

INTERREG Alpine Space Project
"Sustainable Mobility Behaviours in the Alpine Region –
SaMBA"

Concept for SaMBA Tool
for finding policies & estimating impacts
in terms of mobility behavior change

(June 2021)

Short Description

“Development of a tool concept for simulating effects of behaviour change policies (D.T.1.2.2) considering the identified local needs and requirements in respect to usability and functionalities (D.T.1.2.1).” (Project Application Form 01/25/2019)

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List of abbreviations

MIV	Motorized individual vehicles
PT	Public transport

1. Introduction

This deliverable (D.T1.2.3) belongs to WP T1 (“Policy impact estimation”) and contributes to the work package’s output O.T1.1 (“Behavior change policies impact estimation and tool”). The tool concept presented within this document is created as a **framework for the development of the SaMBA tool for finding policies & estimating impacts in terms of mobility behavior change**. It is mainly based on the Collection of existing tools (D.T1.1.1) conducted within WP T1, and a collection of ideas and needs of potential users summarized within the report of user needs (D.T.1.2.1). The Catalogue of policies impacts (D.T.1.2.2) was developed in parallel and also influenced the tool conception. More precise instructions on how to implement the SaMBA tool will be given within a guideline (D.T1.5.1).

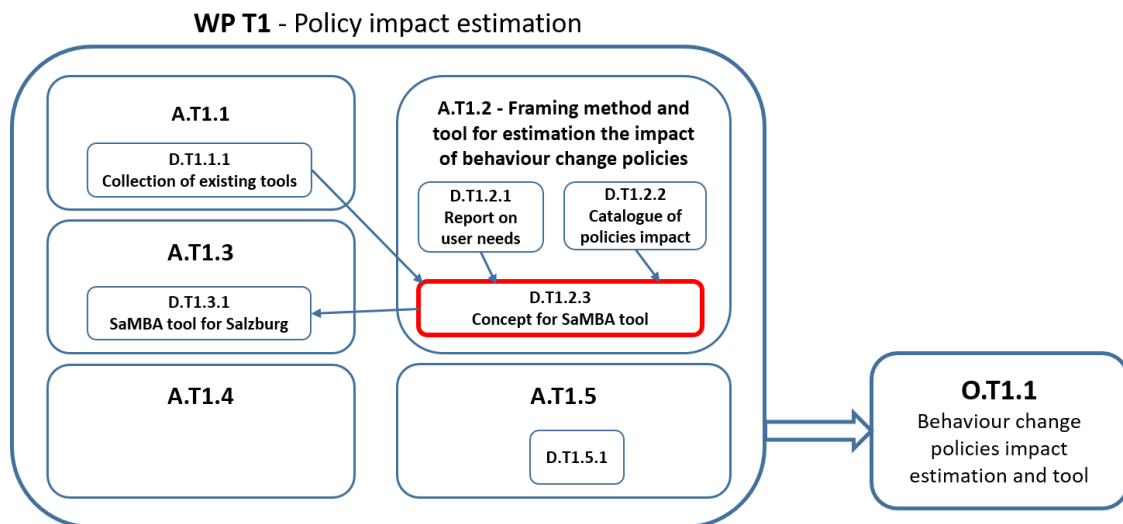


Figure 1: Placement of this deliverable within the project

The generated output (O.T1.1) should be of use for a broad target group consisting of local, regional and national public authorities, sectoral agencies and higher education and research. The responsible partner of this work package is RSA FG Research Studio iSPACE together with the lead partner Piedmont Region. In addition, 12 project-partners are involved within this work package.

The tool concept presented within this document is created as a framework for the development of the SaMBA tool for finding policies & estimating impacts in terms of mobility behavior change.

This document presents the concept for the **SaMBA tool**, which provides **decision support regarding mobility policies** and helps to **raise awareness on the importance of behavior change approaches for the promotion of low carbon mobility**.

Starting from a set of generic **goals** and the **characteristics of the target region**, a list of recommended **measures and incentives** along with their impacts based on best practices

and SaMBA pilot case studies can be identified with the help of the tool. These measures address the mobility behavior of citizens and promote sustainable means of transportation. By choosing a measure of interest which has been suggested for the area its potential/estimated impacts based on best practices will be shown.

This document at first describes the theoretical background by summarizing already existing tools and describing relevant goals and some best practices. Furthermore, the applied methods and the structure of the tool will be demonstrated. The concept also gives an outlook on the implementation in the City of Salzburg and its surrounding regions.

2. Foundations

a) Existing tools

For the development of the SaMBA tool, already existing tools on mobility are a valuable foundation. This chapter takes up the SaMBA **Review of existing tools** (D.T1.1.1), which summarizes and categorizes tools simulating the impacts of policies in the field of sustainable transportation. These tools use different technical foundations like Microsoft Excel, web and stand-alone approaches or models. They address different modes of transport including MIV, PT, cycling and walking. Some of them only deal with one of these modes while others cover a broader thematic range.

Different aspects of the presented applications are useful as first ideas and foundations for the SaMBA tool. The type of a tool is another important issue. The benefit of **web applications** is that on the user side no specific software and knowledge is required. A disadvantage is that more complex calculations are less convenient within a web-tool environment. Furthermore, they require a web server and regular maintenance even after the end of a project in order to function properly. The IMPACT tool¹ as a web-based example assesses impacts of interventions and mobility change technologies in mobility systems (e.g. innovative PT systems in rural areas, autonomous vehicles).

Excel tools, on the one hand, are limited to presenting results as diagrams or tables. However, they provide a variety of functions and most users have experience with this environment. An example is the FLOW tool², which tackles effects of changes in walking and cycling infrastructure regarding congestion and measures impacts of walking and biking on the performance of urban transport networks.

Stand-alone software applications require more time and effort during the implementation phase. The advantage is that no other software is required and user needs and demands can be implemented to a wider extent. An example is the HIGH tool³, which is Java-based and

¹ <https://www.ait.ac.at/en/solutions/impact-assessment-for-transformative-mobility-systems/>

² <http://h2020-flow.eu>

³ <http://www.high-tool.eu/index.php?id=home>

provides results in Excel format. With the help of this tool, the economic, social and environmental impacts of transport policies can be evaluated.

Before starting the development of a tool, the **user group** needs to be delimited in order to meet specific requirements. Generally, the calculations and results have to be comprehensible, transparent and understandable. A suitable and easy way to communicate outcomes for decision makers is the presentation of more general results with the help of interactive maps and diagrams that enable user-friendly visualizations. Planners, who need to work with raw/detailed data, might prefer statistical approaches as they need a more detailed and technical way to plan scenarios and evaluate initiatives.

Other important aspects that can be considered for a tool are the implementation of future scenarios and the evaluation of the existing infrastructure. What-if-analyses are helpful to estimate effects of different actions. Additionally, practical hints and recommendations for the implementation of a measure as a guideline are appreciated by the user.

b) Report on user needs

Within Activity A.T.2.3 (“Collection and analysis of mobility issue cases in each AS country”), each PP country had to organize two **workshops with local participants**. In some of these workshops, ideas and needs of potential users regarding a SaMBA tool were collected in order to guarantee its usability and practicability. The workshop outcomes are presented in the **Report on user needs** (see D.T1.2.1).

Table 1 gives an overview of the summarized user needs, subdivided into four groups: **general**, **functionality**, **analysis/simulation** and **results**. This collection of user needs together with the **Collection of existing tools** (see deliverable D.T1.1.1) is used for further steps within WP T1. Therefore, it is also included in this concept, but not all collected ideas will necessarily be implemented. This will depend also on other factors like the availability of data, the technical frame or the practicability of components.

