Fraunhofer ISI

From Vision to Implementation: Developing Sustainable Urban Mobility Plans

Authors:

Niklas Sieber, Dorien Duffner-Korbee

No. WPS06/2026

Imprint

From Vision to Implementation: Developing Sustainable Urban Mobility Plans

Authors

Niklas Sieber, niklas.sieber@isi.fraunhofer.de; Fraunhofer ISI
Dorien Duffner-Korbee, dorien.duffner-korbee@isi.fraunhofer.de; Fraunhofer ISI

Picture credits

Cover: Shutterstock.com/TechSolution

Recommended citation

Sieber, N.; Duffner-Korbee, D. (2026): From Vision to Implementation: Developing Sustainable Urban Mobility Plans. Karlsruhe: Fraunhofer ISI.
DOI: 10.24406/publica-9261

Published

July 2026

Contact

Fraunhofer-Institut für System- und Innovationsforschung ISI

Breslauer Straße 48, 76139 Karlsruhe
Niklas Sieber, niklas.sieber@isi.fraunhofer.de

Notes

This report in its entirety is protected by copyright. The information contained was compiled to the best of the authors' knowledge and belief in accordance with the principles of good scientific practice. The authors believe that the information in this report is correct, complete and current, but accept no liability for any errors, explicit or implicit. The statements in this document do not necessarily reflect the client's opinion.

This project has received funding from the European Union's Horizon Europe programme under grant agreement No. 101103924. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the granting authority can be held responsible for them.

Abstract

The paper examines why Sustainable Urban Mobility Plans (SUMPs) often fall short of delivering substantial changes in urban transport and climate performance, and how their effectiveness can be improved. Drawing on a 2023 survey of transport planners in ten cities participating in the EU project REALLOCATE, it analyses current SUMP practice regarding spatial coverage, time frames, goal setting, targets, implementation, and monitoring. The findings reveal weak quantification of climate and mobility targets, limited coverage of functional urban areas, and a significant implementation gap, particularly for politically sensitive "push" measures that restrict car use. Monitoring is uneven and sometimes leads to a weakening of targets rather than to policy adjustment.

To strengthen the impact of SUMPs, the paper proposes a vision-led transport planning approach that includes backcasting, SMART targets, and quantitative impact assessments before and after implementation. It provides guidance on the selection of measures and calls for integrated push-and-pull packages. National and regional governments can support the development of vision-led SUMPs by combining funding and technical assistance with regulatory minimum standards. Additionally, the paper introduces "Climate Mobility Plans" as a tool to enhance the effectiveness of transport policies in climate mitigation.

Overall, the paper demonstrates that achieving sustainability in transport requires a vision-led planning approach supported by coordinated action across levels of government. While municipalities play a central role, national and regional governments can significantly improve the performance of SUMPs.

Contents

1 Introduction 5

2 Sustainable Mobility Planning in practice 7

2.1 Geographical scope of the SUMP 7

2.2 Time frame of the SUMP 8

2.3 Setting of goals 8

2.4 Quantitative targets and indicators 9

2.5 Constraints and success factors 10

2.6 Success in plan development 12

2.7 SUMP implementation: constraints and success factors 14

2.8 Ex-post monitoring 15

2.9 The need for a vision-lead planning process 16

3 Strengthen vision-lead transport planning 17

3.1 The vision-lead transport planning process 17

3.2 Goals, targets and indicators 17

3.3 Design of transport interventions according to goals 18

3.4 Combination of Push and Pull measures 20

3.5 Vision-lead development of scenarios 21

3.6 Financing and investment planning 21

3.7 Plan for monitoring 22

4 How can national and regional governments support SUMPs? 23

4.1 Provide funding 23

4.2 Provide technical support 23

4.3 Develop a regulatory framework 24

4.4 Improve climate mitigation 24

5 Conclusions 27

6 List of figures 29

7 List of tables 30

8 Bibliography 31

1 Introduction

According to Article 41(1)(b) of EU Regulation 2024/1679, EU member states must draw up a Sustainable Urban Mobility Plan (SUMP) for 424 'urban nodes' by the end of 2027. A SUMP "builds on a thorough assessment of the current and future performance of the transport system in the functional urban area. It provides a comprehensive review of the existing situation and establishes a baseline against which progress can be measured. To do this, the Sustainable Urban Mobility Planning process identifies objectives and ambitious but realistic targets which are consistent with the established vision and then defines performance indicators for each of these. They are then used to assess current and future conditions" (Rupprecht Consult 2019).

However, a special report by the European Court of Auditors 2020 criticizes that "there is no clear indication that cities are fundamentally changing their approaches [in transport]. In particular, there is no clear trend towards more sustainable modes of transport. Although cities have put in place a range of initiatives to expand the quality and quantity of public transport, there has been no significant reduction in private car usage. In the absence of legislative compulsion, there was limited take-up of the Commission's guidance on the part of many member states and cities – notably in terms of preparing Sustainable Urban Mobility Plans [SUMP]".

These deficits are confirmed by Rupprecht Consult (2023) who analysed 102 SUMPs in Germany. Only 13 plans achieved 80 % of the requirements, while 32 accomplished less than 30 % of the planning obligations. A text analysis of SUMPs from 17 European capitals, conducted by Munkácsy et al. (2024), reveals that "the examined mobility plans barely mention terms that would imply radical changes by the 2030s. Strategic documents and, thus, urban mobility developments suggest only a slow transition towards the expected levels of sustainable and smart urban mobility". The evaluation of the 2013 Urban Mobility Package (European Commission 2021) criticises that "current trends in urban transport do not indicate a significant improvement in terms of modal share, traffic volume and greenhouse gas emissions".

The example of climate mitigation shall illustrate the shortfalls. Sutter et al. (2022) have screened 190 SUMPs and revealed major planning deficits:

- Climate targets are often not compatible with the Paris Climate Goals and are insufficiently quantified or not quantified at all;
- planned transport interventions are often not examined regarding their climate impacts;
- long-term and strategic investment planning is often lacking;
- ex-post evaluation of target achievement and implementation of measures is foreseen in less than half of the SUMPs studied;
- even if ambitious targets are in place, there is a lack of implementation. So far, ambitious climate change targets have not been achieved in almost all cases; and
- many of the observed municipalities were planning for the area of the community and not for the entire functional region.

Additionally, there is a major gap between the intention of the plans, the final SUMP and the implementation of planned mobility measures. This paper aims to identify the factors that hinder or facilitate the successful planning and implementation of SUMPs and proposes strategies to address these challenges. It is based on previous research on SUMPs conducted by Fraunhofer ISI (Sieber, 2024, 2025, 2026).

The following section analyses current planning practice in the development and implementation of SUMPs. It is based on a survey conducted in 2023 with transport planning staff from ten cities

participating in the EU-funded REALLOCATE project[1]. The survey included both qualitative and quantitative questions, focusing on planning processes, goal setting, and implementation challenges.

The third section highlights the need for a stronger focus on vision-led planning in SUMPs and provides advice on how this can be achieved. It draws not only on the survey results but also on insights from the scientific literature. The final section discusses how national and regional governments can support the development and implementation of vision-led SUMPs.

[1] https://reallocatemobility.eu/

2 Sustainable Mobility Planning in practice

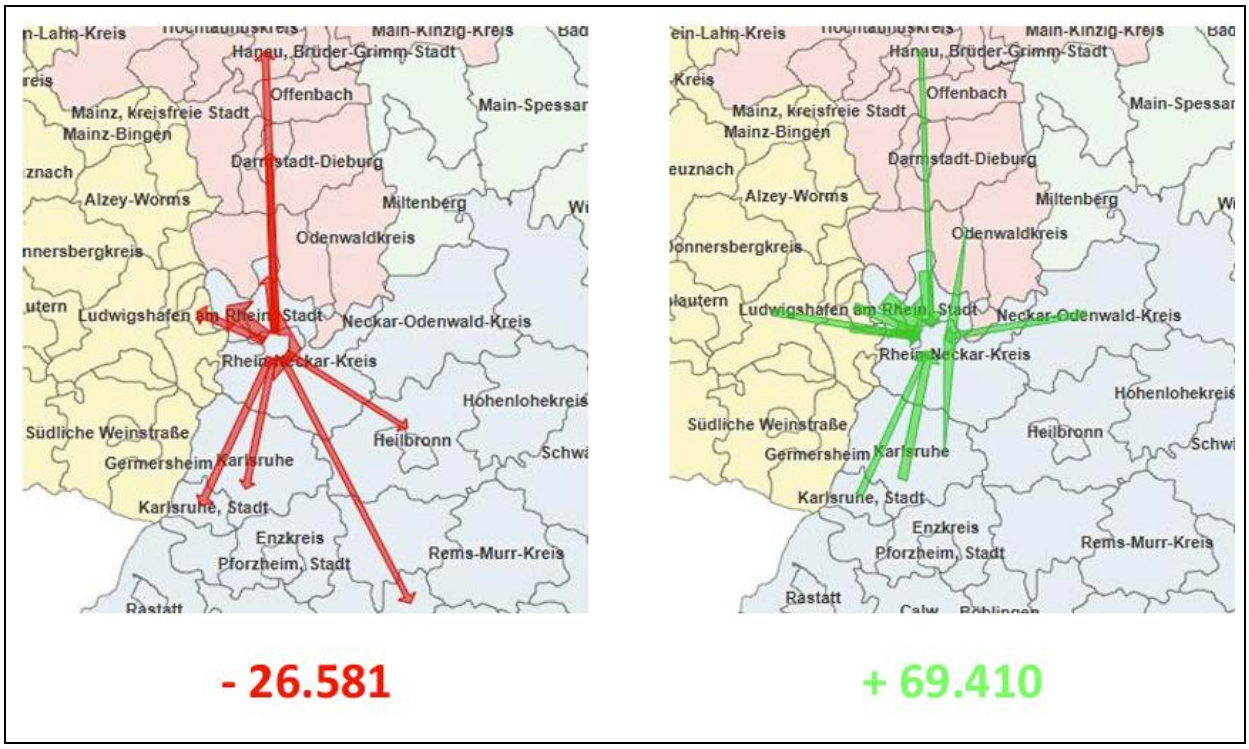
How SUMPs work in practice was observed during a survey, conducted in 2023 amongst planning practitioners in ten cities of the EU funded project REALLOCATE: Barcelona, Bologna, Budapest, Gothenburg, Heidelberg, Lyon, Tampere, Utrecht, Warsaw, and Zagreb. Goal of the survey was to reveal the problems and successful strategies to develop a SUMP. This section reflects the main findings of the survey.

