, clean, and equitable mobility for the entire FUA in a comprehensive and participative approach that helps taking all functional relations into account. Emphasis is placed on citizen and stakeholder involvement, and on cooperation among actors in public administrations and with the private sector. In the development of their action plans for low-carbon workplace mobility, Leipzig and Szeged followed the general SUMP phases. These phases are: (1) Preparation and analysis, (2) Strategy development, (3) Measure planning, (4) Implementation and monitoring[3]. In the following, they are shortly explained.

(1) Preparation and analysis

In the inception phase, the planning area and mobility situation was analysed, building on, e.g., data from existing studies, such as commuter and passenger potential analysis or PT feasibility studies, new data collection, and stakeholder mapping. First encounters between PT operators, the city administrations, and companies located in the planning areas took place to discuss stakeholder interests. This first phase was finalized with a review of the planning capacities and planning situation and resulted in summaries of the mobility problems and opportunities in the defined planning areas.

(2) Strategy development

In a joint process with stakeholders, mobility visions for the planning areas were developed, along with concrete objectives, short/ long-term targets, and actions. Based on the previous diagnosis work, different modal-split options were weighted and assessed as basis for intense discussions with stakeholders, including companies and their employees.

[2] "A Sustainable Urban Mobility Plan 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." Rupprecht Consult (editor), Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan, Second Edition, 2019, p.9. Find more information and SUMP guidance here: https://www.eltis.org/mobility-plans/sump-online-guidelines. In central European languages: https://sump-central.eu/

[3] The need for flexibility is understood and planners are encouraged to make reasonable adaptations as required by their specific situation if the overall principles of SUMP are followed.

(3) Measure planning

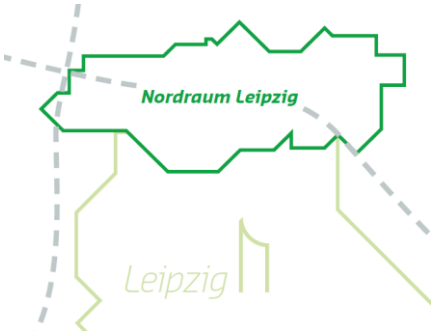
The partners leveraged the planning process from the strategic to the operational level. Accordingly, the focus was on the selected options or scenarios and prioritization of measures, and on the description of monitoring arrangements. Measures were specified as concretely as possible to ensure that they are clearly defined, comprehensive, and well-coordinated. Companies and their employees were invited to suggest concrete measures. The measure-planning phase was concluded with the preparation of the implementation phase and submission of the action plan to the decision-makers of the competent political bodies, who then adopted the plan.

(4) Implementation and Monitoring

The LOW-CARB partners prepared for systematic monitoring, evaluation, and communication during implementation of their measures, while applying for funding. To continue support from stakeholders, small actions that create quick wins are planned to be implemented at first to ensure continued support for the project and to keep motivation to participate in its implementation high. To monitor the performance of measures, the partners will use a newly developed method for data-collection (on-vehicle passenger counting via WiFi sensors in Szeged)[4] and the accessibility map REACHIE (analysis of search requests in the intermodal information online journey planner developed by the Leipzig partners)[5].

2.2. Use case: Nordraum Leipzig

FUA Leipzig (Germany): Increase use of low-carbon modes for workplace mobility



Planning area description: The Leipzig northern industrial area (*Nordraum*) is one of the largest and most important economic hubs of the Saxony region in Germany and Leipzig's primary industrial site. The area spans over about 50km² and features around 35,000 jobs, with an expected increase by 25 % until 2030. This region is embedded in world-wide production and delivery chains with 24 hours/7-days-a-week/multiple-shift-regimes.

Mobility problems: The highways B2/B184, S1, S9 connect directly to the national motorway grid in all directions by in total 5 well-placed interchanges. The rapid development of the industrial area initiated a new flow of traffic with a dynamic perspective. The private car is the main transportation mode in the area for employees and suppliers.

Main challenges for PT development: Long distances to the railway station, peak-capacities in central shift times and low-demand for variable shift-times and nightshifts require specific strategies.

[4] More information can be found on the project website in the Publications section (deliverable D.T3.2.4, Output Fact Sheet O.T3.1 and the LOW-CARB pilots handbook): https://www.interreg-central.eu/LOW-CARB

[5] Find more information on REACHIE here or here: https://www.interreg-central.eu/Content.Node/LOW-CARB--Reachie-Tool-Factsheet.pdf

Institutional and intersectoral cooperation approach: The Leipzig Public Transport Company (LVB), the Central German Transport Association (MDV) and the city of Leipzig cooperated with clear roles and assignments. Consulted regional stakeholders were, e.g., the district and PT of North Saxony, the Regional Rail Association (ZVNL), the city of Schkeuditz, the public transport organisation of Northern Saxony, and other affected surrounding communities. A local Steering Group formed of all three partners led the process and endorsed the Action Plan. An external expert in traffic modelling cooperated closely with the stakeholders in the data processing and scenario building phase.

Approach to corporate mobility management:

A mobility management team at LVB, MDV and city of Leipzig enquired about mobility needs of companies during the LOW-CARB process (e.g., airport, BMW, Porsche, a logistics and goods distribution centre, the local fair, and an industrial area) located in the area. This included analysis of mobility situation and needs, development of actions and marketing. The company involvement was also used to inform about mobility offers and to conduct mobility consulting for direct employees of companies. As part of the action plan, targeted soft measures (information, communication, holistic corporate mobility management) will be planned and a mobility management team will be established.