<i>General</i>	Different level of complexity for different users: planners/decision makers
	Define a main goal as entry
	Citizens as direct target group of the measures and incentives
<i>Functionality</i>	User-friendly interface
	Export function: provide result as factsheet/table/etc.
<i>Analysis and simulation</i>	Local scale of analysis
	Evaluation of existing (transport) infrastructure/quality
	„What-If-Analysis“ to estimate effects initiatives and gauge acceptance

	Simulation of future scenarios
	Temporal aspect: When is a measure successful/most effective?
	Include sociological/psychological aspects → simulation of motives
	Spatial aspects are important for simulating
<i>Results</i>	Easy communicable results through maps, diagrams, checklists, etc.
	Best practices as results (suitable measures and their impacts)
	Impacts in form of CO ₂ emissions, success rates or predicted reliability (social and environmental more important than economic impacts)
	Impact should be presented in relation to surrounding conditions
	Transparent calculations and results
	Additional result: roadmap for how to reach a defined goal

Table 1: User needs for the SaMBA tool collected within national workshops

c) Strategic documents

As a result of the **2015 UN Climate Change Conference** in Paris, 195 nations negotiated an agreement on climate protection. It states that until the year 2050 greenhouse gas emissions need to be reduced to limit global warming to a maximum of 2°C. This results in a specific CO₂ budget per country that determines the amount of CO₂ allowed to be emitted until 2050 (VCO n.d.).

The passenger transport in the EU is strongly based on the car with a share of 83.3% (EEA 2019). Against this background, many EU projects on the promotion of low carbon mobility are funded. The **European Commission** aims at a promotion of co-modality (i.e. an optimal combination of various modes of transport within the same transport chain), technical innovations and a shift towards the least polluting and most energy efficient modes of transport (EUROPEAN COMMISSION 2020). Therefore, the commission has published a **strategy on low-emission mobility**, which includes three main elements. The first one is increasing the efficiency of the transport system through digital mobility solutions for safe, efficient and inclusive transport, fair pricing and promotion of multimodality. The second element is increasing the use of low emission alternative energy since transport in the European Union depends on oil for about 94% of its energy consumption. Therefore, the EU aims at the development of an effective framework for low emission alternative energy, the establishment of an infrastructure for alternative fuels and ensuring interoperability and standards for e-mobility. With the third element, the strategy aims at the promotion of zero-emission vehicles by improving vehicle testing and developing future strategies for cars and buses (EUROPEAN COMMISSION 2016). Furthermore, the EU has developed a **strategy on urban mobility**. It addresses different topics like urban access regulation, road user charging, deployment of intelligent transport systems and road safety (EUROPEAN COMMISSION 2013).

In the **transport protocol of the Alpine Convention**, characteristics of a sustainable transport policy are defined. They include e.g. reduction of negative effects on the environment, increase of transport efficiency, reduction of emissions, improved accessibility, optimization of the use of existing infrastructures, measures against noise and coordination between different carriers and modes of transport (EU 2007).

Against the background of climate change in Austria, the government of the Federal State Salzburg has developed a **Climate and Energy Strategy**. It focuses on the reduction of energy consumption and greenhouse gases and on the expansion of renewable energies. According to this strategy, greenhouse gas emissions have to be reduced step by step until climate neutrality is reached (LAND SALZBURG 2015).

The **Mobility Concept of the Federal State Salzburg** defines future strategies for sustainable mobility and transport policies. Important goals are the reduction of greenhouse gas emissions, promotion of eco-friendly and multimodal transport, coordinated spatial development and traffic systems, using alternative and innovative approaches (e.g. sharing systems) and promotion of non-fossil types of drive. Furthermore, the accessibility of central institutions will be enhanced by providing equal mobility options for all residents (LAND SALZBURG 2016). Similar objectives are tackled by the **Austrian Traffic Master Plan**, which provides Austrian-wide transport political goals for all modes of transport (BMVIT 2012).

d) SaMBA pilot case activities and other best practices

Besides strategic documents, also best practice examples of mobility behavior change policies with rewarding character are an important foundation for the SaMBA tool. Some of them already have been listed in the **Behavior change policies state of the art report** (D.T2.2.1), which has been developed during the SaMBA project. Other best practices were found with the help of own research and in the **Catalogue of policies impacts** (D.T1.2.2). This catalogue describes the impacts of measures for mobility behaviour change that are tested during the 9 SaMBA **pilot activities**. It considers qualitative and quantitative social, economic, environmental and other impacts. The pilot cases address public authorities, infrastructure and service providers and the general public. These target groups will be engaged during the pilot activities to co-create reward and pricing schemes to be tested. The results will be included in a **handbook for implementing behavior change policies** to support public authorities in carrying out activities. However, due to COVID-19, results are expected in autumn 2020, but they still will be included in the tool.

Most of the implemented best practices generally aim at the **reduction of MIV and congestion, promotion of PT, protection of the environment, promotion of sustainable forms of mobility and promotion of active modes** like walking and cycling. Target groups include e.g. employees and commuters, pupils and their parents, university students, car owners or in many cases also all citizens in general. The results and impacts of many of the best practices are well documented, which provides valuable information for the SaMBA tool.

A full list of best practices used for the SaMBA tool is included in the annex of this document.

3. Description of the tool

a) Objectives

The objective of the tool is to **promote low carbon mobility** and to **raise the awareness of the value of behavior change policies**. It will help to promote sustainable modes of transport, to achieve a modal shift from the car to PT, cycling, walking and other sustainable mobility options and to increase options for low carbon mobility by new policies.

Therefore, the tool aims at the **support of decision-making processes** and the choice of appropriate measures and incentives to encourage residents to change their mobility in favor of sustainable means of transport. For the tool concept, **measures** are defined as policies including an **incentive/reward** to promote sustainable modes of transport. The selection of measures suitable for a specific target region depends on a goal initially selected by the user and a set of **parameters**, which describe regional characteristics with influence on mobility (e.g. infrastructure, demography, settlement density, topography). The tool also helps to estimate **impacts** of measures with the help of indicators.

The tool concept is designed for **transnational applicability**, which means that the goals and parameters have no regional specification. Therefore, the tool can be implemented in a generic way (covering all aspects from this concept) or for a specific region and its characteristics and demands. However, it is important to note that a measure may not have the same effects in different target regions. The impacts depend on many factors and details which are beyond the scope of the SaMBA project. Therefore, the SaMBA tool will provide experiences and reported effects of best practices.

As an optional add-on, a **GIS-based framework** is developed in order to **improve and substitute the customization of the tool's user input** by preprocessed spatial statistics and data. Besides that, additional GIS methods on **potential mobility demand and action areas for behavior change policies** are developed with the intention of supporting the decision-making process.

b) Target groups and use cases

The tool primarily addresses **planning experts, policy makers and public authorities** (mostly on local, but also on regional and national level). Furthermore, it can be interesting for **sectoral agencies** dealing with transport, sustainable development or land use planning, **higher education and research** and **infrastructure and service providers**. It also addresses the **general public** since the recommended measures and incentives are designed for citizens.