2.1 Geographical scope of the SUMP

The EU Regulation 2024/1679 on SUMPs makes it compulsory to plan the mobility in the whole "function urban area". This is due to the complex transport relations within and around a city, which do not stop at administrative borders. An example for this is given in which shows the commuter flows in an out of Heidelberg, Germany. A SUMP concentrating on the city would only comprise a minor share of the traffic in the whole region.

The city of Heidelberg with 155.756 inhabitants, had 69.410 incoming commuters and additional 25,000 students from outside the city. Commuters make up about one quarter of the cities' traffic volume. This shows clearly the need for a regional approach containing the functional area of a SUMP.

Figure 1: Commuter flows 6/2025 in and out of Heidelberg, Germany



Source: Fraunhofer ISI, based on: Bundesagentur für Arbeit (2025): Pendleratlas. Online available on https://statistik.arbeitsagentur.de/DE/Navigation/Statistiken/Interaktive-Statistiken/Pendleratlas/Pendleratlas-Nav.html, last verified on 08.05.2026

The REALLOCATE survey revealed that only two of the ten SUMPs reviewed contain the whole functional area, while half of the plans do not include neighbouring municipalities. However, 2/3 of the interviewed planners state that they intend to include the functional area when developing the next plan.

This is a challenge since the process must include all municipalities in the region which requires a voluntary cooperation amongst the communities and consequently major coordination works. The question arises which administrative unit should coordinate the process: Is it the city conducting the SUMP or would it be better if a superior administration should initiate the procedure? A positive example is the Landkreis Ludwigsburg, Germany that is developing a SUMP on the district level. Another example is the Gemeindeverband Mittleres Schussental, an association of rural municipalities with 90,000 inhabitants that develop a common plan[2].

2.2 Time frame of the SUMP

The analysis showed that planning phase of the SUMPs ranged from two to five years, with an average of three years. This implies that usually the planning process can be finished within a legislative period if works would start right during its inception phase. Since this is not very probable, a change in government must be anticipated at the outset. This is a major argument for establishing a political consensus amongst the democratic representatives in the city council which will be discussed later in the text.

The strategic long-term targets of the SUMPs range between 10 to 20 years, while other goals, such as the Paris agreement is even focusing on longer periods up to 2050. Given these long-term targets, the SUMPs should focus on a partial achievement of the objectives.

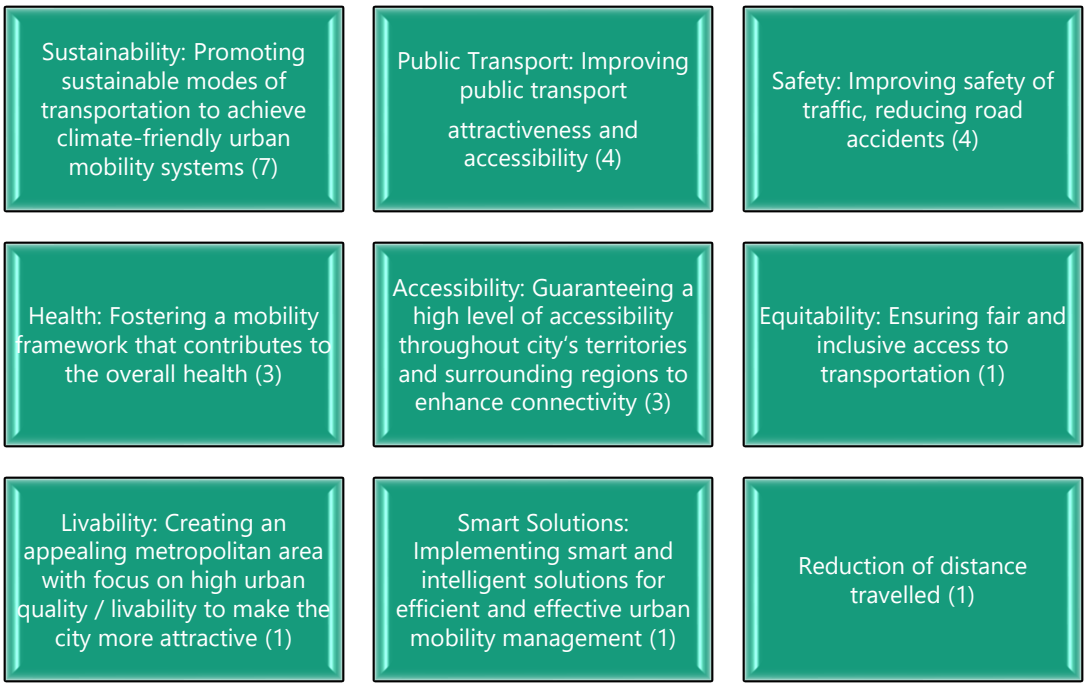
2.3 Setting of goals

Figure 2 lists the most important goals of in the analysed SUMPs. The number of plans mentioning the objective is provided in parentheses. Climate mitigation is the most important goal, mentioned by 7 out of 10 SUMPs. Other goals are safety, health, accessibility, equitability and liveability. However, other items mentioned cannot be classified as targets but may be rather regarded as measures to achieve the objectives: Improvement of public transport, smart solutions and reduction of distance travelled are better understood as means to attain the objectives.

This confusion of goals and means to achieve them shows one of the main problems SUMP procedures. In an ideal world, decision makers should find a consensus on goals and the planners provide alternative means to achieve them. In a second step the city council decides upon which measures should be implemented.

[2] More information on SUMPs developed in Baden-Württemberg is given in https://nvbw-2.storymap.die-wegmeister.com/einleitung

Figure 2: Most important targets of in the analysed SUMPs



2.4 Quantitative targets and indicators

Additional to the definition of objectives the quantification of targets is important to measure the achievement of goals firstly during the planning process and later for monitoring and evaluation. For this purpose, the development of indicators is essential. Presently, the EU has set up structures[3] to develop indicators that have to be reported by the 424 urban nodes up to December 31, 2026. A rational planning process requires that not only the indicators are defined, and target values are set, but as well that the impacts of the planned transport interventions are calculated and compared to the quantitative targets.

In reality of planning, these requirements are often not fulfilled, as the example of climate targets in the SUMP review shows. It is positive that 9 out of 10 cities quantified their CO_2 reduction targets. This is far better than the results of the above screening of 190 SUMPs (Sutter et al. 2022). However, if the target achievement is regarded, only 4 out of 10 cities calculate the expected impacts of their planned transport interventions. This implies that 6 cities do not really know if the planned measures would achieve their own climate targets. The author's impression is rather a blind flight than a vision-led transport planning process. Additionally, the cities show very different levels of ambition with CO_2 reduction targets ranging between 20 % and 90 % and very different timespans between 6 and 40 years!

It has to be emphasized that REALLOCATE cities have been selected and thus do not represent the average municipality. Kreutzberger et al. (2025) conclude their research in four European cities that "none of the partner cities is in fact sufficiently reducing GHG emissions. Even if electricity production was completely green, the remaining gap between GHG reduction aims and analysed GHG delivery lies between 30-81 %, dependent on the scenario and city." A survey in Germany (Tröger et al. 2024) found that 45 % of the observed municipalities had neither a general plan or concept,

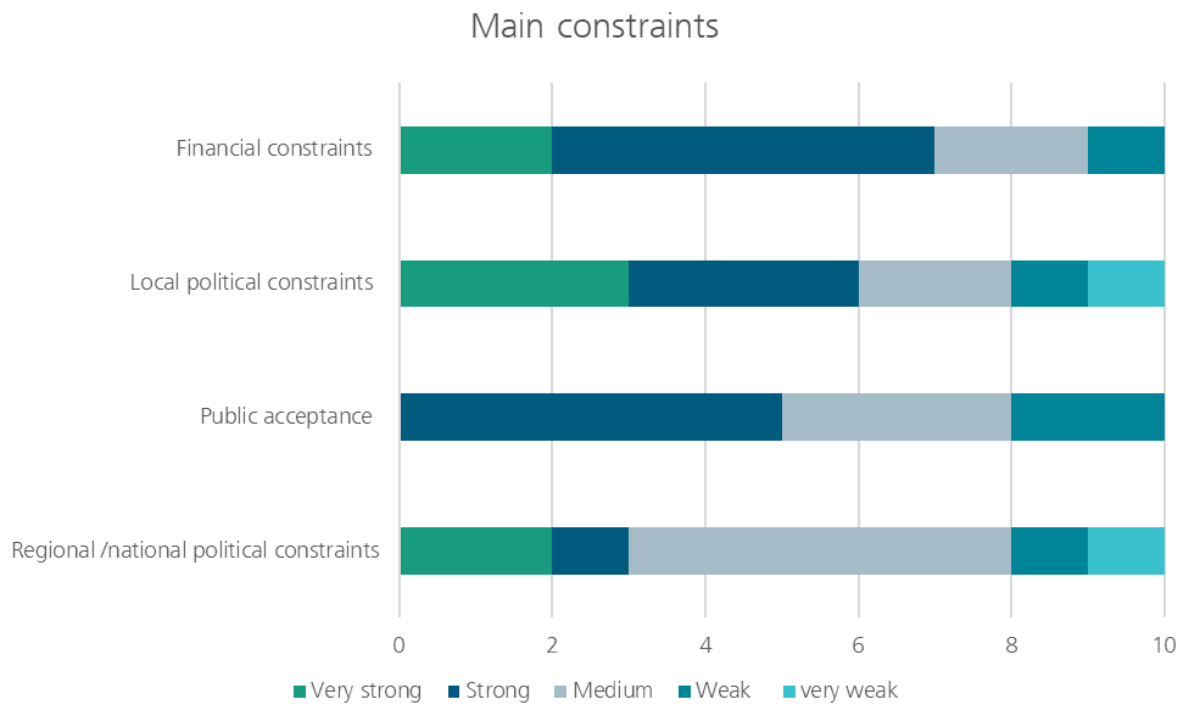
[3] https://transport.ec.europa.eu/transport-themes/urban-transport/sustainable-urban-mobility-planning-and-monitoring_en