Action Plan in a nutshell:

Objective: Starting from the process of developing the first mobility strategy for the area, *Nordraumkonzept 2025+*, the LOW-CARB partners in FUA Leipzig[6] developed the *Masterplan Mobilität Nordraum Leipzig* (Mobility Action Plan Leipzig North Area) aiming at a strong increase of environmentally friendly transport offers, to reach ambitious municipal aims. The Action Plan has been prepared for adoption by the City of Leipzig and the FUA public authorities. A set of 86 measures is clustered in 14 packages focusing on horizontal measures (e.g., stakeholder cooperation, communication, company-based mobility management), rail (e.g., improvement of the regional rail infrastructure), local public transport (e.g., enhancement of the bus and tram offer, on-demand services) and last mile (e.g., mobility hubs, new cycle paths, Bike/ Park and Ride). Their implementation will require a joined financial effort among all the key stakeholders, compensated by governmental funds.

Vision: By 2030, *Nordraum* will set an example for sustainable industry and attractive and eco-friendly mobility. 44% of up to 70,000 commuters are envisioned to use public transport and environmentally friendly transport modes.

(1) Preparation and analysis

A communication strategy for co-creation, consultation and information with local companies was developed, including regular meetings, and events to establish long-term collaboration and their commitment for the implementation of actions at a later stage. First meetings with companies in the planning area took place, with the goal to inform, build trust, and to conduct a survey about the employees' mobility habits, routines and needs. The main challenges in the FUA North industrial area were captured to create a good baseline for a common vision.

[6] The LOW-CARB project team in Leipzig consists of City of Leipzig (LEI), Leipzig Transport Company (LVB) and Central German Transport Association (MDV).

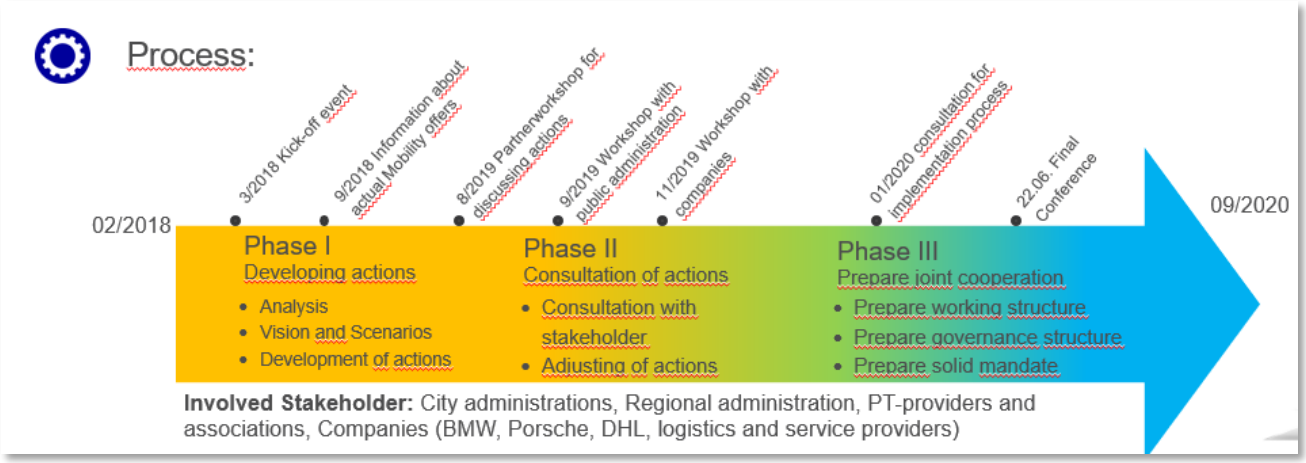


Figure 1: Strategy for stakeholder consultation incl. companies in the planning area. Source: LVB.

In parallel, a traffic model was developed to simulate the traffic development based on modal split data, and the actual and expected economic, land-use and workforce development until 2030. Furthermore, spatial analysis of the mobility situation based on commuting distances, mobility offers (PT, B&R etc.) and interchanges in PT was conducted. The analysis revealed a strong use of motorized individual transport modes by employees compared with PT and bike use.

Figure 2: Modal split analysis for actual workplace mobility choices of employees (red: car/blue: PT/yellow: bike). Source: LVB.

(2) Strategy development

Clear figures about the predicted economic development of the 'Nordraum' area, the workplace situation, and the expected number of employees until 2030 justified a strong increase of environmentally friendly transport modes offers that are needed to reach the ambitious political aims of the city. Based on this scenario, and on

the analysis of problems and opportunities, a vision for the 'Nordraum' area, under participation of the companies in the planning area, was developed.

It comprises the following main elements:

- Up to 70,000 employees work in the Northern Area of Leipzig in 2030.
- 44% use environmentally friendly transport modes, just 65% the car
- Most employees have access to trains or trams, meaning fast connections to the main interchanges.
- For the last mile, different transport modes and options can be used: buses, transport on-demand (partly autonomous), ride pooling, improved pedestrian and cycling infrastructure; bike-sharing and bike stands; easy booking and information through Apps, LOW-CARB accessibility map REACHIE[7], and place-based information.