One requirement of the SaMBA tool is to be **open to a wide audience without any restrictions**. Furthermore, it will be **usable without specific IT expert knowledge**. However, for implementing the optional GIS framework for a specific region, it is recommended to involve a GIS expert.

c) Tool structure and methods

The structure of the tool and the linkage of different input and output components can be seen in Figure 2. By selecting a goal and filling in the required parameters, the tool in the background filters measures and incentives and presents the ones that are most suitable for the target area. Furthermore, the impacts of each recommended measure are described with the help of best practice examples in order to give the user an idea of possible outcomes.

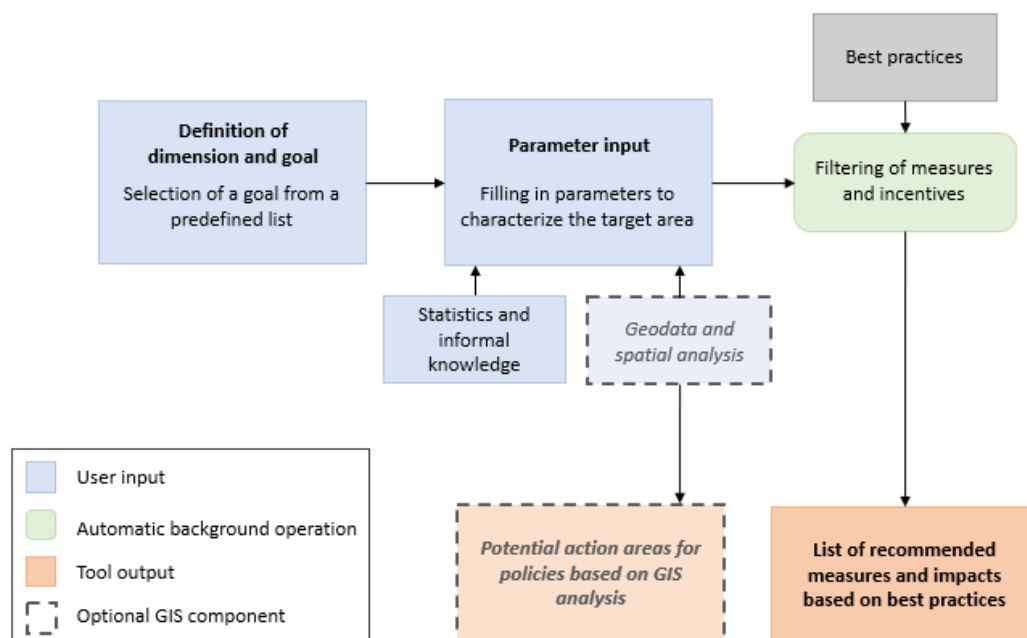


Figure 2: Overview of the structure of the SaMBA tool

At first, the user selects his interests from a list of different superordinate **dimensions**.

Based on the chosen dimension, the tool provides a second list of more **specific goals** the user can choose from. In the third step, the user provides **parameters** that characterize the target area based on demographics, transport infrastructure, mobility characteristics, etc. For each goal, a **list of measures along with best practices and impacts** is provided. Measures are derived from the SaMBA **Catalogue of Policies Impacts** (D.T1.2.2) and additional research.

The impacts of a measure are demonstrated based on best practice examples. Impacts can e.g. refer to changes in the modal split, decreasing number of cars, decreasing greenhouse

gas emissions, etc. Besides quantitative impacts also qualitative ones (e.g. health benefits) can be of importance.

For the case that no measure suits the target area, general suggestions (e.g. that it is required to improve the infrastructure before implementing behavior change measures) are provided.

d) Details on building blocks of the tool

Overview

Figure 2 provides an overview of the central building blocks **goals, parameters, measures/incentives** and **impacts** of the SaMBA tool.

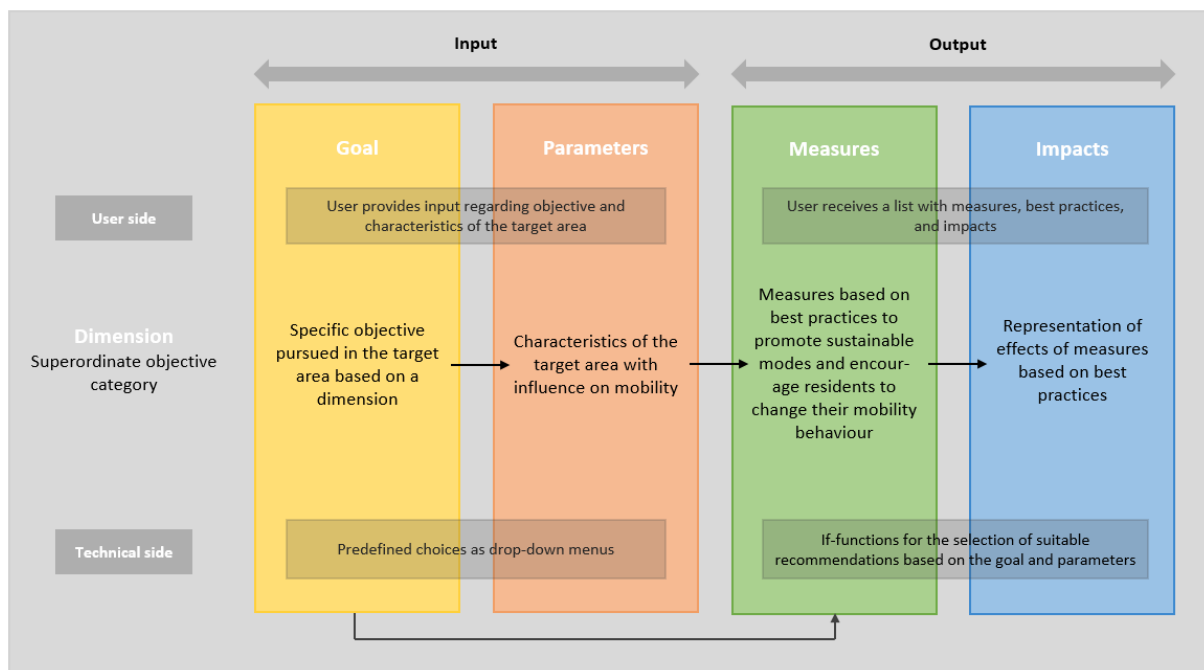


Figure 3: Central building blocks of the SaMBA tool

Goals

The main objective of the tool is the introduction of **measures and incentives that help to increase the share of sustainable forms of transportation and to promote climate and environmental protection**. Based on that, four relevant dimensions of mobility behavior change have been defined: **promotion of PT, promotion of active modes, promotion of multimodality and access and promotion of sharing systems**. Every goal included in the tool is assigned to one of these dimensions for better clarity and structuring. The first step for the users is the selection of the dimension they want to address. Based on this input, the tool automatically provides a list of the assigned goals to make the tool more user-friendly.

The dimensions and goals have been identified with the help of the following main inputs:

- Strategies on low-emission mobility and urban mobility of the European Commission
- Transport protocol of the Alpine Convention
- Mobility Concept of the Federal State Salzburg
- Climate and Energy Strategy of the Federal State Salzburg
- Austrian Traffic Master Plan
- Best practice examples (e.g. taken from the SaMBA Behavior change policies state of the art report)
- Planned SaMBA pilot actions

Figure 4 shows more details on the main objective of the tool and describes the dimensions and related goals.