nor a SUMP focussing on climate mitigation in transportation. However, the larger the community, the more frequent is a strategic document focussing on climate mitigation.

2.5 Constraints and success factors

The planners were asked to rank the problems they had when developing their SUMP. Figure 3 shows the number of cities replying to this question. Clearly, the local political constraints dominate the problems. Financial restrictions are only assessed by two cities as very serious, but five towns believe the financial problems are strong. Regional and national constraints range on place three followed by public acceptance. Thus, there is not one problem influencing the success of a SUMP, all issues rather must be tackled.

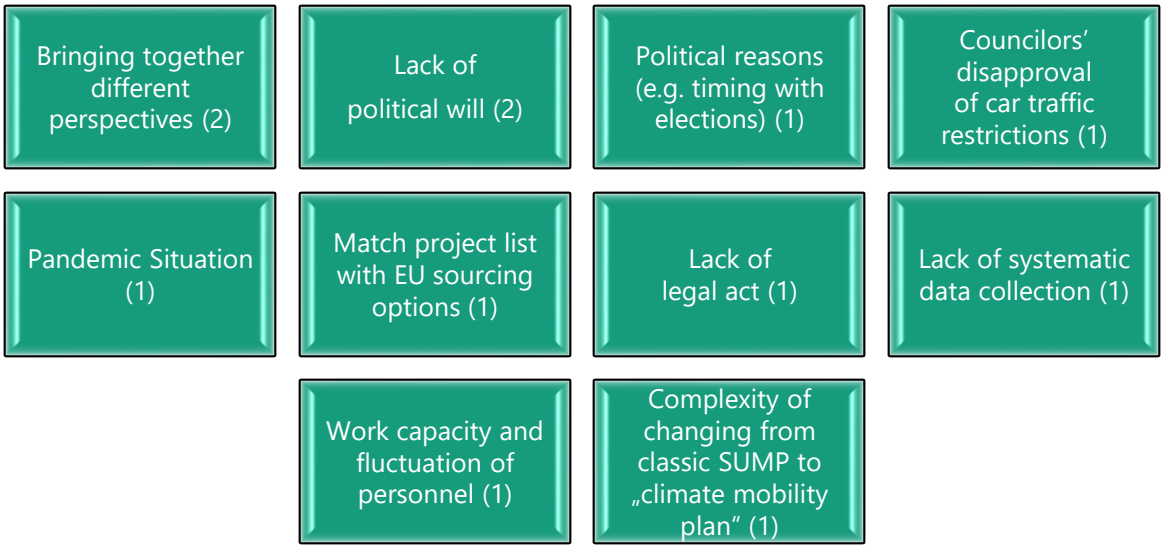
Figure 3: Assessment of main constraints when developing a SUMP (n=10)



2.5.1 Biggest administrative and political constraints

Figure 4 provides an overview on the various political and administrative problems. Here a large variety of constraints is given and not a clear picture of a few challenges. A major task was bringing together the perspectives and needs of public and private entities operating at different territorial levels. Important is the lack of political will, especially if elections are getting closer. Some councillors disapprove restrictions on car traffic. Other constraints should not be forgotten, such as data availability, work capacities, and the lack of a legal act.

Figure 4: Main political and administrative constraints mentioned by the planners



Chinellato et al. (2017) surveyed transport planning authorities from 328 cities in 27 European Union member states. The authors highlight organisational difficulties, for example problems relating to the interplay between countries' various administrative echelons (vertical interaction). Horizontal interaction can turn out to be equally tricky if responsibilities are scattered across agencies at the same organisational level.

> They are constantly working piece by piece - we take a little bit here; we take a little bit there - because they know they can still not get the big projects, which are limiting car traffic, through the Lord Mayor's office.
>
> Interview with a planner in Copenhagen in Peters et al. (2025)

2.5.2 Financial constraints

When 410 German municipalities were asked how climate goals could be better achieved, they named financial constraints as most important (Tröger et al. 2024). Three quarters (307) asked for more financial support of projects and two third (268) regarded the salaries of personnel as crucial.

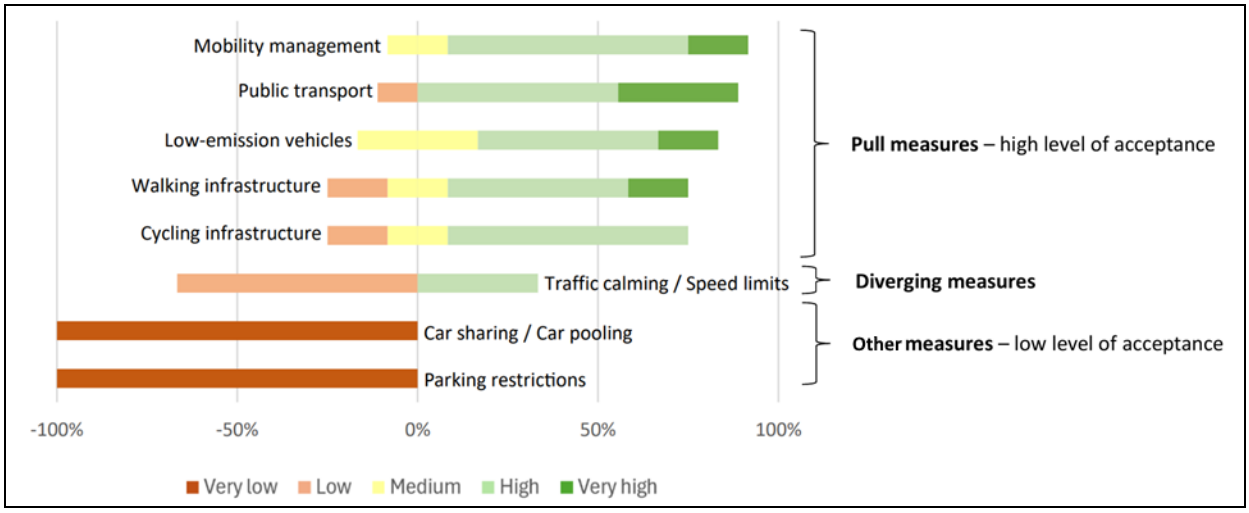
In the REALLOCATE survey, the most important issue regarding finances was that only 3 out of 10 cities were able to reply to the estimations about the distribution of financial sources. Obviously, transparency about funding sources is often missing. For the three cities, a very diverse structure of the financial sources could be observed. The municipal budget ranged between 90 % (Tampere) and 10 % (Budapest). The latter had an EU budget of 90 %, while in Utrecht and Tampere EU funding was below 5 %. EU funding was regarded as challenging for municipalities, especially since it is difficult to match project lists with EU sourcing options.

2.5.3 Public acceptance as a major constraint

A study conducted in 47 Spanish cities (Garcia-Ayllon et al. 2022) revealed the outstanding importance of participation in SUMP development. In the REALLOCATE survey, seven out of eight cities regarded public involvement as important or very important. All cities involved the public in the SUMP Planning process, but not all cities involved the public in all phases of the SUMP planning process. Participation was primarily through public discussion (6 cities), workshops with residents (2), publishing of reports (2), a communication plan (1), and resident surveys (1).

One important part of public participation is gaining acceptance. Figure 5 shows the acceptance of selected transport interventions. The size of the bars reflects the level of approval or disapproval. Generally, Pull-measures such as Public Transport, walking- and cycling infrastructure have a high agreement, while push-measures comprising restrictions have a low consent. In the case of diverging public acceptance participation is most effective. Research by Krauss et al. (2025) and Helferich et al. (2026) show that acceptance increases significantly when during the process additional information about the impacts of the measures is provided by the planners.

Figure 5: Acceptance of planned measures



2.6 Success in plan development

The planners were asked about the essential determinants of a successful planning process, and the answers are presented in Table 1 ordered by decreasing frequency of the replies. Participation is regarded as most important, and the presentation of planning alternatives follows next. The latter is fundamental for the development of scenarios as discussed in section 3.5. Additionally, the availability of time, financial and human resources is essential.

The replies mentioned often the importance of the cooperation between administrative units, effective and direct communication that is the precondition for a common vision, including environmental and safety issues. Personal engagement and motivation of involved persons is key for success. A planner is Karlsruhe reported about a small group of administrators working closely together for SUMP development. In Budapest "state and local government decision-makers sat at a table and thought together".