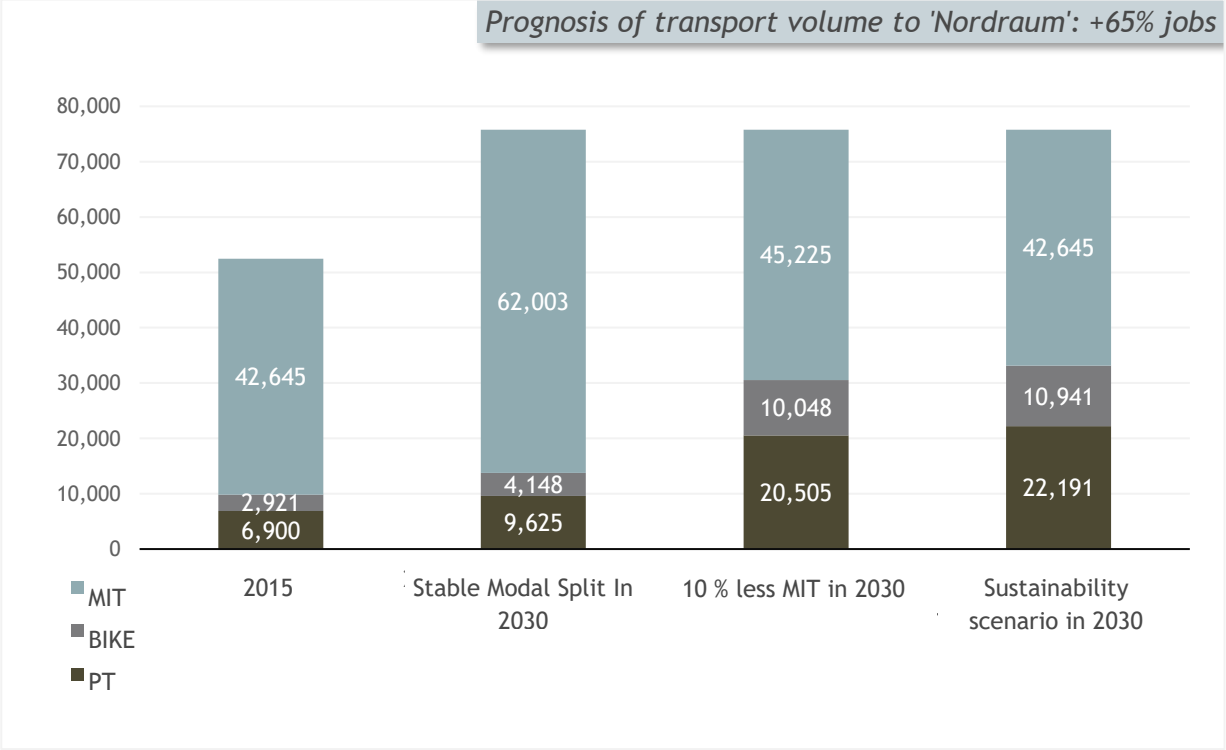


Figure 3: Prognosis of transport volume and modal split to 'Nordraum' with increasing number of jobs in 2015, with stable modal split in 2030, with 10 % less MIT in 2030, and with the sustainability scenario in 2030. Source: LVB.

The REACHIE tool, an online journey planner, was developed for commuters to increase awareness and transparency about existing low-carbon mobility offers. It was developed based on static, weekly updated PT schedule data, and illustrates modes per trip by isochrones and visualizes routes according to its level of accessibility with respect to the starting point (see figure 4 below). REACHIE also informs about CO2 savings' comparison between trips. Furthermore, the tool is used by planners at LVB, MDV and the city of Leipzig to analyse accessibility by low-carbon modes to develop additional offers, based also on the data collected from queries.