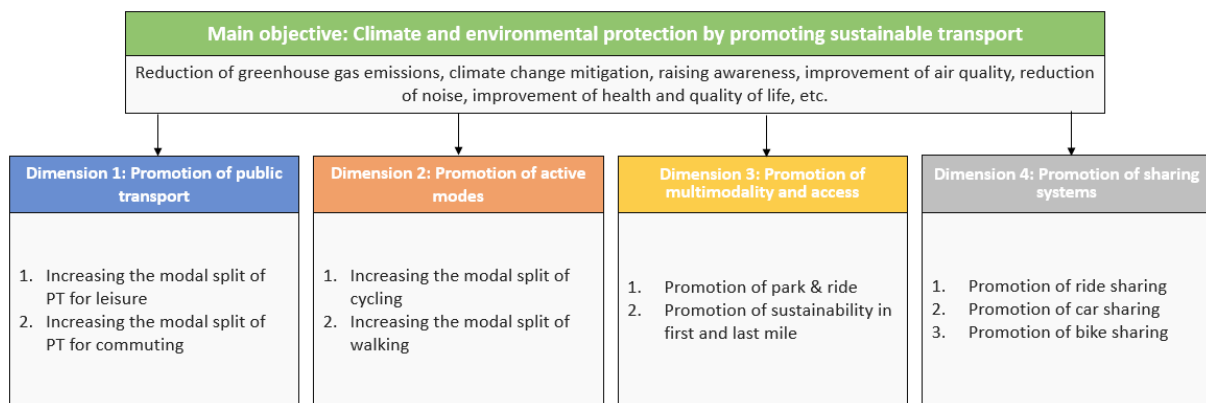


Figure 4: Predefined dimensions and goals for the SaMBA tool

The list of dimensions and goals does not have any claim to completeness. Additional aspects can be added if they arise during stakeholder contacts.

Parameters

Parameters are defined as **regional characteristics with influence on mobility**. They include topics like **infrastructure**, **demography**, **topography** and **settlement** and help to filter measures that are suitable for a target area (e.g. in terms of the presence of a specific target group or the presence of a sufficient PT infrastructure).

As a list of parameters, we use the following:

Parameter name	Categories
Type of the target area	Urban, suburban, rural
Topography	Flat, hilly, steep
Quality of footpaths and sidewalks (density of footpaths, presence of sidewalks, street lighting etc.)	High, medium, low
Quality of cycling infrastructure (density of bicycle lanes, presence of adequate bicycle parking facilities, street lighting, pavement quality etc.)	High, medium, low
Quality of public transport (frequency, vehicle type, persons living in walking distance to a public transport stop etc.)	High, medium, low
Presence of high commuter flows (in and out)	Yes, no
Presence of a university or a university catchment area	Yes, no
Presence of a primary school	Yes, no
Presence of a secondary school	Yes, no
Presence of a bike sharing system	Yes, no
Presence of a car sharing system	Yes, no
Presence of a park & ride system	Yes, no

Figure 5: List of parameters

Like the list of goals, this table of parameters does not have any claim to completeness and can be extended if additional parameters arise during the implementation phase.

To be more user-friendly, the tool only shows the parameters that are relevant for the goal that the user has chosen. The user is not obligated to fill in every parameter. However, with a larger amount of information, the list of recommended measures will be more tailored to the characteristics of the target area.

Parameter values can either be taken from internal sources such as municipal statistics and informal knowledge or it can be derived from a geographical analysis of the region, which can help to sharpen the input and consider areas beyond pre-defined borders.

Measures and incentives

In the context of the SaMBA tool concept, measures can be described as **policies that include an incentive/reward that motivates citizens to change their mobility behavior in favor of sustainable modes of transport**. Many of the best practices used as input for the SaMBA tool focus on the promotion of PT and cycling. Often a technical approach with mobile applications or other tools is used, but also gamification, toll collection/congestion charges and rewards for choosing a sustainable transportation mode are widespread approaches.

The tool at first provides a simple list of the recommended measures and incentives based on the goal and the parameter values. Further details regarding implementation and impacts can be seen when the user clicks on a best practice example.

A full list of best practice examples used for the tool is included in the annex of this document.

Impact

An impact of a measure demonstrates its **effect** with the help of an indicator. For the SaMBA tool, **quantitative impacts** are of major importance. Unfortunately, in most cases there are no specific studies on the impact and, therefore, no quantitative data. Therefore, also the **qualitative impact**, which can at least show a tendency, is presented.

The impacts of the measures and incentives can be described with the help of changes in the modal split. This is also a common approach in many existing best practice examples as they often aim at a modal shift from MIV to more sustainable transport modes. The amount of CO₂ saved by a measure is also an impact indicator that is frequently used. Some other examples are the amount of energy saved, the amount of car kilometers saved or the reduction of the traffic level. However, also health benefits (e.g. from walking or cycling) can be considered as important impacts.

Example

Figure 6 explains the interrelations of the building blocks with the help of a simplified example.

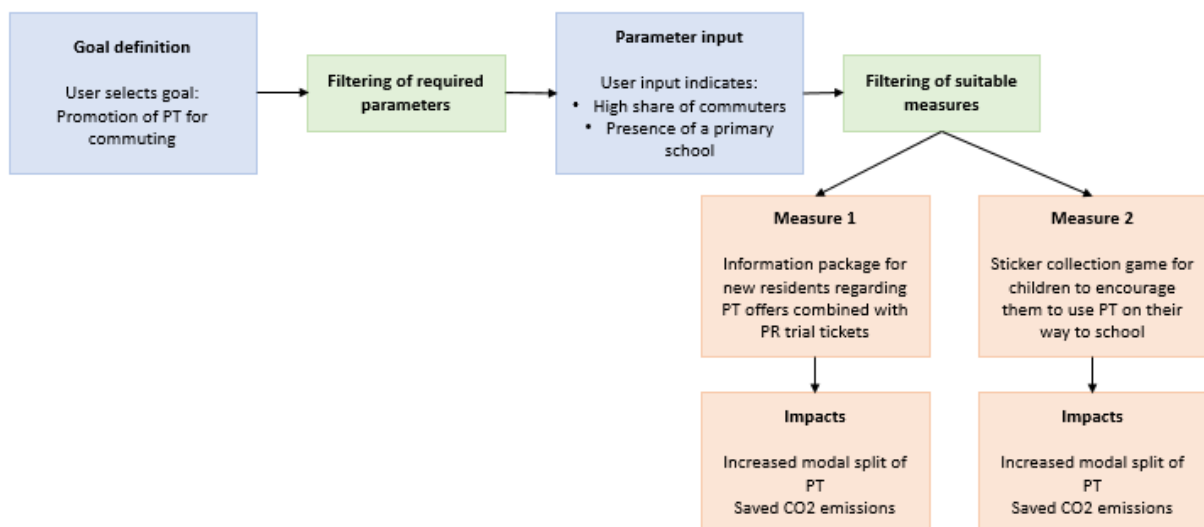


Figure 6: Illustrative demonstration of the relations between the building blocks

4. Implementation

a) Interoperability of the Samba excel tool and optional GIS framework

For improving and customizing the user input of the Excel tool, an **optional GIS framework** is developed. This framework includes GIS-based **methods for modelling the required input parameters in space**. Thus, all listed parameters, which have an influence on mobility and on the selection of measures and incentives within the Samba excel tool (comp. page 13), can be modelled and visualized in space. The GIS framework for modelling these spatial parameters

is based on **geo-data** and **spatial analysis methods**. The data basis includes spatial information on demography, topography, settlement structure, transport infrastructures and services, as well as commuter flows. Figure 7 shows the complementarity of the GIS framework for modelling spatial parameters and the list of required input parameters of the Samba excel tool. In summary, the implementation of the GIS framework allows the focus on smaller areas that are not integrated in official statistics. In addition, the data derived from the standardized analysis framework are a good basis for an argumentation in the decision-making process as spatial areas can be compared.