> "In general, our vice mayor of mobility is very much oriented towards green and sustainable mobility. Also, we have a lot of employees who are personally engaged with this topic and are passionate to get a good result and to enhance sustainable mobility in their own city."
>
> Response from a transport planner in the REALLOCATE survey

Table 1: Key factors of a successful planning process cited by planners

General planning framework

1. Participatory process
2. Offer planning alternatives
3. Sufficient time resources
4. Appropriate planning speed (not too fast)
5. Sufficient human resources
6. Common vision and cooperation of public administrations
7. Not losing political support
8. Possibility to fund projects with EU funds

Process within the administration

1. Increased awareness regarding environmental issues
2. Having dedicated resources
3. Increased awareness of safety issues related to mobility
4. Effective and direct communication
5. Personal engagement and motivation of involved persons
6. Cooperation of transport-related units

When planners were asked what they should have done differently during the process, they mentioned that communication with decision-makers on an early stage of SUMP development should have been improved. Importantly, financial resources should have been identified in time and not when it comes to implementation. Responsibilities within the administration should have been determined in a more binding manner. Other modes of transport beyond car traffic should have been examined in greater detail, and last but not least, the public should have been more actively involved.

> "One of the main learning points were that the car traffic has been studied very precisely and consistently. Similar approaches need to be adopted for the other modes of transportation."
>
> Response from a transport planner in the REALLOCATE survey

Planners were asked, how climate impacts of the SUMP could be improved. Here are the most important replies:

- Make impacts of measures on CO_2 emissions measurable which makes it possible to address and readjust the outcomes. How this can be achieved is discussed later in section 3 where a methodology on a vision-lead transport planning approach is developed.
- Involve politicians at an early stage and learn together during the process (see box below). The constitution of a working group with politicians and administration might be appropriate.
- Break down the plans into more actionable deliverables. Not too much work at the same time.

> "There is a knowledge gap between politicians and administrators responsible for the outputs. The tasks that politicians demand are often not appropriate to solve the problems, and the organisation becomes assignment driven. When politicians say investigate the officials deliver. To solve this problem, it is required to work more closely with politicians to learn together and let politicians give new assignments based on the common learning process."
>
> Response from a transport planner in the REALLOCATE survey

2.7 SUMP implementation: constraints and success factors

Once the SUMP is completed, the question arises if the plans are transformed into action. Which of the measures were implemented and what enhances fulfilment of the plan?

2.7.1 Implementation of key measures

The planners were asked if key measures of their SUMP were implemented. The replies reveal that pull measures, such as public transport improvements, walking and cycling infrastructures were implemented in time or later after end of the planning period. Push measures such as congestion charge, low-emission-zones and traffic constraints on main arteries were not implemented even though they were regarded as key for the success of the SUMP. It is apparent that these activities that have a higher public acceptance are implemented, while push-measures are abandoned.

A comment of a planner from Barcelona (not part of the survey) was that the "non-compliance of plans" is regarded as the major problem in Spain. The authors have observed various cases where planned measures are not implemented as planned or town council decisions revised later, or implementation contradicted existing plans. Planners often report about a huge deficit between planning and implementation. A German saying is that "paper is patient". This needs to be researched more in depth.

> "Tie the financing of infrastructures more closely to their provision within the SUMP, privileging the allocation of the financing to interventions linked to sustainable mobility included in the SUMPs."
>
> Recommendation from a transport planner in the REALLOCATE survey

The reasons why key measures of the 10 cities were not implemented or completed is provided in Table 2. The replies reveal that cities often don't have the responsibility or right to implement the planned interventions. Lack of resources and missing political will is as well important.

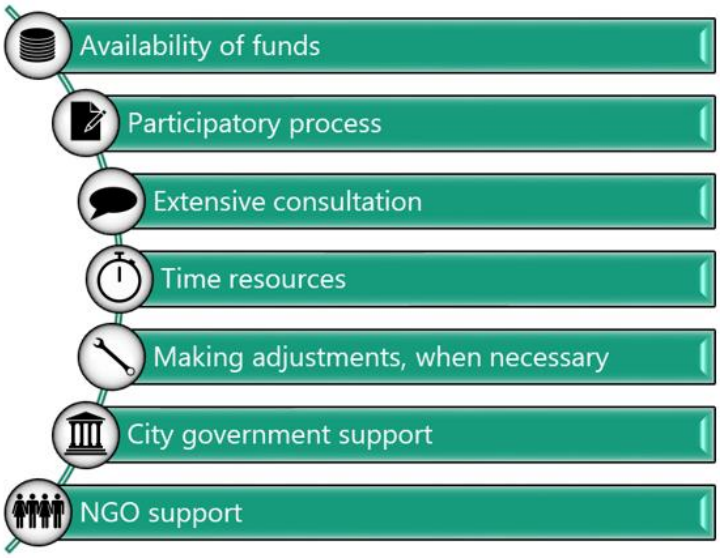
Table 2: Reasons for not implementing or completing key measures

Measure	Reason for not implementing the measure	
Promote the use of electric or low-emission vehicles	Lack of resources	Resources
Emission-reducing traffic control, designation of low-emission zones, associated with implementation of related infrastructure like(P+R)	Lack of resources	
Emission charge (local and nationwide) in conjunction with development of alternative transport options	Not the responsibility of the city	Responsibility
Regulated and reasoned automobile mobility	Lack of enforcement means due to national regulation framework	
Integrated freight transport	Freight is private initiative, with no real means to optimise it at a local level	
Reducing the climate impact from transportation to (90% lower compared to 2010)	It is a complex problem with a lot of dependencies and as well the political will	Political will

2.7.2 Success factors for SUMP implementation

Figure 6 ranks the most important success factors for SUMP implementation according to the number of cities mentioning the issue. Not surprisingly, availability of funding and participation are most often mentioned. However, some other issues are important as well, such as time resources and support by city government and non-governmental organizations (NGOs).

Figure 6: Most important success factors for SUMP implementation



The above quoted European survey by Chinellato et al. (2017) corroborates the above findings. The authors identify (i) access to financial resources; (ii) the conviction that SUMPs can curb mobility issues; (iii) political resolve; and (iv) legal obligations to devise SUMPs as pivotal drivers.

2.8 Ex-post monitoring

It is essential for a SUMP that the impacts are monitored and compared to the targets laid down in the plan. When planners were asked about ex-post monitoring 9 of 10 cities monitor the implementation of the planned transport interventions. Monitoring of climate impacts is conducted by 5 cities, but 3 planners were not aware if this will be made.

Asked about the activities planned, if climate targets are not achieved, some cities are intending corrective interventions or plan additional measures to accelerate climate mitigation. An analysis of the causes is foreseen as well.

It is remarkable that some cities consider reviewing their quantitative climate targets, if they are not achieved in practice. The question arises whether the subsequent review of planning targets is contradicting the initial idea of a SUMP.

> "There are so many nice plans, but actually there are very few evaluations of the effect of the plan, and it's more: 'Is this a nice plan, or is it not a nice plan?', which can be a totally different world. (Martin) Despite selective goal-setting, the city's mobility planning increasingly harnesses public participation, a component of the Action Plan."
>
> Interview with a planner in Copenhagen in Peters et al. (2025)

2.9 The need for a vision-lead planning process

The analysis of planning in REALLOCATE cities showed that in practice various problems hamper the setting of goals, the development of appropriate transportation measures and their implementation. The political and administrative conditions in the municipalities imply that local transport planning is often not very systematic and instead geared towards short-term solutions of traffic problems. Often planning focusses on the avoidance of bottlenecks in the road system and sometimes even expansion "as required" dominate the traffic objectives. The planning methodology is usually determined by future transport demand that is estimated by trend extrapolation. Infrastructures are designed according to this future demand. Instead of influencing future mobility patterns, the plans generate (road) traffic by supplying additional infrastructures. Thus, transport plans have rather the character of a self-fulfilling prophecy but not enabling a vision of a sustainable mobility.

This raises the question of how the SUMP methodology can be streamlined so that planning goals can be achieved more effectively. The next chapter outlines the rationale, methodology, and implications of a vision-led SUMP approach.

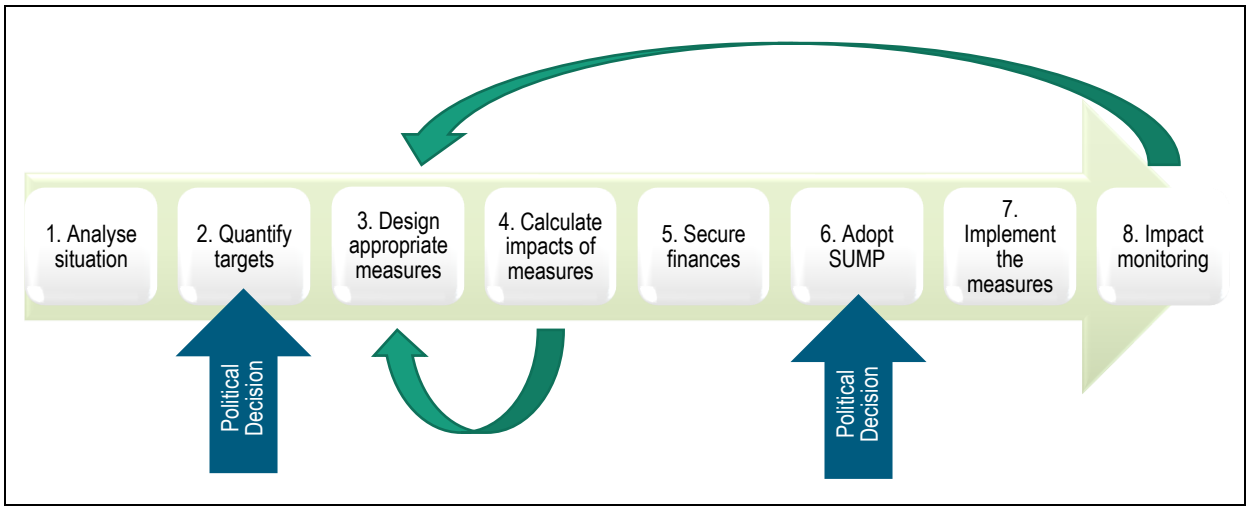
3 Strengthen vision-lead transport planning

While the previous section describes the shortcomings of SUMPs based on the findings of an empirical survey, this chapter uses a literature review to outline how the SUMP methodology can be improved. It proposes an alternative approach that places visions and goals at the centre of the planning process. Instead of asking "Where will we go?", the key question becomes "Where do we want to be in 20 years?". The main idea is to develop transport systems in such a way that they effectively deliver on the goals defined at the outset.