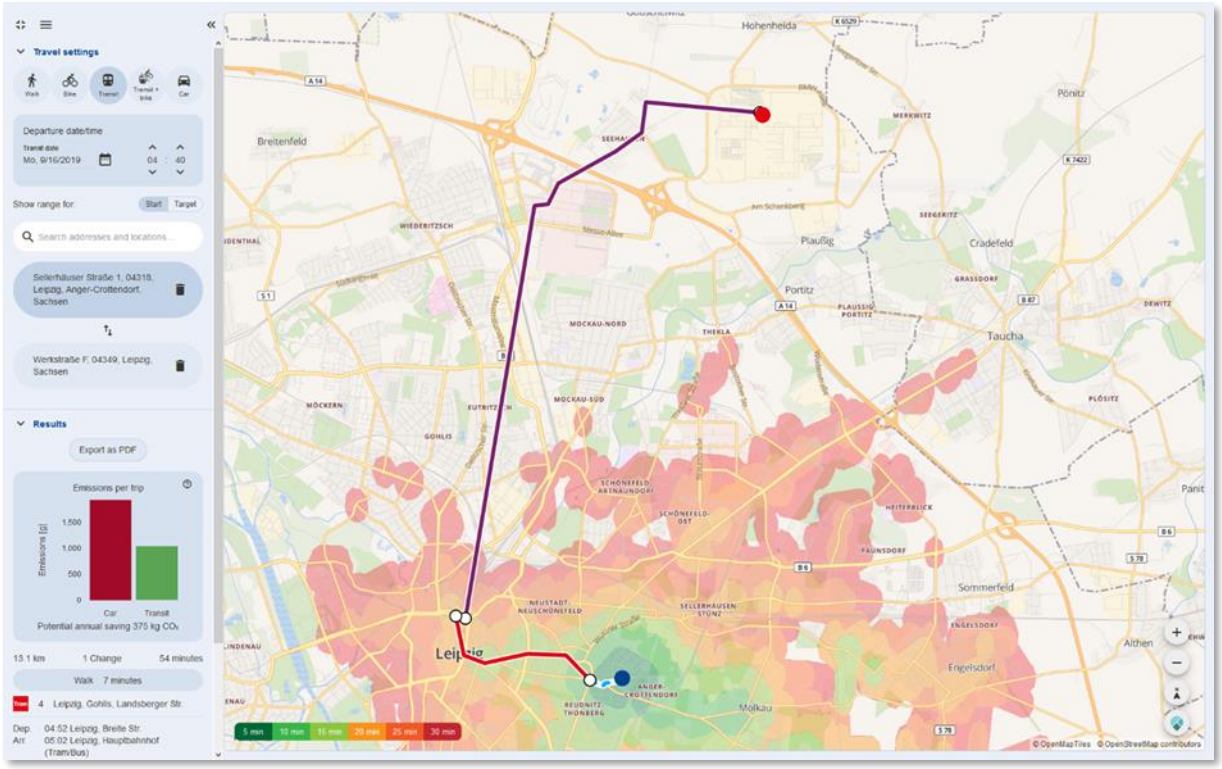


Figure 4: REACHIE screenshot – demonstrating accessibility (in time and per mode) of sites by multimodal mobility (source: LVB/MDV, LOW-CARB final conference, 2020)

(3) Measure planning

A set of ca. 90 prioritized draft actions were developed and discussed during several meetings with representatives from nine companies from the planning area, also tackling the question of cost-sharing. In this phase, different solutions were discussed, tested, and evaluated regarding their applicability in the planning area. This helped defining, adapting, or dismissing certain measures.

- For example, LVB examined the suitability of if its transport on demand system for the area[8], based on the insight that also solutions in non-peak-hours are needed, e.g., at shift times, as a suitable solution in weak demands to increase flexibility. To respond to the situation, standard buses during peak times need to be combined with more flexible forms for the rest of the time.
- To increase further flexibility the concept of mobility hubs was developed together with companies, which allows to solve the 'last mile' problem and give the employees the flexibility to choose between different transport modes in a multi-modal and esp. intermodal way.
- Company employees and local stakeholders decided on measures to strengthen cycling and pedestrian transport modes by infrastructures to shorten ways and make it so more comfortable to use these alternatives.

The interaction and discussion with companies showed that the developed actions met the specific needs of their employees to a large extent, as they tackled their main challenges, such as changing shift times, need for direct connections and high-quality transport systems. Their feedback was also used to adapt some measures.

The developed actions consist of expensive and long-term infrastructure actions, such as high-quality rail and tram connections, combined with smaller middle and short-term actions, which can be realized much earlier and

[8] The system works with virtual stops in another suburban area and flexible buses that can be taken using an app.

faster. These are, e.g., development of cycling and walking infrastructure, new bus lines, a mobility hub at the existing regional train station, targeted corporate mobility management that responds to the needs of the target group, along with information and targeted marketing measures. They are complementary as they lead to development of multi and intermodal mobility offers, and to a mindset change for the actual and new employees towards use of environmentally friendly transport. It is estimated that all actions together will reach a modal split increase from presently around 20% to up to 44% for environmentally friendly transport, which is around 40,000t of Co2 savings per year.