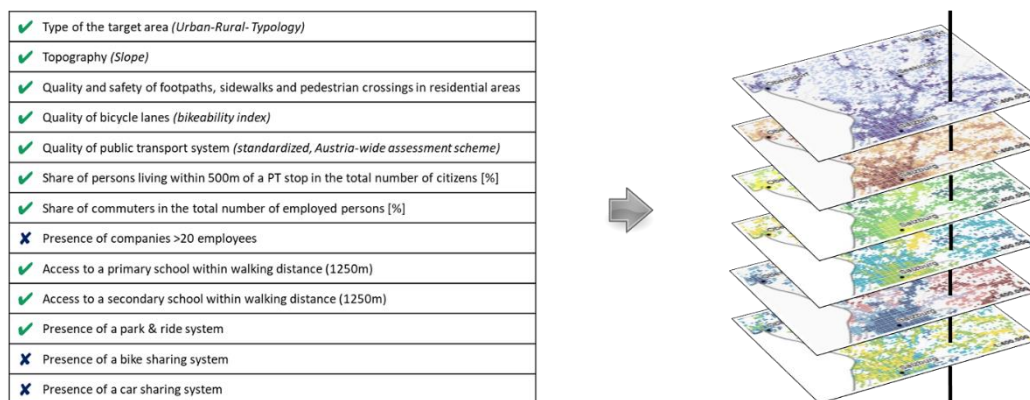


Figure 7: The GIS framework includes methods for modelling the parameters in space

The optional GIS framework includes also **methods for assessing the potential mobility demand and potential action areas for mode-specific mobility behavior change policies**. Routing algorithms, spatial statistics and analysis results are used to assess potential trip lengths and affected target groups and to localize hotspots of potential modes. Based on these information, potential action areas for specific mobility behavior change policies can be derived. Hence, this information supports the user of the excel tool by identifying the planning dimensions and goals (comp. Goals, page 12).

b) Implementation in Salzburg

The tool uses **database technologies** to filter and assess an existing list of measures with their according impacts in regard of local/regional circumstances. The result will be easy to read by providing a simple overview of the most suitable measures and including links to associated best practices. The input provided by the user can be based on statistics, estimations and regional knowledge or on the results of a detailed geographical analysis.

Excel offers the opportunity to implement the required components with the help of a matrix or if-functions. The dimensions and goals the user can choose from are implemented via dropdown menus. Parameter values can also be selected via dropdown menus.

A focus is set on the promotion of PT and cycling, as a great variety of measures related to these goals could be identified.

With the help of D.T1.5.1, **Guideline for implementing the Samba tool**, it will be possible for users with deeper Excel knowledge to make adaptations (e.g. by adding more dimensions, goals, parameters and measures) in order to cover additional thematic ranges or to make it suitable for specific requirements of a target region.

The optional GIS framework is implemented and tested in the Salzburg Region. Within the guideline, a manual will be integrated to guarantee that the GIS framework can be implemented by an expert in other regions, provided that the relevant basic data are available.

5. Outlook and future use

The tool can be used to ease the choice of suitable incentives and their applicability as a first step helping public authorities in planning their strategies to engage the public in choosing sustainable means of transport more often.

Future enhancements, especially by making use of geographical data, can also support the development of regional analytics to compare possible target areas for certain measures and the overall regional impact of the application of such measures especially if interconnected with traffic information, commuting traffic and calculating overall effects on modal split and CO₂.

In the long term, this may allow to simulate potential effects on congestion, occupancy of public transport and pollution or necessities to improve existing infrastructures when exporting the suggested impacts to a spatial dimension and using GIS methodology for further analyses and interpretation.

Furthermore, a combination and interlinkage with other tools is a potential further development.

6. References

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Annex: Overview of all implemented measures

Measure	Best practice	Goal	Spatial dimension	Description	Impacts	Link/contact
App for promoting sustainable modes in first and last mile	Green Miles	Promotion of sustainability in first and last mile	Urban, suburban, rural	The green miles mobile application is a free interactive tracking app and provides an incentive system, which consists of a credit system and a gamification approach. Users collect green miles by using sustainable modes, which can be used for discounts on train tickets or at sports shops.	The app has impacts on the modal split and on CO2 emissions.	https://www.wu.ac.at/entrep/kooperationen/bisherige-praxisprojekte/practiceproject/detail/detail/green-miles/
Awareness-raising among decision-makers	City Cycling+: Cycling for a Better Climate	Increasing the modal split of cycling	Urban, suburban, rural	CITY CYCLING+ aims at bringing the public in the district of Emmendingen, Germany to use the bicycle more frequently for daily mobility routines. The campaign focuses on making politicians and local decision-makers aware of the lack of safe cycling infrastructure by getting them on their own bikes. The district also uses the RADar! reporting platform, which is part of the campaign. Cyclists can report problems in the cycling infrastructure directly to the administration.	In the scope of the project in 2019, 280,7km were cycled and 40 tons of CO2 were avoided. 59 of 199 local parliamentarians participated. Including all participants, 7,9% claimed that they use their bike significantly more often. 32,8% stated that they use their bike slightly more often. In 2020, 4462 cyclists avoided 163 tons of CO2 by covering 1.109.769 km by bike. In 2020, the county also participated for the first time together with the twin municipality in France. The program furthermore contributes to a healthier lifestyle and reduced air pollution.	https://www.stadtradeln.de/alsace-centrale
Bicycle communication campaign	Radlhauptstadt München	Increasing the modal split of cycling	Urban, suburban, rural	This program promotes cycling in Munich with the help of a communication campaign including e.g. bicycle tours, bicycle safety checks, photoshoots, bicycle exhibitions and school activities.	The amount of trips by bike increased from 8.1% to 14% in 2 years, however with the help of an improvement in the cycling infrastructure. Many switches were from walking and public transport.	https://www.radlhauptstadt.muenchen.de/
Bike sharing discounts for students	CAMPUSbike	Promotion of bike sharing	Urban, suburban	This program includes bike sharing discounts in many cities in Germany. The offers depend on the city, but often they include a free rental for the first 30min.	No impacts documented yet	https://www.nextbike.de/de/campusbike/
Bike sharing discounts for train customers	ÖBB & Nextbike	Promotion of bike sharing Promotion of sustainability in first and last mile	Urban, suburban, rural	At many train stations in Austria, bike sharing offers including discounts for persons with a ÖBB Vorteils card (customer card) are available, which is also relevant for promoting sustainable mobility solutions in the first and last mile.	No impacts documented yet	https://www.oebb.at/de/reiseplanung-services/am-bahnhof/nextbike
Car sharing discounts	Car sharing discounts for students	Promotion of car sharing	Urban, suburban	The car sharing provider SHARE NOW offers discounts for students in several cities worldwide. This includes free registration, free parking and 5€ starting credit.	No impacts documented yet	https://www.studententarife.org/carsharing-fuer-studenten.html
Programs for pupils	STARS, Rewards in the MUV app	Increasing the modal split of cycling Increasing the modal split of walking	Urban, suburban, rural	The aim of STARS was to promote active mobility for journeys to and from school. It was carried out by partners from London, Edinburgh, Krakow, Budapest, Madrid, Milan, Brussels, Bielefeld and the Province of Noord Brabant. A website was set up where pupils could track their trips and compete with classmates and other schools across Europe. Furthermore, programs for primary and secondary schools were implemented. The first focuses on empowering primary schools to engage in active mobility. Schools could work their way up a scale from bronze to gold based on how strongly they promote active mobility. For secondary schools, a peer-to-peer engagement program was created. It empowered groups of pupils and gave them tools and ownership to develop, implement and monitor behavioral projects in their school. In Piedmont, Italy, a project on the development of sustainable mobility for home/school trips is implemented. The main objective is to reduce the use of cars through the experimentation of single user/community rewards managed by the mobile application MUV.	The STARS project resulted in a 5.7% modal shift from motorized to active modes in primary schools and a 8.8% modal shift in secondary schools. 894 tons CO2 could be saved in 2 years. The project from Piedmont also causes a modal shift and leads to a higher quality of life in a less polluted city.	STARS: http://starseurope.org/index.php Rewards in the MUV app: https://istitutovitone.it/it/index.php/19-la-scuola/793-progetto-samba
Charges for vehicles	London, Stockholm, Milan, Gothenburg, Singapore	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting	Urban	Charges are collected for driving a vehicle within a charged (inner city) zone. In London, Stockholm, Milan and Gothenburg, the charge is collected only on weekdays. In most cases, exceptions or discounts for residents or vehicles like taxis or buses are possible. In Singapore, every vehicle needs to be equipped with a device (In-vehicle Unit) for payment in order to be allowed to use priced roads.	In London, the charge led to a 20% reduction of vehicles subject to full charge and an increased share of public transport from 29% to 37%. MIV decreased from 46% to 36%. Additionally, positive effects on cycling could be detected. Also in the other cities, the traffic volume significantly dropped.	London: https://tfl.gov.uk/modes/driving/congestion-charge Stockholm: https://www.roadtraffic-technology.com/projects/stockholm-congestion/ Milan: https://www.comune.milano.it/aree-tematiche/mobilita/area-c#navpageinside Gothenburg: https://www.bloomberg.com/news/articles Singapore: https://development.asia/case-study/case-electronic-road-pricing