3.1 The vision-lead transport planning process

As an alternative to trend extrapolation, Banister et al. (2013) propose the methodology of backcasting as an alternative concept. The main idea is to develop future scenarios and determine which measures need to be implemented in order to achieve the goals developed initially. The SUMP methodology (Rupprecht Consult 2019) includes a circular process with 12 steps and four stages: (i) analysis of problems and opportunities, (ii) vision, objectives and targets, (iii) development and adoption of the SUMP and (iv) implementation and monitoring. Sieber et al. (2025) visualise a combination of both approaches as given in Figure 7. Here the procedure regards eight steps as most essential for goal achievement. Of major importance are two feedback loops that ensure the achievement of goals by switching back to earlier steps if targets are not met. Reflecting the importance of financial considerations identified in the REALLOCATE survey, step 5 addresses the timely securing of funding sources. The below scheme structures the following sections of this chapter.

Figure 7: Vision-lead transport planning process



3.2 Goals, targets and indicators

The development of goals is a political process that needs to be supported by the administration which analyse the mobility situation in the first place. Based on this analysis, a political agreement is made on vision, goals, targets and indicators. In an ideal world a consensus agreement of all democratic parties should be achieved. A working group with representatives of administration, stakeholders and politician might facilitate this agreement. The tasks are to analyse mobility problems and opportunities, develop vision and a strategy with all stakeholders and formulate the goals, representing the long-term vision and targets that reflect short-term achievements. For a vision-

lead transport planning approach, the most essential feature is the political agreement on goals, targets and their related indicators. It is recommended to design the targets according to the SMART principles[4]:

- **S**pecific: Objectives are described in detail using key figures and characteristics, so that everyone involved knows exactly what is meant.
- **M**easurable: Progress and results can be measured using defined key figures and indicators.
- **A**chievable: The objectives are realistic, taking into account technical, organisational and financial constraints.
- **R**elevant: The objectives promote sustainable mobility, are consistent with one another and are ambitious yet achievable.
- **T**ime-bound: Timeframes, milestones or key dates are clearly defined.

Each of these goals and targets should be specified through at least one, or better more indicators that specify the targets more in detail. Presently the EU is conducting a discussion process on the Sustainable Urban Mobility Indicators (SUMI)[5]. At the point in time of the writing of this paper, no final decision about relevant indicators was taken. Chatziioannou et al. (2023) identified 13 indicators in expert interviews amongst which the most powerful indicator is traffic congestion, followed by affordability of public transport for the poorest, energy efficiency, access to mobility service and multimodal integration. In Germany, in a two-year-process 24 indicators have been specified (Rupprecht Consult 2025).

3.3 Design of transport interventions according to goals

For the selection and design of transport measures four criteria are essential: (i) Effectiveness for target achievement, (ii) efficiency, (iii) effort and (iv) public acceptance.

(i) Effectiveness assesses if the planned transport interventions are designed in a manner that they achieve the targets set in step 2 of Figure 7. A qualitative assessment of the planning effects is mostly not sufficient to assess the impacts, especially if it comes to climate targets. For example, climate effects of pedestrian and bicycle traffic are often over-estimated[6]. Additionally, rebound effects, such as the shift from walking and cycling to public transport, might distort intuitive impact assessments. In order to avoid such misjudgements, it is imperative to calculate the overall effects of the plans. Simple Excel spreadsheets might be sufficient for smaller towns, but for larger cities or regions, a multimodal traffic model is more appropriate to take into account the respective complexities.

(ii) Efficiency can be quantified in terms of costs per unit. For example, climate mitigation may be measured in terms of costs per ton CO_2 reduced, infrastructures in cost per kilometre, or noise reduction by calculating cost per inhabitant benefitting from the measure. This methodology is used in other fields such as lighting and energy, but not in transport due to its complexity. However, Diez et al. (2018) using the example of Burgos (Spain), prove that this ratio can be calculated with the available data on modal shift and investments in the SUMP, taking into account the costs as a whole.

[4] https://nachhaltig-mobil-planen.de/_SUMP/DE/Planung/SUMP-Prozess/2-Strategieentwicklung/6-Ziele-Indikatoren/ziele-indikatoren.html

[5] https://transport.ec.europa.eu/transport-themes/urban-transport/sustainable-urban-mobility-planning-and-monitoring_en; https://eurocities.eu/projects/sustainable-urban-mobility-indicators/

[6] Although in Germany these modes make up one third of all journeys, the proportion of the relevant traffic volume, measured in passenger-kilometres, is only 6 % (Wuppertal Institut (2020), p. 75).

(iii) Effort is determined by other factors that cannot be quantified but are essential for the success, such as, energy usage, personal resources, planning and construction capacities. (Götz et al. 2025) have developed a seven-step procedure to combine effectiveness, efficiency and effort using a simple Excel matrix with a classification.

(iv) Public acceptance: The REALLOCATE survey demonstrates clearly that an early and intensive involvement of the public is a precondition for the public acceptance of the SUMP. Involvement in the development of goals and scenarios are important to steer the process.

It is important to assess the impacts of the chosen measures and compare them with the targets and indicators defined before. Quantitative analysis is essential to provide evidence on the effects and avoid assessments based on feelings or common sense that is often the case in political decision making which often results in the wrong priorities being set. For this purpose, it is essential to use a multimodal transport model to calculate the impacts of the transport interventions. The advantage is that an objective, transparent and data-based process will rationalise the discussion about the measures, allow for the development of scenarios and sensitivity calculations.

Figure 8: A dozen effective interventions to reduce car use in European cities

Source: Kuss et al. (2022)

Kuss et al. (2022) reviewed nearly 800 documents on reduced car use (369 scientific articles and 407 case study reports). The authors found only 24 documents that adequately quantified the reduction in car use, of which only 10 were peer-reviewed studies. The identified measures are listed in Figure 8. A literature review on the impacts of various transport measures is provided by Sieber et al. (2024). The study includes price elasticities as well that may be used to assess the impacts of pricing measures.

Most essential for the effectiveness of transport interventions is a combination of Push and Pull interventions as discussed in the next section.

3.4 Combination of Push and Pull measures

Banister (2008) suggests to combine push and pull measures in packages to enhance the effectiveness and acceptance of sustainable transport policies. Pull effects make environmentally friendly modes of transport more attractive, i.e. the improvement of public transport, cycling and walking. Push effects are measures that make individual car traffic less attractive, such a parking management, road pricing or city tolls. In practice, pull measures are preferred since they have a higher public acceptance compared to push measures. However, empirical evidence shows, that only the combination of push and pull leads to sustainability (Hekler et al. 2022). This implies that an improvement of public transport, should go hand in hand with a constraint of motorised individual transport.

Figure 9: PUSH and PULL measures

Axsen et al. (2021) compare the effects of Push and Pull measures. The strongest effects are achieved by a mixed strategy comprising road user charges, improved public transport and compact development, which can reduce annual car traffic volume by 7–23 % over a 10-year period and by 15–26 % over 30 years.

Horlemann et al. (2024, S. 23) calculate for a metro line extension in Munich that the cost efficiency for push measures is far higher than for pull measures. Avoidance costs for GHG Emissions (in Euro/ton CO_2) are 17-fold more expensive if pull measures are implemented compared to push measures. The same holds true for avoidance cost of energy consumption (in Euro/GJ) which is 29-fold more efficient for push compared to pull. An agent-based simulation of the city of Hamburg corroborates these findings (Schlenther et al. 2022). Five scenarios strongly suggest that making public transport more attractive is not sufficient to reach climate goals, the results display a meagre 3 %-point change in the share of motorised transport. This may be explained by rebound effects: Improvements to public transport relieve congestion, increase travel speeds for cars, and can thereby induce additional demand for road transport. With introducing additional means to repel motorized transport, an 8 %-point change may be within reach.

3.5 Vision-lead development of scenarios

The development of vision-lead SUMPs implies the reversion of traditional approaches towards scenario calculations as well, as depicted in Figure 10. The present approach often consists of four scenarios, with the Ecology Scenario achieving environmental goals, while usually, the moderate scenario is selected in the end. A future vision-lead transport approach would demand that all scenarios should be designed in a manner that they achieve the targets set in the first step of the process. An option of not achieving the goal is not eligible. The latter would imply that already on the planning stage, initially set targets would not be achieved. However, the appraisal criteria for the scenarios may remain unchanged: accessibility, cost efficiency, traffic safety, environmental impacts, urban quality of life, social justice and public acceptance. The actual political decision for selection of the preferred scenario lies in the weighing of these criteria. In any case, the achievement of the targets should be a "conditio sine qua non" for the approval of the plan.