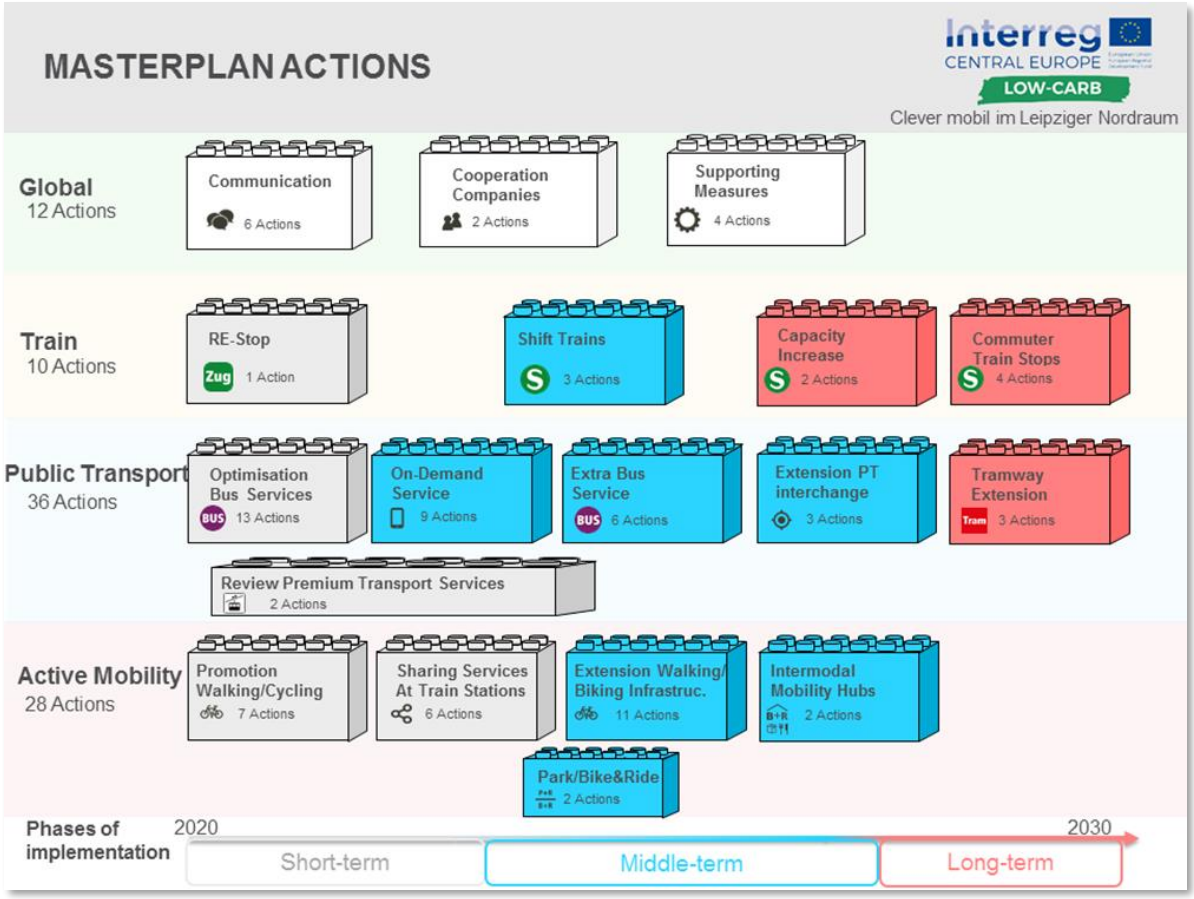


Figure 5: Main categories for jointly developed actions (with stakeholders incl. companies). Source: LVB.

(4) Implementation and Monitoring

The involvement of companies remains key also during implementation, and dedicated resources will be acquired to continue the dialogue with the target group, integrated into dedicated mobility management measures and a communication strategy. The implementation will be monitored using, e.g., the pilot action accessibility map REACHIE and new digital planning tools which measure the effects of actions based on increased accessibility and further data based on surveys with companies in on-going workplace mobility management. Additional studies are planned by the city to measure the possible effects of actions of the masterplan towards road infrastructure motorized individual transport use and commercial transport.

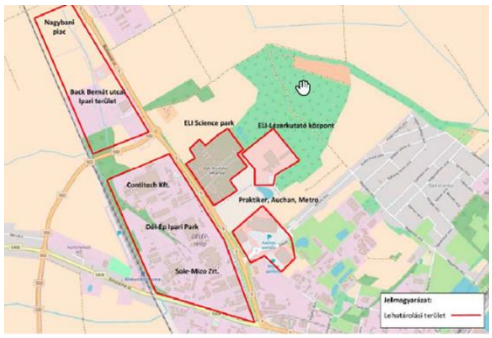
Selected Measures

The measures aim at more frequent trips at shift change as a basic service, especially in the early morning and evening rush hours flexible services (e.g., on-demand transport and automated driving), more interlinked mobility services (e.g., bicycle parking facilities, bike sharing, car sharing), and safe connections between the different means of transport in the MDV area in and out of the northern region. A marketing campaign is planned for greater public awareness for alternative options to car transport for commuters (via apps, flyers, brochures, etc.). Finally, measures aim at increasing reliability of transport services, and good and comprehensible communication with the users. Some of these measures are:

Measure	*Impact*
REACHIE -accessibility map	Applicable as trip-planner for commuters and as planning tool to analyse and monitor accessibility by PT.
Mobility as a Service	Develop apps to promote connected intermodal booking and ticketing.
Introduction of an automated on-demand bus shuttle service between the trade fair center's railway station, the surrounding localities, and the industrial park.	On-demand service as a supplement to the regular offer at times of low demand and on less demanded routes.
Construction of mobility hubs combining a Bike & Ride parking and additional sharing services at the railway station.	Better connected travel options through sharing offers and comfortable parking facilities, increase of comfort level at PT stations.
Extension of tram line and interconnectivity with the bus network.	Increased attractivity and safety of clean public transport modes.
Construction of the cycle expressway Halle-Leipzig.	Cover the last mile offer, supplement the PT with new sharing offers, increase safety on cycle paths.
Corporate Mobility Management Programme	Development of a holistic and targeted corporate mobility management to make PT offers and environmentally friendly transport better respond to the actual needs at company-level and to raise awareness.

2.3. Use case: Szeged

FUA Szeged (Hungary): Understand mobility needs and tailor the PT offer accordingly



Area description: Szeged's Industrial Logistics Centre is a dynamically developing area, situated in the Northwest of the city close to the motorways M5-M43. 2500-3000 employees are working here, with more than 2000 employees working for 100 different employers.

Mobility problems: Most employees commute to the planning area every day by car from outside of Szeged. The city section of road nr. 5 (Budapesti út area) is congested in the peak hours. Proximity to motorways M5 and M43 makes the area easy to reach by car. Also, the current PT offer in this area has a bottleneck of schedule and longer tracking time of PT vehicles (currently diesel buses) with a relatively longer time to travel into this area. There is a need to increase accessibility for

cyclists and PT from the northern residential area of Szeged, for clean bus services, more flexible schedules, and line operations, and for combined and multimodal offers, e.g., sharing offers for last and first mile.

Institutional and intersectoral cooperation approach: Employers, employees, PT operators (DAKK Zrt., SZKT), and the municipality were involved in workshops and surveys. The cooperation and stakeholder process laid the foundation for regular formal and informal communication between the municipality, PT operators and the companies in the planning area. An external expert conducted the surveys and analysed the data. To increase data availability, SZKT developed a data-collection method and application based on sensors and big data analysis - the Wi-Fi-based passenger counting data methodology.

Approach to corporate mobility management: With the city of Szeged and other partners, SZKT developed an extensive corporate mobility management programme to increase sustainable commuting to the planning area.[9] A gamification app was used for data collection and research, and cycling and PT awareness raising campaigns, along with a car-pooling system were introduced. During the LOW-CARB action plan development, SZKT built on synergies with this project.

Action Plan in a nutshell: All in all, 10 groups of measures with 60 targeted measures around public transport, cycling, improved road connections, car-sharing, green mobility promotion have been developed.