Collecting points for sustainable mobility behavior	TrafficO2	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting Increasing the modal split of cycling	Urban, suburban, rural	A mobile application provides challenges and information to promote sustainable transport. It was tested in Palermo. Routes are described according to the distance travelled, cost in €, CO ₂ , calories burned and O ₂ points (as credits). The app tracks personal sustainability goals based on the user's habits. The users can win prizes and discount coupons based on the O ₂ points.	In six months, 300 testers registered over 18.000km and saved 55kg CO ₂ .	www.traffico2.com
Commuter challenges for reducing traffic during peaks	MOBI	Increasing the modal split of public transport for commuting Increasing the modal split of cycling Promotion of ride sharing	Urban, suburban, rural	MOBI was implemented by partners from the Netherlands, Belgium, UK, Bulgaria, Romania and Portugal. It encourages a travel behavior change in order to reduce traffic during peak hours. The users get feedback and information on saved energy and play as a team competing against other teams to see how many sustainable trips are made each week.	The project resulted in an increased share of sustainable modes from 58% to 80% among participants and a reduced share of MIV from 65% to 42%. Public transport increased from 19% to 28%, cycling from 4% to 8% and carpooling from 5% to 16%.	http://www.mobi-project.eu/
Comprehensive car sharing offers	Car sharing all inclusive	Promotion of car sharing	Urban, suburban	The car sharing provider ELOOP provides all offers with free charging, free parking, included kilometers, etc.	No impacts documented yet	https://elooop.at/de/preise/
Encourage the use of carpooling in tourism	Carpooling and hitchhiking - A new way of moving	Promotion of ride sharing	Rural	This measure is implemented in a regional park in the Auvergne-Rhône-Alpes Region, France. The goal is to reduce the number of cars on the road by increasing the number of persons in per car by carpooling and hitchhiking services. To encourage the locals, communication tools and incentives were developed. Concerning the tourists, a network of hosts and tourism professionals is set up to create measures to make customers come to the park with alternative modes. Stories are built to show how visitors can come and move in the region without a car. The park is collaborating with organizers of cultural and sports events to encourage the public to use carpooling for coming to these events (reserved parking, gratification, etc).	The program increases the number of people per car and reduces the number of cars on the road, which also reduces car-related problems like noise, congestion and pollution. Carpooling leads to increasing social links and solidarity and improves the image of the territory.	https://www.rezopouce.fr/territoire/PNR_du_Vercors
Free bike sharing for pupils	Bike sharing in Stirling	Promotion of bike sharing	Urban, suburban	In Stirling, UK, pupils aged 14 and over get a free bike sharing membership for 12 months. The idea is to promote sustainable transport options starting from a young age to help to form habits that last a lifetime.	No impacts documented yet	https://www.nextbike.co.uk/en/news/stirling-schools-bike-share-scheme-is-uk-first/
Free cargo bikes	Grätzlrad Wien	Promotion of bike sharing	Urban, suburban	In Vienna, free cargo bikes can be booked online. Only a deposit is required.	No impacts documented yet	https://www.mobilitaetsagentur.at/jahresaktion/graetzlrad-wien/
Improvement of public transport and fare systems	Hospital 'Madre Teresa Di Calcutta'	Increasing the modal split of public transport for commuting	Urban, suburban, rural	The main focus of this program from the municipalities Monselice and Este in the Province of Padova, Italy is to improve public transport connections to the Hospital Madre Teresa di Calcutta. 5 pairs of journeys were moved to the Monselice train station in connection with the Padova-Bologna line. The program also includes a new reward/pricing scheme and an advertising campaign to promote the initiatives. The fare modification includes a new ticket at the cost of 1€ valid for 4 hours.	The project led to an increase of the use of public transport (276 transport users on 31 journeys with an increase by 33%). 20-25 students daily go to the hospital by bus after their train journey to the Monselice railway station. 140 transport users have the hospital as origin/destination (increase by 2.2%).	https://www.provincia.padova.it/samba-sustainable-mobility-behaviours-alpine-region-0
Incentives for residents to use less MIV	In motion program	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting Increasing the modal split of walking	Urban, suburban	This program was implemented in King County, Washington and provided residents with incentives to drive less and raised individual awareness on alternative travel options. Participants committed to change 2 trips per week from MIV to another mode for 12 weeks and for every successful week they received a voucher to purchase public transport tickets, biking and walking gear or gasoline for carpooling.	Participants reduced MIV trips by 24%. Most trips were converted from MIV to public transport (40%), but the program had also high positive effects on walking (25%).	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf
Including mobility offers in building projects	Building project Kendlerpark and refurbishment project Friedrich-Inhauser-Straße	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting Increasing the modal split of cycling	Urban, suburban, rural	The goal of this program is to foster sustainable mobility behaviour of new residents of new building projects in the City of Salzburg and to change the modal split. Following tools and information materials are conveyed: information and communication to citizens, awareness-raising (including an interactive cycling station, consulting services for the Salzburg transport app and a mobility consultation station), an information brochure and individual mobility advice for all interested residents. These activities are supported by incentives like brochures, but also financial ones like free tickets for the local transport and shopping vouchers. Further goodies include cloth bags filled with smaller incentives.	The project increases the usage of sustainable alternative modes and leads to a modal shift. It helps to reduce car-related problems like noise, pollution and congestion and contributes to an increase of contacts and social exchange between residents. Overall, this project contributes to an improvement of the quality of life in the city, a healthier lifestyle and the achievement of climate goals.	MMag. Gerhard Ainz SaMBA Project management City of Salzburg ainz@raumeval.at