Figure 10: New approach for vision-lead transport scenarios

3.6 Financing and investment planning

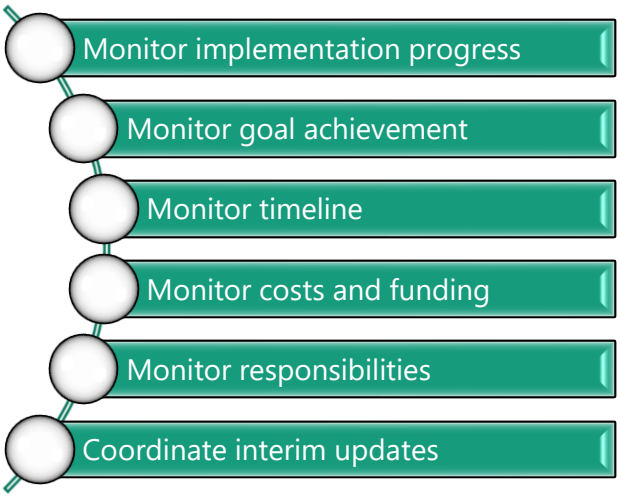
The REALOCATE survey revealed the importance of financial constraints (Figure 3 and chapter 2.6) and the need to include sources of funding in an early stage of SUMP development as depicted in step 5 of Figure 7. The planned transport measures need to be included in long-, medium- and short-term investment plans. The costs do not only include implementation costs, but as well planning and feasibility studies. Adequate financial plans should be developed for the investments that include budgeting of future households, credit uptake and donor financing. Good planning needs to assess financial sustainability of the system, including integration into existing programs and assurance of operations and infrastructure maintenance. Werland et al. (2019), Werland (2019) and Rupprecht Consult (2019) discuss the complex procedures of funding and financing of SUMPs. The above survey revealed that even amongst planners, little knowledge exists about the budgets and financial options for the investments. Obviously, it is important to improve administrative procedures and design government's financial support programmes transparently.

3.7 Plan for monitoring

Monitoring is often not regularly included in SUMPs, but are of major importance, especially if the agreed targets are not met. However, evidence from Vienna, Thessaloniki, Terrassa, Budapest, and York shows "a poor tracking of regional key performance indicators" (Süle et al. 2026). This finding is corroborated by Jordová et al. (2021) which find that "cities that have developed a SUMP … are better at evaluation than cities without a SUMP".

The monitoring process checks at previously defined intervals whether the planned measures have been implemented and whether they have achieved their targets. If monitoring reveals that the targets have not been reached, it is necessary to refine the previous plans. This implies a switchback to Step 3 in Figure 7. The procedures for monitoring and possible amendments to the plan should be laid down in the SUMP.

Figure 11: Essential features of implementation management



Source: Kompetenznetz Klima Mobil 2025

Monitoring should cover multiple dimensions, including traffic flows, mode share, parking, environmental impacts (climate, noise), safety (actual and perceived), and liveability. It is important to distinguish between project-specific impacts and broader trends, which can be achieved through a combination of traffic measurements, modelling, and user surveys.

Monitoring the impacts of interventions is essential, but also time consuming, expensive and sometimes difficult to interpret when external and induced effects overlap. Digital tools, such as transport models and pathway design apps, such as MobileCity[7], can support communities in evaluating interventions and tracking progress. These tools should be user-friendly, aligned with official guidelines, and provide clear outputs, such as dashboards, benchmarks, and graphical reports. Centralized databases collecting evidence from various cities can help share lessons learned and benchmark progress. Monitoring could also be integrated into participatory processes, ensuring that feedback from stakeholders and citizens is collected and used to inform future policy.

[7] https://www.isi.fraunhofer.de/en/competence-center/nachhaltigkeit-infrastruktursysteme/projekte/mobilecitygame.html

4 How can national and regional governments support SUMPs?

In March 2023, the European Commission adopted a recommendation[8] calling on each Member State to put in place a national programme with a dedicated office to help cities with sustainable urban mobility planning. National SUMP support programmes should include guidance material, training programmes and capacity building, and provide technical expertise and financial support to cities. They should animate networks of cities and towns and coordinate dedicated communication campaigns. The Recommendation also provides advice to Member States and cities on how to prepare for the urban nodes requirements that have been proposed for the trans-European transport network[9].

4.1 Provide funding

Since communities already have a multitude of tasks it is recommended not to overburden them with additional legal requirements but instead create incentives through funding programs for the development of SUMPs which contribute to planning costs, personnel and participatory processes. For example, the state of Baden-Württemberg increases the financing of communal infrastructures from 50 % to 75 %, if they are part of a Climate-SUMP (see section 4.4).

On the other hand, existing funding programs should be streamlined towards SUMPs. Major transport investments should only be eligible for public funding if they are included in a SUMP. This will ensure that funds are used in a targeted and efficient manner. To achieve this, existing funding structures at federal level need to be developed and consolidated. To put it popularly: no local bypass should be built without a SUMP.

The latter may also apply for the Connecting Europe Facility[10] by making a SUMP compulsory for funding of transport interventions. This would improve the liability of mobility programs. As the REALLOCATE survey revealed, connecting planned investments with EU funding seems to be complicated. Here improvement of the programs may increase effectiveness.

Long-term monitoring is often omitted due to resource constraints. Governments can address this by ensuring stable funding and staff availability, for example through long-term contracts or dedicated support programmes. National guidelines should specify minimum standards for monitoring, including the use of core indicators (e.g. SUMI), alignment with EU recommendations, and regular reporting intervals. Governments should encourage cities to record and share monitoring results, fostering a culture of learning and continuous improvement.

4.2 Provide technical support

Since municipalities need technical support and guidance to establish a SUMP and implement it, the establishment of a program management office on the level of states, regions or departments is recommended to provide relevant expertise and coordinate with other authorities. Further support will be provided to municipalities in communication (e. g., through a marketing kit, such as the

[8] COMMISSION RECOMMENDATION (EU) 2023/550: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A32023H0550, online 12.04.2024

[9] COM(2021) 812 final: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX %3A52021PC0812

[10] https://cinea.ec.europa.eu/programmes/connecting-europe-facility_en

one from the e-Smartec project[11]), in calculating SUMI indicators, and in implementing urban aspects from EU Mission Climate-Neutral and Smart Cities[12]. Technical support includes the creation of a central access point for data with the aim of providing necessary information to municipalities. Municipal data will also be collected here, which can be used, among other things, for impact evaluation of SUMPs. The state of Baden-Württemberg developed a transport model[13] that may be used by municipalities to calculate the impacts of the planned transport interventions.

The EU established an 'expert corner'[14] that provides material for the development of SUMPs for cities in various geographical settings, such as metropolitan or polycentric regions, for smaller cities and towns or planning for sustainable neighbourhoods.

4.3 Develop a regulatory framework

Federal government should create a legal basis for SUMPs including binding planning standards, which should contain at least the following issues:

- Since planning should generally cover the entire functional area, regional and municipal cooperation must be promoted. The major challenge here lies in the planning and organization of transport routes and mobility needs that go beyond municipal responsibilities. This requires coordination between the municipalities, regions and federal states.
- Involvement of the public on all stages of SUMP development should be made compulsory.
- In order to make SUMPs comparable, uniform standards for the calculation of core indicators (e.g. SUMI) are needed. This is especially relevant for the calculation of climate mitigation.
- Regulations should contain advice for monitoring of SUMPs, including the implementation of planned transport interventions and the ex-post analysis of the achievement of targets, as well as measures taken, if targets are not achieved.

How to handle existing mobility plans? They should only be recognised as SUMP if they meet the minimum standards determined by government and described in the EU guidelines. More information on the development of national support frameworks is provided in EU's Expert Corner[15].

4.4 Improve climate mitigation

Climate mitigation is an important aspect of SUMPs, since 74 % of Europeans live and move every day in cities, and 40 % of the total CO_2 emissions from transport is caused by urban mobility (European Commission 2007).

In the first place, climate targets need to be determined by central governments. Incentives may be provided through special funding programs that focus on the achievement of these goals and include not only contributions to planning costs but also to investments. Funding should be only provided if the plan proves that its impacts comply with government climate targets. Additionally,

[11] https://www.interregeurope.eu/e-smartec

[12] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

[13] https://vm.baden-wuerttemberg.de/de/politik-zukunft/zukunftskonzepte/digitale-mobilitaet/landesverkehrsmodell-baden-wuerttemberg

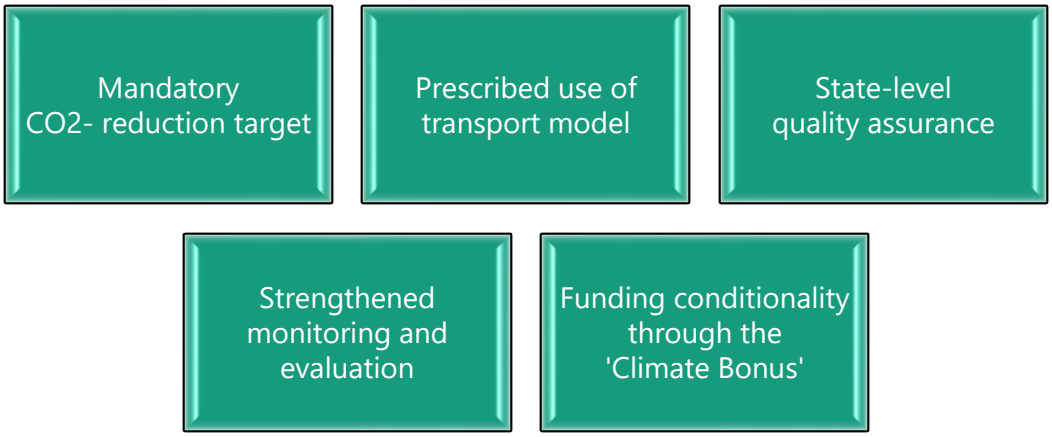
[14] https://urban-mobility-observatory.transport.ec.europa.eu/sustainable-urban-mobility-plans/expert-corner-sump-reference-materials_en

[15] https://urban-mobility-observatory.transport.ec.europa.eu/document/download/13917fc6-0e5a-4351-8866-97a1fd08ff78_en?filename=national_support_frameworks_for_sumps.pdf

it must be assured that the plans are put into reality by monitoring of implementation and climate impacts. A legal basis for Climate SUMPs including binding planning standards is a precondition.