Some priority actions are:

- trolleybus network development,
- new (trolley-) bus stop,
- scheduling harmonization/synchronization,
- building bike paths,
- new bicycle storages,
- increasing awareness for shared mobility and
- developing passenger information system.

VISION: Achieve a more effective and environmentally friendly organisation of public transport in Szeged's north-western area, by reducing car usage and development of zero-emission transport methods that could promote this process. Improve the general well-being and health of the workers.

(1) Preparation and analysis

Building on an ongoing mobility cooperation agreement between the municipality and employers to improve employees' travel-to-work conditions, and the nomination of company mobility managers in the planning area, SZKT had good conditions to get in touch with companies. After making a company classification, the operator organized a workshop and conducted a survey to understand the mobility behaviour (their habits, mobility decisions and future intentions), challenges and needs of commuters in the planning area. 1106 employees answered the survey in person and online. It revealed that, e.g., 33 % of the commuters travel from the surrounding areas outside Szeged to their workplaces, and that the affinity to cycling is higher when respondents commute from inside Szeged. Another result was a relatively high willingness for car-sharing (47%).

[9] https://www.uia-initiative.eu/en/uia-cities/szeged

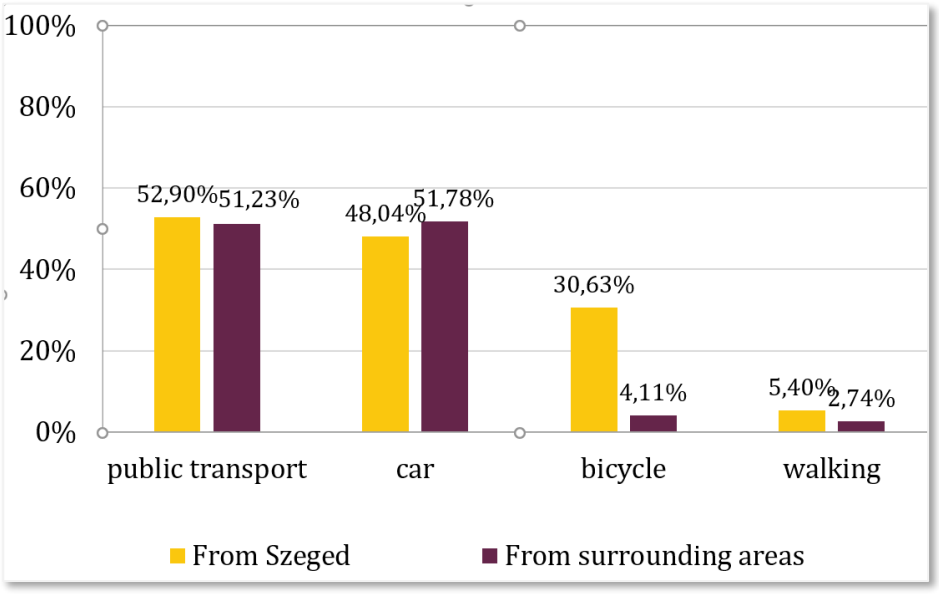


Figure 6: How Szeged and non-Szeged respondents use means of transport to travel to work (n=1.106). Source: SZKT.

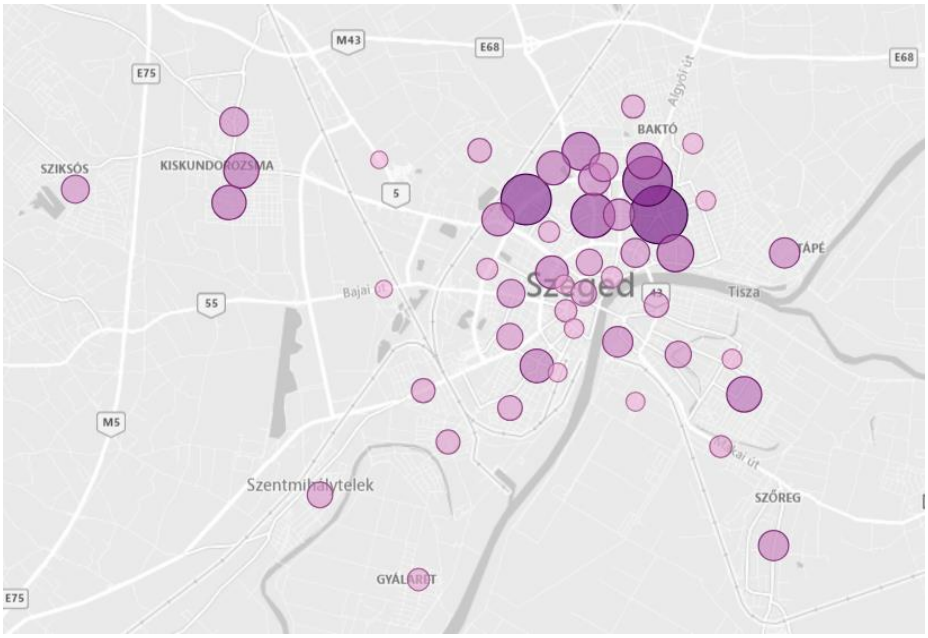


Figure 7: Place of departure of responders living in Szeged, by district (n=1.106). Source: SZKT.

To have more reliable data for future mobility planning, SZKT also tested the precision of a new methodology to count PT passengers by a Wi-Fi based real-data passenger counting system on vehicles in the pilot area.[10]

All analysis results from the survey and passenger-counting were assessed against the predicted economic growth and land use development in the area. For consistency with the SUMP and planning objectives set for the city

[10] The testing was based on a telemetry dataset and was validated by manual passenger counting (a method matching door openings with stops) by processing camera images and by calculating the vehicle passenger load based on axle load datasets. Find more information in the Pilot handbook and factsheet here.

and the region, the political and planning context was analysed to see which other measures would affect the planning area.