Information as incentive	Mobility Info Package and testing of different incentives with MUV App	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting	Urban, suburban, rural	The main focus of the policies regarding a promotion of public transport in Munich, Germany and some municipalities nearby is on providing information as incentive and financial incentives/rewards as a supplementing motivation. It is based on an existing info package and relies on test results from the MUV mobile application competition which was organized to test the effectiveness of different incentives. Some ideas that might work in this context are discounts at stores, free public transport trial tickets or subscriptions, tickets for recreational facilities, partner public transport ticket and tax benefits for using sustainable modes. Some possible digital incentives and rewards are collecting points in an app for travelling sustainably or emotional incentives (e.g. smiley in an app when one buys a public transport ticket). What was also found to be very effective was an advertisement campaign, which targets the good conscience in people regarding environmental protection.	The project increases the use of public transport and its modal split and reduces car-related problems like pollution and congestion.	Münchner Verkehrs- und Tarifverbund GmbH (MUV)
Kilometer collection game for pupils and parents	Beat the street program	Increasing the modal split of walking	Urban, suburban, rural	Pupils and parents collect footsteps/kilometers for their class by tapping so called beat boxes with a chip card. The school with the most footsteps/kilometers collected during 6 weeks wins the contest. During the 6 weeks, prizes are given away. The progress of every player, team or school is recorded with the help of a website. This program originates from England, but was already carried out in other countries like Austria, where it took place in Vienna in fall 2017.	This program has an impact on health as it promotes physical activity in a playful way.	http://young-mobility.at/en/active-healthy
Offers for bike sharing	Bicing Barcelona, Call-a-Bike	Promotion of bike sharing Promotion of sustainability in first and last mile	Urban, suburban	The Barcelona Bicing system promotes the use of bike sharing by giving registered users the opportunity to use bikes without any extra cost for the first 30min. The German Call-a-Bike system, which is implemented in cities like Munich, Berlin, Cologne and Frankfurt, credits the registration fee towards the first rental invoice. Such approaches are also relevant for the promotion of bike sharing as a solution for the first and last mile.	No impacts documented yet	http://www.konsult.leeds.ac.uk/pg/59/
Offers for elderly/at-risk people	Cycling on referral scheme	Increasing the modal split of cycling	Urban, suburban, rural	A program from London includes a free 12 week long program for patients with a variety of health conditions including fixed appointments with professional cycle coaches and instructors. The key aspects are pre-activity consultations, possibility of free use of bikes during the first 4 weeks of training, group cycle rides, gym exercise programs as alternative and a post-program assessment. Within the scope of the SaMBA project, cycling is promoted among elderly people in Koper, Slovenia.	4 out of 10 participants in London. successfully took part, 3 of which have purchased a bike and one intends to. The benefits are improved mental and physical wellbeing, increased confidence to take part in physical activity and the ability to manage pain slightly better.	https://ec.europa.eu/transport/sites/transport/files/cycling-guidance/pasta_handbook_of_good_practice_case_studies_for_promotion_of_walking_and_cycling.pdf
Offers for new residents	Gscheid mobil	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting	Urban, suburban, rural	The city of Munich provides information for new residents about existing public transport offers to encourage them to try and eventually completely switch. Incentives are trial public transport tickets and trial public transport subscriptions.	The results of the pilot project from 2005/2006 showed that the share of public transport among the experiment group was almost 8% higher than the control group, while the share of MIV share among the experiment group was 3.3% lower than the control group. Furthermore, 700 tons of CO2 could be saved.	https://www.mvg.de/ueber/mvg-projekte/gscheid-mobil.html
Park & ride discounts	Special park & ride tariffs for rail customers	Promotion of park & ride	Urban, suburban, rural	At the train station in Worms, Germany rail customers receive discounted parking tickets on presentation of a valid train ticket.	No impacts documented yet	https://www.worms.de/de/web/parken/P-R--Park-and-Ride--Parkhaus-Am-Bahnhof.php
Park & ride marketing campaign	MIMOSA	Promotion of park & ride	Urban, suburban, rural	The MIMOSA project promoted park & ride with the help of posters, flyers, etc. Furthermore, shopping bags were given out to people using park & ride facilities to reward good behavior.	The project led to an increase in the number of sold park & ride tickets and helped to reduce the traffic volume by 4900 cars per month.	https://civitas.eu/sites/default/files/measure_evaluation_results_2_1_park_and_ride_facilities.pdf
Park & ride ticket as public transport ticket	Feinstaubalarm Stuttgart	Promotion of park & ride	Urban, suburban	In Stuttgart, for two car parks the parking ticket is also valid as public transport ticket.	This program helps to reduce the emission of particulate matter and decreases traffic volume.	https://www.stuttgart.de/feinstaubalarm/
Pop-up bike lanes	Pop-up bike lanes in Vienna	Increasing the modal split of cycling	Urban, suburban	In many cities worldwide, e.g. in Vienna, pop-up bike lanes recently were created due to the trend towards cycling caused by the COVID-19 pandemic. The goal is to create more room and a higher safety for cyclists and to evaluate the use of these pop-up lanes and use the results as a foundation for the establishment of permanent bike lanes.	The pop-up lanes generally are strongly frequented. On weekdays during peak times, over 400 cyclists per hour were counted on the new lanes in one street.	https://www.fahrradwien.at/2020/06/24/pop-up-bikelanes-gut-genutzt-von-wiens-rad-fahrenden/
Pricing strategies for parking	Park & ride in Amsterdam	Promotion of park & ride	Urban, suburban	In Amsterdam, parking is expensive in the city center. To promote park & ride, cheap offers in the suburban areas starting from 1€ per day (max. 4 days in a row) can be used when using PT for going to the city center.	No impacts documented yet	https://www.nach-holland.de/reisen/in-die-stadt/amsterdam/amsterdam-parkplaetze