Good practices are Climate Mobility Plans[16] (Klimamobilitätspläne) that are developed in the State of Baden-Württemberg as a voluntary instrument for municipalities. This special edition of a SUMP must prove that government's emission targets (55 % reduction 1990 to 2030) are met through the planned transportation measures. Proof shall be provided by modelling the impacts of the planned interventions. For this purpose, a modelling manual[17] has been developed and a number of additional SUMP elements introduced to the Climate Mobility Plan as depicted in Figure 12.

Figure 12: Additional SUMP elements introduced to the Climate Mobility Plan approach in Baden-Württemberg



The Kompetenznetz Klima Mobil (2025) promotes the advantages of developing a Climate SUMP:

- Synergies through integration with other planning initiatives
- Comprehensive overview of the local traffic situation
- More effective measures through a holistic, model-based approach
- Greater impact through collaboration with surrounding areas
- Efficient use of resources
- Broad support through public participation
- Objective discussions
- Improved quality of life and living environment locally
- Planning that is always up-to-date and future-proof

In Baden-Württemberg, a state law[18] provides significant incentives for local authorities, such as advice, support for personnel and climate mobility plans, and higher subsidy rates for the implementation of measures from the plan. This encourages local authorities to draw up climate mobility plans and implement the resulting measures. The State has created an agency to advise municipalities and manage a network of cities (Komptenznetz Klima Mobil). Additionally, a planning tool for

[16] https://urban-mobility-observatory.transport.ec.europa.eu/sump-made-land-how-baden-wurttemberg-germany-supports-municipal-transport-transition_en; https://www.klimaschutz-bewegt.de/klimaschutzorientierte-verkehrsplanung/klimamobilitaetsplan/

[17] https://www.klimaschutz-bewegt.de/wp-content/uploads/231012_Klimamobilitaetsplaene_HandbuchModellierung_V0.1_barrierefrei.pdf

[18] Klimaschutz- und Klimawandelanpassungsgesetz Baden-Württemberg (KlimaG BW)

participative planning (Mobi-Planer[19]) and a transport model that may be used by municipalities was developed.

An important criterion for the selection of transport interventions is the cost-efficiency of climate mitigation measures. Diez et al. (2018) demonstrate that it is possible to calculate total cost per tonne of CO_2 saved in the SUMP for the city of Burgos, Spain. The methodology used was developed in the projects HEATCO (Bickel et al. 2006) and HEAT (World Health Organization 2014). Sieber et al. (2026) show in an ex-post analysis that local measures, such as parking management, user advantages for electric mobility and Bus Rapid Transit have significant impacts on climate mitigation.

Essential for the assessment of climate impacts is the distinction between the effects caused by the municipality's transport interventions and the general effects caused by national policies. The Climate Mobility Plan in Freiburg[20] estimates that in 2030 only 22 % of its climate mitigation effects are generated through local interventions. The increasing use of electric vehicles will determine future climate impacts of a modal shift. Friedrich et al. (2024) calculate that 44 % of the climate mitigation effects in Baden-Württemberg will be caused by electric mobility in 2030 and 75 % in 2040.

[19] https://mobiplaner.urbanista.de/

[20] https://www.freiburg.de/pb/1828983.html; https://www.klimaschutz-bewegt.de/klimamobilitaetsplan-monitoring-freiburgs-zeigt-mehrheit-der-klimamobilitaetsmassnahmen-auf-kurs/; https://www.freiburg.de/pb/2563814.html

5 Conclusions

This paper analyses why many Sustainable Urban Mobility Plans (SUMPs) in Europe fail to deliver the intended transport and climate outcomes and how they can be redesigned to better achieve their goals. Empirically, the paper draws on a 2023 survey of transport planners in ten REALLOCATE cities (Barcelona, Bologna, Budapest, Gothenburg, Heidelberg, Lyon, Tampere, Utrecht, Warsaw, Zagreb). The survey examines planning practice, goal setting, constraints, implementation and monitoring.

Key findings show that many SUMPs still plan within municipal borders rather than the full functional urban area, even though commuting patterns clearly span wider regions. In terms of goals, climate mitigation is the most frequently cited objective, alongside safety, health, accessibility and liveability. However, goals are often mixed with measures (e.g. "improve public transport"), blurring the distinction between ends and means. Most cities now quantify CO_2 targets, but only a minority quantify the expected impacts of their measures; many therefore have little evidence whether planned interventions can actually meet their own targets.

The survey identifies political constraints, such as lack of will, election cycles and resistance to car restrictions. Key barriers are public acceptance, fragmented administrative responsibilities and limited staff capacities. Participation is widely recognised as crucial but is not consistently applied across all SUMP phases. In implementation, "pull" measures the improve environmentally friendly modes are much more likely to be realised than "push" measures that restrict private vehicle usage, leading to a pronounced implementation gap. Ex-post monitoring is uneven; some cities even react to underperformance by softening targets rather than adjusting policies.

To address these deficits, the paper proposes a vision-lead transport planning approach which entails a shift in the present planning paradigm: Instead of planning according to "where will we go?", the question is "**where do we want to be in 20 years?**" This new paradigm requires to put the goals in the centre of the procedure and reverse planning procedures from forecasting to backcasting. It includes the political agreement on common a vision, goals, targets and SMART indicators, designing measures by quantifying their impacts (ideally via multimodal transport models) and systematic monitoring. Measures should be selected using criteria of effectiveness, cost-efficiency, implementation effort and public acceptance, and should systematically combine push and pull instruments, since evidence shows that pull-only strategies are insufficient and less effective.

Even if a SUMP has been adopted it does not guarantee that transport interventions are finally implemented. Planners confirm that "non-compliance of plans" is regarded as the major problem. This may be regarded as an important deficit of democratic processes where political majorities might change after the end of an electoral period. Or to put it in words attributed to a German politician "why should I care about my gossip from yesterday?"

However, the paper stresses the role of national and regional governments. They should provide funding incentives linked to SUMPs. Major government investment should only be supported if the plan proves that sustainable transport goals are met. Additionally, governments should provide technical support (guidance, data, modelling tools, training), and a regulatory framework that mandates planning for functional areas, inclusive participation, harmonised indicators and robust monitoring. Climate-oriented SUMP variants, such as Baden-Württemberg's Climate Mobility Plans, illustrate how binding climate targets, mandatory impact modelling and higher co-funding rates can significantly strengthen the effectiveness and credibility of local SUMPs.

Overall, the paper demonstrates that achieving sustainability in transport requires a vision-led planning approach supported by coordinated action across levels of government. While municipalities play a central role, national and regional governments can significantly improve the performance of SUMPs.

6 List of figures

Figure 1: Commuter flows 6/2025 in and out of Heidelberg, Germany 7
Figure 2: Most important targets of in the analysed SUMPs 9
Figure 3: Assessment of main constraints when developing a SUMP (n=10) 10
Figure 4: Main political and administrative constraints mentioned by the planners 11
Figure 5: Acceptance of planned measures 12
Figure 6: Most important success factors for SUMP implementation 15
Figure 7: Vision-lead transport planning process 17
Figure 8: A dozen effective interventions to reduce car use in European cities 19
Figure 9: PUSH and PULL measures 20
Figure 10: New approach for vision-lead transport scenarios 21
Figure 11: Essential features of implementation management 22
Figure 12: Additional SUMP elements introduced to the Climate Mobility Plan approach in Baden-Württemberg 25

7 List of tables

Table 1: Key factors of a successful planning process cited by planners 13
Table 2: Reasons for not implementing or completing key measures 14

8 Bibliography

Axsen, J.; Wolinetz, M. (2021): Taxes, tolls and ZEV zones for climate: Synthesizing insights on effectiveness, efficiency, equity, acceptability and implementation. In: Energy Policy, 156, S. 112457. https://doi.org/10.1016/j.enpol.2021.112457.

Banister, D. (2008): The sustainable mobility paradigm. In: Transport Policy, 15 (2), S. 73-80. https://doi.org/10.1016/j.tranpol.2007.10.005.

Banister, D.; Hickman, R. (2013): Transport futures: Thinking the unthinkable. In: Transport Policy, 29, S. 283-293. https://doi.org/10.1016/j.tranpol.2012.07.005.

Bickel, P.; Lindberg, G. (2006): HEATCO. Developing harmonised European approaches for transport costing and project assessment. Deliverable 5. IER.

Chatziioannou, I.; Nikitas, A.; Tzouras, P. G.; Bakogiannis, E.; Alvarez-Icaza, L.; Chias-Becerril, L.; Karolemeas, C.; Tsigdinos, S.; Wallgren, P.; Rexfelt, O. (2023): Ranking sustainable urban mobility indicators and their matching transport policies to support liveable city Futures: A MICMAC approach. In: Transportation Research Interdisciplinary Perspectives, 18, S. 100788. https://doi.org/10.1016/j.trip.2023.100788.