(2) Strategy development

Based on the collected data and analysis results, strategic objectives to increase the share of sustainable modes of transport usage by commuters were defined, such as, e.g., the integration of non-motorized transport modes, or supporting mobility decisions with the help of digital tools. Indicators to measure performance for these objectives were discussed and set, such as, e.g., increase in number of bike parking stations, the reduction of transfers and travel time, use of shared services, or the level of comfort.

To ensure that – as a result from the stakeholder involvement process - the most pressing and easily implemented actions are prioritized, three phases for measure implementation were identified: “immediate”, “within 3 years” and “can be implemented within 10 years”.

(3) Measure planning

In this phase, evaluation and testing of possible actions to enable sustainable workplace commuting took place.

- SZKT tested a car-pooling app for workplace mobility, with an important lesson learned: incentives are important to use the app at first, but as people get to use it more, they will more likely organize themselves and not use it anymore. Instead, there is a need for a centralised app for all mobility solutions of the industrial zone.
- To show users the CO2 emissions impact as consequence of their mobility decisions between different modes of transport, SZKT developed an educational feature for its online travel planner. The “CO2 calculator” shows users how much CO2 a planned trip will emit compared to if they used another mode of transport.
- Further tests included bicycle storage at companies, company-owned bicycle fleet, bike-repair companies, and ticket-purchase options at the workplace, which helped to define conditions for successful corporate mobility management measures for the action plan.

Based on the interaction with the companies, stakeholders and on other analysis results, 10 groups of measures were developed with 60 concrete proposals for city-wide measures, public transport and cycling infrastructure development, better road connections, car-sharing, and electrification measures. Priority was given to schedule harmonization and synchronisation, developing bike infrastructure and storage, extension of the trolleybus network including a new hub, installation of a ticket vending machine and a passenger information system. Detailed measures that aim at enabling corporate mobility management are part of the action plan.

(4) Implementation and Monitoring

SZKT plans to continue its collaboration with mobility managers at the companies in the planning area to monitor and evaluate the measures. Furthermore, it is planned to conduct more surveys in the coming years to assess the impact of actions. Cooperation with the municipalities and consultancies for data collection and analysis is envisaged, e.g., to analyse PT usage based on data collected with the WiFi passenger counting method.

Selected measures:

Measure	*Impact*
Bicycle parking stations at companies (Installation, expansion, modernisation, sheltering and security).	Facilitate biking to work to achieve higher share of active modes.
Implementation of cycle route network.	Increase quality of cycle network to achieve higher share of active modes.
Rendering company vehicle stock multipurpose (elaboration of a multi-purpose daytime car sharing and booking system).	Reduction of emissions by shared services among companies.
Environmentally conscious work. Reducing mobility needs (Teleworking, work from home, part-time employment, flexible working hours).	Increasing environmental consciousness and reducing trips.
Real-time route planner	Support of passenger decisions to increase use of low-carbon modes.
Timetable synchronisation of local and long-distance PT schedules.	Reduction of travel and waiting time.
Pass contribution for public transport (companies should wholly or partly pay for the public transport passes).	Cost-sharing between PT operator and users/companies in the planning area to enable joint solutions.
Extension of trolleybus line with driverless operation.	Extend needed convenient PT infrastructure.

3. Summary and recommendations to PT operators for developing and implementing sustainable workplace mobility

In Leipzig and Szeged, public transport operators led an integrated mobility planning process with public and private stakeholders, searching to increase the accessibility of industrial areas at the periphery of their cities, by developing action plans for sustainable workplace mobility. Both used the opportunity to get to know their customers – by inquiring about their mobility behaviour, challenges and needs – and to raise awareness and trust in existing PT offers and active mobility. In the following planning process, they used this knowledge to develop targeted, informed strategies with measures that aim at reducing traffic to and in the planning area, and that respond to the mobility needs of their target group.

The close interaction and communication with local companies and their employees not only helped the public transport operators to develop offers that better respond to actual and future needs of commuters. It also enhanced trust between companies, employees, and operators, and laid the foundation for synergy effects of joint corporate mobility management measures. For example, innovative mobility offers such as corporate car sharing for business trips can be jointly realised in a business park but would not be financially or organisationally feasible for individual companies. Furthermore, the process was a first step towards sharing the costs of implementation of some measures, which can also lead to a quicker implementation.

For the participating companies, the added value was to receive expert consultancy for possible corporate mobility management from a proven and trusted expert, the PT operator. Other benefits seen by companies are, e.g., to see that the workplaces will be more accessible, the potential contribution to the health and satisfaction of their employees, their improved reputation as companies by playing a role model, the general increase of workplace attractivity for both current and future employees, or, to reduce their number of parking lots.

For the consulted employees, the benefit in participating in the planning process is the outlook towards reducing their personal mobility costs to work, while improving their fitness, health, and motivation, to save time, and to reduce stress.

3.1. Consolidation of engagement with stakeholders

For public transport operators to facilitate and achieve joint planning for sustainable workplace mobility, the engagement of the different stakeholders is essential and should be consolidated throughout the process. A couple of recommendations can be made based on Leipzig and Szeged examples to engage with stakeholders.

There should be one contact person per company to connect stakeholders and there should be one mobility manager at the municipalities to get in contact with companies.