Promoting public transport for events	Mit dem Zug zum Match	Increasing the modal split of public transport for leisure activities	Urban, suburban, rural	This program promotes journeys to sports competitions by train and has been initiated by the Salzburg Tennis Association. After the match, a communal meal with organic food is provided as a reward.	No impacts documented yet	https://mobilitaetsprojekte.vcoe.at/mit-dem-zug-zum-match?suchstr=belohnung
Promotion of carpooling among parents of school children	Carpool to school program	Promotion of ride sharing	Urban, suburban, rural	This program was implemented in Contra Costa, California. Ride matching brochures are distributed in schools and parents who submit a request receive a list of potential matches.	The program helped to reduce daily vehicle trips by 3612. The approximate amount of vehicle kilometers saved is 5.7 million.	http://www.konsult.leeds.ac.uk/pg/03/
Promotion of carpooling to work	Carpooling to Work Makes You Get a Lot	Promotion of ride sharing	Urban	The Department of Isère, France, has developed and opened an incentive platform to provide incentives for shifting to alternative mobility modes for everyday travels. It makes people gain points, which can be traded for rewards, gifts and commercial offers on the integrated online shop. In a new project, a new service of carpooling lines has been connected to the platform. This carpooling line concept includes a geo-located mobile app and live information of drivers arriving and passengers waiting. Drivers receive points for proposing seats in their car and additional points for every passenger picked up. Passengers also get points for every travel.	The project helps to reduce congestion and the numbers of cars on the streets. It also promotes environmental protection.	https://illicov.fr/ligne/bievre/
Promotion of public transport in touristic regions	Mobility in Gorenjska Region	Increasing the modal split of public transport for leisure	Rural	Main focus in Bohinj, Slovenia is to decrease traffic by personal cars from the lake shores in and to enable sustainable travelling to the starting points of the hiking trails. Sustainable touristic mobility is promoted by improving public transport, linking buses with hiking trails, hop on hop off systmes, regional public buses and skiing buses. Public passenger services are planned to be free for local residents and visitors are encouraged to leave their cars at P&R places. Furthermore, active mobility is promoted and traffic safety is improved. The municipality Tržič aims at lowering the peak-hour occupancy below 85% on all municipal parking spaces by the introduction of paid and short-term parking regimes.	The project helps to decrease the number of cars on the street and leads to a modal shift, especially in tourism. It also decreases emissions and pollution caused by traffic.	https://www.bohinj.si/en/mobility/
Promotion of walking to school	Walking bus	Increasing the modal split of walking	Urban, suburban, rural	A walking bus is a program for young children to walk to school together with volunteering adults as leaders. This walking bus follows a fixed route with several stops on the way. Children can receive small presents like stickers as a reward for walking. The idea originates from Australia, but walking buses have been implemented in many other counties like Germany, France, Italy, Austria, Switzerland, Luxembourg, the UK and Canada. Within the scope of the SaMBA project, they are implemented in Koper, Slovenia.	Walking buses help to promote traffic safety, health and contribute to the reduction of traffic volume.	General information: http://www.walkingschoolbus.org/resources.html Walking bus in Koper: http://www.etmkoper.si/pesbus.html
Rewards for avoiding peaks	MIMOSA, Spitsmijden	Increasing the modal split of public transport for commuting	Urban	In the MIMOSA project, Participants receive 4€ when they avoid main traffic axes roads during 6 and 10 AM. In the Spitsmijden program, commuters get rewards for avoiding car travel during peaks. They receive 7€ for avoiding the entire morning peak and 3€ for avoiding 7:30 to 8 and 9 to 9:30. The program was tested on the Dutch A12 motorway corridor from Zoetermeer towards The Hague.	The MIMOSA project helped to reduce the traffic volume between 500 and 700 cars during the morning rush hour in Utrecht. The Spitsmijden program led to a decline of total car-use from 70% to 65% mainly due to an increased use of public transport.	MIMOSA: https://civitas.eu/content/mimosa Spitsmijden: https://www.vtpi.org/spitsmijden.pdf
Rewards for car-poolers	Fahr mit	Promotion of ride sharing	Rural	This project initiates carpooling by creating ride-sharing stops. People searching for lifts need to stand at designated places marked with green arrows and wait to be picked up. Drivers are encouraged to participate with the help of rewards during the starting phase. This program was developed for the Tennengau area in the Austrian federal state Salzburg.	No impacts documented yet	https://mobilitaetsprojekte.vcoe.at/fahr-mit-2019?
Rewards for children using sustainable modes on the way to school	Traffic Snake Game	Increasing the modal split of public transport for commuting Increasing the modal split of walking Promotion of ride sharing	Urban, suburban, rural	This project was implemented in a great number of European countries. Children received a sticker for every day they walked, cycled, used public transport or shared a car journey to school. The goal was to collect as many stickers on a banner as possible. The children got rewards for reaching key points on the banner (e.g. no homework) and completing it (e.g. cycling tour).	The project led to a reduction of CO2 emissions and had the greatest impact on the modal split of walking with a total increase of 9% across the participating countries. Carpooling increased by 4% and public transport by 1%.	https://www.trafficsnakegame.eu/
Rewards for commuters going by bike	Cycling kilometer allowance	Increasing the modal split of cycling	Urban, suburban	Employees who commute to work by bike got a financial reward. They received 0.25€ per kilometre and up to 200€ annually. A pilot study was carried out in 18 French companies.	The program led to a 50% increase in the number of active cyclists, which rose to 125% after one year. However, most switches were from public transport, but also 20% switched from MIV and 9% from moped or motorcycle. 2.7 tons of CO2 could be saved in 6 months.	https://ec.europa.eu/transport/sites/transport/files/cycling-guidance/pasta_handbook_of_good_practice_case_studies_for_promotion_of_walking_and_cycling.pdf

Rewards for giving up the private car	MOBILIS	Promotion of car sharing	Urban, suburban	Participants received financial rewards for scrapping their personal car and using car sharing instead. This involved a bonus to be used within 2 years to cover costs related to kilometric consumption only. The program was implemented in Venice.	Besides the reward system, the project also included the improvement of the existing car sharing scheme. Altogether, it led to an increase of car sharing users by almost 50% and, thus, an increase of car sharing mileage.	https://civitas.eu/content/mobilis
Rewards for not using a parking space	Parking cash out program	Increasing the modal split of public transport for commuting Promotion of ride sharing	Urban, suburban	Employees are given the choice between a free parking space and cash. Parking cash out programs are e.g. implemented in California.	An analysis of 8 Californian companies shows that with the help of this program the modal split among participants decreased from 76% to 63%, while the modal split of public transport (6% to 9%) and carpooling (14% to 23%) increased.	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf
Rewards for sustainable mobility during holiday	Käse für Kilometeraskese, Sanfte Mobilität im Urlaub	Promotion of bike sharing	Urban, suburban, rural	The program Käse für Kilometeraskese is offered by a hotel in Mittelberg, Austria. Hotel guests leave their car keys at the reception and receive a free parking space, a free rental bike and a piece of cheese at the end of the holiday. Tourists arriving by train also receive a free rental bike. Furthermore, the use of the free Walser Bus is promoted. The program Sanfte Mobilität im Urlaub was offered by a hotel in Zell am See, Austria. The hotel offered to pick up guests at the train station and provided rental bikes. Every guest got a green mile pass and a present as a reward. At the end of the year, the guest with most green miles received a prize.	With the help of the program Käse für Kilometeraskese, between 8000 and 10000 car trips can be saved per year.	Käse für Kilometeraskese: https://mobilitaetsprojekte.vcoe.at/kaese-fuer-kilometeraskese Sanfte Mobilität im Urlaub: https://mobilitaetsprojekte.vcoe.at/sanfte-mobilitaet-im-urlaub
Rewards for using less cars per household	One less car program	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting Increasing the modal split of cycling Increasing the modal split of walking	Urban, suburban, rural	The goal of this program was for households to park one of their cars and use other modes instead. Participants received 85\$ per week as a compensation for recording their data and as an economic incentive. The program was implemented in Seattle with 86 households over a period of 6-9 weeks.	The program helped to reduce drive-alone car miles of participants by 27%. The mileage of cycling (38%), walking (30%), public transport (25%) and carpooling (23%) strongly increased.	https://www.nctr.usf.edu/wp-content/uploads/2014/11/77947_508.pdf
Voucher programs	Transit voucher program	Increasing the modal split of public transport for leisure activities Increasing the modal split of public transport for commuting	Urban, suburban	Third-party benefit administrators and/or transit agencies issue vouchers that riders give to participating transportation providers to acquire fare media. Employers may subsidized the costs of the vouchers to create an incentive to use public transport. Transit voucher programs are implemented in many US cities, e.g. San Francisco, Philadelphia and New York.	An analysis shows that commuter trips shifted by 20% from MIV to public transport.	https://www.nctr.usf.edu/wp-content/uploads/2013/12/77947.pdf