Chinellato, M.; Staelens, P.; Wennberg, H.; Sundberg, R.; Böhler, S.; Brand, L., Adams, R.; Dragutescu, A. (2017): Users' needs analysis on SUMP take up. Deliverable No. D 1.2. European Programme for Accelerating the Take-up of Sustainable Urban Mobility Plans. European Platform on Sustainable Urban Mobility Plans.

Diez, J. M.; Lopez-Lambas, M. E.; Gonzalo, H.; Rojo, M.; Garcia-Martinez, A. (2018): Methodology for assessing the cost effectiveness of Sustainable Urban Mobility Plans (SUMPs). The case of the city of Burgos, 68, S. 22–30. https://doi.org/10.1016/j.jtrangeo.2018.02.006.

European Commission (Hrsg.) (2007): Green Paper: "Towards a new culture for urban mobility". COM (2007) 551.

European Commission (2021): EXECUTIVE SUMMARY OF THE EVALUATION of the 2013 Urban mobility package. Commission Staff Working Document. Brussels. Online verfügbar unter https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021SC0048, zuletzt geprüft am 18.04.2024.

European Court of Auditors (2020): Sustainable Urban Mobility in the EU: No substantial improvement is possible without Member States' commitment. Online verfügbar unter https://www.eca.europa.eu/Lists/ECADocuments/SR20_06/SR_Sustainable_Urban_Mobility_EN.pdf, zuletzt geprüft am 18.04.2024.

Friedrich, M.; Schmaus, M. (2024): Weiterführende Berechnungen im Rahmen der Aktualisierung des Klimaschutzszenarios 2030.

Garcia-Ayllon, S.; Hontoria, E.; Munier, N. (2022): The Contribution of MCDM to SUMP: The Case of Spanish Cities during 2006–2021. In: International Journal of Environmental Research and Public Health, 19 (1), S. 294. https://doi.org/10.3390/ijerph19010294.

Götz, S.; Schmicker, I.; Kipke, H. (2025): Standardisiertes Verfahren zur Auswahl von Mobilitätsmaßnahmen für die Erstellung von resilienten Mobilitätskonzepten. In: DVWG Journal für Mobilität und Verkehr, 24, S. 3-11.

Hekler, M.; Drews, F.; Gertz, C.; Schwedes, O. (2022): Push & Pull: Aktueller Forschungsstand.

Helferich, M.; Tröger, J. (2026): Social acceptance factors of mobility-related policy packages. In: Transportation Research Part A: Policy and Practice, 203, S. 104759. https://doi.org/10.1016/j.tra.2025.104759.

Horlemann, J.; Heidinger, M.; Wenner, F.; Thierstein, A. (2024): Introducing a Novel Framework for the Analysis and Assessment of Transport Projects in City Regions. In: Sustainability, 16 (6). https://doi.org/10.3390/su16062349.

Jordová, R.; Brůhová-Foltýnová, H. (2021): Rise of a New Sustainable Urban Mobility Planning Paradigm in Local Governance: Does the SUMP Make a Difference? In: Sustainability, 13 (11), S. 5950. https://doi.org/10.3390/su13115950.

Kompetenznetz Klima Mobil (2025): Klimamobilitätspläne. Ein Leitfaden für klimagerechte Verkehrsplanung in Städten, Landkreisen und kommunalen Zusammenschlüssen in Baden-Württemberg. Online verfügbar unter https://www.klimaschutz-bewegt.de/wp-content/uploads/Leitfaden_Klimamobilitaetsplaene.pdf, zuletzt geprüft am 30.03.2026.

Krauss, K.; Duffner-Korbee, D.; Flacke, J.; Doll, C. (2025): Do People Actually Want Sustainable Urban Mobility Systems? A Residentsâ Perspective on Policy Measures. In: Transport Transitions: Advancing Sustainable and Inclusive Mobility, 2025, Cham. Cham. ISBN: 978-3-031-85578-8, S. 606–612.

Kreutzberger, E.; van Binsbergen, A.; Drabicki, A.; Reitemeyer, F.; Kachousangi, F. T.; van Oort, N. (2025): Climate-friendly mobility in cities. Planning for carbon reduction in the long term in four European cities. In: Progress in Planning, 202, S. 101021. https://doi.org/10.1016/j.progress.2025.101021.

Kuss, P.; Nicholas, K. A. (2022): A dozen effective interventions to reduce car use in European cities: Lessons learned from a meta-analysis and Transition Management. In: Case Studies on Transport Policy. https://doi.org/10.1016/j.cstp.2022.02.001.

Munkácsy, A.; Földes, D.; Miskolczi, M.; Jászberényi, M. (2024): Urban mobility in the future: text analysis of mobility plans. In: European Transport Research Review, 16 (1), S. 29. https://doi.org/10.1186/s12544-024-00649-x.

Peters, N. V.; Reisch, L. A. (2025): Drivers of and barriers to Sustainable Urban Mobility Plan implementation: Lessons from Copenhagen. In: Case Studies on Transport Policy, 20, S. 101417. https://doi.org/10.1016/j.cstp.2025.101417.

Rupprecht Consult (2019): Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan. Online verfügbar unter https://sumps-up.eu/fileadmin/user_upload/Tools_and_Resources/Publications_and_reports/Guidelines/guidelines_for_developing_and_implementing_a_sump.pdf, zuletzt geprüft am 18.04.2024.

Rupprecht Consult (2023): Bestandserhebung und -analyse in Bezug auf nachhaltige urbane Mobilitätspläne (Sustainable Urban Mobility Plans - SUMPs) in deutschen Kommunen mit über 100.000 Einwohnern. Projekt-Nr.: VB970446. Abschlussbericht.

Rupprecht Consult (2025): Forschungsprojekt Indikatoren nachhaltiger urbaner Mobilität. Schlussbericht. Köln. Online verfügbar unter https://www.bmv.de/SharedDocs/DE/Anlage/G/indikatoren-nachhaltiger-urbaner-mobilitaet.pdf?__blob=publicationFile.

Schlenther, T.; Wagner, P.; Rybczak, G.; Nagel, K.; Bieker-Walz, L.; Ortgiese, M. (2022): Simulation-based investigation of transport scenarios for Hamburg. In: Procedia Computer Science, 201, S. 587-593. https://doi.org/10.1016/j.procs.2022.03.076.

Sieber, N.; Krail, M.; Hölzemann, Charlotte (2024): Klimawirkungen von Maßnahmen im Verkehr. (2024): Klimawirkungen von Maßnahmen im Verkehr. Eine Literaturstudie zu Benutzervorteilen, Parkraummanagement und Maßnahmen zum massiven ÖPNV-Ausbau. Karlsruhe: Fraunhofer ISI.

Sieber, N.; Krail, M.; Horlemann, J.; Aulich, C. (2026): Ex-post-Untersuchung der Klimawirkungen von ausgewählten verkehrlichen Maßnahmen in Baden-Württemberg. Karlsruhe: Fraunhofer ISI. Online verfügbar unter doi: 10.24406/publica-7609.

Sieber, N.; Krauss, K. (2025): Improvement of SUMP-Methodology for Climate Mitigation, Proceedings of the 10th TRA Conference, 2024, Dublin, Ireland (Volume 4: Clean Energy Transition, LNMOB), S. 114–119.

Süle, E.; Florez, M. F.; Horváth, A. (2026): Sustainable Urban Mobility Plans Policies and Implementation in Europe: Evidence from Vienna, Thessaloniki, Terrassa, Budapest, and York. In: Džunić, M.; Östh, J.; Muratori, S. (Hrsg.): Advancing Urban and Local Governance in Western and Transition Europe: Equity, Sustainability, and Smart Practices. Cham: Springer Nature Switzerland, S. 203-226. https://doi.org/10.1007/978-3-032-04265-1_11.

Sutter, D.; Wörner, M.; Esche, C.; Sieber, N. (2022): Overview of Urban Mobility Climate Mitigation Strategies and Climate objectives in Urban Mobility Plans (SUMPs). INFRAS Final Report. Zurich. Online verfügbar unter http://www.niklas-sieber.de/Publications/2022 %20Urban-Climate-Strategies-and-Urban-Mobility-Plans.pdf, zuletzt geprüft am 18.04.2024.

Tröger, J.; Duffner-Korbee, D.; Dütschke, E.; Scherf, C.; Emmerich, J. (2024): Ergebnisse der Kommunenbefragung zu Klimaschutz im Bereich Mobilität 2023. [Foliensatz zur Berichterstattung]. Unveröffentlichtes Dokument im Rahmen der Begleitforschung zum Expertenbeirat Klimaschutz in der Mobilität (EKM). Fraunhofer-Institut für System- und Innovationsforschung ISI Karlsruhe und M-Five GmbH Mobility, Futures, Innovation, Economics Karlsruhe.

Werland, S. (2019): Financing and funding options for Sustainable Urban Mobility. 6th European Conference on Sustainable Urban Mobility Plans Groningen, 17-18 June (2019).

Werland, S.; Rudolph, F. (2019): Funding and financing of Sustainable Urban Mobility Measures. Online verfügbar unter : https://www.researchgate.net/publication/336890610, zuletzt geprüft am 18.04.2024.

World Health Organization (2014): Development of the Health economic assessment tools (HEAT) for walking and cycling::. Consensus workshop: Bonn, Germany, 11-12 December 2014. Meeting Report.

Wuppertal Institut (2020): CO2-neutral bis 2035: Eckpunkte eines deutschen Beitrags zur Einhaltung der 1,5-°C-Grenze. Wuppertal. Online verfügbar unter https://epub.wupperinst.org/frontdoor/deliver/index/docId/7606/file/7606_CO2-neutral_2035.pdf, zuletzt geprüft am 18.04.2024.