In addition, public transport operators that are actively involved in the planning process should try to get a good database where the employees come from to analyse the mobility patterns of the area, understand the mobility needs and suggest solutions to answer these needs. Therefore, collection of data on needs, shift times, public transport infrastructure on-site, people's knowledge about their mobility options, etc. is essential.

One of the main challenges that can be faced is how to get in touch with the user group - here the employees - directly. The Leipzig partners dealt with this challenge by interviewing and consulting employees during the European Mobility Week by arranged appointments.

Communication is also a key element in the consolidation of engagement with stakeholders, as it can help clarify which actions are possible, start the discussion about the possible solutions and bring in other stakeholders. Public transport operators that are highly active in the creation of a joint planning process with companies can inform about the on-going process and the quick wins to keep stakeholders motivated. Communication also allows certain stakeholders that have never met – such as employers or employees from the industrial zone that never interacted – to come together and discuss their common needs and objectives. Overall communication provides a foundation to consolidate the engagement of stakeholders.

When communicating with stakeholders to consolidate their engagement, public transport operators that are actively engaged in the planning process should bear in mind that stakeholders need concrete suggestions and actions to discuss. They will probably expect and demand things that municipalities and public transport operators cannot do without high efforts. As the democratic process takes time, there is a need to communicate clearly to stakeholders about the goals, the process, and the feasibility of actions.

Finally, if the engagement of stakeholders has been consolidated during the first three phases of preparation, strategy development and measure planning, the phase of implementation can also be a time to further consolidate stakeholders' engagement through gamification options for employees of the measures being implemented. For example, Szeged used gamification in its car-pooling app to promote the implementation of shared commuting measure while ensuring the consolidation of stakeholders' engagement. In Leipzig, European Mobility Week was used to give out free tickets via a competition. For the implementation of several actions, a communication strategy should be developed to use different approaches adapted to the different type of measure scales.

3.2. Key barriers

When implementing sustainable workplace mobility planning with companies, the public transport operator at the initiative of the project might face certain barriers.

To get all the different stakeholders present in the industrial area to participate might become a challenge as some stakeholder might be harder to reach than others. Not all companies are interested in mobility management, esp. in the field of environmental transport modes. Mobility management cannot be enforced on

companies, but can communicate the added value of environmentally friendly transport also from an economic point of view e.g. less traffic jam, less parking lots. It is also hard is to motivate the employees, esp. in car production companies. Here the personal interest and personal situation must be considered. Similarly, in Szeged, the transport company had a hard time reaching out and communicate with physical workers. The role of company mobility managers here is key to create a closer intermediary between workers and the transport company.

Transport planners might also face barriers due to the different sizes of the companies present in the industrial zone. This can lead to a power imbalance in the participation of stakeholders from bigger companies towards smaller companies in the same area. To solve this problem, mobility managers must raise awareness for dependencies between companies and show the added value of joint actions to create win-win situations for all.

Once the communication issues have been resolved, and the transport operator has managed to a certain extent to reach out to different stakeholders, it might face another challenge in the creation of the mobility plan because of the converging objectives. In Szeged, for example, the transport operator faced challenges to keep sustainability as a main goal in the creation of the corporate mobility management programme, as stakeholders had other priorities.

As one of the key benefits for corporate mobility management is cost-sharing, the legal framework around the financial participation of PT operators, the municipalities and companies must be planned out. In Leipzig, e.g., there was the idea of making companies pay a small yearly entrance fee per employee which necessitated some legal clarification.

3.3. Success factors when planning for sustainable workplace mobility

The experiences from Leipzig and Szeged have shown that certain factors can play a role in the success of the planning process for sustainable workplace mobility. In Szeged for example, the strong support from the political level helped the PT operators to engage more easily with the companies and to push for sustainable mobility practices in the industrial area.

The established outlook for the industrial area is also determining in the success of the planning process. In both Leipzig and Szeged, the anticipated growth of the industrial area and the need for change is the driving force for developing the action plan, also as basis for a corporate mobility management. The strain on the industrial area to change is also coming from the growing need for high-quality workplaces, especially in the IT sector, that requests a diversity of mobility modes to adapt to the various needs of its employees.

Key recommendations from lessons learned by Szeged and Leipzig

Set up a governance strategy suited for your situation to best interact with stakeholders and consolidate their engagement in the process.
Mobility managers are key to achieve engagement with stakeholders as they have the role of representatives and messengers for stakeholders and more particularly companies.
Engaging with employees and companies and creating opportunities for them to network is essential to improve the implementation process.
Communicate throughout the process, from the analysis to the implementation to monitoring and evaluation of measures.
Develop modal split scenarios to imagine potential mobility alternatives to the current situation.
Set short-term and long-term measures to implement to create quick wins and consolidate stakeholder’s engagement.

4. Conclusion

The action plans for sustainable workplace mobility in the FUAs of Leipzig and Szeged contributed to identify and agree with key stakeholders a set of concrete actions that can contribute to improving sustainable mobility and transport in each of their industrial areas in a short-, medium- or long-term timeline. The actions outlined are the results of pro-active public transport companies and regional transport authorities.

In both Leipzig and Szeged, following the SUMP approach worked well and lead to a high acceptance and willingness for the implementation. The process and its flexibility allowed looking beyond borders to consider new ways of mobility and innovation. An ambitious vision can be created by not directly focusing on finances at the beginning. To achieve this, all stakeholders need a willingness for change and a strategic view beyond the transport sector to take into consideration the needs of companies and the economy. The close cooperation of all stakeholders and especially the companies will be the key to a successful implementation. Developed governance and communication strategies are the first step to make this reality.